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2025 WHEAT FUNGICIDE TRIAL

Beelbangera NSW

This trial was a collaboration between Ag Grow Agronomy and Research and Hart Bros Seeds

INDEPENDENT AGRONOMY ADVICE + CUTTING EDGE RESEARCH

Evaluating the impact of spraying fungicides on various wheat varieties for stripe rust

KEY POINTS

- **Despite a slower developing year for stripe rust, severe infections still developed in susceptible varieties. This highlights that varietal resistance is important when assessing the need and value of fungicide applications.**
- **This trial compared 1 early fungicide to 3 well timed fungicide applications. It would have also been valuable to have a 2 fungicide treatment, but this didn't occur.**
- **In evaluating the economic return from spraying for stripe rust, the more susceptible varieties such as Vixen, Scepter and Shotgun benefited the most from three fungicide sprays. Screenings and test weight were also impacted on these varieties where only one fungicide was applied.**
- **Many varieties rated MRMS to stripe rust displayed variable disease expression and mixed economic outcomes. Some MRMS varieties responded positively to fungicide application, while others showed little advantage. Packer showed the strongest response to three sprays in this trial. This highlights the complexity of managing this varietal resistance subgroup.**
- **More resistant varieties showed minimal yield or economic benefit from three fungicide sprays. In these cases, a single fungicide application provided equivalent outcomes, highlighting that additional sprays were not justified.**
- **The rust pathotye found in the trial was a combination of 239 E237 A-17+33+ and 238 E191A+17+33+.**
- **It is important to base in crop fungicide decisions on both monitoring and timing of previous sprays. This may vary greatly according to the seasonal conditions.**
- **There were no other diseases present other than stripe rust in this trial.**

BACKGROUND

Variety selection is important for maximising grain yield and also managing disease. Without appropriate management stripe rust can significantly reduce grain yield and impact grain quality, if conditions are right and particularly if susceptible varieties are grown.

It is important to monitor crops for disease throughout the season, to protect and retain green leaf area so as yield potential can be maximised.

In managing stripe rust, besides removing the green bridge over summer and early winter to reduce the carryover between seasons, variety choice and fungicide treatments including in crop fungicides play an important role.

By choosing varieties that have a higher level of stripe rust resistance, you can reduce the reliance on fungicides in protecting yield. However, many growers in our region still grow moderately susceptible (MS) or susceptible (S) varieties for their yield potential and genetic phenology, increasing exposure to early infection.

A fully replicated small plot trial was designed and established at Beelbangera in 2025, with the aim of evaluating the benefit of applying foliar fungicides for stripe rust control, on a range of varieties with varying stripe rust resistance ratings in 2025.

TRIAL DETAILS

The trial was established at the Ag Grow Agronomy research farm "Ridgetop" in Beelbangera, approximately 16 km NE of Griffith. Paddock history was field peas 2024 and wheat 2023. Soil tests conducted prior to sowing showed a pH ($CaCl_2$) of 5.8, total nitrogen (0-60 cm) 67 kg N/ha and Colwell phosphorus 39 ppm.

The trial was sown on 1st May 2025 at a rate of 30 kg/ha, with 80 kg/ha of DAP. 160 kg/ha Green Urea was spread at the end of March. Weeds and pests were adequately controlled in crop. The trial was harvested 12th November 2025.

Treatments & fungicide application details

Twelve varieties with varying stripe rust ratings were selected for the trial, table 1. Each of the varieties in the trial were either sprayed with a full fungicide program, consisting of 3 timely sprays, or sprayed once early with the post emergent herbicide, table 2.

Table 1: Varieties and their resistance ratings to stripe rust 2025.

	Variety	Stripe rust resistance (2025 east coast)
1	Anapurna	RMR
2	Genie	MSS
3	Ironbark	MR
4	LRPB Lancer	RMR
5	LRPB Major	MRMS
6	LRPB Optimus	MRMS
7	LRPB Raider	MR
8	Packer	MRMS
9	Scepter	S
10	Shotgun	MSS
11	Sunmaster	MRMS
12	Vixen	SVS

Sourced from NVT (National Variety Trial) disease ratings

The first fungicide was boom sprayed across all plots with a commercial ground rig. This is in line with district practice with an early protective fungicide spray added into the spray mix when going over the crop for weed control.

Fungicide applications 2 and 3 were applied to the plots which were fully sprayed throughout the season using a handheld Brolga lightweight offset trial spray boom, with a spray volume of 100 L/ha and medium droplets using AIXR11002 nozzles.

The environmental conditions at the time of application of the 2nd spray (1pm) were 17.9°C temperature and 52% relative humidity. Environmental conditions at the time of application of the 3rd spray (2pm) were 15.3°C temperature and 51% relative humidity.

At the time of application of the first two fungicide sprays there was minimal disease in the trial. At the time of application of the 3rd fungicide spray stripe rust was active within the trial, figure 1.

Figure 1: Level of stripe rust in the trial at 3rd fungicide spray, 12th September 2025.

Table 2: Fungicides treatments applied

	Date	Chemical	Active(s)	Rate (ml/ha)	Wetter Rate (%)	Comments
1	16.07.2025	Bumper 625	*625 g/L Propiconazole*	200ml	Hasten 1%	*Applied to all plots - early to mid tillering*
2	15.08.2025	Epoxiconazole 500	*500 g/L Epoxiconazole*	125ml		*Full fungicide treatment only – booting to head emergence*
3	12.09.2025	Prosaro 420	*210 g/L Prothioconazole 210 g/L Tebuconazole*	300ml	BS 1000 0.25%	*Full fungicide treatment only - flowering*

Seasonal Conditions 2025

Conditions for the first 4 months of the year were dry, with below average rainfall and above average temperatures. Warm and dry conditions persisted into May, with some much-needed rain towards the end of the month, table 3. Follow up rain occurred mid-late June, before the crop accessed stored moisture.

With warmer, windy days and frosts impacting topsoil moisture, below average rainfall continued throughout June, July and August as drought conditions strengthened. Much needed rain occurred in early September, setting up the crop.

The trial received 166.5 mm growing season rainfall (GSR) from April–October (240 mm GSR average) with 76 mm of this rainfall received from mid-September and October.

Table 3: Rainfall for Beelbangera 2025, compared to Griffith and long-term rainfall data (Griffith Airport - nearest met station).

MONTH	Ridgetop Rainfall 2025	Griffith Airport 2025	Griffith Airport Long Term (1958 to 2025)
January	4	4.4	36.3
February	18	23.6	28
March	32	25	35.3
April	*13.5*	*12.4*	*29.3*
May	*18*	*14.8*	*36.1*
June	*25*	*29*	*35.1*
July	*24.5*	*22.4*	*32.4*
August	*9.5*	*17*	*34.9*
September	*50.5*	*32.8*	*32.7*
October	*25.5*	*7.2*	*39.4*
November	8.5*	11.8	
December			
TOTAL	**229**	**200.4**	**339.5**
GSR (April - Oct)	***166.5***	***135.6***	***239.9***

** to 17th November*

RESULTS AND DISCUSSION

Crop establishment scores as well as disease scores were undertaken in crop.

Grain yield and quality (protein, screenings and test weight) were also measured on this trial. Statistical analysis was carried out using the most appropriate method.

Establishment:

Establishment was evaluated using a scoring system, with each plot rated from 0 to 9, where 0 indicated poor establishment and 9 indicated very even establishment.

Establishment was assessed early June at 5 leaf to early tillering, figure 2. The trial established well with an average establishment score across varieties of 8.5.

Figure 2: Fungicide wheat trial establishment, June 2025.

Disease observations:

The level of leaf greenness was used as a measure of assessing the level of disease in the trial, using a scale of 0-9 (where 0 is clean and 9 is covered in rust), table 4.

Table 4: Scale for scoring disease based on green leaf area

Score	Description
0	100% leaf area green (clean)
1	>90% leaf area green
2	>80% leaf area green
3	>70% leaf area green
4	>60% leaf area green
5	>50% leaf area green
6	>40% leaf area green
7	>30% leaf area green
8	>20% leaf area green
9	>10% leaf area green (covered in rust)

Four disease scores were undertaken on the trial, table 5. The first assessment had insignificant levels of disease, and as such only scores 2, 3 and 4 are reported.

An initial assessment was conducted before the 2nd fungicide spray was applied to the fully sprayed plots on 15th August 2025, 30 days after the first fungicide was applied. At that stage there was very minimal disease, figure 3.

Figure 3: Level of disease in the trial 15th August 2025.

Table 5: Stripe rust disease scores of the fully sprayed v 1 spray treatments for each variety.

Variety	Disease Score 2 3.09.2025		Disease Score 3 12.09.2025		Disease Score 4 29.09.2025	
	Sprayed 3 x	Sprayed 1 x	Sprayed 3 x	Sprayed 1 x	Sprayed 3 x	Sprayed 1 x
Anapurna	0	0	0.2	0.5	0.5	0.5
Genie	0	1.4	0.5	3.3	1.2	5.4
Ironbark	0	0.7	0.9	2.3	2.3	3.3
Lancer	0	0	0.7	1.0	1.3	1.6
Major	0.1	1.7	1.2	2.6	1.9	3.4
Optimus	0	1.0	0.5	1.6	1.2	5.6
Packer	0	2.1	0.8	4.5	1.3	7.7
Raider	0	0.8	0.7	1.3	1.7	2.5
Scepter	0.4	3.0	1.0	5.7	2.5	8.7
Shotgun	0.1	1.7	1.2	5.1	2.0	8.5
Sunmaster	0	1.5	0.7	3.2	2.1	6.1
Vixen	0.4	3.3	2.1	7.3	3.2	9.0
Mean	***0.1***	***1.4***	***0.9***	***3.2***	***1.8***	***5.2***

The second assessment was conducted on 3rd September, two weeks after spraying. Active stripe rust was evident in several varieties in the plots which had only received the first spray, showing that the infection was starting to progress, figure 4. The very susceptible and susceptible varieties Vixen and Scepter were the varieties which had the most active spores and highest disease scores at this assessment. Packer, which is MRMS, had the next highest impact on green leaf area.

Figure 4: Level of disease in the trial 3rd September 2025.

The third assessment was carried out 12th September, 28 days after the 2nd fungicide spray and before the 3rd fungicide was applied. At this stage some varieties, which had only received the first early spray, had active stripe rust spores on the lower leaves as well as on the flag leaf, figure 5. Active stripe rust was prevalent and impacting leaf green area of Vixen, Scepter and Shotgun, which all had disease scores above 5 in plots receiving an early spray only. These varieties were rated SVS, S and MSS respectively to stripe rust. The green leaf area of Packer was also greatly impacted by stripe rust with a score just under 5.

The final assessment was carried out on 29th September, 17 days after the 3rd fungicide application.

Figure 5: Level of disease in the trial 3rd September 2025.

Stripe rust had started to advance in more susceptible varieties, with rust starting to develop in the heads of the one early spray plots, figure 6. Anapurna, Lancer and Raider were the only varieties, which received one spray, to have greater than 90%, 85% and 75% green leaf area respectively. Vixen, Scepter and Shotgun all had less than 15% green area left, with Vixen covered in rust. These more susceptible varieties also had a few active spores in the upper canopy, in plots receiving the full spray program. At the time of this assessment early maturing varieties such as vixen had also started to senesce.

Figure 6: Level of disease in the trial 29th September 2025.

Grain Yield and Grain Quality:

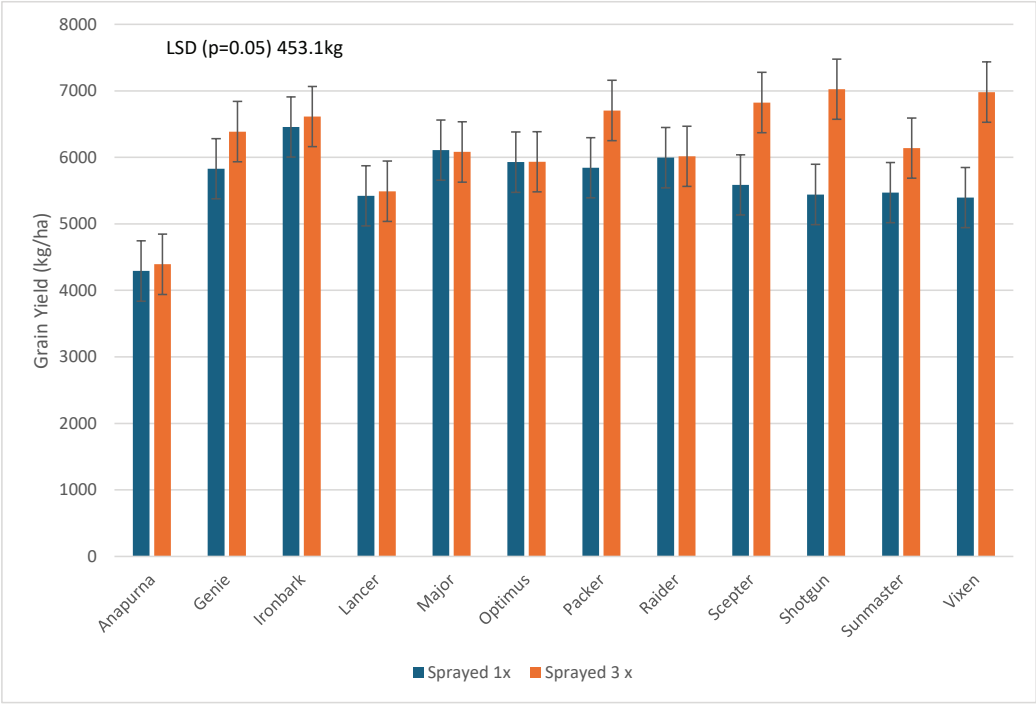
Grain yield and protein, screenings (2.0mm screen) and test weight were all measured and analysed.

Grain Yield: The trial was harvested on 12th November 2025. The average yield of the trial was 5937 kg/ha, with the 3 fungicide sprays averaging 6206 kg/ha and the one spray averaging 5658kg/ha. The yield of each variety for 1 spray compared to 3 sprays is shown in figure 7.

There were minimal differences in grain yield of varieties that were rated MR (Ironbark and Raider) to RMR (Lancer and Anapurna) for stripe rust, between spraying once and spraying three times for stripe rust.

There were variations in grain yield of varieties rated MRMS for stripe rust (Major, Optimus, Packer and Sunmaster) between spraying once or spraying three times for stripe rust. The more susceptible varieties to stripe rust (Vixen, Genie, Scepter and Shotgun) had the greatest yield differences between spraying once and spraying 3 times for stripe rust.

Figure 7: Grain yield of the wheat fungicide trial - harvested 12th November 2025



Grain Quality: Quality data for each variety, sprayed once compared to sprayed three times for stripe rust, is shown in table 6.

The average grain protein of the trial, across spray treatments, was 11.68%. Varieties to have significant differences between one spray and three fungicide sprays for protein were Genie, Optimus, Packer, Scepter and Sunmaster.

Screenings were mostly all below 5%, with Genie, Scepter, Shotgun, Sunmaster and Vixen having significant higher screenings for one spray compared to three fungicide sprays.

The average test weight of the trial was 82.1 kg/HL. Scepter, Shotgun and Vixen had significantly lower test weights with one spray compared to three fungicide sprays.

Table 6: Protein, Screenings and test weight of the wheat stripe rust trial 2025.

	PROTEIN		SCREENINGS		TEST WEIGHT	
Variety	Sprayed 1 x	Sprayed 3 x	Sprayed 1 x	Sprayed 3 x	Sprayed 1 x	Sprayed 3 x
Anapurna	14.96	14.43	6.32	6.47	72.54	72.33
Genie	10.66	11.96	5.42	2.79	85.03	84.48
Ironbark	11.50	11.56	0.69	0.63	83.8	84.04
Lancer	13.20	12.96	0.54	0.59	82.86	83.18
Major	11.43	11.86	0.77	0.66	85.05	84.11
Optimus	11.56	12.50	0.70	0.63	83.78	83.36
Packer	10.43	11.36	1.38	0.85	84.12	85.08
Raider	11.96	12.00	0.76	0.77	81.79	82.07
Scepter	10.03	11.00	1.78	0.79	80.52	83.44
Shotgun	9.93	10.36	2.58	1.15	79.58	83.32
Sunmaster	11.43	12.00	1.54	0.69	82.57	83.65
Vixen	10.45	10.73	3.31	1.05	76.53	83.72
Mean	***11.46***	***11.89***	***2.15***	***1.42***	***81.51***	***82.73***
LSD (p=0.05)	***0.52***	***0.52***	***0.78***	***0.78***	***1.45***	***1.45***

Economics:

The cost of each fungicide applied in this trial is shown in table 7.

Table 7: Fungicides applied in the trial and costs of each application.

Fungicide Application	Date	Chemical	Active(s)	Rate (ml/ha)	COST ($/ha)	Application Cost	Total Cost	*Comments*
1	16.07.2025	Bumper 625	*625 g/L Propiconazole*	200ml	$1.95	$7.50	$9.45	*Applied to all plots - mid tillering*
2	15.08.2025	Epoxiconazole 500	*500 g/L Epoxiconazole*	125ml	$7.42	$7.50	$14.92	*Fully Sprayed plots only - booting*
3	12.09.2025	Prosaro 420	*210 g/L Prothioconazole 210 g/L Tebuconazole*	300ml	$7.81	$7.50	$15.31	*Fully Sprayed plots only - flowering*

** fungicide prices as at August 2025*

Based on the costs above the first spray, which all treatments received, cost an additional $9.45, over the standard paddock costs. The 3-spray program cost an additional $30.23 over the first spray, totalling $39.68.

The yield responses, in terms of the additional grain yield (kg/ha) achieved for each variety, by applying 3 fungicides for stripe rust compared to a 1 spray fungicide program is shown in table 8.

The table highlights the yield differences explained above and the yield benefits observed in the more susceptible varieties by fully spraying. Additional revenue, and profit obtained from the 3-spray program are also shown in table 8.

Varieties to have the greatest benefit were the more susceptible varieties with Vixen, Shotgun and Scepter returning an additional $461.12, $460.50 and $353.55 profit respectively. Packer and Sunmaster which are MRMS to stripe rust also positively benefited from 3 sprays, returning an additional $236.99 and $176.85 respectively.

Table 8: Yield Response and additional income and profits of applying 3 fungicides over a 1 spray program for stripe rust in 2025.

VARIETY	Yield Response (kg/ha) *additional grain yield 3 sprays*	Extra Revenue ($)	Cost of Extra 2 sprays ($)	Profit ($) *compared to 1 spray*
Anapurna	*ns*	*ns*	30.23	*ns*
Genie	558	172.98	30.23	142.75
Ironbark	*ns*	*ns*	30.23	*ns*
Lancer	*ns*	*ns*	30.23	*ns*
Major	*ns*	*ns*	30.23	*ns*
Optimus	*ns*	*ns*	30.23	*ns*
Packer	862	267.22	30.23	236.99
Raider	*ns*	*ns*	30.23	*ns*
Scepter	1238	383.78	30.23	353.55
Shotgun	1583	490.73	30.23	460.50
Sunmaster	668	207.08	30.23	176.85
Vixen	1585	491.35	30.23	461.12

** wheat at $310/t on-farm*

*** costs include additional 2 sprays over 1 spray program cost*

ns = not significant

DISCUSSION

Spraying decisions in 2025 were particularly challenging due to the season's conditions. It should however be noted the high yields (and plant canopy) achieved in this trial.

Although it was generally a lower pressure year for stripe rust, significant disease development still occurred in susceptible varieties. Notably, some varieties with higher resistance, such as Raider, also showed early infections before adult plant resistance became effective, adding further complexity to fungicide decision making. Many crops in the region were sprayed with a fungicide and in some cases the results were positive and in other cases there were no measurable benefits.

In this trial, all treatments received an early fungicide application, allowing clear comparison of the value of additional sprays. The results demonstrated that further fungicide applications provided substantial yield benefits in the more susceptible varieties, including Vixen, Scepter and Shotgun. These yield gains translated into positive economic returns, supporting the value of multiple sprays in highly susceptible varieties under the conditions experienced in 2025.

On the other hand, the more resistant varieties such as Lancer and Raider only achieved marginal yield increases from additional fungicide applications, and these gains were insufficient to generate an economic return. This aligns with expectations for varieties carrying effective adult plant resistance, where disease suppression occurs naturally later in the season.

Varieties rated MRMS showed variable responses. Some displayed yield and economic gains from additional sprays, while others showed little or no improvement. This variability highlights the complexity of managing MRMS varieties in seasons where early infection occurs, but overall disease pressure is moderate.

Overall, the trial reinforces the importance of considering varietal resistance, seasonal disease dynamics, and economic returns when determining fungicide strategies for stripe rust.

CONCLUSION

This trial demonstrated that varietal resistance remains the most influential factor when determining the value of fungicide applications for stripe rust. Even in a season of generally lower disease pressure, significant infections occurred in susceptible varieties, and additional fungicide sprays provided both yield and economic benefits in these lines.

In contrast, more resistant varieties showed little benefit from multiple sprays, with economic returns generally not justified. MRMS varieties displayed variable responses, highlighting the need for season specific and variety specific decision making. Overall, strategic fungicide use is important, but its value is maximised when adapted to varietal susceptibility and seasonal conditions.

Further contacts

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