

7. WATER USE EFFICIENCY TRIALS

7.1 Optimising the Profitability of HRZ Cropping in SW Victoria: Wheat Time of Sowing Trial - Lake Bolac, Vic

Location: Lake Bolac research site

Researcher/Author:

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Funding:

Water Use Efficient Farming Systems (GRDC tender 2.3.01)

Acknowledgments:

I would like to acknowledge the following people for assisting in this trial and the overall project, Blair McCormick, Jon Midwood, Ben O'Connor, Toby Campbell and James Hunt.

Background/aim:

This trial is part of a larger project aiming to increase the Water Use Efficiency (WUE) of High Rainfall Zone crops in South Western Victoria by 10%. Timely sowing is a simple operation to assist in improving potential WUE. This trial aims to evaluate five wheat varieties sown at three different times and assess how each one responds.

Summary of findings:

- Significant variation was observed with tiller counts from one time of sowing to another.
- Early sowing provided a clear yield advantage over the two later sowing dates.
- Revenue Wheat was the highest yielding variety in the trial and adaptable to sowing time variation.

Rainfall:

Avg. Annual:	540mm
Avg. G.S.R.:	401mm
2010 Total:	749mm
2010 G.S.R.:	506mm

Yield Potential: Calculated using WUE values of 15kg/mm/ha—Wheat, 110mm evaporation and GSR of 30% Dec (8.34) Jan (60.60) & Feb (19.08) + 50% Mar (26.90) (only if >20mm) + April–November. Yield calculated by adding (GSR) to date (Jan–Nov)(506). Therefore, for Lake Bolac, Wheat Trial yield should be 7.66t/ha or 510.92mm x 15kg/mm/ha. The French-Schultz yield potential method outcomes may be negatively impacted due to short periods of water-logging.

Varieties:

Beaufort, Bolac, Derrimut, Preston and Revenue. These varieties represent a number of currently grown Wheats in South West Victoria. Bolac is an excellent Australian Hard variety for the South West. Derrimut was included as there has been some interest in growing it in the South West due to the number of drier years. Preston was also included as it had shown some promise in trials as an ASW Wheat but is now classified as a Feed Wheat. Beaufort and Revenue are feed wheat varieties with potential for high yields in the HRZ areas.

Table 1: Wheat variety classification and maturity.

	Classification	Maturity
Beaufort	Feed	Mid -Late
Bolac	Australian Hard	Mid -Late
Derrimut	Australian Hard	Early - Mid
Preston	Feed	Mid -Late
Revenue	Feed	Mid -Late

Sowing rate:

Target 200plants/m² therefore Beaufort, Derrimut and Preston were sown at 80kg/ha. Bolac and Revenue were sown at 70kg/ha

Sowing dates: 3rd May, 27th & 24th June 2010

Herbicides:

- Seed treated with Dividend and Emerge
- Prior to each sowing time - Knockdown - Roundup PowerMax @ 1.5L/ha
- Prior to each sowing time - Triflur X @ 1.5L/ha plus Boxer Gold @ 2.5L/ha
- Prior to each sowing time – Axial @ 300ml/ha
- 22nd Sep - Precept @500ml/ha, Adigor @ 0.5%, Prosaro @ 150ml/ha, Hasten @ 1.0%
- 19th Oct - Prosaro @ 300ml/ha, Hasten @ 1.0%

Fertiliser: 80kg/ha MAP

Treatments:

Five wheat varieties and three times of sowing. Sown using Landmark's 6 row DBS (Knife point press wheel) seeder.

Plot size: 12m x 1.65m x 4 replicates.

Measurements:

- Stem Rust visual % assessments 16th November
- Tiller counts per metre row 21st November
- Harvest t/ha adjusted yield 27th January

Paddock History:

2009: Canola

Soil Type: clay loam

Diseases:

Stem Rust and Stripe Rust were present in the trial.

Results and discussion:

This trial provided some insight into the response of the five varieties selected. All varieties responded in a positive manner to early sowing. It was planned that the first time of sowing would be conducted in April but due to logistical issues was sown on May 3rd. 24 days later the second time of sowing was conducted on May 27th and the final sowing date was June 24th. The final time of sowing did not receive as thorough weed control as the other two timings as conditions were very poor for herbicide application, which led to increased weed pressure on this sowing time.

Wheat tiller counts indicated that there was considerable difference between sowing times and tillering. The two May sowing times were similar to each other with most varieties with no significant difference. Generally there was a slight increase in tillers for the first time of sowing when comparing the May 3rd to May 27th with one exception, Bolac, which has a slight reduction from sowing on May 3rd. The June sowing was, in all cases, significantly lower in tiller numbers when compared to the highest numbers achieved for each variety. The late sowing was visually much thinner than the earlier sowings with each variety having more than 100 tillers less. (Figure 1.)

Revenue wheat was the highest yielding variety in the trial achieving 7.1t/ha for both May 3rd and May 27th time of

sowing. The fact that Revenue achieved the same yield with delayed sowing was surprising as it compensated well for what would be considered very late sowing for Revenue at the end of May. Overall Revenue was the high achiever in the trial with the highest yield for the June sowing as well. It was expected that a shorter season variety such as Derrimut would perform best with June sowing but only yielded 3.0t/ha compared to Revenue at 4.3t/ha.

All varieties responded positively from the earlier sowing, Beaufort wheat was three times higher in yield comparing June 24th (2.2t/ha) with May 3rd (6.6t/ha). Bolac responded by having an increase of 2.6t/ha increase, Derrimut a 2.7t/ha increase and Preston 3.9t/ha increase. The June sowing was significantly lower than both the May sowing in all varieties. (Figure 2.)

These results do indicate that whatever variety of wheat you choose to grow, timing is crucial to getting a positive result. The unfortunate aspect of this trial is that the heavy summer rainfall resulted in us not being able to obtain quality data on the trial to examine gross margins to determine the value for high yielding feed varieties against the Australian hard varieties.

Figure 1: Summary of tiller counts/m². Error bars show LSD figures of 64 tiller/m².

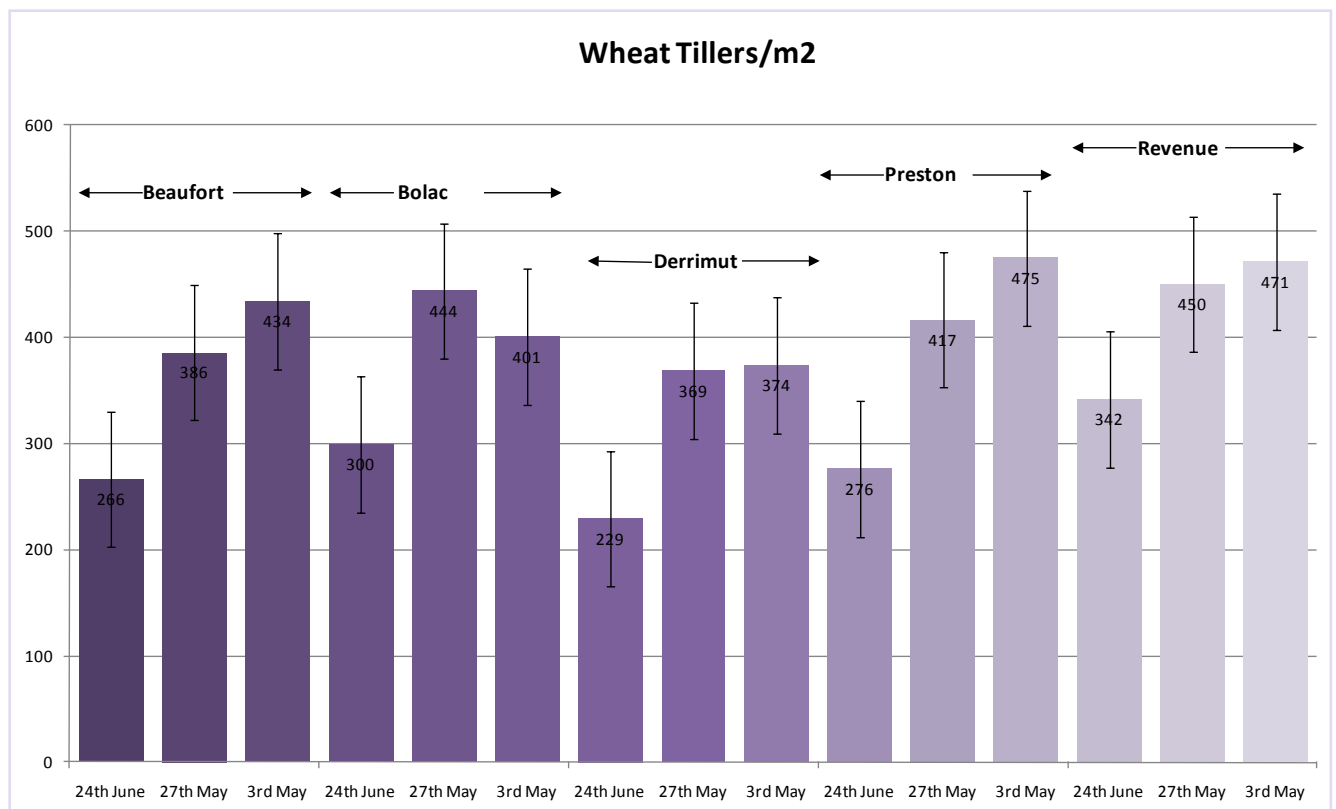
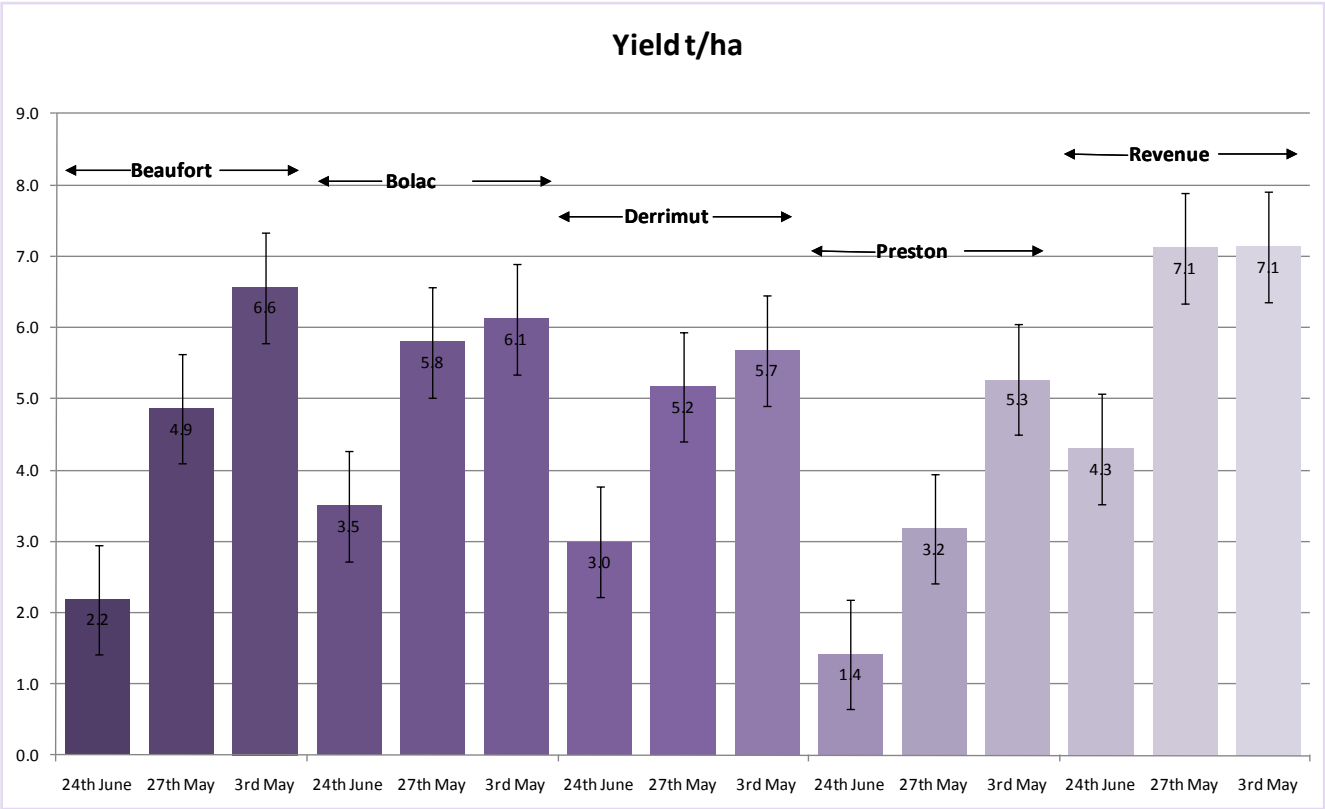


Figure 2: Summary of Yield data t/ha. Error bars show LSD figures of 0.773t/ha for Yield.



The WUE for each variety was calculated using the formula listed in the trial information – ‘Yield Potential’ provided by SFS. None of the treatments in this trial reached the potential 15kg/mm/ha but Revenue did come close with 14kg/mm/ha. Clearly the yield results show us the performance of each treatment but it is interesting to see what the WUE figures are for each one. (Table 2.)

Table 2: Summary of WUE. Kg/mm/ha

	24th June	27th May	3rd May
Beaufort	4.3	9.5	12.8
Bolac	6.9	11.3	12.0
Derrimut	5.9	10.1	11.1
Preston	2.8	6.2	10.3
Revenue	8.4	13.9	14.0

Summary:

This trial has shown a clear response by sowing on time or early. Timely sowing operations will not cost any more to the grower but has the potential to increase returns significantly. Increased tillers this year did convert into increased yield.

This trial is a single component to the whole project being undertaken by SFS and it’s partners. The next objective in the Water Use Efficiency project will be to combine the individual components into one larger trial including time of sowing with canopy management and subsoil manuring.