Greater and lesser yam beetle

Heteroligus meles and *Heteroligus appius*

Photo: G. Georgen, IITA

An example of Heteroligus meles.

Photo: Dr Stephen Kwaku Asante, CSIR-Savanna Agricultural Research Institute.

Tuber damage caused by the yam beetle.

SUMMARY: Greater and lesser yam beetles are both important pests of yams in West Africa. The adult beetles burrow into the soil and feed on the tubers. Preventive methods, such as planting as late in the season as possible and treating planting material with an insecticide before planting, are the best ways to control yam beetles and reduce the damage they cause.

KEY SIGNS

Greater and lesser yam beetles are major pests of yams in West Africa. The adult beetles feed on the yam planting material (setts) as well as the tubers, starting just after planting and continuing until harvest. The beetles leave small round holes about 1-2 cm deep which allow secondary disease infections and cause the tubers to rot, leading to significant post-harvest losses. If the attack is severe it can cause the plant to wilt and die.

The adult beetles of both species are blackish-brown in colour and shiny; the greater yam beetles are 23-33 mm long and have two prominent lumps on their heads, and lesser yam beetles are smaller at 21-23 mm. The larvae are creamy-white to grey grubs with a curled body and a light brown head.

Light traps can be used for monitoring the adult beetles.

MANAGEMENT

Prevention – what to do before signs are seen

Cultural approaches: Timing of planting is the most important preventive measure available. Planting as late in the season as possible can significantly reduce the damage caused by the beetles. A study in the Nigerian delta showed that planting as late as June or July significantly reduced the damage caused by the yam beetles.

If possible, yams should not be planted near wet areas, along rivers, creeks, or tributaries where the beetles breed.

The white Guinea yam variety Tamenyo is reported to be significantly less prone to beetle damage compared to the Amula, Pepa and Ogoja cultivars.

Mulching with the leaves of lemon grass (*Cymbopogon citrates*) or mosquito plant (*Ocimum viride*) can increase yields and reduce the damage caused by the yam beetle. These plants are also believed to have properties that repel the yam beetles.

Chemical approaches: Treating setts with insecticides before planting, and applying a post-sprouting treatment, can significantly reduce the damage caused by yam beetles. Insecticides such as dieldrin, endosulfan, carbofuran or aldrin dust have been used in the past to treat planting material; however, these chemicals are extremely toxic to people, livestock and the environment. They have been banned in many countries and should not be recommended to farmers for use. Furthermore, one study reported resistance to aldrin.

Safer sett treatments are:

- Pirimiphos-methyl and deltamethrin. These can be either sprinkled on the setts as a powder or used for dipping (after mixing with water). As with all pesticides, label instructions for dosages and safety precautions must be followed. Only pesticides registered for the intended use in the relevant country should be used.
- Wood ash is a safer and more cost effective alternative. Studies have shown that wood ash can be just as effective as chemical pesticides against yam beetles. Wood ash can be sprinkled as a powder on yam setts just prior to planting. Alternatively, mix two parts wood ash with five parts water and immerse the setts in this mixture for 20 minutes, then remove the setts and dry them under shade before planting.

Post-sprouting treatments:

- Neem extract, 5% concentration, applied once per week for three weeks, starting 12 weeks after planting.
- Insecticides, such as pirimiphos-methyl or deltamethrin, applied once per week for three weeks, starting 12 weeks after planting.

CAUSE

There are two main beetle species that attack the yam in Africa: the greater yam beetle, *Heteroligus meles*, and the lesser yam beetle, *Heteroligus appius*. The greater yam beetle is bigger and more widespread, but the signs are similar for both. Yams are the primary crop the beetles attack; alternate hosts include the roots of grasses, bananas and coffee grown in marshy areas.

During the dry season, the greater yam beetle breeds near wet areas such as river basins, where they lay their eggs in the moist soil. When the eggs hatch the larvae start feeding on the roots of grass and other debris in the wet areas. After pupation, at the start of the rainy season when the yams are planted, the adults start to emerge and migrate by flying to the yam fields, where they cause the greatest damage. Here they burrow into the soil down to the tubers. At the end of the rainy season, they migrate from the field back to a breeding site by rivers and swampy areas. The total life cycle, from egg to adult, takes about 22-24 weeks.

Lesser yam beetles live in wetter areas during the dry season and migrate into yam gardens to breed.

IMPACT

About 95% of global yam production occurs in West Africa, primarily Nigeria, Ghana, Ivory Coast and Benin. Yams are one of the most important crops in West Africa, providing a source of carbohydrates and income. The adult beetles attack the tubers and leave holes, which reduces the value of the crop and provides an entry point for bacteria and fungi that cause the tuber to rot. It is reported that the beetle is the pest that causes the most damage to yam production in West Africa. They cause yield losses up to 77% and also significant post-harvest losses due to tubers that rot.

DISTRIBUTION

The greater yam beetle is widely distributed throughout tropical Africa, particularly in humid areas and near rivers in West Africa. It also occurs in India. The pest is often spread from country to country by tubers: movement of tubers or setts between countries should be restricted. The greater yam beetles are also found on islands in the Caribbean and Pacific Islands. Lesser yam beetles are found in southern Nigeria from Sierra Leone to Cameroon.

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

Infonet-Biovision http://www.infonet-biovision.org/default/ct/146/crops

FAO/IBPGR Technical Guidelines for the Safe Movement of Yam Germplasm. A. A. Brunt, G. V. H. Jackson, E. A. Frison Bioversity International, 1989, pp. 16-17.

Onwueme, I. C. and Charles W.B. 1995.Tropical Root and Tuber Crops: Production, Perspectives and Future Prospects. Food and Agriculture Organization of the United Nations, p. 90.

Okoroafor, E.; Amatobi, C. I.; Misari, S. M.; Onu, I. Field assessment of yam beetle (*Heteroligus meles* Billb) damage on yam cultivars (Dioscorea spp.). Research on Crops, 2009, 10, 2, pp 398-401.¨

Tobih, F.O. Evaluation of some plant materials as organic mulch for the control of yam tuber beetles (*Heteroligus* spp) In Delta State, Nigeria. Agriculture and Biology Journal of North America. 2011, 2(5): 818-825.