



Centurion  
UNIVERSITY

# **Insect Pests of Sugarcane & Their Management**

<b>Common name</b>	<b>Scientific name</b>	<b>Family</b>	<b>Order</b>
<b>1. Early shoot borer</b>	<i>Chilo infuscatellus</i>	Pyralidae	Lepidoptera
<b>2. Internodal borer</b>	<i>Chilo sacchariphagus indicus</i>	Pyralidae	Lepidoptera
<b>3. Top shoot borer</b>	<i>Scirpophaga nivella</i>	Pyralidae	Lepidoptera
<b>4. Sugarcane scales</b>	<i>Melanaspis glomerata</i>	Diaspididae	Hemiptera
<b>5. Sugarcane pyrilla</b>	<i>Pyrilla perpusilla</i>	Lophopidae	Hemiptera

Common name	Scientific name	Family	Order
<b>6. White grub</b>	<i>Holotrichia serrata, H. consanguinea</i>	Scarabaeidae	Coleoptera
<b>7. Sugarcane mealy bug</b>	<i>Saccharicoccus sacchari</i>	Pseudococcidae	Hemiptera
<b>8. Termites</b>	<i>Odontotermes obesus</i>	Termitidae	Isoptera
<b>9. Whiteflies</b>	<i>Aleurolobus barodensis, Neomaskellia bergii</i>	Aleurodidae	Hemiptera
<b>10. Woolly aphid</b>	<i>Ceratovacuna lanigera</i>	Pemphigidae	Hemiptera

# **EARLY SHOOT BORER** *Chilo infuscatellus*

Pyralidae: Lepidoptera

## **DISTRIBUTION:**

It is a major pest in South India, distributed all over the cane growing regions of India

## **APPEARANCE:**

- Moth is small, slender, greyish brown or straw coloured with labial palpi projected upwards.
- A row of white dots is present along the outer margin of forewings.
- The caterpillar whitish with five violet stripes dorsally and dorso laterally on its body with dark brown head.



## LIFE CYCLE:

- Flat, scale like, overlapping eggs are laid in 3-5 rows on the **underside of leaf sheath or leaves in clusters** containing 8-40 eggs.
- Single female lays about 300-400 eggs.
- Oviposition period lasts about 4 days.
- Egg period varies from 3-8 days.
- Larval period ranges between 22-44 days depending upon the climate
- Pupation takes place **in a pupal cell** at the end of the larval tunnel and the pupa is pale straw coloured.
- After 4-6 days moth comes out.
- The adult survives for 3-8 days.
- There are six generations in a year.

## **SYMPTOMS OF DAMAGE:**

- The larvae that hatch out from the eggs get scattered and young larva enters the stem by passing into the space between the leaf sheath and stem.
- The caterpillar bores into the growing stem and kills the young plant causing dead heart, if ignored later becomes internodal borer, which bores the stem at internodes.
- In young tillers, caterpillar bites holes through the stem at the ground level and feeds inside and exhibits the following symptoms

- Presence of an entrance hole at the ground level.
- Dead hearts which can be easily pulled out.
- The dead heart emits offensive smell.
- If infested canes are split opened, the larvae or pupae are seen inside.

The pest attack is usually severe in the early stages of the crop growth during the hot pre monsoon period. The attack of the borer is a continuous process from sprouting stage to cane formation. Even after cane formation, it acts as an internodal borer affecting the internodes. **Infestation is favoured by poor irrigation, absence of rains, high temperature and low humidity.**







## **MANAGEMENT:**

- Systematic collection of egg masses and their destruction.
  - Removal of dead hearts and their destruction.
  - **Trash mulching** which not only checks the population but also conserves soil moisture and adds the organic matter to the soil.
  - **Planting in** deep trenches reduces the borer incidence.
  - **Adjusting the planting** dates to avoid the peak oviposition.
- Minimum incidence is in November and December planting.  
Maximum incidence is in January and February planting.

- **Quick** growing varieties escape heavy infestation – Attack will be more in thin varieties than in thick ones.
- Set treatment with **0.1% malathion** or chloripyriphos.
- **Light earthing up** of soil up to 4-6 week old crop to make the stem inaccessible to larvae followed by frequent irrigations.
- Installation of light traps.
- The release of egg parasites, *Trichogramma minutum*; *T. australicum* is reported to have given good control of this pest at many places (Chagallu sugar factory area).
- Application of **Phorate 10G** @ 1.0 kg a.i. /ha at 4h week age of the crop in equal splits to the soil and leaf whorls.

# **INTERNODAL BORER** *Chilo sacchariphagus indicus*

## Pyralidae: Lepidoptera

### **DISTRIBUTION:**

The insect is found throughout India and usually occurs on sugarcane late in its growing phase. Its multiplication is rapid under conditions of low temperature and high humidity and the infestation ranges from 20 to 50%. It is serious on sugarcane in **Andhra Pradesh, Karnataka, Kerala, Tamil Nadu and Uttar Pradesh.**

### **APPEARANCE:**

- Moth is small, straw coloured. Forewings have a marginal dark line and the hind wings are whitish.
- Caterpillar has a white body with dark spots and a brown head.









## **LIFE CYCLE:**

- Scale like white eggs are laid in batches, each batch containing 9-11 eggs in two rows **on the sheath or leaves.**
- The incubation period is 5-6 days.
- The larva becomes full grown in 37 to 53 days and pupates in the leaf sheath.
- The pupal period lasts for 8-10 days.
- The total life cycle takes 50-70 days.
- There are six broods in a year.

## **SYMPTOMS OF DAMAGE:**

- The larva usually attacks sugarcane late in its growing phase.
- The caterpillar bores at the nodal region and enters the stem.
- The tissues turn red and the hole is usually plugged with excreta.
- A larva may attack a number of nodes.

## **MANAGEMENT:**

- Collection of egg masses and their destruction.
- Inundative release of the egg parasite *Trichogramma australicum* at 50,000 parasites/ ha/ week.





# TOP SHOOT BORER *Scirpophaga nivella*

## Pyralidae: Lepidoptera

### **DISTRIBUTION:**

•It is distributed all over the country, but it is more serious in **North India**. It is also found in **South-East Asia, Japan etc.** Besides sugarcane, it attacks a number of wild plants belonging to the genus *Saccharum*.

### **APPEARANCE:**

- Moth is medium sized, creamy white, slightly bigger than early shoot borer moth.
- Female has tuft of crimson coloured hairs at the tip of the abdomen.
- In case of certain males, each of the forewings has a black spot.



- Full grown caterpillar is creamy white in colour with yellow head.

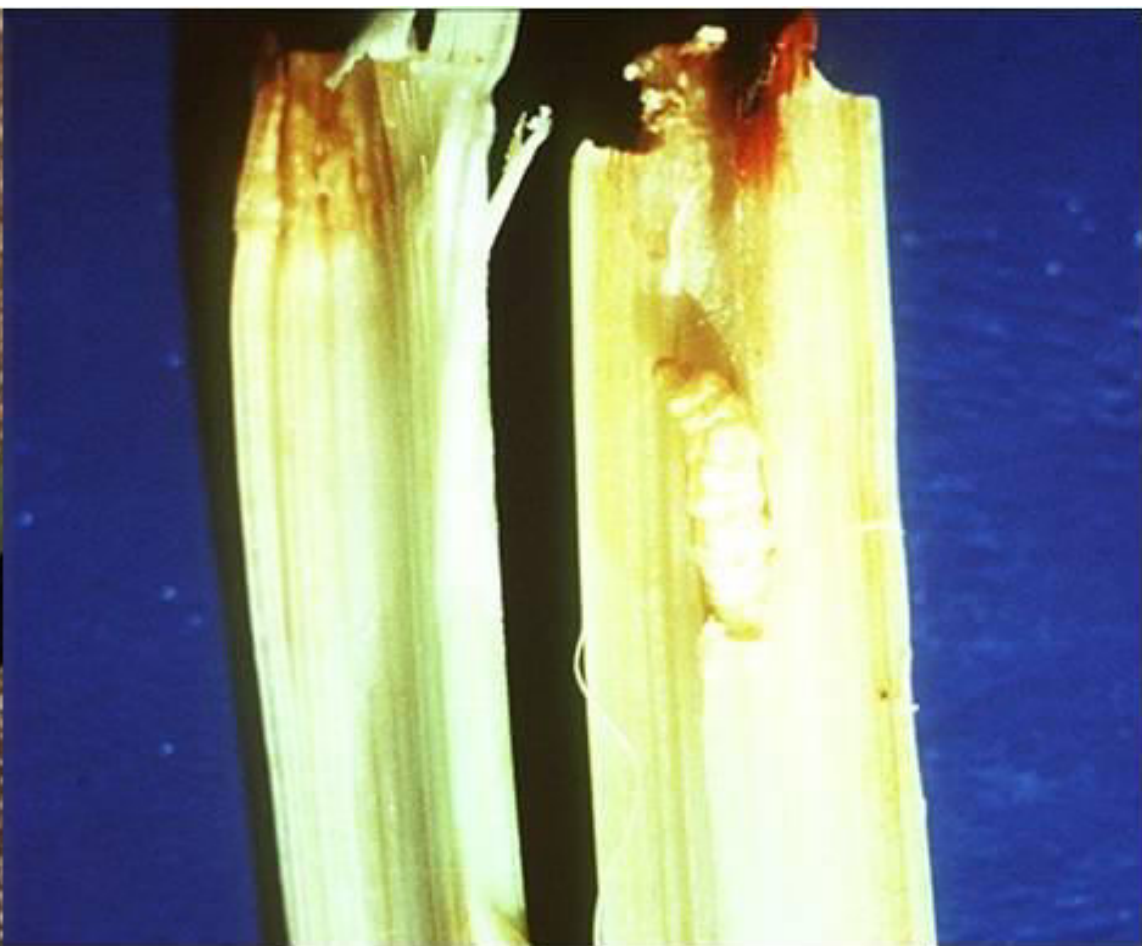
### **LIFE CYCLE:**

- About 250-300 dull white elongate overlapping eggs are laid in clusters, each cluster having 9-79 eggs, **usually near mid ribs.**
- The eggs are covered by buff coloured hairs from female anal tuft.
- Eggs hatch in 7-9 days.
- The larval period lasts for 25-42 days
- Pupation is inside the stem.
- The pupal period lasts for 7-10 days.
- The life cycle may range from 40-62 days.
- It completes 7 generations in a year.

## **SYMPTOMS OF DAMAGE:**

- The top shoot borer damage starts when the sugarcane is 2-3 months old.
- The damage results in the following symptoms
  - ❖ A number of shot holes on affected leaves due to biting across the spindle
  - ❖ Reddish brown charred dead heart that can not be easily pulled out.
  - ❖ Interference with apical growth gives rise to side shoots and bunched top symptoms.







## **MANAGEMENT:**

- Collection and destruction of egg masses.
- Collection of affected tillers and destruction.
- Release of egg parasitoid *Trichogramma minutum* and larval parasitoid, *Isotima javensis* during November and December in Adsali sugarcane is found successful.

# **SUGARCANE SCALES** *Melanaspis glomerata*

## **Diaspididae: Hemiptera**

### **DISTRIBUTION:**

- This armoured scale is of considerable importance in Andhra Pradesh, Gujarat, Karnataka, MP and Maharashtra.
- It is reported that the pest gained entry into AP in 1966 into Nizamabad district of AP and from there to East Godavari district in 1968 and from there to West Godavari and Krishna.

### **APPEARANCE:**

- Adults are **greyish black** in colour, irregularly oval and slightly convex in shape.
- Female are **flat and pyriform** shape.
- The males are **winged and smaller** in size but are rare. The adult female is **ovoviviparous**.

## **LIFE HISTORY:**

- The nymphs that hatch inside female come out through the **genital aperture** (crawlers), crawl about some time and settle down after selecting suitable spot, preferably on the internodes.
- Freshly hatched crawlers are tiny and light **yellowish** in colour.
- The tiny nymphs after settling down insert their mouthparts into the tissue and start sucking the plant sap.
- They **remain stationary** all through their life if they are females.
- The formation of the protected covering *i.e.*, scales starts soon after a nymph gets settled and becomes thicker and increases in size.

## **SYMPTOMS OF DAMAGE:**

- Infestation commences with the **formation of the internodes** and continues to increase as the plant grows.
- Plant sap is sucked and the plant is devitalized.
- In severe cases, even it infests the **leaf sheath and the lamina including the mid rib.**
- Varieties **having persistent leaf sheaths are attacked to a greater extent and a definite correlation exists** between number of stomata in the stem epidermis and the intensity of attack.

•In a highly susceptible variety of sugarcane, the germination was reduced by about 20 per cent, further the weight of canes, juice sucrose content, bulk density and purity reduced by about 13, 47, 28 and 26 per cent respectively.

- ❖ Shrivelled canes with shortened internodes.
- ❖ Formation of shiny thick encrustation on the cane, maximum on the bottom and middle of the cane.





## **MANAGEMENT:**

- Planting of varieties having a leaf sheath and are almost self stripped in endemic areas of this pest.
- A variety CO – 7706 has been found moderately tolerant to scales
- Immersion of setts before planting in **dimethoate 2ml/l or malathion 2ml/l solution for at least 15 minutes** or **drenching the cane setts kept in the furrow with 0.1% dimethoate solution @ 450-500 litres per hectare** before covering them with earth.
- When the shoots have atleast 6-8 internodes, detrashing the basal 4-5 internodes ensuring that the top most detrashed node is free from scale insect (Before end of July).

- Spraying with malathion 2ml/l or dimethoate 1.7 ml/l on the exposed basal nodes twice at an interval of 10-15 days whenever the stage of the crop and its growth permits.
- Application of **carbofuran** 3G at the base of clumps 5"-6" deep before July.
- Release of predatory coccinellids, *Pharoscymnus hornii* or *Chilocorus nigrinus* in the detashed fields after July.

# SUGARCANE LEAFHOPPERS OR SUGARCANE PYRILLA

*Pyrilla perpusilla*

Lophopidae: Hemiptera

## **DISTRIBUTION:**

•It is a potential pest occurring in an epidemic form in UP and Punjab. It is also seen in Bihar and Maharashtra. It infests wheat, sorghum, rice, mango, oats, barley etc.

## **APPEARANCE:**

•Adults are straw coloured with two pairs of wings folded like a roof on the back and the head prominently drawn forward as a sort of rostrum.



## **LIFE CYCLE:**

- About 600 – 800 pale greenish yellow eggs are laid on the **underside of leaves** in clusters, covered over with a white **filamentous waxy material** secreted by the female.
- Eggs hatch in 7-10 days in summer.
- **Newly hatched nymphs are milky white in color with a pair of characteristic processes or filaments covered by wax.**
- They are very active and are found in very large numbers on sugarcane.
- Nymphal period lasts one to two months.
- Life cycle is completed in about 2 months. There are 3-4 generations in a year.



## **SYMPTOMS OF DAMAGE:**

- Both adults and nymphs suck sap usually from the underside of leaves and devitalize the plant.
- In severe cases, the leaves dry up and the plant is stunted.
- Due to feeding the **sucrose** percentage of juice is adversely affected.
- Besides sucking the sap, they excrete honey dew that spreads on the leaves on which a black fungus develops adversely affecting photosynthesis and ultimately the yield
  - ❖ Affected plants present sickly and blighted appearance.
  - ❖ Development of sooty mould.
  - ❖ Fading and drying up of the leaves.

## **MANAGEMENT:**

- Cultural practices like prompt **destruction of trash after harvest.**
- Selection of tolerant varieties
- Mechanical methods of collecting and destroying egg masses in the initial stage *i.e.*, during April-May.
- lepidopteran parasite, *Epiricania melanoleuca* naturally suppress the population.
- Foliar sprays with malathion 2 ml/l



# WHITE GRUB

*Holotrichia serrata, H. consanguinea*

Scarabaeidae: Coleoptera

- Grubs of *Holotrichia* spp are found feeding on roots and root hairs of sugarcane. The attacked clumps dry up.

## MANAGEMENT:

- Effective management practices include **ploughing** the field deep after the crop.

- application of **phorate** 10G 8 – 10 kg / ac in furrows on both sides of cane row at planting or standing crop, and spraying with carbaryl 5 g/l on leaves of **neem, subabul, drumstick** as the beetles emerge in June after the break of monsoon and are active at night and feeding on them and erection of light traps to collect beetles which are phototropic







# SUGARCANE MEALY BUG *Saccharicoccus* *sacchari* Pseudococcidae: Hemiptera

## APPEARANCE:

- Small pinkish oval insect attached to **the lower nodes**, protected by leaf sheaths and covered by a white waxy powder.
- Adults and nymphs of these bugs are found in large number near the nodes.
- The **females are sac** like with clearly segmented body.
- Males are **winged** but rare.

## **LIFE CYCLE:**

- The female deposits about **1000** eggs covered with a white waxy or mealy mass in the nodal region.
- Eggs hatch within a few hours and the newly hatched nymphs move rapidly for some time, select a place on plant and settle.
- The total life cycle take in about a month.

## **SYMPTOMS OF DAMAGE:**

- Both nymphs and adults persist on **plants** and suck the cane juice from the **growing canes** and excrete honey dew on the leaves.
- Sooty mould develops on the infested portion.
- The pest population builds up under **drought** conditions.
- Ants help in their dispersal to a large extent and they live in symbiotic existence.

- The infestation can be identified by the presence of mealy bugs at the nodes within the leaf sheath, reduced **plant vigour and growth, movement of ants and mould** on infested area.

### **MANAGEMENT:**

- Destruction of crop residues, **immersion of setts in malathion 2 ml/l or dimethoate 1.7 ml/l solution for 15 minutes before planting**, selection of pest free sets for planting and detrashing and spraying malathion 2 ml/l or dimethoate 1.7 ml/l are effective measures.





# TERMITES

## *Odontotermes obesus* Termitidae: Isoptera

- Termites or **white ants** are another destructive pest of sugarcane, omnivorous and omnipresent.
- They live under ground attacking the crop, when the setts are planted in the soil and ravages continue till harvest of the crop with slight slackness during monsoon.
- They are mostly found in light soil.
- Their attack is severe in **red soils** and where **irrigation facilities are inadequate**.
- The termites damage the cut ends and buds of setts affecting their **germination**.
- Setts are **completely eaten away** leaving only the outer hard rinds.

- In attacked plants, the outer leaves first show signs of drying and the attacked canes may come out easily, if pulled.
- The damage may range from 40-50%.
- Its attack results in heavy loss in **yield** in sugarcane and also reduction in **sucrose** content.
- Six species of termites have so far been recorded from India, damaging sugarcane viz., *Odontotermes obesus*, *O. assumthi*, *O. taprobenes*, *Microtermes anandi*, *Eremotermes nerapololis*, and *Trinervitermes biformis*.
- These are morphologically different, but their habits, symptoms of damage *etc* are all similar.



## MANAGEMENT:

- Systematic digging up of termite mounds and destruction of queen is a permanent measure of control.
- Dusting **methyl parathion 200 g** around and levelling, deep ploughing and copious irrigation reduces infestation and drenching with **chlorpyrifos 50 EC** @ 10ml/l is effective.

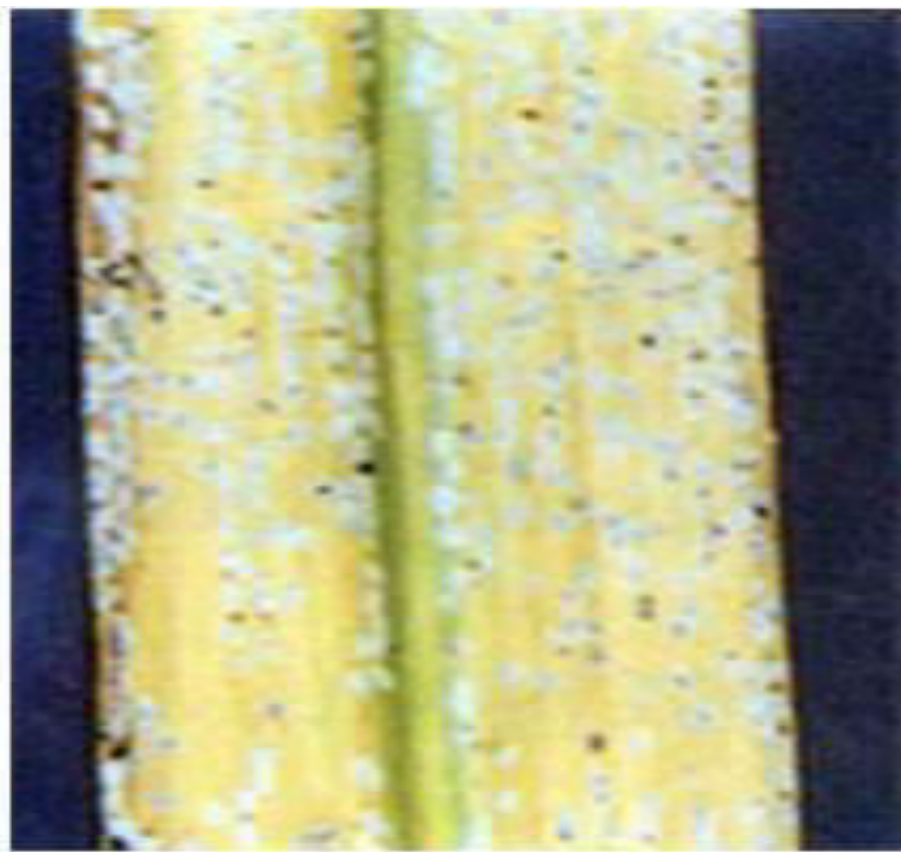
# WHITEFLIES

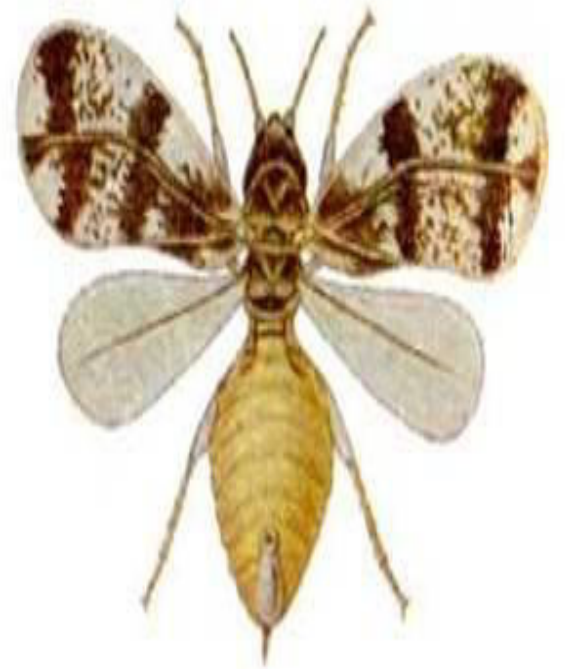
*Aleurolobus barodensis*, *Neomaskellia bergii*

Aleurodidae: Hemiptera

- Only these two species have been recorded damaging sugarcane in India.
- Both nymphs and adults suck sap from leaves which dry up and **characteristic yellow streaks** appear along the length. Nymphs are stationary. Severely attacked plants become stunted.
- The sugarcane crop raised in low lying, water logged areas and in semi dry alkaline soils suffers more due to whitefly. Infestation is seen from August - October.

\*\*\*\*\*Due to attack by this pest, cane juice becomes more watery and the jaggery (gur) quality is adversely affected.





- A loss of 30-40 per cent in **sucrose** and 20-25 per cent in total solids was estimated due to its attack.
- It is reported that the loss to be of 15-20 per cent in yield and 1-2 units in sugar recovery due to the pest attack on crop. Whiteflies prefer broad leaved succulent varieties.

### **MANAGEMENT:**

- Avoid **ratooning** in low lying areas, prompt clipping and destruction of affected parts, foliar sprays with **quinalphos** 2 ml/l against young nymphs and fenetrothion 1 ml/l against puparia are effective measures.



# WOOLLY APHID *Ceratovacuna lanigera*

## Aphididae: Hemiptera

- Adults colonise on **either side of mid rib**, covered with white puff material on under side of leaves.
- Nymphs develop white waxy and mealy filamentous material from **third** instar.
- Nymphs and adults suck sap from undersurface of leaves resulting in white and **yellow spot on leaves**, drying of leaves, sooty mold on honeydew and activity of ants.
- Earthing up to destroy infested material, weed management, restricting movement of seed material from infested areas, biological control by neuropteran predator, *Chrysoperla carnea*; lepidopteran predator: *Diapha aphidivora* and foliar spray with endosulfan 2 ml/l or acepahte 1.5 g/l are effective management practices.







Thank You

