

RESEARCH NOTE

Relative impact of insecticidal applications on the parasitization activity of *Campoletis chloridae* Uchida, a parasitoid of *Helicoverpa armigera* in chickpea

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ABSTRACT

The impact of two insecticides were evaluated on the activity of *Campoletis chloridae* Uchida, a potential larval parasitoid of *Helicoverpa armigera* (Hubner) Hardwick for two years during 2011-12 and 2012-13 at College Agronomy farm, B.A. College of Agriculture, AAU, Anand. The schedule based application of flubendiamide 480 SC @ 0.01 per cent was relatively safer to this parasitoid and recorded higher per cent parasitism (19.47) in chickpea ecosystem.

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Chickpea (*Cicer arietinum* Linnaeus) is the most important pulse crop of India with its probable origin in South West Asia. Nearly 150 species of insect pests are known to attack pulse crops in India. Out of them, gram pod borer, *Helicoverpa armigera* (Hubner) Hardwick which attacks numerous crops of agricultural importance and is parasitized by *Campoletis chloridae* Uchida, *Banchopsis ruficornis* (Cameron), *Carcelia* sp. and *Eriborus* sp. (Srinivas and Jayaraj, 1989). Out of these, *C. chloridae* is known to be the most prominent throughout the country. Information regarding the per cent parasitization and the relative safer insecticides for the parasitoid is meagre and hence the present investigation was carried out at Agronomy farm, B. A. College of Agriculture, Anand Agricultural University, Anand, Gujarat during 2011-2012 and 2012-2013.

To record the effect of the insecticidal treatments on the activity of the parasitoids of the *H. armigera*, investigation was carried out at Agronomy farm, B. A. College of Agriculture, Anand Agricultural University, Anand, Gujarat during 2011-2012 and 2012-2013. For the purpose, 10 early instar larvae of *H. armigera* from the each treated plot were collected and reared in the laboratory. Fresh food was provided to larva

each day till the emergence of the parasitoids, if any and number of emerging parasitoids were observed and counted. The per cent parasitism by *C. chloridae* was recorded from the field collected early instar larvae of *H. armigera* from the each treatment replication-wise during both the years. Number of parasitoid emerged out from the larvae were recorded and thus, per cent parasitism was worked out.

The data presented in Table 1 (column 2) at parasitism due to *C. chloridae* for the year 2011-12 revealed that both the control plots *i.e.* one kept for schedule based (CS₁) and another kept for need (ETLs) based (CS₂) recorded significantly higher per cent parasitism (30.79 and 32.41, respectively). Among the insecticidal treatments, S₁I₁D₁ *i.e.* flubendiamide 480 SC @ 0.01 per cent on schedule based and S₂I₁D₂ *i.e.* flubendiamide @ 48 g a.i./ha on ETLs based recorded higher activity (19.47% parasitism) of *C. chloridae* on *H. armigera* and proved comparatively safer followed by S₂I₁D₂ (14.40%), S₂I₁D₁ (13.40%), S₂I₂D₂ (13.40%), S₁I₁D₂ (11.08%) and S₁I₂D₂ (11.08%). Fenvalerate 20 EC @ 0.01 per cent either on schedule based or on ETLs based strategy was found comparatively less safer to *C. chloridae* and recorded lower (9.98) per cent parasitism.

The activity of *C. chloridae* was also recorded during 2012-13 on *H. armigera* and the data are presented in Table 1 (column 3). The same trend was observed for the activity of parasitoid in control plots as it was observed during 2011-12 with significantly higher per cent parasitism (32.41 and 34.63% for CS₂ and CS₁, respectively). Among the insecticidal treatments (S × I × D), flubendiamide 480 SC @ 0.01 per cent on schedule based spray *i.e.* S₁I₁D₁ recorded the highest (19.47) per cent parasitism and proved safer, however, it was at par with S₂I₂D₁ (14.63). Rest of the insecticidal treatments were at par with each other and were found equally toxic to *C. chloridae*.

The data presented in Table 1 (column 4) pooled over years revealed that the activity of *C. chloridae* was comparatively higher and uniform in both the control (CS₁ and CS₂) plots. The chronological order of various treatments in comparison to control based on per cent parasitism on *H. armigera* by *C. chloridae* given in bracket was: CS₂ (33.51) > CS₁ (31.06) > S₁I₁D₁ (19.47), > S₂I₁D₂ (14.40) > S₂I₂D₂ (13.40) = S₂I₁D₁ (13.40) > S₂I₂D₁ (12.21) > S₁I₁D₂ (11.08) > S₁I₂D₂ (11.08) > S₁I₂D₁ (9.98). Flubendiamide 480 SC @ 0.01 per cent on schedule based application (S₁I₁D₁) was found significantly superior and recorded the highest activity of *C. chloridae*.

There was significant reduction in the activity of this parasitoid in the plots treated with fenvalerate 20 EC @ 0.02 per cent or 100 g a.i./ha either on schedule or on need based applications.

Looking to the past findings, Ameta and Bunker (2007) reported that there was not much adverse effect of flubendiamide 480 SC on the activity of *C. chloridae* on *H. armigera* in tomato. In the present investigation, the activity of this parasitoid was comparatively higher in chickpea plots treated with flubendiamide 480 SC. Thus, present finding tallies with the earlier report. So far fenvalerate 20 EC is concerned; it was proved comparatively less safe to *C. chloridae*. The moderate toxicity of the fenvalerate 20 EC was observed on the activity of *C. chloridae* earlier on *H. armigera* in chickpea (Reddy *et al.*, 1994).

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Table 1: Impact of insecticides on the parasitization of <i>Camponotus chloridae</i> Uchida on <i>H. armigera</i> in chickpea						
Treatments	Parasitism (%)					
	2011-12		2012-13		Pooled over years	
1	2		3		4	
S ₁ I ₁ D ₁	26.18b (19.47)		26.18b (19.47)		26.18b (19.47)	
S ₂ I ₁ D ₁	22.49bc (14.63)		20.45c (12.21)		21.47cd (13.40)	
S ₁ I ₁ D ₂	20.45bc (12.21)		18.42c (9.98)		19.44cd (11.08)	
S ₂ I ₁ D ₂	26.18b (19.47)		18.42c (9.98)		22.30c (14.40)	
S ₁ I ₂ D ₁	18.42c (9.98)		18.42c (9.98)		18.42d (9.98)	
S ₂ I ₂ D ₁	18.42c (9.98)		22.49bc (14.63)		20.45cd (12.21)	
S ₁ I ₂ D ₂	20.45bc (12.21)		18.42c (9.98)		19.44cd (11.08)	
S ₂ I ₂ D ₂	22.49bc (14.63)		20.45c (12.21)		21.47cd (13.40)	
Control (CS ₁)	33.70a (30.79)		34.70a (32.41)		33.87a (31.06)	
Control (CS ₂)	34.70a (32.41)		36.05a (34.63)		35.37a (33.51)	
ANOVA	S.E. ±	C.D. (P=0.05)	S.E. ±	C.D. (P=0.05)	S.E. ±	C.D. (P=0.05)
Treatment (T)	2.00	5.79	1.77	5.13	1.37	3.87
Year (Y)	–	–	–	–	0.59	Sign.
T × Year (T × Y)	–	–	–	–	1.88	NS
C. V. %	16.43		15.12		15.81	

Notes:

1. Treatment mean with letter(s) in common are not significant at 5% level of significance within column.
2. S₁: Schedule based spray; S₂: ETLs based spray; I₁: Flubendiamide 480 SC; I₂: Fenvalerate 20 EC; D₁: concentration(%); D₂: g a. i./ ha ; NS: Not significant at 5% level; Bet. Controls: between controls; CS₁: control for schedule based sprays; CS₂: control for ETLs based sprays; Sign.: Significant.
3. Figures outside the parenthesis are the arc sine transformed values, while those inside are retransformed values.

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