

2.1.4 Winter wheat variety trial - Inverleigh, Vic

Location:

Inverleigh Research Site.

Funding:

This was an SFS Geelong Branch funded trial.

Researchers:

Rohan Wardle, Jon Midwood, Gary Sheppard & Sam Cockayne - all SFS.

Author:

Ben O'Connor, SFS.

Acknowledgements:

Thanks to John Hamilton for providing the land for this trials programme.

Background/Aim:

New winter wheat 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 of southern Victoria. Winter wheats have a strong fit in the grain production systems of South-West Victoria. Feed wheat markets are available through regional industries such as dairies, piggeries and feed mills. Dual purpose winter wheats also allow for diversification of farm management options such as winter grazing. 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.

Take home messages:

- The winter wheat variety trial yielded an average of 5.72 t/ha. Revenue had the highest yield with 6.67t/ha, after topping the 2008 Mininera variety trial. Mackellar again yielded well with 6.05 t/ha, and was the highest yielding variety at Dunkeld in 2008.
- Most varieties were classified as feed wheats, and were all able to achieve this grade. Revenue had the highest gross margin of \$750/ha, however consideration must also be given to the value of grazing these dual purpose varieties.
- The grain quality of the longer season varieties Mackellar, Frelon, Einstein and Revenue was slightly reduced as these were filling during the hot November period.
- BYDV was evident in Revenue, Frelon, CS170, 10.10.3 and Amarok. Mackellar is the only cultivar that is resistant to BYDV, however did show signs of leaf rust during the season.

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 ¹

(Inverleigh Research Site; 73mm below average)

¹ 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 Wheat 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.

Paddock History:

2007: Canola, 2008: Peas

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 (CaCl₂) = 5.8.

Treatment list:

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

Tillage type:

This trial was seeded with the SFS cone seeder using 2.5cm knife points.

Diseases:

Minor pressure of stripe rust was observed in 2009, with most varieties demonstrating good resistance levels. Some expression of BYDV was evident within some Winter wheat varieties.

Sowing rate:

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

Sowing date: 23rd April 2009

Harvest Date: 24th December 2009

Fertiliser:

100kg/ha MAP at sowing
Two timings of Urea at 25kgN/ha from late tillering (31/7 & 2/9)

Herbicides:

- 23/4/09 Roundup @ 1.2L/ha + Triflur 480 @ 1.50L/ha + Striker @ 0.1L/ha
- 27/4/09 Dual Gold @ 0.25L/ha + Diuron @ 0.50L/ha
- 16/6/09 Axial @ 0.35L/ha + Precept @ 1.20L/ha + Lontrel 0.15L/ha + Adigor @ 0.5%

Fungicides:

14/9Prosaro @ 0.2L/ha + Hasten @ 1%

Results and discussion:

The winter wheat variety trial at Inverleigh achieved an average yield of 5.72 t/ha. Revenue – a newly released dual purpose feed wheat was the highest yielding variety this year after topping the yields at Mininera last year. The effects of grazing Revenue were investigated this year, and can be found later in the trial report booklet. Mackellar, another consistently high yielding variety achieved 6.05 t/ha this year and 6.26 t/ha in 2008 at Dunkeld further establishing itself as a benchmark for dual purpose wheats. Naparoo yielded 73% of the site mean, this may

be attributed to significant grain loss through shattering prior to harvest. This variety has a tendency to lose grain as demonstrated in previous years and other trial sites.

Expression of BYDV was evident in Revenue, Frelon, CS170, 10.10.3 and Amarok. Mackellar, which yielded well is the only BYDV resistant variety in Australia, and may be a consideration when choosing a variety. Moderate pressure of Stripe Rust was observed in 2009, with Mackellar showing some signs of expression.

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 4.87t/ha	2008 Ranking	Quality Classification Potential	Untreated Check (t/ha)
Revenue	6.67	a	136.9	6	Feed	6.03
CS170	6.20	b	127.3	NA	Feed	5.82
Mackellar	6.05	b	124.2	1	Feed	6.33
Amarok	5.98	b	122.8	5	Feed	5.91
Einstein	5.92	b	121.6	NA	Feed	6.28
Frelon	5.85	bc	120.2	3	Feed	6.13
Preston	5.51	cd	113.1	NA	APW	5.27
10.10.3	5.10	d	104.7	NA	Feed	4.88
Naparoo	4.19	e	86.0	8	Feed	3.72
Mean	5.72					5.60
LSD (P=0.05)	0.412					
CV	4.16					
Trt Prob (F)	0.001					

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 Inverleigh for the 2009 growing season; being 243.6mm x 20kg/mm/ha, or 4.87t/ha.

Grain quality is not the primary target for the majority of the winter wheat varieties as they are graded as feed by Grain Trade Australia. Grain quality varied between varieties, mainly due to maturity length where the sudden finish to the season reduced the quality of the longer season cultivars. Mackellar, Frelon, Einstein and Revenue had screenings above 5%. This would be an effect of the unseasonal hot conditions in November where grain filling could not be completed. All varieties were able to meet a minimum test weight of 62.0 kg/hl for Feed 1, however most were below 74.0 kg/hl. A protein dilution effect

could be observed, where, as yields increased protein generally decreased.

Revenue topped the gross margin with \$750/ha from grain yield. Consideration should also be given to the value of grazing these dual purpose wheats as they may add to other enterprises in terms of live weight gain, reduced quantity of bought feed and managing a feed gap in pasture rotations. The value of storing feed grain for on farm use may exceed the market value at harvest.

Table 2: Grain quality analysis, including protein, test weight & 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	Screenings below 2.0mm ¹	Resultant Quality Classification	² GM\$/Ha
APW1 Specs		10.5	74.0	5.0		
Feed1 Specs		No Limit	62.0	15.0		
Revenue	6.67	9.8	72.0	5.7	F1 => F1	\$750
CS170	6.20	10.3	73.6	2.7	F1 => F1	\$666
Mackellar	6.05	10.6	73.5	7.3	F1 => F1	\$638
Amarok	5.98	10.9	75.4	3.7	F1 => F1	\$626
Einstein	5.92	10.8	71.5	5.7	F1 => F1	\$616
Frelon	5.85	11.9	74.4	6.3	F1 => F1	\$604
Preston	5.51	12.7	73.2	2.7	APW1 => AUH2	\$679
10.10.3	5.10	12.9	72.3	2.7	F1 => F1	\$468
Naparoo	4.19	11.2	72.9	4.0	F1 => F1	\$304
Mean	5.72	11.2	73.2	4.5		
LSD (P=0.05)	0.412	0.72	1.68	1.3		
CV	4.16	3.68	1.32	16.63		
Trt Pr (F)	0.001	0.001	0.004	0.001		

¹ Quality 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 Malt 1 – testing undertaken at Riordan Grains, Inverleigh Office.

² Prices for grain were taken as a spot price on the day of harvest and supplied by Riordan Grains; H1 = \$228/t, APW1 = \$209/t, AUH2 = \$205/t, AGP1 = \$194/t, F1= \$180/t.

Summary:

Dual purpose winter wheats have a strong fit in the cropping rotation in south-west Victoria. Revenue and Mackellar again topped the yields with 6.67 and 6.05 t/ha respectively. This is on the back of Revenue topping the 2008 Mininera variety trial and Mackellar the 2008 Dunkeld variety trial. Revenue had the highest gross margin of \$750/ha, however consideration must also be given to the value of grazing these dual purpose varieties. The grain quality of the longer season varieties Mackellar, Frelon, Einstein and Revenue was slightly reduced as these were filling during the hot November period. The expression of BYDV was evident in Revenue, Frelon, CS170, 10.10.3 and Amarok. Mackellar is the only cultivar resistant to BYDV, however did show signs of Stripe Rust during the season.