

FACTSHEET:

Drying and Storing Weather Damaged Grain



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THE RISK

The wet conditions at harvest this year mean that it is important to take care when drying and storing grain. Grain put into storage with a high moisture content may spoil, resulting in downgrading. The risk of insect infestation increases if the grain is moist. Grain with fungal contamination that is stored with high moisture is likely to either rot, making it worthless, or have significant levels of mycotoxins which will make it difficult to sell.

Begin by testing the moisture content of the grain using a reliable NIR instrument. Then decide if the grain is to be harvested and if it will be mechanically dried.

DRYING OPTIONS

Aerated Drying

- Aeration drying (15-25 L/s/t) can be used to safely reduce grain moisture content. Fans are run continuously for the first week providing ambient relative humidity is below 80%. Higher ambient temperature and lower relative humidity will assist grain moisture reduction.
- Grain being dried by aeration should be turned at least once to ensure that no 'hot spots' remain (clumps of wetter grain that might rot).

Heated Drying – 'low and slow' are the way to go!

Heated drying is suited to cereal grains with up to 25% moisture. With rain heading your way or hectares waiting to be harvested it is tempting to get the grain dry as fast as possible but this approach risks ruining the grain quality. The grains may look normal but still have been exposed to heat damage. If the grain is dried at high temperatures or exposed to heat for long periods heat damage will occur and the grain will be downgraded (generally to feed).

Heat damage of grain causes:

- *Visual deterioration.* The grain may have a glossy seedcoat and be brown in colour.
- *Poor germination and seedling vigour.* High temperatures damage the grain's ability to germinate making it unsuited to malting or use as seed.
- *Protein damage.* Gluten is the main protein in wheat that makes wheat ideal for making bread. Over heating wheat grains damages the quality of the gluten forming proteins. Bread made with this wheat is dense with large 'bubbles' of air. Noodles made from heat damaged grain are inelastic and have poor texture when eaten.
- *Loss of weight.* Over drying reduces the weight of grain that will be sold as it contains less water.

When drying grain:

- It is recommended that when drying grain you follow the manufacturer's instructions issued with your drier.
- Use the lowest temperature that will achieve grain drying.
- Mix the grain during drying to minimise the chance of 'hot spots' forming e.g. with a stirring auger.
- Cool the grain before delivery or returning it to storage. Many receival points will not accept grain that has been artificially dried and is above 50°C.

FACTSHEET:

Drying and Storing Weather Damaged Wheat



STORING WEATHER DAMAGED GRAIN

Grains are living things

Although mature grain is dormant its cells are still alive and respiring. Cell respiration generates heat and higher moisture grain respire more rapidly. Water also evaporates from the grain depending on the temperature and humidity. When cereal grains are stored above 12.5% moisture (8% for canola) the water vapour from respiration and evaporation can quickly build up in the space between the grains and conditions can become suited to mould and insect spoilage. To reduce the rate of respiration and evaporation in weather damaged grain the grain should be dried and stored at low temperatures.

Moisture Migration

Moisture migration is when pockets of grain form where the moisture content is higher than in the bulk of the grain. Moisture migration can occur if:

- Grain is stored wet
- Wet and dry grain are blended
- The temperature outside the silo differs from that in the grain e.g. if day or night temperatures are cool grain near the silo walls becomes cool. The difference in temperature creates a downward airflow through the grain by the silo walls and an upward air flow in the centre of the silo. As the air current moves through the grain it picks up moisture which can condense at the cool upper surface of the grain at the centre of the bin.

In pockets of high moisture grain moulds and insects can thrive. Not only is the grain downgraded due to the presence of insects, fungi and fungal staining, moulds may also produce mycotoxins which can be harmful to stock and humans. The best way to prevent hotspots once the bulk of grain has been dried below 12.5% moisture content, is with aeration cooling. Unlike aeration drying, cooling only requires low airflow rates of 2-3 L/s/t and is best run when ambient temperature is cool providing the relative humidity is below 75%.

STORAGE OPTIONS

Bags

- Only use silo bags as a short-term option (<3-4months) for dry grain.
- If storing in bags regularly check the grain, bags and surface on which the bags are sitting.

Silos

If storing grain in silos:

- Routinely monitor the grain closely. Look for condensation, crusting and insects. Spear the grain at different locations within the silo to measure temperature and moisture content. Grain temperatures above 30°C and samples with high moisture may indicate hot spots/moisture migration.
- Store the grain with good ventilation to prevent moisture migration and provide consistently cool and dry conditions.
- Cooled aerated storage is ideal. Cooled aerated storage has a low air flow through the grain e.g. 2-3 L/s/t which can protect grain quality (e.g. malting, flour or oil quality), limit insect activity, maintain seed viability, minimise moisture migration and prevent increases in grain temperature. Aeration cooling can be used in a sealable silo providing the lid is left open to allow adequate ventilation.
- If storage with aeration cooling is not an option, putting cool grain into silos (in the morning or evening), painting galvanised iron silos white or using silos made from zincalume or colourbond help to keep grain cool.
- If the stored grain is to be used for seed check its Falling Number. Always do a germination test before seeding.

Receive standards for maximum moisture content are:

Wheat	12.5 -13.5%
Barley	12.5 -13.5%
Canola	8%

There is some variation in receive standards between traders and delivery sites.

REFERENCES:

- www.storedgrain.com.au
- GRDC Factsheet Retaining Seed January 2011. www.grdc.com.au

Acknowledgements

Acknowledgements to Chris Warrick of Kondinin Group and Phillip Burrill of DEEDI Agri Science Queensland, for their valuable contributions to this factsheet.

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