

Wheat varieties



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Take home messages

- Average yield for all varieties was 5.2t/ha, with Scout (5.86t/ha), IGW 3073 (5.95t/ha) and IGW 3119 (5.86t/ha) topping the yields
- Correll, Gladius and Catalina yielded similarly to Yitpi (at 5t/ha).
- The higher yielding varieties - Scout, Magenta, Mace and InterGrain (Nuseed)-lines, were the most profitable.

Given the incidence of stem rust this year, growing more than one wheat variety in 2011 will be an appropriate strategy. Yield losses of up to 70% can occur in susceptible varieties if conditions are conducive and early infestations are untreated. Fortunately, in 2010, stem rust infections appeared late in the season and losses in most cases were minimal. With the level of stem rust inoculum now high, early infection in 2011 is likely. Mid-maturing susceptible varieties (such as Yitpi) are at greatest risk. Deciding on a replacement for Yitpi will not be easy. Plenty of varieties have good disease profiles but most have flaws such as sprouting intolerance which, as recent years have shown, can be devastating. Other considerations such as classification, test weight and sprouting susceptibility should be added into the equation. Growers should continue to review varieties and alternatives to ensure the best option is chosen to maximise profit with minimal risk.

Method

Location:	Culgoa	
Replicates:	4	
Sowing date:	11 May 2010 (harvested 24 November)	
Seeding equipment:	Gason parallelogram knife point, press wheel bar (30cm spacings).	
Target Plant Density:	160 plants/m ²	
Fertiliser:	11 May	50kg/ha MAP (10% N, 21.9% P)
	15 June	100kg/ha Urea (46% N)
	13 August	90kg/ha Urea (46% N)
	17 July	2L/ha ZincSol (16.7% Zn v/v)
Herbicides	11 May	2L/ha Roundup PowerMax + 1.5L/ha TriflurX
	27 June	200ml/ha Agritane 750 + 3g/ha Ally + wetter
Fungicides	27 July	145ml/ha Folicur
	31 August	145ml/ha Folicur
	28 October	250ml/ha Opus

Varieties grown in this trial were chosen because they are either currently grown or are potentially suitable for the southern Mallee and northern Wimmera. Table 1 summarises the agronomic and disease ratings for each variety in the trial (source: Winter Crop Summary Guide, DPI publication).

Table 1. Wheat variety agronomic and disease rating information.

Variety	Seed company	Quality	Maturity	CCN	Stem rust	Stripe rust	YLS	Long-term NVT yields	Sprouting tolerance
Yitpi	AW/B seeds	AH	Mid	MR	S	MR-MS	S-VS	100	MI
Correll	AGT	AH	Mid	MR	MR-MS	MR-MS	S-VS	102	I
Catalina	AW/B seeds	AH	Mid	MR	MR-MS	MS	MS-S	96	
Espada	AGT	APW	Mid	S	MR	MR-MS ^{vrl17}	MS-S	111	I-VI
Derrimut	Nuseed	AH	Early-Mid	R	R-MR	MS ^{vrl17}	MS-S	100	
Young	ABB Seeds	AH	Ear-Mid	R	MR	MS ^{vrl17}	MR-MS	102	
Axe	AGT	APW	Early	S	MS	MR	S	101	I-VI
CLF_STL	Farmer retained	APW	Mid	S	MR-MS	S	S	93	
Gladius	AGT	AH	Mid	MS	MR	MR-MS ^{vrl17}	MS	103	I-VI
Peake	NuSeed	AH	Early-Mid	R	MR-MS	MR-MS	MS-S*	100	
Lincoln	Pacific Seeds	AH	Mid	S	R-MR*	R-MR	MS-S	99	
Scout	Pacific Seeds	APW	Mid	MR	R-MR	MR-MS	S	*	
Wyalkatchem	Plant Tech	APW	Early	S	MS	MS-S	MR	100	I
Mace	AGT	AH	Early	MR-MS	MR	S-VS ^{vrl17}	MR-MS	*	MI-I
H46	SunPrime seeds	APW	Mid	#	MR	#	#		
Carinya	SunPrime seeds	AH	Mid	S	R-MR	MR-MS ^{vrl17}	S		
IGW 3119	Nuseed	#	Early	S	?	MR	MR-MS		
IGW 3073	Nuseed	#	Mid	S	MR	MR	MS		
Magenta	Nuseed	APW	Mid	S	R-MR	MS-MR	R-MR	102	

rating yet to be classified *limited years of comparison

Results

Visual differences in canopy greenness were observed throughout the season. These differences were most notable after stem elongation (GS30-39). Normalised Difference Vegetative Index (NDVI) was measured using the hand held 'GreenSeeker®' at regular intervals. Figure 1 shows the differences identified between different varieties as well as the rapid growth that all varieties exhibited during stem elongation. After stem elongation, the differences between early, mid and late season varieties were evident. Axe, Correll, Yitpi and Magenta are presented to simply illustrate the difference. There was a strong interaction in NDVI ($P < 0.001$, LSD 0.05, C.v 8.2%) between varieties and growth stage. Magenta had consistently higher NDVI than Axe after flag-leaf emergence (GS37). Correll and Yitpi were significantly higher than Axe from booting onwards. At the last assessment at the end of flowering (based on Yitpi), Axe began to lose leaf area as senescence began. This was reflected by a much lower NDVI than in Magenta, Yitpi and Correll.

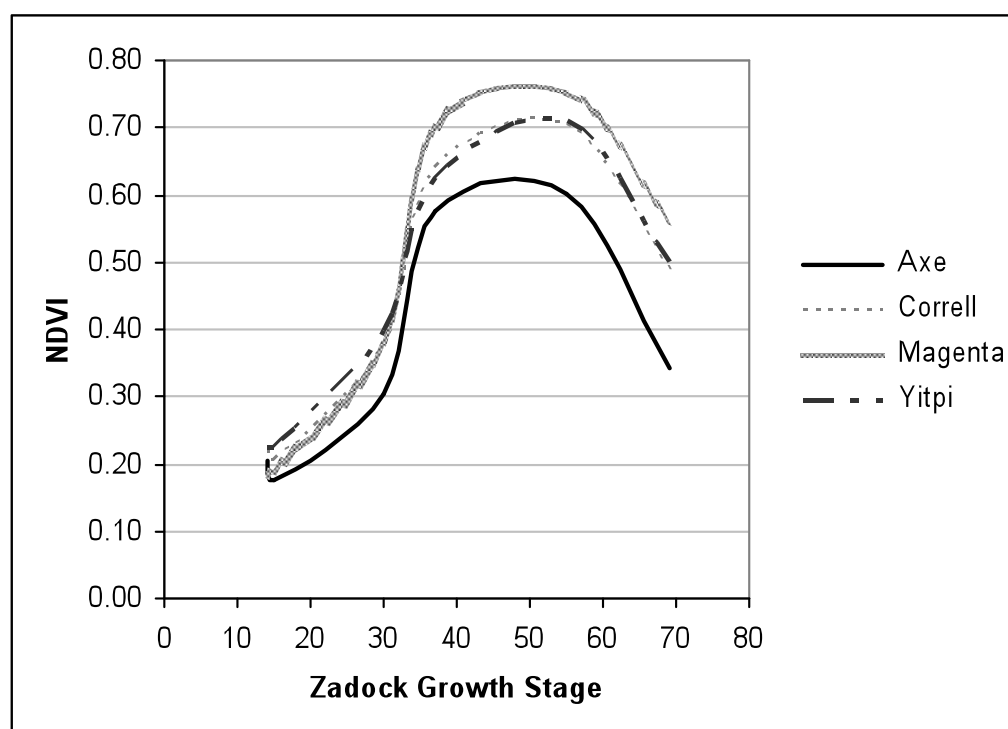


Figure 1. 'Canopy Greenness' measured by NDVI at regular stages during the season of Axe, Correll, Magenta and Yitpi.

As expected, significant differences in yield ($P < 0.001$) were found between different varieties (Table 2). All varieties achieved excellent yields, the mean yield being 5.20t/ha. Scout and the two InterGrain lines (IGW 3073 and IGW 3119) topped the varieties, yielding 5.85, 5.92 and 5.85t/ha respectively. Catalina recorded the lowest yield of 4.66t/ha.

Grain protein (%) levels were low ($< 11\%$) which is typical of high yielding cereals unless late nitrogen is applied. Catalina, Axe, Gladius and H46 produced higher ($P < 0.001$) protein than Yitpi. Screenings for each variety were less than 5% (under the maximum receival standard for important grades) and subsequently had no bearing on grain quality. Differences in test weights occurred between all varieties, despite each being above the minimum test weight standard of 74kg per hectalitre. Correll achieved the same test weight as Yitpi. However, both varieties were on the lower end compared with the other varieties (not significantly less than the site mean of 79). Young, Scout and IGW 3073 notably produced higher test weights. As the trial was harvested prior to the first harvest rainfall event, it was not necessary to complete falling numbers analysis.

Table 2. 2010 Yield and quality results from the Culgoa site.

Variety	Yield (t/ha)	Yield (% Yitpi)	Protein (%)	Test Weight
Yitpi	5.01	100	9.8	77
Correll	4.97	99	9.6	77
Catalina	4.66	93	10.5	79
Espada	5.23	104	10.3	77
Derrimut	5.25	105	9.6	79
Young	5.22	104	10.1	83
Axe	4.76	95	11.6	79
CLF_STL	4.76	95	9.6	78
Gladius	4.88	97	10.5	76
Peake	5.09	102	10.0	79
Lincoln	4.83	96	9.8	79
Scout	5.86	117	9.7	82
Wyalkatchem	4.89	98	10.2	81
Mace	5.73	114	10.2	80
H46	4.77	95	11.2	78
Carinya	5.36	107	9.9	79
IGW 3119	5.86	117	9.3	81
IGW 3073	5.92	118	9.1	83
Magenta	5.74	115	9.6	81
Sig. Difference	P<0.001		P<0.001	P<0.001
LSD (P<0.05)	0.39	8%	0.6	3
C.v %	5.3%		4.5%	2.8%

Theoretical gross incomes were calculated based on the grain yield and grain quality. The price received was based on the standard pricing used throughout this publication. Table 3 shows the price received for each variety. With only slight differences in quality, the higher yielding varieties produced the greatest gross income. Axe achieved H2 standard but because it is an APW variety, could not be granted the H2 grade. Mace, Magenta, Scout and the two InterGrain lines produced the highest returns. Clearfield STL returned the lowest income of all the varieties.

Table 3: Gross income based on yield and grain quality of the varieties trialled. Varieties are sorted by highest to lowest gross income.

Variety	Classification	Price (\$/t)	Gross income (\$/ha)
Mace	ASW	257.00	1,531
Magenta	ASW	257.00	1,525
IGW 3073	ASW	257.00	1,521
Scout	ASW	257.00	1,507
IGW 3119	ASW	257.00	1,505
Espada	ASW	257.00	1,455
Carinya	ASW	257.00	1,431
H46	APW	297.50	1,418
Axe	APW	297.50	1,416
Young	ASW	257.00	1,388
Wyalkatchem	ASW	257.00	1,356
Peake	ASW	257.00	1,354
Gladius	APW	297.50	1,351
Derrimut	ASW	257.00	1,349
Yitpi	ASW	257.00	1,287
Lincoln	ASW	257.00	1,286
Correll	ASW	257.00	1,270
Catalina	APW	297.50	1,270
CLF_STL	ASW	257.00	1,222
Sig. Difference			P<0.001
LSD (P<0.05)			159
CV %			8.0

Interpretation

New varieties such as Scout (mid) and Mace (early) performed exceptionally well, with other varieties such as IGW 3119 and IGW 3073 also yielding very well. The conditions experienced this year favoured the longer season varieties such as Magenta. In drier years, these varieties are more likely to yield poorly.

Based on the relatively low protein measurements, all varieties achieved APW or ASW quality. Axe would have achieved H2 if its maximum classification had not been APW. There were no issues with test weight and screenings, although it is notable that Correll and Yitpi were at the lower end of test weights compared with other varieties. Seven varieties had higher test weights than Yitpi ($P<0.001$). However, test weight problems will typically occur after harvest rains. Because this trial was harvested prior to the rain, the results may not reflect commercial experiences in 2009 and 2010.

Although this trial was not affected by harvest rain, the majority of growers in the region will have to manage rain affected (sprouted grain) carefully in 2011. Below are some germination percentages of grain harvest after the rain (Table 4). Grain was visually sprouted in Axe, Correll and Gladius. Staining and mouldy grain was observed in Yitpi and Derrimut.

Table 4. Germination percentages, grain weight and adjusted sowing rates for rain affected wheat varieties.

Variety		After rainfall	
	1000 grain wt (g)	Germination (%)	Sowing rate (kg/ha)
Yitpi	36.5	96	57
Correll	42.2	79	80
Axe	41.9	82	77
Gladius	42.7	82	78
Derrimut	27.9	94	45

Target plant density = 150pl/m²

BCG will check germination of seed during March 2011. If you require your seed tested for germination, please contact the BCG office.

When choosing between varieties next year, it is important to consider the limitations of some of the current varieties. This trial managed inputs to maximise yield by controlling limiting factors such as nutrition and disease. Varieties differ in their response to these inputs: the gross income here may not truly reflect the profitability of a variety. For example, in a year similar to 2010, varieties such as Mace may require three fungicide applications, compared with Lincoln, which may need not even one.

Table 5 is a quick guide to the key limitations of certain varieties. Note: after the incidences of disease experienced this year, the disease ratings of all varieties are under review and are subject to change. Before sowing a variety in 2011, check the revised ratings to decide on the disease management required for that variety. AGT has released a new variety called Estoc (tested as RAC1412). It has all the characteristics of Yitpi, but better stem rust resistance (R-MR). It is classified as APW and yields similarly to Scout. Unfortunately, this variety was not available for inclusion in this trial, but is another option to consider if Scout is difficult to source.

The 2010 NVT results are presented in the Tables 6 (Mallee). To compare the yields found in this trial with the NVT yields locally, please refer to these tables. Remember to take into account that not all NVT sites were sprayed with fungicides.

Table 5. Characteristics of current wheat varieties.

Variety	Management issues
Yitpi	Yellow leaf spot (S-VS) and stem rust (S)
Correll	Test weight and sprouting (I)
Catalina	Stripe rust (MS)
Espada	APW classification, CCN (S) and sprouting (I-VI)
Derrimut	Stripe rust (MS)
Young	Screenings
Clearfield STL	Herbicide tolerance to Midas APW classification, CCN, stripe rust (S) & leaf rust (S)
Axe	APW classification, CCN, stem rust (S), sprouting (I-VI) and yellow leaf spot (S)
Gladius	CCN (MS) and sprouting (I-VI)
Peake	Yellow leaf spot (MS-S)
Lincoln	CCN (S) and yellow leaf spot (MS-S)
Scout	APW classification and yellow leaf spot
Wyalkatchem	APW classification, stem rust (MS) and stripe rust (MS-S)
Mace	Stripe rust (S-VS)
Magenta	APW classification and CCN (S)

Unfortunately, the Wimmera results (except Brim) were not available at the time this article was written and could not be included. Results are updated regularly, you are encouraged to check the NVT website (www.nvtonline.com.au).

So which variety should I grow?

Unfortunately, there is not yet a Yitpi replacement amongst the current varieties, making it difficult to change. Yitpi's main threat in 2011 will be stem rust. With seed germination of the newer varieties likely to be affected by harvest rains, many farmers will still need to sow a significant proportion to Yitpi (perhaps 30–40%). If you are growing Yitpi next year, be prepared for an extensive fungicide application program and see the articles on managing stem rust in this publication.

Frustration with Correll with test weight and sprouting has made it unlikely to be the variety of choice. Scout certainly looks like a good alternative, but its main limitation is its APW classification. The higher yields are likely to compensate for the difference.

If cereal cyst nematode (CCN) is not a concern (e.g. no CCN susceptible barley was included in the rotation and break crops were regularly grown) then Gladius, Lincoln, Axe, Espada and Magenta are also alternatives. Espada has yielded very well in BCG trials in 2009 and 2010. Mace is a Wyalkatchem replacement that has yielded very well in this trial; managing stripe rust will be its major limitation.

Acknowledgments

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Table 6: 2010 NVT yield data (Mallee) expressed as a percentage of Yitpi mean yield.

Variety	Birchip	Hopetoun	Manangatang	Ultima	Walpeup	Woomelang	Quambatook	Brim*
Sowing Date	27 May	11 May	14 May	17 May	7 May	13 May	18 May	13 May
Yitpi (t/ha)	4.08	4.53	3.12	3.09	3.21	3.93	3.98	3.39
Axe	98	77	94	96	79	104	107	102
Catalina	90	85	82	91	83	92	83	86
Clearfield STL	97	104	94	108	88	90	93	92
Correll	105	102	94	97	88	104	96	100
Derrimut	100	86	91	91	93	90	96	75
Estoc	101	103	101	96	103	104	98	100
Espada	91	113	100	99	86	106	95	100
Frame	91	108	92	95	95	91	88	92
Gladus	92	91	93	90	85	94	93	95
Lincoln	103	89	93	96	91	105	97	97
Magenta	103	108	93	99	98	105	103	94
Peake	92	89	87	94	90	102	94	87
Scout	118	101	101	103	104	112	101	101
Wyalkatchem	90	92	107	106	74	97	81	94
Young	96	82	77	98	86	89	90	96
Site Mean (t/ha)	4.14	4.32	3.04	3.17	2.90	4.04	3.90	3.26
CV (%)	3.4	5.7	5.3	5.12	5.8	6.1	3.7	3.7
LSD (%)	6	10	10	9	10	10	7	6

*Brim was the only Wimmera data available at the time this article was printed