



2012 SEASON VARIETY EVALUATION TRIALS REPORT

GRAINSEARCH / SQP MEMBERS & AFFILIATES ONLY

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Introduction

The following Report details the key outcomes from the 2012 trial season. GrainSearch & SQP Coop members are more than welcome to discuss any results further – please contact Philip Jobling – GrainSearch Business Manager. This Report is being sent exclusively to GrainSearch and SQP Coop members and Affiliates.

In 2012, GrainSearch had approximately 650 experimental plots in the ground located at 3 sites in Victoria. GrainSearch was evaluating approximately 150 new lines of Wheats (milling and feed types) and 140 new lines of Malt Barley. The ultimate aim of this evaluation program is to continue to identify new wheat and barley varieties suited to the high rainfall zones (HRZ) of Southern Australia – including Tasmania. GrainSearch is however, expanding its evaluation program to look at shorter season varieties that would either suit the Wimmera type grain growing region or suit spring sowing in the HRZ regions. Overall the 2012 season started with much promise and growth rates and potential yields at all three sites were looking exceptional until the rapid change to hot dry conditions put many varieties under pressure. Those varieties that performed well under these trying conditions will be closely monitored in 2013, as they certainly are showing traits that could be of benefit to growers in seasons to come.

To define some terminology used in these trial reports please note the following

S3 = Varieties that are being grown for the first time out of quarantine – in one plot at one site.

S4 = Varieties that have been grown for at least one season and are in replicated plots to ensure statistical evaluations can be made to compare the varieties to standard lines for the region. A variety being closely evaluated may stay at S4 stage for up to 4 years to ensure we know how the variety performs under a range of seasonal conditions. During this time, grain quality traits are tested to ensure that the grain is fit for purpose each season.

Standard lines = lines that growers would traditionally grow in the region for the same purpose. These are used to compare the new lines against – for yield maturity and of course grain quality.

PGGW = Our breeder partner from New Zealand – PGG Wrightson – lead by Nicholas Brooks

Acta = Our breeder partner based in New Zealand – Acta – lead by Richard Cross.

Syngenta = Our breeder partner based in the UK – Syngenta – Head Breeder, James Wroth

In 2013, GrainSearch's trial program will expand to around 850 plots over 5 locations, including a site at Junee, where we are evaluating an exciting new milling wheat line from the University of Queensland. This line, if successful will have strong rust resistance package along with a strong yield potential and will suit being grown in the Riverina (NSW) and NE Vic, as well as potentially being a great option for a high yielding spring sown milling wheat for WD of Victoria.

GrainSearch will continue to investigate new variety options for the benefit of GrainSearch and SQP Coop Members.

GrainSearch Trial Results Summary Report – 2012 Season

1. Barley Trials

Background

Syngenta S4 barley material was tested across two Victorian sites (Inverleigh -Western District and Marnoo -Wimmera). The S4 material is that which has progressed from the single plot S3 testing programme to a fully replicated trial design. At each site for replications were sown. The 1st rep was left unsprayed for disease, whilst Reps 2 – 4 were given up to three (3) foliar fungicide sprays - to keep them as free as possible from disease. The reason for this was to help identify that material carrying good levels of disease resistance whilst at the same time assessing total yield potential in low/no disease pressure. The same material was tested at both sites, with more intense observations undertaken at the Inverleigh site. Trial detail is given in Table 1.

Table 1 : Trial detail and analysis

Information	Inverleigh	Marnoo
Sowing Date	15/5/2012	30/5/12
Number of lines	42 inc. 7 checks	42 inc. 7 checks
Plot length	10 metres x 4 reps	8 metres x 4 reps
Co-operator	Kalyx Pty Ltd	BCG Pty Ltd
Fertiliser	100 kg/ha Granulock Supreme Z plus 25 kg/ha Urea at sowing. 100 kg/ha Urea on 16/8/12	55 kg/ha MAP at sowing 90 kg/ha Urea 25/7/12 90 kg/ha Urea 27/8/12
Fungicide (Reps 2 – 4)	Bumper 500 ml/ha 16/8/12 Folicur 145 ml/ha 16/9/12 Prosaro 420SC 300 ml/ha 18/10/12	Prosaro 300 ml/ha 9/10/12
Harvest Date	8/12/12	7/12/12
Notes	Plots well established and grown, some lodging in early lines at harvest	Plots grown well, high nitrogen application plus coming out of a pulse crop 2011
Trial CV (R2 – R4)	6.78	6.01

Yield Results

It is important not to place too much reliance on 1 year's worth of data. It is also important to analyse the trial to determine how reliable the data is. Both trials had a low CV (Table 1). A CV of less than 10 means that the trial results can be relied upon as giving a fair comparison between entries with not too much static in the results.

A summary of the yield results across the trial is given in the Table 2.

Table 2 : Summary of Yield Results

	Inverleigh	Marnoo
Average Yield (R2 – R4) T/ha	5.23	4.35
Top Yield (R2 – R4) T/ha	5.88	4.89
Bottom Yield (R2 – R4) T/ha	3.82	3.73
LSD P=0.05	0.5054	0.4742

An LSD figure gives the amount of yield T/ha you need to reach before you can say that the yield between any 2 varieties is statistically different. In the case of Inverleigh, a variety must be 0.51 T/ha higher yielding than any other variety before you can be 95% sure that it is in fact better.

The results for the top yielding lines (sprayed reps 2 – 4) for the Inverleigh site are shown in Table 3. All lines down to but not including Gairdner and Baudin are statistically the same for yield.

Table3: S4 Barley Yield results Inverleigh

S4 Syngenta Trial Inverleigh						
Pedigree	Maturity of Gairdner	Yield Sprayed	Rank Sprayed	Yield Unsprayed	Rank Unsprayed	Sprayed vs Unsprayed
9646-12	-5	5.88	1	4.26	17	138.09%
HENLEY	-3	5.87	2	5.19	8	113.09%
9621-13	-7	5.85	3	4.48	19	130.39%
4117-16-2	-1	5.83	4	5.81	1	100.46%
4117-13-2	1	5.81	5	5.46	4	106.44%
HINDMARSH	-7	5.80	6	5.42	5	106.96%
SY Rattler	-8	5.74	7	4.75	15	120.87%
8036-07 A	-8	5.72	8	5.08	10	112.70%
4117-07-2	-3	5.71	9	5.68	3	100.57%
COMMANDER	-3	5.61	10	5.00	11	112.27%
4134-05-2	-5	5.61	11	5.13	9	109.38%
9518-08	-11	5.59	12	4.35	20	128.36%
4117-09-1	1	5.53	13	5.72	2	96.56%
Westminster	1	5.52	14	5.35	6	103.02%
4134-06-1	-7	5.49	15	4.94	12	111.30%
4081-02-1	0	5.48	16	4.59	18	119.52%
4113-08-2	-2	5.48	17	5.29	7	103.59%
4134-02-2	-7	5.43	18	4.94	13	110.02%
4081-02-2	0	5.42	19	4.69	16	115.60%
8111-11 A	-8	5.42	20	4.90	14	110.54%
GAIRDNER	0	4.92	32	4.60	17	107.06%
BAUDIN	2	4.69	38	NA	NA	
Average		5.56		5.03		
LSD		0.5054				

Discussion of S4 Syngenta Inverleigh Barley Results

It is interesting to note that there are a number of early lines that have yielded very well. The column “Maturity of Gairdner” means for example in the case of the top yielding line 9646-12, it was 5 days quicker to reach 50% head emergence than Gairdner. In the case of Westminster, it was 1 day slower than Gairdner. These earlier lines may have a very good fit for a later sowing date or in environments where the growing season is shorter.

It is interesting to note how the yield performance of these lines changed when they were not sprayed with a fungicide. Remember that there was only 1 Rep that was not sprayed, so the data is quite limited.

In the case of Westminster, its ranking improved from 14 to 6 where it was not sprayed. This means Westminster by comparison with many other varieties has good levels of disease resistance. On the other hand, the top yielding line 9646-12 slipped in ranking from 1 to 17 when not sprayed, indicating its level of disease resistance is not as strong. Ideally we are looking for lines that maintain their ranking whether they are sprayed or unsprayed.

The main diseases present at the Inverleigh site were Spot Form of Net Blotch and Net Form of Net Blotch. There was a small amount of scald and low levels of leaf rust.

Table 4. S4 Barley Yield results Marnoo

Pedigree	Maturity of Gairdner	Yield Sprayed	Rank Sprayed	Sprayed vs Unsprayed %
9621-13	-7	4.897	1	99.74
HINDMARSH	-7	4.833	2	99.96
4117-07-2	-3	4.703	3	111.15
COMMANDER	-3	4.640	4	107.38
4081-02-2	0	4.613	5	106.86
BOLOUKE	-5	4.590	6	106.26
4076-10-1	-11	4.583	7	94.11
4134-05-2	-5	4.570	8	103.68
2693-08-1	-9	4.560	9	114.99
4113-08-2	-2	4.523	10	119.47
9518-08	-11	4.520	11	100.15
4117-03-2	-11	4.517	12	109.91
4117-13-2	1	4.490	13	127.34
4122-01-2	-5	4.477	14	106.53
HENLEY	-3	4.467	15	111.49
9454-06	-5	4.447	16	98.41
9516-01	-19	4.443	17	100.61
2693-05-2	-5	4.433	18	106.59
2693-03-1	0	4.423	19	
Gairdner	0	4.250	29	102.27
SY Rattler	-8	4.170	32	95.03
Westminster	1	3.730	42	101.22
Overall site Mean Yield		4.349		
CV		6.010		

Discussion of S4 Syngenta Marnoo Results

There was a low level of leaf disease at the Marnoo site. The average increase in yield across all varieties as a result of spraying for disease was approximately 5%.

Table 4 shows the 19 highest yielding varieties at Marnoo (no sig. yield difference) along with the check varieties. The LSD 5% of 0.4742 T/ha indicates that Gairdner marginally out-yielded Westminster. The poor performance of Westminster was somewhat surprising however we know that it suits the longer growing season areas better than the drier areas. The low disease pressure may also explain why Westminster did not show its superiority over the more disease sensitive lines such as Gairdner.

The earlier maturing lines performed better at Marnoo as would be expected.

There are a couple of earlier maturing lines that have performed well across both Inverleigh and Marnoo, namely 9621-13, 4117-07-2 and 4134-05-2 It will pay to keep an eye out for these lines. They may give GrainSearch a strong variety for the more northern environments.

Grain quality analyses have been conducted across all of the lines, however the results are inconclusive, except to say that the Marnoo site gave very high grain protein levels as a result of high Urea application in crop, as well as coming out of a pulse crop the previous year. We will be conducting small scale malt evaluations on the most promising lines.

2. Wheat Trials

Background

There were 2 wheat trials conducted located at Marnoo and Inverleigh. These were single plot non-replicated trials where the material was seen for the 1st time by GrainSearch. Table 5 below gives the treatments for each of the trials.

Table 5 : Trial background information

	Marnoo	Inverleigh
Company Supplying Germplasm	ACTA	PGGW
Number of experimental lines	112	30
Trial Co-operator	BCG Pty Ltd	SFS Ltd
Sowing Date	30/5/12	28/5/12
Flat/Beds	Flat	Beds
Fertiliser	55 kg/ha MAP at sowing plus 90 kg/ha Urea 25/7/12 (GS13/21) plus 90 kg/ha Urea 27/8/12 (GS 30 – 32)	100 kg/ha MAP at sowing plus 125 kg/ha Urea on 23/8/12 (GS31)
Fungicide	No in crop fungicide	150 ml/ha Prosaro plus 250 ml/ha wetter 1000 on 27/8/12

Results

Table 6 shows the yield results of the most promising PGGW lines at Inverleigh. The main objective with this material is to find a high yielding and high quality milling line that is of similar maturity to Derrimut, a very widely grown and accepted commercial line.

Table 6: Yield Results for the PGGW lines at Inverleigh

Line no.	Maturity cf Derrimut	Yield T/ha	Yield cf Site Mean	Yield cf Derrimut	Grain Yield/day
Forrest	20	6.43	120.49%	118.97%	44.33
11FD-AU-17	2	6.34	118.74%	117.24%	49.89
11FD-AU-01	-8	6.24	117.00%	115.52%	53.35
11FD-AU-05	1	5.96	111.76%	110.34%	47.32
Lincoln	1	5.90	110.59%	109.20%	46.83
Bolac	6	5.84	109.43%	108.05%	44.57
11FD-AU-19	1	5.84	109.43%	108.05%	46.34
11FD-AU-04	0	5.62	105.36%	104.02%	44.97
11FD-AU-23	2	5.56	104.19%	102.87%	43.77
11FD-AU-03	-2	5.53	103.61%	102.30%	44.94
Derrimut	0	5.40	101.28%	100.00%	43.23
11FD-AU-30	1	4.94	92.55%	91.38%	39.19
Correll	3	4.60	86.15%	85.06%	35.91
11FD-AU-22	-1	3.22	60.30%	59.54%	25.95
Kellalac	20	2.62	49.13%	48.51%	18.08
	Average	5.34	100%		41.91

Table 7: Other agronomic data PGGW trial Inverleigh

Line no.	1 = nil/mild; 5 = severe			Height cm	Test Weight	Protein	Screenings
	BYDV	Yellow Leaf Spot	stripe rust				
	Observations 22/10/2012						
Forrest	1	2	1	100	69.99	10.60	4.49
11FD-AU-17	1	2	1	95	64.49	11.30	1.32
11FD-AU-01	1	3	1	90	71.12	11.50	0.78
11FD-AU-05	1	3	1	95	65.77	11.00	1.21
Lincoln	1	4	1	100	68.39	11.00	3.93
Bolac	1	3	1	90			
11FD-AU-19	1	3	1	90	66.18	11.50	0.91
11FD-AU-04	1	2	3	85	67.60	11.90	2.74
11FD-AU-23	1	1	1	95	66.53	11.60	1.39
11FD-AU-03	1	2	1	80	71.06	11.10	1.94
Derrimut	1	2	1	80	66.80	10.40	4.22
11FD-AU-30	2	3	1	95	76.08	12.60	2.15
Correll	2	1	1	95	72.09	11.60	2.83
11FD-AU-22	1	1	1	95	68.48	10.90	4.10
Kellalac	1	1	1	100	69.04	10.60	4.68

Table 8: ACTA Wheat Results Marnoo

Variety	Yield (t/ha)	Test Weight	Protein	Moisture	Screenings
11ACTA1040	3.80	77.0	13.2	11.4	3.2
11ACTA1022	3.72	61.3	14.7	11.3	1.6
11ACTA1023	3.66	68.7	13.9	11.4	1.7
11ACTA1030	3.61	69.1	13.7	11.6	1.5
11ACTA1036	3.59	66.8	12.9	11.5	2.6
11ACTA1042	3.57	64.7	12.5	11.3	1.9
11ACTA1021	3.54	69.1	15.4	11.2	1.8
11ACTA1068	3.49	62.5	13.1	11.3	5.0
CORRELL	3.47	69.3	11.3	11.4	5.3
11ACTA1041	3.46	61.5	12.8	11.5	2.3
11ACTA1024	3.46	68.5	14.2	11.5	3.0
11ACTA1039	3.43	73.3	12.5	11.6	3.2
11ACTA1069	3.40	70.0	13.7	11.4	3.3
11ACTA1037	3.39	69.3	10.9	11.5	9.6
11ACTA1083	3.38	64.6	13.4	11.6	1.8
11ACTA1014	3.36	72.6	13.8	11.7	1.8
11ACTA1020	3.33	65.0	15.9	11.6	1.6
DERRIMUT	3.07				
SCOUT	2.99				
AXE	2.97				
YITPI	2.94				
KELLALAC	2.83				
GLADIUS	2.65				
LINCOLN	1.98				

Discussion of Results - S3 PGGW Wheat - Inverleigh

Whilst Forrest topped the trial for yield (Table 6), it was only marginally better than a number of experimental lines. Forrest was very uneven, indicating a seed quality issue and it was considerably later in maturity (days to 50% heading) than the bulk of the material. It was 20 days later than Derrimut.

There are a number of experimental lines of similar maturity to Derrimut but higher yielding. Care must be exercised however that the yield results were only from 1 plot of each line.

The last 4 lines in Table 6 were affected by spray drift (neighbouring canola) and the yield is not a fair result.

Table 7 gives further agronomic information for the top yielding lines. Many of the lines discarded from the Table suffered from high levels of Yellow Leaf Spot and/or Stripe Rust infections.

Grain quality of the top yielding experimental lines was overall quite acceptable, being equal to or better than Derrimut for the parameters measured. Whilst it has been indicated that the lines are of milling quality, we need to determine whether they meet Australia Standards. Small scale milling and baking tests will be commenced on the best of the material.

One of the issues we need to be mindful of is the height of some of the lines and potential for lodging. There was no lodging in this trial, despite very dry and tough grain fill conditions.

Discussion of Results - S3 Acta Wheats - Marnoo

There is some quite promising material identified in the Marnoo trial for both the northern environments and for the longer growing season southern zone. It was clear from the yield results that the quicker maturing lines performed much stronger, with some of the later maturing checks such as Kellalac and Lincoln performing relatively poorly. Again it should be noted that the results are simply from one plot of each line so the data may be somewhat misleading.

One of the pleasing things is that grain protein and test weight for some of the experimental lines was quite high compared to Correll. The top yielding line 11ACTA1040 looked particularly strong. We are yet to finish analysing the other checks.

The collection of agronomic data was somewhat limited due to the relative isolation of the trial. All of the material selected for further trialling in 2013 will be watched much more closely at the Inverleigh site.