Trial 2. HYC Wheat Disease Management x Variety (FAR SAC W23-04a)

Key Points:

- *There was a significant interaction between cultivar and fungicide management with cultivars responding differently to the number of fungicide units applied. Yields ranged from 7.34t/ha in untreated RGT Cesario, to 10.16t/ha in the newly released AGF cultivar Longford (AGF4818) with full fungicide protection.*
- *Stockade (white wheat – APW) was the only cultivar to give no significant response in yield to fungicide application, although there was a trend for higher yield under full protection.*
- *Red wheats Longford (AGF4818), RGT Cesario and AGTW005 gave significantly higher yields with full protection based on 4 units of fungicide, but only RGT Cesario gave a significant response when a single fungicide was applied at GS39 (8.21t/ha vs. untreated 7.34t/ha).*
- *The yield response to full protection over untreated was Stockade (0.29t/ha), Longford (AGF4818) (0.63t/ha), RGT Cesario (2.12t/ha) and AGTW005 (0.64t/ha).*
- *The dominant diseases were stripe rust in RGT Cesario and Septoria tritici blotch (STB) in Stockade, although drier spring conditions reduced upper canopy infection with STB.*
- *There was no obvious disease in Longford (AGF4818) and only traces of Wirrega blotch and stripe rust in AGTW005 during grain fill, so it is difficult to suggest where the additional yield came from in these two varieties.*
- *Longford (AGF4818) and AGTW005 retained their green leaf the longest, however four fungicide units were necessary to retain green leaf in RGT Cesario which is now very stripe rust susceptible.*
- *Higher senescence in Stockade was primarily related to a shorter growing season rather than the effect of more STB, which although less evident under four fungicides did not remove the senescence in the lower canopy.*
- *In terms of economics the most profitable approach in a dry spring with Stockade was based on four units of fungicide (despite lower yield response there was an improvement in bin grade through improved test weights), the same was the case with RGT Cesario where it was imperative to provide full protection against stripe rust. The net margin advantage of four fungicide units over one being almost over $300/ha.*
- *Grain quality parameters varied slightly with the different combinations of fungicide and cultivar, but all treatments had protein at least 11% or over with slightly, but significantly higher test weights under more intensive fungicide management.*

Treatments:

Three red feed winter wheats Longford (formerly AGF4818), RGT Cesario, AGTW005 and the white wheat Stockade (APW) were managed with three levels of fungicide, untreated, a single unit flag leaf spray and full protection based on 4 units of fungicide.

Table 1. Treatments

Treatment	
Treatment 1.	**Untreated**
Treatment 2.	**1 unit of Fungicide** -A single flag leaf spray Revystar 150EC (mefentrifluconazole 100g/L, fluxapyroxad 50g/L) applied at 750mL/ha (75g ai/ha & 37.5g ai/ha) (750 mL/ha) at GS39
Treatment 3.	**4 units of fungicide (Full protection)** – flutriafol-coated MAP in furrow at sowing (500 g ai/L at 200 mL/ha), Prosaro 300mL/ha at GS31, Revystar 150EC (mefentrifluconazole 100g/L, fluxapyroxad 50g/L) applied at 750mL/ha (75g ai/ha & 37.5g ai/ha) (750 mL/ha) at GS39 and Opus 125 SC (epoxiconazole 125g/L) applied at 500mL/ha (62.5 g ai/ha) at GS59

Stockade was the only variety not to give a statistically significant yield response to increased fungicide input based on four fungicides as opposed to one fungicide (Table 2), however four units of fungicide generated the better profitability as a result of yield with all varieties except Stockade, where bin grade improvement was the key (Table 3 & Figure 2).

Table 2. Influence of management strategy and cultivar on grain yield (t/ha).

	Yield (t/ha)			
	Management Strategy			
	Untreated	**1 Fungicide**	**4 Fungicides**	**Mean**
Stockade	8.68 ef	8.62 f	8.97 e	**8.76**
RGT Cesario	7.34 h	8.21 g	9.46 cd	**8.33**
AGTW005	9.34 d	9.55 cd	9.98 ab	**9.62**
Longford	9.53 cd	9.69 bc	10.16 a	**9.80**
Mean	**8.72**	**9.02**	**9.64**	**9.13**
LSD Cultivar P=0.05		0.18	**P value**	<0.001
LSD Management P=0.05		0.26	**P value**	<0.001
LSD Cultivar x Man. P=0.05		0.32	**P value**	<0.001

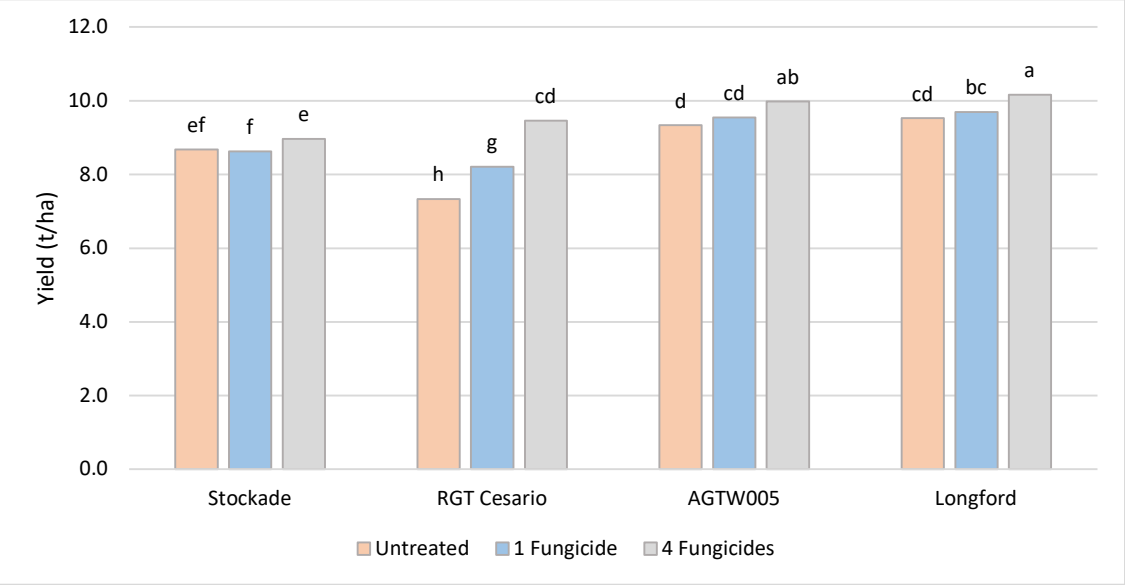

Figure 1. Interaction of cultivar and fungicide on grain yield (t/ha) ($p < 0.001$, LSD = 0.32).

Table 3. Influence of cultivar and fungicide management on bin grade, net margin over the untreated and operational costs.

	Fungicide Management	Bin Grade	Margin after Fungicide Costs & application $/ha	Fungicide Costs & application $/ha	Net Margin over Untreated
Stockade	Untreated	AGP1	$2,672.82	$0.00	0
	1F	APW1	$2,931.99	$34.32	$259.17
	4F	APW1	$2,985.00	$98.96	$312.18
RGT Cesario	Untreated	SFWR	$2,259.18	$0.00	0
	1F	SFWR	$2,493.74	$34.32	$234.56
	4F	SFWR	$2,814.11	$98.96	$554.93
AGTW005	Untreated	SFWR	$2,875.18	$0.00	0
	1F	SFWR	$2,905.54	$34.32	$30.36
	4F	SFWR	$2,975.81	$98.96	$100.63
Longford	Untreated	SFWR	$2,935.24	$0.00	0
	1F	SFWR	$2,951.12	$34.32	$15.88
	4F	SFWR	$3,031.25	$98.96	$96.01

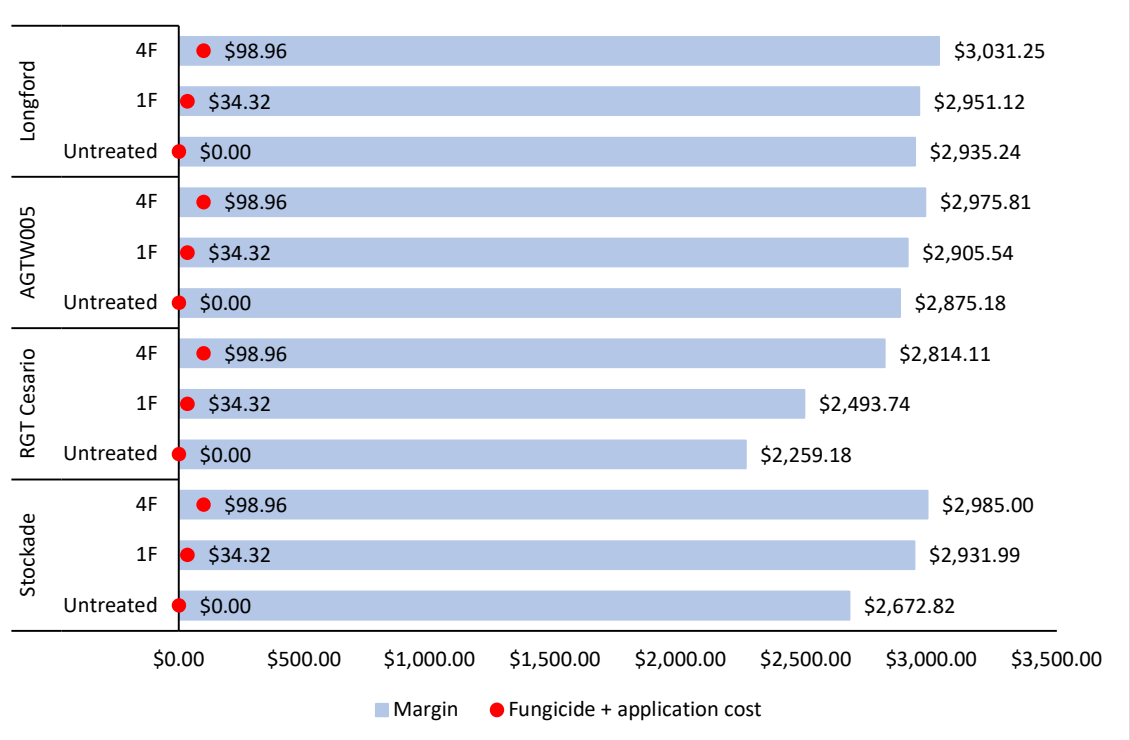

Figure 2. Influence of fungicide strategy and cultivar on system profitability. Value outside the bar denotes margin.

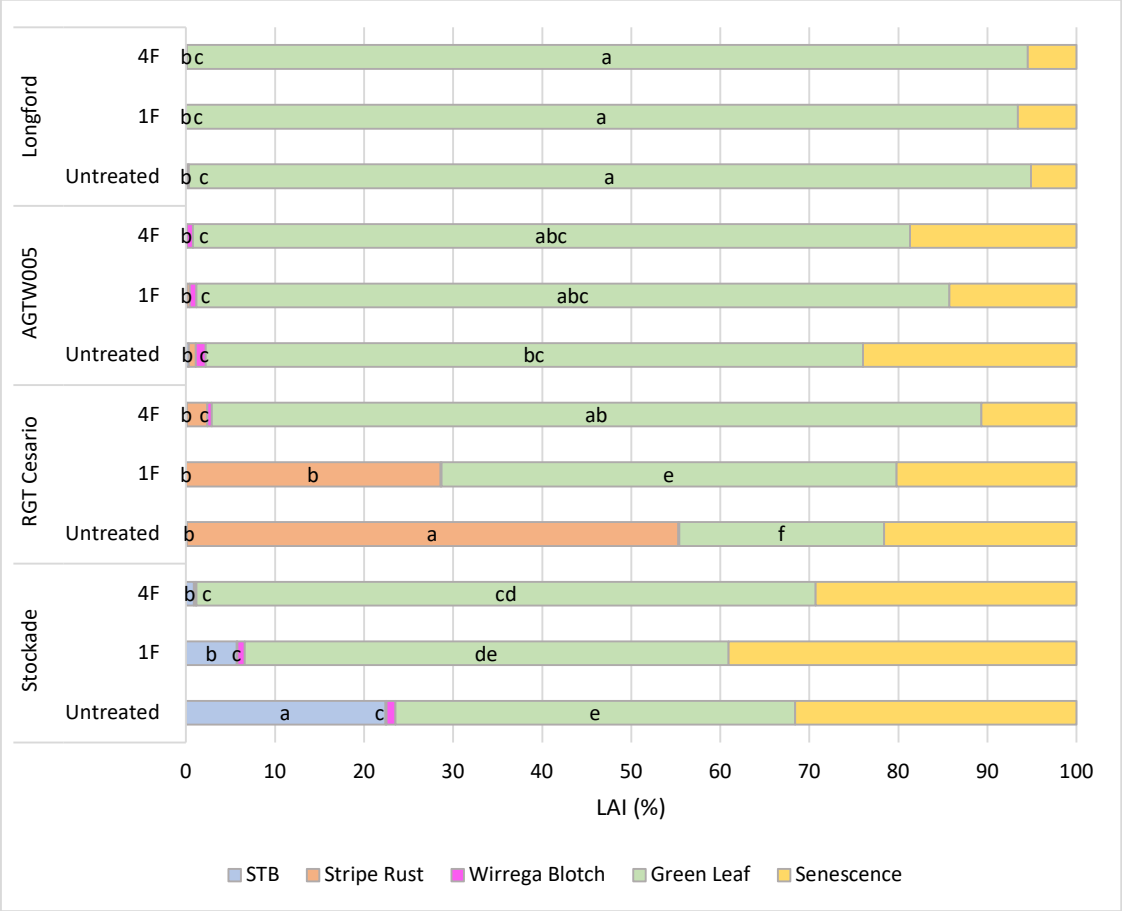

Figure 3. Influence of management strategy and cultivar on F-2 leaf area coverage (%) of septoria tritici blotch (STB), stripe rust, wirrega blotch, green leaf retention, and senescence assessed 17 November (GS71). Refer to Table 3 for statistical significance.

Table 4. Significance analysis of the influence of management strategy and cultivar on leaf area coverage (%) of septoria tritici blotch (STB), stripe rust, wirrega blotch, green leaf retention, and senescence.

		LSD P=0.05	P value
Septoria tritici blotch	**Cultivar**	5.8	0.004
	Management	ns	0.147
	Cultivar x Man.	10.0	0.037
Stripe rust	**Cultivar**	4.3	<0.001
	Management	2.9	<0.001
	Cultivar x Man.	7.5	<0.001
Wirrega blotch	**Cultivar**	0.6	0.039
	Management	ns	0.357
	Cultivar x Man.	ns	0.654
Green leaf retention	**Cultivar**	10.8	<0.001
	Management	9.5	0.005
	Cultivar x Man.	16.5	<0.001

Table 5. Influence of management strategy and cultivar on protein (%).

	Protein (%)			
	Management Strategy			
	Untreated	**1 Fungicide**	**4 Fungicides**	**Mean**
Stockade	11.6 -	11.9 -	11.9 -	**11.8 a**
RGT Cesario	11.0 -	11.3 -	11.4 -	**11.2 b**
AGTW005	12.0 -	11.8 -	12.0 -	**11.9 a**
Longford	11.4 -	11.2 -	11.3 -	**11.3 b**
Mean	**11.5 -**	**11.5 -**	**11.6 -**	**11.5**
LSD Cultivar P=0.05		0.2	**P value**	<0.001
LSD Management P=0.05		ns	**P value**	0.084
LSD Cultivar x Man. P=0.05		ns	**P value**	0.386

Note: 150 N kg/ha of applied nitrogen fertiliser as solid prilled 46% N urea

Table 6. Influence of management strategy and cultivar on test weight (kg/hL).

	Test weight (kg/hL)			
	Management Strategy			
	Untreated	**1 Fungicide**	**4 Fungicides**	**Mean**
Stockade	75.3 -	76.8 -	77.1 -	**76.4 -**
RGT Cesario	75.0 -	76.7 -	77.1 -	**76.3 -**
AGTW005	77.0 -	76.2 -	77.4 -	**76.9 -**
Longford	77.4 -	77.0 -	77.5 -	**77.3 -**
Mean	**76.2 b**	**76.7 ab**	**77.3 a**	**76.7**
LSD Cultivar P=0.05		ns	**P value**	0.074
LSD Management P=0.05		0.7	**P value**	0.025
LSD Cultivar x Man. P=0.05		ns	**P value**	0.133

Table 7. Influence of management strategy and cultivar on screenings (%).

	Screenings (%)			
	Management Strategy			
	Untreated	**1 Fungicide**	**4 Fungicides**	**Mean**
Stockade	4.1 a	3.8 ab	3.5 bc	**3.8 a**
RGT Cesario	2.0 d	1.7 de	1.4 e	**1.7 c**
AGTW005	1.5 e	1.4 e	1.6 de	**1.5 c**
Longford	3.2 c	3.6 b	3.5 bc	**3.4 b**
Mean	**2.7 -**	**2.6 -**	**2.5 -**	**2.6**
LSD Cultivar P=0.05		0.3	**P value**	<0.001
LSD Management P=0.05		ns	**P value**	0.324
LSD Cultivar x Man. P=0.05		0.5	**P value**	0.034

Table 8. Trial input and management details.

Varieties:		**Longford, RGT Cesario, AGTW005 and Stockade**
Sowing date:		11 May 2023
Harvest date:		14 January 2024
Seed rate:		180 seeds/m^2
Basal fertiliser:	11 May	100 kg/ha MAP
Nitrogen:	26 Jul	50kg N/ha
	19 Sep	100kg N/ha
Fungicides:		As per treatment list

Table 9. Active ingredients and chemical loading (g/L) for products used.

Name	**Active 1**		**Active 2**		**Type**
Fungicide					
Flutriafol	Flutriafol	500 g/L	---	---	SC
Opus	Epoxiconazole	125 g/L	---	---	SC
Prosaro	Prothioconazole	210 g/L	Tebuconazole	210 g/L	SC
Revystar	Mefentrifluconazole	100 g/L	Fluxapyroxad	50 g/L	EC