

Choosing the right wheat variety for the system (part B)

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Key messages

Trojan and Harper may be long season wheat options to replace Yitpi.

Monitor for disease expression in a wheat on wheat system but choosing a high yielding variety adapted to your environment is still the most important consideration.

Recheck the leaf rust resistance of your variety because a new leaf rust pathotype was discovered last year. It is important to budget for fungicide application in rust prone areas.

Background

DAFWA agronomy trials and national variety trials (NVT) funded by GRDC are able to provide information to support growers with their decisions on variety choice and management for their farming system. A new method of analysis of the National Variety Trial database was outlined in the companion paper 'Choosing the right wheat variety for the system- Part A' by Zaicou-Kunesch, D'Antuono and Reeves, Crop Updates 2014. This paper, Part B, reports on the findings for DAFWA agronomy trials conducted in 2012 and 2013.

Aims

The aim is to support growers with variety selection and management in a continuous wheat environment and long season environments.

Method

Very early sowing systems - long season wheats

To investigate the effect of fungicide on the performance of wheat varieties sown early in May, two trials were conducted by Kevin Young, DAFWA. They were sown on 1st May at Gibson and 2nd May at Grass Patch in 2013 onto canola stubble. Fungicide treatments were nil and plus. At Gibson the 'plus' fungicide (0.5 L/ha Tilt® Xtra), was applied at 22nd July and 10th September. At Grass Patch the 'plus' fungicide treatments was a single application of Tilt® Xtra (0.5 L/ha) on 20th August (disease incidence at this site was low).

Continuous wheat environment

Four agronomy trials that were sown on wheat stubble investigated the interaction between nitrogen and fungicide application on wheat varieties. The trials were located in 2012 at Mingenew (Zaicou-Kunesch and Beard, 2013, MIG Trials Report 2012) and Corrigin (Amjad, Coutts and Thomas, 2013, Facey Group Crop Update Book 2013). Trials in 2013 were located at Binu (Zaicou-Kunesch, Beard and Reynolds 2014, DAFWA trials and demos Report 2014) and Cunderdin (Amjad and Thomas, 2014, Crop Updates 2014). Refer to the published papers for methodology.

Results and discussion

Very early sowing systems - long season wheats

If Yitpi is a benchmark variety for longer season environments because of its maturity and moderate susceptibility to frost damage, are there varieties which growers can consider as alternatives for very early sowing in the southern districts?

The trials on the south coast at Gibson and Grass Patch investigated the performance of longer maturing varieties and the value of fungicide on production as alternatives to Yitpi. At Grass patch, disease incidence was low and fungicide did not improve productivity of varieties significantly. At Gibson, *Staganospora nodorum* was the dominant leaf disease with *S.tritici* developing later in the season (pers comm. K Young). Estoc and Envoy were higher yielding than Yitpi but similar to Mace in the absence of fungicide. Necrosis on the top 3 leaves was reduced by between 20 and 57% (Figure 1). Disease control improved yields of all varieties (Figure 1) and improved Trojan's yield to make it the second highest ranked variety. On the south coast, monitoring and managing disease will be key management strategies for long season wheats.

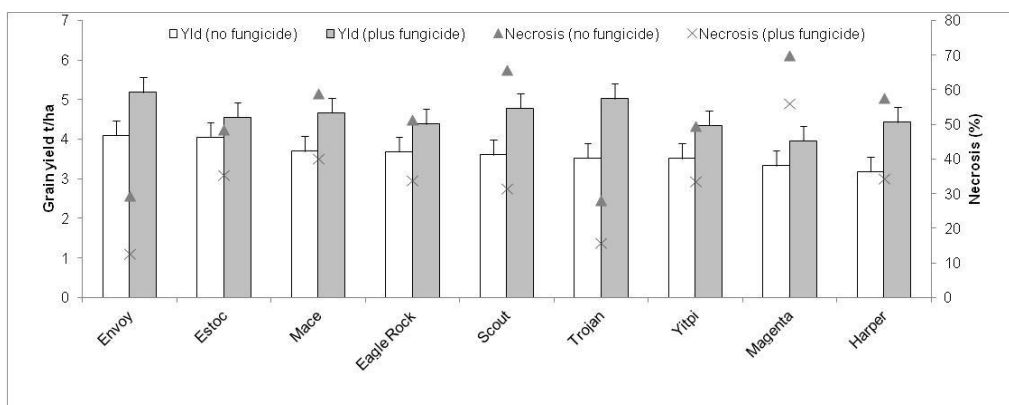


Figure 1 Effect of fungicide application on the grain yield (t/ha) and leaf necrosis (top 3 leaves) of varieties sown on the 24th April 2013 in Gibson (Source Young, DAFWA. LSD depicted by error bars)

Harper and Trojan are recently released varieties. The sprouting tolerance of Trojan and Harper is similar to Yitpi, however frost susceptibility is not known. Their development was similar or 5 days earlier than Yitpi in 2013 (Figure 2).

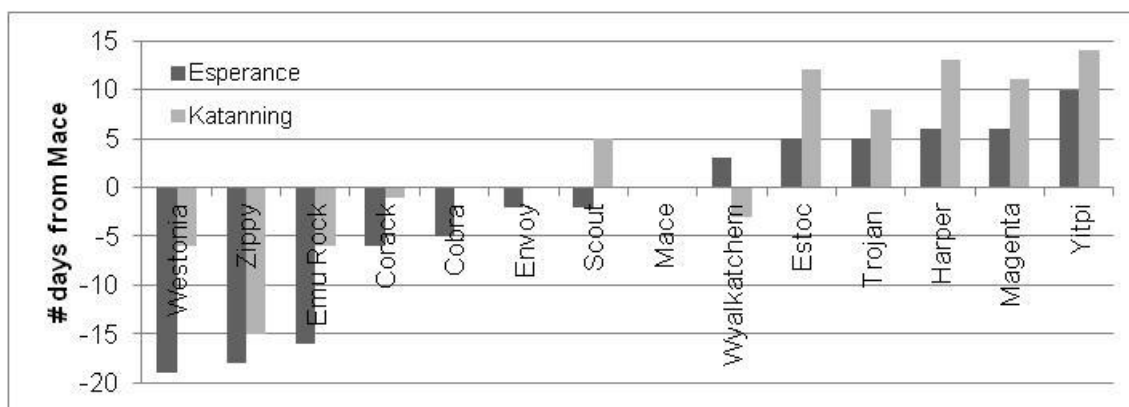


Figure 2 Days of flowering from Mace of varieties sown in DAFWA's phenology trials which were sown on 26th April at Katanning and Esperance in 2013. (Mace flowering date – 28th and 17th August at Katanning and Esperance respectively) (Source Shackley and Young, 2014).

A comparison of Trojan to Yitpi in the NVT's indicates Trojan has a yield advantage over Yitpi but not Mace (Figure 3). However, when compared to Mace, it was significantly lower yielding than Mace in 2012 but not in 2013. Harper has only been included in the 2013 NVT's. It did not perform better than Mace in Agzones 5 and 6, but yielded similar or better than Mace in Agzone 3.

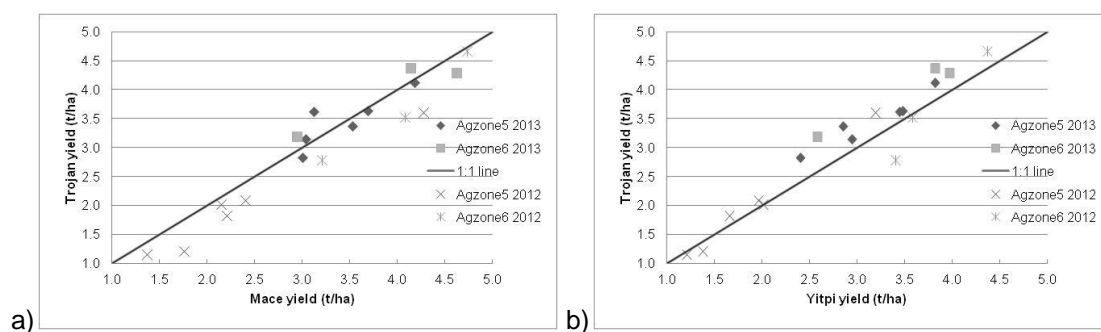


Figure 3 Grain yield (t/ha) of Trojan compared to a) Mace and b) Yitpi in NVT's in Agzones 5 and 6 in 2012 and 2013.

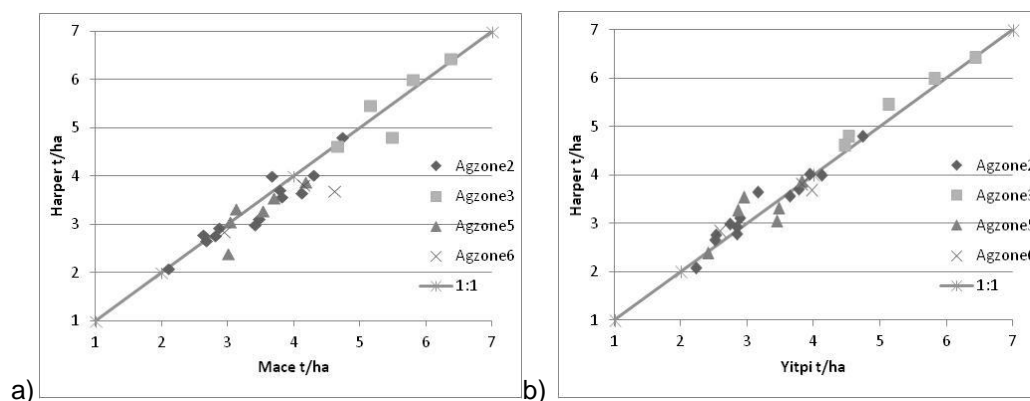


Figure 4 Grain yield (t/ha) of Harper compared to a) Mace and b) Yitpi in NVT's in Agzones 2,3,5 and 6 in 2013.

Disease assessments were undertaken on NVT's at Wongan Hills, Mt Madden and Hyden in 2013. Harper and Trojan had better disease ratings than Yitpi (Table 3). Trojan and Harper may be long season wheat options to replace Yitpi.

Table 3 Leaf disease ratings on wheat varieties, courtesy of NVT trials in 2013. (0 - no infection/necrosis, 9 - full infection/necrosis) (Source: Young and Zaicou-Kunesch, DAFWA).

	Wongan Hills	Mt Madden	Hyden	Hyden
Name	YLS/SN	YLS/SN	YLS	LR
Cobra	2.8	3.3	3.8	0.7
Corack	6.1	4.9	3.4	2.3
Envoy		7.2	6.0	0.0
Estoc		7.0	6.4	0.0
Harper	5.9	6.0	6.6	0.0
Mace	5.7	5.5	5.0	1.0
Magenta	2.0	2.6	2.4	0.0
Scout	7.4	7.5	8.2	0.0
Trojan	3.9	5.2	5.8	0.7
Wyalkatchem	5.2	4.5	4.4	1.9
Yitpi	6.2	7.3	9.0	2.3
mean	4.9	5.7	5.3	0.7
F pr	<0.001	<0.001	<0.001	<0.001
LSD(5%)	1.0	1.2	1.2	0.8

Where : YLS = yellow leaf spot and SN = S. nodorum; LR = leaf rust

Wheat on wheat – variety management

Wheat on wheat is an important rotation in the wheat belt. The analysis of the NVT database does not indicate any varietal differences in grain yield based on rotation however there are limited number of wheat NVT's sown on wheat. (Zaicou et al -part A. Crop Update 2014).

Leaf disease risk in a continuous wheat rotation is high for stubble borne diseases such as yellow spot and *Stagonospora nodorum* (Glume Blotch), but severity will be influenced by the environment. At Corrigin in 2012, yellow seeding was observed at the two leaf stage (10%) but the very dry conditions limited the spread of the disease throughout the rest of the season (Amjad et al 2013). At Mingenew in 2012 and Binu in 2013, despite the low rainfall during the growing season, fungicide application was profitable when leaf spot diseases were present (on average there was a 0.3 t/ha and 0.2 t/ha yield response across all varieties respectively). At Cunderdin in 2013, the dry early season conditions limited disease development prior to flag leaf emergence. Although fungicide applied at Z32/33 significantly reduced disease severity the subsequent yield response (0.35 t/ha across all varieties) was not statistically significant (Amjad and Thomas 2014). Fungicide application is more likely to reduce disease levels and result in yield increases in years when there is good spring rainfall that promotes disease.

The interaction between nitrogen and fungicide on disease incidence and yield has been investigated in the agronomy trials. The results indicate that sub-optimal levels of nitrogen nutrition resulted in small increases in disease severity and the primary benefit of optimal nitrogen is reflected in plant growth rather than disease management (Amjad and Thomas 2014; Zaicou-Kunesch, Beard and Reynolds 2014. Table 1). Adequate nitrogen is not an alternative to fungicide but an additional measure to make plants less vulnerable to disease.

In both 2012 and 2013, the season influenced the profitability of additional nitrogen and fungicide application in the wheat on wheat system in the northern and central agricultural regions. Mace was consistently the highest yielding variety at each trial. Choosing high yielding varieties adapted to the environment, ensuring optimal crop nutrition, and monitoring and managing disease, continue to be important management strategies for the wheat on wheat system.

Table 1 Percentage leaf area diseased (LAD) of 4 varieties with nitrogen and fungicide treatments sown at Binu in 2013. Figures are average disease on top three leaves at Z71 (early grain development). Disease was a mixture of SNB and YS.

Variety	Nil Fungicide				Plus Fungicide			
	N0	N30	N60	N90	N0	N30	N50	N90
Cobra	28	27	23	21	15	13	11	14
Corack	29	34	26	33	18	18	14	13
Mace	28	28	26	21	16	18	13	14
Wyalkatchem	28	30	22	19	15	10	11	11
Source: Zaicou-Kunesch, Beard and Reynolds 2014.							LSD(5%)	5.59

New leaf rust pathotype – what does it mean?

The finding of a new leaf rust pathotype in WA (the first occurrence of virulence for the resistance genes Lr13, Lr17a, Lr17b, and Lr26) will reduce the resistance rating of some wheat varieties such as Mace, Corack, Emu Rock, King Rock and Wyalkatchem. Refer to the Wheat Variety Guide for WA, 2014 (available on line).

Growers in rust prone areas should be prepared for the chance that Mace (and other varieties) may respond as an MS type and budget for a fungicide spray after flag leaf emergence. If spraying is likely to be carried out for the control of yellow spot or *S. nodorum* (Glume Blotch) then that spray is also likely to help control the leaf rust.

Conclusion

Growers on the south coast capitalise on early sowing options through adoption of Yitpi because of its longer maturity and reduced risk of low falling number following pre-harvest rain. Trojan and Harper may be long season wheat options to replace Yitpi. They have a similar falling number risk as Yitpi, similar maturity or 5 days earlier, depending on the environment, and yield better than Yitpi.

The environment has a huge role in disease expression in the wheat on wheat system and fungicide application can be effective in improving grain yield. However in the wheat on wheat system, choosing high yielding varieties adapted to the environment, ensuring optimal crop nutrition, and monitoring and managing disease continue to be important management strategies. In rust prone areas budget for the application of fungicide, particularly since the discovery of a new leaf rust pathotype which will affect the disease resistance ratings of some wheat varieties.

Key words

National Variety trials, agronomy, wheat, varieties

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