

## 4.1.2 OPTIMISING FUNGICIDE STRATEGIES FOR MORE DISEASE RESISTANT WHEAT CULTIVARS - VICTORIA & TASMANIA

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**Funding:**  
Grains Research and Development Corporation

**Location & Variety:**  
Gnarwarre, (SFS) MacKellar (winter wheat-feed)  
Hamilton, (SFS) MacKellar (winter wheat-feed)  
Devonport, (SFS) MacKellar (winter wheat-feed)

**Background:**  
Last season there was evidence particularly from the Hamilton site that strobilurin fungicides were conferring significant yield responses in the absence of visual foliar disease. These responses appeared to be linked to prolonged green leaf retention. This years trials looked at whether these results were repeatable, using the new more disease resistant winter feed wheat MacKellar.

**Objectives:**  
In this trial a selected number of treatments from the protocol on susceptible wheat were tested on a more disease resistant variety, in order to examine whether lower disease levels reduce any potential response to strobilurin fungicides. In the UK and New Zealand strobilurins have still generated yield responses in more disease resistant varieties, however the level of active ingredient required has been demonstrated to be lower).

### Summary:

#### **GNARWARRE**

With extremely low levels of disease none of the individual fungicides treatments were significantly higher yielding than the untreated, however there was evidence that fungicide application at flag leaf emergence (GS39) created significantly better yields than the same active ingredient applied at GS32 (second node). The mean yield increase of the GS39 fungicide timing over the untreated was 6.3%, compared to a slight negative effect from the GS32 timings (minus 1.5%). There was some suggestion that strobilurin addition was leading to higher yields than folicur alone, but the differences were extremely small and restricted to the highest rates. There was no evidence of prolonged green leaf retention resulting from strobilurin (Amistar) addition.

The individual objectives in the trial are as follows:

- To examine influence of triazole and triazole/strobilurin application on green leaf area retention and yield response under very low disease pressure (**Trt 1-13**)
- To compare the disease control and yield response associated with two different timings of triazole fungicide (Folicur) application and to assess whether two sprays are superior to one with a disease resistant variety. (**Trt 1, 5 & 9**)
- To examine the disease control, green leaf area retention and yield response from one and two spray programmes of triazole with and without strobilurin inclusion on a disease resistant variety. (**Trt 1 -13**)
- To examine the influence of increasing the rate of strobilurin dose (Azoxystrobin – Amistar) from a 62.5g/ha ai to 250g/ha ai in one and two spray programmes on a disease resistant variety when mixed with identical amounts of triazole. (**Trt 2-4, 6-8 & 9-11**)
- To compare whether the same level of strobilurin active ingredient was better applied as a one spray or two spray programme and to assess whether the optimum rate of strobilurin is influenced by the number of fungicide applications. (**Trt 2-4, 6-8 & 9-11**)

#### **HAMILTON**

There was no evidence of foliar disease or yield response to fungicide application at this site.

#### **TASMANIA**

Yields were much higher at the Tasmania site and there was evidence of stripe rust in the untreated plots. As a consequence there was a significant yield increase from fungicide application at this site, which ranged from 2.5% to 11% depending on treatment. Unfortunately it was not possible to conclude that there was any statistical difference between the different fungicide treatments, however somewhat unusually the split approach of GS32 + GS39 timings was significantly better than the GS39 alone timing, a result that did not correlate with any disease observations.

### Overall conclusions:

Looking at all 3 sites and averaging the 3 different timing treatments there was a 4% response to fungicide with MacKellar, however this mean is strongly influenced by the positive responses observed in Tasmania.

Although at some sites there appeared to be trends suggesting a strobilurin response, there were no statistically significant effects and no observations of better green leaf retention.

**Table 40: Treatment List and Trial Design**

trt	GS32 (leaf 3 emergence)	GS39 (Flag leaf emergence)
1	Folicur 145 ml/ha	Nil
2	Folicur 145 ml/ha + Amistar 250ml/ha	Nil
3	Folicur 145 ml/ha + Amistar 500ml/ha	Nil
4	Folicur 145 ml/ha + Amistar 1000ml/ha	Nil
5	Nil	Folicur 145 ml/ha
6	Nil	Folicur 145 ml/ha + Amistar 250ml/ha
7	Nil	Folicur 145 ml/ha + Amistar 500ml/ha
8	Nil	Folicur 145 ml/ha + Amistar 1000ml/ha
9	Folicur 72.5 ml/ha	Folicur 72.5 ml/ha
10	Folicur 72.5 ml/ha + Amistar 125ml/ha	Folicur 72.5 ml/ha + Amistar 125ml/ha
11	Folicur 72.5 ml/ha + Amistar 250ml/ha	Folicur 72.5 ml/ha + Amistar 250 ml/ha
12	Folicur 72.5 ml/ha + Amistar 500ml/ha	Folicur 72.5 ml/ha + Amistar 500 ml/ha
13	Untreated	

At all 3 sites varieties were subjected to the same treatment list of 13 treatments (Table 40) replicated 4 times. Fungicide applications were targeted at two growth stages GS32 (second node) and GS39 (flag leaf emergence), however at Hamilton and Gnarwarre applications were delayed until GS33 (3<sup>rd</sup> node) and GS55 (50% ear emergence) due to poor spraying weather.

**Table 41: Spray Application Dates and Sowing Dates Appropriate for Each Trial**

	Sowing date	GS32 application	GS39 application
Gnarwarre	27 <sup>th</sup> May 2003	23 <sup>rd</sup> September 2003	27 <sup>th</sup> October 2003
Hamilton	27 <sup>th</sup> May 2003	14 <sup>th</sup> October 2003	4 <sup>th</sup> November 2003
Tasmania	9 <sup>th</sup> May 2003	9 <sup>th</sup> September 2003	24 <sup>th</sup> October 2003

### Disease Assessments:

All 3 sites had extremely low foliar disease levels. At Hamilton premature senescence was observed in the MacKellar plots, however this was very patchy and was not related to the different treatments.

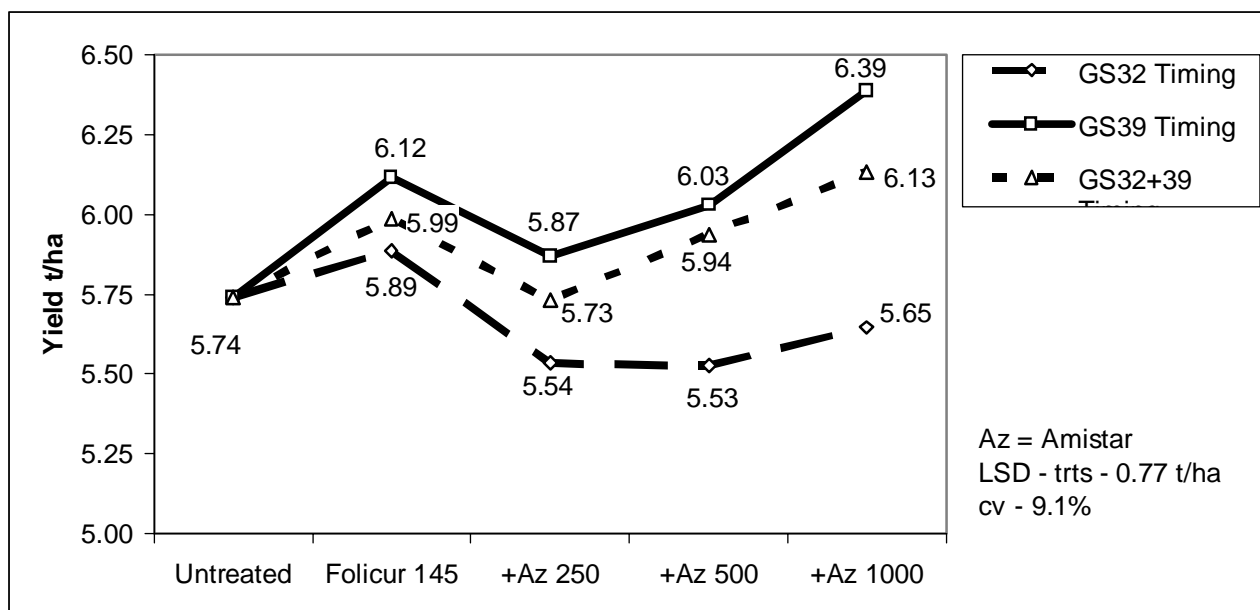
It was in Tasmania where Stripe rust was found in the untreated at low levels, but there was no sign of disease in the fungicide treated plots.

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**Results:**

**Figure 7: Influence of Fungicide Timing and Rate on Mackellar - Gnarwarre**

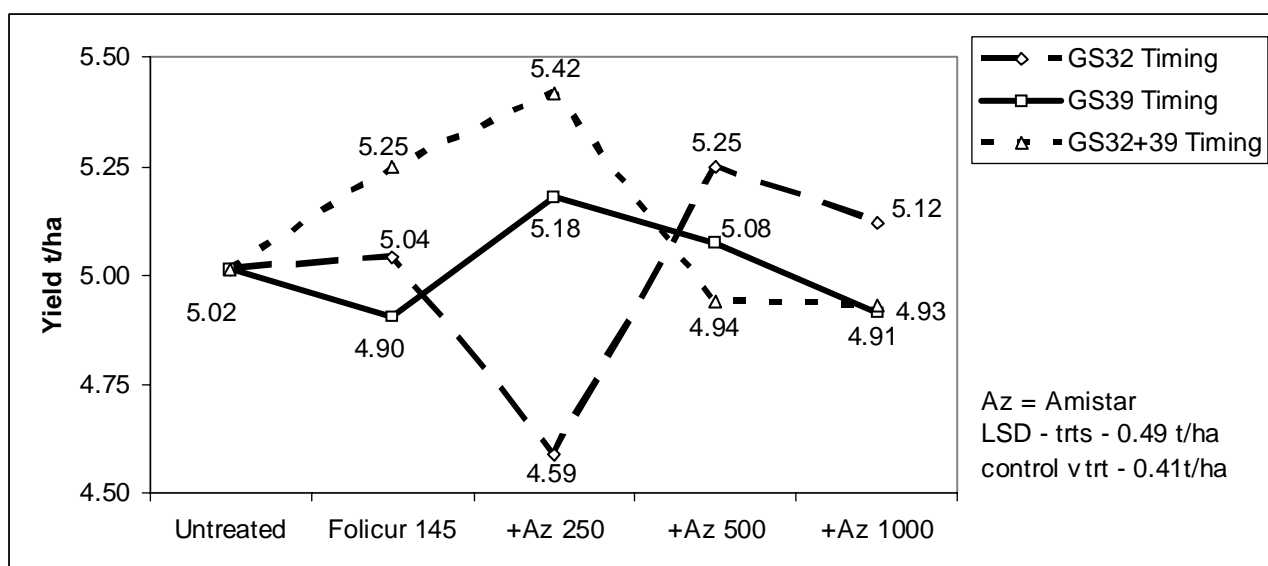


<b>Significance of contrasts:</b>	
Fungicide (trts 1-12) vs Control	ns
Time T1 (trts 1-4) vs T2 (trts 5-8)	*
Splitting effect (trts 1-8 vs 9-12)	ns
Amistar effect (trts 1,5,9 vs 2-4, 6-8, 10-12)	ns
Amistar x T1vT2	ns
Amistar x Split	ns
Amistar rate linear trend (trts 2-4, 6-8, 10-12)	ns
Amistar rate-linear x T1vT2	ns
Amistar rate-linear x Split	ns

Unfortunately the variable nature of the yield data did not create any significant yield differences, apart from the fact that the flag leaf fungicide timings applied at GS39 were significantly higher yielding than the same application of active ingredient at GS32. GS39 timings created a 6.3% yield increase over the untreated control as compared to minus1.5% with the GS32 timings. There was no significant response to strobilurin application at this site. All other interactions were non significant.

Note: ns=not significant; \*=5% sig; \*\*=1% sig; \*\*\*=0.1% sig

**Figure 8: Influence of Fungicide Timing and Rate on MacKellar - Hamilton**



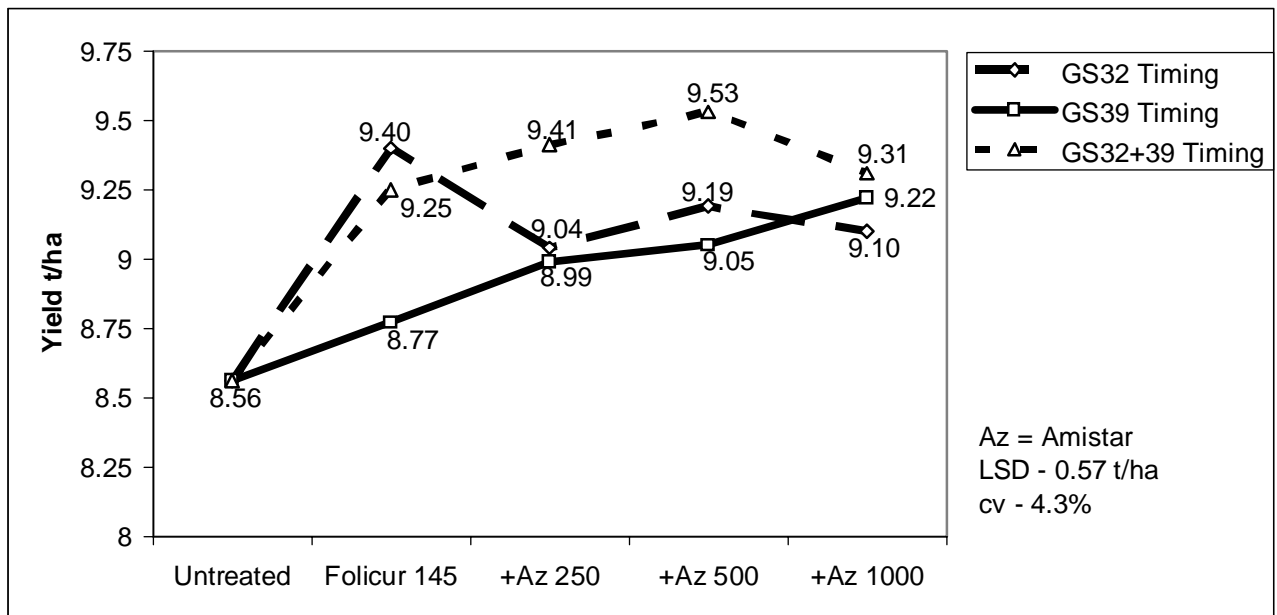
<b>Significance of contrasts:</b>	
Fungicide (trts 1-12) vs Control	ns
Time T1 (trts 1-4) vs T2 (trts 5-8)	ns
Splitting effect (trts 1-8 vs 9-12)	ns
Amistar effect (trts 1,5,9 vs 2-4, 6-8, 10-12)	ns
Amistar x T1vT2	ns
Amistar x Split	ns
Amistar linear trend (trts 2-4, 6-8, 10-12)	ns
Amistar-linear x T1vT2	*
Amistar-linear x Split	ns

Again there were no significant yield differences between individual treatments, though there was a significant contrast suggesting that higher rates of Amistar were valuable with earlier GS32 timings, but the opposite was found with GS39 timings.

There was no significant response to strobilurin application at this site. All other interactions were non significant.

Note: ns=not significant; \*=5% sig; \*\*=1% sig; \*\*\*=0.1% sig

**Figure 9: Influence of Fungicide Timing and Rate on MacKellar - Tasmania**

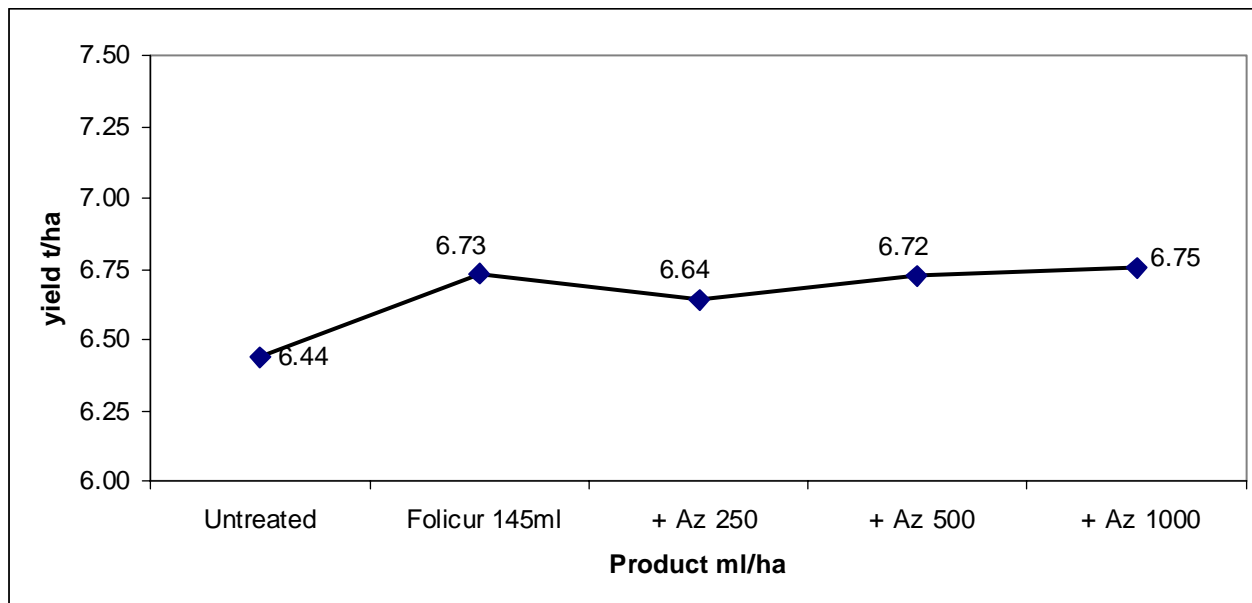


<b>Significance of contrasts:</b>	
Fungicide (trts 1-12) vs Control	**
Time T1 (trts 1-4) vs T2 (trts 5-8)	ns
Splitting effect (trts 1-8 vs 9-12)	*
Amistar effect (trts 1,5,9 vs 2-4, 6-8, 10-12)	ns
Amistar x T1vT2	ns
Amistar x Split	ns
Amistar linear trend (trts 2-4, 6-8, 10-12)	ns
Amistar-linear x T1vT2	ns
Amistar-linear x Split	ns

Fungicide treatment significantly increased yield compared to the untreated control, however there were no significant differences between individual fungicide treatments. Splitting the fungicide active between the GS32 and GS39 timings gave significantly higher yields than the GS39 timing alone at this site. There was no significant response to strobilurin application at this site. All other interactions were non significant.

Note: ns=not significant; \*=5% sig; \*\*=1% sig; \*\*\*=0.1% sig

**Figure 10: Influence of Fungicide Rate on Yield Response in MacKellar – 3 Sites/3 Timings**



Overall there was a maximum 4.5% yield increase due to fungicide with MacKellar when all sites and timings were averaged. There was no yield response to the strobilurin (Amistar) over and above the standard triazole application of Folicur (tebuconazole).