Grain testing on-farm for profit

By Craig Moore, Graintec Scientific

Combining last season's improved total crop with a positive outlook for 2009–10, grain growers are embracing the opportunity to gain maximum profit from their harvest. Whilst many factors are outside of their control, growers are focusing on the quality of their grain and ultimately, the bottom line. Marketing strategies include how they sell their grain, manage pests and investing in grain quality testing and sampling equipment.

Partners in Grain (a GRDC funded project which facilitates professional development activities for farming businesses) recently conducted a series of workshops throughout NSW to assist growers in testing their grain on-farm to meet Grain Trade Australia's grain receival standards.

Left to right is Dr Joanne Holloway (NSW DPI Wagga Wagga), Gerard McMullen (GP McMullen Consulting), Ingrid Taylor (*Partners in Grain*), Lucas Anstiss (Graintec Scientific).

Presented by industry consultant Gerard McMullen, together with Dr Joanne Holloway from the NSW DPI in Wagga Wagga, the workshops highlighted the importance of testing grain on-farm and the treatment of insects.

Grain Trade Australia sets standards for classifying grain at receival. Growers need to understand the parameters which determine grain classification so they can market their grain to buyers who can offer them the best price. For example, marketing grain that has a low falling number to a miller may not be an effective strategy as the grain may be classified as 'feed' – or, the difference between wheat APH2 and AUH2 can be determined by a single additional foreign seed.

The deregulated market has created many opportunities for growers to sell their grain to a wide range of buyers and each buyer has their own requirements in terms of grain quality and variety. Simply stated, grain sampling and quality testing is a critical step in successful grain marketing.

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ON-FARM TESTING

The following highlights the critical wheat receival parameters and the on-farm sampling equipment growers require to successfully measure these parameters.

The first step – how to obtain a representative sample

In order to successfully perform the required grain quality tests, a representative sample must be taken. Grain samples are typically drawn from a truck or rail carriage or storage shed/bunker using a probe system.

The probe is usually in the form of a truck spear or a vacuum sampling system and determined according to the type of grain storage. For example, given a 20–30 tonne truck load of grain, a minimum of five probes are required with a total minimum sample volume of five litres.

Each sample must be drawn from a different section of the truck load – that is, to gain a representative sample of the entire load (each probe should be placed randomly and with at least one probe taken from the front, middle and rear of the truck). Sub samples are then taken using equipment such as a 'Divider' to gain a truly representative sample of the load.

It is important to remember that all representative samples be retained as a future reference should a dispute arise.

Moisture

Moisture is the most fundamental parameter in meeting receival standards. The maximum moisture percentage allowed for wheat and barley is 12.5 per cent. Failing to meet this parameter will result in the load being rejected – without the need for further assessment. For growers, moisture can be measured using a conductivity or capacitance meter and/or using near infrared technology (NIR).

The CropScan 1000B NIR protein and moisture analyser. (Photo: Craig Moore)

Out in the field, a portable moisture meter such as the HE–50 is an accurate indicator of measuring moisture in a grain sample. But it is vital that the unit you use to measure moisture is calibrated and measures the same (or close to) as the measuring device used by the receiving depot/facility of your grain.

Protein

Knowing the protein level of your grain is crucial in many instances and can assist with harvesting decisions such as:

- The segregation of grain on-farm;
- Meeting your buyers' minimum protein level conditions;
- Store or sell; and,
- Which grain should be mixed to optimise protein results.

An NIR protein analyser can determine the protein level of a given sample in 60 seconds (some instruments take longer to read). Protein analysers usually come in two forms:

- Portable on-farm; and,
- Bench units suitable for traders, packers and exporters.

The portable on-farm protein analysers are light-weight and thus suitable for moving around on-farm whether it be on the back of a ute or in the cab of a header. They feature a 12V plug-in.

Trade certified protein (NIR) instruments are becoming increasingly sought after to ensure buyer conditions are met. The CropScan 1000B is a popular choice for both traders and growers as it is certified by the National Measurement Institute (NMI).

Grain dividers accurately split samples into representative sub samples. (Photo: Craig Moore)

GTA's wheat receival standards for example refer to the use of a NIR instrument, stating that it must be approved for use for trade purposes under the conditions stipulated by the NMI. Additionally, the CropScan 1000B has a rapid 60 second analysis, is portable and able to measure a wide variety of grains including wheat, barley, canola, sorghum, oats and rice.

Test weight

Test weight measures the density of grain and is calculated as kg per hectolitre. This is measured by weighing a half litre measure of grain in grams and dividing the weight by five.

The importance of measuring test weight using correct methods or an approved apparatus is often overlooked. Test weight is a critical grain receival parameter. Incorrectly measuring test weight by three grams could result in a downgrading of your wheat from APH2 to AUH2.

A chondrometer is an approved apparatus to measure test weight. There are many different models on the market and the key to achieving accurate readings is to use the unit correctly. Varying pouring actions, using damaged parts, incorrect tarring of scales and so on, can result in an incorrect test weight measurement.

The message to growers is to contact your grain equipment testing supplier for an approved unit and find out more about the correct procedure to measure test weight according to your chosen unit.

Screenings

Screenings are defined as the unmillable material below the screen. The GTA stand-

The Agtator automates the shaking action to analyse screenings. (Photo: Craig Moore)

Gerard McMullen demonstrating the correct specification of screens. (Photo: Lucas Anstiss)

ards express screenings as a percentage of the total hectolitre weight. For example, the maximum per cent of screenings allowed for APH2 is five per cent. Using the appropriate equipment in the correct way is essential to effectively measure screenings.

Using certified screens is just the beginning of the process. How growers operate their screens is vital. There are two methods used:

- Manual method; and,
- Using an Agtator.

The manual method (often referred to as 'hand shaking') is difficult to execute accurately. Using this method, the grower needs to be aware of issues including:

- The number of shakes required;
- The correct shaking action;
- Understand what constitutes a 'shake'; and,
- Ensuring the sieve slots are lined in the correct orientation.

The advantage of using an Agtator is that the machine can be set to the correct number of shakes per grain and eliminates the potential for human error as well as reducing physical strain. Using an Agtator provides greater accuracy and also meets current GTA standards.

Falling number

Falling number is a grain quality test which measures the degree of weather damage in wheat. Generally, a falling number value of 350 seconds or longer indicates low enzyme activity and very sound wheat. As the amount of enzyme activity increases, the falling number decreases.

The falling number test is an alternative to visual assessment for sprouted grains, and always overrides the visual grain assessment. The Perten system is the approved apparatus in measuring falling number. Weather damaged grain can have a huge bearing on classifying grain at receival. If the falling number for barley is lower than 300 seconds for instance, it is downgraded to feed.

There is a portable falling number kit available to provide growers with an accurate indicator as to the falling number of their grain. The WheatRite test kit provides a five minute test. Results can be evaluated visually by comparison with a colour chart to estimate falling number equivalent. Speak to your grain equipment supplier for more information.

Other parameters

Other parameters to consider in meeting GTA receival standards include the measurement of defective grains, foreign seed contaminants and other contaminants. These can be determined using screens, and seed count trays. Refer to the standards for more detail.

In conclusion, using the right grain testing equipment in the correct manner is vital. Measuring moisture, protein, test weight, screenings and falling number are critical for growers if they are to value and market their grain effectively and maximise profit. ■