



# Larger grain borer

*Prostephanus truncatus*



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Adult larger grain borer.



Photo: CABI

Large gain borer adult boring into maize grains.

**SUMMARY:** The larger grain borer is a serious pest of stored maize throughout Africa. The beetle eats its way into the grain leaving a hole and empty shell. Having a clean storage facility is important to prevent the pest from becoming unmanageable. Shelling the grains from the cob prior to storage can minimize the damage.

## KEY SIGNS

The larger grain borer (LGB) is a major pest of stored crops, such as maize, dried cassava roots and yams. Although it is considered a post-harvest pest, the LGB attacks maize both before and after harvest. The adult beetles bore into maize cobs, husks and grains leaving tunnels and empty grain shells, and producing large quantities of grain dust. The adults prefer grain that is still attached to the cob rather than loose-shelled grain; damage is often greater on unshelled maize. The pest often bore into the wood used to construct the stores in which the grains are kept.

Adult females lay eggs inside the tunnels or near the food source. The larvae bore into the grains or feed on the dust produced by the adults, and pupate in the grain, cob and dust. The adults are about 3-4.5 mm long, cylindrical in shape, shiny, dark brown-black in colour with their heads turned down. The larvae are white, grub-like, thinly covered with hairs and have three pairs of legs.

Early detection of the pest is difficult unless the populations are high because they develop inside the cob or grain and are therefore not visible. Flight traps (e.g. funnel, delta or wing traps) baited with pheromones can be used by plant protection officers and researchers to monitor for large infestations of adult beetles. Farmers can look for tunnels and irregular shaped holes in stored grain and large quantities of dust.

## MANAGEMENT

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

*Cultural approaches:* Use maize varieties with a good husk cover that provide protection and are less likely to be attacked. Having a clean storage facility is important to prevent or limit LGB infestations. The storage facility should be cleaned thoroughly between harvests. Any old stock should be removed and burned before bringing newly harvested grain into the storage facility.

Sacks used to harvest or store grain should be immersed in boiling water to kill any remaining infestations.

Do not put crops that show signs of infestation inside the storage facility.

If using a wooden storage facility, inspect the wood for tunnels and remove infested boards. Wood is a host of the LGB; if possible, farmers should be encouraged to construct storage structures using brick or other non-wood materials such as metallic containers, old oil drums, mud or cement-plastered basket cribs.

Roofs should be constructed with iron sheets instead of grass-thatch to prevent the pest from harbouring and breeding in the roof. If using grass-thatch, the roof should be thick and cone shaped.

Shell cobs before storing and dry to a moisture point below 12% (or when it is too difficult to bite through the grain with your teeth).

Sell maize stock within three months after harvest when infestation of the LGB is lower.

Destroy crop residues after harvest and burn cob cores after shelling.

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

*Cultural approaches:* Harvest shortly after the maize has matured, before the LGB has an opportunity to enter the grain.

Mixing the stored grain with a dust, such as ash or clay, causes the beetles to desiccate and can help reduce populations.

At the regional or national level, releasing the predatory beetle *Teretrius nigrescens* can maintain the populations at a tolerable level.

## CAUSE

The LGB is currently classified as *Prostephanus truncatus* but used to be classified as *Dinoderus truncates* or *Stephanopachys truncates*. It is commonly referred to as the larger grain borer (LGB), but is also called the greater grain borer (GGB) in some countries to distinguish it from the lesser grain borer (*Rhyzopertha dominica*). It is easy to confuse the LGB with other species such as the lesser grain borer (*Rhyzopertha dominica*) and the maize weevil (*Sitophilus zeamais*). The lesser grain borer is smaller, narrower, rounder and dark brown-red in colour; the maize weevil is rounder at the end of the body.

The entire life cycle from egg to adult is completed in about 25 days under favourable conditions (27-32°C and 70-80% relative humidity), a little longer under cooler or drier conditions. The LGB prefers high temperatures and relatively high humidity, but it is a hardy pest that can develop in grains with low moisture content.

## IMPACT

LGB can cause significant losses in stored grain, ranging from 19-30% after 6 months storage. LGB causes a weight loss of the grain, as well as reduced quality and nutritional value, leading to economic losses for farmers and traders. Furthermore, there are strict quarantine measures against the pest; detection can result in rejection of traded goods. Host plants include yams, cassava, sorghum, wheat, maize and other materials such as wood products, gourds, bamboo and even plastic and soap. LGB can develop in forested areas therefore complete eradication is nearly impossible. In heavily infested areas, wooden storage structures may provide a host to the pest from which it can develop and attack the next harvested crop.

## DISTRIBUTION

The LGB is native to Central and South America. In East Africa, it was first introduced into Tanzania in the 1970s. Since then it has spread to Burundi, Kenya, Malawi, Mozambique, Namibia, Rwanda, Zambia, South Africa and most likely other countries in the region. It was introduced separately to West Africa, where it was first detected in Togo in 1984, and has spread to Benin, Burkina Faso, Ghana, Niger and Nigeria. The LGB is distributed across countries and regions through the import and export of infested grains. Locally, the LGB is distributed through local trade of grain (e.g. in contaminated sacks and lorries) and by adult beetles flying from one location to another.

## FURTHER READING

Plantwise Knowledge Bank <http://www.plantwise.org/knowledgebank/datasheet.aspx?dsid=44524>

FAO: A guide for marketing maize for extension officers <http://www.fao.org/docrep/005/x0530e/x0530e05.htm>

Infonet-Biovision <http://www.infonet-biovision.org/default/ct/91/pests>