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Research Article

## ENTOMOLOGICAL SURVEY ON PEST COMPLEX IN SUGARCANE CROP IN TOBA TEK SINGH

MUNIR AHMAD CHOCHAN<sup>1</sup>, MUHAMMAD SIDDIQ AASI<sup>2</sup>, RANA ZULFIQAR ALI<sup>3</sup>, SALEEM HUSSAIN<sup>4</sup>,  
MUHAMMAD YASIR<sup>5</sup>, MALIK FIAZ<sup>6</sup>, RAO KHURRAM SHAHZAD<sup>7</sup> AND QURBAN ALI RANA<sup>8</sup>

<sup>1,2</sup>Assistant Director of Agriculture (Plant Protection) Pest Warning and Quality Control of Pesticides Toba Tek Singh,  
Mandi Bahaudin

<sup>3,4,5</sup>Agricultural Officer (PP) PW & QCP Mianwali, T. T. Singh and Kamalia

<sup>6</sup>Director General Agriculture (PP) PW & QCP, Lahore-Punjab, Pakistan

<sup>7</sup>Research Officer/Economic Investigator, Directorate General Agriculture (Ext. & A. R.) Lahore-Punjab, Pakistan

<sup>8</sup>Agricultural Officer (Ext.) Daroghawala, Lahore

Corresponding Author: saleemhussain75@yahoo.com

### Abstract

Entomological survey was conducted to monitor pest infestation (%) in sugarcane crop in the area of District Toba Tek Singh during 2012-2014. The result revealed that highest economic threshold level (ETL) was recorded in range 0-3.53%; 0-6.06%; 0-1.32% by borer infested sugarcane fields followed by below ETL 0-35.48%; 0-26.33% and 0-24.81% during 2012-2014. However above ETL was recorded 0-4.36%; 0-3.60% and 0-4.51% infestation by whitefly followed by below ETL ranges between 0-13.49%; 0-15.53%; 0-10.53% during three successive seasons. After that infested fields in district was above ETL recorded nil during 2012 and 2013 but below infestation was recorded in range 0-0.17% followed by below ETL ranges 0-11.2%; 0-8.9%; 0-4.32% by black bug insect. At the end it was concluded that pest scouting played an important role for management of pests.

**Keywords:** Entomological; Pest; Scouting; Survey; Sugarcane; Punjab-Pakistan

### Introduction

Sugarcane an important cash crop ranking fourth in the economy of the Pakistan. Sugarcane grown on an area of 2.6 million acres having annual production 54741.6 tons and average yield was 37-50 tons ha<sup>-1</sup> (Malik and Gurmani, 2005). Sugarcane is a main source of sugar to majority of human population; it is consumed in a variety of ways, ranging from direct chewing to extracted juice and from different forms of processed sugar to alcoholic beverages i.e. rum, cachaca (Naidu, 2009). Low yield of sugarcane in Pakistan was recorded compared to the other countries of the world. The main causes of low yield are attack of pests and diseases.

#### BORERS

The sugarcane borer, *Diatraea saccharalis* (F.), (Lepidoptera: Crambidae), in most years, is the most

destructive insect pest attacking sugarcane in Louisiana and is responsible for greater than 90% of the total insect damage to this crop (Reagan, 2001). About 103 insects were associated with sugarcane crop (Kumarasinghe, 2008). In Pakistan, 12 species of insect pests had been reported to be associated with the sugarcane crop (Chaudhry and Ansari, 1988). Among all insect pests, sugarcane stem borer, *Chilo infuscatellus* (Snellen) (Lepidoptera: Pyralidae) is one of the serious problems in reducing the yield of sugarcane crop (Ashraf and Fatima, 1980). It can cause losses up to 36.51% (Aheer *et al.*, 1994). Its caterpillars destroy about 20% of the young shoots during April-June annually (Dhaliwal, 2004). The larvae, after hatching reaches the plant base, bore into the shoot and feed there. In severe infestation, it reduced sugarcane yield up to 30-70% (Anwar *et al.*,

2004). The caterpillars feed into the stem and cut off the growing point or central whorl of the leaf causing wilting and later on drying up of the plant. The central dead shoot is called "dead-heart". Pest outbreaks, pesticide resistance, severe pesticide instructions, concern about human health and environmental quality had renewed the interest in Integrated Pest Management that emphasizes the biological control which was very effective pest control strategy (Mohyuddin *et al.*, 1997). The safety of biological control is relatively permanent, safe, economical and environment friendly (Shenhmar *et al.*, 2003).

### WHITEFLY

The sugarcane whitefly, *Aleurolobus barodensis* Mask in recent years had assumed serious proportions on sugarcane. The nymphs of whiteflies suck the sap from the undersurface of the leaves. As a result, the leaves turn yellow and pinkish in severe cases of infestation and gradually drying up (Gupta and Avasthy, 1954). Heavily infested leaves covered by the sooty mould, (*Capnodium* sp.) which adversely affects photosynthesis. High infestation causes stunted crop growth and reduced juice quality. There is a loss of 30-40 per cent in sucrose in whitefly affected cane (Singh *et al.*, 1956). Severe whitefly infestation resulted in reduction in cane yield up to 24 % and loss in sugar up to 2.9 units (Khanna, 1948). The plant and ratoon crops affected by this pest under nitrogen deficiency condition.

### BLACK BUG

Sugarcane black bug *Cavelarius excavates* (Dist.) is one of the most important pest of sugarcane widely distributed in India and Pakistan (Atwal and Dhaliwal, 2009). It is recorded as minor pest of sugarcane but occasionally it becomes a serious pest. Ratooning in sugarcane known to encourage its infestation. It was reported in epidemic form from Indian Punjab during 1930 (Agarwal and Siddiqui, 1964) and again in 1983 (Bains and Dhaliwal, 1983). Recently, it has become a serious pest of sugarcane in some areas in Pakistan such as Kot Bhahi Khan Sugarcane Farm, Yousaf Sugar Mill Shahpur Sargodha. Both adults and Nymphs caused damage by sucking cell sap from the plants. The leaves of the affected plants turn yellow with brown patches. The growth of the plant and quality of the juice affected adversely. Adult black bugs were highly mobile and heavy populations quickly invaded the sugarcane fields. Attack of seedling plants reduced plant growth significantly after one or more days after feeding. Damage was characterized by desiccation of leaves and plant death. Sugarcane black bug attacked newly emerged plants and significantly retarded growth by sucking cell sap from the stem and leaves. After reaching feeding intensities of 1 or 2 bugs for 4 days

and when 4 and 6 bugs fed for 4 or 6 days then the growth was seriously affected. In case of rice, the weight of grain per panicle was significantly reduced when 6 bugs fed for 4 or more days (Morrill *et al.*, 1995).

### BIOLOGICAL CONTROL

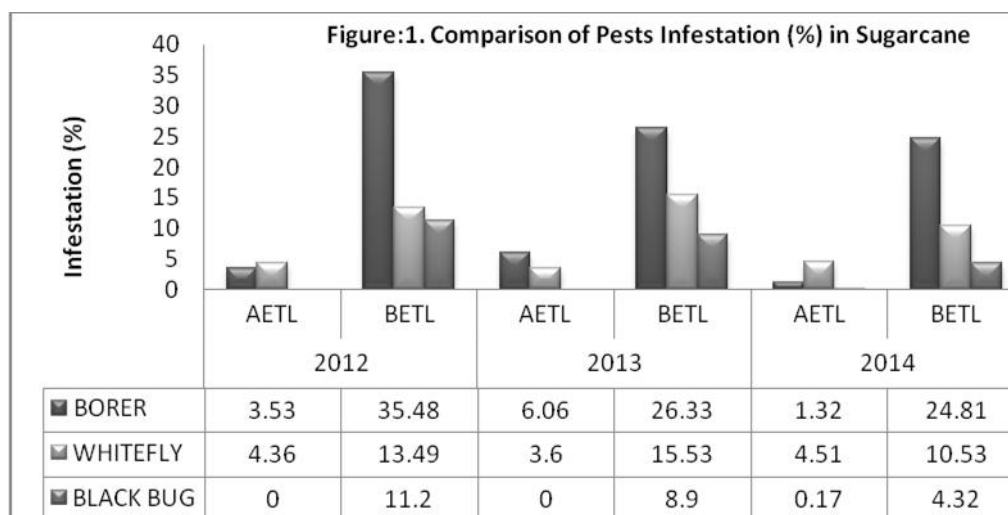
*Trichogramma* is widely used as biological control agent in every part of the country. *T. chilonis* released in China, Switzerland, Canada and former USSR reduced the damage up to 70-92% on sugarcane, cotton and corn crops (Lily, 1994). Rafique *et al.*, (2007) found that *T. chilonis* is very effective against sugarcane stem borer. They recorded 83% reduction of *C. infuscatellus* infestation with the application of *T. chilonis* at 60,000 eggs. Zia *et al.* (2007) reported that the application of *T. chilonis* against *C. infuscatellus* showed a negative correlation with an increase in the number of eggs which indicated that it can be very effectively utilized to control stem borer and it reduces the borer infestation at 2.74%. In sugarcane, *T. chilonis* reduced stalk borer incidence by 55-60% (Shenhmar *et al.* 2003). However an entomological survey was planned to evaluate the pest infestation (%) in sugarcane crop in the area of District Toba Tek Singh during 2012-2014.

### Materials and Methods

The Entomological survey was conducted to monitor pest infestation (%) in sugarcane crop in the area of District Toba Tek Singh during 2012-2014. Survey was conducted by taking random samples in equally divided parts in pockets at Tehsil level by Randomized Complete Block Design (RCBD). Pest scouting was done in each part of the field in the area of the district. For monitoring the population trends of the pests, 25 plants from each replication of each treatments were selected at random by taking five plants each from the four corners and five from the middle of the fields (or plot) and were examined. Outer leaves of each plant were removed and insects in leaf sheaths were collected on the white paper sheet and counted. Mortality (%) of insect was recorded taking average infestation of insect and compared with Economic Threshold Level (ETL).

### Results and Discussion

Figure-1 revealed that above ETL was recorded in range 0-3.53%; 0-6.06%; 0-1.32% by borers infested sugarcane fields followed by below ETL 0-35.48%; 0-26.33% and 0-24.81% during 2012-2014. However above ETL was recorded 0-4.36%; 0-3.60% and 0-4.51% by whitefly infested plot followed by below ETL ranges between 0-13.49%; 0-15.53%; 0-10.53% during three successive seasons. However infested fields in district was above ETL recorded nil during 2012 and



AETL=Above Economic Threshold Level; BETL=Below Economic Threshold Level

2013 but below infestation was recorded in range 0-0.17% followed by 0-11.2%; 0-8.9%; 0-4.32% by the attack of black bug. These results were in accordance to Zada et al., (2013) who reported same trend of these elaborated results. These results were in agreement with the results reported by Bains and Dhaliwal (1983) who recorded that in Indian Punjab, black bug was known to build up highest levels of infestation where rationing was done. These results were in agreement with the findings of Rombach *et al.*, (1986). These results were in accordance to (Campbell *et al.*, 2009) who reported that these insects were caused huge loss to the sugarcane crop.

### Conclusion

At the end it was concluded that sugarcane borers being the most prominent insect pests of sugarcane that infest highly valued crop. In order to control these pests multi-dimensional system of pest control agents needs to be implemented, which should include predators, resistant genotypes, culture practices and finally insecticides by using pest scouting methods. However IPM should be developed on the basis of an infestation history of the pest in the field where the problem recorded. However the grower or plant doctor must be very careful to proper pest scouting, economic threshold level and timing of application of insecticides.

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