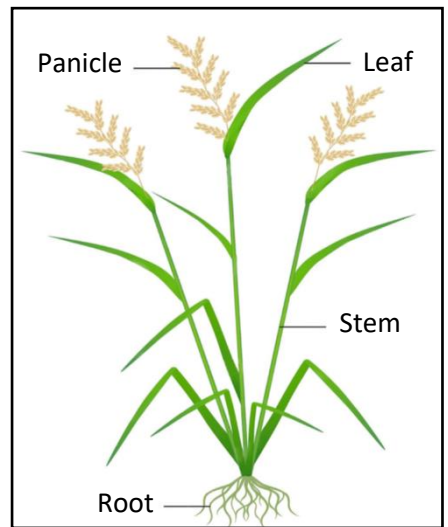


RICE

Main Pest: Stem Borers

4 main stem borers in Tanzania:

- **White stem borer** (*Maliarpha separatella*)
- **African pink borer** (*Sesamia calamistis*)
- **Spotted stem borer** (*Chilo partellus*)
- **Stalk-eyed fly** (*Diopsis thoracica*)



Moths:



White stem borer

- 110-150mm long
- Long pale-yellow wings



African pink borer

- Wingspan = 20-30mm
- Pale brown wings
- Silky appearance
- Nocturnal



Spotted stem borer

- Wingspan 20-25mm
- Forewings are yellow-brown with dark scale pattern
- Hindwings are white

Flies:



Stalk-eyed fly

Characteristics

- Grow up to 10mm
- Black thorax with reddish brown abdomen

Stem borers are also common pests of maize, sorghum, millet and sugarcane

Distribution: These pests can be found in the Mbeya, Morogoro, Mwanza, Shinyanga, Coast and Zanzibar regions of Tanzania.

Symptoms

- Reduced plant height
- Reduced total number of grains per panicle
- Reduced grain weight
- Dead heart symptom (death of central shoot)
- White head (white, empty panicles stand upright)



White head



Dead heart

Control measures



Inspect regularly for pests



Early planting (only after the first effective rains)

Can reduce the incidence of pests



Intercropping

Can prevent the migration of larvae from one plant to another



Remove host weeds and wild rice during the dry season



Attract and maintain natural predators (for example, with wildflower borders)

Natural predators include:

- Parasitoid wasps such as *Chelonus madae*, *Pristomerus cans* and *Goniozus indicus*
- Pathogens such as *Beauveria sp.*

SUGARCANE



Main Pest: Pink Sugarcane Mealybugs

Mealybugs are a type of scale insect, they are sap-sucking pests that can also transmit plant diseases, seriously reducing sugarcane yield.

Characteristics

- Mealybugs tend to be around 1cm in length
- Pink coloured body
- Covered in a white sticky powder resembling cornmeal and giving them the name 'mealybug'. The pink sugarcane mealybug has a thinner mealy wax layer, allowing its pink body to show through

Symptoms

- Abnormal colour leaves
- Honedew or sooty mould on leaves
- External feeding of roots and stems



Sooty Mould

Mealybugs are also common pests of cassava, mango and okra

Soft Scale Insects

Characteristics

- Like mealybugs, body covered in waxy shell resembling cottony cushions
- Produce a lot of clear sticky liquid called honeydew

An ant infestation can also be a first sign of a soft scale infestation as they harvest the honeydew. However, ants will often help soft scale thrive by moving them from plant to plant.

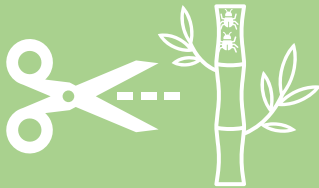
Symptoms

- Circular smoky-brown or greyish-black covers on stems and leaf mid-ribs
- Leaves unhealthy pale green colour
- Non opening, yellow leaves
- Stunted growth



Control measures for mealybugs and soft scale insects

Removing and destroying heavily infected plants



Inspect for pests regularly

Remove mealybugs by rubbing, picking, or spraying affected part of crop to stop infestations growing.

Avoid overusing nitrogenous fertilizers



Attract and maintain natural predators

Natural predators include:



- Ladybird beetles
- Hoverflies
- Green Lacewings
- A range of parasitoids such as parasitoid wasps

MAIZE

Maize has many crop pests with the most common being **stem borers** and **aphids**. Other pests include **armyworms** and **cutworms**.

Armyworm



Adult armyworm (moth)

- 1.4 - 1.8 cm long
- Wingspan: 3cm
- Forewings are dark brown with grey markings
- Hindwings are white with dark veins



Armyworm at caterpillar stage

- Grow up to 4cm long
- Greenish brown body with a thin stripe down the centre and 2 orange stripes along each side
- Active at night (found in soil during day)

Symptoms

It is the larvae that cause damage to the crop, feeding on the leaves, growing points and young stems. This gives the leaves ragged edges. Some may even create holes in the leaf that cause it to dry up and have a scorched appearance.

Control measures



Inspect regularly
Especially at night
when caterpillars are
active



Attract natural predators
Maintaining natural surroundings
with plenty of breeding places for
them, like trees and shrubs

Natural predators
include:

Lacewings, wasps, flies,
and spiders attack the
caterpillar.

Night birds and bats
feed on the moths

Cutworm



The cutworm at larval stage.
This is the stage that the cutworm is a pest

Characteristics

- 2-5cm long
- Dark grey/brown colour
- Feed mainly on seedlings, cutting the stem below or on the soil surface
- Feed at night



(Cutworm at moth stage)

Symptoms

- Leaves with chewed edges
- Small holes in the stems
- Small holes in the roots
- Cut stems, causing the plant to fall or wilt
- Missing stems: the cutworms cut at the base of the stem and carry the stem back to their burrow

Control measures



Attract natural predators
by maintaining natural surroundings and wildflower borders.
Natural predators include Tachinid flies and Braconid wasps.



Remove weeds around a week before planting (removes suitable habitat for female to lay eggs)



Ploughing during the crop growing season exposes the caterpillars to predators such as birds

MANGO

Oriental Fruitfly

Oriental fruitfly infest a range of fruits globally, including banana, avocado, papaya and citrus.

Characteristics

- Colourful with wings banded or spotted with brown
- Two wings, each wing 4-7mm long
- Yellow and dark brown to black marking on the thorax
- Marking on abdomen usually form a "T" shape



Oriental fruitfly

Other pests of mango include:

- Mango seed weevil
- Mealybugs

Symptoms

- Rotting and decomposition of fruits



Fruit infested with larvae - The eggs of a fruit fly are laid within the fruit, where they hatch and feed.

Control measures

Inspect for pests and puncture marks regularly, use fruitfly traps to monitor and trap fruitflies



Open suspect fruits to check for larvae



Attract natural predators such as parasitoid wasps



OKRA

Aphids attack a number of plants including cotton, groundnut, pumpkin, sweet potato, mango, sugarcane and maize, making them one of Africa's biggest pests.

Cotton aphids

Characteristics

- 1-1.5mm in length
- Colours range from yellow to dark green, depending on climate and host plant
- Excrete honeydew



Yellow cotton aphid infestation

Symptoms

- Yellowing of leaves to begin with that become puckered and curled as aphid numbers increase
- Sooty mould
- Stunted plants with twisted stems



Green cotton aphid infestation

Aphids also carry a range of diseases that may also threaten crops.

Control measures

Inspect for
pests regularly



Attract natural predators
such as ladybird beetles,
green and brown lacewings,
hoverflies, and spiders



CASSAVA

Whitefly are a common pest of cassava, that cause damage to crops similar to aphids.

Whitefly

Characteristics

- 1-3 mm in length
- Flat and oval, resembling small moths
- Covered In a white, opaque powder
- 4 transparent or clouded wings



Whitefly

Other pests of cassava include stem borers, scale insects and mealybugs.

Symptoms

- Sooty mould
- Yellowing and curling of leaves
- Cassava Mosaic disease



Cassava mosaic disease: Symptoms include stunting of growth, distorted leaves with irregular green, yellow or white patches

Control measures

Check for white-brown eggs on the underside of leaves



Attract natural predators such as ladybird beetles, lacewings, hoverflies, and



Provide suitable irrigation for crops to reduce risk of whitefly damage



Sweet Potato

Weevils are also known as snout beetles. They are a major pest to crops like sweet potato all around the world.

Sweet potato weevil

Characteristics

- Long, thin, ant-like body head and legs
- Black head, orange antennae, thorax and legs and a metallic blue abdomen
- Appears to be smooth and shiny
- Curved snout
- 3-4 mm



Sweet potato weevil

Symptoms

- External feeding of roots, leaves and stems, leaving behind round feeding punctures
- Malformation, thickening and cracking of the vine
- Pale green leaves

Other types of destructive weevils:



Grain weevil

Bores holes inside cereal grains and implants eggs inside



Rice weevil

Adults feed on whole grains whilst larvae develop inside grains

Mango seed weevils are another major pest

Control measures

Keep soils well-watered: dry, cracked soil is a favourable environment for weevils.



Check upper 15 cm of soil and lower 15 cm of the vine for larvae



Attract predators such as wasps and ants



Pigeon pea

Pod borers are some of the most common pests of pigeon pea. Pod borers include the African Bollworm.

African Bollworm

Characteristics (caterpillar)



Caterpillar stage

- 3-4 cm long
- Colour ranges from yellow/white to reddish brown with age
- Black bumps and short hairs along their backs give them a spotted appearance



(Moth stage)

Symptoms

- Circular holes through fruits/pods
- Caterpillar faeces should be evident around damaged areas
- Hole in leaves

Other pod borers include:

Bean pod borer



Pulse pod borer



Control measures



Check for eggs regularly (tiny white/yellow eggs)



Attract natural predators such as wasps with wildflowers



Plant trap crops such as sunflowers



Plough field to expose pest to the sun and predators