

## 2. CROP VARIETY TRIALS

### 2.1 Wheat

#### 2.1.1 Spring wheat variety trial - Inverleigh, Vic

**Location:**

Inverleigh Research Site.

**Funding:**

This was an SFS Geelong Branch funded trial.

**Researchers:**

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**Acknowledgements:**

Thanks to John Hamilton for providing the land for this trials programme.

**Background/Aim:**

New spring wheat varieties need to be tested across a number of years before they will be considered in the domestic or export markets. This trial evaluates a number of varieties that are either commercially available or close to commercial release that may be suitable for the growing conditions of southern Victoria. This trial differs from other comparative crop variety testing in that it evaluates the varieties with a fungicide programme; to determine the yield response of the varieties when controlling leaf diseases against a control, or no foliar fungicide applied. Additionally, the management of inputs in the trial are based on the objective to gain the best margin per hectare.

**Take home messages:**

- The average yield for the spring wheat trial at Inverleigh was 5.12t/ha. The highest yields were achieved by the shorter season varieties Beaufort (6.95t/ha) and Derrimut (6.10t/ha). Both varieties yielded well in the 2008 wheat variety trial at Inverleigh.
- The longer season varieties were unable to reach their full yield and quality potential with the rapid finish to the year due to the unseasonal hot conditions in November.
- Test weight was the main reason for grain to be downgraded in quality; protein was the key reason in varieties graded as AH.
- Derrimut, graded as APW1, achieved the highest gross margin with \$826/ha. The feed wheat Beaufort was the only other variety with a gross margin above \$800/ha, which can be attributed to its high yield.
- Minor pressure of stripe rust was observed for the 2009 season at Inverleigh, with most varieties demonstrating good resistance levels. Susceptible varieties such as Chara suffered a yield penalty, however yielded well where a fungicide was used.

**Trial information:**

Trial design consisted of a replicated randomised block design using 3 repetitions treated with foliar fungicide and leaving 1 repetition untreated, to demonstrate local disease pressure and varietal susceptibility. Plot lengths were 12 metres long and 1.45m wide. Rainfall was highly variable throughout the season, with a wet winter, then a drying Spring. Late rainfall in November was not considered a contributor to yield results for this trial.

**Rainfall:**

Avg. Annual: 483.9mm, Sheoaks 1991-2009  
 Avg. G.S.R. 386.5mm, Sheoaks 1991-2009  
 2009 Total: 502.0mm, Inverleigh Research Site  
 2009 G.S.R. April – October = 317.0mm<sup>1</sup>

**(Inverleigh Research Site; 73mm below average)**

<sup>1</sup> Yield Potential: 1/3 of Dec (77mm), Jan (2mm) & Feb (4mm) with monthly totals above 20mm + ½ March (36mm) rainfall when total above 20mm + ((April – October rainfall) – 117mm\*) x 20kg/mm/ha. In total December-March adjusted rainfall to stored soil water = 43.6mm, plus April-October = 317.0mm, minus evaporation factor of 117mm\* => 243.6. Therefore, for Inverleigh, the Wheat Variety Trial water limited yield should be 4.87t/ha, or 243.6mm x 20kg/mm/ha.

\*Kirkagaard 2009, Evaporation intercept adjustment for a clay loam.

**Paddock History:**

2007: Canola, 2008: Peas

**Soil Type:** Sandy clay loam

**Soil Nutrients:**

N = 16mg/kg (0-10cm) + 4.1mg/kg (10-60cm)  
 P = 43mg/kg (Colwell)  
 K = 0.5 Meq/100g  
 S = 11mg/kg  
 pH (CaCl<sub>2</sub>) = 5.8.

**Treatment list:**

13 current wheat varieties.  
Measurements included yield and grain quality components, including protein, test weight, screenings and resulting classification

**Tillage type:**

This trial was seeded with the SFS cone seeder using 2.5cm knife points.

**Diseases:**

Minor pressure of stripe rust was observed for the 2009, with most varieties demonstrating good resistance levels. Susceptible varieties suffered yield penalties, however yielded well where a fungicide was used.

**Sowing rate:**

Seeding rate based on seed size with a desire to establish 160 plants/m<sup>2</sup>

**Sowing date:** 18th May 2009

**Harvest Date:** 24th December 2009

**Fertiliser:**

17/8 & 2/9 - 100kg/ha MAP at sowing, Urea at 25kgN/ha from late tillering at two timings

**Herbicides:**

- 18/5/09 Sprayseed @ 1.5L/ha + Triflur X @ 1.50L/ha
- 25/5/09 Dual Gold @ 0.25L/ha + Diuron @ 0.50L/ha
- 10/7/09 Axial @ 0.35L/ha + Precept @ 1.20L/ha + Lontrel @ 0.15L/ha + Adigor @ 0.5%

**Fungicides:**

14/9 Prosaro @ 0.2L/ha + Hasten @ 1%

**Results and discussion:**

The Spring wheat trial at Inverleigh yielded an average of 5.12t/ha for the 2009 season. The shorter maturity varieties topped the yields with Beaufort the standout with 6.95t/ha and Derrimut yielding 6.10t/ha. Derrimut and Beaufort yielded very well in 2008 when we experienced a shorter finish to the season similar to this year. The longer season varieties were unable to reach their full yield potential with the rapid finish to the year

with unseasonal hot conditions in November. The water use efficiency of the higher yielding varieties exceeded the forecasted yields based on the growing season rainfall.

Strip Rust was evident in Chara, a variety susceptible to the disease, however with the strategic use of a fungicide it yielded above the site average. The disease pressure at Inverleigh was lower than forecasted early in the season.

**Table 1:** Grain yield, corrected to 12.5% moisture, sprayed with fungicide and compared to unsprayed check. A WUE calculation and comparison to the 2008 yield performance is also included.

Variety	<sup>1</sup> Yield (t/ha)	<sup>2</sup> Sig. Diff.	<sup>3</sup> WUE % of 4.87t/ha	2008 Ranking	Quality Classification Potential	Untreated Check (t/ha)
Beaufort	6.95	a	142.7	2	Feed	6.28
Derrimut	6.10	b	125.4	3	AH	6.41
VV2582	5.89	b	121.0	NA	APW	6.31
Chara	5.78	b	118.7	5	AH	4.86
Bolac	5.09	c	104.6	6	AH	5.44
Yenda	5.09	c	104.5	NA	ASF	4.57
Espada	4.80	cd	98.6	1	APW	5.08
Gascoigne	4.71	cd	96.7	NA	APW	4.48
Kellalac	4.68	cd	96.2	10	APW	4.25
Eaglehawk	4.59	cd	94.3	12	APW	4.61
Lincoln	4.54	de	93.2	8	AH	4.95
HRZ 65	4.33	de	88.9	NA	APW (prov.)	4.72
Endure	4.04	e	82.9	NA	ASW	3.7
Mean	<b>5.12</b>					<b>5.05</b>
LSD (P=0.05)	<b>0.523</b>					
CV	<b>6.06</b>					
Trt Prob (F)	<b>0.001</b>					

<sup>1</sup> Consideration needs to be taken for yields, as plots represent 72.5% of arable area and thus should be calculated using this percentage for comparison to local and commercial results.

<sup>2</sup> Means followed by the same letter do not significantly differ (P=0.05, LSD).

<sup>3</sup> Water Use Efficiency percentages are calculated based on the water limited potential yield of wheat at Inverleigh for the 2009 growing season; being 243.6mm x 20kg/mm/ha, or 4.87t/ha.

**Table 2:** Grain quality analysis, including protein, test weight & screenings that contributes to final economic analysis of variety performance on a GM/ha basis (using standard inputs across all treatments of \$450/ha).

Variety	Yield (t/ha)	Protein % <sup>1</sup> (min)	Test Weight kg/hl <sup>1</sup>	Screenings below 2.0mm <sup>1</sup>	Resultant Quality Classification	<sup>2</sup> GM\$/Ha
<b>H1 Specs</b>		<b>13.0</b>	<b>74.0</b>	<b>5.0</b>		
<b>APW1 Specs</b>		<b>10.5</b>	<b>74.0</b>	<b>5.0</b>		
<b>AHU2 Specs</b>		<b>11.5</b>	<b>71.0</b>	<b>10.0</b>		
Beaufort	6.95	11.5	71.9	1.3	F1 => F1	\$801
Derrimut	6.10	11.2	76.2	1.3	H1 => APW1	\$826
VV2582	5.89	11.7	76.6	1.3	APW1 => APW1	\$782
Chara	5.78	12.1	73.7	1.7	H1 => AUH2	\$736
Bolac	5.09	12.5	73.3	3.7	H1 => AUH2	\$594
Yenda	5.09	11.8	70.5	2.7	ASF => AGP1	\$537
Espada	4.80	13.9	71.0	1.3	APW1 => AUH2	\$535
Gascoigne	4.71	13.8	73.7	0.7	APW1 => AUH2	\$516
Kellalac	4.68	13.0	71.6	1.7	APW1 => AUH2	\$510
Eaglehawk	4.59	12.8	73.0	2.0	APW1 => AUH2	\$492
Lincoln	4.54	12.7	72.3	1.3	H1 => AUH2	\$481
HRZ 65	4.33	13.2	72.9	2.0	APW1 => AUH2	\$437
Endure	4.04	15.3	71.7	0.3	ASW1 => AUH2	\$378
<b>Mean</b>	<b>5.12</b>	<b>12.73</b>	<b>72.95</b>	<b>1.64</b>		
<b>LSD (P=0.05)</b>	<b>0.523</b>	<b>0.58</b>	<b>1.58</b>	<b>1.15</b>		
<b>CV</b>	<b>6.06</b>	<b>2.70</b>	<b>1.29</b>	<b>41.49</b>		
<b>Trt Pr (F)</b>	<b>0.001</b>	<b>0.001</b>	<b>0.001</b>	<b>0.001</b>		

<sup>1</sup> Quality parameterisation is based on 2009-2010 NACMA Wheat Standards and should be used as a guide only. Cells with gray covers indicate readings outside preferred test range for highest achievable grade – testing undertaken at Riordan Grains, Inverleigh Office.

<sup>2</sup> Prices for grain were taken as a spot price on the day of harvest and supplied by Riordan Grains; H1 = \$228/t, APW1 = \$209/t, AUH2 = \$205/t, AGP1 = \$194/t, F1 = \$180/t.

Grain quality was reduced due to the rapid finish to the season. All varieties except the shorter maturity Beaufort, Derrimut and VV2582 were downgraded due to low test weight. The rapid finish to the season did not allow the mid-longer season varieties to complete grain fill, and as a result all had lighter test weights. Varieties rated as Australian Hard Wheat, Derrimut, Chara, Bolac and Lincoln, were all downgraded based on protein, and were further downgraded due to test weight. Derrimut topped the gross margin with \$826/ha as it was graded as APW1, VV2582 was the only other variety to make this grade based on grain quality. Beaufort, a feed wheat, was the only other variety to achieve a gross margin above \$800/ha, this was due to its superior yield.

#### Summary:

The short season varieties were the highest yielding at Inverleigh this year. Beaufort was the highest yielding with 6.95t/ha followed by Derrimut with 6.10t/ha. The unseasonal hot conditions in November reduced the yield and quality potential of the longer season varieties which were still grain filling at this point. Minor pressure of stripe rust was observed in 2009, with most varieties demonstrating good resistance levels. Susceptible varieties such as Chara suffered a yield penalty, however yielded well where a fungicide was used. Derrimut topped the gross margin with \$826/ha as it was graded as APW1, the feed wheat Beaufort was the only other wheat with a gross margin above \$800/ha, this can be attributed to its high yield.



**Figure 1.** Rohan Wardle talking to students.