Wheat varieties – Mallee

Simon Craig *(BCG)*

Take home messages

- *Espada, Lincoln and Correll yielded 10% higher than Yitpi at Woomelang.*
- *Gladius achieved H2 quality and was the most profitable on this occasion.*
- *Yitpi is likely to remain the main variety grown, though interest in Correll, Derrimut and Gladius is growing.*

Background

An on-going issue faced by many farmers is knowing which wheat variety to grow. Seasonal conditions in 2009 were ideal to see how some new varieties performed. At our Main Field Day in September, early maturing varieties were well advanced with heads fully emerged.

For the past decade, Yitpi has been the most successful and widely grown variety in the Mallee. Yitpi was bred to be high yielding, with excellent grain quality, and suited to dryland low rainfall environments (eg Mallee). For a new variety to be preferred over Yitpi it will need to consistently produce more than 10% yield and have a better disease rating, especially to Cereal Cyst Nematode, CCN (*Heterodeva avenae*). Incidences of CCN, or eelworm, have recently declined in the Mallee mainly because Yitpi is resistant to the disease. If a CCN-susceptible variety becomes the variety of choice, this will increase the incidences of the disease and yields will be reduced over time. CCN can reduce grain yield by 60 – 70%.

The most successful varieties are chosen because of their overall agronomic package in terms of diseases and quality, not just grain yield. Different varieties may suit a particular system more than another, thus there is a need for continued evaluation of new and current varieties.

Aim

To evaluate new wheat varieties and their suitability to the Mallee.

Method

This trial was a replicated complete randomised block design. Sowing rate for each variety was determined by calculating the 1000 grain weight and assuming 90% germination. The targeted plant density was 150 plants per metre square (pl/m^2). The equation used to determine sowing rates was:

$$\text{Sowing rate (kg/ha)} = \frac{\text{(1000 grain weight (g) x targeted plant density)}}{\text{expected germination (\%)}}$$

The trial was sown in the first week of May at 2cm depth. Soil moisture was marginal at the time. All plots emerged 9 days after sowing. Nitrogen and fungicides were applied when required. Dry matters were taken at flowering (GS65) and converted into kilograms per hectare (kg/ha). The trial was harvested on 17 November before the rainfall events later in the month. Grain yield was converted to 12% moisture. A sub-sample was taken from each plot and measured for grain protein (% as is), screenings (<2.0mm) and test weight (½ hecta litre).

Location:	Woomelang	
Replicates:	4	
Sowing date:	6 May 2009	
Seeding density:	150 plants/m²	
Seeding equipment:	Knife points, press wheels, 30cm row spacing	
Fertiliser:	6 May	55kg/ha Supreme Z (N10:P21.9:K0:Zn1)
	9 July	60L/ha UAN (26kg N/ha) diluted in 60L water and applied at 120L/ha (50:50 mix)
Herbicides:	6 May	Roundup PowerMax (1.5L/ha) Triflur X (1.1L/ha)
	6 July	Precept (1.0L/ha) Lontrel (60mL/ha) Hasten (1% v/v)
	17 July	Atlantis (330mL/ha) Hasten (1% v/v)
	27 August	Fastac Duo (200mL/ha) Folicur (145mL/ha) at GS39

Table 1. Wheat variety agronomic and disease ratings information.

Variety	Supplier	Quality	Maturity	CCN	Stem rust	Stripe rust	YLS
Yitpi	AWB seeds	AH	M	MR	S	MR – MS	S – VS
Correll	AGT	AH	M	MR	MR – MS	MR – MS	S – VS
Catalina	AWB seeds	AH	M	R	MR – MS	MR – MS	MS – S
Espada	AGT	APW		MS	MR	MR – MS^{yr17}	MS
Derrimut	Crop Care	AH	E – M	R	R – MR	MS^{yr17}	MS – S
Young	ABB Seeds	AH	E – M	R	MR	MS^{yr17}	MR – MS
Axe	AGT	APW	E	S	MS	MR	S
CLF_STL	Nufarm	APW	M	S	MS	S	S
Gladius	AGT	AH	M	MS	MR	MR – MS^{yr17}	MS
Peake	NuSeed	AH	E – M	R	MR – MS	MR – MS	MS – S*
Lincoln	Pacific Seeds	AH	E – M	S	R – MR*	R – MR	MR
Crusader	Pacific Seeds	APW	E – EM	MS	R – MR	MR – MS^{yr17}	MR
Scout	Long Reach	APW	M	MR	R – MR	MR – MS	S
LPB04-0965	Long Reach	APW	M	S	MR	MR – R^{yr17}	S
LPB05-2148	Long Reach	AH	E – M	n/a	MR*	MR^{yr17}	S

Quality: AH *= Australian Hard, APW = Australian Premium Wheat*

Maturity: *E = early, M = mid, L = late*

Disease Ratings: *VS = very susceptible, S = susceptible, MS = moderately susceptible, MR = moderately resistant, R = resistant*

*Yr17 = the later rating applied to the WA pathotype YR17, * = rating yet to be confirmed*

Results

At the end of tillering, Crusader, Correll and Axe visually showed greater vigour in early growth, but at flowering there was no difference between the varieties in biomass. Table 2 shows the crop production results of the varieties at Woomelang.

Table 2. Crop production data from the Woomelang site.

Variety	Flowering dry matter (t/ha)	Grain yield (t/ha)	Grain yield (% Yitpi)	Long-term average grain yield (% Yitpi)
Yitpi	4.57	2.11	100	100
Correll	4.55	2.31	110	102
Catalina	4.21	2.13	101	96
Espada	4.74	2.38	113	111
Derrimut	4.41	2.19	104	100
Young	3.96	2.23	106	102
Axe	4.10	2.02	101	101
CLF_STL	4.68	1.85	89	93
Gladius	4.53	2.29	109	103
Peake	4.54	2.23	106	100
Lincoln	4.60	2.35	112	99
Crusader	4.41	1.99	94	91
Scout	4.71	2.28	108	-
LPB04-0965	4.16	1.99	95	-
LPB05-2148	4.08	1.95	93	-
Sig. diff **LSD (P<0.05)** **CV (%)**	**NS** **9.8**	**P<0.001** **0.22** **7.2**	**P<0.001** **10.2** **7.0**	

Note: Long-term averages were sourced from DPI 2009 Winter Crop Summary in the Woomelang district.

Below are the grain quality results for the varieties and the grade.

Table 3. Grain quality and income of the various varieties.

Variety	Grain protein (%)	Screenings (%)	Test weight (g)	Grade	Income ($/ha)
Yitpi	11.2	2.1	83	APW	416
Correll	10.5	4.6	83	APW	456
Catalina	10.3	3.1	87	ASW	394
Espada	10.4	2.3	83	ASW	441
Derrimut	10.5	3.5	86	APW	432
Young	10.4	5.3	86	ASW	413
Axe	11.2	1.7	84	APW	398
CLF_STL	12.8	1.5	85	H2	387
Gladius	11.8	2.6	84	H2	479
Peake	9.8	5.0	85	ASW	413
Lincoln	9.9	4.7	87	ASW	435
Crusader	11.3	4.9	85	APW	392
Scout	9.7	3.3	84	ASW	422
LPB04-0965	11.0	5.9	85	APW	392
LPB05-2148	10.5	2.4	86	APW	385
Sig. diff	**P<0.001**	**P<0.001**	**P<0.001**		
LSD (P<0.05)	**1.1**	**1.5**	**2**		
CV (%)	**7.3**	**30.2**	**1.4**		

Correll, Espada and Lincoln performed better than Yitpi in terms of grain yield, yielding at least 10% more. Clearfield STL produced the lowest yield.

Protein levels were generally low across all varieties, with the majority of varieties below 10.5%.

For Correll, the test weight has been highlighted as a potential thorn in this variety's side. If the required test weight is raised to improve export quality, this may cause some problems for Correll which anecdotally has a lower test weight. In terms of this trial, all varieties were above the current minimum standard at grain receival sites (74g).

In terms of screenings, all varieties were below the 5% maximum except for Young and LPB04-0965. Young is a derivative of Silverstar and is prone to high screenings.

Interpretation

It is difficult to conclude that any of the varieties in this trial warrant replacing Yitpi as the main variety. Shorter season varieties such as Axe are ideal options for improving weed control as delayed sowing allows for better knockdown control. Of the potential replacements for Yitpi it is likely to be between Correll, Derrimut, Gladius and Catalina. Despite Lincoln and Espada yielding quite well in this trial, their susceptibility to CCN makes them unsuitable as obvious replacements of Yitpi in the long-term. Both varieties could be used in rotation with Yitpi or a CCN-resistant variety.

Given the late harvest rain experienced this year, some varieties are more prone to sprouting than others. Axe, Correll, Catalina and Espada can be susceptible to sprouting under these circumstances so these varieties would need to be prioritised at harvest to reduce the risk of the events experienced in 2009.

There are differences in sprouting tolerance between varieties. The following list is the result of laboratory tests where all varieties were treated the same (Table 4). The germination (sprouting) index ranges from 0 (= very tolerant) to 1 (= very intolerant).

Table 4. Tolerance of some varieties to sprouting.

Variety	Germination index (0 – 1)	Tolerance
Gladius	0.87	I – VI
Espada	0.87	I – VI
Axe	0.84	I – VI
Wyalkatchem	0.75	I
Correll	0.74	I
Mace	0.64	MI – I
Yitpi	0.58	MI
Frame	0.57	MI
Janz	0.53	MI

VI = very intolerant, I = intolerant, MI = moderately intolerant

The most susceptible varieties to sprouting appear to be those that are better suited to hot, dry springs. In recent years, there has been a greater impact from hot, dry springs on the bottom line than sprouting. In other words, hang onto these high yielding, intolerant varieties until we get a better variety. Until then, manage these varieties accordingly, such as prioritising those paddocks at harvest.

Herbicide tolerance can vary between crop varieties. As part of a current GRDC project co-ordinated by the SA Research and Development Institute (SARDI), cereal and pulse varieties are being investigated for their tolerance to commonly used herbicides and tank mixes. SARDI research trials in both 2006 and 2007 found that Hussar (registered product of Bayer CropScience) reduced grain yield in Gladius by up to 18% when applied at the registered rate and timing. Relative to other varieties, Buloke barley was also found to have increased sensitivity to Cadence as did Yallara oats to Tigrex and Banvel M. Seasonal conditions and time of application can greatly influence the effects of herbicides on crops. Though this work is ongoing, it does provide guidance for growers to select safer herbicide options for their sown cultivar and/or select more tolerant cultivars for their important herbicides.

Table 5. 2009 NVT data from Mallee sites.

Variety	Birchip	Hopetoun	Murrayville	Ultima	Walpeup	Woomelang
Yitpi (t/ha)	*1.69*	*2.21*	*1.58*	*2.57*	*3.19*	*1.08*
Axe	133	84	-	91	101	147
Catalina	106	88	92	95	84	122
Clearfield Jnz	91	88	70	98	86	93
Clearfield Stl	73	92	84	93	92	74
Correll	127	103	102	111	104	137
Derrimut	124	79	102	102	107	121
EGA Bounty	56	62	68	82	74	58
EGA Kidman	74	84	75	86	81	81
Espada	118	90	95	89	112	137
Frame	82	92	93	90	82	88
Gascoigne	97	96	96	104	96	116
Gladius	131	91	106	105	108	139
Lincoln	104	91	98	108	106	114
Mace	109	88	89	93	106	123
Magenta	114	100	123	103	114	107
Peake	124	90	96	105	105	131
Scout	143	91	117	112	118	144
Wyalkatchem	99	93	92	114	107	123
Young	112	95	82	100	99	135
Site mean (t/ha)	**1.8**	**1.99**	**1.5**	**2.61**	**3.21**	**1.25**
CV (%)	**5.37**	**7.65**	**7.74**	**6.83**	**5.22**	**7.39**
LSD (%)	**9**	**13**	**13**	**11**	**9**	**13**

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