J.Biol.Control, 4 (1), 15-17, 1990

Control of Sugarcane Pyrilla by *Epiricania melanoleuca* (Fletcher) (Epipyropidae : Lepidoptera) in Puri District of Orissa

N.C.PATNAIK[1], J.N.MOHANTY, B.K.MISHRA and M.K.GHODE[2]

Department of Entomology, Orissa University of Agriculture and Technology

Bhubaneswar 751003

ABSTRACT

The seasonal activity and suppressive action of *Epiricania melanoleuca* (Fletcher), a nymphal-adult parasite of *Pyrilla perpusilla* (Wlk.) was studied in an endemic cane growing village of Puri district (Orissa) where the parasite had been introduced against the pest. Peak pyrilla activity was observed in the second fortnight of September whereas, the parasite activity reached its peak activity with a time lag of one month. The parasite:pest ratio which was 1 : 64 in the second fortnight of August, declined to 1 : 0.25 in the second fortnight of October, implicating the suppresive role of the parasite over the pest.

Key Words : *Pyrilla perpusilla*, nymphal - adult parasite, *Epiricania melanoleuca*

Sugarcane pyrilla, *Pyrilla perpusilla* (Walker) has been causing ravage to sugarcane in Khurda and Nayagarh and subdivisions of Puri district (Orissa) since 1984. A large number of insect parasites, predators, spiders and pathogens attack pyrilla in nature and check its populations (Butani, 1972; Pawar, 1979). Among this wide array of natural enemies, *Epiricania melanoleuca* (Fletcher) (Epipyropidae : Lepidoptera) is dominant. In 1979, the Directorate of Agriculture, Orissa (Plant Protection Unit) made an attempt to control pyrilla by introducing 110 cocoons and 16,000 eggs of *E. melanoleuca* which did not establish in the area of release. Under the aegis of the Central Biological Control Station, Bhubaneswar (Directorate of Plant Protection, Quarantine and Storage), a fresh attempt was made in 1985 by releasing *E. melanoleuca* in the following pyrilla endemic villages, viz., Sanakumari, Gadadharprasad, Itamati, Bengadia, Badasa, Sukhalgadia, Gunthuni, Champatipur, Golasahi, Sarapada and Badakumari of Khurda and Nayagarh subdivisions. Till 1987, 46,605 cocoons and five million eggs of the parasite have been released in these areas.

MATERIALS AND METHODS

During 1987-88 a critical study was undertaken in one such endemic village, Sanakumari (62km from Bhubaneswar) by the Department of Entomology, Orissa University of Agriculture and Technology, Bhubaneswar to know the seasonal activity and suppressive effect of the parasite on the host.

The activity of the host and the parasite was traced in the field throughout the crop season. Ten sugarcane Plants were selected at random from each infested field (0.25 ha) and replicated over 4 such fields in the adjacent patch. From each Plant, the hopper and parasite population (egg mass + nymph + adult/egg mass + cocoon + adult) were recorded. The observations were recorded at fortnightly intervals from July, 1987 through January, 1988 when the crop was finally harvested.

1. OUAT Research Station, Post Box-10, Sunabeda-2, Koraput (Orissa)
2. Central Biological Control Station, Lewis Road, Bhubaneswar (Orissa)

Meteorological data for the period of study were gathered from the village.

RESULTS AND DISCUSSION

Pyrilla population was mostly distributed on the second to sixth leaf from the top. Particularly the fourth leaf harboured the maximum hoppers (20.3 hopper/leaf) followed by the third (17.9 hoppers/leaf) and fifth leaf (9.2 hoppers/leaf). Parasite population followed suit according to the spread of the pest.

Studies on the seasonal activity of pyrilla vis-a-vis its most important natural enemy, *E. melanoleuca* revealed that in the month of June the pyrilla population was at its low ebb. The accelerating phase of the pest started from early July and the population continued to increase at a faster rate from the second fortnight of July reaching its peak (598 hoppers/50 leaves) in the second fortnight of September (Table 1). After that there was a slow decline in the population and from the first fortnight of October, an abrupt decline of population was noticed (Fig. 1).

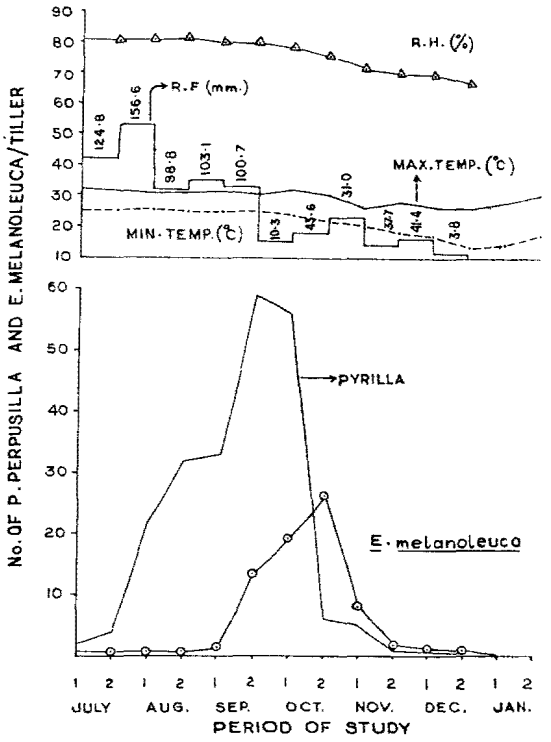

Fig. 1 Population fluctuation of pyrilla and *E. melanoleuca* in relation to meteorological parameters in the sugarcane fields of Sanakumari village (Puri district, Orissa)

Table 1. Seasonal activity of pyrilla and *Epiricania melanoleuca* in Sanakumari of Puri district (Orissa)

Month	Fort night	No.of hoppers/10 tillers (50 leaves)				No.of *Epiricania*/10 tillers (50 leaves)			Parasite : host ratio
		Egg mass	nymph	adult	Total	Egg mass	cocoon	Total	
Jul., 1987	I	1	9	10	20	—	1	1	1 : 20.00
	II	2	20	25	47	—	2	2	1 : 23.50
Aug., 1987	I	3	191	27	221	—	2	2	1 : 110.50
	II	—	248	80	328	—	2	2	1 : 164.00
Sep., 1987	I	2	170	161	333	7	5	12	1 : 27.75
	II	17	179	402	598	43	95	138	1 : 4.33
Oct., 1987	I	7	220	336	563	20	169	189	1 : 2.98
	II	—	26	42	68	47	221	268	1 : 0.25
Nov., 1987	I	4	52	2	58	8	78	86	1 : 0.67
	II	—	2	2	4	—	79	79	1 : 0.21
Dec., 1987	I	—	3	—	3	—	16	16	1 : 0.18
	II	—	2	—	2	—	11	11	1 : 0.18
Jan., 1988	I	—	—	—	—	—	—	—	—
	II	—	—	—	—	—	—	—	—

The parasite activity started from the first fortnight of September and reached its peak in October second fortnight (268 parasites/50 leaves) with a time lag of one month from the peak incidence of the pest.

It was interesting to note that the rainfall from July to September was 621mm which helped pyrilla to trigger off its activity. Morever, the cane crop was more succulent due to the humid weather which helped the pest to breed prolifically.

The decline in pest activity from the second fortnight of September was attributed to the following factors. In the first place, the parasite multiplied unbridled, overtaking the pest population. The pest was also affected by the recession of south west monsoon from October. Moreover, food supply to the pest became a constraint for its rapid breeding as sugarcane plants approached maturity (Fig. 1).

A further analysis of data on parasite: host ratio revealed that from the second fortnight of October, the parasite population was already at a higher plateau than that of the pest. For instance, during the second fortnight of August, the parasite:pest ratio was 1 : 164 whereas, it declined to 1 : 0.25 in the second fortnight of October (Table 1). As there was a sharp decline in the population of the host from the first fortnight of October, the parasite did not get sufficient food for feeding and breeding. That was responsible for the parasite to decline.

Correlation studies between climatic parameters vs. pest revealed that there was positive correlation between temperature, R.H. and rainfall in one hand and pyrilla activity on the other whereas, parasite activity being host dependent did not show significant correlation with the climatic factors (Table 2).

Butani (1964) and Agarwal and Butani (1976) reported that intermittant rain followed by long dry spells during July to August accelerated pyrilla multiplication. The present observation is in conformity with the above reports as pyrilla activity was intense from July to September. Pawar (1979) reported that *E. melanoleuca* was active when parasite : host ratio exceeded 1 : 37 during September - October. In the present study, the parasite : host ratio was 1 : 164 in the second fortnight of August which dropped to 1 : 0.25 in the second fortnight of October confirming the above report.

Table 2. correlation between meteorological parameters vs. pyrilla and parasite activity

Weather parameters	Correlation coefficient (r)	
	Pyrilla activity	Parasite activity
Max. temp.°C	0.465 (n.s.)	0.188 (n.s.)
Min. temp.°C	0.607 *	0.176 (n.s.)
Mean temp.°C	0.615 *	0.070 (n.s.)
R.H. (%)	0.636 *	0.116 (n.s.)
Rainfall (mm)	0.638 *	0.229 (n.s.)

- Period of study : July, 1987 to January, 1988
* Significant at P = 0.05, n.s. = not significant

ACKNOWLEDGEMENTS

The authors are grateful to Dr. M.P.Mishra, Asst. Director, C.B.C.S., Gorakhpur for kindly supplying the initial cultures of the parasite.

REFERENCES

AGARWAL, R.A. and BUTANI, D.K. 1976. Sugar cane leafhopper and its control. *Cane Grower's Bull.*, **1**, 3.

ANONYMOUS, 1987. Annual Report, Central Biological Control Station, Bhubaneswar.

BUTANI, D.K. 1964. Sugarcane Leafhopper, *Pyrilla perpusilla,* (Wlk.)-a review. *Indian Sug. J.*, **9**, 60-75.

BUTANI, D.K. 1972. Parasites and predators recorded on insect pests of sugarcane in India. *Indian Sug.*, **22**, 17-31.

PAWAR, A.D. 1979. Sugarcane pyrilla and its biological control. *Plant Prot Bull.*, **13**, 137-163.