

DPI&F note

Grain storage – short cuts for insect control

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Quick, easy answers

The most common question asked about pests of stored grain is:

'What can I do to kill the weevils in the grain that I've got to deliver it today?'

There isn't a quick, easy answer to the immediate problem. The long-term answer is to plan your storage so that the problem doesn't arise.

There are no simple short cuts for storing grain safely. Unless you plan for insect control and have the necessary equipment, you should not be storing grain.

Chemical answers

Two chemicals are registered for killing insects in grain – dichlorvos and phosphine. Both have been used for quick kills in infested grain, but there are serious problems looming for both.

Dichlorvos

Dichlorvos is applied by spraying the grain, with a calibrated sprayer into an auger. Restrictions on this method are:

- Dichlorvos is registered for use only on cereal grains, not on pulses or oilseeds
- Lesser grain borers, the most common pest of cereal grains, is resistant to dichlorvos so a *higher dose rate* is required
- A *withholding period of 7 days is needed for the low rate and 28 days for the high rate* if the grain is for human consumption
- Some insects take up to 3 days to die
- The grain must be moved for treatment, therefore you need an empty storage that you can auger the grain into

Markets are increasingly sensitive to residues, and dichlorvos residues above the MRL (maximum residue limit) are the most common residue problem in grain. Application at rates higher than the label and/or sale or use within the withholding period can result in loss of a market, for you if it is a domestic market or for Australia if it is an export market.

Phosphine fumigation

Phosphine fumigation, or 'bombing with phostoxin', as it is commonly known, is usually applied as tablets that release phosphine gas. Grain can be treated in the storage without moving the grain. However, there are restrictions on this method:

- a minimum exposure period of 7 days is needed to kill all insects. This is when the grain is at the optimum temperature for effectiveness, ie, warmer than 25°C
- grain must be *aired* after the exposure period for 1 day with fans or 5 days without fans, *before handling*

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- a *further* withholding period of 2 days *after the airing period* applies before the grain can be used for human food or stockfeed. Grain can be transported during this period
- the *minimum* period of 10 days from treatment to use therefore applies under ideal conditions
- a sealed, gas-tight storage is needed to keep the phosphine concentration high enough, for long enough time period, to kill all insects. Only *some* adult insects are killed in unsealed storages
- use in unsealed storages is leading to resistance, and the adults are starting to survive treatments in unsealed storages
- insects are very difficult to kill at low grain temperatures cooler than 15°C. Grain temperatures in winter-stored grains can often be lower than 15°C
- transporting grain while it is being fumigated is illegal and dangerous
- there have been many recent cases of rejection of grain loads due to fumigation during transport and noticeable phosphine gas residues in grain

Risks if short cut treatments are used

Neither dichlorvos nor phosphine should be used to disinfest grain for delivery within a week. Taking short cuts with these chemicals can result in concentrations that are:

- harmful for grain handling workers, thus breaching workplace health and safety regulations; and
- higher than MRLs, thus putting markets at risk.

You have a moral and legal obligation to avoid these risks.

Alternative chemical treatments

Some of the residual protectant treatments, such as Reldan® + methoprene (IGR®, Diacon®), or Actellic® + methoprene do not have problems with withholding periods and MRLs. However chemical companies will not guarantee that these chemicals will kill adult beetles, even over three days. Methoprene alone (IGR/Diacon) has almost no effect on adult insects. (Labels for these protectant insecticides should always be consulted before use).

Avoid short cuts

So what is the answer to the problem of insects in grain for sale?

The immediate answer is to change the intended arrangements. Options include:

- arrange with the buyer to accept and treat the infested grain, usually at the sellers expense; or
- treat the grain and hold it on farm until the exposure and/or withholding period has passed.

Longer term plans

In the longer term, grain storage should be planned so that the unanswerable question does not arise. Spraying grain with protectant insecticides is usually effective in controlling insects, but check that potential markets will accept the residues. Cleaning all grain handling and storage equipment before harvest and using automatically controlled aeration is effective for some farmers, but insects are still a problem in summer for others.

Plans for treating infested grain

Plan to treat any insects that are detected prior to sale by:

- sampling for insects by sieving samples from the grain a month and a fortnight prior to sale to allow time for treatment if any are found;
- having at least one sealed silo as a hospital bin for fumigation of infested grain; or
- having a calibrated sprayer and an empty storage into which cereal grain can be turned and treated with dichlorvos.

Further information

If you require further information, see

- DPI&F website www.dpi.qld.gov.au/fieldcrops/3947.html , for a wide range of up-to-date information on grain storage matters

- DPI&F Call Centre open from 8.00am to 6.00pm Monday to Friday (telephone 13 25 23 for the cost of a local call within Queensland; interstate callers 07 3404 6999) or email callweb@dpi.qld.gov.au ■