

Strategies for managing high moisture grain at harvest

RECENT rain and forecasts for a wetter than average few months ahead may contribute to a frustrating grain harvest for some growers.

Recognising that the challenges facing growers could extend beyond harvest if high moisture grain is coming off crops, the GRDC Stored Grain Extension Team is on call (1800 WEEVIL) to provide advice to growers storing grain at less than optimum moisture levels.

Grain storage specialist, Chris Warrick, who leads the GRDC Stored Grain Extension Team, says growers need to keep several key points front of mind when it comes to storing grain with high moisture levels.

Act quickly with high moisture grain

“The current weather conditions and forecasts suggest there could be some high moisture cereal harvested,” Chris says.

“To avoid delivery or storage quality problems, growers need to act quickly once high moisture grain is harvested. Grain respire like most living organisms, which means it takes in oxygen to use with carbohydrates, which in turn generates carbon dioxide, water and heat.

“When grain has a high moisture content and is warm, the rate of respiration increases significantly, causing it to heat.”

Chris says high moisture grain in storage can increase in temperature rapidly without aeration. This can result in serious grain damage or ‘bin burn’ and creates ideal conditions for moulds and insect pests.

Growers without grain drying or blending facilities need to delay harvest until moisture levels meet receival standards. The receival standards for moisture content are there for a reason – they enable safe storage without compromising grain quality, particularly for bulk handlers storing grain for export.

For those growers who need to harvest early and temporarily store high moisture grain, it is critical they have aeration cooling, as well as clear plans to dry grain or blend grain within three to five weeks.

In most cases, grain can be safely held for a few weeks at 14 to 16 per cent moisture content with small aeration cooling fans

running continuously, delivering airflows of at least two to four litres per second per tonne (2–4 L/s/t), according to Chris.

“The options for managing high moisture grain depend on the equipment available, but it is important to understand it is very difficult to reliably reduce moisture content using standard small aeration cooling fans (output 2–4 L/s/t) designed for cooling grain, not drying.”

In summary, small aeration fans are useful for temporarily holding wet grain, but growers need a plan to dry grain that involves either a grain dryer (batch or continuous flow); aeration drying in silos with high output fans (15–25 L/s/t); or blending grain.

Silo set up

Tactics for silo set up for temporary storage of high moisture grain include:

- Run aeration fans continuously (24/7) as soon as the first truck load of moist grain goes into a silo or shed to keep it cool. Ideally, use a silo with an aeration ducting providing effective air distribution through wet grain. Silos with a wide base may require at least two fans opposite each other. Ensure silo roof vents or the top silo lid is open enough to ensure airflow is not restricted. Aeration fans need to be delivering airflow rates of at least 2–4 L/s/t.
- Consider only filling two-thirds of the silo to reduce the grain depth and effectively increase air flow.
- Do twice daily checks on grain temperature, check silo fan operation and smell the grain at the top of the silo.
- If available, use an automatic aeration controller set on ‘auto continuous’. This automatically turns fans off for a short time when air exceeds 85 per cent relative humidity.
- If manually operating fans, growers should monitor the ambient temperature and relative humidity on-farm. If the weather is wet and humidity is consistently above 85 per cent, they should turn off fans for short periods (two to four hours).
- Regularly check grain temperature with the aim of keeping it below 25°C. Remember, it is the average relative humidity of the air you are using while fans are running that is important. Short run periods for one to two hours of high humidity air during a rain storm should not cause problems provided this is promptly followed by lower average relative humidity air (30 to 65 per cent relative humidity).
- ‘Turning grain’ could be considered. After two to four days of having wet grain in the silo, auger the grain into a truck, then back into a silo. Moving grain around and turning it over helps to break up hot spots that can develop in a silo. This may be helpful if the aeration air distribution system/ducting is limited.

For advice from the GRDC Grain Storage Extension Team call 1800 WEEVIL. For more detailed information about storing high moisture grain go to <https://storedgrain.com.au/dealing-with-high-moisture-grain/>.

Other useful resources:

How aeration works <https://storedgrain.com.au/how-aeration-works-grdc-update/>.

Aerating stored grain http://storedgrain.com.au/wp-content/uploads/2016/10/GRDC-Aeration-Book-2016_R2.pdf.

Water activity and equilibrium relative humidity – Len Caddick, CSIRO <https://storedgrain.com.au/water-activity-and-equilibrium-relative-humidity-len-caddick-csiro/>.

PAMI Equilibrium moisture content charts for grain management http://pami.ca/wp-content/uploads/2017/09/Equilibrium-Moisture-Content-Charts-for-Grain-Storage-Management_rev2.pdf



To avoid quality issues growers need to act quickly if storing high moisture grain.