



## Study on Population Dynamics of Sugarcane Leaf Hopper in Udham Singh Nagar, Uttarakhand, India

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**Abstract:** The studies on diversity of insect fauna and population dynamics of leaf hopper in sugarcane were carried out for two crop seasons during 2017-18 and 2018-19 in U.S. Nagar, Uttarakhand, India. Leaf hopper, *Pyrilla perpusilla* is distributed extensively in most of sugarcane farming area of the country including Uttarakhand. The Survey and observations were conducted in sugarcane farmer's field both seeded and planted crop distributed over at four place of district U.S. Nagar with an objective to gather information of insect pest in this area towards developing survey scheduled for the farmers to recommend control to determine the population dynamics of sugarcane leaf hopper, *P. perpusilla* in the month of March till harvest of the crops. A total of one hundred canes from each place have been studied for the experimentation. The infestation reached its highest during 2nd half of August and 2nd week of September. Thus, the study exhibited that the peak activity of leaf hopper, *P. perpusilla* was from March to October during 2017-18 and 2018-19 crop seasons, respectively.

**Keywords:** Sugarcane • Leaf hopper • *P. perpusilla* • Population Dynamics

### Introduction

Sugarcane is an important agro-industrial crop of India. It is a long period crop of 10-18 months and therefore is liable to be attacked by a number of insect pest. According to an estimate, sugarcane production declines by 20.0 and 19.0 per cent by insect pest and disease, respectively. Among the various insects, the pests play an important role for low productivity and sugar recovery (Banerjee, 1973). About 103 insects were associated with sugarcane crop (Gupta, 1948; Kumarasinghe, 1999). *Pyrilla perpusilla* is commonly known as Indian sugarcane leaf hopper and is widely distributed in India including Uttarakhand. It is very harmful for sugarcane crops (Gupta and Avasthi, 1957). Viewing its importance, the present work on "Study on population dynamics of leaf hopper in sugarcane in U.S. Nagar" was conducted.

### Materials and methods

The experiments were conducted in the farmer's sugarcane field at four place of

district U.S. Nagar, i.e., Kashipur, Bazpur, Jaspur, and U.S. Nagar, Uttarakhand, India, to study the population dynamics of leaf hopper, *P. perpusilla* in sugarcane. The sugarcane was studied i.e., planted on 26th March and 2nd March during the year 2017 and 2018 respectively. Systematic survey was taken to assess the population dynamics of leaf hopper, *P. perpusilla*. The observations were made at monthly interval, starting from the month of March 2017 onwards till harvest of the crops. Sugarcane leaf hopper *P. perpusilla* is found on the under surface of the leaves. Both nymph and adult suck the sap of leaves by their rostrum. They suck up plant sap that causes yellowing and ultimately dried up leaves. In case of low infestation yellow colour patch appears on the leaves Butani, (1964), resulting in the reduction of sucrose content of the juice by up to 30 percent. *P. perpusilla* secretes a sweet substance called honeydew which covered the leaves and attracts a black colour fungus, which also reduces photosynthesis resulting in the poor



quality and quantity of sugar and yield loss. The per cent infestation was obtained by dividing the total number of infested plants

with total number of plant multiplied by 100. Per cent leaf hopper infestation calculated by following formula:

$$\text{Per cent incidences of hopper} = \frac{\text{Number of infested cane} \times 100}{\text{Total number of plant}}$$

### Results and Discussion

Leaf hopper, *P. perpusilla*, is the most harmful sap sucking pest of sugarcane, which excretes honey dew onto foliage and causes fungal disease, resulting in to direct and indirect loss of sugarcane production and quality. Fletcher, (1914) were also reported same infestation of *P. perpusilla* in sugarcane. Adults are white but gradually turned straw colour, with pale green eyes, snout like head with black spots position posteriorly. Adult and nymph, both are feeds on sugarcane leaves, by sucking the sap from lower surface, but mostly damages caused by the nymphs. Feeding areas turn yellow colour, leading to wilting of leaves with retarded plant development. Similar finding were found by Varma (1986). An early infestation, during the grand growth period of cane, adversely affects the crop, while the late infestation from September onwards, mostly affects the sucrose contents of cane in the crop.

In the present investigation, the population of leaf hoppers and their parasites (*C. Septempunctata*, *I. scutellaris*) was recorded from the month of March to till October. However, heavy infestation was observed in the month of May and in September. The population recorded in the month of September showed highest infestation as compared to March during both cropping season on the basis of data presented in Tables

1, 2, 3 & 4 and Figs 1, 2, 3 & 4. In figures Series 1 indicates the percentage of infestation in sugarcane plants, Series 2 indicates the population of *P. perpusilla* in sugarcane plants, and Series 3 and 4 indicates the population of *P. perpusilla* parasites *C. Septempunctata* and *I. scutellaris* in sugarcane plants respectively. Highest level of population of *P. perpusilla* parasites *C. Septempunctata* and *I. scutellaris* in month of September was recorded during crop season 2017-18. High level of pest infestation was observed during both the year of the survey in all area. The highest infestation of 12.33 per cent was recorded in Kashipur. However, the lowest average infestation of 9.33 per cent was recorded in Jaspur during crop season 2017-18. While, during crop season 2018-19 the maximum pest infestation was observed 12.33 per cent in Kashipur and the minimum infestation 9.33 per cent in Jaspur.

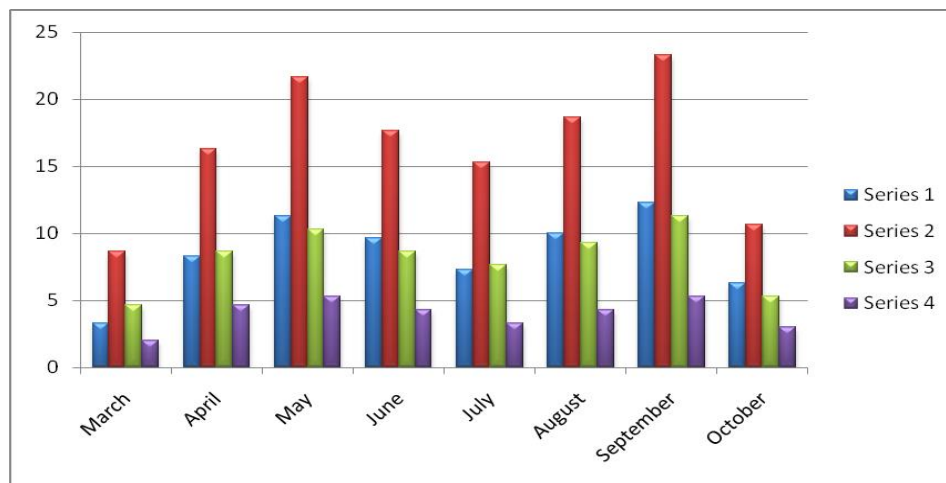
Perusal of data revealed that the per cent infestation by leaf hopper varied from 3.33 to 12.33 per cent during the course of investigation. The pest marked its first appearance by an average of 3.33 per cent in month of March and the maximum infestation in the month of September (12.33 percent) respectively. Miskatullah and Mahmood (2007) also reported the population dynamics of Sugarcane plant hopper, *P. perpusilla* and its natural Enemies.



**Table 1. Survey for population dynamics of Leaf hopper, *Pyrilla perpusilla* and their parasites on sugarcane at Kashipur**

Months	% plant Infestation	Population of <i>P. perpusilla</i>	Population of <i>C. Ceptempunctata</i>	Population of <i>I. scutellaris</i>
March	3.33	8.67	4.67	2.00
April	8.33	16.33	8.67	4.67
May	11.33	21.67	10.33	5.33
June	9.67	17.67	8.67	4.33
July	7.33	15.33	7.67	3.33
August	10.00	18.67	9.33	4.33
September	12.33	23.33	11.33	5.33
October	6.33	10.67	5.33	3.00
November	0.00	0.00	0.00	0.00
December	0.00	0.00	0.00	0.00
January	0.00	0.00	0.00	0.00
February	0.00	0.00	0.00	0.00

Data is pooled analysis of cropping year 2017–18 and 2018–19 Sample size = 100 sugarcane plants

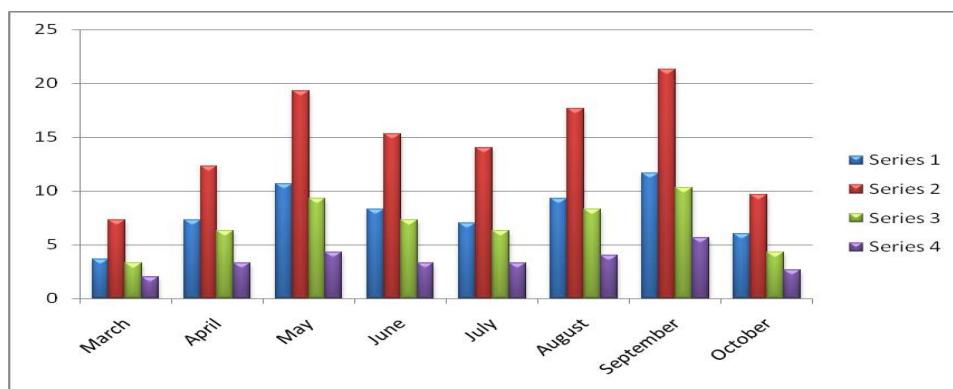


**Fig. 1. Population dynamics of Leaf hopper, *Pyrilla perpusilla* and their parasites on sugarcane at Kashipur**

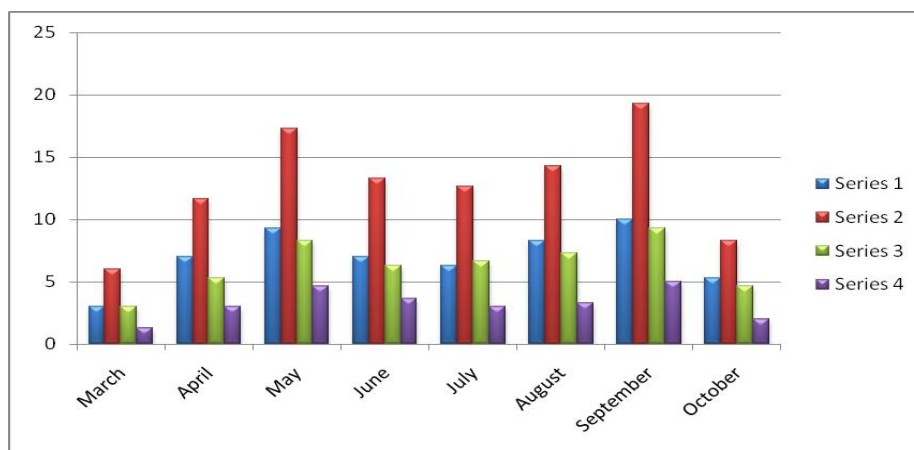
**Table 2. Survey for population dynamics of Leaf hopper, *Pyrilla perpusilla* and their parasites on sugarcane at Udham Singh Nagar**

Months	% plant Infestation	Population of <i>P. perpusilla</i>	Population of <i>C. Septempunctata</i>	Population of <i>I. scutellaris</i>
March	3.67	7.33	3.33	2.00
April	7.33	12.33	6.33	3.33
May	10.67	19.33	9.33	4.33
June	8.33	15.33	7.33	3.33
July	7.00	14.00	6.33	3.33
August	9.33	17.67	8.33	4.00
September	11.67	21.33	10.33	5.67
October	6.00	9.67	4.33	2.67
November	0.00	0.00	0.00	0.00
December	0.00	0.00	0.00	0.00
January	0.00	0.00	0.00	0.00
February	0.00	0.00	0.00	0.00

Data is pooled analysis of cropping year 2017–18 and 2018–19 Sample size = 100 sugarcane plants



**Fig. 2. Population dynamics of Leaf hopper, *Pyrilla perpusilla* and their parasites on sugarcane at Udham Singh Nagar**



**Fig. 3. Population dynamics of Leaf hopper, *Pyrilla perpusilla* and their parasites on sugarcane at Bazpur**

**Table 3. Survey for population dynamics of Leaf hopper, *Pyrilla perpusilla* and their parasites on sugarcane at Bazpur**

Months	% Plant Infestation	Population of <i>P. perpusilla</i>	Population of <i>D. Ceptempunctata</i>	Population of <i>I. scutellaris</i>
March	3.00	6.00	3.00	1.33
April	7.00	11.67	5.33	3.00
May	9.33	17.33	8.33	4.67
June	7.00	13.33	6.33	3.67
July	6.33	12.67	6.67	3.00
August	8.33	14.33	7.33	3.33
September	10.00	19.33	9.33	5.00
October	5.33	8.33	4.67	2.00
November	0.00	0.00	0.00	0.00
December	0.00	0.00	0.00	0.00
January	0.00	0.00	0.00	0.00
February	0.00	0.00	0.00	0.00

Data is pooled analysis of cropping year 2017–18 and 2018–19 Sample size = 100 sugarcane plants



**Table 4. Survey for population dynamics of Leaf hopper, *Pyrilla perpusilla* and their parasites on sugarcane at Jaspur**

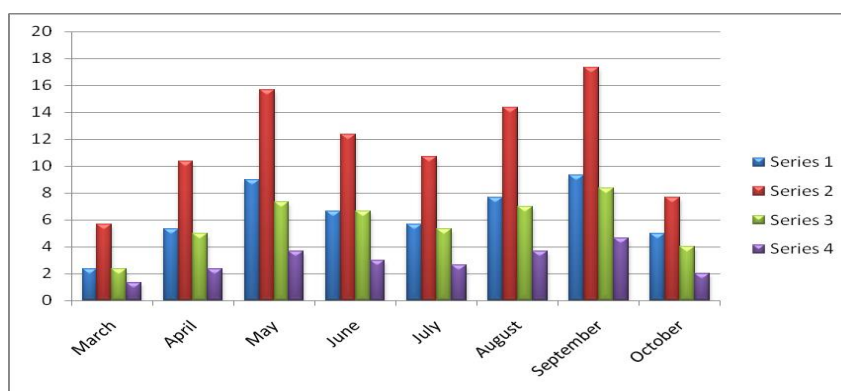
Months	% Plant Infestation	Population of <i>P. perpusilla</i>	Population of <i>C. Septempunctata</i>	Population of <i>I. scutellaris</i>
March	2.33	5.67	2.33	1.33
April	5.33	10.33	5.00	2.33
May	9.00	15.67	7.33	3.67
June	6.67	12.33	6.67	3.00
July	5.67	10.67	5.33	2.67
August	7.67	14.33	7.00	3.67
September	9.33	17.33	8.33	4.67
October	5.00	7.67	4.00	2.00
November	0.00	0.00	0.00	0.00
December	0.00	0.00	0.00	0.00
January	0.00	0.00	0.00	0.00
February	0.00	0.00	0.00	0.00

Data is pooled analysis of cropping year 2017–18 and 2018–19 Sample size = 100 sugarcane plants

**Conclusion**

Surveys and observation is a vital tool to gather information of insect pest in the areas toward developing survey schedule for the farmers to recommend control measure. Thus it can be concluded on the basis of the survey was conducted on major insect pest Leaf hopper, *P. perpusilla* infestation of the various

place. Hence, the present study was undertaken with an objective to analyze the status of insect pest and losses caused to the sugarcane crop conducting surveys and observation in different places of district U.S. Nagar for helping the farmers for getting sustainable yields and better returns.



**Fig. 4. Population dynamics of Leaf hopper, *Pyrilla perpusilla* and their parasites on sugarcane at Jaspur**

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