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## Survey and observation of sugarcane insect pests in U. S. Nagar district Uttarakhand

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### Abstract

Surveys and observation were conducted in sugarcane farmer's fields in planted/ seeded crops distributed over at four places of district U. S. Nagar during two successive years 2017 -18 and 2018 -19 with an aim to gather knowledge of insect pests in this field towards developing surveys schedule for the farmer to recommend control measures and to determine the different sugarcane pests in U. S. Nagar. A total of one hundred canes from each places have been studied for the experimentation. Different developmental stages of sugarcane observed critically with naked eyes or with hand lens, for collection of insect pests as well as their pests and predators. Among the various insect pest; root borer, top borer, early shoot borer and leaf hopper, can be studied as major pests, while mealy bug, scale insect, woolly aphid and yellow aphid as minor pests. The survey and observation were conducted in the months of March to till harvest of the crop. Among different insect pest shoot borer remained active from March to July, top borer from June to December, root borer from April to July, leaf hopper from March to October, scale insect from May to November, mealy bug from August to November and aphids from November to February, respectively. The results revealed that the eight species of insect pests causing damage to sugarcane at different developmental stages were recorded during survey. Similar mode was also observed in 2018 -19.

**Keywords:** insect pests, surveys, observation, sugarcane

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### Introduction

Sugarcane is a major cash crop of India. Sugarcane yields are influenced by many factor and prevalence of pests and diseases as well as environmental strain. Among them, pests are known to inflict considerable damage in cane yields as well as sugar output. Sugarcane is a long duration crops of 10 -18 months and thus it is liable to be attacked by a number of insect pests and diseases. According to an estimate, sugarcane production declines by 20 and 19 percent by insect pests and diseases, respectively. Among the different factors, infestation of insect pest plays a vital role for low productivity and sugar recovery. About 102 insects were associated with sugarcane crops (Kumarasinghe, 1999) <sup>[1]</sup>. economical damage in sugarcane has been estimated to be 20 percent in cane yield and 15 percent in sugar recovery due to destroy of the insect pest (Avasthy, 1977) <sup>[1]</sup>. Among these borers, *C. infuscatellus* causes considerable losses during the early periods of sugarcane growth in India, mainly during the summer months (Balaji and Gowrishanker, 1999) <sup>[3]</sup>. Heavy infestation of this pest, the BSPB declared north Bihar to be an endemic area for *C. infuscatellus* (Gupta, Mishra, Dwivedi and Sharma 1987). *Scirpophaga excerptalis* is a major sugarcane insect pest in different parts of India reducing the yield and sugar contents of up to 51 percent and 1.9 units as noted in Indian sugarcane fields (Pandey, Sharma and Singh 1997, Madan, Singh and Singh, 1999). Therefore, the present study was undertaken with an aim to study the status of insect pest and damages caused to the sugarcane crops conducting surveys and observation in different places of district U.S. Nagar for helping the farmers to fix the management schedules for obtaining the sustainable yield and better return.

### Materials and Methods

Survey and observation were planned in sugarcane fields in planted/ seeded crops in four places of district U. S. Nagar in two successive years 2017 -18 and 2018 -19. Surveys and observation was noted at monthly interval in the farmer's fields with an aim to gather knowledge of insect pests of sugarcane in this area. The farmer's fields were selected in the adjoining areas distributed over four places, that is Kashipur, Bazpur, Jaspur and U. S. Nagar district of Uttarakhand for regular visit and recording of insect pests of sugarcane. The insects were collected by hand picking and sweep netting and were preserved dry or in 70 percent alcohol. Similarly, the plant parts infected were also collected and brought to the laboratory for their further study. The infestation of insect pest was noted on the basis of nature of the damage caused by each pest and the symptoms expressed by the plants in response to the pest attack. The damage was noted in terms of percent infestation for tissue borers and in terms of number of sucking pests per leaf/ plant. In case of borers, hopper and aphid percent infestation based on dead hearts, bunchy top and infested plants for four hundred plant randomly sort out at four various site. The percent infestation was obtained by dividing the total number of dead hearts/ bunchy top/ infested plants with total number of plant multiplied by hundred.

$$\text{Percent infestation of borer} = \frac{\text{Number of dead hearts/ bunchy top/ infested canes}}{\text{Total number of plants}} \times 100$$

*P. perpusilla* and *C. lanigera* population of nymphs and adults per leaf were found on the three surface of leaves (upper, middle and lower) from forty leaves randomly sort out at four various sites.

### Results and Discussion

The results revealed viz. shoot borer, root borer, top borer, and leaf hopper, inhabited the key pests in sugarcane developing regions of U. S. Nagar district of Uttarakhand followed by and mealy bug, scale insect, woolly aphid, and yellow aphid.

#### Shoot borer

Shoot borer, *Chilo infuscatellus* is the major insect pest in sugarcane. The incidence of shoot borer, *C. infuscatellus* was seen in both years of the surveys as well as in entire area. The percent infestation of *C. infuscatellus* was found highest in Kashipur area. However the lowest infestation was found in Jaspur in crops seasons 2017 -18. While, in crops seasons 2018 -19 also, respectively. The pest was appeared in the month of March and to the end of July, while highest infestation was found in month of May. The finding agreement with Singh and Varma (1995) <sup>[8]</sup> also found in the Nizamabad district of A. P. India.

#### Root borer

Root borer, *Emmalocera depressella* is the major insect pest in sugarcane. The incidence of root borer, *E. depressella* was seen in early stages of growing crops. The pest infestation was appeared from March to July and highest in month of June both crops seasons of 2017 -18 and 2018 -19, respectively as well as in entire areas. The percent infestation of this pest was found highest in Kashipur. However, the lowest average infestation was recorded in Jaspur in crops seasons 2017 -18. While, in crops seasons 2018 -19 the highest pest infestation was observed in Kashipur and the lowest infestation in Jaspur. Similar finding was also found by Fletcher (1932) <sup>[9]</sup> in case of sugarcane root borer, *E. depressella*.

#### Top borer

Top borer, *Scirpophaga excerptalis* is the major insect pest in sugarcane. The incidence of top borer, *S. excerptalis* was seen in early stages of growing crops and after formation of internodes. The percent infestation of top borer, *S. excerptalis* was maximum or minimum uniform in both the years as well as in entire area. Data revealed that average minimum incidence was recorded in Jaspur and the maximum in Kashipur in crops seasons 2017 -18 and also highest infestation in Kashipur and the minimum average in Jaspur were appeared in crops seasons 2018-19 respectively. The pest incidence appeared from March to October and reaches highest in month of June. The finding similar with Shenhmar and Brar (1996) <sup>[10]</sup> also found with most of the loss found in July- August.

#### Leaf hopper

Leaf hopper, *Pyrilla perpusilla* is the major insect pest in sugarcane. Leaf hopper, *P. perpusilla* was seen in the month of March to till harvest the crops in U. S. Nagar district of Uttarakhand during 2017 -2018. The highest infestation of leaf hopper, *P. perpusilla* hoppers per leaf was found in Kashipur during 2017 -18 and 2018 -19 both crop season, respectively. Chaudhary and Sharma (1990) <sup>[11]</sup> concluded that *P. perpusilla* infestation was the highest hoppers per leaf during 2nd half of August, falling to hoppers per leaf in the 2nd week of September. Bhavani (2013 -2014) <sup>[12]</sup> also reported the infestation of sugarcane leaf hoppers, *P. perpusilla* on sugarcane crops.

#### Mealy bug

Mealy bug, *Saccharioccus sacchari* is the minor insect pest of sugarcane. The infestation of mealy bug, *S. sacchari* in the farmer's field of sugarcane remained for a very short period from August to November. The percent infestation of this pest on sugarcane was remained maximum in Kashipur and minimum in Jaspur, in the month of September, respectively. The population of mealy bug, *S. sacchari* was recorded as maximum bugs/ plant in Kashipur and minimum bugs/ plant in Jaspur in the month of September, respectively.

#### Scale insect

Scale insect, *Melanaspis glomerata* is the minor insect pest of sugarcane. The infestation of scale insect, *M. glomerata* in the farmer's field of sugarcane was seen from month of May to November. The percent infestation of scale insect, *M. glomerata* on sugarcane was recorded maximum in Kashipur and minimum in Jaspur, respectively in the month of July. Scale insect, *M. glomerata* attained highest population on sugarcane in the month of July and recorded maximum insects/ plant in Kashipur and minimum insects/ plant at Jaspur.

#### Woolly aphid

Woolly aphid, *Ceratovacuna lanigera* is also minor insect pest in sugarcane. The infestation of woolly aphid, *C. lanigera* in the farmer's field of sugarcane was seen in most of the state of India. Basu & Banerjee (1958)

reported Sugarcane woolly aphid, *C. lanigera* for the first time from W. Bengal. Rabindra et al. (2002) seen the serious incidence by aphid, *C. lanigera*, on the leaves of four to nine month old sugarcane plants was reported in Maharashtra in September - October. The infestation appeared from August and continued up to February and reached the highest during October till December. This pest remains almost until harvest and causes losses.

### Sugarcane Yellow aphid

Sugarcane Yellow aphid, *Sipha flava* is also minor insect pest of sugarcane. The infestation of Sugarcane Yellow aphid, *S. flava* in the farmer's field of sugarcane was appeared from November to February and its peak period was seen in the month of January during both crop season. Feeding of Sugarcane Yellow aphid, *S. flava* results yellowing growing leaves and internodes of sugarcane, they also thinner, lighter stalks with shorter node lengths and breadth. The average lowest infestation was seen in Jaspur and the highest in Kashipur during both crop seasons.

### Conclusion

Survey and observation is a useful method to accumulate data of insect pest in place towards developing surveys schedule for the farmer's to suggested command measure. Consequently it can be gathered on the basis of the surveys were planned on major insect pests infestation of various places that Among the various insect pests, i.e. root borer *Emmalocera depressella*, top borer *Scirpophaga excerptalis*, shoot borer *Chilo infuscatellus*, leaf hopper *Pyrilla perpusilla*, can be considered as major pests, while mealy bug *Saccharioccus sacchari*, scale insect *Melanaspis glomerata*, sugarcane woolly aphid *Ceratovacuna lanigera* and sugarcane yellow aphid *Sipha flava* as minor pests. The population/ infestation of eight species of insect pest causing damage to sugarcane at different developmental stages were observed during both crop seasons of 2017 -18 and 2018 -19.

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