Getting the most out of our long season wheat varieties

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Key messages

- Magenta and Trojan are competitive with Mace when sown early to mid May, taking advantage of good conditions for grain filling.
- Although Magenta and Trojan are at less risk from frost than Mace when sown mid May, they are still at some risk when sown earlier. There is a need for a higher yielding, longer season variety to take advantage of early sowing opportunities.
- Monitoring and managing disease is an important management strategy, especially when the leaf disease pressure is high.

Aims

To determine the yield and profitability of long season wheats with an early sowing opportunity and how management with fungicides and plant growth regulators may influence yield response.

Method

A series of five trials were located at Merredin, Eneabba, Kojonup, Katanning and Esperance in 2014. The trials examined 12 to 24 wheat varieties including Magenta, Trojan, Harper, Yitpi, Calingiri and a number of potential mid to long season varieties in comparison to Mace and other competing mid to short season varieties. Details of the disease management treatments and trial details are outlined in Table 1.

Table 1: Details of foliar fungicide, in-furrow fertiliser dressing (IFFD) and plant growth regulator (PGR) treatments, sowing time, previous crop, issues and variety number tested for five trials conducted in Western Australia in 2014.

	Merredin	Eneabba	Kojonup	Katanning	Esperance
Foliar fungicide: Prosaro® or Tilt®	-	150mL/ha at Zadok 31 and 41	300mL/ha at Zadok 31 and 41	300mL/ha at Zadok 31 and 41	500mL/ha of Tilt® at Zadok 31 and 41
IFFD: Uniform®	-	400mL/ha onto fertiliser	400mL/ha onto fertiliser		
PGR: Moddus® Evo	-			400mL/ha at Zadok 31 to 32	400mL/ha at Zadok 31 to 32
Sowing time	May 1	May 6	May 15	May 9	May 31
Previous crop	wheat	wheat	canola	canola	canola
Varieties tested	24	18	12	18	18
Issues	Crown rot	Leaf disease	None	Weeds	Late sown
GSR (April – Oct)	240mm	416mm	521mm	392mm	311mm

Note: Moddus Evo is currently not registered for cereal application.

Eneabba was sown into wheat stubble to encourage leaf diseases and Kojonup was sown into canola stubble where Rhizotonia had been detected by PreDicta B test in the previous season. The IFFD is the new in-furrow fungicide, Uniform®, which is registered for control of Rhizotonia. Both Katanning and Esperance were sown into canola stubble with at least a two years break from wheat, unfortunately a shorter break between wheat crops was not available.

Results

Overall yield

Previous results from the wheat agronomy project have shown that the mid to long season varieties are competitive with Mace or Wyalkatchem when sown early to mid May (Zaicou-Kunesch *et al.* 2014). Although the trials in 2014 focused on one sowing time the results again highlight that mid to long season varieties can be competitive with Mace when sown early May (Table 2).

Average grain yields ranged from almost 4 t/ha at Esperance to only 1.5 t/ha at Merredin. All five trials showed a significant response between varieties with Magenta and Trojan yielding the highest or among the top yielding varieties at sites which were sown early May and had no leaf disease issues (Table 1). Zen, a new replacement for Calingiri also yielded well at Eneabba and Katanning. Trials which included both Calingiri and Zen showed the varieties to perform similarly, however long term NVT data suggests Zen out yields Calingiri by at least 4%. Due to the late start of the season at Esperance sowing was delayed until the end of May hence favouring the mid to short maturing varieties Mace and Scout.

Merredin

The Merredin trial was unfortunately affected by crown rot so the yield performance of a variety was affected by its resistance and/or if a variety has avoided the impact of crown rot by maturing earlier in the season. Estoc, which has a rating of MSS for Crown Rot, was the highest yielding variety at this site. Magenta and Trojan also have a rating of MSS while Mace is rated S. The yield of each of these three varieties was not significantly different to Estoc (Table 1) when sown in early May. Mace's response in the presence of Crown Rot may be due to its maturity limiting the moisture stress exposure compared to other varieties. Crown Rot resistant ratings for wheat varieties are available in the Wheat variety guide for WA, 2015. Generally Estoc yields only slightly higher than Yitpi, but at Merredin in 2013 and 2014 Estoc has been one of the highest yielding varieties when sown early May.

Eneabba and Kojonup

Eneabba experienced a high level of leaf disease early (a mixture of yellow spot and septoria (stagonospora) nodorum blotch) but dry conditions limited the progress of disease . With a relatively dry August (rainfall decile 2 to 3) the average response to two applications of fungicide was still nearly 0.8 t/ha. There was also an interaction between the treatments and variety as varieties such as Mace and Zen were able to maintain high yields with the absence of fungicide hence did not respond to fungicide while Trojan, Magenta, Yitpi and Cobra had a significant yield response with the application (please refer to DAFWA website for results of 14CH31). A yield increase of nearly 1 t/ha with the application of foliar fungicide was also achieved in 2013 at Esperance. Again Magenta and Trojan had lower yields with no fungicide treatment while Mace had relatively higher yields in comparison. Trojan however was able to obtain higher yields with fungicide at Esperance in 2013 (Zaicou-Kunesch 2014).

Although Rhizotonia had been previously detected at Kojonup, sampling throughout the year only detected very low levels. Leaf disease was also low with an average of 30% on the top three leaves at early grain fill or an average difference between nil and plus fungicide of 9% (average leaf disease of 30 and 21% for the nil and plus treatments respectively). As a result there was no significant response to the IFFD or fungicide treatment. Trojan and Magenta achieved the highest yields at this site while Mace was the lowest yielding.

Table 2: Average grain yield (t/ha) of selected wheat varieties across all treatments, except Eneabba, from the mid to long season wheat trials in 2014. *Eneabba is the average grain yield of fungicide treatments.

Variety	Maturity	Location Merredin	Location Eneabba*	Location Kojonup	Location Katanning	Location Esperance
Mace	Short - Mid	1.61	3.39	3.13	3.11	**4.35**
Cobra	Short - Mid	1.25	3.32	3.75	3.38	3.91
Scout	Mid			3.81	**3.59**	4.22
Calingiri	Mid - Long	1.10		3.59	3.44	
Estoc	Mid - Long	**1.83**	2.33	3.75	3.16	3.99
Harper	Mid - Long	1.58	2.22	3.50	3.27	3.90
Magenta	Mid - Long	1.72	2.81	4.01	**3.54**	3.81
Trojan	Mid - Long	1.47	2.72	**4.07**	**3.52**	3.77
Yitpi	Mid - Long	1.36	2.40	3.72	3.04	3.82
Zen (IGW6046)	Mid - Long	1.12	3.61		3.49	4.14
Average		1.45	2.35	3.77	3.35	3.90
lsd		0.36	0.54	0.20	0.40	0.14
CV (%)		16.0	11.6	6.7	15.0	4.5

Bold = highest yielding and underlined = not significantly different from highest yielding variety

Katanning and Esperance

Leaf disease levels were also low at Katanning and Esperance so there was no significant response to the fungicide treatment or a response to the PGR. Although Esperance was sown late, there is a significant interaction indicating

that some varieties have responded to the PGR and/or fungicide. Plant growth regulators (PGRs) were investigated to determine if yields could be improved by increasing the harvest index when crops are sown early. Harvest Index wasn't measured in the trials but crop height was significantly reduced by an average of 10% with the application of the PGR at Katanning. Note the conditions were not conducive to lodging at either site. PGRs may also delay flowering however there was only an average delay in flowering of 2 days with the application at both sites.

Date of Flowering

No frost events occurred in 2014 which can have a dramatic influence on the yield performance of varieties. Figure 1 shows the date of flowering (50%) for a range of varieties grown in WA at four sowing dates of April 24, May 13, May 30 and June 20 at Northam in 2014. The mid to long season varieties (Magenta, Trojan and Yitpi) are exposed to less frost risk than the shorter maturing varieties such as Mace when sown mid May (indicated by the shaded area representing the estimated flowering window).

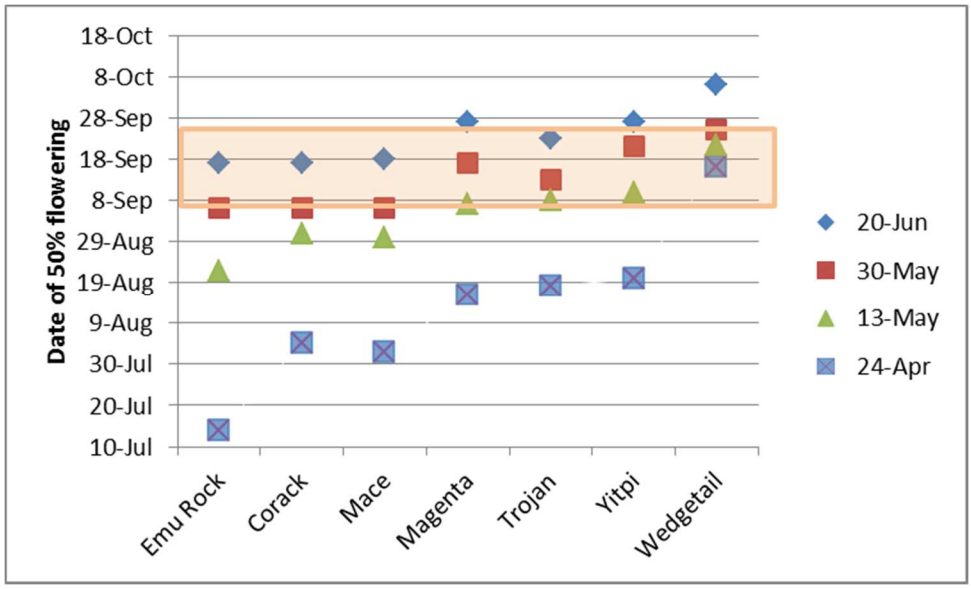

Figure 1: The influence of sowing date on the date of flowering (50%) for selected varieties at Northam in 2014. The shaded area represents the estimated flowering window for the region. Note the probability of a damaging frost is at least 1 in 3 years for the first half of the estimated "window".

Conclusion

Although Mace dominated (60%) area sown to wheat in WA in 2014, Calingiri, Yitpi and Magenta were ranked in the top five. These mid to long season varieties make up 20% of the area sown in 2014, indicating a need for longer maturity types to avoid the risk of frost, to take advantage of longer seasons, and with good sprouting tolerance. Magenta and Trojan are currently the most competitive varieties when sown early to mid May in WA. A major disadvantage of Magenta is its poor sprouting tolerance, however Trojan has moderately good sprouting tolerance (Wheat Variety Guide 2015). Although agronomy data on the newly released Zen is limited, long term data from NVT suggests that Zen is a competitive noodle replacement for Calingiri. It should be noted that although these varieties are at less risk to frost exposure than Mace when sown early May (Figure 1), they are still at risk. There is still a requirement for a longer season variety to fill this niche.

There is limited data on the performance of contemporary mid to long season varieties sown early May in the Merredin area. But there is a need to take advantage of early sowing opportunities without increasing the risk of frost or exposure to terminal drought or high temperatures during grain fill. Wheat agronomy and NVT trials have shown Magenta to be competitive with Mace when sown early May. Trojan's performance in this region is uncertain, the variety tends to perform better under high yielding conditions. Estoc sown early May has performed well on the heavy loam at Merredin over the last two years in the wheat agronomy trials. There is no NVT data available for Estoc over this time frame but Yitpi was competitive with Mace in the favourable season of 2012.

Early sown wheat crops can also be more exposed to leaf diseases such as yellow spot and septoria (stagonospora) nodorum blotch. Results in 2013 and 2014 have shown massive responses to the application of fungicide (0.8 and 1 t/ha) when exposed to an intense rotation (wheat on wheat at Eneabba or wheat/canola/wheat at Esperance). Although Magenta and Trojan are considered medium to low risk for septoria (stagonospora) nodorum and yellow spot, it was not reflected in their yield performance at Eneabba (Table 2) or Esperance in 2013. Similar observations

for Trojan have been observed elsewhere (M Peipi *pers comm*.). Monitoring and managing disease is an important management priority, especially when the leaf disease pressure is high.

If the growing conditions or variety are not conducive to lodging then the use of a PGR will have no benefit (L Forsyth *pers comm*.). Growing conditions at Katanning and Esperance were not conducive to lodging in 2014. Investigation of the benefits of PGRs, particularly to delay flowering is being conducted by the Frost Project funded by GRDC and DAFWA (contact B Biddulph).

Key words

Wheat, early May sowing, varieties, flowering, fungicide

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