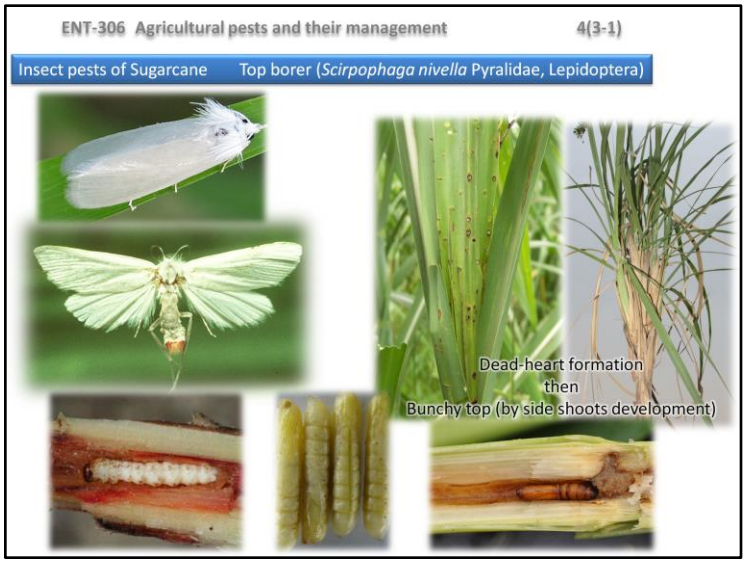
Major Insect Pests of Sugarcane Crop in Pakistan

Important cash crop of Pakistan (Saccharum officinarum / S. spontaneum) tropical and sub-tropical climate crop. source of income and employment for the farming community.

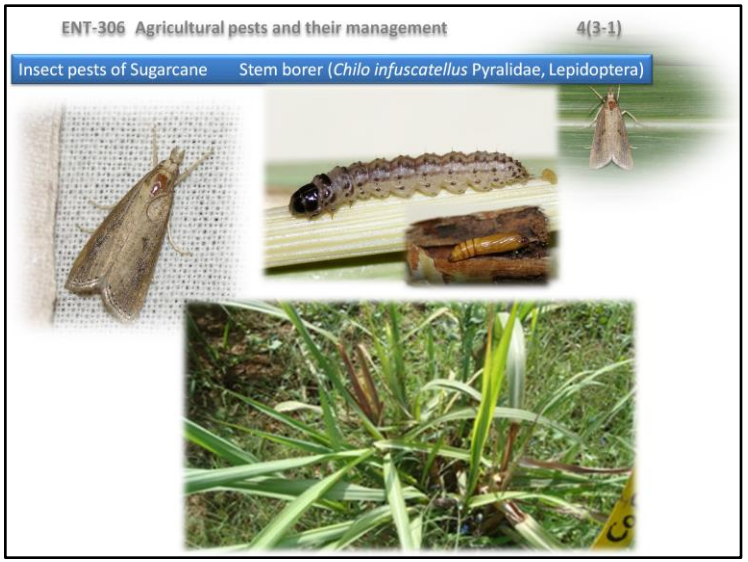
fifth position in cane acreage and production and almost 15th position in sugar production. Brazil India China (with about 60 t/ha and sugar recovery 10-13 t/ha) Pakistan 35 t/ha with sugar recovery of 5 t/ha.

Provides essential items for industries like sugar, chip board, paper, barrage, confectionery, uses in chemicals, plastics, paints, synthetics, fiber, insecticides and detergents.
According to officials, total sugarcane cultivated area in 2019-20 was 1.06 million hectares against an area of 1.1 million hectares the year before; Pakistan's Marketing Year 2019/20 sugar production is forecast at 5.2 million tons, 2017-18 it was 6.5 million tons
2012-2013_area 1.13 million ha (India 4.5million) and production 63.7 million tonnes (India more than 300) with 5.05 million tonnes sugar at end of crushing season. Domestic needs of sugar in country is about 4.5 millon tonnes. Per capita sugar consumption in Pakistan is 25 Kg. Global is 24.8 Kg. In India it is 20 kg
Almost 200 species of insects pests have been reported to attack sugarcane crop in Indo-PaK. Cause 15-35% yield loss.

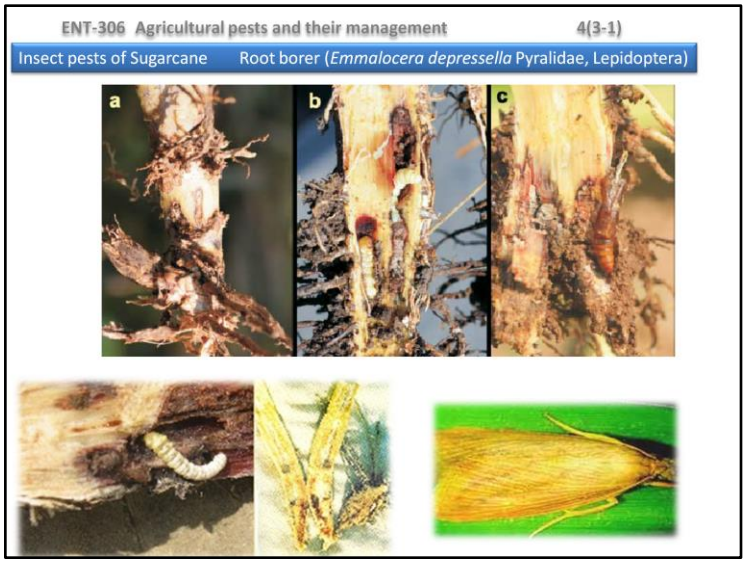


Scirpophaga nivella
Larva is creamy white, 25-30mm long. Adults are pure silky white often found sitting on sugarcane tops in the morning. Females with reddish or orange or brownish tuft of silken hairs with which it covers its egg masses (30-60 eggs_total about 150 to 200 eggs/female) on lower leave surface of top leaves.
Usually, active period of all borers is March to November and dormant period is December to February. Overwinters (hibernates) as larva in cane tops. Pupation occurs in Feb.
Usually, borer moths are short-lived (4-5 days), larvae 4-5 weeks, eggs hatch in 4-5 days. 4-5 generations per year. 4-5 larval instars.
First two broods (generations) damage young cane plants and can cause major damage to crop. Subsequent broods cause dead-heart and bunchy tops and can cause 25% damage to crop weight and 0.3 to 3 units to sugar recovery units.

Larvae bore through lower side via mid rib of leaves, bores into the central core (growing point) and thus unfolded shot-holes on leaves show pest attack.
Full grown larva makes a pupal chambers with an emergence hole in rind between nodes.
Dead-heart and later on becomes bunchy-top.
In attacked young plants, there is presence of the reddish mid-rib streaks on the crown leaf indicates top-borer infestation
Control: Trichograma chilonis (egg parasitoids) Telenomus (Scelionidae) egg parasitoid
Mechanical/cultural: Collect and destroy egg clusters and moths after trapping by light.
Cut and burn attached shoots in April to June (young crop).
Chemical: Carbofuran granules application following irrigation



Chilo infuscatellus
The larva is dirty white (20-25mm) with five violet longitudinal stripes and black head capsule.
Moths have brownish grey-colored forewings and whitish hindwings.
In young crop (from April to June), the larvae bore into the plants by one or more holes and kill the growing point, resulting in the characteristic 'dead-heart' that emits a foul smell and can be easily pulled out.
the upper portion of the cane dries up completely (dead-heart formation mostly from April to June). After cane formation, attack does not results in to dead-hearts and remain confined to few inter nodes.
Losses about 15-25% of cane yield and 2% sugar recovery rate.
4-5 generations per annum and overwinters as full-grown larva in crop stubbles. Female lays 300-400 eggs in clusters on lower leaf surfaces.
Control:
Egg parasitoids Tricho
Larval parasitoid Apanteles flavipes
Pupae parasitoid Tetrastichus sp. (Eulophidae)
Chemcial: Carbofuran/carbaryl
Cane settes treatment with systemic pesticide before sowing.
Earthening up and irrigation of crop after granular application.



Emmalocera depressella

Larvae have creamy white body (30mm long) with yellowish brown head and with a somewhat wrinkled body.

Moths are pale yellow or greyish brown forewings and white hindwings.

4 generations in an year and overwinters as full grown larva in crop stubbles in Feb. pupates after making an emergence hole just near stem root.

Female lays 200-300 scale like creamy white eggs on leaves, stems or on the ground near stem.

There is only one entry hole near the base of the shoot.

Dead hearts and general yellowing of the leaves. The dead hearts cannot be pulled easily and does not emit any offensive smell.

Damage can be up to 10% and sugar recovery up to 0.3 unit.

Control:

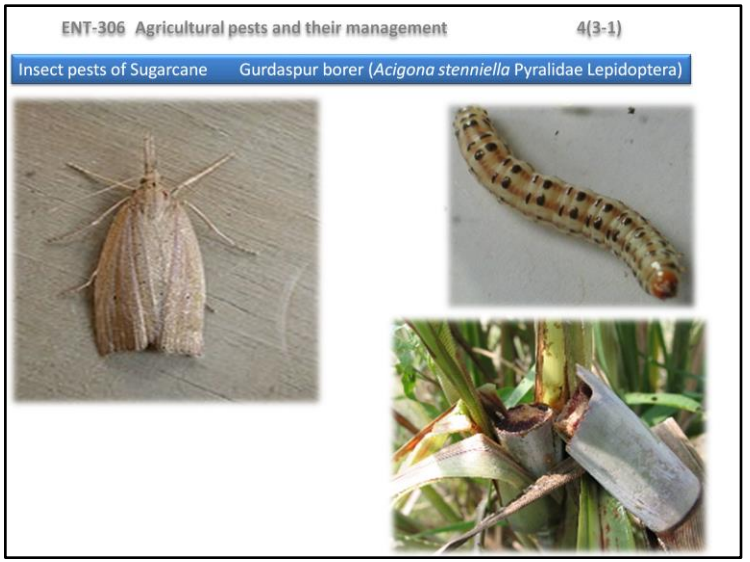
Egg parasitoids Tricho

Larval parasitoid Apanteles flavipes and Braconid wasps.

Chemcial: not needed.

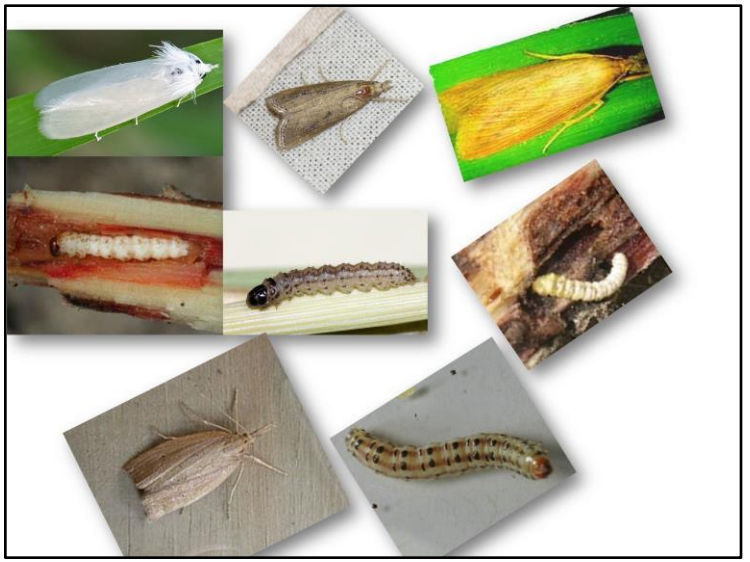
Canes should be harvested deeply and soil should be deeply ploughed after harvesting.

Earthening up and irrigation of crop after granular application.



Acigona steniella
1st time recorded in District Sialkot in 1923.
Larva creamy white 30-35 mm long with 4 longitudinal reddish white/violet strips. Orange brown head,
Adult dull brown forewings with tiny black spots in between veins along out margin. Hind wings white.
Active in July to October months.
100 to 300 flattened scale-like eggs laid in 5-20 eggs per mass on leave upper sides near veins. Larvae enter bore make spiral gallaries and 3rd instar emerge and enter new canes besides. Voltinism = 3
Young larvae enter the top portion of a cane through a single hole just above the node. They feed gregariously by making spiral galleries which run upwards.
Dried cane patches in the field is an indication of the pest attack
20-25 % crop loss could occur in some areas
Sugar contents recovery decline
Easily break off of infested canes by wind etc.

Removal of cane with maximum close to base.
Light traps
Deep ploughing after harvesting followed by flood irrigation mixed with some insecticide or kerosene oil etc.
Crop rotation

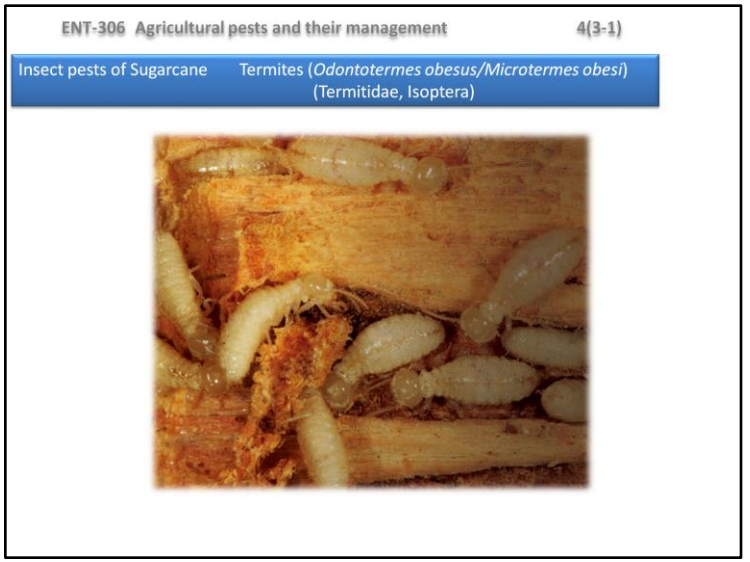


Pyrilla perpusilla (Adult straw-colored (10-15mm long) and nymph yellowish white with long prominent white feather like filaments at end of abdomen) both suck sap from underside of leaves.
Very active and agile active making a fainted low noise as somebody walks through infested sugarcane.
foliage-sucking pest
Alternate hosts wheat, barley, maize, sorghum and different wild grasses (Baru grass/sudan grass/swank).
By Pyrilla infestation, cane yield loss could be about 28%, while 1.6 unit loss in sugar recovery.
leaves turn yellowish white and wither away.
Sooty mould on honeydew which interferes with normal photosynthetic activity.
Breeds throughout year. About 300 eggs are laid by females underside leaves. 3 to 4 generations per year. Life cycle 2-3 months.

Control:
Sugarcane trash destruction after harvesting.
Spray of some systemic and contact insecticide.

BC: Epipyropes (Epipyropidae) small months.
The parasitized nymphs of *Pyrilla* spp. can be immediately recognized by the presence of fleshy, ellipsoidal larvae with white waxy cover carried on the body of the nymphs. Presence of parasitic larvae on the body of the leafhopper adult is always indicated by the elevated position of the wing on one side. Boat-shaped white cocoons can be observed on leaves with hopper infestation. Epipyrop adult moths of both sexes are small, dark brown or blackish wings, triangular in outline, with prominent

bipectinate antennae.



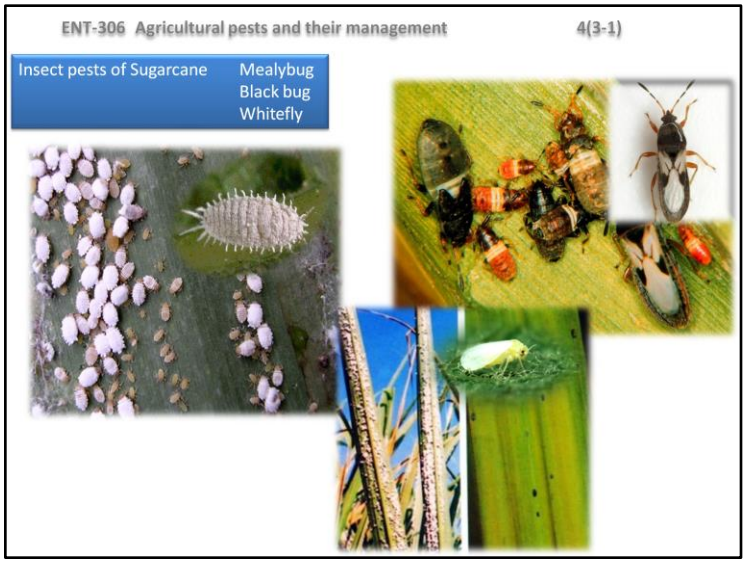
Macrotermes spp.
Odontotermes guptai

Setts are infested by termites. So pre-sowing treatment with some insecticide is effective against termites.
Add well rotten FYM in field.
Remove deeply crop stubbles after harvest to ensure eradication of termite infestation and flood irrigate with some insecticide or kerosene oil dripped after deep soil ploughing.

What are different sugarcane termite species in Pakistan?
Odontotermes obesus (Macrotermitinae: Termitidae) Native to old world (Asia, Africa and Australia)
Odontotermes guptai
Microtermes obesi (native to India, Sri Lanka, Pakistan and Vietnam)
Microtermes mycophagous
Microcerotermes
These termites attack the planted sugarcane setts at the ends or eye buds but in severe attack, the internodes as well. These termites can deteriorate germination and also quality of sugarcane at harvest.

Slow-release formulation (using cellulose/maize cob baits plus fipronil) based on attract and kill strategy
Horizontal transmission of EPF conidia to eliminate colonies of fungus growing pest termites
Trophallaxis is the transfer of food or other fluids among members of a community through mouth-to-mouth (stomodeal) or anus-to-mouth (proctodeal) feeding)
Grooming and **other social interactions** among colony mates and **intermingling behaviour.**

Minor/Occasional Insect Pests of Sugarcane
(Sucking Insect Pests of Sugarcane)



Saccharicoccus sacchari (minor pest, 2.5-5mm long females, male adults sluggish one pair of wings and short-lived, active throughout year, several generations per year, sugar content reduction potential upto 20% in case of severe infestation, tight-sheathed varieties are less attacked. Blackish/sickly appearance due to sooty mold.) Methidathion, profenofors, lambda-cyhalothrin.

Cavelerius excavatus (ratooning major factor. Alternate hosts rice, maize etc., congregated under leaf sheaths or in top whorl. Adult 6-7mm long, black with white patches on wings, abdomen is reddish, eggs laid in clusters in sheath inner-sides (in soil in winter season), 5 nymphal instars complete in 4-6 weeks, 5 generations per year, Spray in sheaths or whorls for effective results.)

Aleurolobus barodensis (alternate host wild grasses like sarkanda, baru etc., body size 3mm, pale-yellow colored, 9 generations per year, severe infestation causes 15-25% sugar recovery. Sooty mold grow, sickly appearance of crop)