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POPULATION DYNAMICS OF *PYRILLA PERPUSILLA* WLK. AND ITS PARASITE *EPIRICANIA MELANOLEUCA* FLETCHER AT FAISALABAD

Zubair Ahmed Rana*, Muhammad Masud Mahmood** and Ali Asghar Hashmi***

ABSTRACT: Studies on the population of *Pyrilla perpusilla* walker and *Epiricania melanoleuca* Fletcher were carried out at Faisalabad during March, 1987 to December 1987. Population of Pyrilla appeared in March, April and April while parasite in May, April and April at Ayub Agricultural Research Institute, Faisalabad, chak No.6/JB and chak No.109/RB, respectively. Peak population of pyrilla and epiricania were recorded during August. Population of parasites were found to be increasing in proportion to that of its host. Highly positive correlations were found between the population of pyrilla and epiricania. The percentage parasitism ranged was recorded from a low level of 4.16 - 64.74, experimental areas respectively.

Key Words: Pyrilla perpusilla; Epiricania melanoleuca; Parasitism; Nymphs; Adults; Cell Sap; Growth; Pakistan.

INTRODUCTION

Pyrilla perpusilla Walker, sugarcane leafhopper appeared periodically as a destructive pest of sugarcane in Pakistan but was distributed throughout India. Both the nymphs and adults sucked the cell-sap from the underside of the leaves. Due to this leaves turned pale yellow and later on dried up. This ultimately affected the growth of the cane (Atwal, 1976). Pawar (1981) recorded 5.5 individuals (nymphs and adults) per leaf and 20-60% of the adults were found parasitized on rice crop. There were a number of natural enemies of *P. perpusilla* and among them, *Epiricania melanoleuca* was considered to be the most important parasite of the nymphs and adults of this pest as reported by Misra and Pawar (1981). Misra and Pawar (1982) did not reveal the presence of ectoparasite of pyrilla in September. Mohyuddin et al. (1982) reported that at Faisalabad population of *P. perpusilla* at first appeared in April and continued to increase till July, decreased thereafter, and was at its minimum in November and December. They also reported that *Epipyrops melanoleuca* became active in April and its incidence increased gradually in August and September, with peak in October and then declined in November. Garg and Sathi (1983) found the adults of pyrilla in March on paddy crop. Wajih and Sulaiman (1983) noted that pyrilla adults started appearing from the end of March and continued till July-August and parasitism during July-September ranged from 30-80%. Mote (1984) recorded 23-112 adults of pyrilla/plant of *rabi* sorghum, peak was in November and nymphal parasitism was 8% in October and reached a peak of 40% in December and the fall in temperature contributed to the rapid decline of *Pyrilla perpusilla* in mid December. Population of pyrilla was highest (91.88 individual/leaf) in July and lowest in October-December as reported by Gholap and Ghandele (1985). Gupta et al. (1971) found that parasite population increased in proportion to that of the host but contributed little to the actual control of pyrilla outbreaks. Garg and Sathi (1982) found that %age parasitism by this parasite increased with the increase in pest population. Khan (1988) recorded mean parasitism of nymphs and adults ranged from 17.92 – 29.44% and 14.21 – 25-41% respectively. He also observed that fluctuations in parasitism were attributed to weather conditions and pest population. Natural parasitism of pyrilla

* *Ayub Agricultural Research Institute, Faisalabad, Pakistan.*
** *Potato Programme, National Agricultural Research Centre, Islamabad, Pakistan.*
*** *National Agricultural Research Centre, Islamabad, Pakistan.*

was found to be 0- 66.67% in nymphs and 2.40-63.42% in adults during July to August, 1988 as reported by Anonymous (1989). Patnaik et al. (1990) observed peak population of pyrilla activity in 2nd fortnight of September, whereas the Ectoparasite reached its peak activity with a time lag of one month. Arshad and Hashmi (1991) recorded that peak population of sugarcane leaf hopper nymphs occurred in the third week of August which tremendously decreased later. While maximum adult population was found during fourth week of August. Joshi and Sharma (1992) held the view that peak parasitism of the pyrilla was observed in October (47.9%) declining to December when very few parasitised hosts were observed.

The research efforts of the previous workers in Pakistan have mainly been confined to the study of biology and effective control measures of pyrilla but locality specific work on the population of pyrilla and its parasite is much needed. Therefore, the present investigations were undertaken at Faisalabad to fill in this lacuna.

MATERIALS AND METHODS

The population of *Pyrilla perpusilla* Wlk. and *Epiricania melanoleuca* Fletcher, was recorded at fifteen days interval from three fields of sugarcane (variety L-118) selected at three different localities in Faisalabad District during 1987. The fields were selected at Ayub Agricultural Research Institute, Faisalabad (AARI), at chak No. 6/JB and at chak No. 109/RB. Populations of nymphs and adults of pyrilla were recorded per leaf basis from 75 randomly selected leaves from each field. Cocoon population of *Epiricania* was recorded on per plant basis from 75 randomly selected plants from each field and %age parasitism was also calculated. The correlation coefficient between pyrilla and its parasite was also calculated statistically. Population of *P. perpusilla* and *E. melanoleuca* have been presented in Figures 1, 2 and 3.

RESULTS AND DISCUSSION

It was evident from Table 1 that at AARI pyrilla population appeared in the second

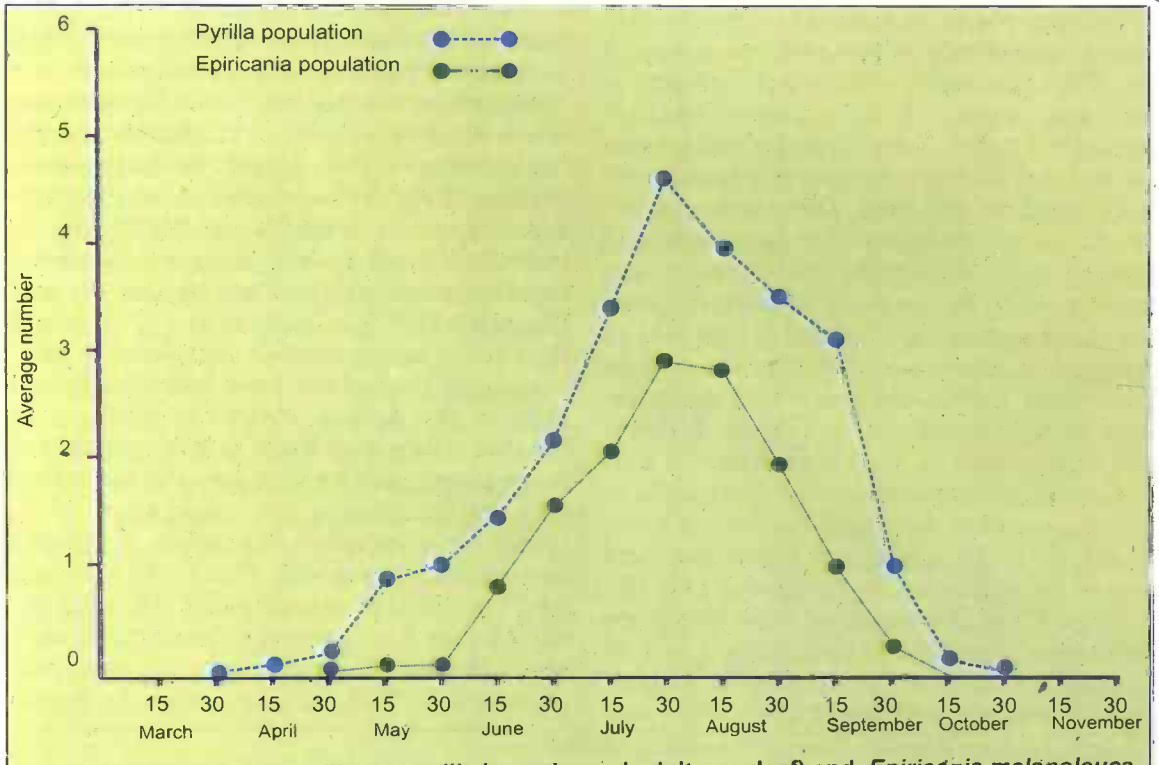

Figure 1. Population of *pyrilla perpusilla* (nymphs and adults per leaf) and *Epiricania melanoleuca* (coocon per point) at Chak No. 109/R. B. Faisalabad

Table 1. Population of *Pyrilla perpusilla* per leaf, *Epiricania melanoleuca* per plant and %age parasitism.

Date	Av.No. of nymphs and adults of per leaf pyrilla			Av. No. of cocoons of Epiricania per plant			Percentage parasitism		
	AARI	6/JB	109/RB	AARI	6/JB	109/RB	AARI	6/JB	109/RB
1987									
March 15	-	-	-	-	-	-	-	-	-
March 30	0.04	-	-	-	-	-	-	-	-
April 15	0.06	0.04	0.04	-	-	-	-	-	-
April 30	0.10	0.28	0.10	-	0.10	0.02	-	4.76	-
May 15	0.32	1.25	0.94	0.06	0.76	0.08	4.16	8.51	2.81
May 30	1.14	1.44	1.10	0.10	1.00	0.10	13.95	14.81	9.63
June 15	2.22	1.96	1.58	0.25	1.15	0.90	20.95	21.76	21.00
June 30	3.70	2.56	2.33	0.48	1.74	1.74	28.77	39.06	35.42
July 15	4.36	3.10	3.66	2.72	2.20	2.22	36.69	42.91	45.45
July 30	4.45	4.82	4.90	3.25	2.32	3.14	52.39	44.19	58.42
August 15	5.56	5.33	4.20	3.33	2.92	3.10	64.74	60.00	41.26
August 30	4.29	4.37	3.76	2.12	2.00	2.10	41.92	38.10	23.04
September 15	3.66	4.10	3.33	1.15	1.50	1.10	25.45	27.59	14.00
September 30	3.02	2.22	1.10	0.85	1.15	0.37	11.01	13.17	3.61
October 15	1.50	1.06	0.10	0.04	0.76	-	4.42	8.75	-
October 30	0.76	0.45	-	-	0.35	-	-	5.88	-
November 15	0.20	-	-	-	-	-	-	-	-
November 30	-	-	-	-	-	-	-	-	-
Correlation coefficient.		0.88			0.95			0.95	

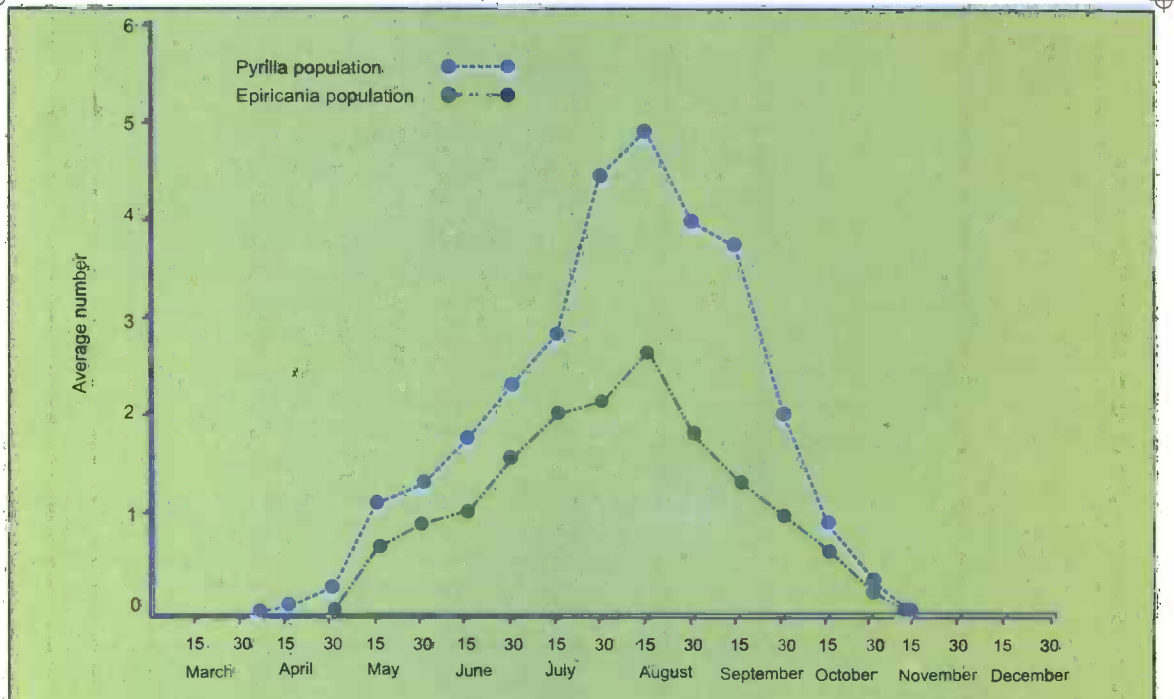

Figure 2. Population *Pyrilla perpusilla (nymphs and adults per leaf)* and *Epiricania melanoleuca (cocoons per point)* at Chak No. 6/J. B. Faisalabad

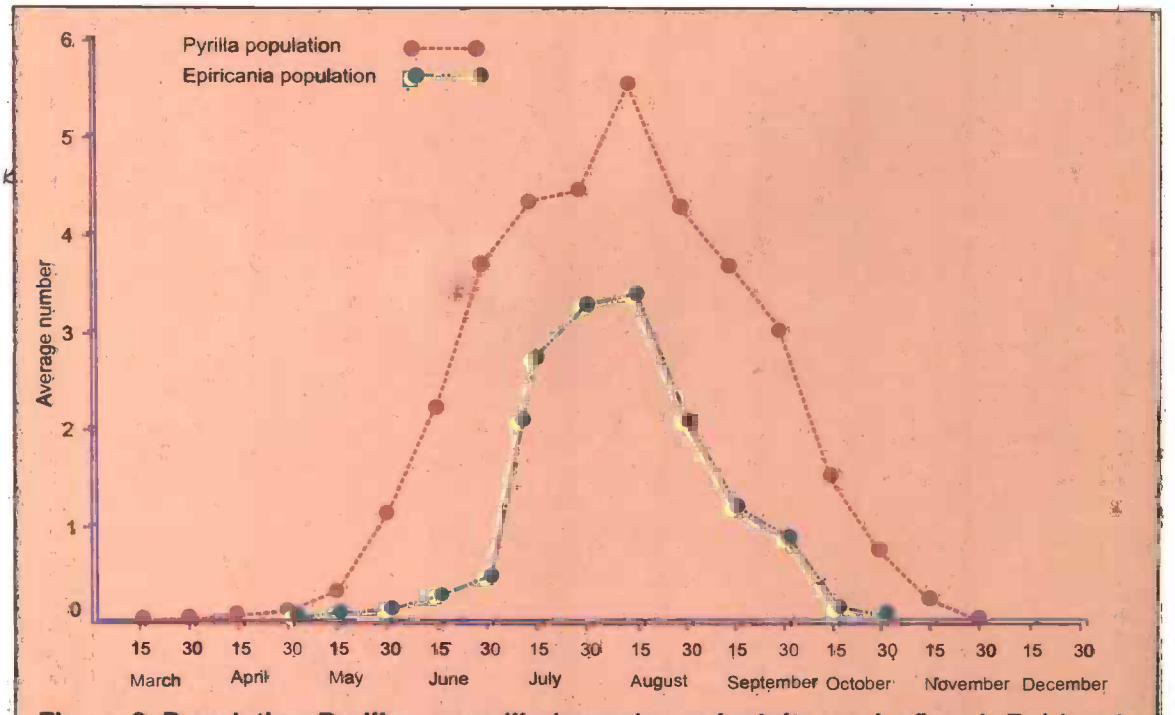

Figure 3. Population *Pyrilla perpusilla (nymphs and adults per leaf)* and *Epiricania melanoleuca (cocoons per point)* at AARI, Faisalabad

fortnight of March (Av.min.12.1° C, Av. max. 25.1°C) and continued to increase towards peak at (5.5 individual/leaf) upto first fortnight of August (Av.min.26.9°C, Av. maxi. 36.6°C) and decrease thereafter and was minimum (0.20 individual/leaf) in first fortnight of November, (Av. min. 9.7°C, Av. max. 27.3°C). However, its parasite. *Epiricania melanoleuca* became active in first fortnight of May (Av. min. 20.4°C, Av. max. 32.2°C) and its incidence increased towards peak at (3.34 individual/leaf) gradually till first fortnight of August and decreased thereafter and was minimum (0.05 individual/leaf) in October (Av. min. 17.1°C, Av. max. 31.9°C). While the %age parasitisum was only 4.16 in second fortnight of May, increased to a maximum of 64.74 during the first fortnight of September and decreased thereafter, with the minimum parasitism 4.42 in the first fortnight of October. These findings are in close proximity to Wajih and Sulaiman (1983), Grag and Sathi (1983), Anonymous (1989) and Arshad and Hashmi (1991) but do not agree with Patnaik et al. (1990) and Jhoshi and Sharma (1992).

At chak No. 6/JB population of pyrilla and *Epiricania* was observed at the first fortnight of April (Av. min. 17.8°C, Av. Max. 33.5°C) second fortnight of April, respectively and both continued to increase upto first fortnight of August and decreased thereafter and was minimum in second fortnight of October. The %age parasitism was only 4.76 in second fortnight of April, increased to a maximum of 60.00 during the first fortnight of August and decreased thereafter with the minimum parasitism 5.88 in the second fortnight of October. This endorses the view expressed by Mohyuddin et al. (1982), Wajih and Sulaiman (1983), Anonymous (1989) and Arshad and Hashmi (1991).

However, the population of pyrilla appeared in the first fortnight of April and continued to increase upto second fortnight of July (Av. Min. 25.9°C, Av. max. 37.6°C), decreased thereafter till first fortnight of October at chak No.109 R.B. Its parasite appeared at second fortnight of April (Av. min. 17.8°C, Av. max. 33.5°C) with the increase in its incidence till second fortnight of July and decreased thereafter with the minimum population in the second fortnight of September (Av. min. 23.3°C, Av. max. 36.6°C). The population of pyrilla peaked at (4.90 individual/plant) was observed in the second fortnight of July. Non of them was observed in the second fortnight and first fortnight of October, respectively. On the other hand %age parasitism was found only 2.81 % in the first fortnightly of May increased to a maximum of 58.42 during the second fortnight of July and decreased thereafter with the minimum parasitism, 3.61 in the second fortnight of September. The results were in line with those of Mohyuddin et al. (1982), Wajih and Sulaiman (1983), Gholap and Ghandele (1985), Anonymous (1989) and Arshad and Hashmi (1991), but did not agree with Misra and Pawar (1982), Garg and Sathi (1983), Mote (1984), Patnaik et al. (1990) and Joshi and Sharma (1992).

The population of *E. melanoleuca* was found directly related to the host *P. perpusilla* population at the three experimental areas which was in line with those of Gupta et al. (1971) Garg and Sathi (1982) and Khan (1988). A positive correlation coefficient between the population of *P. perpusilla* and *E. melanoleuca* was found at the three experimental areas.

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