

3.1.2 OPTIMISING FUNGICIDE STRATEGIES FOR MORE DISEASE SUSCEPTIBLE WHEAT CULTIVARS (INVERLEIGH, VIC)

Abstract:

In trials where yields of Kellalac were around 3t/ha, fungicides for the control of low levels of stripe rust early and leaf rust late were cost effective, provided the expenditure on fungicide input was kept at a minimum. Split applications of the triazole Folicur (2 applications of 72.5ml/ha) were cost effective and gave a cost benefit ratio of approximately 2:1.

Strobilurin/triazole mixtures whilst giving superior disease control and some evidence of improved green leaf retention, were not consistently better than triazoles alone, however there was a non significant improvement when strobilurin based mixtures were used as single sprays. The cost of the strobilurin products precluded any yield increases from being cost effective at this yield level.

The low rate 2 spray programmes applied at GS32 and 45 produced the highest mean yield increase of approximately 10%. The equivalent single spray options gave a yield increase of 7.5%, but it was noticeable that the triazole alone options of Folicur and Opus performed better as 2 spray splits.

This work whilst endorsing the fact that fungicides give yield increases, emphasizes the need to keep expenditure to a minimum, since the drier conditions during grain fill can quickly curtail the potential yield benefits of these inputs. At this yield level strobilurins despite superior late season disease control (low level infection) were not cost effective.

Growing Season Rainfall: (April-Nov): 388mm

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Researchers:

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Col Hacking, Dominic Bolton Southern Farming Systems.

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Background/Objectives:

With the large majority of wheat cultivars now deemed to be susceptible to stripe rust, in particular the new WA pathotype, this trial was set up to look at economic response to different foliar fungicide timings. In addition the trial continued the evaluation of the strobilurin fungicides (as part of project SFS 00006), the first of which was registered for broad acre cereals in Australia in August 2004 (Amistar Xtra).

Methodology:

Kellalac wheat was sown on 11th June 2004 at the main Inverleigh trial site. The planting population target was 200 plants/m². The crop was top dressed with 56 kg/ha N (10 kg/ha N at sowing and 46 kg/ha N GS30/31 on the 14th September). Fungicides were targeted at one of 4 different timings, GS32 (second node), GS33 (third node), GS39 (flag leaf emergence) and ear emergence GS59. The actual dates of application were 21st September (GS32), 5th October (late GS33), 19th October (late GS39-45) and 1st November (GS61). The treatments are listed in Table 1.



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Table 1: Products and Timings for Foliar Fungicide Evaluation

Trt No.	Fungicide Timing (ml/ha)			
	GS32 (Second node, flag minus 2 emerging)	GS33 (Third node, flag minus 1 emerging)	GS39 (Flag leaf emerging)	GS59-69 (Ear emergence)
1 SPRAY PROGRAMME				
1.	----	----	Folicur 145	----
2.	----	----	Folicur 145 +Az 250	----
3.	----	----	Folicur 145 +Az 500	----
4.	----	----	Folicur 145 +Az 1000	----
5.	----	----	Amistar Xtra 625	----
6.	----	----	Opus 250	----
2 SPRAY PROGRAMME (EARLY)				
7.	Folicur 145	----	Folicur 72.5	----
8.	Folicur 72.5 +Az 125	----	Folicur 72.5 +Az 125	----
9.	Folicur 72.5 +Az 250	----	Folicur 72.5 +Az 250	----
10.	Folicur 72.5 +Az 500	----	Folicur 72.5 +Az 500	----
11.	Amistar Xtra 312.5	----	Amistar Xtra 312.5	----
12.	Opus 125	----	Opus 125	----
3 SPRAY PROGRAMME (LATE)				
13.	----	Folicur 145	----	Folicur 145
14.	----	Folicur 72.5 +Az 125	----	Folicur 72.5 +Az 125
15.	----	Folicur 72.5 +Az 250	----	Folicur 72.5 +Az 250
16.	----	Folicur 72.5 +Az 500	----	Folicur 72.5 +Az 500
17.	----	Amistar Xtra 312.5	----	Amistar Xtra 312.5
18.	----	Opus 125	----	Opus 125
19.	Untreated			
20.	Untreated			

Explanatory notes on new fungicides:

Amistar® 250 SC contains 250g/l azoxystrobin, thus 500ml/ha applies 125g/ha ai. Folicur® contains 430g/l tebuconazole, thus 145 ml/ha applies 62.5g/ha ai. Opus® contains 125g/l epoxiconazole, thus 250ml/ha applies 31g/ha ai.

Az = Amistar Xtra® contains 200g/l azoxystrobin and 80g/l cyproconazole thus at 625 ml/ha applies 125g/ha azoxystrobin ai and 50g/ha cyproconazole ai.

Results and Discussion:

Despite the more widespread nature of stripe rust in the region, Kellalac was relatively resistant to the disease, however there was evidence of yellow necrosis (thought to be a reaction to stripe rust) which, whilst not developing into stripe rust pustules did remove green leaf area. The principal weakness of Kellalac is leaf rust when grown in southern Victoria.

In this trial, leaf rust developed very late, thus its impact was relatively limited compared to previous seasons. All fungicide treatments clearly gave benefits against the late build up of this disease (Table 2.), with strobilurin and Opus based treatments out performing the Folicur treatments.

Table 2: Inverleigh, Kellalac

The influence of Fungicide Application on Disease Infection Assessed 22nd October (GS45) - % Stripe Rust on Flag, L2, L3 and 29th November (GS80)- % Leaf Rust and % GLA on Flag.

Product	Timing of Applic'n	Rate (ml/ha)	% Stripe Rust – 22/10			% Leaf Rust & GLA – 29/11	
			Flag	L2	L3	% LR	GLA
Folicur [®]	GS45	145	0.1	0.4	0.8	2.4	38
Folicur [®] + Amistar [®]	GS45	145 + 250	0.0	0.4	0.6	0.7	36
Folicur [®] + Amistar [®]	GS45	145 + 500	0.0	0.5	0.7	0.1	47
Folicur [®] + Amistar [®]	GS45	145 + 1000	0.0	0.5	0.7	0.1	39
Amistar Xtra [®]	GS45	625	0.1	0.4	0.6	0	43
Opus [®]	GS45	250	0.1	0.6	1.0	0.4	46
Folicur [®]	GS32 +45	72.5 x2	*	*	*	2.9	24
Folicur [®] + Amistar [®]	GS32 +45	(72.5 + 125) x2	*	*	*	0.8	33
Folicur [®] + Amistar [®]	GS32 +45	(72.5 + 250) x2	*	*	*	0.9	43
Folicur [®] + Amistar [®]	GS32 +45	72.5 + 250) x2	*	*	*	0	37
Amistar Xtra [®]	GS32 +45	312.5 x2	*	*	*	0.3	37
Opus [®]	GS32 +45	125 x2	*	*	*	0.8	34
Folicur [®]	GS33 +61	72.5 x2	*	*	*	4.1	30
Folicur [®] + Amistar [®]	GS33 +61	(72.5 + 125) x2	*	*	*	1.4	32
Folicur [®] + Amistar [®]	GS33 +61	(72.5 + 250) x2	*	*	*	0.5	37
Folicur [®] + Amistar [®]	GS33 +61	72.5 + 250) x2	*	*	*	0.1	47
Amistar Xtra [®]	GS33 +61	312.5 x2	*	*	*	0.1	34
Opus [®]	GS33 +61	125 x2	*	*	*	0.3	35
Untreated	-	-	0.1	0.6	0.9	8.6	24
LSD (5%) – (trt v trt)						0.49	12
LSD (5%)- (trt v control)							

*treatments effectively untreated at assessment timing



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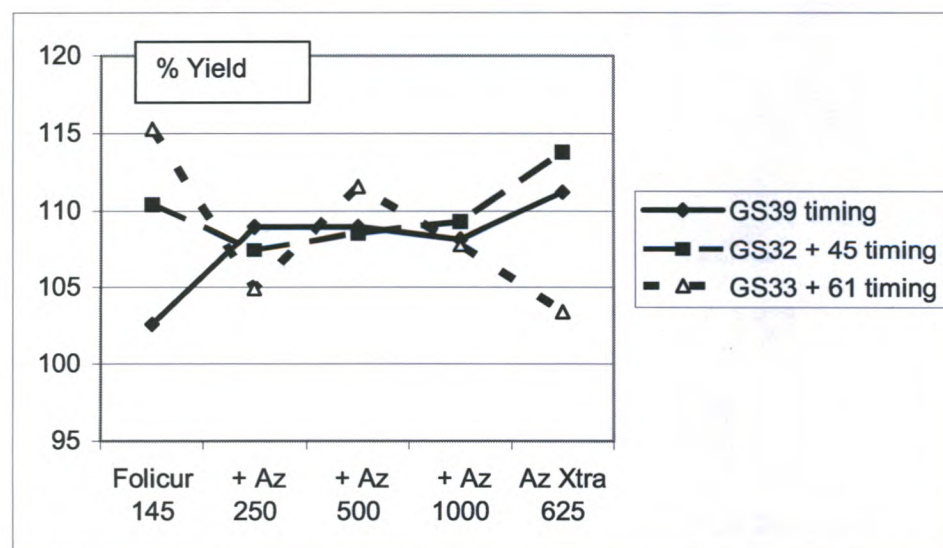
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Table 3: Inverleigh, Kellalac

The Influence of Fungicide Application on Yield (t/ha and % of Control) and Quality (% Protein, % Screenings 2.2mm, Test Weight kg/hl and TSW (Thousand Seed Weight - Selected Treatments Only)

Product	Timing of applic'n	Rate (ml/ha)	Yield (t/ha & % of control)		Quality data			
			t/ha	%	% Pr.	% Sc	Kg/hl	TSW
Folicur®	GS45	145	2.75	102.6	11.1	2.9	78.4	40.9
Folicur® + Amistar®	GS45	145 + 250	2.92	109.0	11.1	3.2	78.6	*
Folicur® + Amistar®	GS45	145 + 500	2.92	109.0	11.3	2.7	78.4	*
Folicur® + Amistar®	GS45	145 + 1000	2.90	108.2	11.0	4.7	76.5	41.2
Amistar Xtra®	GS45	625	2.98	111.2	10.9	4.1	76.3	*
Opus®	GS45	250	2.82	105.2	11.3	3.9	77.2	*
Folicur®	GS32 +45	72.5 x2	2.96	110.4	10.7	3.6	78.2	41.5
Folicur® + Amistar®	GS32 +45	(72.5 + 125) x2	2.88	107.5	11.2	1.9	78.9	*
Folicur® + Amistar®	GS32 +45	(72.5 + 250) x2	2.91	108.6	11.0	2.0	78.5	*
Folicur® + Amistar®	GS32 +45	72.5 + 250) x2	2.93	109.3	10.9	3.5	78.8	41.9
Amistar Xtra®	GS32 +45	312.5 x2	3.05	113.8	11.4	4.1	78.3	*
Opus®	GS32 +45	125 x2	3.03	113.1	11.3	4.3	77.5	*
Folicur®	GS33 +61	72.5 x2	3.09	115.3	10.8	3.2	78.1	40.8
Folicur® + Amistar®	GS33 +61	(72.5 + 125) x2	2.81	104.9	11.4	5.1	76.2	*
Folicur® + Amistar®	GS33 +61	(72.5 + 250) x2	2.99	111.6	11.0	3.5	77.6	*
Folicur® + Amistar®	GS33 +61	72.5 + 250) x2	2.89	107.8	11.2	4.6	77.8	40.8
Amistar Xtra®	GS33 +61	312.5 x2	2.77	103.4	11.2	4.8	77.7	*
Opus®	GS33 +61	125 x2	2.82	105.2	11.1	5.0	77.2	*
Untreated	-	-	2.68	100.0	10.8	4.3	77.9	39.5
LSD (5%) – (trt v trt)			0.30		0.5	2.4	2.1	1.6
LSD (5%)- (trt v control)			0.26		0.4	2.1	1.8	1.6

Graph 1: Influence of Strobilurin Addition to Folicur (Az = Amistar) on % Yield Relative to Untreated Yield Equal to 100.



Amistar Xtra at 625 ml/ha applied the equivalent amount of the strobilurin Amistar as the Folicur + Az 500ml/ha, however Amistar Xtra applies the triazole cyproconazole not tebuconazole.

Looking at fungicide treatment overall, there was a significant yield increase to fungicide application (yield range 3% to 15% 0.07 – 0.34 t/ha). There was also a significant increase in protein associated with fungicide application. Despite the significant benefits associated with strobilurin and Opus in end of season disease control and green leaf area scores, this was not represented in yield (graph 1.) at the end of the season. There was a trend with the GS45 timing for strobilurin addition to improve the yield performance of Folicur, but this increase was not significant.

Looking at the timings specifically, there was 7.5% yield increase associated with the single spray applications and a 10.5% yield increase associated with the same amount of active applied at GS32/45, the slightly later timings of GS33/61 gave 8% yield increase. The small advantages of 0.08t/ha would just have paid for the extra application cost of the GS32/45 2 spray approach.

Conclusions:

Fungicides were cost effective provided the cost of the products were kept to a minimum. Thus triazole applications of split Folicur were cost effective (single flag leaf application was not) but at this yield level strobilurins were not cost effective.

If the grain was valued at \$158/tonne, a mean yield increase of 10% would have created a gross output increase of approximately \$43/ha, this would have paid for the Folicur split application of 145 ml/ha (costed at \$10/ha + 2 applications – farmer costs with boom sprayer \$5/ha per spray) at approximately \$20/ha. The strobilurin/triazole fungicide combination Amistar Xtra was not cost effective in this trial, even though better disease control was demonstrated from these products and the triazole Opus (not yet available).



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