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Disease Management in wheat – what's the yield response to fungicide in your region?

This issue of InGRAINed examines fungicide response (t/ha) of fully commercial and new wheat varieties at our regional Crop Technology Centres (CTC). The results are based on our independent Germplasm Evaluation Network (GEN) results where varieties have been evaluated under plus and minus fungicides over the last two-three years and some of the final yield data collected from the Hyper Yielding Crops (HYC) project (courtesy of GRDC). Disease susceptibility is based on observations at the FAR Australia CTCs, please refer to breeders and NVT ratings for specific varieties we may not have included or where those diseases have not been present in the FAR Australia trials.

National overview and regional key points for HRZ regions

Wheat

- ***As a general observation over the last three years, yield responses to fungicide in both new and popular varieties have been higher in HRZ regions in the east (SA, VIC, NSW) than in the west (WA)****, with the control of stripe rust Puccinia striiformis f. sp. tritici. and Septoria tritici blotch (STB) Zymoseptoria tritici in the east being responsible for higher yield responses.*
- *In the east, the extremely high disease pressure experienced in 2022 resulted in variety responses that were many times greater than those experienced in 2023, which were themselves greater than those experienced in 2024.*
- ***In many varieties of wheat that were not susceptible to stripe rust, fungicide programmes lost money in 2024!***
- *In many cases in Victoria and South Australia, this reduction in fungicide response in 2023 & 2024 was mirrored in overall lower grain yields with yields at the Victorian CTC at Gnarwarre no greater than 4.5 – 5.0t/ha.*
- *In our southern NSW high altitude site our fungicide responses were greater than in VIC and SA in 2024 with yields maintained at 9t/ha at our Wallendbeen site.*
- *Stripe rust infection has continued to be the greatest yield "robber" in susceptible varieties (e.g. Scepter, RGT Cesario, RGT Accroc, RockStar, Genie, Mammoth, LRPB Matador and Boa), even in the drier seasons of 2023 and 2024 (see national GEN results 2023 & 2024 for stripe rust infection levels - https://faraustralia.com.au/).*
- *In contrast STB has been conspicuous by its absence in susceptible varieties such as Stockade, in the dry seasons of 2023 and 2024.* ***Dry weather during stem elongation is the most effective fungicide for STB!***
- *Therefore, if you are growing a variety that is susceptible to stripe rust in the eastern states consider applying flutriafol to the MAP fertiliser, since stripe rust has continued to reduce yields even in dry years.*
- *To date the least fungicide responsive wheat varieties in the southeast have been the red feed wheats Longford, Triple 2, AGFWHWW2, KWS Expectum and Big Red (KWS Expectum and AGFWHWW2 are not yet commercially available).*
- *The responsiveness of the primarily STB susceptible varieties such as Stockade and Brighton have fallen in 2023 and 2024 because of dry spring conditions between GS31 – GS59.*
- *WA disease levels (Stagonospora & Yellow leaf spot) have been low at the Esperance and Frankland River HRZ zones in 2023 and 2024****. Growers should be cautious of overspending on fungicides in WA as yield responses to fungicide have been significantly lower than those observed in the east.***

Regional fungicide responses (t/ha) and principal diseases observed

i) **Southern Victoria (HRZ), Gnarwarre** - 3 Year 2022-2024 & 2 Year fungicide responses

VIC Wheat	Yield response (t/ha)				Observed Diseases	
Variety	**2022**	**2023**	**2024**	**Three-year mean**	**Main diseases**	**Other diseases**
KWS Expectum (s)	0.40	0.24	0.21	**0.28**	STB	Leaf rust
Longford (w)	1.19	-0.46	0.30	**0.34**	STB	---
Big Red (w)	1.46	-0.06	-0.06	**0.45**	STB/stripe rust	STB/stripe rust
Stockade (s)	2.66	-0.43	0.15	**0.79**	STB	Stripe rust
RGT Cesario (w)	1.89	0.41	0.97	**1.09**	Stripe rust	---
RGT Accroc (w)	2.78	1.57	-0.12	**1.45**	Stripe rust	STB/leaf rust
RockStar (s)	2.73	3.27	0.90	**2.58**	Stripe rust	STB
Year Mean	**1.91**	**0.77**	**0.28**	**1.00**		
RGT Waugh (w)	1.04	0.66	----	**----**		

w – winter wheat, s – spring wheat

Yield responses displayed in tables are representative of the additional grain yield (t/ha) achieved by controlling disease through a 3-spray fungicide program compared to the untreated. Negative values show a yield loss to fungicide application.

Green, yellow and pink colouration – guide to least and most fungicide responsive varieties

Least responsive to fungicide application	Generally unresponsive to fungicide application
Intermediate	Showing moderate yield responses, could be managed with a reduced fungicide program in most years
Most responsive to fungicide application	Showing large fungicide responses in most years. Should be a priority in the fungicide program

GEN results in a wider range of milling wheats have now been generated in the last two years and are featured below.

VIC Wheat	Yield response (t/ha)			Observed Diseases	
Variety	**2023**	**2024**	**Two-year mean**	**Main diseases**	**Other diseases**
Stockade (s)	-0.43	0.15	**-0.14**	STB	
Longford (w)	-0.46	0.30	**-0.08**	----	----
AGFWHWW2	0.14	0.02	**0.08**	----	----
Triple 2 (w)	0.46	0.24	**0.36**	Leaf rust	----
Brighton (w)	0.45	0.05	**0.25**	Stripe rust/STB	Leaf rust
KWS Expectum (s)	0.24	0.21	**0.23**	STB	Stripe rust
Triple 2 (w)	0.46	0.24	**0.36**	Leaf rust	----
Ironbark (s)	0.70	0.13	**0.42**	STB	----
V15019-088 (s)	0.70	0.60	**0.65**	Stripe rust	----
RGT Cesario (w)	0.41	0.97	**0.69**	Stripe rust	----
RGT Accroc (w)	1.57	-0.12	**1.00**	Stripe rust	STB
Mammoth (s)	1.41	1.06	**1.23**	Stripe rust	STB
Genie (s)	2.13	1.10	**1.78**	Stripe rust	STB
RockStar (s)	3.27	0.90	**2.48**	Stripe rust	STB
Year Mean	**1.28**	**0.58**	**0.97**		

Please note that new cultivars that have only been featured for one year (2024) are not included in tables but are featured in the 2024 GEN results on the FAR Australia website. Notable of these varieties is **Shotgun, Vortex and LRPB Matador** which all performed strongly across FAR's medium rainfall zone sites, however, be aware that in SA and the eastern states more generally they are susceptible to stripe rust and Septoria tritici blotch. In SA, at Bordertown, Shotgun was particularly responsive to fungicide when stripe rust was the principal disease present (see national GEN results 2023 & 2024 for stripe rust infection levels - *https://faraustralia.com.au/*).

ii) **NSW High altitude site, Wallendbeen** - 3 Year 2022-2024 & 2 Year fungicide responses (t/ha)

This has been on average the highest yielding CTC over the last five years and unlike the Victorian HRZ fungicide response was higher in 2024 than 2023. The huge responses to fungicide in 2022 compared to 2023 and 2024 underline the influence of season on fungicide response.

NSW Wheat	Yield response to fungicide (t/ha)				Observed Diseases	
Variety	**2022**	**2023**	**2024**	**Three-year mean**	**Main diseases**	**Other diseases**
Big Red (w)	1.67	0.06	0.24	**0.66**	STB	----
RGT Accroc (w)	3.71	0.54	0.20	**1.48**	Stripe rust /STB	Leaf rust
RGT Cesario (w)	1.88	0.86	2.46	**1.73**	Stripe rust	----
Scepter (s)	5.72	1.85	3.28	**3.62**	Stripe rust/STB	----
Year Mean	**3.25**	**0.83**	**1.55**	**1.87**		

NSW Wheat	Yield response (t/ha)				
Variety	**2023**	**2024**	**Two-year mean**	**Main diseases**	**Other diseases**
RGT Accroc (w)	0.54	0.20	**0.37**	Stripe rust / STB	Leaf rust
Triple 2 (w)	0.37	0.48	**0.43**	Leaf rust	----
Stockade (s)	0.80	0.17	**0.48**	STB	----
Brighton (w)	0.90	0.50	**0.70**	STB	Stripe /leaf rust
RGT Cesario (w)	0.86	2.46	**1.66**	Stripe rust	
Year Mean	**0.69**	**0.76**	**0.73**		

The breakdown of RGT Cesario to stripe rust in 2024 at this site (one - two years later than it was observed further south) had considerable impact on fungicide yield response resulting in greater yield loss to disease in 2024 than that observed in the same variety in the 2022.

iii) **SA HRZ site, Millicent** - 3 Year 2022-2024 & 2 Year fungicide responses (t/ha)

SA Wheat	Yield response (t/ha)					
Variety	**2022**	**2023**	**2024**	**Three-year mean**	**Main diseases**	**Other diseases**
KWS Expectum (s)	0.77	-0.61	-0.22	**-0.02**	STB	
Longford (w)	0.80	0.63	0.11	**0.51**	STB	
RGT Cesario (w)	0.89	1.65	0.27	**0.94**	Stripe rust	
Big Red (w)	2.19	0.41	0.27	**0.96**		
RGT Accroc (w)	1.83	3.32	0.15	**1.78**	-	
RockStar (s)	2.52	2.35	0.73	**1.87**	STB	Stripe rust
Year Mean	**1.57**	**1.68**	**0.23**	**1.19**		

SA Wheat	Yield response (t/ha)				
Variety	**2023**	**2024**	**Two-year mean**	**Main diseases**	**Other diseases**
KWS Expectum (s)	-0.61	-0.22	**-0.42**	STB	
Longford (w)	0.63	0.11	**0.37**	-	
Stockade (s)	0.29	0.52	**0.41**	STB	
Triple 2 (w)	1.10	-0.19	**0.46**	Leaf rust	
V15019-088 (s)	0.83	0.26	**0.55**	STB	
RGT Cesario (w)	1.65	0.27	**0.96**	Stripe rust	
RockStar (s)	2.35	0.73	**1.54**	STB	Stripe rust
RGT Accroc (w)	3.32	0.15	**1.74**	-	
Genie (s)	2.54	0.96	**1.75**	STB	
Mammoth (s)	3.24	1.85	**2.55**	Stripe rust	
Year Mean	**1.53**	**0.44**	**0.99**		

iv) **WA HRZ site, Frankland River** - 2 Year fungicide responses (t/ha) – 2023 & 2024

Data from the WA HRZ region is one year behind that already gathered in the eastern states but it is clear that the current absence of stripe rust and STB in the west results in much smaller yield responses to fungicide, as such growers and advisers need to be sure they know what diseases are being targeted with fungicides since many varieties are not giving profitable yield responses. For a wider range of variety yield responses see the FAR website for the 2024 GEN results. WA Yield responses to fungicides for varieties such as Scepter, Genie and Mammoth are in stark contrast to results for Victoria and SA.

WA Wheat	Yield response (t/ha)				
Variety	**2023**	**2024**	**Two-year mean**	**Main diseases**	**Other diseases**
Genie (s)	0.28	-0.31	**-0.02**	SNB	
Wallaroo (w)	0.08	-0.04	**0.02**	-	
Scepter (s)	0.14	-0.01	**0.06**	SNB, WPM	
Mammoth (s)	0.27	0.04	**0.16**	SNB/YLS	
Brighton (w)	0.45	0.16	**0.31**	SNB/YLS	
Year Mean	**0.24**	**-0.03**	**0.11**		

It is notable that the most yield responsive varieties in WA trials have been those where the Stagonospora (SNB)/Yellow leaf spot (YLS) disease complex has been present, with Mammoth, Brighton and Scepter being those varieties tested where this has been most noticeable. In addition, wheat powdery mildew has been noted in Genie, Scepter and Valliant.

Foliar Disease Management in wheat in SE Australia – New GRDC project FAR 202503 – RTX 001

A new three-year study on foliar fungicide disease management strategies for wheat has just been commissioned by GRDC with FAR Australia leading the project over nine research sites in four states. The research will look to validate new approaches to managing wheat varieties in the presence of fungicide resistance, looking at the most useful parameters for judging the economic response from fungicide application. The research which focuses on rusts, Septoria and powdery mildew will examine some of the newly developed decision support apps and spore traps.

The project which has an important extension role sees FAR Australia collaborating with Ag VIC, Trengove Consulting (SA) and Brill Ag (NSW). The following map shows the locations of the research sites of FAR 202503-RTX001covering four states in SE Australia