



# Yam moths

*Dasyses rugosella*, *Euzopherodes vapidella* and *Erechthias minuscula*

**SUMMARY:** Caterpillars of several different species of moth are major post-harvest pests of yams in Africa. Cleaning the storage facility and avoiding storing damaged tubers helps reduce damage. There are also botanical and synthetic pesticides that can be applied to stored yams to control the eggs, caterpillars and adult moths.

## KEY SIGNS

Yam moths are post-harvest pests of yam tubers. Several species of yam moths have been observed in West Africa. The larvae of the moths bore into the tubers during harvest and storage, leaving tunnels. This causes the tubers to deteriorate, decreasing the value of the crop. The yams are most susceptible to an attack during the first four months of storage. The yam moths develop very quickly and can cause complete loss after only one month of storage. Favourable conditions for the moth occur during the dry season.

There are two main types of moths: pyralid moths, which cause the most damage, and tineid moths.

The adult pyralid moths (*Euzopherodes vapidella*) typically lay eggs in wounds on the surfaces of the tubers soon after harvest, but can also pierce the skin of the tuber to lay eggs. The yam variety *Dioscorea alata* (also known as water yam, greater yam or cuscus) is more commonly attacked by pyralid moths compared to other varieties; the tubers have a higher water content, which the moths prefer. Signs of yam moth caterpillars include black frass (faecal matter) woven together by silk threads and pupa cases that are left behind after the adult emerges. The adult moths do not eat the tubers; they only lay eggs which hatch into caterpillars that tunnel into the tubers, causing the damage.

The tineid moths (*Dasyses rugosella* and *Erechthias minuscula*) are a secondary pest that attack the tubers once the pyralid moths have already caused damage and the yams have lost moisture. Their larvae eat the inside of the tuber leaving only the skin. The tineid moths prefer the *Dioscorea cayenensis* variety (the yellow yam) but attack other varieties as well.

## MANAGEMENT

**Prevention** – what to do before signs are seen

*Cultural approaches:* Use clean planting stock that does not have yam moth eggs or caterpillars on it.

Try not to pierce or damage the yams during harvest, as this can provide an easy access point for the yam moths.

Clean and disinfect the storage facility prior to storage.

If using a temperature-controlled storage facility, storing the tubers between 12°C and 20°C will delay the development of the moths and help control damage. Be careful not to store below 12°C, however, as this will cause chilling damage to the tubers.

**Control** – what to do after signs are seen

*Cultural approaches:* Do not store tubers that show signs of damage with undamaged tubers. Sort the tubers prior to storage and keep the damaged tubers separate.

*Chemical approaches:* There are several synthetic and botanical pesticides that can be effective against yam moths. The botanicals are less toxic to humans and the environment, and do not leave potentially dangerous chemical residues on the tubers.

- Powders of sweet pepper (*Capsicum annum*), also known as bell pepper or capsicum, and chili pepper (*Capsicum frutescens*) are effective against adult moths and can provide 100% control within 24 hours. The powders also prevent hatching and emergence of the adult moth. These powders can persist for 14 days, so they continue to provide control during that time. Apply by lightly dusting the pepper powder on cuts or other visible damage on the yam tuber surface.
- Pirimiphos-methyl (an organophosphate) and deltamethrin (a pyrethroid) can also be sprayed on stored tubers. Spray once after harvest before the tubers are placed in storage, and a second time after one month on damaged tubers only. Read the label for dosage rates and always follow safety precautions for use.

## CAUSE

The pyralid moth, *Euzopherodes vapidella* Mann, and the tineid moths, *Dasyses rugosella* Stainton and *Erechthias minuscula* (formerly known as *Decadarchis minuscula* Walsingham) are species of yam moth known to be present in West Africa. There may be similar unidentified species as well. Yam moth is the common name, but *E. vapidella* is also known as the citrus stub moth or pyrale des greffons in French.

*Euzopherodes vapidella* life cycle: Eggs are 0.5 mm long, laid singly in rows and groups, and take 3.5 days to hatch. The larval stage lasts 14 days and the pupal stage about 7.5 days. Adult female moths (wingspan 13.8-16.8 mm, body length 7-9 mm) are bigger than the male moths (wingspan 11-13.8 mm, body length 6.2-7.5 mm) and live longer. The forewings of the adult moths are brown with a large dark brown-black thick stripe and dark brown-black along the edges near the tip of the wings. The total development time from egg to adult is an average of 27 days.

*Dasyses rugosella* life cycle: Eggs are elliptical and about 0.8 mm long. They are laid singly in rows and groups, hatching after about 5 days. The adult larvae have a dark head. The adult female moths (wingspan 17-18.5 mm, body length 6.5-8.5 mm) are bigger than the male moths (wingspan 13-15 mm, body length 5.3-6.8 mm). The total development time from egg to adult is an average of 61 days.

*Erechthias minuscula*: Adults are cream or light yellow in colour. The forewings are turned upwards at the tips, have light to dark brown scales and the wingspan is 3.5-4 mm.

## IMPACT

Approximately 95% of the yams produced worldwide are produced in West Africa. Yams are one of the most important food crops and a main source of carbohydrates for people in this region. Yam moths are one of the most important post-harvest pests of yams. Storage losses of 10-15% after three months and up to 50% after six months have been reported. Yam moths are reported to cause 64% of the damage reported by yam chip producers in Benin.

## DISTRIBUTION

Present primarily in West Africa, notably Nigeria, Ivory Coast and Benin, the three primary yam producing countries, but found throughout sub-Saharan Africa. *E. vapidella* is also a common pest of citrus crops in the Mediterranean regions of Europe and northern Africa (Morocco and Egypt), and has been found in Sri Lanka, Java, Australia, the Caroline Islands, Fiji, Samoa, the Marquesas, the West Indies, Hawaii and Florida.

## FURTHER READING

PIP Guide to Good Crop Protection Practices: for Yam (*Dioscorea* spp.). <http://pip.coleacp.org/files/documents/GBPP-Ignames%2010-2011-09-1-UK.pdf>

Ashamo, M.O. 2010. Management of the yam moth, *Dasyses rugosella* Stainton, a pest of stored yam tubers (*Dioscorea* spp.) using plant products. 10th International Working Conference on Stored Product Protection. Julius-Kuhn-Archiv, 425.