3.1.9 OPTIMISING FUNGICIDE STRATEGIES FOR MORE DISEASE RESISTANT WHEAT CULTIVARS (WESTBURY, TAS)

Abstract:
Mackellar wheat became infected with stripe rust at flag leaf emergence (GS37- 39). The disease developed such that by the beginning of grain fill 30% of leaf 2 and 3 had been destroyed by the disease in the untreated plots. As a consequence the response to fungicide ranged from 5-17% (0.4 – 1.35 t/ha). For all treatments, except the Folicur 145ml/ha (triazole only), it was more cost effective to apply fungicide active split into 2 sprays applied at GS33 and GS45/51 rather than as a single dose at GS45/51. The single spray was less effective since control of disease on leaf 2 and 3 was inferior to the split application. In this trial part of the reason for the poorer performance of the single spray was due to the delay in applying the spray, which was originally planned for flag leaf emergence GS39.
There was a significant response to strobilurin addition in this trial, particularly with the split application where strobilurin addition resulted in a yield increase of approximately 0.8 t/ha. There was no significant difference between whether the azoxystrobin (Amistar) was supplied as Amistar Xtra (the commercial formulation that contains cyproconazole as well as Amistar) or straight Amistar mixed with Folicur.

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Location: Westbury, Tasmania

Growing Season Rainfall (April-Dec): 465mm

Background/Objectives:
At Hamilton in 2002 a single high yielding trial suggested that strobilurin addition gave yield increases in the absence of disease (a phenomenon that is experienced in some seasons in the rainfall zones of Europe and New Zealand). To date this trial result has not been repeated in the project. These trials taking place in southern Victoria and Tasmania were conducted to examine the response of more disease resistant varieties to triazole and strobilurin fungicides in the near absence of disease. With Mackellar having been affected by stripe rust for 2 seasons in Tasmania, yield responses in this trial resemble patterns experienced with more disease susceptible cultivars.

Methodology:
MacKellar wheat was sown on 26th May 2004 at Westbury, Tasmania. The planting population target was 250 plants/m^2. Fungicides were targeted at one of 2 different timings, GS32 (second node –flag minus 2 emerging) and GS39 (flag leaf emergence). The actual dates of application were 16th October (GS33) and 4th November (GS45/51). The treatments are listed in Table 1.

Table 1: Products (ml/ha) and Timings for Foliar Fungicide Evaluation

Trt No.	Fungicide Timing (ml/ha)	
	GS33 (third node, flag minus 1 emerging)	GS45/51 (ear starting to emerge)
1 SPRAY PROGRAMMES		
1.	----	Folicur 145
2.	----	Folicur 145 +Az 250
3.	----	Folicur 145 +Az 500
4.	----	Folicur 145 +Az 1000
5.	----	Amistar Xtra 625
2 SPRAY PROGRAMMES		
6.	Folicur 145	Folicur 72.5
7.	Folicur 72.5 +Az 125	Folicur 72.5 +Az 125
8.	Folicur 72.5 +Az 250	Folicur 72.5 +Az 250
9.	Folicur 72.5 +Az 500	Folicur 72.5 +Az 500
10.	Amistar Xtra 312.5	Amistar Xtra 312.5
11.	Untreated	

Explanatory notes:

Az = Amistar® 250 SC contains 250g/l azoxystrobin, thus 500ml/ha applies 125g/ha active ingredient.

Folicur® contains 430g/l tebuconazole, thus 145 ml/ha applies 62.5g/ha active ingredient.

Opus® contains 125g/l epoxiconazole, thus 250ml/ha applies 31g/ha active ingredient.

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

Results and Discussion:

Come early grain fill (24th November) stripe rust had developed to significant levels in the untreated crop, the disease having become evident earlier than in 2003. Fungicide application had a significant influence on disease levels (Table 2) with the split application exhibiting clearly superior disease control.

These disease infection differences related to the subsequent yield increases, however the Folicur alone lacked the persistency on the flag leaf when applied as a split of 72.5 ml/ha and therefore the loss of disease control on the flag counterbalanced the better disease control on leaf 2 and 3 relative to the single spray of Folicur.

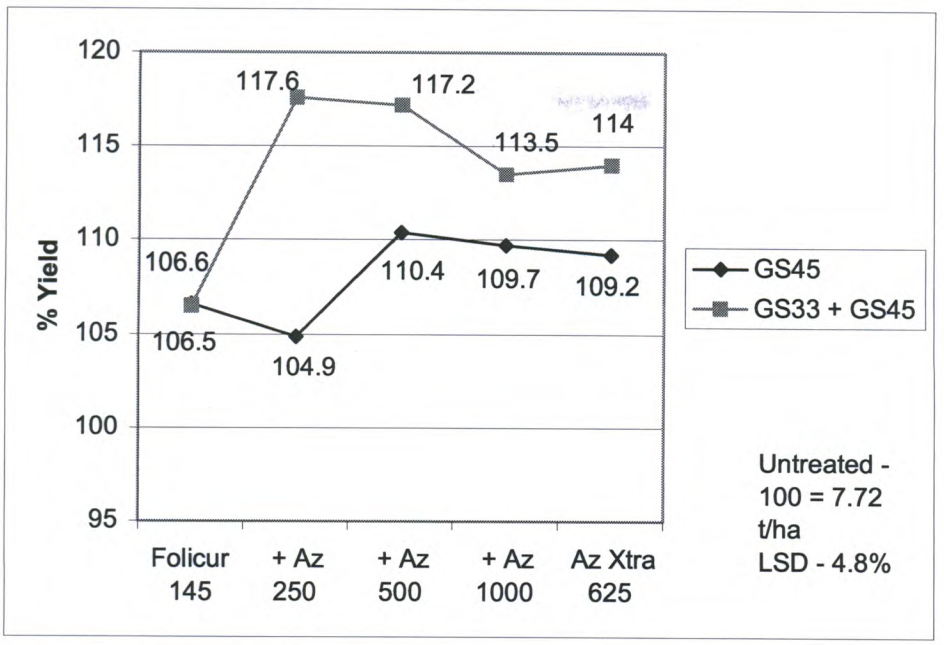
Table 2: The Influence of Fungicide Application on Yield (t/ha and % control) and Stripe Rust Infection on the Top 3 Leaves (flag, leaf 2 (F-1) and leaf 3(F-2)) Assessed on 24 Nov (GS69) – Westbury, Tasmania CV MacKellar

Product	Timing of Applic'n	Rate (ml/ha)	Yield (t/ha and % control)		% Stripe rust infection		
			t/ha	%	Flag	F - 1	F - 2
Folicur®	**GS45**	145	8.23	106.6	6.9	27.5	29.6
Folicur® + Amistar®	GS45	145 + 250	8.10	104.9	7.0	17.8	23.3
Folicur® + Amistar®	GS45	145 + 500	8.52	110.4	6.6	21.0	19.6
Folicur® + Amistar®	GS45	145 + 1000	8.47	109.7	7.2	23.2	27.9
Amistar Xtra®	GS45	625	8.43	109.2	6.2	21.2	27.2
Folicur®	GS32 +45	72.5 x2	8.22	106.5	3.7	0.9	5.2
Folicur® + Amistar®	GS32 +45	(72.5 + 125) x2	9.08	117.6	4.5	2.2	4.3
Folicur® + Amistar®	GS32 +45	(72.5 + 250) x2	9.05	117.2	2.6	0.8	3.8
Folicur® + Amistar®	GS32 +45	(72.5 + 500) x2	8.76	113.5	0.8	1.0	5.1
Amistar Xtra®	GS32 +45	312.5 x2	8.80	114	0.7	0.7	2.1
Untreated			7.72	100	9.6	32.4	30.5
LSD (5%)	**CV – 2.9%**		**0.35**		**2.3**	**5.2**	**5.4**

Fungicides created statistically significant yield responses of between 5 – 18% in this trial (Table 2.) The split applications gave superior stripe rust control; primarily on leaf 2 and 3 (F-1 and F-2) and as a consequence significantly greater yields (p=0.001). There was a significant response to strobilurin particularly in the 2 spray programmes, however this yield response is less easily attributed to differences in the stripe rust infection recorded at GS69.

The optimum strobilurin rate was lower when the active ingredient was split into 2 sprays as opposed to a single application. There was no difference in performance between Amistar applied as Amistar Xtra (mixed with Alto-cyproconazole) and the same quantity of Amistar applied in a mixture with Folicur - tebuconazole)

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



Az = Amistar

Conclusions:

As was the case last season MacKellar succumbed to stripe rust infection, though this season disease was more severe. As a consequence, fungicides were cost effective in this trial. The triazole Folicur whether applied alone at GS45/51 or split into 2 sprays gave a yield increase of approximately 0.5 t/ha, however when strobilurin was added (Amistar 250ml/ha) the yield was increased to 1.35 t/ha over the untreated.