

Fungicide effects on wheat at Conmurra

Charlton Jeisman, SARDI Struan, Ph: 8762 9132, email: charlton.jeisman@sa.gov.au

Key Outcomes

- Mace and Scout both yielded higher when fungicide was applied
- Triad is a cheap fungicide and can be effective, but needs to be used strategically and at rates of at least 2 L/ha
- Management and attention to monitoring wheat crops must match variety grown to achieve yield potential
- Regular crop inspections are essential to maximize yield potential
- All fungicides work best when used as a preventative spray than as a cure

Trial Objectives: To investigate the effect of fungicide and timing of application on controlling stripe rust infection in wheat

Trial Duration: 2012

Location: Conmurra **Farmer Cooperator:** Lachie Seears

Soil Type: Black clay over limestone

Monthly Rainfall:

Rain	Jan	Feb	Mar	April	May	June	July	Aug	Sept	Oct	Nov	Dec	April-Oct	Total
Conmurra (NRM)	9	7	34	39	51	151	71	121	42	39	29	11	514	604

Paddock History: faba beans (2011)

Plot Size: 1.6m x 10m (8 rows x 15cm spacings)

Replicates: 3

Trial Details

Table 1: Management operations of Conmurra wheat fungicide trial in 2012

Trial	Fungicide x Timing	Date applied
Sowing date	8-Jun	
Harvest date	31-Dec	
Seeding rate	75 kg/ha	
Sowing fertiliser rate	18:13:0:10 @ 140 kg/ha	15 August (40 units N)
Fungicide	9 treatments sprayed at	GS31 20 August
	GS31 and/or GS39	GS39 9 October

Flutriafol was not used on fertiliser at seeding for any treatments in this trial.

Table 2: Fungicide products, rates and active constituents used in the wheat fungicide trial at Conmurra 2012

No.	Fungicide	Active
1	Nil	-
2	Triad @ 1 L/ha Triad @ 1 L/ha	triadimefon
3	Opus @ 500 mL/ha	epoxiconazole
4	Triad @ 2 L/ha Triad @ 2 L/ha	triadimefon
5	Prosaro @ 300 mL/ha	prothioconazole + tebuconazole
6	Amistar Xtra @ 800 mL/ha	azoxystrobin + cyproconazole
7	Triad @ 1 L/ha Prosaro @ 150 mL/ha	triadimefon, prothioconazole + tebuconazole
8	Triad @ 1 L/ha	triadimefon
9	Folicur @ 290 mL/ha	tebuconazole

Trial Results

Fungicide x Variety

A significant fungicide treatment by variety interaction occurred for grain yield. Mace yield was highest with Opus applied at Zadok's growth stage 39 (GS39) (116% of site mean), while Scout yielded highest when two applications of 2 L/ha Triad were applied at two different growth stages (figure 1) (122% of site mean).

Later applications of fungicide at GS39, compared with GS31, caused a reduction in Scout yield and an even greater reduction for Mace. Grain yield was severely compromised when no fungicide was applied, with Scout yielding 93% of the site mean, while Mace only achieved 49% of the site mean (figure 1).

Mace suffered a yield penalty when 1 L/ha Triad was used at GS31, regardless of whether a follow up fungicide was applied or not (treatments 7 and 8), although when followed up with a second application yield was slightly higher (treatment 2). This suggests Triad is required in higher doses to 'hold' the crop in order to maintain yield potential.

Prosaro was applied at GS39 in treatments 5 and 7; however in treatment 7 the rate of Prosaro was halved as it also received Triad at GS31. The effect on grain yield of Mace was marked compared with Scout, highlighting the susceptibility of Mace to stripe rust.

Grain Quality

A significant fungicide treatment by variety interaction occurred for grain protein, and likewise for test weight (table 3). Mace treatments 7, 8 and 9 recorded lower yields and protein, although test weights were around average for the trial. Scout recorded minimal differences in test weight between treatments; however there was a considerable difference between varieties where Mace test weights were generally 5 kg/hL lower than Scout.

An increase in Mace test weight was observed when Opus and Amistar Xtra were applied (treatments 3 and 6 respectively). Nil fungicide substantially reduced Mace test weight.

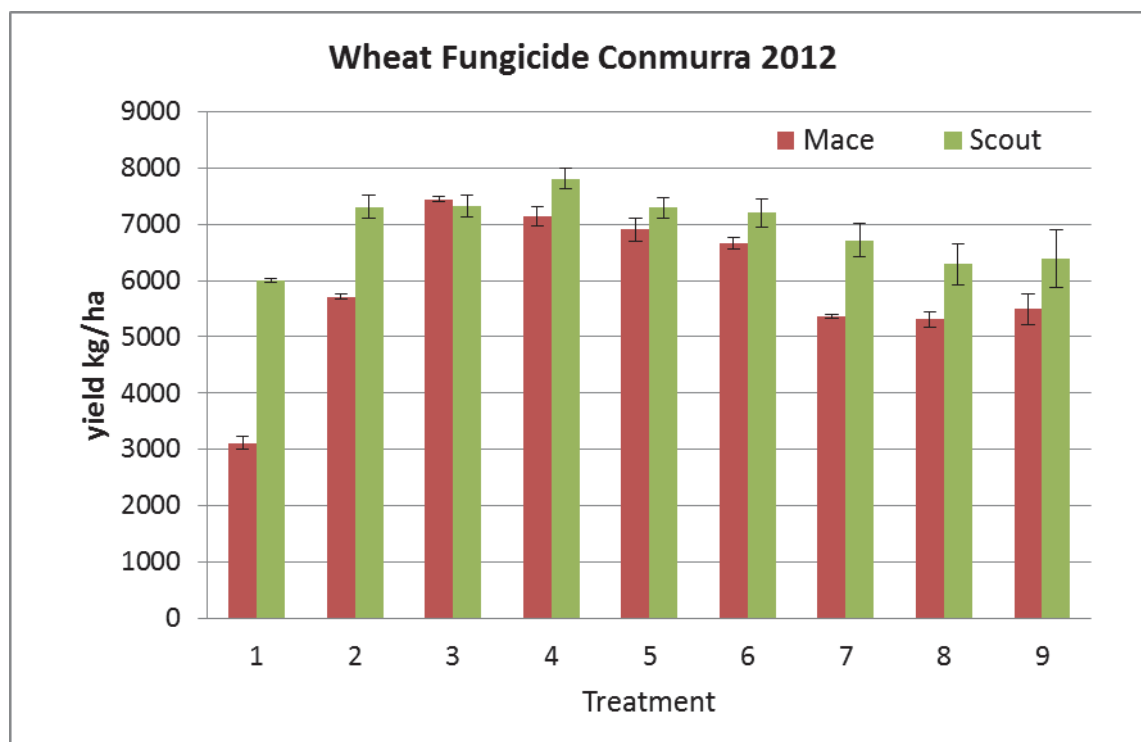


Figure 1: Grain yield of Mace and Scout wheat when treated with nine different fungicide treatments at Conmurra, 2012. In most cases Scout wheat outperformed Mace. Refer to Table 3 for full list of treatments applied and their timings.

Table 3: Grain quality results for wheat fungicide trial at Conmurra 2012, showing differences between Mace and Scout

No.	Fungicide Treatment	Timing	Mace		Scout	
			Test Weight kg/hL	Protein %	Test Weight kg/hL	Protein %
1	Nil	-	77.0	11.6	83.5	11.4
2	Triad @ 1 L/ha	GS31	79.3	11.8	85.0	11.3
	Triad @ 1 L/ha	GS39				
3	Opus @ 500 mL/ha	GS39	82.5	11.7	85.8	11.1
4	Triad @ 2 L/ha	GS31	81.4	11.9	85.6	11.7
	Triad @ 2 L/ha	GS39				
5	Prosaro @ 300 mL/ha	GS39	80.5	11.9	85.3	11.9
6	Amistar Xtra @ 800 mL/ha	GS39	82.1	11.5	85.3	11.7
7	Triad @ 1 L/ha	Triad @ GS31	80.4	11.1	85.1	11.6
	Prosaro @ 150 mL/ha	Prosaro @ GS39				
8	Triad @ 1 L/ha	GS39	80.8	11.4	85.4	11.4
9	Folicur @ 290 mL/ha	GS39	81.9	11.1	85.5	11.2
		LSD (0.05)	0.97	0.38	0.97	0.38

Comments

Wheat yield increased when fungicides were used to control stripe rust, particularly for Mace. Mace is rated S-VS for stripe rust whereas Scout is rated as MS. Therefore most fungicide treatments applied in time to protect the flag leaf are likely to assist Mace yield. While Scout is MS for stripe rust, it is not as sensitive as Mace.

The impact of timely fungicide use in Mace was evident by analysing grain quality, particularly with the low test weight recorded when no fungicide was applied. This suggests that although Triad assisted to maintain yield somewhat, Opus and Amistar Xtra were more superior in maintaining Mace test weight, and ultimately grain yield (Opus).

Fungicide treatments that were applied at GS39 took place in early October and were possibly too late to provide maximum protection of the flag leaf. Stripe rust was already present at the site in 'hot spots' and possibly reduced some yield potential. GS39 is when the flag leaf of the crop is fully emerged.

Triad still has a role in the farming system and remains an effective fungicide, but must be used at the correct rates and timings. This trial shows how two applications of 2 L/ha (GS31 and GS39) maintained yield potential for both Mace and Scout; however at lower rates yield was compromised. Triad has been on the market for a long time and is a low cost fungicide option; however its disadvantage is the amount of product required to provide a similar level of crop protection compared with other options.

Prosaro provided much better protection to Scout and Mace wheat when applied at a rate of 300 mL/ha compared with 150 mL/ha. The susceptibility of Mace to stripe rust was highlighted in this situation and demonstrated the importance of timely crop inspections by growers.

Conclusion and into the paddock

Selection of a suitable fungicide to protect crops from stripe rust remain the responsibility of the grower, however it is important to remember fungicides differ in their active constituents and modes of action. This means that although they might respond differently in a paddock situation, they can still provide a similar level of crop protection.

The significant yield penalty between applying fungicide and not shows the importance of timely and proactive fungicide use on wheat when the stripe rust pathogen is present in the district. Farmers must remain vigilant and focus on protecting their crop to maximise yield potential.

Acknowledgements

Trials were conducted by the SARDI New Variety Agronomy group at Struan.

Funding Body

This work was funded by the GRDC Water Use Efficiency Initiative

