

## FIELD RECOVERY OF *Eucelatoria bryani* ON *Heliothis armigera* (Hubner)

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Studies made on the field recovery of *Eucelatoria bryani* Sabrosky from *Heliothis armigera* Hubner indicated that there was effective parasitism from December to April to an extent of 20 per cent and emergence of adult flies was 9 from each parasitised larvae. The percentage of parasitism and emergence of adult flies were significantly high from the larvae of *Heliothis armigera* collected from tomato followed by redgram and Lab-lab. A positive correlation was found to exist between the number of larvae parasitised vs. percentage of parasitism as well as with the number of adult flies emerged. Regression equation fitted with the above variables showed that for every parasitised host larvae in the field, there would be an increase of 5.63 per cent parasitism and 3.73 adult flies emergence. These studies significantly revealed the practical utility of this parasitoid for effective parasitism on *Heliothis armigera* by mass multiplication and release in the field.

*Heliothis armigera* Hubner (*Lepidoptera Noctuidae*) is polyphagous and causes heavy damage particularly on pulses, cotton and tomato in the North western region of Tamil Nadu. The larvae of *Heliothis armigera* Hubner are known to be parasitised by an exotic larval parasite, *Eucelatoria bryani* Sabrosky. Earlier workers reported the biology and mass rearing technique (Jackson *et al.*, 1969), length of developmental period (Bryan *et al.* 1970), longevity and production of progeny (Bryan *et al.*, 1972), its super parasitism (Ziser *et al.*, 1979). In India, Sankaran and Nagaraja (1979) reared this parasitoid on *Heliothis armigera* Hubner. Sithanandam and Reed (1980) reported that this parasite was found to establish well on field populations of *Heliothis armigera* in Pigeon pea (*Cajanus cajan*) than in Chickpea, (*Cicer arietinum*). Studies on development of *Eucelatoria bryani* on different instars of *Heliothis*

*armigera* were carried out and 23.97 per cent of host larval mortality was observed (Mani and Sudha Nagarkatti, 1981). Pawar *et al.*, (1981) investigated the field recovery of *Eucelatoria bryani* from *Heliothis armigera* larvae in Karnataka and indicated the possibilities for establishment of this parasite on *Heliothis armigera* larvae for effective control of this pest under field condition. Hence it was contemplated to explore the possibilities for its effective parasitism on *Heliothis armigera* a case study was conducted around the Regional Research Station, Paiyur by periodical inundative release of this parasite and the results on the recovery of parasite are presented in this paper.

### MATERIALS AND METHODS

Cultures of *Eucelatoria bryani* Sabrosky were obtained from the National Centre for Biological control (Indian Institute of Horticultural Research) Bangalore, maintained in the

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Table 1: Data on the field release and recovery of parasite *E. bryanii*

Date of Release	Number released		Crop	Place	Date of collection	Field recovery		No. of Adults emerged
	Mated female flies	Parasitised larvae of <i>H. armigera</i>				No. collected	Per cent parasitised	
8-4-1982	23	25	Tomato	Manickanoor	19-4-82	10	—	—
17-4-82	25	24	—do—	Paiyur	28-4-82	10	—	—
18-5-82	75	20	—do—	Manickanoor	29-5-82	50	—	—
18-7-82	25	25	Lab. lab	Paiyur	29-7-82	20	—	—
20-7-82	30	15	—do—	—do—	1-8-82	20	—	—
28-7-82	20	20	—do—	Sappanipatti	7-8-82	20	—	—
2-8-82	15	25	—do—	Malaipayur	13-8-82	20	—	—
16-12-82	50	26	Redgram	Paiyur	27-12-82	20	1	5.0
23-12-82	50	25	—do—	Idaipaiyur	3-1-1983	20	3	15.0*
7-1-83	134	40	—do—	Paiyur	18-1-83	20	2	10.0*
8-1-83	60	20	Lab. lab.	—do—	19-1-83	20	2	10.0*
9-1-83	60	20	—do—	—do—	20-1-83	22	2	9.1*
10-1-83	60	20	—do—	—do—	21-1-83	18	1	5.5
12-1-83	30	30	—do—	—do—	23-1-83	10	1	5.0
25-1-83	100	25	Tomato	—do—	5-2-83	10	2	20.0*
25-3-83	100	25	—do—	—do—	5-3-83	16	2	12.5*
28-3-83	100	30	—do—	—do—	8-4-83	22	2	9.1*
31-3-83	50	24	—do—	—do—	11-4-83	10	1	10.0*
Total	904	439						
						Mean		6.7
						S.E. (±)		1.44
								4.77
								1.21

\* (Significantly high percentage of parasitism and number of adult emergence)

Table 2: Correlation coefficient and regression

Sl. No.	Variable	Correlation coefficient (r)	Regression equation
1.	Number of parasitised larva vs. percentage of parasitism	0.908**	$y = -0.23 + 5.63 x$
2.	Number of larva parasitised vs. percentage of parasitism	0.723**	$y = -0.85 + 3.73 x$

\*\* Significant at 1% level.

Table 3: Data showing the weather factors

Sl. No.	Period	Temperature in °C		Relative humidity (%)
		Minimum	Maximum	
1.	23rd December, 1982 to 11th April, 1983	20.3	27.9	90.1
2.	19th April 82 to 13th August, 82	26.3	32.2	61.7
Difference		10.3	4.3	+ 28.8

laboratory at  $28 \pm 1.5^\circ\text{C}$  and  $67.0 \pm 7.5$  per cent RH and reared on 4th and 5th early instar larvae of *Heliothis armigera* as described by Sankaran and Naçaraja (1979) and Mani and Sudha Nagarkatri (1981). For field experiments, mated females were kept in the laboratory for a week for pre-oviposition and a total of 904 mated female flies and 439 parasitised larvae of *Heliothis armigera* were released from April 1982 to March, 1983 in villages of Manichanoor Paiyur, Sapanipatti, Malaipaiyur and Edaipaiyur around Regional Research Station on lab-lab, tomato and redgram. Field recovery of the parasite was done by collecting the total number of larvae on each crop at 10 days interval, observing the number of parasitised larvae and percentage of parasitism was worked out. The parasitised larvae were kept in the laboratory and the number of adult parasites emerged out

of them was also recorded. Simple correlation coefficients between the number of parasitised larvae vs. percentage of parasitism as well as number of adult flies emerged.

## RESULTS AND DISCUSSION

The results of the experiments showed that there was no parasitism by the parasitoid from April 1982 to August 1982 while its parasitism on larvae of *Heliothis armigera* was found to range from 5.0 to 20.0 per cent and emergence of adult flies from 3 to 9 from each larvae during December to April, 1983 (Table 1).

The plausible explanation for this parasitism from 27th December, 1982 to 11th April 1983 may be due to reduction in maximum temperature (4.3°C) and maximum temperature (6.3°C) and increase in RH (28.8%) Table 3).

The percentage of parasitism was found to be significantly high in *Heliothis armigera* collected from tomato (20) followed by redgram (15) and lablab (10) while the emergence of adult flies from the parasitoid larvae of *Heliothis armigera* was in the order of tomato (18) redgram (12) lablab (10) (Table 1). The high preference of the parasitoid on the larvae of *Heliothis armigera* on tomato for its effective parasitism (24.0%) reported by Pawar *et al.*, (1981) under field condition is in agreement with the present findings. A positive correlation was found to exist significantly between the number of larvae parasitised vs. percentage of parasitism ( $r=0.908$ ), as well as with number of adult flies emerged ( $r=0.723$ ). Regression equation fitted with the number of larvae parasitised and percentage

of parasitism is  $\hat{Y} = 0.23 + 5.63x$  exhibiting that for every parasitised larvae in the field, there would be an increase of 5.63 per cent parasitism. The regression equation fitted with the number of adult flies emerged is

$\hat{Y} = 0.85 + 3.73x$  predicting that for every parasitised larva in the field, there would be an increase in number of emergence of parasitic flies by 3.73 (Table 2).

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