

Seasonal Parasitization and Carryover of *Epiricania melanoleuca* Fletcher, an Ectoparasite of *Pyrilla perpusilla* Walker, under Arid Conditions

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Abstract The seasonal activity of parasitoid, under arid conditions starts on nymph pyrilla, infesting ratoon crop of sugarcane in March. The peak parasitization of adult host was observed during October. The parasitization declined in subsequent months and in December, only traces of parasitised hosts were noticed. Carryover of parasitoid was through over-wintering eggs and cocoons (Pupae).

Key words Parasitization, Carryover, *Pyrilla perpusilla*, Sugarcane, Arid condition

Epiricania melanoleuca Fletcher has been an effective bio-control agent in integrated pest management of sugarcane leaf hopper *Pyrilla perpusilla* Walker. The parasitoid remains active on *P. perpusilla* from April to November (Bindra & Brar 1978). Brar (1978) observed this parasitoid as a key mortality factor for second and third generations of *P. perpusilla* in Punjab. No work is on record for seasonal parasitization and carryover of the parasitoid under arid conditions. Therefore, seasonal parasitization by *E. melanoleuca* on *P. perpusilla* and its carryover after overwintering, under arid conditions of north-western Rajasthan were studied.

Materials and Methods

The seasonal parasitization by *E. melanoleuca* on *P. perpusilla* was observed for two successive years on planted crops (1981-1982) and their successive ratoon crops (1982-1983) of sugarcane. The observations were recorded on three locations having different cropping pattern and rotations at Agriculture Research Station (Cotton-fallow-Sugarcane-ratoon-zaid pulses), the Ganganagar Sugar Mills farm (Sugarcane-ratoon-Sugarcane-ratoon-fallow) and village (Cotton-fallow-Sugar-

cane-Ist year ratoon-IIInd year ratoon). The fields at each locations were divided into 8 blocks (1200-1500 m²) and five fixed observational units 9 m² (each) were randomly selected. Parasitization was recorded on adult and third instar and on ward nymphs of *P. perpusilla* on nine leaves per observational unit by visual counting.

The carryover of *E. melanoleuca* through overwintering eggs and pupae (Cocoons) was studied separately. For these studies 10 egg masses in three replicates were obtained from (i) laboratory culture in last week of October to second week of November and (ii) sugarcane fields, in the last week of January. Individual egg-mass was kept in Petri dishes at room temperature and observed at weekly intervals for their hatching.

Extent of carryover of parasitoid was worked out under laboratory conditions in batches, each containing 25-30 live cocoons obtained from laboratory culture during second fortnight of November. For field studies, cocoons exposed to cold months (December-January) were collected from sugarcane fields in last week of January and placed in 9 glass troughs each containing 200-250 and 185-250 cocoons, during 1983 and 1984, respectively. The adult emergence from these

Table 1 Seasonal parasitization (%) of pyrilla by *Epiricania melanoleuca* Fletcher in planted and ratoon crops of sugarcane.. (Mean of 3 locations).

Months	% Adults Parasitized			
	1981	1982		1983
	Planted crop	Planted Crop	Ratoon crop	Ratoon Crop
Jan	-	-	-	-
Feb	-	-	-	-
Mar	-	-	T (0.6)	T (1.0)
Apr	-	-	3.9 (5.3)	4.7 (4.5)
May	-	-	3.5 (2.3)	5.3 (3.7)
Jun	-	-	- (-)	- (-)
Jul	1.5 (T)	2.6 (T)	4.1 (2.9)	4.6 (2.6)
Aug	3.2 (1.8)	7.1 (5.7)	19.9 (32.6)	25.7 (23.9)
Sep	15.5 (13.7)	16.9 (16.4)	33.4 (30.4)	33.9 (43.6)
Oct	22.8 (20.2)	26.6 (31.0)	47.9 (35.8)	52.2 (52.1)
Nov	10.3 (12.6)	14.8 (25.3)	19.6 (25.6)	23.5 (30.2)
Dec	T	T	T	T

'T' denotes traces of parasitization.

Figures in parenthesis indicates % nymphs parasitized

cocoons were recorded at weekly intervals, upto first week of May.

Results and Discussion

Seasonal parasitization

The activity of *E. melanoleuca* was first noticed in March (Table 1) on pyrilla nymphs infesting ratoon crop of sugarcane with a mean parasitization of 0.6 and 1.0% during 1982 and 1983, respectively. In pre-monsoon months, both adults and nymphs of pyrilla were parasitized maximum to the extent of 5.3% (April, 1982 & May, 1983). No parasitized hosts were recorded in June. The activity of parasitoid was resumed with the on-set of monsoon, in July when 4.1% and 4.6% adults and 2.9% and 2.6% nymphs were parasitized during 1982 and 1983, respectively, on ratoon crop of sugarcane. On planted crop 1.5% and 2.6% adults were parasitized in respective years. The parasitization of both nymphs and adult

hosts, in planted as well as ratoon crop, during August and September, recorded an increase. The peak of parasitoid activity coincided with the peak population of feeding stages of host on ratoon crop. The parasitization declined in subsequent months.

Carryover of parasitoid

The overwintering eggs, kept in laboratory, under room temperatures, started hatching from February 7 and continued till the week ending March 14 (Mean hatching 15.1%). The eggs exposed to field conditions upto January end, hatched a week later and continued upto the week ending March 21 (mean hatching 9.2%). Maximum hatching in both set of conditions were during the last week of February (Table 2).

The mean adult emergence of *E. melanoleuca* from live cocoons, kept at room temperatures, during December to mid April was 36.3% (Table 2). A mean of 7.7% cocoons, collected from fields

Table 2 Carryover of *E. melanoleuca* through overwintering stages

Particulars	1982-83		1983-84	
	Field	Lab.	Field	Lab.
Overwintering Eggs				
Period of egg laid/ collected	22-28 Jan 83	2-8 Nov 82	19-25 Jan 84	27 Oct. - 10 Nov 83
Mean No. of eggs/egg mass	445.6	425.2	422.0	344.8
Mean no. of eggs hatched	41.1	66.3	38.5	51.2
per cent carryover through eggs	9.5	15.5	8.9	14.8
Overwintering Pupae (cocoons)				
Period of cocoons collected	23-30 Jan 83	4-14 Dec 82	23-31 Jan 84	2-13 Dec 83
Mean no. of cocoons observed	216.7	25.0	242.8	30.0
Mean no. of cocoons harbouring pupae	18.7	25.0	16.7	30.0
Mean % cocoons harbouring pupae	8.6	100.0	6.7	100.0
Mean no. of adult emergence from pupae	5.7	9.8	6.3	10.4
Adult emergence/carryover through cocoons harbouring pupae(%)	30.7	39.1	28.7	34.8
Carryover through cocoons laying in field exposed to weather conditions(%)	2.6	-	2.2	-

(exposed to cold weather conditions of December-January) were harbouring pupae. The mean adult emergence from these cocoons was 29.7% and as such only 2.4% of the overwintering cocoons laying in trash, contributed to the carryover of parasitoid. The present studies indicate that the carryover of parasitoid can be increased by preserving the overwintering eggs and cocoons, at room temperatures during the cold months of December-January.

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