2.2.7 GrainSearch barley variety trial – Inverleigh & Dunkeld, Vic

Location:
Inverleigh (E. Peel) & Dunkeld research sites

Funding:
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Background/Aim:
These trials were designed to test a number of potential malting quality barley lines out of the Syngenta Seeds breeding program in comparison to current commercial barley varieties. Barley yield throughout Victoria continued to disappoint in 2010, a heavy reliance on Gairdner barley has been hard felt by many farmers due to poor yields as a result of scald (Rhynchosporium)susceptibility, poor head retention and lodging. The need for a high yielding Gairdner replacement with good all round disease resistance is well overdue. The following data shows the potential of a number of experimental and more advanced lines.

Summary of findings:
- The mean site yield for the GrainSearch Inverleigh Barley trail was 4.51 t/ha, whilst Dunkeld site mean 5.00 t/ha.
- Westminster was the standout commercial barley variety at the Inverleigh site yielding 123% of the site mean, displaying exceptional scald and lodging resistance compared with current commercial lines.
- Shorter statured varieties with good head retention were the standout performers in the Dunkeld trial. Baudin and Westminster were the top commercial performers yielding 6.51 and 5.91t/ha respectively.
- Several early season experimental lines yielded exceptionally well topping the trials for yield. These lines also displayed good grain quality data.
- Early sowing at both sites was essential to achieve high yields in longer season varieties.

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: 483.9mm, Sheoaks 1991-2009
Avg. G.S.R.: 386.5mm, Sheoaks 1991-2009
2010 Total: 672.9mm E. Peel Inverleigh Site
2010 G.S.R.: May-November 459.7mm E. Peel Inverleigh Site

Dunkeld
Avg. Annual: 587.3mm Hamilton Airport 1991-2009
Avg. G.S.R.: 460.2mm Hamilton Airport 1991-2009
2010 Total: 736.6mm Dunkeld Site
2010 G.S.R.: May-November 439.4mm Dunkeld Site

Paddock History:

Inverleigh
2009: Canola
2008: n/a

Dunkeld
2009: Canola
2008: n/a

Soil Characteristics:

Inverleigh
Soil Type: Clay loam
Soil Nutrients:
N = 11 mg/kg (0-60cm)
P = 70 mg/kg (Colwell, 0-60cm)
K = 0.33 Meq/100g (0-60cm)
S = 24 mg/kg (0-60cm)
pH (water) = 5.1

Dunkeld
Soil Type: Clay loam
Soil Nutrients:
N = 91mg/kg (0-60cm)
P = 40mg/kg (Colwell, 0-60cm)
K = 0.78 Meq/100g (0-60cm)
S = 47mg/kg (0-60cm)
pH (water) = 5.7

Inverleigh

Sowing rate:
Seeding rate based on seed size with a desire to establish 175 plants/m^2

Sowing date: 9th June 2010

Fertiliser:
100kg/ha MAP at sowing, 50kg Urea at GS31 (26/8/2010)

Fungicides:
23/9/2010 Prosaro @ 0.20L/ha + 1% Hasten

Herbicides:
- 9/6/2010 Roundup P'max @ 1.5L/ha
- 10/6/2010 Goal @ 0.15L/ha + Boxer Gold @ 2.5L/ha
- 11/8/2010 Axial @ 0.3L/ha + 0.5% Adigor + Precept @ 0.5L/ha

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

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

Dunkeld

Sowing rate:
Seeding rate based on seed size with a desire to establish 175 plants/m^2

Sowing date: 25th May 2010

Fertiliser:
(8/09/2010) 100kg/ha MAP at sowing, 110kg Urea at GS30

Fungicides:
- 30/9/2010 Prosaro @ 0.15L/ha + 1% Hasten
- 26/10/2010 Prosaro @ 0.3L/ha + 1% Hasten

Herbicides:
- 25/5/2010 Roundup P'max @ 1.5L/ha
- 26/5/2010 Goal @ 0.15L/ha + Boxer Gold @ 2.5L/ha
- 30/9/2010 Axial @ 0.3L/ha + 0.5% Adigor + Precept @ 0.5L/ha

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

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

Results and discussion:
(Refer to tables on following pages)
The early sown barley trial at Inverleigh yielded an average of 4.51t/ha for the 2010 season. Westminster was the highest yielding commercial variety at 5.55 t/ha. The site mean yield for Dunkeld was 5.00t/ha. Baudin and Westminster were the top commercial performers yielding 6.51 and 5.91 t/ha respectively. This was a reflection of the excellent head retention and lodging resistance of these varieties. There were a number of experimental lines that yielded exceptionally well at both Dunkeld and Inverleigh sites, whilst these lines look promising we need to remember that this is only one years data. The grain yield CV's for Dunkeld and Inverleigh were relatively high, and results should be interpreted with caution.

Grain Quality was reduced across all varieties at both sites, as a result of unseasonal rains in November and December. Test weights at Dunkeld and Inverleigh were low with site means of 66.36kg/hL and 64.15kg/hL respectively. Protein levels generally within the malt range of 9-12, with site means of 10.13% and 11.90% at Inverleigh and Dunkeld respectively.

Image 1: Gairdner Barley, pictured Dunkeld 14th October 2010, GS 50-59, nil fungicide treatment.

Image 2: Westminster Barley, pictured Dunkeld 14th October 2010, GS 50-59, nil fungicide treatment.

Summary:
Whilst both Inverleigh and Dunkeld trials looked good throughout the growing season, late season rainfall resulted in reduced yields and downgraded grain quality. Varieties that displayed excellent standability and head retention were the standout performers at both Inverleigh and Dunkeld. Grain quality at both Dunkeld and Inverleigh sites was poor due to late season rain, all grain samples were of feed quality. Early sowing was a key factor in yield potential at both sites, with both early and late season material yielding well. Heavy infection of Scald at the Dunkeld site tested varieties with poor resistance. Varieties that displayed good resistance were amongst the top performers.

Table 1: Inverleigh barley trial grain yield and agronomic information

Variety	Cereal Yield t/ha, 12/12/2010 GS90-99	Cereal Yield % of Site Mean	Seedling Vigour, 1-9, 9/8/2010 GS10-19	Crop Maturity, Days, GS50-59	Maturity c/w Gairdner	Cereal Lodging, 1-5, 29/12/2010 GS90-99
8118-08 A	5.98a	132	4.75c-f	116e-h	-7	2
9463-11	5.94ab	131	4.25e-h	124ab	1	2
9621-13	5.64abc	125	4.00f-i	115fgh	-8	3
8036-07 A	5.63abc	124	4.00f-i	115fgh	-8	3
8033-02 B	5.61abc	124	5.00cde	115fgh	-8	4
Westminster	5.55a-d	123	6.00ab	126a	3	1
Gairdner	5.18a-f	114	6.75a	123ab	0	3
Fairview	4.96a-h	109	5.50bc	123ab	0	2
0937-5-1	4.94a-i	109	4.25e-h	117efg	-6	3
GS1234	4.69a-k	103	6.50a	124ab	2	2
0653-6-1	4.34a-l	96	3.75g-j	118def	-5	3
Vlamingh	4.30b-m	95	4.00f-i	114gh	-9	3
Hindmarsh	4.02c-m	89	4.25e-h	113hi	-10	4
Baudin	3.79e-m	84	6.50a	123ab	1	2
Buloke	3.77e-m	83	3.50h-k	121bcd	-2	3
LSD (P=0.05)	**1.66**	-	**0.81**	**2.81**	-	-
Mean	**4.51**	-	**3.94**	**117.10**	-	-
Standard Deviation	**1.34**	-	**1.23**	**4.12**	-	-
CV	**29.81**	-	**31.31**	**3.52**	-	-

*Means followed by same letter do not significantly differ (P=.05, LSD)

Table 2: Inverleigh barley trial grain quality data

Variety	Protein %	Test Weight kg/hL	Retention % w/w	Screening % w/w
8118-08 A	9.95g-n	64.20a-h	89.00a-g	3.00d-j
9463-11	9.30mn	62.40d-j	82.50efg	4.50b-i
9621-13	9.85g-n	64.30a-h	88.75a-g	3.25d-j
8036-07 A	9.98g-n	66.85a-d	90.00a-f	3.50c-j
8033-02 B	10.00g-n	62.35d-j	83.25efg	5.50b-e
Westminster	9.88g-n	63.33b-j	91.25a-d	3.25d-j
Gairdner	9.58j-n	66.10a-e	86.75a-g	2.75e-j
Fairview	10.05f-n	65.40a-f	91.25a-d	2.00hij
0937-5-1	10.00g-n	66.33a-e	88.75a-g	3.25d-j
GS1234	10.63b-i	65.85a-e	91.00a-d	2.00hij
0653-6-1	10.38b-k	65.03a-g	87.75a-g	3.25d-j
Vlamingh	11.03b-f	66.20a-e	94.50a	1.25j
Hindmarsh	10.83b-g	67.15abc	86.50a-g	3.75c-j
Baudin	9.90g-n	63.25b-j	91.00a-d	2.75e-j
Buloke	10.65b-i	59.10j	85.50b-g	5.00b-g
LSD (P=0.05)	**1.00**	**4.59**	**8.74**	**2.86**
Mean	**10.13**	**64.15**	**87.85**	**3.56**
Standard Deviation	**0.93**	**3.73**	**7.77**	**2.50**
CV	**9.21**	**5.81**	**8.85**	**70.21**

*Means followed by same letter do not significantly differ (P=.05, LSD)

Table 3: Dunkeld barley trial grain yield and agronomic information

Variety	Cereal Yield t/ha, 12/12/2010 GS90-99	Cereal Yield % of Site Mean	Seedling Vigour, 1-9, 9/8/2010 GS10-19	Crop Maturity, Days, GS50-59	Maturity c/w Gairdner	Cereal Lodging, 1-5, 29/12/2010 GS90-99
GS5092	7.32a	145	5	132bcd	5	3
6049-07 A	7.09ab	141	5	124jk	5	4
8136-06 B	7.01a-c	139	7	129ef	7	5
9454-05	6.89a-d	137	9	130de	9	5
Baudin	6.51a-e	129	6	132bcd	6	3
0653-6-1	6.08d-h	120	6	126hi	6	2
Westminster	5.91e-i	117	4	135a	4	1
Buloke	5.77e-k	114	5	129ef	5	4
Gairdner	5.67e-l	112	4	130de	4	4
GS1234	5.36g-n	106	5	135a	5	1
9463-11	5.32g-o	105	6	132bcd	2	2
Starmalt	5.21h-p	103	7	128fg	7	4
Hindmarsh	4.12r-u	81	5	123kl	5	3
LSD (P=0.05)	**0.9**	-	-	**2.03**	-	-
Mean	**5.0**	-	-	**127.50**	-	-
Standard Deviation	**1.2**	-	-	**3.65**	-	-
CV	**24.0**	-	-	**2.86**	-	-

*Means followed by same letter do not significantly differ (P=.05, LSD)

Table 4: Dunkeld barley trial grain quality data

Variety	Protein %	Test Weight kg/hL	Retention % w/w	Screening % w/w
GS5092	11.83a-h	61.45n	84.00h	3abc
6049-07 A	11.73b-h	67.13b-g	97.00ab	1d
8136-06 B	11.93a-h	66.88b-h	93.00cde	2cd
9454-05	12.23a-f	64.65lm	88.00g	4ab
Baudin	11.65b-h	64.80jk	93.00cde	2cd
0653-6-1	12.00a-h	67.45abc	96.00abc	1d
Westminster	12.28a-e	67.00b-h	96.00abc	1d
Buloke	11.60b-h	64.7kl	94.00b-e	2cd
Gairdner	11.93a-h	66.00g-j	88.00g	3abc
GS1234	12.05a-h	64.73k	96.00abc	2cd
9463-11	12.10a-h	63.9m	92.00def	3abc
Starmalt	12.18a-g	68.35a	96.00abc	1d
Hindmarsh	11.53b-h	67.35a-e	89.00fg	4ab
LSD (P=0.05)	**1.98**	**1.21**	**3.93**	**1.01**
Mean	**11.90**	**66.36**	**94.11**	**1.85**
Standard Deviation	**0.92**	**1.47**	**3.95**	**0.99**
CV	**7.71**	**2.21**	**4.19**	**53.30**

*Means followed by same letter do not significantly differ (P=.05, LSD)