



Sweet potato weevil

Cylas spp.



Photo: Edwin M Escobar, Flickr, CC BY-NC 2.0, <http://bit.ly/1yY5kTM>

Adult sweet potato weevil (body length 6-8 mm).



Photo: Scot Nelson, Flickr, CC BY-NC-SA 2.0, <http://bit.ly/1HUql1j>

A cut sweet potato showing larvae in tunnels.

SUMMARY: Sweet potato weevils are insect pests that can cause severe damage to sweet potatoes. The larvae cause the most damage by feeding on the stems and storage roots. When weevil populations are high, more than one preventive method should be used such as: use of clean planting material, planting early in season and/or using early maturing varieties, selecting deep rooting varieties or earthing up the soil around the base of the plant, removal of crop residues and volunteer plants, and crop rotation.

KEY SIGNS

The larvae cause the most damage by feeding on and tunnelling into the stems and storage roots. Adult weevils also cause damage by feeding on the leaves, vines and underground storage roots. When the plants are young, before the storage roots form, the larvae mainly feed on the lower base of the stem, leaving small tunnels. In heavy infestation, the stems turn yellow, crack and wilt. Damage to the stems can result in a significant loss in yield and cause young seedlings to die. Larvae bore into the storage roots, leaving tunnels that can rot becoming brown, soft and spongy. An infestation of the storage roots can make them inedible because the damaged tissue has a bitter taste and bad smell, lowering the quality and value of the sweet potato.

The weevils' eggs are yellowish-white, shiny and oval shaped. The larvae are chunky white legless grubs, about 5-10 mm long and slightly curved; the head is brown or light yellow. The pupae are about 5-6 mm long and initially creamy white but become grey as they get older. The adult weevils are black and shiny blue with long slender bodies (6-8 mm long), and a long snout with antennae on both sides.

Monitoring for the weevil early in the crop season is important. The adults can be difficult to detect because they are mostly active at night; during the day they can be found hiding under leaves or in cracks in the soil. Early in the season, before the storage roots are formed, the adults are often found on the plant leaves and vines, leaving small round feeding holes; if disturbed they will drop to the ground and hide. Inspect the base of the stems for feeding holes and larvae tunnels, and look for signs of wilting or swelling. Cut open the stems of plants showing symptoms and look for tunnels filled with larvae, droppings (frass) and adult weevils. If damage to the stems is detected, dig up the roots of a few plants and inspect the surface of the roots for deep feeding punctures and cavities plugged with frass, and inspect the tunnels for larvae. Pheromones for all three *Cylas* species can be used, but they are expensive and not widely available. Trials are being conducted to study the use of pheromones for mass trapping in East Africa. Homemade traps can be made using local materials to reduce costs.

MANAGEMENT

Prevention – what to do before signs are seen

Cultural approaches: To reduce the possibility of bringing weevils into a newly planted area, it is important to select clean,

uninfested cuttings for planting the new crop. Clean vine-tips are preferred, especially the tender tips (the top 25-50 cm), because weevil eggs and larvae are more likely to be found in the old woody parts of the vines. Using a pre-plant dip to treat the cuttings can provide control for the first few months of the growing season. Dip the cuttings into a solution of the fungus *Beauveria bassiana* for 10-15 minutes prior to planting.

Select deep rooting varieties with long necks as these are less vulnerable: adult weevils cannot burrow below 1 cm. Varieties that grow and develop roots near the soil surface are more likely to create cracks in the soils where the weevils can access the roots.

Plant early in the season, or early-maturing varieties, so that harvest can be completed before the dry season when the soil will dry and crack.

Build up the soil around the base of the plant with a hoe to create a small hill or mound and re-ridge about 30 days after planting. This buries the roots deeper and minimises cracks in the soil where the weevils can enter. Straw or plastic mulches can also provide cover and should be applied soon after planting.

If possible, irrigate regularly to prevent the soil from drying and cracking.

Remove alternative host plants, such as morning glory, water spinach and wild Ipomoea, from in and around the field.

Remove and destroy crop debris and volunteer plants immediately after harvest.

If possible, do not plant sweet potato in the same field year after year, and plant at least 1 km away from infested fields (weevils cannot easily fly from field to field). Rotating crops with non-host plants can significantly reduce the populations; if the weevils have nothing to feed on they will die. Rotate with a non-host crop, such as sorghum or rice, for 2 or 3 seasons. If rotation is not possible, an alternative is to flood the field for 24 hours after harvest to drown and kill the weevils.

Sweet potato weevils can continue to cause damage during post-harvest storage. Do not store roots that show symptoms with non-infested roots.

Control – what to do after signs are seen

Chemical approaches: Chemical control is difficult with sweet potato weevils because the larvae feed on the storage roots in the ground or inside the woody base of the stems. There are many natural enemies of the sweet potato weevil, including ants (predator of the eggs), earwigs, ground beetles and spiders. Minimising the use of chemicals will help preserve these natural enemies.

CAUSE

There are three main species of *Cylas* that are present in Africa, *Cylas puncticollis*, *Cylas brunneus* and *Cylas formicarius*, all of which are commonly known as the sweet potato weevil. Other names include the sweet potato root borer or the African sweet potato weevil.

In addition to sweet potato, host plants include coffee, morning glory, sesame, cowpea and maize.

All three species have a life cycle that includes four stages: egg, larva, pupa and adult. After mating, the adult female weevils will lay eggs one-by-one in small cavities at the base of the stems or storage roots and seal the cavity with grey frass. Female weevils do not have the ability to dig; they enter the soil through cracks in the soil surface to find the storage roots. The larvae (or grubs) hatch after 3 to 7 days and start feeding on and tunnelling into the storage roots and stems. The larval stage lasts 2-3 weeks depending on the temperature. The larvae begin pupation in the tunnel where they have been feeding. The pupa stage lasts about 3 to 7 days, depending on the conditions. The adult emerges from the storage root or stem to search for a mate. The total life cycle, from egg to adult, takes about 33 days under favourable weather conditions (dry and hot temperatures between 27° and 30°C).

IMPACT

The sweet potato weevil is one of the most important pests of sweet potatoes. The larvae can kill young seedlings by boring into the stems and cause severe damage by boring into the storage roots of older plants. Damaged storage roots develop a bitter taste, lowering their quality and economic value.

DISTRIBUTION

Cylas species are present in tropical and subtropical regions worldwide. *Cylas puncticollis* and *Cylas brunneus* are the two species most commonly found in sub-Saharan Africa. *C. puncticollis* is one of the major pests of sweet potato in tropical Africa, particularly Uganda, Rwanda, Kenya and Cameroon. *C. brunneus* is native to West and Central Africa and present in Burundi, Ivory Coast, Ghana, Kenya, Nigeria, Rwanda, Sierra Leone, Togo and Uganda. *Cylas formicarius* is also present in several countries, notably South Africa and the coastal regions of Kenya.

FURTHER READING

Plantwise Knowledge Bank www.plantwise.org/knowledgebank

Biovision Infonet <http://www.infonet-biovision.org/default/ct/97/pests?search=sweet%20potato>

T. Ames, N.E.J.M. Smit, A.R. Braun, J.N. O'Sullivan, and L.G. Skoglund. 1996. Sweetpotato: Major Pests, Diseases, and Nutritional Disorders. International Potato Center (CIP). Lima, Peru. 152 p.