Stripe rust management in wheat

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Take home messages

- *Select a wheat variety with good stripe rust resistance.*
- *Fungicides applied as a seed treatment and/or as a foliar application provide cost effective control of stripe rust.*
- *Timing of fungicide application is critical. Monitoring for stripe rust is important, as fungicide spays are generally more effective when applied early in an epidemic.*

Background

Stripe rust *(Puccinia striiformis)* is an important disease of wheat that can cause significant yield losses, especially in susceptible varieties. The disease is generally managed by growing resistant varieties, using seed or fertiliser treatments, applying foliar fungicides or by using a combination of these methods. However, there has been some discussion as to the relative merits of applying or not applying seed treatments compared with simply relying on one application of a foliar fungicide, especially in the drier Mallee environment.

This trial was established to determine if it were possible to control stripe rust by using a single treatment. Two wheat varieties with different levels of rust resistance were included in the trial to demonstrate stripe rust resistance and to determine if there were additive effects of combining resistance with chemical control.

Aim

To investigate the feasibility of using a low cost "one-shot" option for the management of stripe rust in a Mallee environment.

Method

Location:	Culgoa
Replicates:	4
Sowing date:	20 May 2010
Seeding density:	150 plants/m^2
Crop type/s:	Yitpi wheat (MR-MS), Wyalkatchem wheat (MS-S)
Seeding equipment:	BCG parallelogram seeder 30cm row spacing
Fertiliser:	MAP (50kg/ha)
Herbicides:	Roundup Power (2L/ha) plus Striker (75ml/ha) 12 May 2010 Triflur X (1.5L/ha) 20 May 2010, Ally (3g/ha) plus Agritone 750 (200mL/ha) 27 June 2010.

Seed dressings: Jockey (active against stripe rust) or Proguard (not active on rust)

Fungicides: See Table 1

Rust assessment: Mid-anthesis (GS65)

Harvest: 14 December 2010

Table 1. Fungicide treatments used to control stripe rust in wheat.

Treatment	Description/product	Method/timing	Rate
1. Jockey®	fluquinconazole 167g/L	Seed treatment, sowing	3L/t seed
2. Folicur®	tebuconazole 430g/L	Foliar, applied @ GS 32, 20 August 2010	145mL/ha in 160L/ha water
3. Folicur®	tebuconazole 430g/L	Foliar, applied @ GS 38, 2 September 2010	145mL/ha in 160L/ha water

Results

Severity: Stripe rust was detected in the Wyalkatchem, but not Yitpi, at a low level on 2 September 2010. However, stripe rust developed in both varieties, and there were significant differences in the severity of stripe rust by the mid-anthesis assessment (GS65).

Wyalkatchem had over twice the percentage of leaf area affected by stripe rust, compared with Yitpi. There were also treatment effects. Plants sprayed with Folicur or treated with Jockey had significantly less stripe rust compared to the untreated control (Table 2).

Table 2. The effect of fungicide treatments, applied at different growth stages, on the severity of stripe rust (percentage of leaf area affected) on two wheat varieties with different stripe rust resistance ratings.

Treatment	Wyalkatchem % LAA	Yitpi % LAA
Nil (untreated control)	20.0*	8.8*
Jockey (fluquinconazole) seed treatment	8.8	3.3
Folicur (tebuconazole) @ GS32 second node on 20 August 2010	4.5	3.0
Folicur (tebuconazole) @ GS38 flag leaf visible, 2 September 2010	6.0	3.5
Mean variety	9.8*	4.6
LSD between varieties (P = 0.05)	**3.3**	
LSD between treatment (P = 0.05)	**4.7**	
*** Indicates significance**		

Wyalkatchem Moderately Susceptible to Susceptible for stripe rust. Yitpi Moderately Resistant to Moderately Susceptible for stripe rust. Stripe rust was first detected in the Wyalkatchem, but not Yitpi, on 2 September 2010,Stripe rust assessed at mid-anthesis (GS65)

Grain yield: There was a significant difference in grain yield between the two varieties. Yitpi yielded 0.2t/ha more than Wyalkatchem in this trial. There was also a significant fungicide treatment effect in Wyalkatchem, but not in Yitpi. Wyalkatchem treated with Folicur at GS38 had a significantly higher grain yield compared with the other treatments, but not to Yitpi. There were no significant treatment effects on the grain yield of Yitpi (Table 3).

Table 3. The effect of fungicide treatments, applied at different growth stages, on the grain yield of two wheat varieties with different stripe rust resistance ratings.

Treatment/Variety	Wyalkatchem (t/ha)	Yitpi (t/ha)
Nil	3.2	3.5
Jockey (fluquinconazole) seed treatment	3.3	3.6
Folicur (tebuconazole) @ GS32 second node, on 20 August 2010	3.3	3.5
Folicur (tebuconazole) @ GS38 flag leaf visible, 2 September 2010	3.6*	3.6
Mean variety	3.4	3.6*
LSD between varieties (P = 0.05)	**0.1**	**-**
LSD between treatment (P = 0.05)	**0.2**	**ns**
* Indicates significance		

Wyalkatchem moderately Susceptible to Susceptible for stripe rust. Yitpi Moderately Resistant to Moderately Susceptible for stripe rust. Stripe rust was first detected in the Wyalkatchem, but not Yitpi, on 2 September 2010

Interpretation

Stripe rust severity was lower than expected in the trial, even though conditions were ideal for rust carry over on the green bridge, and cool wet conditions during the growing season were favourable. However, the value of growing a variety with good stripe rust resistance like Yitpi (MR-MS) compared with Wyalkatchem (MS-S) was demonstrated by both reduced disease severity and higher grain yield.

All the fungicide treatments significantly reduced the severity of stripe rust compared with the control. However, there was only a weak relationship between reduced disease severity and increased grain yield. This may be due to the low levels of stripe rust detected at this site.

Every year is different, so it is always important to monitor crops during the growing season so a foliar fungicide can be applied early in the epidemic. In this trial, this coincided with spraying with Folicur at GS38, flag leaf emergence. This result reinforces the importance of monitoring crops for stripe rust, and spraying when necessary.

During the season crops should be monitored regularly (at least every two weeks) for the presence of stripe rust. The earlier that rust occurs within a crop the greater the potential loss, but the easier it is to control. If stripe rust is present before ear emergence (GS59), then crops must be sprayed before the level of infection reaches 1% leaf area affected (this is when approximately 35 leaves per 100 have stripe rust). It is better to spray sooner rather than later.

When stripe rust is first detected at ear emergence, only the most susceptible (S and VS) crops may need spraying. After a fungicide application crops should continue to be monitored, as fungicides only provide between 2 – 4 weeks protection.

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