MAIZE STORAGE PESTS

MAIZE WEEVIL (Sitophilus zeamais)
The maize weevil (Sitophilus zeamais) attacks both standing crops and stored cereal products.

Description and Distribution
- Adults are identical in external appearance to the rice weevil (Sitophilus oryzae); dissection required to distinguish between the species.
- Adults are reddish brown beetles with a characteristic long weevil snout and have 4 yellow to red spots on the elytra.
- The maize weevil has a length of 2.5 mm to 4 mm.
- The reddish markings on the wing covers are more clearly defined.

S. zeamais occurs throughout warm, humid regions around the world, especially in locations where maize is grown.

Life cycle
The complete development time for the life cycle of this species averages 36 days. The female chews a hole on the grain then deposits the eggs in it before covering it with a mucous plug. When the egg hatches into a white, legless grub, it will remain inside and begin feeding on the grain. The larvae will pupate while inside, then chew a circular exit hole and emerge as an adult beetle. Adults can live for 3 to 8 months. Breeding conditions require temperatures between 15 and 34 °C and 40% relative humidity.

Angoumois Grain Moth
Sitotroga cerealella (Olivier)

Life Cycle
- Females lay up to 150 eggs, either singly or in groups, on the outside of grains.
- Larvae burrow into the grain inside which they feed and remain until emergence as an adult.
- The length of this life cycle depends on temperature with completion in 30 days.

Description
- Adults are smaller than other stored-product moths.
- Adults have strongly curved labial palps and are pale grayish brown with a wingspan of 12 to 14 mm.
- Fresh specimens have a single black dot on the centre of each front wing, approximately two-thirds from the wing base.
- Adults do not feed on commodity.

Management
- Carry-over grain can be a major source of AGM and other stored grain insect pests hence should be removed and discarded.
- Removal of all spilled grain from in and around the storage area is an important method of reducing the infesting population.
- All equipment used to harvest, move, and store the grain should be thoroughly cleaned well before these events occur.
- Storage of ear or shelled corn in a solid sided facility through which air may be moved will allow for drying of the grain, thus reducing the chance of mold and limiting the ability of AGM to infest the kernels.

Commodities affected
- Primarily affects maize.
- Also affects dried root crops, bamboo, cassava, wheat, sorghum, dried sweet potato, and cowpea, cocoa, haricot, coffee, rice.

Prevention
Prevention is the best strategy to avoid insect problems in stored grains.
- Proper bin sanitation before introduction of new grain minimizes the need for pesticides.
- Good sanitation involves the removal of old grain and dust in and around the grain bin.
- After the bin is cleaned, and all needed repairs have been made, the floor and wall surfaces both inside and outside the bin should be treated.
- Take special care to treat all cracks, crevices, and areas around doorways and other places where insects could hide or enter.
- Spray the bins about four to six weeks prior to storing grain.

Before grain is placed in a bin, it should be screened to eliminate fine materials and broken kernels. Grain placed in a clean bin should be checked at two week intervals during warm months and at one month intervals during cooler months for the presence of hotspots, moldy areas, and live insects. If any of these conditions exist, the grain should be aseptically treated to lower the moisture level and temperature.

Grain that is to be stored for longer than six months may need a protective application of an approved insecticide. If infestation occurs in spite of these precautions, fumigation of the grain will be necessary.

Damage
- As larvae develop within the grain kernel, damage is not readily apparent.
- Heating of grain may be an indication of presence.
- Presence of adults flying nearby is an indication of infestation.

Damage
- Angoumois grain moth larvae feed on a number of whole kernel grains. Their feeding causes a reduction in grain weight and quality.
- Heavily infested grain smells bad and is less attractive for consumption.
- Does not bind grain with silks as many moths do.
- Infestations produce abundant heat and moisture that may encourage mould growth and attract secondary pests.

Remediation:
Control of existing infestations in either a crib or bin is possible through fumigation.

Life history
- females lay eggs singly or in batches in or near food.
- Newly hatched larvae bore into grains or feed on damaged grain and flour produced by adult feeding.
- Larvae can successfully develop within a single seed.

Commodities affected
- Primarily affects maize.
- Also affects dried root crops, bamboo, cassava, wheat, sorghum, dried sweet potato.
- Will bore into, but does not feed on, cowpea, cocoa, haricot, coffee, rice.

Signs of infestation
- Characteristic damage is extensive tunneling.
- Readily visible holes are bored in seeds.
- Copious amounts of flour are produced.

How to control
- The only way to control these pests is fumigation.
- Since it is an internal pest, residual control will only kill exposed adults. To kill the internal stages (larval and pupal), you must fumigate.

Distribution
The larger grain borer, Prostephanus truncatus is a species originating in Meso-America which was accidentally introduced to Tanzania and Togo. The Larger Grain Borer (LGB), Prostephanus truncatus (Horn), is an exotic pest of stored maize and cassava which first appeared in Kenya in 1983. It has since spread widely, becoming the most destructive pest of stored maize in both East and West Africa.

Adult P. truncatus tunnel extensively in the grain, feeding directly on it and excavating side chambers, off the main tunnel, where the females lay a batch of 4 to 8 eggs. On hatching, the larvae tunnel into the grain within which the eggs are laid.

Larger Grain Borer (Prostephanus truncatus)