# 16. Irrigated Dual Purpose Crops

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## KEY MESSAGES

- Third and final year of trials for the GRDC funded project 'Southern Irrigated Cereal and Canola Achieving Target yields' (DAN00198).
- Wheat and canola dual purpose trials were established at Bool Lagoon under irrigation.
- Seasonal conditions dictated the use of the dual purpose crops.
- Due to inundation trial results must be interpreted with caution.
- Variety specific agronomy packages will be developed from data collected over the duration of this project.

## Trial Background

This is the third and final year of the GRDC funded project 'Southern Irrigated Cereal and Canola Achieving Target yields' (DAN00198). The project is addressing the improvement of advisor and grower knowledge of high yielding cereal and canola varieties under irrigated systems and specific agronomic management that will improve profitability of these crops. The project is led by NSW DPI, with MFMG a collaborator and SARDI project and trial managers.

MFMG growers highlighted the need to investigate the management of dual purpose canola and cereal crops under irrigation in the region. As a result of this discussion trials have been established at Bool Lagoon to evaluated the management of canola and wheat under this farming system. The 2016 trials compared spring canola to winter canola and mid-late wheat to late wheat, focusing on the management issues of times of sowing (TOS), grazing and nitrogen application rates.

## Canola Trial

The canola trial compared winter canola Hyola 970CL and spring canola Hyola 575CL at four different TOS's, with and without grazing and two nitrogen rates.

The four TOS's were: TOS 1 4 April (Hyola 970CL only); TOS 2 2 May (Hyola 970CL only); TOS 3 19 May (Hyola 970CL and Hyola 575CL); and TOS 4 1 June (Hyola 970CL and Hyola 575CL). At each TOS treatments were either grazed or un-grazed. Post grazing a nitrogen application of either 75 kg N/ha (High N) or 40 kg N/ha (Low N) was applied (treatments were all sown with 140 kg/ha 18:13:0:10 with 400 ml of impact). Grazing occurred just after 6-8 leaf stage, before bud elongation was greater than 10 cm.

High rainfall events resulted in the trial being exceptionally wet from June onwards, with the trial experiencing variable and lengthy inundation (Figure 1). No TOS 4 treatments were grazed, as they had low DM production and grazing would have adversely affected the trial plots. These plots still received their allocated high or low N application. Also 30 % of plots were not harvestable. As a consequence, the trial was highly variable and results must be interpreted with caution.

***Figure 1.*** Example of site variability and impact of prolonged inundation on the canola plots, photos taken on 17 October 2016.

Early sowing with the winter variety Hyola 970CL produced the greatest amount of DM, 2129 kg/ha (Figure 2). The two other Hyola 970CL TOS treatments only removed an average 291 DM kg/ha. Hyola 575CL at TOS 3 had greater DM removed compared to Hyola 970CL at the same TOS.

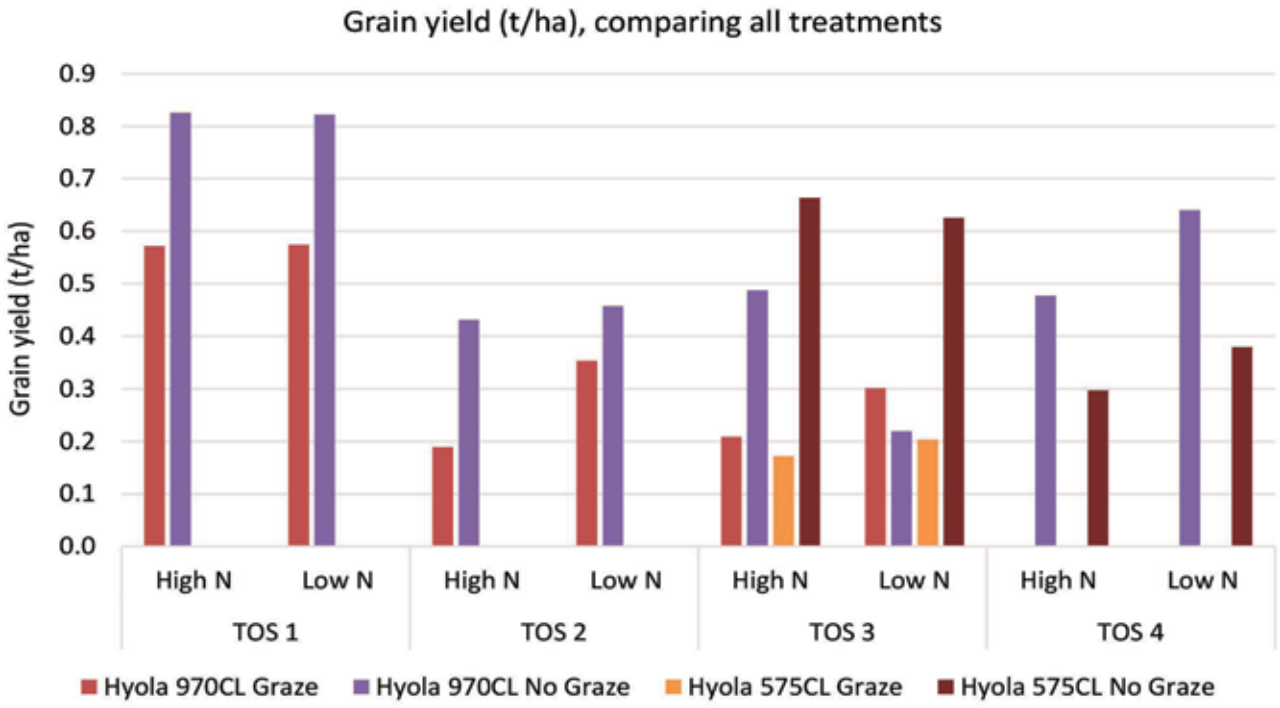


***Figure 2.*** Comparison of dry matter removed (DM kg/ha) between varieties and TOS's.

Grain yields are presented in Figure 3. Due to the seasonal conditions and prolonged inundation the yields obtained were low (site average 0.4 t/ha). Increasing nitrogen rates in 2016 did not result in an increase in canola yields.

Grazing Hyola 970CL tended to reduce grain yields. This in contrast to past findings where grazing did not significantly reduce grain yields. The contrary 2016 results are most likely a result of the seasonal conditions and prolonged inundation, reducing the time Hyola 970CL had to recover from grazing.

Grazing Hyola 575CL resulted in a reduced in grain yield at TOS 3. When comparing Hyola 575CL and Hyola 970CL at TOS 3, un-grazed Hyola 575CL had a slightly higher grain yield compared to Hyola 970CL un-grazed.

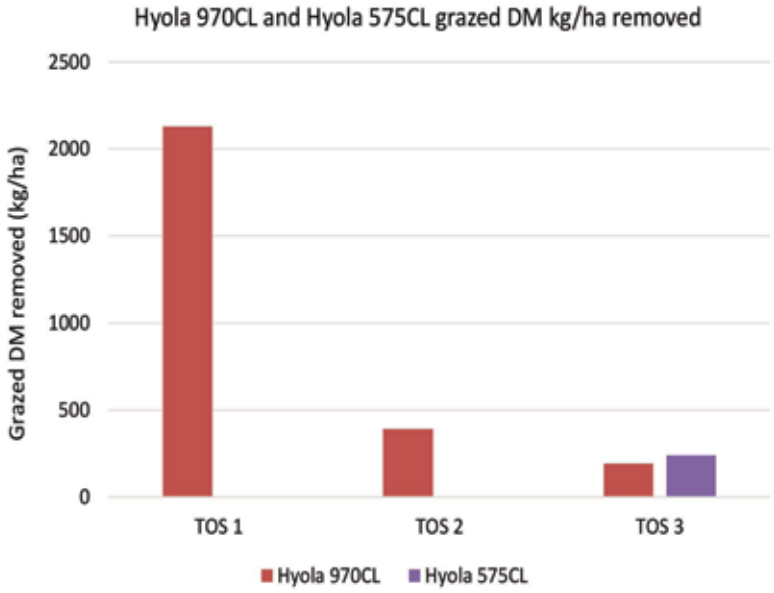


***Figure 3.*** Grain yield (t/ha) comparing canola varieties and treatments evaluated.

## Canola Key Lessons

- Seasonal conditions can dictate the successful use of dual purpose crop; be flexible
- Utilise the tools and knowledge accessible on GRDC website and available 'rule of thumb' guidelines
- Sow the correct variety at the correct time
- Be prepared to sow early
- Don't graze too early (wait to 6-8 leaf stage)
- Lock up before bud elongation >10 cm
- Recovery and winter growth is slower with canola compared to cereals
- Grower needs to consider how the timing of DM availability can best be utilised in livestock program

## Wheat Trial

The wheat trial compared mid-late variety Trojan to late variety Manning at four different TOS's, with and without grazing and two nitrogen rates.

The four TOS's were: TOS 1 4 April (Manning only); TOS 2 2 May (Manning only); TOS 3 20 May (Manning and Trojan); and TOS 4 1 June (Manning and Trojan). At each TOS treatments were either grazed or un-grazed (Figure 4). Post grazing a nitrogen application of either 75 kg N/ha (High N) or 40 kg N/ha (Low N) was applied (treatments were all sown with 140 kg/ha 18:13:0:10 with 400 ml of impact). Grazing occurred when plants were anchored and before stem elongation at growth stage 30, allowing lock up by growth stage 30.

***Figure 4.*** Example of grazed (mower simulated) treatment to un-grazed treatment (TOS 1 Manning 21 June 2016).

High rainfall events resulted in the trial being exceptionally wet from June onwards, with the site experiencing variable and lengthy inundation (Figure 5). As a consequence, the trial was highly variable and results should be interpreted with caution. Manning sown at TOS 3 and TOS 4 were not grazed as there was insufficient DM to remove and would have resulted in significant damage to the trial plots. These plots still received the N treatments rate assigned to them. DM production and grain yields were well below results obtained in the 2015 trials and other research projects and results must be interpreted with caution.

Manning DM production did not significantly vary between TOS, with an average 504 kg/ha removed. Trojan DM production was very low (average 212 kg/ha removed) and was significantly higher at TOS 4 compared to TOS 3. Manning sown early had greater DM removed than Trojan sown later. DM produced results are presented in Figure 6.

***Figure 5.*** Example of wheat trial inundation on 29 September 2016.

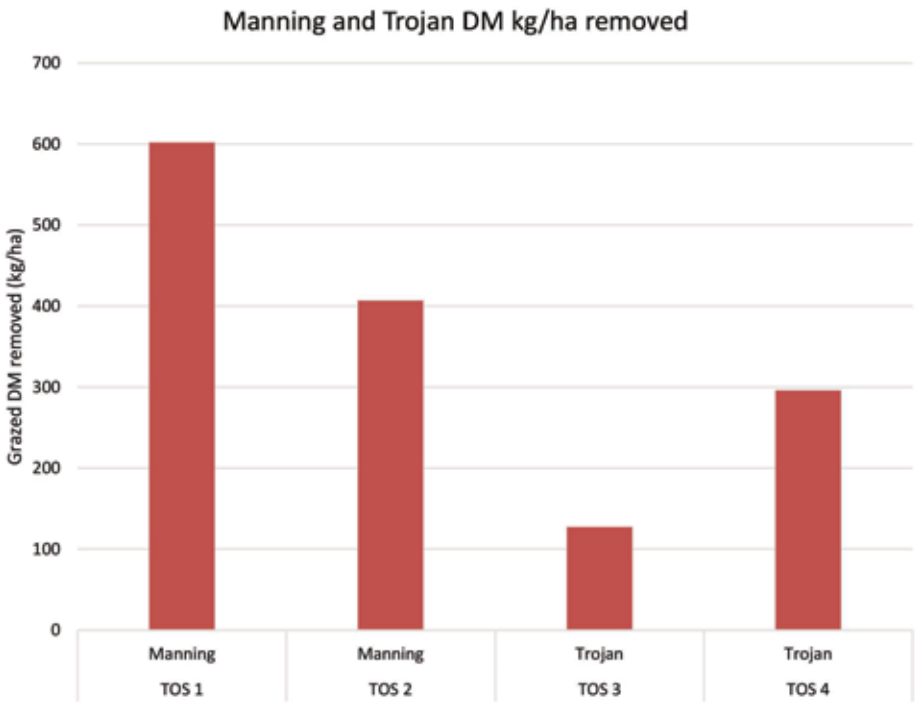


***Figure 6.*** Grazed DM (kg/ha), Manning TOS 1 and TOS 2 and Trojan TOS 3 and TOS 4.

Grain yield results are presented in Figure 7. The trial site average yield was 2.2 t/ha. There was no significant interaction between TOS X variety X grazing treatment X N treatment (P value (0.05), l.s.d 0.54), this is a result of the highly variable conditions. In 2017 grazing significantly decreased grain yield. The later sowing and seasonal conditions favored un-grazed Trojan compared to un-grazed Manning. High N at the later TOS significantly increased grain yield for both varieties.

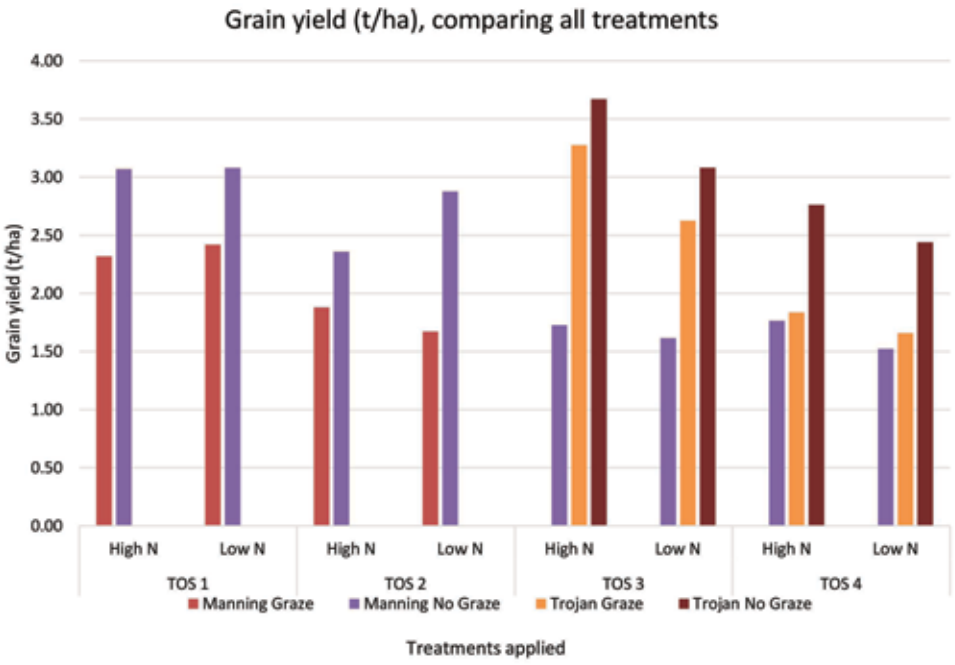


***Figure 7.*** Grain yield (t/ha) comparing treatments evaluated.

## Wheat Key Lessons

- Seasonal conditions can dictate the successful use of dual purpose crop; be flexible
- Utilise the tools and knowledge accessible on GRDC website and available 'rule of thumb' guidelines
- Sow the correct variety at the correct time to maximize recovery time
- Be prepared to sow early
- Don't graze down to growing point
- Lock up before stem elongation (growth stage 30)
- Grower needs to consider how the timing of DM availability can best be utilised in livestock program


## ACKNOWLEDGEMENTS

- **GRDC for funding the 'Southern Irrigated Cereal and Canola Achieving Target yields' (DAN00198) project and the project team;**
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- **Bruce McLean as the co-operating grower.**