• Freshly harvested grain benefits from aeration designed to reduce grain temperature and creating uniform grain moisture conditions throughout the silo. These two factors combined with good hygiene will significantly reduce problems with grain quality and storage pests.
• Over the medium and long term, grain is best held under aeration cooling, aiming to achieve grain temperatures of 20 degrees C or less. Automatic aeration controllers assist in achieving reliable results.

Life cycle

The egg, larva, and pupa stages of these weevils occur in the grain kernels and are rarely seen. Feeding is done within the grain kernel, and adults cut exit holes to emerge. Emergence holes of the granary weevil are fairly large and tend to be more ragged than smooth and round. Females drill a tiny hole in the grain kernel, deposit an egg in the cavity, then plug the hole with a gelatinous secretion. The egg hatches into a young larva which bores toward the centre of the kernel, feeds, grows, and pupates there. New adults bore emergence holes from the inside, then leave to mate and begin a new generation. Female granary weevils lay from 36 to 254 eggs. At 27 - 30°C and 75 - 90 % rh, eggs hatch in wheat with a moisture content of 13.5 to 19.6 percent in 3 days. There are 4 larval instars, and the developmental period is from 3 to 5 weeks. Pupation within the kernel requires 5 to 16 days. The life cycle is about 30 to 40 days during the summer, and 123 to 148 days during the winter, depending on temperature. The granary weevil is long-lived, surviving for 7 to 8 months as an adult. The female lays very few eggs at temperatures below 16 °C, but can survive for 2 months or more at about 2 °C.

Control:

The simplest and most effective measure is to locate the source of infestation and quickly get rid of it. If practical and regulations allow, dispose of heavily infested foods in wrapped, heavy plastic bags or in sealed containers for garbage removal, or bury deep in the soil. If you detect an infestation early, disposal alone may solve the problem. Properly ventilate the storage area to discourage these moisture-loving stored product pests. Be sure to store only clean, dry grain with a moisture content of 12 percent or less to reduce weevil problems.

Grain insects are declared under the Agriculture and Related Resources Protection Act. Limited chemical controls are available to farmers and emphasis is placed on clean hygienic storage and cleaning of machinery. Farmers are encouraged to purchase and maintain sealed farm silos to increase the effectiveness of fumigation.

Aeration: Using aeration reduces grain temperatures and creates uniform, cool conditions in the grain bulk. This maintains grain quality and slows or stops grain pests breeding. Aim for grain temperatures of 20ºC in summer and under 15ºC in winter. Best aeration results are achieved by using a good quality aeration system.

Maintaining grain quality in storage:

The two most common, serious threats to grain quality in Australia’s storages are insect pest infestations and grain moisture problems causing mould / fungal growth. Key initial strategies include through hygiene for storages and equipment, plus aiming for “cool, dry grain” in storage.

The high numbers of storage pest that can fly out from on-farm sources of infested grain in spring and summer looking for newly harvest clean grain to infest demonstrates the value of regular hygiene activities and grain inspections.

Grain temperatures below 15°C stop the breeding life cycle for all of our common storage pests. During summer, achieving grain temperature close to 20^{o}C is also valuable as it either stops or significantly slows insect population increase.

Grain fungal growth in storage is kept in check with appropriate grain moisture contents – e.g. wheat less than 12.5%, sorghum less than 13.5%. Lower grain temperatures also assist to some extent in reducing fungal growth.

Attention paid to the three areas listed below will provide reliable grain quality outcomes:

Good storage & equipment hygiene – reduces early pest infestations & grain contamination problems. Sieve & inspect grain in storages monthly.

High moisture grain in storage – have the right equipment & management to deal with it promptly. Monitor regularly.

Cool grain temperatures - use aeration to achieve cool, uniform moisture conditions in storages in the first few weeks after harvest. Monitor and maintain these conditions.