

Studies of Pest Succession in Sugarcane (*Saccharum officinarum*) at Rampur- Rudra, Chapra (Saran), Bihar.

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Abstract

Studies of pest succession in sugarcane (*Saccharum officinarum*) were conducted at the experimental farm, village Rampur- Rudra, District, Chapra (Saran), Bihar, under P.G. Department of Zoology (Entomological Laboratory), Jagdam College, Chapra (Saran), Bihar during 2015 to 2016. In this investigation weekly observation were recorded on sugarcane for different types of sugarcane pests. Results clearly indicated that sugarcane was found to be infested by leaf hopper, *Pyrilla purpusilla* (Homoptera : Lophopidae), root borer, *Scripophaga nivella* (Lepidoptera : Pyralididae) and top borer, *Scripophaga nivella* (Lepidoptera : Pyralididae). These sugarcane pests are more harmful and destructive than other sugarcane pests.

Key Words: Pest succession, Sugarcane (*Saccharum officinarum*), Entomological laboratory.

Introduction

Sugarcane (*Saccharum officinarum*) is one of the most important commercial crop produced in the state of Bihar. Sugarcane is commercial cultivated on a large scale in the dry zone of Bihar in the Rampur-Rudra 25° 36' and 26° 13' North Latitude and 84° 24' and 85° 15' East Longitude in the Southern part. The production of sugar cane in 1990 – 92 was reported to 5,176 thousands metric tons. It is well known that pest and disease are important limiting factors which affect sugarcane production. Bihar sustained annual crop loss proved a great economic loss on account of sugarcane pest (Siddiali, 1965, Singh and Singh 2013. Notable contributions are those of Agrawal 1969, Awasthy 1973, Ayyar 1984, Box 1953 and Fletcher, 1914.

There are 30 species of insect pests that have been reported to bring about damage to sugarcane in the state of Bihar (Gupta 1956, Prasad 1960, Chakarvarti 1970 and Srivastava 1979). Other contributions are of Ganeshwarachari and Femand 2006, Khanna 1948, Prasad 1960 and Rahman 1942.

The three species of sugarcane pest more harmful to sugarcane production in the state of Bihar are:

(1) *Pyrilla perpusilla* (Sugarcane leaf-hopper)

Belonging to order Homoptera and family Fulgoridae. It is straw coloured and spread all over the sugarcane growing regions of Bihar. Its length ranges from 1 cm to 1.5 cm. It is a polyphagous pest but it prefers to feed on the sugarcane leaves. It sucks the plants sap by puncturing the leaf again and again, hence it is popularly called the leaf hopper. The nymphs and the adults suck the plant sap by puncturing the leaves again and again in various places. The adult *Pyrilla* lays eggs in masses. Each egg mass is generally covered with white filamentous material and contains several hundreds of eggs. If the eggs are laid in normal conditions during summer or monsoon period, the eggs hatch in about 7 days. But if the temperature and humidity are not favourable the hatching may extend up to 30 to 40 days. The young nymphs are white in colour and they bear a pair of white brush-like projections to their posterior end of the body. After several moults the nymph develops into the adult. The development takes place in about five months. During development the wings also develop. Now the adult is also able to fly.



Fig : *Pyrilla purpusilla*

(2) *Emmalocera depressella* (Sugarcane root-borer)

Belonging to order Lepidoptera and family Pyralididae. It attacks the underground part of the sugarcane stem, hence it is popularly called the sugarcane root borer. The straw-coloured moths are the adult stage of the root borer. Its wing span is about 2.5 cm. It becomes more active during night and also lays eggs during night. It lays eggs singly i.e., not in masses. The eggs are normally laid in the fields. The larva hatches in about ten days and the young larva crawls to reach the plant. It

reaches the root of the sugarcane along with the stem through the cracks and crevices. The young larva generally makes a small hole in the young plant root and enters it. Normally the grown up crops are not harmed by the root borers. The fleshy wrinkled body surface of the larva is creamy-white in colour. The larval period lasts about 30 to 40 days. Sometimes larva hibernates for more than 200 days. After that the larva pupates and the pupal period lasts for 5 to 15 days. In normal condition the root borers complete their life-cycle in about 40 to 60 days.



Fig : *Emmalocera depressella*

(3) *Scripophaga nivella* (Sugarcane top-borer)

Belonging to order Lepidoptera and family Crambidae. The caterpillars of this pest destroy the top portion (apical bud) of the plants, hence it is popularly called the top borer. So, these sugarcane pests are more harmful and destructive to other sugarcane pest. Up to 25 percent mortality of shoots and 40 percent stunting has been recorded in Rampur-Rudra. Generally adult moths are silvery creamy white in colour and tuft of hairs in females. Male *S. nivella* is slightly smaller, with a wing span 26-35 mm. The female produced 150 - 300 eggs. Eggs are white colour, oval shaped laid in overlapping clusters of about 30 eggs on the surface of the leaf. Incubation period is 5-7 days. Larval stage is 25 -40 days and pupal stage is 10-20 days depending on the climate temperature.



Fig : *Scripophaga nivella*

Materials and Methods

The present study on pest succession were conducted at the experimental research farm village Rampur-Rudra, Distt. Chapra (Saran), Bihar, under P.G. Department of Zoology (Entomological Laboratory) Jagdam College, Chapra (Saran) Jai Prakash University, Chapra (Saran), Bihar, during 2013-2015 . Observations were recorded at weekly intervals for different types of sugarcane pests *P. perpusilla*, *E. depressella* and *S. nivella* and their numbers infesting sugarcane (*Saccharum officinarum*) plants. The data thus recorded was tabulated as monthly mean population.

Results And Discussion

The results in respect to the sugarcane pest succession i.e. the monthly mean population of the observed sugarcane pests are presented in the table. The results clearly indicates that sugarcane was found to be infested with *Pyrilla perpusilla*, *Emmalocera depressella* and *Scripophaga nivella*. The peak activity of sugarcane leaf hopper *P. perpusilla* was observed in the month of November (3.82 and 3.00 pest/plant) . According to Pruthi, 1937, *Pyrilla* aberrance is not found in India rather *P. perpusilla* and *Pyrilla puasna* are either having same name of *P. perpusilla* is a variety of *Pyrilla perpusilla* .Mukherjee and Prasad, 1954 claimed that only one variety of *Pyrilla* is found in India, but later scientists reported various subspecies of *P. perpusilla* (Butani, 1964). The maximum

population of sugarcane root borer, *Emmalocera depressella* was observed in the month of December in both the year (2.48 and 6.00 Larvae/Plant) The peak population of sugarcane content top borer *Scripophaga nivella* was observed in the month of December in the year 2014 – 2015 (6.66 pests/plant) in case of sugarcane pests were seen in the field from October to May in 2014 – 2015, while in the previous year it was noticed during the month of December only. In case *Scripophaga nivella* it was seen only in the year 2014 – 2015. It was found maximum in the field during the month of January (4.17 plant).

It can be concluded from the above studies on sugarcane pest succession that there is an increase in the number of pests in the current year 2015 in comparison to the previous year and their activity period more or less followed the same trend in both the years.

Table-1. Pest Succession on sugarcane (*Saccharum officinarum*) during 2013-2014 and 2014-2015.

Months	Leaf Hopper <i>Pyrilla perpusilla</i> ,		Root Borer <i>Emmalocera depressella</i>		Top Borer <i>Scripophaga nivella</i>	
	2013-2014	2014-2015	2013-2014	2014-2015	2013-2014	2014-2015
October	0.86	1.27	0.00	0.32	0.00	0.00
November	3.83	3.00	1.80	4.00	0.00	0.00
December	3.13	0.666	2.48	6.00	8.25	6.68
January	0.71	1.49	1.20	1.28	0.00	4.17
February	0.00	1.05	0.00	0.00	0.00	3.67
March	0.00	0.48	0.00	0.13	0.00	3.00
April	0.00	0.84	0.00	0.00	0.00	0.42
May	0.00	0.00	0.00	0.00	0.00	4.25

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