

## 2.2 Barley

### 2.2.1 Barley variety trial - Inverleigh, Vic

#### Location:

Inverleigh Research Site.

#### Funding:

This was an SFS Geelong Branch funded trial.

#### Researchers:

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#### Acknowledgements:

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#### Background/Aim:

New malting barley varieties need to be thoroughly tested across a number of years before they will be considered in either domestic or export malting or brewing markets. This trial compares a number of varieties that are either commercially available or close to commercial release that may be suitable for either malting or feed markets in 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.

#### Paddock history:

2007: Peas, 2008: Wheat

#### 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.

#### Take home messages:

- The highest yielding variety was the short season feed cultivar Fleet, yielding 7.87t/ha, followed closely by Hindmarsh at 7.55t/ha and Commander, 7.27t/ha. Gairdner yielded statistically equivalent to all 3 lines above, but suffered from large infections of scald.
- Grain proteins were all within malting receival specifications, with grain retention, test weights and screenings causing many lines to be downgraded.
- The average yield for the barley block treated with fungicide was 6.9t/ha (3.54t/ha in 2008, 4.4t/ha in 2007 & 5.2t/ha in 2006), compared to an average of 6.52t/ha for the untreated block in 2009.
- Disease pressure was extreme for susceptible lines, suggesting either a change in cultivar choice, or improved disease management through timely fungicide application.
- This trial had matured prior to the late November rains and suffered from the hot week in Spring. Water Use Efficiencies were also resultantly high due to the dry early Winter and below average growing season rainfall for the year.

#### 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 Barley 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.

#### Treatment list:

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

#### Sowing rate:

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

#### Sowing date:

26<sup>th</sup> May 2009

#### Fertiliser:

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

#### Herbicides:

- 26/5/09 SpraySeed @ 1.0L/ha + Triflur 480 @ 1.50L/ha
- 5/6/09 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

#### Diseases:

In the susceptible varieties Gairdner and Baudin, there was a significant level of leaf scald and a minor infection, spot form of net blotch, with other lines exhibiting increased levels of resistance in the untreated block.

### Results and discussion:

Overall, the yields achieved in this trial suggest a somewhat larger response to calculated WUE yield potentials. In a dry finish to a wet year, we again are presented with similar outcomes as achieved in 2008; that early season varieties yielded higher than the later maturing lines. These yield results are in direct contrast to the 2007 season, where Capstan, Baudin and Gairdner yielded significantly more than Flagship and Buloke. Hindmarsh has again yielded well, ranking 2<sup>nd</sup> this season and 1<sup>st</sup> in 2007, suggesting that although this variety is still considered a short season feed type, it may need to be included in the farming system for risk management purposes. Gairdner performed above the site mean, but when left untreated for fungicide, lost 1.5t/ha when compared to the fungicide treated plots, reinforcing the need for management of foliar diseases

in susceptible lines. New material from Europe was again included in this variety evaluation, with Fairview, Oxford, Westminster & GS1234 all running close to or just below the trial average. Baudin may now be considered an inferior line for SW Victoria.

For the variety Hindmarsh, being a shorter season feed variety, its growing season characteristics suited its potential for a dry finish to the growing season. With current price deficits from malting to feed classification of up to \$45/t, it may now be a consideration for farmers to invest in shorter season feed varieties throughout the higher rainfall zone. One shining light is that Hindmarsh is in its second year of a two year malting evaluation, so if testing goes well, then this newer variety may offer choice as an alternative short season malt line.

**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.

Entry No.	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)
2	Fleet	7.87	a	161.6	N/A	Feed	7.7
6	Hindmarsh	7.55	ab	155.0	1	Feed	7.67
3	Commander	7.27	abc	149.3	N/A	Malting	6.94
11	VB0432	7.08	a-d	145.4	10	Malting (Prov)	6.98
12	Gairdner	7.07	a-d	145.2	14	Malting	5.53
5	Buloke	6.87	b-e	141.1	2	Malting	6.77
8	Fairview	6.82	b-e	140.0	5	Malting (Prov)	5.84
1	Capstan	6.77	b-e	139.0	4	Feed	6.6
10	Oxford	6.76	b-e	138.8	7	Malting (Prov)	6.86
4	WI4262	6.65	cde	136.6	11	Malting (Prov)	6.41
9	GS1234	6.47	cde	132.9	13	Malting (Prov)	6.26
7	Westminster	6.32	de	129.8	12	Malting (Prov)	6.29
13	Baudin	6.23	e	127.9	3	Malting	4.87
Mean		<b>6.9</b>					<b>6.52</b>
LSD (P=0.05)		<b>0.811</b>					
CV		<b>6.974</b>					
Trt Prob (F)		<b>0.014</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 barley at Inverleigh for the 2009 growing season; being 243.6mm x 20kg/mm/ha, or 4.87t/ha.

Grain quality for the longer season varieties was badly affected by the hot week in late October during grainfill, especially for Gairdner and newer European material. Grain protein levels were mainly within malting specifications, with test weights, retention and screenings falling outside required tolerances in many instances, downgrading many varieties to Malt 3 or feed. Gairdner, as the check variety in the trial, yielded above the site average but had very poor quality specifications, downgrading the variety to F1. Of note, Hindmarsh (P) & Commander, whilst returning the highest yields for the trial, also had very good quality parameters equivalent to malt characteristics and should be considered as a future fit in risk management strategies.

Again, an important outcome for the 2009 season was the penalty for not achieving malt status. Whilst many varieties have the provisional status to achieve malt in this trial, early evaluations of new material may not necessarily eventuate and thus leave discrepancies of \$100's/ha in some situations. Paying particular attention to market acceptance, soil nitrogen reserves & knowing crop demands, disease susceptibilities and use of accurate weather forecasts should all help to prevent this dilemma in future paddock situations.

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

Entry No.	Variety	Protein % <sup>1</sup>	Test Weight kg/hl <sup>1</sup>	Retention above 2.5mm <sup>1</sup>	Screenings below 2.2mm <sup>1</sup>	Resultant Quality Classification	<sup>2</sup> GM\$/Ha
<b>Malting 1 Specs</b>		<b>9-12</b>	<b>65.0</b>	<b>70%</b>	<b>7.0</b>		
2	Fleet	11.47	65.7	81.33	3.0	F1 => F1	730.5
6	Hindmarsh	11.33	70.4	86.67	3.0	F1 => F1 (M1,P)	682.5
3	Commander	11.6	67.35	83.67	3.7	M1 (P) => M1	1004
11	VB0432	12	67.3	71	6.3	M1 (P) => M1(P)	966
12	Gairdner	11.3	67.38	51.33	10.7	M1 => F1	610.5
5	Buloke	11.7	68.58	70.33	5.7	M1 => M1	924
8	Fairview	11.57	67.6	71	4.7	M1 (P) => M1(P)	914
1	Capstan	11.77	63.33	48	13.0	F1 => F1	565.5
10	Oxford	11.4	65.5	45.67	11.7	M1 (P) => F1	564
4	WI4262	11.63	64.25	75.67	3.7	M1 (P) => M3(P)	680.5
9	GS1234	11.5	65.18	64.33	7.3	M1 => M3	649.9
7	Westminster	12.67	66.15	53.67	9.7	M1(P) => M3(P)	624.4
13	Baudin	11.97	66.33	59	9.3	M1 => M3	609.1
Mean		<b>11.68</b>	<b>66.75</b>	<b>66.28</b>	<b>7.05</b>		
LSD (P=0.05)		<b>0.813</b>	<b>1.676</b>	<b>6.432</b>	<b>2.451</b>		
CV		<b>4.13</b>	<b>1.59</b>	<b>5.76</b>	<b>20.63</b>		
Trt Pr (F)		<b>0.123</b>	<b>0.0001</b>	<b>0.0001</b>	<b>0.0001</b>		

<sup>1</sup> Quality parameterisation is based on 2009-2010 NACMA Barley Standards and should be used as a guide only. Cells with gray covers indicate readings outside preferred test range for Malt 1 – 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; M1 = \$200/t, M1Baudin = \$205/t, M3 = \$170/t, F1= \$150/t.

### Summary:

Overall, grain quality had an important bearing on the profitability of barley varieties within this 2009 Inverleigh trial. Of note, many of the higher yielding lines also achieved malt specifications, being Hindmarsh, Commander and VB0432. If in future, Hindmarsh is able to be delivered as Malt 1, the resulting return per hectare would be \$1060/ha compared to the actual \$682.5/ha when currently delivered as feed. Data for European material is also only provisional and further testing and evaluation will be needed before pursuing this germplasm for future plantings. Gairdner has again performed less than desirably (due in part to high susceptibility to scald), being downgraded to F1, severely penalised this current mainstay when compared to Commander and VB0432. With susceptible lines and a large potential spread of returns for quality, growers targeting malting barley still needs to follow strict nitrogen and disease management strategies to ensure that maximum returns are achieved in each situations.

This barley variety trial programme will continue annually, with the support of both industry and researchers to constantly evaluate new varieties, as well as the disease susceptibility of current varieties on the market. In the 2009 season, it has shown that if we continue with drier seasons, then changing to shorter season varieties may alleviate some yield penalty taken by the currently grown longer season sown varieties.



**Figure 1.** Seeding at inverleigh, 2009