

Do-it-yourself traps to monitor storage pests

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If you store grain you are aware that it can be attacked by a number of insect pests, notably beetles, moths and psocids. Very often serious infestations are discovered very suddenly, often just before an intended sale or delivery. Rather than wait until this time to find out it is infested — with all the inconvenience that brings — why not undertake a program of regular monitoring to detect pests as early as possible?

The earlier insects are detected the more time you have to plan and properly conduct fumigations and pesticide applications. Withholding periods, legally required after treatment with certain chemicals, can be properly implemented.

One way to monitor for the presence of insects is to use traps. The alternative — visual inspection — can be time-consuming to do properly. Many growers, too busy with other things, tend to neglect this activity with the risk of a nasty surprise later on.

Use of traps can cut down significantly the amount of time needed to search for insects. And the daily activity profiles of insects and humans are very different, with insects being more active at night. Traps do the work of detecting insects when you are doing something else, like sleeping!

For most storage pest species, traps can detect the presence of insects at much lower population levels than is usually possible with visual inspection.

A number of traps are available commercially to detect grain storage insects. These have been carefully designed and are provided with various baits and lures. While many are highly effective commercial traps can be expensive. But all is not lost. Effective traps can be easily and very cheaply made from items found in any home (Photo 1).

Traps can catch insects in several ways:

- Pitfall traps — insects fall into a con-

tainer from which they cannot escape;

- Crevice traps — these provide a physical environment into which insects crawl into and remain; and,

- Bait traps — these contain a food or some other form of bait attractive to the insect.

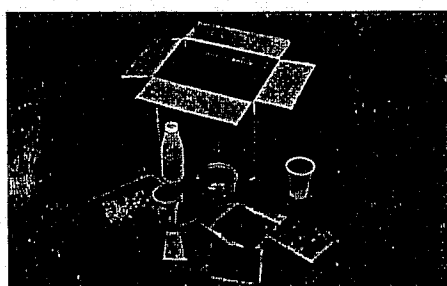


Photo 1: Effective insect traps can be easily made out of common household materials.

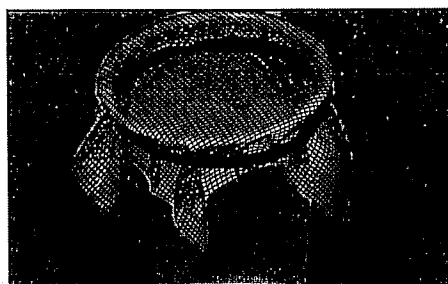


Photo 2: A simple pitfall trap made from a disposable plastic beaker.

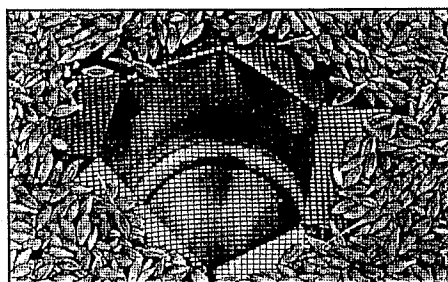


Photo 3: A pitfall trap in use. Inserted into grain so that the top of the trap is level with the grain surface, this one is made from an empty beer can.

PITFALL TRAPS

A simple pitfall trap is very easy to make. A vertical or near vertical sided container can be used for this purpose. Do not use glass containers or containers which have contained toxic or otherwise nasty materials. Clean plastic takeaway food containers or clear plastic disposable plastic cups (not the styrofoam ones) are ideal for this purpose. An empty beer or soft drink tin could even be used. The chosen container is inserted into the surface of grain so that the rim is level with the grain surface (Photo 3).

A good spot to set pitfall traps is at or along the grain peak. Many insects tend to congregate at this point. Traps can be easily attached to a cane or broom handle to allow them to be inserted into grain, from say, the top of a silo without having to enter the bin.

Pitfall traps can be improved in a couple of ways. A piece of screen door netting held in place with an elastic band will stop the trap filling up with grain (Photo 2). Do not use netting with too fine a mesh or you will keep insects out as well. A mesh with holes of 1.5–2.0 mm across will keep grains out but allow insects to pass through. Some species, notably grain weevils (*Sitophilus* spp.) and saw-tooth grain beetles (*Oryzaephilus surinamensis*) are able to climb up most vertical surfaces and could escape from pitfall traps.

One way to help prevent this is to put a small quantity of a vegetable cooking oil in the bottom of the trap. Trapped insects can become bogged down in this. Do not use a mineral oil for fear of contaminating your grain. Some edible oils are attractive to insects in their own right and act as baits. An example is wheat germ oil, which can often be obtained from health food shops.

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for grain legumes



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Tests have shown that pitfall traps are very effective at detecting many beetle pests of stored grain, especially the more active species such as saw-tooth grain beetles, flour beetles (*Tribolium* spp.) and flat grain beetles (*Cryptolestes* spp.).

CREVICE TRAPS

Insects that attack stored grain don't like being out in the open, instead they usually prefer to hide in or under something. Crevice traps take advantage of this behaviour. A very simple, cheap, effective trap of this type is a piece of corrugated cardboard, cut from a clean cardboard box (Photo 4). This type of trap is especially useful to detect insects in empty storages or in grain harvesting and handling equipment. After a period of time, traps can be collected up and captured insects can be knocked out onto a tray or other clean flat light-coloured surface.

Trap efficacy may be improved by adding a bait. A small quantity of whole-meal flour or wheat germ can be dribbled into the corrugations of each trap. To help prevent this bait from falling out, a piece of sellotape can be stuck over the open corrugations along one side of the trap. Corrugations on the other side are left open for insects to crawl into. Alternatively, a few drops of wheat germ oil can be soaked into the trap.

Traps can be made any size. In our research we use rectangles of four mm thick corrugated cardboard 100 x 150 mm with open corrugations on the long side. This type of trap can be easily dropped into and recovered from silos and bins of any size when attached to a piece of string or lightweight fishing line.

BAIT TRAPS

Certain foods are highly attractive to insects and some have already been mentioned. A simple bait trap is a mesh bag made from a square of flyscreen mesh 200 x 200 mm. This can be half filled with your choice of bait (Photo 5). After being set for a time in a place of interest, insects caught in them can be simply shaken out of the trap over a tray. The mesh bag acts as a sort of sieve. Bait traps are especially good at detecting beetles and moths in empty stores and in machinery where food could be scarce (Photo 6). Brown rice fresh out of the packet (not white rice) and good quality natural muesli make good bait.

HOW TO USE TRAPS

You will get the most out of any trapping program if you are systematic, keep

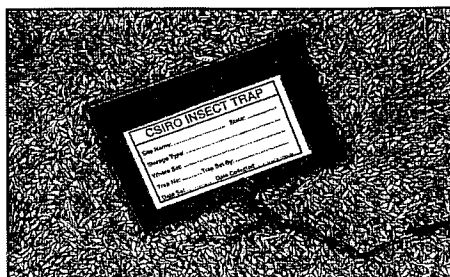


Photo 4: A crevice trap made from a piece of corrugated cardboard cut from a box. This trap has been lowered onto a grain surface on a piece of string.

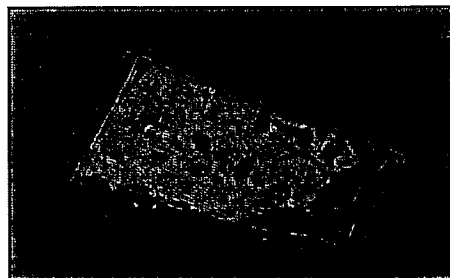


Photo 5: A bait trap made from fly screen filled with muesli.

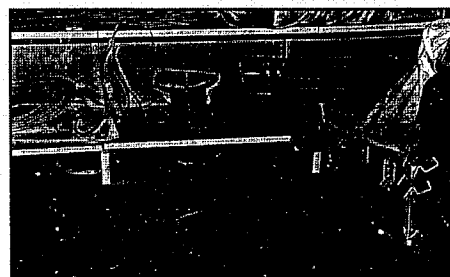


Photo 6: A bait trap being used to catch insects in an equipment store.

records and act on results obtained.

First, draw up a simple sketch plan of your storage area. Identify locations where you would like to trap. The first priority should be your grain pathway — storages, handling and harvesting machinery. Other areas where food residues can lurk to maintain insect populations include storage sheds, disused equipment and other collections of 'stuff'.

If putting out traps in sheds place them close to the wall or pillar or in 'low traffic' areas. Insects will more likely be found in such places than in the middle of the floor. Also, avoid putting traps in areas that get very hot or are exposed to bright sunlight. Record and number these locations on your plan.

Draw up a chart to record trap catches — enter it on a computer spreadsheet or in a notebook. Record trap location and number, dates of trap placement and recovery and numbers (and identity) of insects caught. Examine traps at regular intervals — say every one to four weeks.

The more frequent the examinations the

better. If traps are reused, clean out pitfall traps and disinfest (by freezing) crevice and bait traps before re-use. New trap locations can be added and old ones dropped.

In time, you may notice seasonal variation in insect numbers caught. You may also notice 'hot spots' of insect activity, which you can then attend to. Trapping before and after pest control procedures will help to determine how effective treatments have been. These records become ever more valuable as they allow you to better understand the nature of your pest problems and will help you anticipate potentially serious problems.

It is important to start trapping well before harvest. Very often insects persist from one year to the next in grain residues in stores and in harvesting and handling machinery.

Some trap tips

Not catching insects does not mean that none are present, only that none were caught!

Different species respond to traps in different ways. Some important storage pests, notably grain weevils and the lesser grain borer (*Rhyzopertha dominica*) are hard to detect at low population densities. If either of these insects are captured, and the grain is to be stored for any length of time, then urgently consider immediate fumigation or treatment.

In contrast, other species such as moth larvae, psocids, flour beetles, saw-tooth grain beetles and flat grain beetles are much easier to catch. Insects are also more active and are more likely to be caught when it is warm.

Accurate identification of insects caught is useful as species vary in their pest status. Sometimes other non-pest species are accidentally caught that are part of the local fauna. While these insects may not be a direct threat to your grain it is important to be able to separate them from those that are. CSIRO sells a pocket ID guide* to storage insect pests that allows you to identify the important species.

Give insect trapping a go. If it saves you only once the hassle of finding insects in grain just when you are about to deliver it — then it has been well worth it.

More information on insect identification can be found in a full colour pocket guide available through CSIRO Stored Grain Research Laboratory for \$20 plus postage. Contact Yvonne Hawkins on 02 6246 4191 or fax 02 6246 4202.

Alternatively visit the CSIRO Stored Grain Research Laboratory website at <http://www.ento.csiro.au/research/storprod/storprod.html>