

2.2.3 Barley variety trial - Bairnsdale, Vic

Location:

Bairnsdale Research Site.

Funding:

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Researchers:

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Background/Aim:

New barley 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 the south east of Victoria.

Take home messages:

- The average yield for the barley variety trial at Bairnsdale was 3.81 t/ha. This was higher than the predicted 3.20 t/ha based upon the growing season rainfall.
- The highest yielding variety was Capstan with 4.45 t/ha, malting varieties Oxford (provisional malt) and Gairdner also yielded well.
- Protein and test weight were the key reason for grain to be downgraded. No variety recorded a test weight above 60 kg/hl, thus all were graded as Feed.

Trial information:

Trial design consisted of a replicated randomised block design using 4 repetitions. Plot lengths were 18 metres long and 1.45m wide. Rainfall was highly variable throughout the season, with below average growing season rainfall. Late rainfall in November was not considered a contributor to yield results for this trial.

Rainfall:

Avg. Annual:	653.5mm, Bairnsdale 1942-2009
Avg. G.S.R.	479.8mm, Bairnsdale 1942-2009
2009 Total:	390.5mm, Bairnsdale Research Site
2009 G.S.R.	April – October = 259.2mm ¹

(Bairnsdale Research Site; 131.3mm below average)

¹ Yield Potential: 1/3 of Jan (9mm) & Feb (44.2mm) with monthly totals above 20mm + ½ March (12.6mm) rainfall when total above 20mm + ((April – October rainfall) – 114mm*) x 20kg/mm/ha. In total December-March adjusted rainfall to stored soil water = 14.7mm, plus April-October = 259.2mm, minus evaporation factor of 114mm* => 159.9. Therefore, for Bairnsdale, the Barley Variety Trial water limited yield should be 3.20t/ha, or 159.9mm x 20kg/mm/ha.

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

Paddock History:

2008: Wheat & canola, 2007: Field peas, green manure crop

Soil Type: Sandy clay loam

Treatment list:

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

Sowing rate:

Seeding rate based on seed size with a desire to establish 160 plants/m².

Sowing date: 3rd June 2009

Harvest Date: 12th December 2009

Fertiliser:

100kg/ha MAP at sowing, Urea at 100kg/ha at stem elongation (28th August)

Herbicides:

- 3/6/09 Round Up P/max @ 1.5L/ha + Triflur 480 @ 1.5L/ha
- 2/9/09 Hoegrass @ 1.0L/ha + Lontrel @ 0.15L/ha + Wetter @ 0.25L/ha

Results and discussion:

Capstan, a currently available feed barley was the highest yielding variety at the Bairnsdale research site for 2009 with 4.45 t/ha. The average barley yield was 3.81 t/ha, however the trial was considered to be not statistically valid. The malting varieties Oxford (Provisional Malt) and Gairdner also yielded well, demonstrating that the long running variety Gairdner is still a good variety to include in the cropping system.

The water use efficiency of the barley varieties was on average 119% of the water limited yield potential. The predicted yield potential was 3.20 t/ha based on the poor winter rainfall. The earlier sowing date may have also assisted in yield and WUE potential of the trial.

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	¹ Yield (t/ha)	² Sig. Diff.	³ WUE % of 3.20t/ha	2008 Ranking	Quality Classification Potential
Capstan	4.45	a	139		Feed
Oxford	4.24	a	132		Malting (Prov)
Gairdner	3.90	ab	122		Malting
Fleet	3.80	ab	119		Feed
5092	3.75	ab	117		Feed
Baudin	3.65	ab	114		Malting
Hindmarsh	2.93	b	91		Feed
Mean	3.81				
LSD (P=0.05)	1.11				
CV	19.5				
Trt Prob (F)	0.183				

¹ 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.

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

³ Water Use Efficiency percentages are calculated based on the water limited potential yield of wheat at Bairnsdale for the 2009 growing season; being 159.9mm x 20kg/mm/ha, or 3.20t/ha.

Grain quality was reduced due to protein and test weight, however for all varieties retention and screenings were within specification. No variety was able to record a test weight above 60 kg/hl which would register as Feed 2 or below. Malting varieties Gairdner and Baudin would also be downgraded due to protein, Oxford was the only variety to record a protein level below 12%. The feed barley varieties were not downgraded on protein as they have a no limit requirement.

The high protein levels may have been caused by low protein dilution within the grain, where in higher yielding year the equivalent protein content would be distributed across a greater quantity of grain, thus reducing the protein percentage of the grain.

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).

Variety	Yield (t/ha)	Protein % ¹	Test Weight kg/hl ¹	Retention above 2.5mm ¹	Screenings below 2.2mm ¹	Resultant Quality Classification
Malt 1 Specs		9-12	65.0 (min)	70% (min)	7.0 (max)	
Capstan	4.45	13.9	54.7	81.5	4.5	Feed
Oxford	4.24	12.0	59.2	81.5	4.3	Feed
Gairdner	3.90	13.8	59.6	90.0	2.5	Feed
Fleet	3.80	13.4	52.4	90.3	2.3	Feed
5092	3.75	12.3	54.8	82.3	4.0	Feed
Baudin	3.65	13.1	55.9	83.0	6.0	Feed
Hindmarsh	2.93	13.7	59.8	81.5	4.5	Feed
Mean	3.81	13.2	56.6	84.3	4.0	
LSD (P=0.05)	1.11	0.939	4.256	12.14	3.80	
CV	19.5	4.80	5.06	9.7	63.9	
Trt Pr (F)	0.183	0.002	0.009	0.47	0.45	

¹Quality 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.

Summary:

The average yield for barley at the Bairnsdale research site was 3.81 t/ha, this average was higher than the predicted 3.20 t/ha based upon the water limited yield potential for 2009. The highest yielding variety was Capstan with 4.45 t/ha, Gairdner again had a consistently strong result proving that it should be included in the cropping programme. Test Weight was the key quality issue, with no varieties recording a result above 60 kg/hl.