

Comparing Fungicide Rates for Stripe Rust Control – Wimmera

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This trial is part of a new GRDC funded project (SFS 00015) which started in July 2005. The project looks at canopy management and its integration with disease management principles in the different climates of southern Australia.

Summary

- Yield increases were the result of stripe rust control and the associated green leaf retention achieved with fungicide treatment.
- Low levels of stripe rust built up from flag leaf through to grain fill following upfront treatment with Impact 200ml/ha (half rate).
- Fungicide application at early booting (GS42) in Goroke wheat (rated MR-MS for stripe rust) created yield increases of between 0.04 -0.54t/ha (1-14%) depending on fungicide product and rate applied, despite upfront treatment with Impact 200ml/ha at sowing.
- The best performance in terms of yield above the control were given by applications of Opus®(epoxiconazole) 250ml/ha or Amistar Xtra® (cyproconazole / azoxystrobin) 200ml/ha. However, it could not be concluded that these treatments were significantly better than Triad® (Triademefon) at 1000ml/ha.
- Opus appeared to offer adequate protection from re-infection of stripe rust as the lower rates tested (62.5 & 125ml/ha). This was not the case for Amistar Xtra or Triad where there was clearer indication that the higher rates tested (Triad 1000ml/ha & Amstar Xtra 200ml/ha) performed best.

Background

With the introduction of Opus (epoxiconazole) this season there has been much discussion about the merits of this product versus existing industry standards such as Triad/Bayleton® (triadimefon). This work looked at both products at 3 different rates (which overlapped in terms of cost) in order to clarify which products were most cost effective in this particular scenario.

In addition, with an MR-MS stripe rust resistant variety (Goroke) grown in the Wimmera (just south of Horsham), is it cost effective to apply foliar fungicides once upfront measures of Impact have been used?

Methods

Plot size: 20m x 2m
 Replicates: 4
 Location: South of Horsham

Following the application of Impact in furrow at 200ml/ha (half rate) at sowing on 28th June, Goroke wheat was treated with 3 different fungicide active ingredients at the early booting stage (GS42) on October 17. All other inputs were standard across the trial. Fungicide active ingredients were applied in accordance with the treatment list outlined in Table 1.

Table 1: Treatment list and approximate cost \$/ha

Product	Active ingredient	Rate of active ingredient	Product rate	Approx cost
		a.i. g/ha	ml/ha	\$/ha
Triad	Triadimefon	31.25	250	1.25
Triad	Triadimefon	62.5	500	2.50
Triad	Triadimefon	125	1000	5.0
Opus	Epoxiconazole	7.81	250	3.75
Opus	Epoxiconazole	15.62	500	7.50
Opus	Epoxiconazole	31.25	1000	15.00
Amistar Xtra	Azoxystrobin / cyproconazole	20 / 8	100	10.00
Amistar Xtra	Azoxystrobin / cyproconazole	40 / 16	200	20.00
Untreated				

Results

At application there were low levels of stripe rust visible in the crop on the top three leaves of the plant. The absolute levels were assessed on the basis of 40 plants collected randomly across the trial area (Table 2).

Table 2: % Stripe rust infection on top three leaves assessed at application of the flag leaf spray – applied GS42 assessed 17th October

Flag leaf	Flag – 1 (leaf 2)	Flag – 2 (leaf 3)
0.05	1.9	2.0

Stripe rust infection increased such that on November 4 it was 3.3% on untreated flag leaves and there were small differences in the levels of active stripe rust (Figure 1).

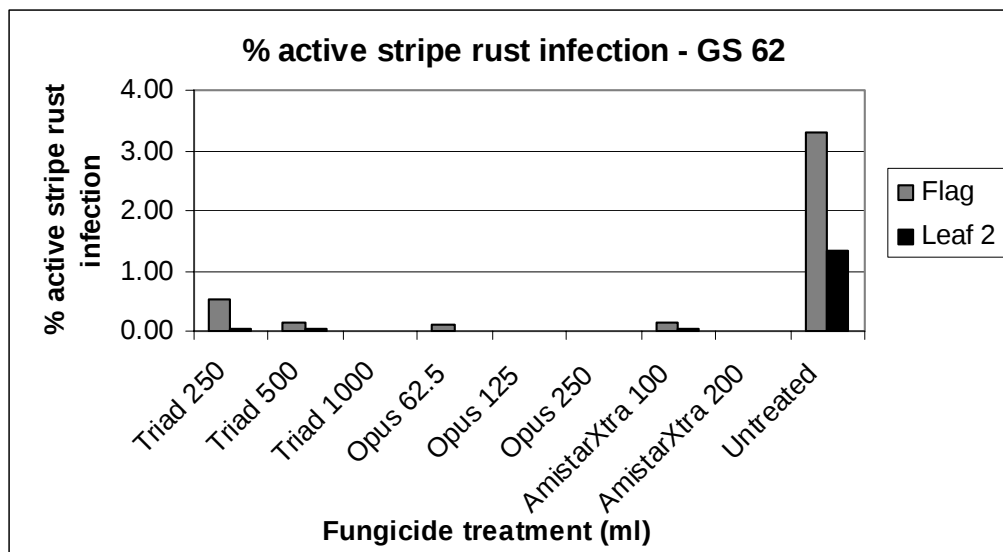


Figure 1: % active stripe rust infection 18 days after treatment application at flag leaf – 4th November.

The only fungicide treatments that had any evidence of active stripe rust 18 days after application were the lowest rate of Amistar Xtra 100ml/ha, Opus 62.5 ml/ha and the two lowest rates of Triad 250 & 500ml/ha. In all cases levels of active stripe rust were well below 1% although older stripe rust had caused necrosis which had taken out more leaf area (Figure 2).

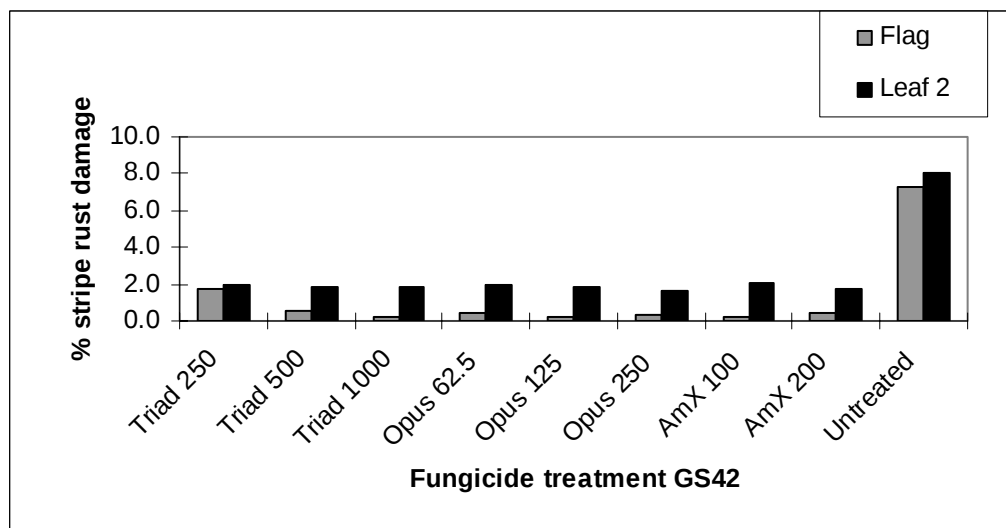


Figure 2: % stripe rust damage (necrosis) 18 days after treatment application at flag leaf.

NOTE: the lack of curative activity in the flag leaf Triad at 250ml/ha compared to the same product at 500 & 1000ml/ha.

By November 18, there was no active stripe rust visible but there were significant differences in green leaf area due to necrosis caused by stripe rust (Figure 3).

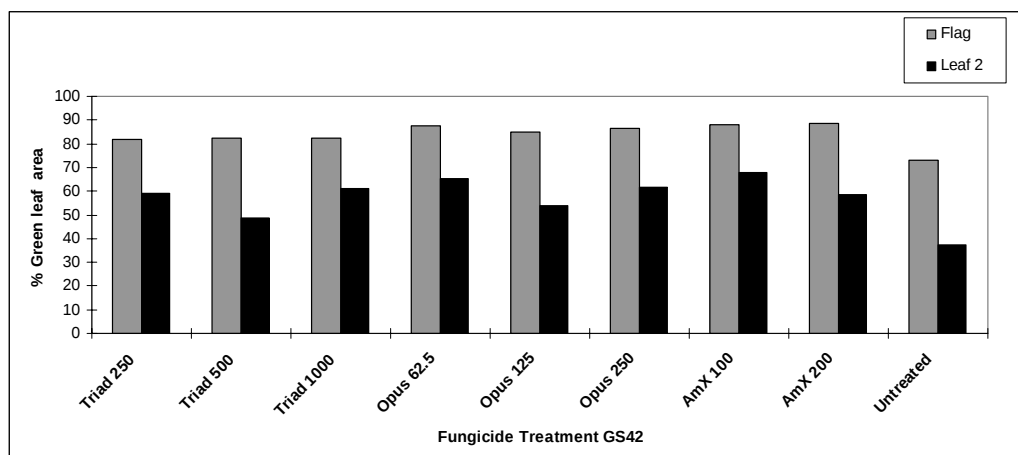


Figure 3: % Green leaf area at GS80 (grain fill) recorded 31 days after fungicide treatment

Other than the difference between treated and untreated there was little difference in green leaf retention amongst the different fungicide treatments.

The only two treatments to significantly out yield the untreated crop were Opus 250ml/ha (12.9% response) and Amistar Xtra 200ml/ha (14.2% response). Triad 1000ml/ha was an intermediate treatment such that it was not significantly better than the untreated, nor was it significantly lower yielding than Amistar Xtra 200ml/ha. All other treatments showed a yield increase over the untreated but were not statistically significant.

Table 3: Yield (t/ha, % untreated)

Product	Rate ml/ha	Yield t/ha	% control
Untreated		3.80	100
Triad	250	3.84	101.1
Triad	500	3.88	102.1
Triad	1000	4.13	108.7
Opus	62.5	4.12	108.4
Opus	125	4.02	105.8
Opus	250	4.29*	112.9
Amistar Xtra	100	3.85	101.3
Amistar Xtra	200	4.34*	114.2
Significant difference:		PC0.05	
LSD		0.43	

* significantly higher yielding than the untreated (untreated crop had Impact 0.21/ha at sowing)

Interpretation

Though Impact (flutriafol) was applied at sowing, fungicide application at early booting GS42 created a yield increase up to 0.54 t/ha, depending on treatment. With the best treatments, Opus 250ml/ha and Amistar Xtra 200ml/ha having a yield increases equated to an increase in margin of approximately \$40/ha over and above the Impact 200ml/ha at sowing. This increase in productivity was realized through increased green leaf retention on the flag leaf and the leaf below (F-1).

Triad (triadimefon) treatments at 500ml/ha and 250 ml/ha were observed to be the subject of re-infection only 18 days later. In 2005, the length of protection provided by these low rates was not enough. The higher 1000ml/ha rate had a trend of higher yields as a result of reduced flag leaf infection from the higher dose rate.

Opus appeared to be slightly more rate flexible than Triad. There was a trend to increase yield when the rate of Triad applied was increased, but this trend was not evident with Opus. Furthermore, figure 2 shows re-infection of the flag leaf occurred at the low rates of Triad but not at the full rate of 1000ml/ha Triad. Again, Opus showed no change in leaf area infected, indicating that perhaps there is an option to lower the rate of Opus used whilst still providing adequate protection. That said it was the highest rate of Opus (250ml) tested that was statistically different to the control in this trial.

Amistar Xtra was the most expensive fungicide tested. It was ineffective at a rate of 100ml/ha however 200ml/ha created the highest increase in yield and remained a profitable treatment with \$40/ha margin.

Commercial Practice

With an MR-MS rating for stripe rust this work illustrates that despite upfront treatment with a half rate Impact 0.2l/ha (flutriafol) it is important to consider follow up treatment with a foliar fungicide in the Wimmera. With approximately 40 days covering the period between early booting application and the end of grain fill, it was important to keep fungicide rates up in order to maximise margins at this key timing.

The more expensive fungicides Opus and Amistar have created an extra yield benefit at the Horsham site, that was profitable in this season. As the prices of these fungicides continue to reduce there may be a role for them in more marginal environments.

The results suggest that Opus can be applied at lower rates than those registered without consequence for yield or re-infection. Thus if \$6/ha was to be invested in foliar fungicide protection, it could be invested in a reduced rate of Opus (not registered) – the most expensive triazole – rather than invested in the most basic triazole contained in Triad.

When using upfront fungicides such as Impact, it is essential that crops are monitored for signs of stripe rust from second node onwards. In 2005, there was a benefit from applying a foliar fungicide to control stripe rust once the Impact had worn off.

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