Detecting the presence of insect pests as early as possible can stop the demise of stored grain quality and quantity. Insects can breed rapidly, especially when conditions are ideal. Harvest conditions in Australia are such that grain is often harvested and stored at temperatures ideal for rapid growth of insect populations.

Most insect pests breed rapidly at 30-35 degrees Celsius. At these temperatures eggs can develop into adults in as little as a month and populations can increase at up to 50-100 times during this time.

In contrast most pest species will breed slowly or not at all on cool dry grain at less than 20°C.

About 100 species of insect can be found associated with stored grain in Australia. Of these less than a dozen are important pests. The rest are of minor importance or are parasites and predators of pest species.

Typically most grain in Australia becomes infested from residues of previous crops which linger in harvesting, handling and storage equipment. Pre-harvest infestation by major pest species is uncommon with winter grown cereals but is more likely to occur with summer crops such as maize and sorghum.

Not all insects present in grain are damaging. Some are beneficial by attacking and feeding on pest species.

A number of small wasp species are parasites of larvae of beetle and moths. Larvae of these wasps develop inside the body of their host and eventually kill it.

Other species such as predatory bugs (Xylocoris spp.) and small scorpion-like animals known as pseudoscorpions (not insects) are predators of any small soft bodied insects they encounter.

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, CSIRO Entomology, phone (02) 6246 4191, fax (02) 6246 4202. Alternatively, visit the CSIRO Stored Grain Laboratory's web site at www.ento.csiro.au/research/storprod/storprod.html

**Pests of sound grains**

Several pest species can attack whole cereal grain, even if they are totally undamaged.

These include two species traditionally regarded as the most important pests of stored cereal grains — the lesser grain borer (Rhyzopertha dominica) and grain weevils (Sitophilus spp.).

**Lesser grain borer**

Infestations of the lesser grain borer are characterised by the large quantity of flour produced by adult insects as they bore through grains. Eggs are laid in the flour and damaged grain. Larvae then hatch and burrow into grains.

**Sitotroga cerealella**

The moth (Sitotroga cerealella) can be a pest in grain, especially with summer crops such as sorghum and maize.

Infestation can start before harvest and larvae develop inside the grain, eating it from the inside out.

**Grain weevil**

Grain weevil larvae develop inside the individual grains. When the adult emerges it leaves a large cavity in the grain. Every adult weevil is equivalent in size roughly to half a wheat or barley grain.

Infestation of this species can cause grain to heat and become mouldy.

Infestations of either of these pests are often concentrated in a small portion of a parcel of grain which is left severely damaged.

These species can be difficult to detect. If either is detected, and the affected grain is to be stored for any length of time, consider immediate fumigation or treatment of grain with a registered grain protectant.

**Damp grain**

A number of insect species can be found infesting damp grain. Some may also infest ripening grain in the paddock and may persist but not breed on dry grain in storage.

Species include the hairy fungus beetle (Typhaea stercorea), the minute mould beetle (Corticaria spp.) and dried fruit or corn sap beetles (Carpophilus spp.). Mites also can occur in vast numbers in moist grain.

**Lesser grain borer (Rhyzopertha dominica)**

**Sitotroga cerealella**

**Grain weevil (Sitophilus spp.)**

**Hairy fungus beetle (Typhaea stercorea)**

**Minute mould beetle (Corticaria spp.)**

**Dried fruit beetle**

**Mites**
Identification...

Damaged and processed grain pests

Previously mentioned species remain important providing the product remains in solid form. But damage is required for other species to gain a foothold. This may include minor abrasions such as those caused by normal harvesting and handling processes.

Weather-damaged grain and grain containing high levels of admixture are at greater risk of attack by these insects than clean intact grain.

Common species include the flour beetles (Tribolium spp.), sawtoothed grain beetle (Oryzaephilus surinamensis) and the flat grain beetles (Cryptolestes spp.). Larvae of these insects live freely in the grain and will attack all cereal grains. Flour beetles are found frequently in stored canola.

Other species include the warehouse beetle (Trogoderma variabile). Adults of this insect are rarely seen but larvae, which are pale yellow in colour and hairy, are more often encountered. Larvae of this insect can survive for years without food and as a result the warehouse beetle can persist in storage structures long after they were first infested. In some States this insect is under official control. If its presence is suspected consult the local agriculture department.

The warehouse beetle has recently become more common in stored canola where it mostly infests surface layers.

Booklice, or psocids, are increasingly being encountered as pests of stored cereals and some pulses such as lupins. These are small, flattened insects about 1mm in length which move rapidly in a characteristic jerky fashion.

Grain stores

Warehouse moths (Ephestia spp.) and the Indian meal moth (Plodia interpunctella) are common inhabitants of grain stores, mills and domestic situations.

Larvae of these species live freely within grain and produce large quantities of silk webbing that clump together the infested material. Such clumping can prevent grain flow when it is moved and can block and damage handling equipment.

Pulses are increasingly being grown by Australian farmers.

Several species of bruchid beetles can attack these grains. Larvae of these species develop concealed inside individual grains.

The pea weevil (Bruchus pisorum) is a pest of ripening peas in southern Australia.

Another species, Acanthoscelides obtectus, attacks kidney and closely related beans. A third species, Callosobruchus maculatus, can attack peas, mung beans, and lentils.

Unlike the pea weevil, these other species can continue to infest and damage dry grain in storage.

In areas of the world where pulses have been traditionally grown these species are common pests which cause extensive damage to pulses.