



Checking is essential for 8 t/ha of wheat

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IN A NUTSHELL

- Crop monitoring is essential for achieving high wheat yields, as all facets for paddock and crop management must meet required targets
- In 2005 crops with seemingly high yield potential did not meet expectations – analysis of crop management and seasonal factors suggest that any one of several factors could have been responsible

Farmers were grateful for the good rains last season, however irrigated wheat yields were very disappointing with most crops only yielding 5.0–5.5 t/ha. Why wasn't 8 t/ha achieved for the good looking crops in 2005?

Farmer and agronomist views as to why yields were low and screenings high included late sowing, thick sowing populations, too much nitrogen, stripe rust, shallow roots, take-all and crown rot diseases, lodging, variety, waterlogging and moisture stress.

Which factor caused yield loss?

If crops were not checked one can only guess which particular factor or combination of factors caused yield loss.

Low yields (4–5 t/ha) and high screenings also occurred in the good spring rainfall season of 2000. In that season, CSIRO haying-off expert Anthony van Herwaarden diagnosed the answer to what caused the poor results. His research has found that the first 10 days after flowering is critical for grain size. At this time grains are enlarging and forming and conditions during the period (not only weather conditions) but manageable conditions such as moisture will affect the final size of the grain. This is contrary to previous thought that believed only the milky to doughy stage was important for grain size. In short, moisture stress in the first 10 days after flowering can reduce grain size.

Crops with 6–8 t/ha yield potential have much higher biomass and use much more soil water than crops with 3–4 t/ha potential. Any short period of moisture stress or period without good rainfall in a high yield potential crop will cause a large dip in the yield achieved.

The first half of October in 2005 had light rainfalls when crops were from the booting to early milk stage. The average evaporation rate in October is 5.3 mm/d. Hence one week without rain adds up to a moisture loss of 37 mm. Some paddocks in 2005 had cracks at this time which is a sure sign crops were suffering severe moisture stress.

Farmers need to monitor and measure crops if they wish to improve wheat yields and profitability.

How many farmers regularly checked soil moisture with a probe or auger to 60 cm rather than the often misleading shovel depth?

Join the club to lift yields

In 1984 a crop monitoring wheat package called the "Five Tonne Irrigated Wheat Club" commenced. Farmers had to monitor crops and check to see if their crop had attained the benchmarks or checks to achieve the target yield of 5.0 t/ha. At the time, average yields for irrigated wheat were 2.5 t/ha. With closer monitoring and specific targets set for specific components of the crop production system, yields doubled in three years.

The bar has been raised again and since 2001, some irrigated wheat farmers have been aiming for eight tonne wheat crops.

Eight tonne key checks for 2006

The "Eight Tonne Irrigated Wheat Club" follows the same principles as the "Five Tonne Club". Based on the monitoring package "Irrigated Wheatcheck", it sets checks or benchmarks specific to a high yielding crop, ie 8 t/ha.

Willingness to monitor and record the key checks

If this check is not carried out there is no way of understanding progressively, if eight tonnes can be achieved, or retrospectively, why eight tonnes was achieved or not achieved

Irrigation layout

Use a layout which allows water application and drainage within 15 hours

Paddock history

Use a paddock which had a break crop or non-grass



pasture last season to minimise risk of take-all and crown rot diseases

Soil structure

Choose paddocks with moderate to good soil structure, ie the better paddocks on the farm

Subsoil moisture

Ensure there is a minimum of 50% available soil moisture at sowing to a depth of at least 60 cm to avoid moisture stress in dry winters and provide a longer window before the crop needs its first spring watering

Soil nitrogen

Measure deep soil nitrogen (to 60 cm) and avoid high nitrogen paddocks, ie paddocks with over 120 kg N/ha, as the risk of excessive growth and lodging with yield loss in average rainfall seasons is too high

Sowing date

Sow mid-season maturity varieties in late April to early May to target flowering in late September/early October

Sowing fertiliser

- if needed, top up soil nitrogen at sowing or pre-sowing so that total soil and fertiliser nitrogen is 100–120 kg N/ha
- fertilise with 4 kg phosphorus for each tonne of target yield, ie an 8 tonne target means 32 kg P/ha

Plant establishment

Aim for 150–200 plants/m² at the plant emergence stage which, depending on soil type, requires sowing rates of 90–110 kg/ha – a higher rate for heavy soils, and a lower rate for lighter soils

Weed control

Undertake pre-sowing and post-sowing weed control to avoid yield loss due to weed competition

Nitrogen topdressing at late tillering to initial stem elongation stage (DC30)

Nitrogen topdressing will depend on the number of shoots – count shoots to determine whether the crop has the target population of 500–800 shoots/m²

If the shoot number is 750–800 shoots/m² there is no need to topdress at this stage

If the shoot number is below 750 shoots/m² topdress with a top-up rate of 30–45 kg N/ha

If the shoot number is below 500 shoots/m², the chance of eight tonnes is limited – subsequent management should be revised for a lesser yielding crop

If the shoot number is above 800 shoots/m², the crop is too thick and there is a greater chance of yield loss from lodging and extra disease compared with crops of lower shoot numbers

Available soil moisture from stem elongation to mid dough stage

Soil moisture needs to be 50% or more throughout these

stages to avoid yield losses from moisture stress. Crops with 8 t/ha potential will have high moisture demand – regular checks of soil moisture down to 60 cm are essential. Generally budget for two to three spring irrigations. Make sure moisture is particularly adequate at the most critical moisture stress stage, head emergence.

Plan for an irrigation at flowering and the early milk stage to allow good grain fill, up to the mid dough stage.

Maintain three green leaves at flowering

Use seed treatments and foliar fungicide sprays for stripe rust and other diseases at the flag leaf stage to maintain three green leaves per shoot at flowering

Late nitrogen topdressing at booting to head emergence

A late nitrogen topdressing is recommended if:

- if *all* the other checks have been achieved
- water is available for 2–3 spring irrigations
- the decision to target eight tonnes has been made

Topdress 60–90 kg N/ha (125–188 kg urea/ha) between the booting to head emergence stages and water the fertiliser in – this is after the flag leaf stage when most crops will require spraying for stripe rust.

Eight tonne wheat yields are hard to achieve consistently. That is why a lot of time has gone into developing the "Eight Tonne Club" package, which is very different to previous packages. *The catch is all checks need to be adopted.* Non adoption of just one check could mean a significant crash in yield and profit. Alternatively there is also the chance a crop has better than expected yield potential. If the 8 tonne checks are satisfied there is the opportunity to manage the crop for eight tonnes.

Will you participate?

Although the current price outlook for wheat is poor for 2006, well managed, high yielding crops will still be




Figure 1 Regular crop monitoring is essential and many key checks required to achieve eight tonne wheat crops require management decisions based on plant population



profitable, particularly in the bigger picture of the overall farm cropping system.

Irrigated wheat growers need to make up their minds at the outset of the season if they plan to grow high yielding wheat, and whether or not they wish to use the tools available to improve the management and profitability of their crops. This means being prepared to monitor crops to determine if they meet the key checks required for high yields.

The risk in targeting a yield of 7–8 t/ha is not much higher than 5 t/ha because the costs of growing a 7–8 tonne crop the "Eight Tonne Club" way is no different to a five tonne crop

up to the first-node stage. If poor crop prices, lack of crop potential and lack of water become impediments, a decision can be made at the first-node stage to aim for 5 t/ha rather than 8 t/ha. 

Further information

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Crop checking in 2006

Farmers interested in the "Eight Tonne Club" or other crop checking packages in 2006 should contact their NSW DPI District Agronomist.

GRDC has been funding a project "Cropcheck for irrigated and dryland cropping" which supplies monitoring cards and a database for analysing and benchmarking the practices of the monitored crops.