

3.2.5 GrainSearch barley variety trial – Inverleigh & Lake Bolac, Vic

Location:

SFS Inverleigh and Lake Bolac Research Sites

Funding:

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Summary of findings:

- The mean site yield for the Inverleigh trial was 6.53t/ha, whilst Lake Bolac site mean was 6.32t/ha.
- Westminster was the best of the commercial barley varieties at both Inverleigh and Lake Bolac with yields of 7.52t/ha and 7.06t/ha respectively.
- SY Rattler show considerable promise as a domestic malt line, with yields of 7.23t/ha and 7.00t/ha respectively. The malt profile of this line is aimed at the domestic brewing market.
- Disease resistance played a large role in determining yield performance. Varieties that showed susceptibility to powdery mildew and leaf rust generally performed poorly for yield and grain quality.
- Fairview, Henley and Gairdner showed severe scald infection early in the season. A dry August/September period meant that the scald infection did not develop to impact of yield at either site.
- Early sowing was essential to achieving high yields at both sites.

Background/Aim:

The breakdown in disease resistance of the main stream barley varieties in South Eastern Australian has created a new focus to find a suitable high yielding malting barley replacement with excellent all round disease resistance. These trials aim to evaluate yield, agronomic and malt quality performance of numerous breeding lines under evaluation for the medium to high rainfall zones of Eastern Australia.

Trial information:

Trial design consisted of fully randomized and replicated trials using 3 replicates with foliar fungicide and leaving 1 replicate untreated, to demonstrate local disease pressure and variety susceptibility.

Rainfall:
Inverleigh

Avg. Annual: 547.6mm, Inverleigh Research Site
 Avg. G.S.R.: May – November 368.2mm Inverleigh Research Site
 2011 Total: 595.1mm, Inverleigh Research Site
 2011 G.S.R. May – November 356mm Inverleigh Research Site

Lake Bolac

Avg. Annual: 539.7mm, Lake Bolac Research Site
 Avg. G.S.R.: May – November 357mm Lake Bolac Research Site
 2011 Total: 595.4mm, Lake Bolac Research Site
 2011 G.S.R. May – November 311.6mm Lake Bolac Research Site

Soil Characteristics:
Inverleigh

Soil Type: Brown Sandy Loam
 Soil Nutrients: N = 18.6 mg/kg (Nitrate Nitrogen 0-40cm)
 N = 5.3 mg/kg (Ammonium Nitrogen 0-40cm)
 P = 71mg/kg (Colwell, 0-10cm)
 K = 260mg/kg (0-10cm)
 S = 14mg/kg (0-10cm)
 pH (CaCl²) = 5.40

Lake Bolac

Soil Type: Brown Clay Loam
 Soil Nutrients: N = 31.5 mg/kg (Nitrate Nitrogen 0-40cm)
 N = 6.0 mg/kg (Ammonium Nitrogen 0-40cm)
 P = 38mg/kg (Colwell, 0-10cm)
 K = 390mg/kg (0-10cm)
 S = 12mg/kg (0-10cm)
 pH (CaCl²) = 6.80

General:*Inverleigh*

Paddock History: 2010: Bulk Canola

2009: Bulk Peas/Fallow

Sowing rate: Seeding rate based on seed size with a desire to establish 175 plants/m²Sowing date: 26th May 2011Fertiliser: 26/5/2011 100kg/ha MAP
25/8/2011 150kg Urea at GS30Fungicides: 05/9/2011 GS31, Prosaro @ 0.30L/ha + 1% Hasten
26/9/2011 GS39, Prosaro @ 0.30L/ha + 1% HastenHerbicides: 25/5/2011 Roundup P'max @ 2.0L/ha + Boxer Gold @ 2.5L/ha
26/7/2011 Axial @ 0.30L/ha + 0.5% Adigor + Precept @ 0.5L/ha
26/9/2011 Logran @ 0.15L/ha

Treatments: 33 treatments made up of current commercial varieties and experimental lines

Plot size: 10m x 1.45m x 4 reps.

Lake Bolac

Paddock History: 2010: Canola

2009: Wheat

Sowing rate: Seeding rate based on seed size with a desire to establish 175 plants/m²Sowing date: 1st June 2011Fertiliser: 1/6/2011 100kg/ha MAP
13/9/2011 100kg Urea at GS31Fungicides: 1/9/2011 GS30, Prosaro @ 0.30L/ha + 1% Hasten
5/10/2011 GS49, Prosaro @ 0.30L/ha + 1% HastenHerbicides: 1/6/2011 Roundup P'max @ 2.0L/ha + Boxer Gold @ 2.5L/ha
27/7/2011 Axial @ 0.40L/ha + 0.5% Adigor + Precept @ 0.5L/ha + Lontrel 300 @ 0.15L/ha

Treatments: 33 treatments made up of current commercial varieties and experimental lines

Plot size: 10m x 1.45m x 4 reps.

Results and discussion:

Wet conditions during the early stages of establishment of these trials resulted in severe powdery mildew infection in susceptible varieties. Varieties that were heavily infected with Powdery mildew suffered severe lodging at harvest. Baudin and Gairdner were the worst varieties affected, which may explain their below average yields and poor grain quality.

Leaf rust pressure was extremely high through the booting stage of these trials, those varieties that displayed excellent disease resistance were the standout performers. Again susceptible varieties Gairdner, Buloke and Baudin were the worst affected.

Trial Lines 9621-13 and 9454-05 have again preformed exceptionally well from a yield perspective. With excellent disease resistance and good malt quality these lines remain the ones to watch over the coming years.

Grain quality was generally good across the two trials, with Westminster being the standout for test weight, retention and screenings. Grain quality of the varieties infected by powdery mildew and leaf rust was adversely affected, with considerably lower test weight retention and increased screenings.



Image 1. Barley variety trials, Inverleigh

Table 1. Inverleigh barley trial yield and agronomic information

Variety	Cereal Yield t/ha, 5/12/2011 GS99	Cereal Yield % of Site Mean	Seedling Vigour, 1-5, 6/7/2011, GS10 - 19	Crop Maturity, Days, GS50 - 59	Maturity c/w Gairdner	Cereal Lodging, 1-9, 5/12/2011, GS90-99
9454-05	7.83a	119.87	4.5	123	0	0.05cd
9621-13	7.77ab	118.99	3.0	122	-1	0.00d
9646-12	7.64abc	117.01	3.5	122	-1	0.00d
9463-11	7.57abc	115.92	3.5	124	1	0.00d
8118-19 B	7.53a-d	115.27	4.0	123	0	0.00d
Westminster	7.52a-d	115.11	4.0	124	1	0.00d
SY Rattler	7.23a-e	110.77	3.5	118	-5	0.00d
Fairview	7.22a-e	110.52	3.0	123	0	0.00d
8111-11 A	7.16a-f	109.60	3.5	122	-1	0.50cd
Hindmarsh	7.09a-g	108.59	3.5	117	-6	1.00cd
9518-08	7.06a-g	108.04	3.0	115	-8	0.00d
8118-08 A	6.99a-g	107.07	3.0	123	0	0.00d
Buloke	6.83c-g	104.61	3.0	122	-1	1.00cd
Henley	6.66d-h	101.95	4.5	122	-1	0.00d
Gairdner	6.27f-j	96.01	3.5	123	0	3.75b
Baudin	5.31k	81.23	3.0	123	0	2.25bc
<i>LSD (P=0.05)</i>	<i>0.88</i>	-	-	-	-	<i>0.7</i>
<i>Mean</i>	<i>6.53</i>	-	-	-	-	<i>1.83</i>
<i>Standard Deviation</i>	<i>1.31</i>	-	-	-	-	<i>1.72</i>
<i>CV</i>	<i>20.05</i>	-	-	-	-	<i>40.96</i>

Table 2. Inverleigh barley trial grain quality data

Variety	Protein %	Test Weight kg/hL	Retention% w/w	Screening % w/w
9454-05	11.23e	65.65a-f	93.7%a	1.8%b
9621-13	10.70e	65.60a-f	96.3%a	0.9%b
9646-12	10.67e	66.55a-f	96.8%a	1.2%b
9463-11	10.85e	64.90c-f	96.5%a	1.1%b
8118-19 B	11.48de	64.90c-f	97.2%a	0.9%b
Westminster	11.40de	67.45abc	98.7%a	0.5%b
SY Rattler	10.55e	65.40a-f	96.6%a	0.8%b
Fairview	11.18e	64.40ef	97.0%a	0.6%b
8111-11 A	11.77cde	65.80a-f	98.1%a	0.6%b
Hindmarsh	11.80cde	65.80a-f	94.9%a	1.7%b
9518-08	11.77cde	64.25ef	97.8%a	0.8%b
8118-08 A	11.73cde	66.35a-f	97.8%a	0.8%b
Buloke	11.15e	64.90c-f	94.0%a	1.3%b
Henley	10.73e	64.80def	98.3%a	0.5%b
Gairdner	11.65cde	66.65a-e	92.7%a	1.9%b
Baudin	12.43abc	64.35ef	81.3%b	5.5%a
<i>LSD (P=0.05)</i>	<i>0.84</i>	<i>2.58</i>	<i>9.64</i>	<i>2.46</i>
<i>Mean</i>	<i>11.53</i>	<i>65.87</i>	<i>95.72</i>	<i>1.07</i>
<i>Standard Deviation</i>	<i>0.82</i>	<i>2.00</i>	<i>10.53</i>	<i>1.80</i>
<i>CV</i>	<i>7.10</i>	<i>3.04</i>	<i>11.00</i>	<i>167.24</i>

Table 3. Lake Bolac barley trial yield and agronomic information

Variety	Cereal Yield t/ha, 9/12/2011 GS99	Cereal Yield % of Site Mean	Seedling Vigour, 1-5, 6/7/2011, GS10 - 19	Crop Maturity, Days, GS50 - 59	Maturity c/w Gairdner	Cereal Lodging, 1-9, 9/12/2011, GS90-99
Westminster	7.06a	111.78	3.63d-g	124	0	1.00b
Henley	7.05a	111.62	3.75c-f	123	-1	1.00b
9629-03	7.01ab	110.96	3.50efg	122	-2	1.00b
SY Rattler	7.00abc	110.77	4.00b-e	119	-5	1.00b
8118-19 B	6.96a-d	110.14	3.00gh	124	0	1.00b
9454-05	6.95a-d	110.03	4.25a-d	124	0	1.25b
9621-13	6.94a-d	109.76	3.50efg	122	-2	1.00b
9463-11	6.87a-e	108.71	3.38efg	124	0	1.00b
8111-11 A	6.73a-f	106.44	4.00b-e	117	-7	1.00b
Buloke	6.56a-h	103.86	3.13gh	122	-2	1.5b
9646-12	6.42d-i	101.60	3.50efg	122	-2	1.5b
Fairview	6.36e-i	100.70	3.63d-g	124	0	1.00b
Hindmarsh	6.15g-k	97.35	4.00b-e	115	-9	1.00b
Gairdner	5.69k-n	90.10	3.00gh	124	0	1.00b
Baudin	5.07o	80.18	2.50h	122	-2	1.5b
<i>LSD (P=0.05)</i>	<i>0.56</i>	<i>-</i>	<i>0.68</i>	<i>-</i>	<i>-</i>	<i>0.62</i>
<i>Mean</i>	<i>6.32</i>	<i>-</i>	<i>3.65</i>	<i>-</i>	<i>-</i>	<i>1.12</i>
<i>Standard Deviation</i>	<i>0.67</i>	<i>-</i>	<i>0.65</i>	<i>-</i>	<i>-</i>	<i>0.48</i>
<i>CV</i>	<i>10.54</i>	<i>-</i>	<i>17.9</i>	<i>-</i>	<i>-</i>	<i>42.72</i>

Table 4. Lake Bolac barley trial grain quality data

Variety	Protein %	Test Weight kg/hL	Retention% w/w	Screening % w/w
Westminster	10.08f-i	69.90abc	94.0%b-f	2.89%e-i
Henley	10.60d-g	67.55f-j	94.8%bc	2.75%f-i
9629-03	10.20e-i	69.20a-f	91.9%fgh	2.97%d-i
SY Rattler	10.13f-i	68.70a-i	92.9%c-h	2.99%d-i
8118-19 B	10.30e-i	67.30hij	91.8%ghi	4.38%abc
9454-05	9.80hi	67.15ij	87.8%k	3.80%a-g
9621-13	9.75hi	68.40b-i	93.7%b-g	3.29%c-i
9463-11	9.78hi	68.15d-i	93.0%b-h	3.01%d-i
8111-11 A	10.65d-g	69.00a-h	94.6%bcd	2.83%f-i
Buloke	9.73hi	67.40hij	92.6%d-h	3.20%d-i
9646-12	9.70i	68.05d-i	91.1%hij	4.85%a
Fairview	9.90ghi	69.55a-e	94.1%b-e	2.23%ij
Hindmarsh	11.55ab	70.10ab	92.0%e-h	3.42%b-h
Gairdner	10.58d-g	68.65b-i	89.7%ijk	3.88%a-f
Baudin	10.53d-g	66.10j	89.2%jk	4.54%ab
<i>LSD (P=0.05)</i>	<i>0.72</i>	<i>1.73</i>	<i>2.10</i>	<i>1.10</i>
<i>Mean</i>	<i>10.50</i>	<i>68.56</i>	<i>93.23</i>	<i>3.25</i>
<i>Standard Deviation</i>	<i>0.70</i>	<i>1.50</i>	<i>2.29</i>	<i>0.98</i>
<i>CV</i>	<i>6.69</i>	<i>2.19</i>	<i>2.45</i>	<i>30.12</i>