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Arable Update

Cereals: Issue 211

Regular monitoring protects grain quality

Background

Good grain storage should preserve grain quality over the storage period. This can be challenging as the New Zealand system does not always allow growers to accurately predict how long grain needs to be stored before use, as movement of grain from silos is dictated by contracts, end use and grain prices. A recent FAR survey of 42 growers, carried out as part of a three year MPI SFF project on understanding and managing pests of stored grain, found that grain could be in storage for up to 20 months. This uncertainty can be further complicated by storage conditions that may not be ideal, such as high seed moisture and temperature, and can lead to insect infestation or other storage problems such as mould (Figure 1). High temperatures will also be detrimental to seed quality. At temperatures between 15-35ºC, insect activity is temperature dependent; the higher the temperature, the faster insects move, feed, grow and reproduce. Saw-toothed grain beetles, which were found in 33% of grain samples, can reproduce at 21ºC and in their optimum temperature range of 31-34 ºC they can reproduce in as little as 20 days.

Key points

- Protecting grain in storage is key to preserving quality.
- Poor storage conditions such as high grain moisture and temperature can results in increased levels of insect infestation and moulds.
- Regular monitoring for grain quality and insects is an important tool for protecting stored grain.
- Keep a sampling record of what was sampled, and hang onto samples until all grain from that line has been sold and delivered.

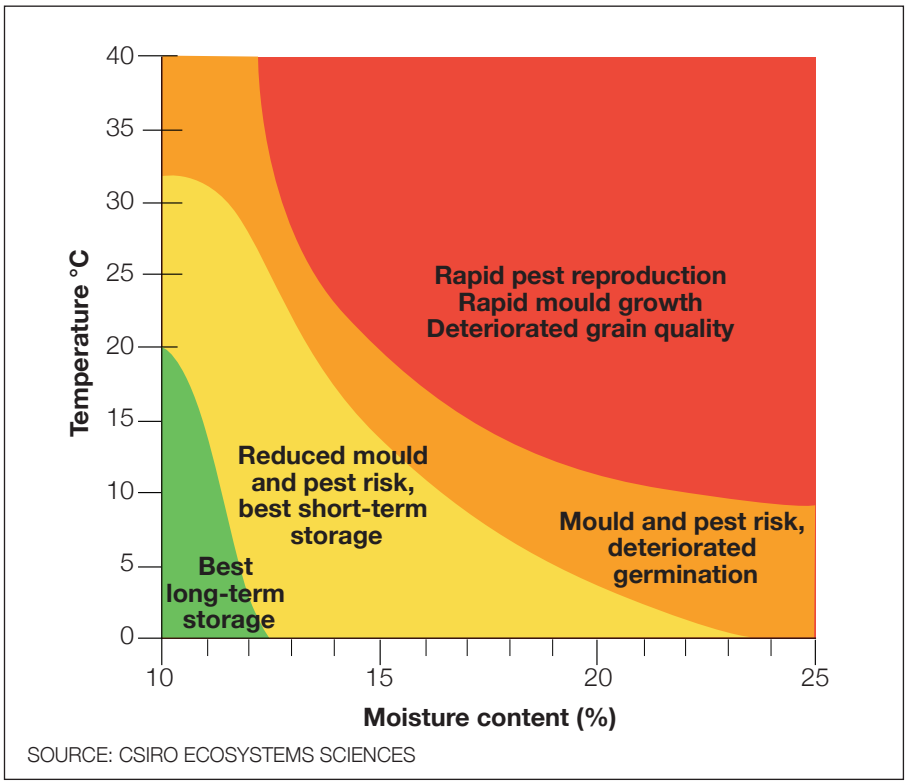
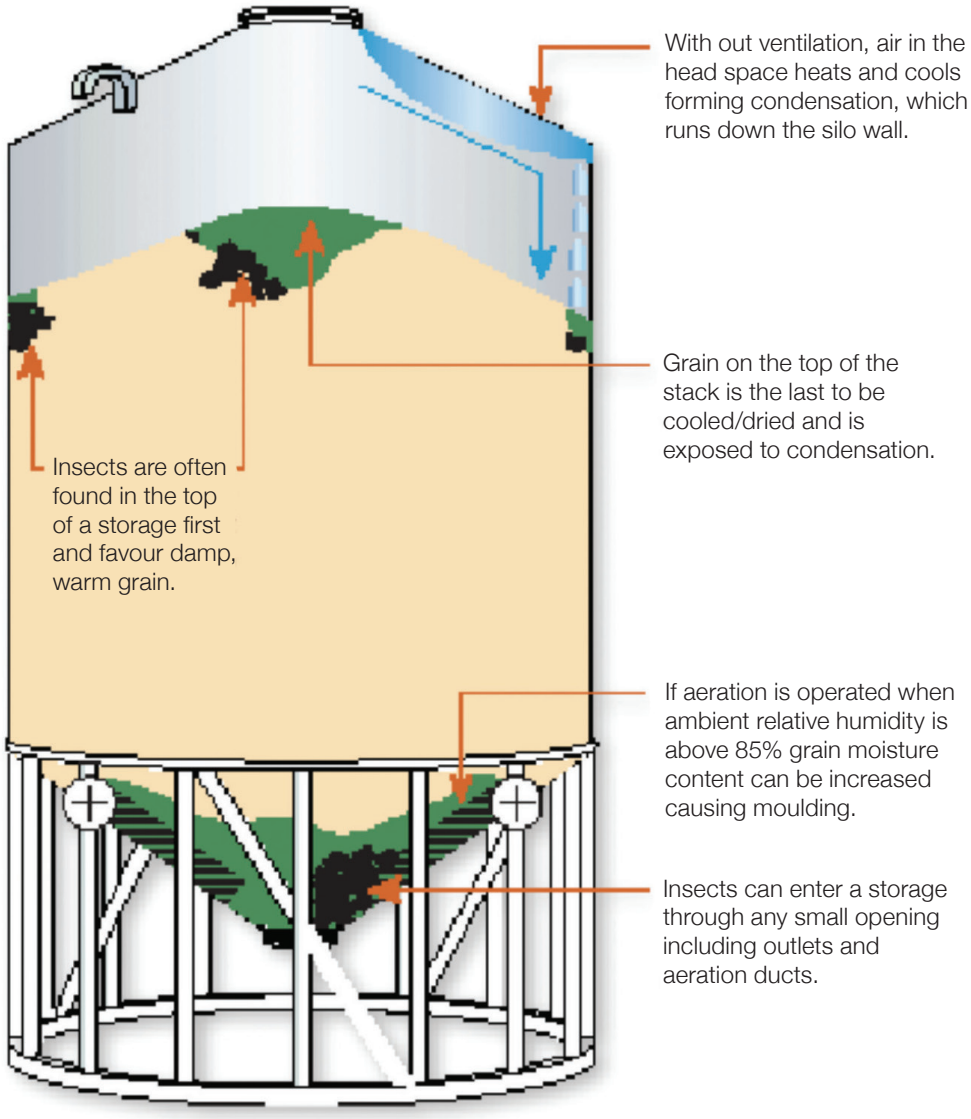


Figure 1. Effects of temperature and moisture on stored grain.

Stored grain deteriorates over time under any conditions, but high grain moisture and temperature accelerate this process. Insect infestation predominantly comes from inadequately cleaned or disinfested storage facilities prior to re-use or where there is old, discarded seed or seed debris in machinery or areas surrounding stores. All of these factors mean that good hygiene practices in and around grain stores and ongoing monitoring are key to preserving the quality of stored grains.

Monitoring

Just like monitoring a crop during the growing season, monitoring grain during storage is an important tool in maintaining seed quality. The longer grain remains in storage the more important this becomes, because deterioration in seed quality early in storage is slower and insects are sparse and not easily noticed. Once grain is in storage, monitoring for insects and mould once a month will help with planning a pest management programme. Grain samples should be collected from areas where insects and mould are likely to establish first, such as hatches, doors, aeration fan inlets, filling and emptying points (Figure 2). Another common place to check for insects and mould in a silo is at the top, just below the surface of the peak of the grain. However, sampling from the top of a storage should only happen if it is safe to do so. Health and safety guidelines should be followed at all times.



Source: Kondinin Group.

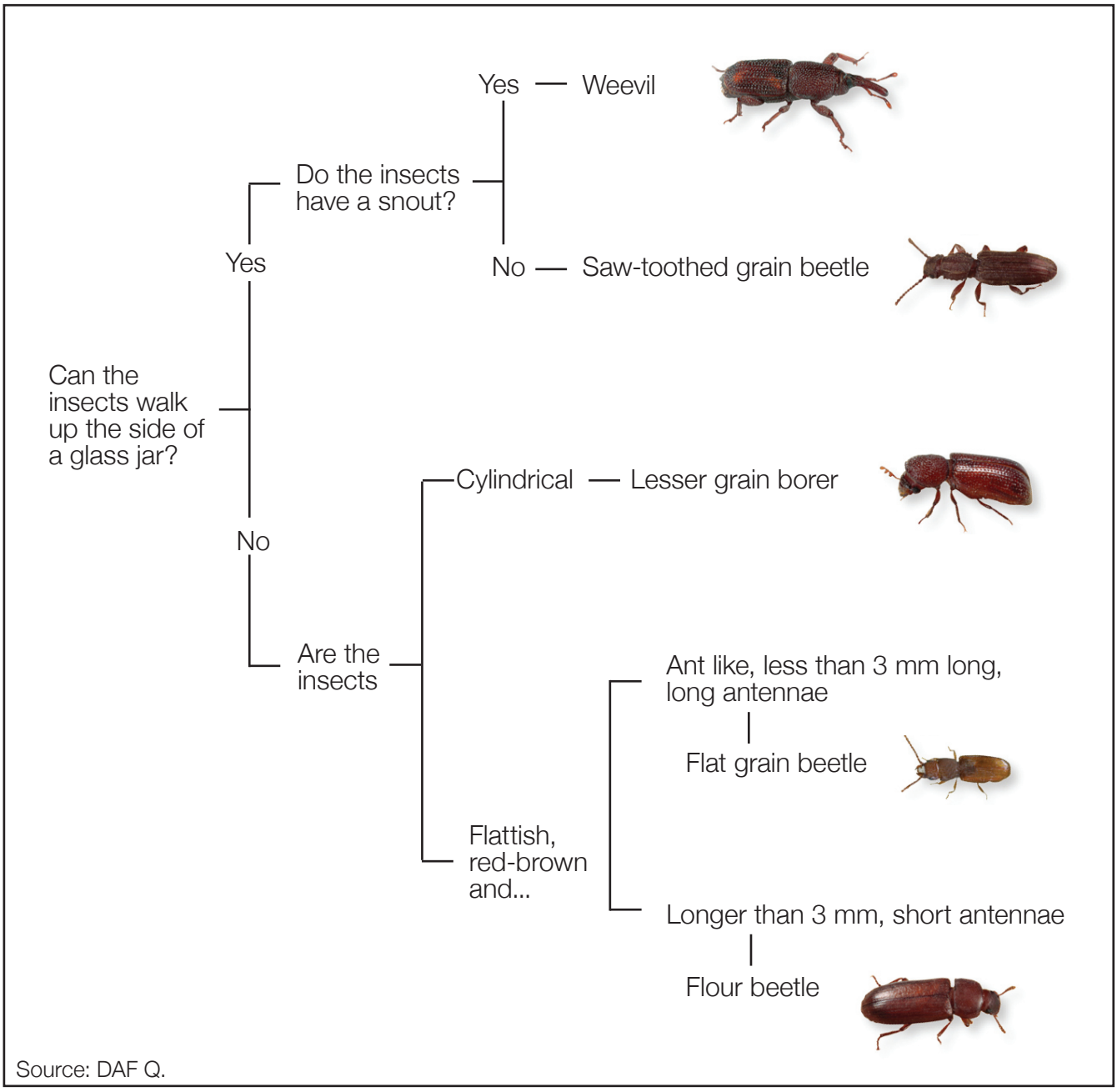
Figure 2. Common problem areas in grain stores.

Sampling of stored grain

Samples should be taken from below the grain surface, away from the edges. When sampling from the bottom of a silo, the best way to do this is to open an outlet to run a small amount of grain out before collecting the sample. Around 1kg of grain per 50 tonnes of grain in storage is sufficient; this can be bulked together to form a subsample of around 1kg. Once the subsample is collected, sieve it onto a white tray or plain surface where insects can easily be detected. If insects are present, they may need to be warmed up a little by exposing them to sunlight, a lamp or other heat source to get them moving. Some insects will try to take cover under grain, while others will stay out in the light. A wide range of insects attack grain store, some of the more common ones can be identified by following the key below. Samples should be kept in sealed bags until all grain of that line has been sold and delivered. Record the date, grain temperature, grain moisture content and whether insects were present. It's also a good idea to keep track of information on aeration, silo cleaning, filing, pesticide use, sales and transfers of grain.

Identification chart of common pests of stored grain

The following flow chart provides a useful guide for grain pest identification.



Source: DAF Q.

Acknowledgements:

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