

Stripe rust trials – Southern NSW 2010

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Key Points

- High yields and mild spring conditions in 2010 helped to demonstrate the value of fungicide management for stripe rust in wheat.
- Stripe rust was more severe in the first sowing time in the Flag and Flag-1 leaves.
- There were few differences observed between the seed and fertiliser fungicide treatments used.
- Higher levels of infection were detected in the MS variety than the MR-MS varieties or the MR variety.

Trial aim

To compare the effect stripe rust has on yield at 2 different sowing times in Southern NSW and 8 fungicide treatments on six wheat varieties with different stripe rust resistance levels.

Treatments

Sites

Three sites representative of the southern NSW winter cropping region were selected – Wagga Wagga, Temora and Cowra.

Varieties

Six varieties with a range of stripe rust resistance were used. Only three are discussed in this publication:

- Lincoln (MR)
- EGA_Wedgetail (MR-MS)
- Ventura (MS)

These varieties were selected to be locally relevant and form part of a wider national project to develop a better understanding of 'adult plant resistance' expression in the paddock.

Sowing date

There were two sowing times at each site:

- Cowra – TOS1 29 April; TOS2 3 June
- Temora – TOS1 30 April; TOS2 7 June
- Wagga – TOS1 7 May; TOS2 24 June

Treatments

There were 8 different fungicide treatments plus a untreated control used in this trial (shown in Table 1). Fungicide was applied to the seed or fertiliser at sowing or as a foliar spray applied at growth stage 39.

Trial results

Disease severity

Disease severity was monitored during the season as a percentage of leaf area loss caused by stripe rust. This was assessed on two parts – upper canopy, the flag and flag-1 leaves; and the lower canopy, leaves below the flag-1.

Disease development across the three sites was reasonably uniform in 2010. The appearance of stripe rust at each of the sites varied however the pattern of disease severity within the trials was consistent. Stripe rust was first detected in the susceptible buffer plots in mid July at all site and progressed into the yield plots during August.

Stripe rust was more severe on varieties with lower resistance levels. Lincoln (an MR variety) had a low severity of disease in both sowing times in all treatments. As a result, there was no effect of treatment on the severity of disease for Lincoln (Figure 1 and Table 2).

By comparison, EGA_Wedgetail (rated MR-MS) had moderate levels of disease, especially in TOS1 (Table 2). While Ventura (rated MS) had high levels of disease, especially in TOS1 (Table 2). The incidence of stripe rust in Ventura was highest in the nil (untreated control), seed only and fertiliser only treatments. The nil treatment had 70% and 60% leaf area loss in TOS1 and TOS2 respectively.

Yield

The pattern of yield loss mirrored the severity of disease.

The average yield across the three sites was 5.56 t/ha. TOS1 averaged 5.59 t/ha while TOS2 averaged 5.52 t/ha.

The nil Lincoln treatment yielded 6.35 t/ha in TOS1 and 5.67 t/ha in TOS2 (Table 2). In TOS1 there were not significant differences in yield between the treatments. In TOS2, treatments 3, 4, 5, and 7 yielded significantly more than the nil treatment. However these yield increases do not appear to be due to the presence of stripe rust as there was no significant difference between stripe severity across all treatments for Lincoln.

The nil EGA_Wedgetail treatment yielded 5.55 t/ha in TOS1 and 4.91 t/ha in TOS2. In TOS1, all treatments except 2, 4 and 6 (Table 2) yielded significantly more than the nil treatment. In TOS2, all treatments except 6 and 8 yielded significantly more than the nil treatment.

The nil Ventura treatment yielded 2.85 t/ha in TOS1 and 3.59 t/ha in TOS2. All treatments except treatment 4 (seed only) in TOS1 yielded significantly more than the nil treatment.

Discussion

Overall, stripe rust was more severe in TOS1 than in TOS2. In TOS1, stripe rust was more severe on the flag and flag-1 leaves than the lower leaves. Because TOS2 developed stripe rust at an earlier growth stage, more stripe rust developed in the lower canopy.

The impact of stripe rust on yield was higher in TOS1 than TOS2. This was especially evident in EGA-Wedgetail in TOS2. Where only treatments 6, 8 and 9 (Table 2) yielded significantly less than the full control treatment.

There was little difference in effectiveness of the three up front fungicides used in these trials when used in isolation (Treatments 2, 4 and 6). This was also true when the up front treatments were followed by a foliar fungicide at GS39 (Treatments 3, 5, and 7). The only significant difference occurred in Ventura TOS2 where treatment 3 had a higher yield of 6.02 t/ha than treatments 5 and 7.

The 2010 season with high yields and high disease pressure showed the benefits of extending the duration of green leaves in the canopy. In a year with less available moisture in spring it may be expected that lower responses to fungicides would occur.

The trials reported here are part of a three year program. Trials in 2011 and 2012 will help build a better understanding of stripe rust management through integrating host resistance and fungicide.

Acknowledgement

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File reference: WYRMETSNSW10.doc

Table 1: Treatments used in the trial.

	Name	Seed	Fertiliser	Foliar	Rates
1	Fert + foliars	Nil	Flutriafol	Multiple	Flutriafol (400ml/ha) + regular foliar sprays (Propiconazole 500ml)
2	Fertiliser (Fl)	Nil	Flutriafol	Nil	Flutriafol (400ml/ha)
3	Fert (Fl) + 1 foliar	Nil	Flutriafol	1 @ GS39	Flutriafol (400ml/ha) + 1 foliar sprays (Propiconazole 500ml)
4	Seed only	Fluquinconazole	Nil	Nil	Fluquinconazole (450ml/ha)
5	Seed + 1 foliar	Fluquinconazole	Nil	1 @ GS39	Fluquinconazole (450ml/ha) + 1 foliar sprays (Propiconazole 500ml)
6	Fertiliser (Tr)	Nil	Triadimefon	Nil	Triadimefon (200g/ha)
7	Fert (Tr) + 1 foliar	Nil	Triadimefon	1 @ GS39	Triadimefon (200g/ha) + 1 foliar sprays (Propiconazole 500ml)
8	1 foliar	Nil	Nil	1 @ GS39	1 foliar sprays (Propiconazole 500ml)
9	Control	Nil	Nil	Nil	Nil

Table 2: Yield (t/ha) (LSD = 0.52) and stripe rust severity on the Flag and Flag-1 leaves (%) (LSD = 5) for the three sites in 2010.

Variety	Treatment	Yield (t/ha)		Stripe rust severity (% leaf area loss) on the Flag and Flag-1	
		TOS1	TOS2	TOS1	TOS2
LINCOLN (MR)	1 Flutriafol fert.+ foliars	6.41	5.90	5	3
	2 Flutriafol fert.	6.50	5.28	5	3
	3 Flutriafol fert. + 1 foliar	6.21	6.28	4	3
	4 Fluq. Seed	6.50	6.20	5	3
	5 Fluq. seed + 1 foliar	6.30	6.23	5	3
	6 Triad. Fert.	6.33	5.77	5	4
	7 Triad. Fert. + 1 foliar	6.62	6.35	6	3
	8 1 foliar - GS39	6.16	6.05	5	4
	9 Nil - Control	6.35	5.67	6	4
EGA_WEDGETAIL (MR-MS)	1 Flutriafol fert.+ foliars	7.34	5.92	4	3
	2 Flutriafol fert.	5.93	5.46	15	7
	3 Flutriafol fert. + 1 foliar	6.52	5.83	12	5
	4 Fluq. Seed	5.48	5.57	26	7
	5 Fluq. seed + 1 foliar	6.50	5.54	13	5
	6 Triad. Fert.	5.78	5.06	19	8
	7 Triad. Fert. + 1 foliar	6.76	5.58	11	7
	8 1 foliar - GS39	6.09	5.19	15	6
	9 Nil - Control	5.55	4.91	23	12
VENTURA (MS)	1 Flutriafol fert.+ foliars	6.19	6.04	4	6
	2 Flutriafol fert.	3.61	4.56	59	34
	3 Flutriafol fert. + 1 foliar	4.67	6.02	15	6
	4 Fluq. Seed	3.08	4.47	54	27
	5 Fluq. seed + 1 foliar	4.46	5.38	15	8
	6 Triad. Fert.	3.57	4.11	58	33
	7 Triad. Fert. + 1 foliar	4.52	5.34	17	10
	8 1 foliar - GS39	4.65	5.06	24	19
	9 Nil - Control	2.85	3.59	70	60

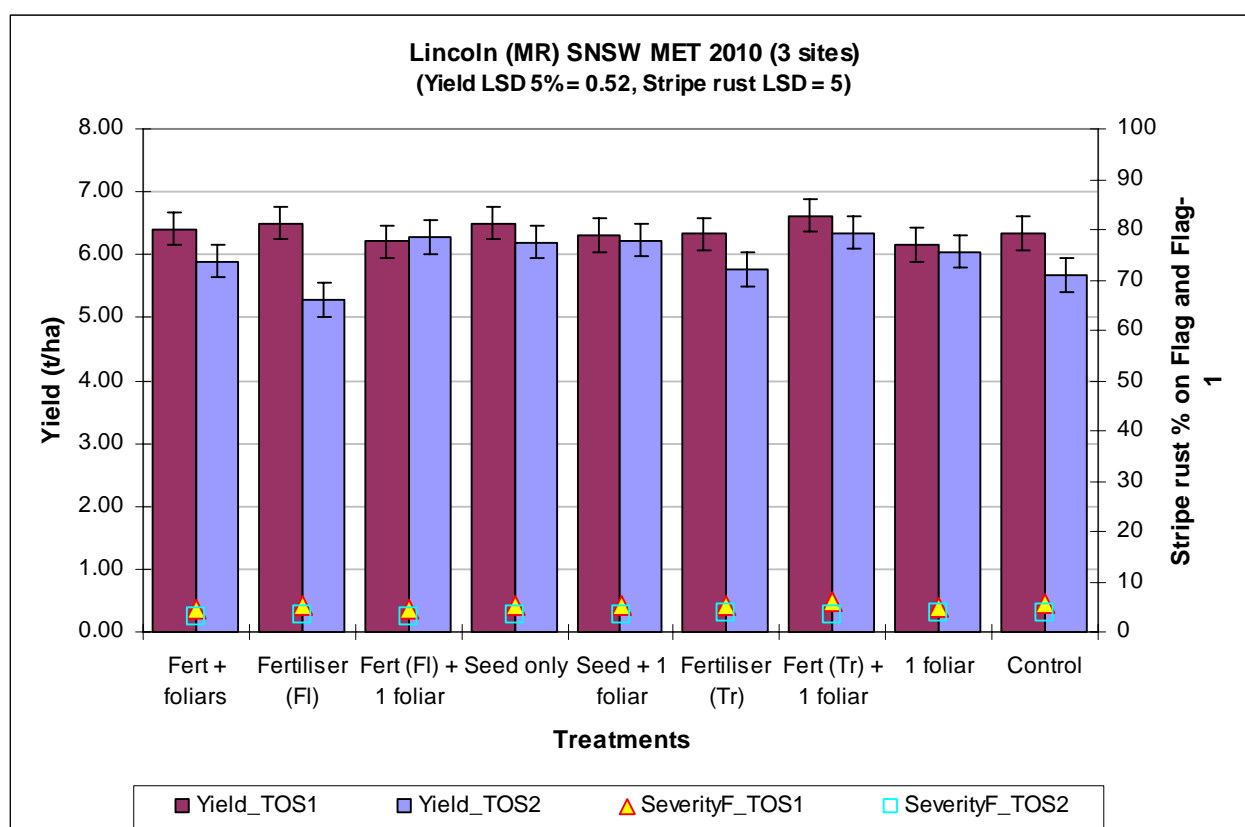


Figure 1: Comparison of grain yield (t/ha) in the presence of stripe rust in the variety Lincoln.

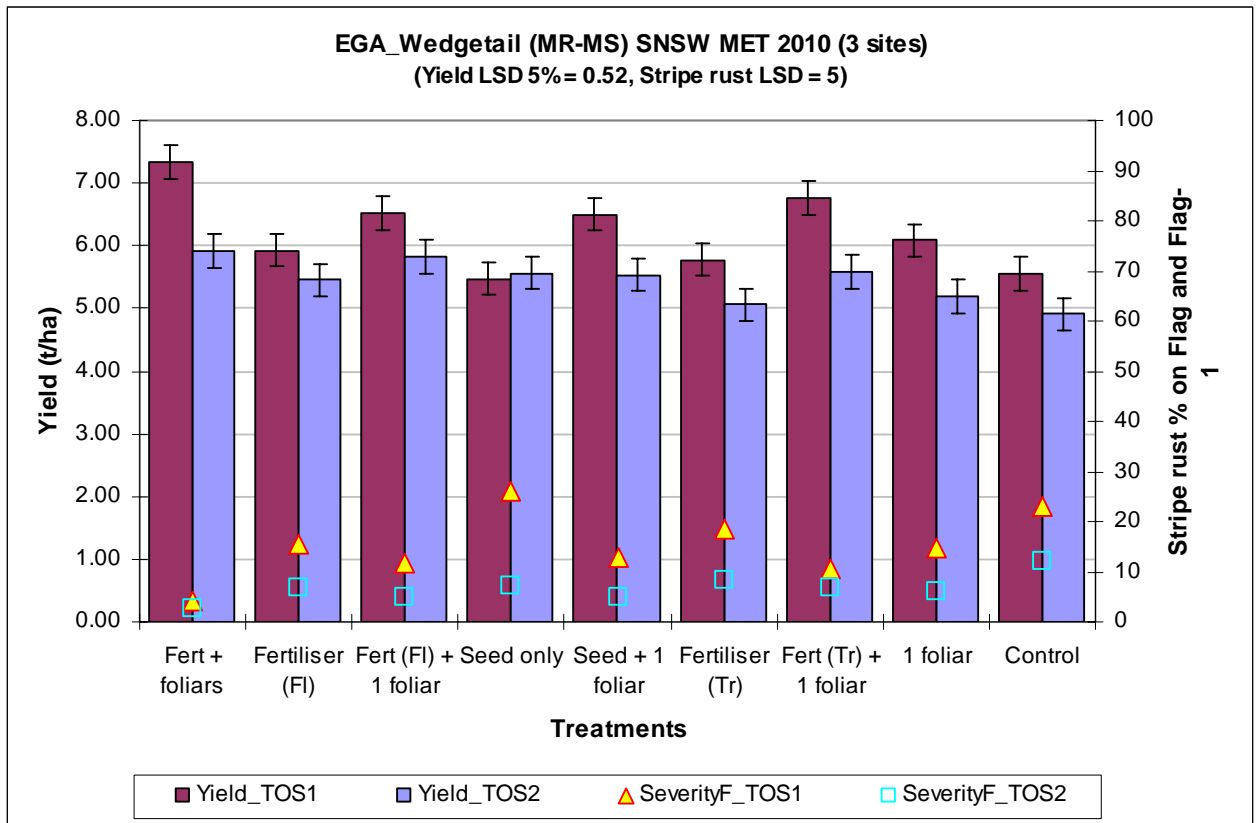


Figure 2: Comparison of grain yield (t/ha) in the presence of stripe rust in the variety EGA_Wedgetail.

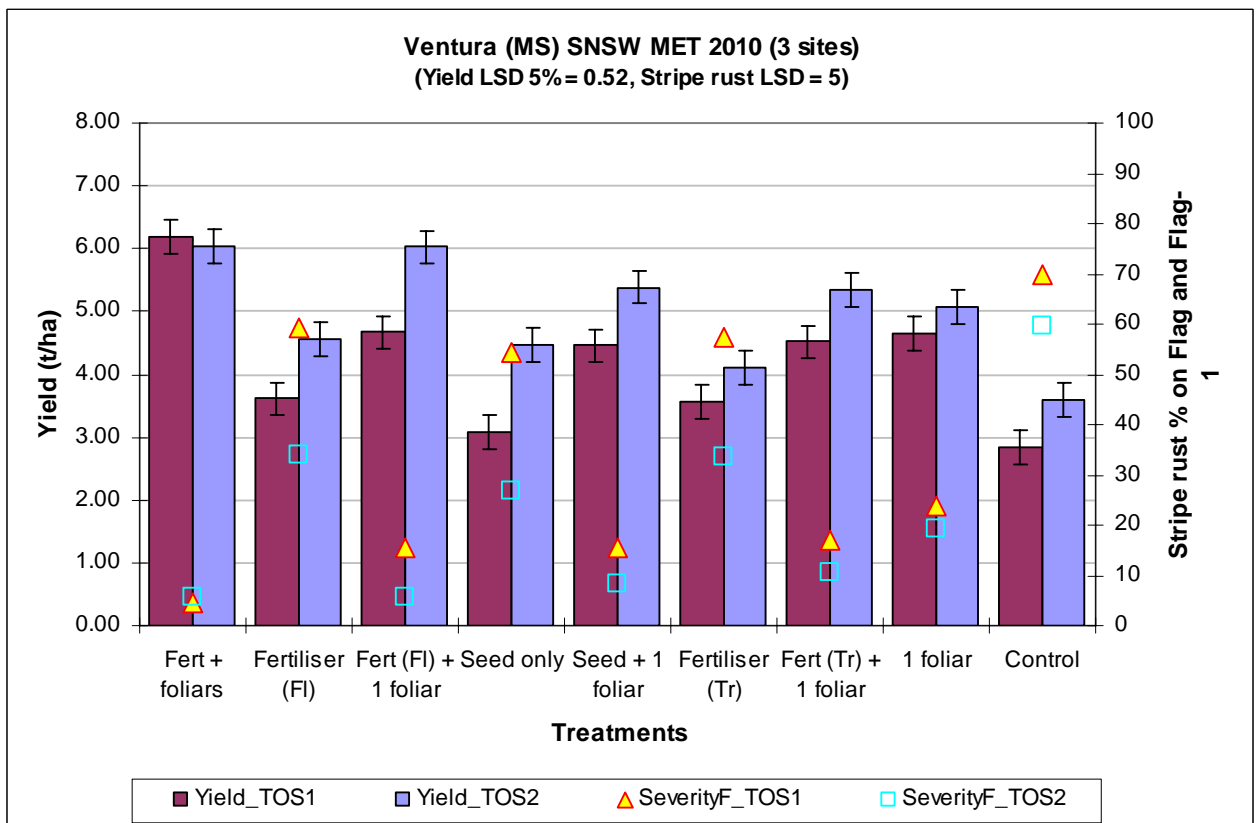


Figure 3: Comparison of grain yield (t/ha) in the presence of stripe rust in the variety Ventura.