

Sugarcane Top Borer, *Scirpophaga Exerptalis*: A Major Biotic Stress of Sugarcane Production in Indian Subtropical Regions

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Introduction

Sugarcane is the second important industrial crop in India occupying around 4.9 million hectares with production of 398 million tones and productivity of 81.9 tonnes/ha. The productivity is challenged by various a biotic and biotic factors. Among them, it is estimated that around 20.0 per cent in cane yield and 15.0 per cent in sugar recovery is lost due to pests alone. Moth borers are the key pests that reduce crop yields in many sugarcane producing countries. Among them, sugarcane top borer, *Scirpophaga exerptalis* (Lepidoptera: Pyralidae) is a major and regular pest in the subtropical region but as a minor and occasional pest in the tropical region of India. This pest widely in Pakistan, Formasa, Japan, Philippines, Thailand, Bangladesh, Indonesia, Cambodia, Vietnam, Myanmar and Taiwan. In India, the yield loss in cane caused by *S. exerptalis* is estimated between 30 and 50 per cent. Therefore, a knowledge on this pest life history, nature of damage and pest management options will certainly contribute to increase sugar production and productivity in sugarcane farming.

Life history

Amongst the borers of sugarcane, the moths of top borer are relatively easy to identify due to their silvery white colour with or without one black spot on each of the forewings, which is distinctly different from straw coloured moths of other borers. Females have a tuft of crimson red orange or buff coloured anal hairs. Eggs are laid in clusters of two to four overlapping rows covered with orange or buff coloured tuft of anal hairs mostly on the underside of the basal or middle portion of second and third laminae. A female may lay 45 to 220 eggs. After an incubation period of one to two weeks, newly hatched larvae crawl actively on the leaves, suspend themselves by silken threads and get dispersed to adjacent plants by wind. They bore into the midribs of leaves through the lower epidermis, finally

reach the inner core of the crown and then enter the central core near to the growing point. The larvae feed above the growing point upto fourth instar after which it cuts across the growing point, thus cause dead heart. After spending 35 to 40 days in four instars, grown up larva tunnels through the cane downwards and reach toward the rind to make an exit hole and after making the exit hole closes it with the cut portion of rind. The larvae are pale white to creamy, sluggish with atrophied legs. Pupa is cylindrical in shape and pale yellow in colour. Pupation takes place in the cane and pupal period lasts for about a week (i.e 7-10 days). Average life cycle is completed in 54-60 days. Under tropical conditions, the pest multiplies continuously throughout the year with no brood pattern and no serious flare ups of abundance. Under sub tropical conditions, the pest completes five generations (broods) in a year and remain active from February to November. First brood adult (moth) appears in February, second brood moth appears in April, the third brood in June, the fourth brood in August and the fifth in September. The third generation which normally occurs in June and is more damaging as this attack takes place after completion of tillering and at the beginning of cane formation. During winter months, the pest hibernates as grown up larvae in the cane.

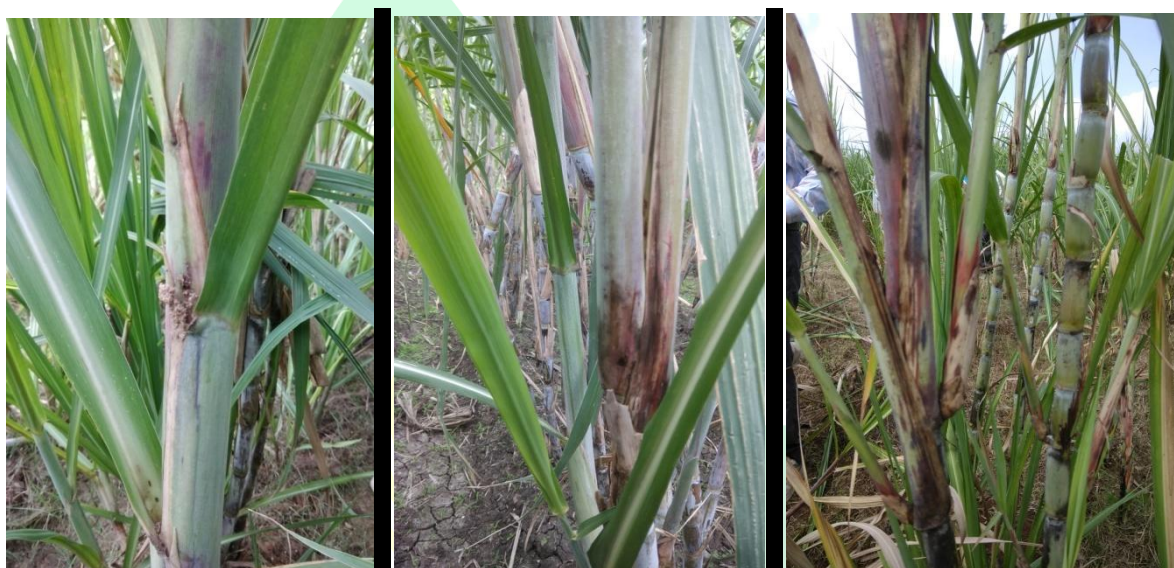


Different life stages of top borer 1. Adult, 2. Egg mass, 3. Larva, 4. Pupa

Nature of damage and Symptoms

The pest is capable of attacking the crop at all stages of growth. The unique early symptoms of infestation is tunneling by the first instar larvae into the mid rib causing a white streak that subsequently turns reddish brown and becomes visible on the ventral surface of the midrib. The larva bores its way to the central core of the spindle through the unfurled leaves and as a result rows of shot holes become visible when the leaves unfold. As the larva feeds by boring into the narrow central core towards the growing point, it also nibbles the inner half of the leaf immediately surrounding the feeding region. This leaf dries up, becomes atrophied and turns dark brown forming the dead heart. The dead heart cannot be pulled out

easily because the leaf forming the dead heart is never severed off transversely in the course of feeding by the larva. In tillering phase of the crop, the attacked shoots die leading to the formation of side tillers. In the grand growth phase, the crop growth is arrested and the crown with dead heart completely dries and leads to stunted growth. In grown up canes, dead heart formation induces sprouting of the lateral buds giving a bunched top appearance. Occasionally, top borer infestation induces aerial root formation. Top borer attack on weak and old shoots may result in 100 per cent mortality. At 50 per cent infestation, the yield loss could be 18.5 tonnes/ha. Loss in sugar recovery varies from 0.2 to 4.1 units.



Symptoms of Damage

Management

1. Planting time may be altered wherever the pest is severe as sugarcane planted during July to August showed high level of borer infestation in Southern states of India
2. In subtropical conditions, autumn planting is to be followed as it escapes the borer attack in ensuring winter months
3. Intercropping with coriander, onion, garlic, fenugreek and fennel and other crops such as wheat and mustard reduces top borer incidence. In spring planted sugarcane, intercrop with sunflower reduces incidence of second brood
4. Hand collection of egg masses of the borer should be carried out upto one month from the day of first month collection in pheromone traps. Egg masses should be collected at four days intervals so that they can be destroyed before the larvae hatch on the fifth day of oviposition

5. Setting up of six pheromone traps @ 50 numbers for the first two broods and operated upto 30 days for each brood in subtropical states reduce moth population and brings down the severity of subsequent broods. In tropical India, traps can be set up in hot spots with lure changes at 45 days interval in line with extent of borer occurrence. The method should be practiced on a community basis for reliable long term results
6. The egg parasitoid. *Trichogramma japonicum* released five times @ 2.5 cc/ha during second and third broods is found to reduce damage by half. *Isotima javansis* is an efficient natural larval parasitoid in the field
7. In case of severe infestation, if economical threshold level of 6-7 percent incidence in third brood and the incidence of the pest increases steadily, spray chlorantraniliprole 18.5 % SC @375 ml/ha for bringing down the borer population.

