

Egg Parasitism of *Heliothis armigera* (Hb.) (Lepidoptera : Noctuidae) in Gujarat

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ABSTRACT

Studies on egg parasitism of *Heliothis armigera* (Hb.) were made during 1973-74 and 1974-75 by collecting *Heliothis* eggs from different host plants grown around Anand Campus. *Trichogramma chilonis* Ishii* was common in *Heliothis* eggs collected from all host plants except gram. The parasite exerted significant pressure on *Heliothis* infesting potato whereas it was not effective in lucerne. The parasite could not survive in gram fields probably because of an acidic secretion produced by the leaves.

(Received on 30th June, 1979)

INTRODUCTION

Heliothis armigera (Hb.) is an important polyphagous pest of economic plants. Parasites and predators attacking *H. armigera* on important crops at Anand were studied in order to promote the possibilities of its biological control. This paper records observations on egg parasitism of *H. armigera* on various food plants.

MATERIALS AND METHODS

Fortnightly collections of *Heliothis* eggs were made during 1973-74 and 1974-75 from tomato, potato, gram and lucerne fields around Anand. The eggs were held individually in glass vials for emergence of parasites. The data on parasitism on different host plants are presented in Table 1.

RESULTS AND DISCUSSION

The parasite reared from the eggs of *Heliothis* was identified as *Trichogramma chilonis* Ishii. This was recorded for the first time from *H. armigera* in Gujarat. *T. chilonis* was actively associated with *Heliothis* from October to April on various food plants. The parasitism, however, was low on tomato during the early part of the season (9.9 to 51.6% in 1973-74 and 5.4 to 19.2% in 1974-75) but it increased appreciably in the potato crop during February (98.2% in 1973-74 and 84.2% in 1974-75). In 1973-74 heavy rains during August and September amounting to 392 mm (in 19 days) and 427 mm (in 17 days) respectively seem to have affected the initial population of *Trichogramma*. Si-

*This species has hitherto been referred to in the literature as *T. australicum* Girault until the error was pointed out by Nagarkatti and Nagaraja (1979).

milarly, parasitism by *Trichogramma* on tomato during 1974-75 seems to have been affected by the drought conditions that prevailed. The total rainfall in this season was only 357 mm which was far below the normal rainfall of this tract (from 750 to 900 mm). Thus due to the effect of these two abnormal seasons, the true impact of *Trichogramma* as a biocontrol agent could not be assessed accurately.

T. chilonis played an important role in regulating *Heliothis* population on potato. In 1973-74, the population of *Heliothis* from 35 larvae/100 shoots in the second week of February came down to zero in the fourth week of March. Similar decline in *Heliothis* population from 24 larvae/100 shoots in the fourth week of January to 2 larvae/100 shoots was recorded in the second week of March during 1974-75. This decline was mainly due to high degree of egg parasitism by *Trichogramma* (98.2% in 1973-74 and 84.2% in 1974-75) and a larval parasite, *Camptetis chlorideae* Uchida (58% in 1973-74 and 48.5% in 1974-75).

Though parasitism of *Heliothis* eggs by *Trichogramma* was quite appreciable on potato and lucerne during both the years, it was not found to occur in *Heliothis* eggs laid on gram. This is being generalised from 456 *Heliothis* eggs collected during 1973-74 on different sampling dates (sample range 28 to 150) and 409 eggs collected during 1974-75 on different sampling dates (sample range 22 to 100). None of these eggs collected from gram was parasitised, which may either be due to

environment prevailing in the gram fields which are never irrigated and are isolated from other irrigated fields or due to the detrimental effects of an acidic secretion produced by gram leaves. The complete absence of *Trichogramma* in the gram fields and high degree of parasitism of *Heliothis* eggs on potato and lucerne during both the years seem to indicate that host plant and its growth conditions play an important role in attracting *T. chilonis*. Parsons and Ulyett (1936) recorded low degree of parasitism in *Heliothis obsoleta* Fabr. eggs on cotton by *Trichogramma lutea* Gir. This was attributed to the growth habit of the plant, the scattered manner of egg deposition and the impediment offered by the dense cover of hairy processes of the plant. Manjunath *et al.* (1970) have also reported similar observations in their work on *Trichogramma chilonis*. In their studies 5 to 80% of the *H. armigera* eggs laid on marigold and 2 to 20% eggs laid on niger were parasitised by *T. chilonis*. They also stated that egg parasitism on other plants growing in the adjacent fields was negligible. Todd and Lewis (1976) have also reported that growth habit of food plant had a marked effect on the percentage of parasitism of *Nezara viridula* (L.) by a tachinid, *Trichopoda pennipes* (F.) in soybean.

Activity of *Trichogramma* was reasonably high in lucerne in both the years (ranging from 0.0 to 47.5% in 1973-74 and 13.3 to 50% in 1974-75) and yet *Heliothis* could not be prevented from causing injury to lucerne. It is possible that the high

temperature (38.3° C) during the second week of April in 1974 and during the fourth week of March in 1975

(34.8° C) had adverse effect on the survival of the parasite.

TABLE 1

Extent of parasitism of *H. armigera* eggs by *T. chilonis* during 1973-74 and 1974-75.

Host Plants	Percentage parasitism in the fortnight													
	October		November		December		January		February		March		April	
	I	II	I	II	I	II	I	II	I	II	I	II	I	II
1973-74														
Tomato	9.9	11.8	8.8	11.1	16.0	18.0	48.7	51.6	22.6	0.0				
Gram					0.0	0.0	0.0	0.0	0.0	0.0	0.0			
Potato									84.2	98.2	71.0			
Lucerne									47.5	43.4	36.7	29.5	0.0	
1974-75														
Tomato	0.0	11.1	12.5	19.2	9.0	6.2	5.0	0.0	5.4	0.0				
Gram						0.0	0.0	0.0	0.0	0.0	0.0			
Potato						5.2	12.5	41.9	84.3	77.7	58.3			
Lucerne									42.2	50.0	34.4	32.5	13.3	

From the observations recorded in these two seasons, it can be generalised that *T. chilonis* was active throughout the period of activity of *Heliothis*. Maximum activity of the parasite was recorded during January and February. Due to the presence of adequate population of *Trichogramma* and possibly other parasites, *Heliothis* did not cause serious damage to potato but was quite serious on tomato, gram and lucerne. In view of the important role played by *Trichogramma*, its conservation in the potato fields is suggested. Similarly, it would be worth while obtaining egg parasites of *Heliothis* from the hotter parts of the country and releasing them against

Heliothis in Gujarat and testing their capacity in regulating the pest. It is reported that *T. chilonis* can survive the extreme conditions (summer temperatures more than 36° C) of Bangalore (Sudha Nagarkatti 1973).

ACKNOWLEDGEMENTS

The authors express their gratefulness to the Director, Far Eastern Regional Research Office, American Embassy, New Delhi, for financing the project from P.L. 480 funds. They are also thankful to Dr. R. M. Patel, the then Director of Campus, Gujarat Agricultural University, Anand Campus, Anand for providing facilities and to Dr. Sudha Nagarkatti for identifying the parasite.

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