



## IRRIGATION RESEARCH & EXTENSION COMMITTEE

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FOR IRRIGATION CROPPERS

**Achieving 10t/ha  
irrigated wheat**

**Paper prepared by**

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### **In a nutshell**

- In 2007 wheat trials at Yanco targeted 10t/ha
- The 10t/ha target was 2t/ha above what was believed possible
- The target was reached using the checks in the 8 tonne club which were modified for 10t/ha
- The results showed a number of current varieties can yield 9-10t/ha
- The results give farmers confidence commercial crops can yield 9-10t/ha in this region, as some have

### **Background**

In 2007 wheat variety trials in a GRDC/ICF project “High yielding genotypes of winter cereals for irrigated regions of SE Australia” at Yanco Agricultural Institute averaged close to 10 tonnes/ha. Although a number of new genotypes yielded above 10t/ha the commercially released bread varieties such as Chara and Giles still yielded 9t/ha with Bellaroi durum wheat over 10t/ha. Thus for these varieties the management of the trials had a large impact in achieving the high yields rather than genotype. This article explains the management for the trials.

The trial management was based on the key checks in the “Eight tonne club package” which has been compiled in the “Growing eight tonnes of irrigated wheat in southern NSW” primefact available from NSW DPI offices and the NSW DPI website. The 8 tonne package only suits a small proportion of most irrigated farms as well drained layouts, good soil structure and around 5ML/ha water are needed. For the trials extra nitrogen and fungicides were applied for targeting 10 tonnes.

### **Sowing**

The trials were conducted in a border check layout following a break crop of canola with a previous history of lucerne. The red loam soil site was pre-irrigated with 1.7ML/ha and deep soil nitrogen tested. The soil nitrogen was 70kgN/ha so this was topped up with fertiliser so the total nitrogen at sowing was the recommended check of 120kgN/ha. The nitrogen at sowing was deliberately limited to reduce the chance of excessive vegetative growth and potential for lodging. Sowing fertiliser was 120kgMAP/ha. Fallow weed control was Roundup Max ® mixed with dicamba and pre-emergent weed control was with Stomp® and Avadex Xtra®.

The sowing date was the 15<sup>th</sup> May and the 100kg/ha sowing rate resulted in the target plant population of 160-200plants/m<sup>2</sup>. Post sowing grass control was not required but effective broadleaf weed control was undertaken.

### **Shoots and Nitrogen topdressing**

At the first node stage the shoot populations of most varieties averaged a high 780 shoots/m<sup>2</sup> which does not normally require nitrogen topdressing for 8 tonnes. Since the target yield was 10t/ha, 68kgN/ha was topdressed at the end July (Zadock 31) just ahead of 9mm rain. A second topdressing of 110kgN/ha just before the awns visible stage (Zadock 41-45) was applied just ahead of the second spring irrigation on 18<sup>th</sup> September. This strategy of making the delayed second topdressing the major nitrogen topdressing stage helped to reduce the potential for lodging and diseases.

## **Irrigation**

The timeliness of irrigations was a major factor in obtaining the high yields. Soil moisture was monitored with an enviroscan and gypsum block Hansen loggers. Five spring irrigations were applied with the first irrigation on the 30<sup>th</sup> August using 0.8ML/ha with 0.7ML/ha for each of the other irrigations. Thus the total spring irrigation water use was 3.6ML/ha.

## **Stripe rust**

Since the aim of the project was to target maximum yields three preventative stripe rust applications of propiconazole fungicide were applied on the 7<sup>th</sup> September, 5<sup>th</sup> October and 9<sup>th</sup> November.

## **Lodging**

The eight tonne package aimed to reduce the risk of early lodging which has been a major factor preventing consistent 8 tonne wheat yields. In two of the wheat trials lodging was post flowering and had no effect on yield. However in the main wheat trial earlier lodging after flowering resulted in reduced yields for lodging prone genotypes.

## **Temperatures**

Average temperatures in the post flowering period from second to the last week October averaged 20°C which was well above the desired 14°C considered conducive to high yields so it was surprising the yields were so high.

## **Profitability**

Based on the average yield of the three trials at 9.8t/ha and wheat price \$350/tonne the income per hectare was \$3430. The trials achieved an average protein 12.6% which satisfied quality for Australian Hard grade. The variable cost was \$1650/ha based on current (March 2008) herbicide, fungicide and fertiliser prices. The irrigation cost was \$90/ML based on the 2007/08 season irrigation allocation of 13% for Murrumbidgee Irrigation and includes farm fixed and variable water costs.

The gross margin per hectare was a profitable \$1779. For the total pre-irrigation and spring water use of 5.3ML/ha the gross margin per megalitre was \$336/ML. Using the same costs the gross margin per megalitre for 8 tonnes was \$255/ML. If the budgets were calculated on 50% irrigation allocation and water cost of \$28/ML the gross margin per megalitre for 10 tonnes would rise 18% to \$395/ML.

Profitability would have been even higher for farmer crops as nitrogen and fungicide inputs would be lower than the high nitrogen and fungicide trial inputs and costs.

## **The Future**

If this trial result is any indication there is an exciting future for irrigated wheat. The evaluation of genotypes and identification of new higher yielding varieties arising from the project led by NSW DPI researcher Andrew Milgate, managed with the eight tonne plus package, should lead to new levels of profitability for irrigated wheat.