INDUSTRY INNOVATIONS 2024: PROVISIONAL HARVEST RESULTS – May Sown Barley

2024 SA Bordertown Crop Technology Centre (MRZ)

Sown: 15 May 2024
Harvested: 10 December 2024
Rotation position: 2023 Canola
Soil type: Brown clay
FAR code: FAR MSA II B24-33

The Germplasm Evaluation Network (GEN) is a FAR Australia 'Industry Innovations' initiative that tests crop variety performance across FAR Australia's national network of Crop Technology Centres. GEN sites test variety performance with and without fungicide. FAR Australia provides the control varieties and breeders enter their chosen lines for evaluation.

Key Points:

- *A very dry start to the season and 232mm growing season rainfall (GSR – Apr-Oct) resulted in barley yields that ranged from 6.24 – 7.39t/ha depending on variety and foliar fungicide input.*
- *This compared to wheat yields sown at the same time alongside ranging from 4.37 – 6.03t and giving on average of 0.3t/ha response to fungicide because of stripe rust.*
- *There were significant differences in grain yield due to variety (p=<0.001) but not as a result of fungicide management (p=0.415), despite net blotch and scald being present in some untreated varieties.*
- *The highest yielding variety was Neo CL (7.34 t/ha) although this yield was not statistically superior to raft of six varieties that all averaged over 7t/ha, these were AGFBA021022, RGT Orbiter, RGT Asteroid, RGT Planet and Minotaur.*
- *There were significant effects of variety on grain quality (grain protein, test weight, retentions and screenings) with Neo CL again performing strongly across all these parameters.*
- *Despite no significant effects on yield fungicide application resulted in very small but significant improvements in screenings (1.9% vs 1.8%) and test weights (67.4 kg/hl vs 67.8 kg/hl).*
- *In untreated crops the highest levels of net form net blotch were recorded in RGT Planet, RGT Asteroid, PegasusAX (AGTB0667), KWS Thalis (FAR SB2) and RGT Orbiter, whilst with scald Bigfoot CL (AGTB0669) and Cyclops were the most infected varieties, however none of these infections lead to significant yield increases.*
- *Overall, grain quality was in the correct range for malt varieties to achieve malting specifications.*

Yield (t/ha) & quality data (% protein, test weight, % screenings)

There were significant differences in yield and quality due to variety (p=0.005), but no response to fungicide management or interaction between variety and fungicide management (Tables 1 – 3 & Figure 1).

Table 1. Influence of fungicide application on the grain yield (t/ha) of spring barleys (varieties grown plus and minus fungicide) – May 15 sown.

	Management Level					
Variety (all spring germplasm)	**Untreated**		**Plus fungicide**		**Mean**	
	Yield t/ha		**Yield t/ha**		**Yield t/ha**	
RGT Planet	7.23	-	7.11	-	**7.17**	**abc**
Neo	7.29	-	7.39	-	**7.34**	**a**
Minotaur	6.87	-	7.33	-	**7.10**	**abc**
Rosalind	6.42	-	6.24	-	**6.33**	**e**
Bigfoot CL (AGTB0669)	6.53	-	6.33	-	**6.43**	**de**
PegasusAX (AGTB0667)	6.47	-	6.74	-	**6.60**	**cde**
Cyclops	6.30	-	6.66	-	**6.48**	**de**
KWS Thalis (FAR SB2)	6.52	-	7.24	-	**6.88**	**a-e**
KWS Willis (FAR SB1)	6.82	-	6.63	-	**6.72**	**b-e**
KWS 18/3518 (FAR SB5)	6.90	-	7.00	-	**6.95**	**a-d**
AGFBA021022	7.50	-	7.07	-	**7.28**	**ab**
RGT Asteroid	7.13	-	7.19	-	**7.16**	**abc**
RGT Orbiter	7.10	-	7.23	-	**7.16**	**abc**
Mean	**6.85**	**-**	**6.93**	**-**	**6.89**	
LSD Variety p = 0.05	0.59		**P value**		0.005	
LSD Management p = 0.05	ns		**P value**		0.415	
LSD Variety x Man. p = 0.05	ns		**P value**		0.863	

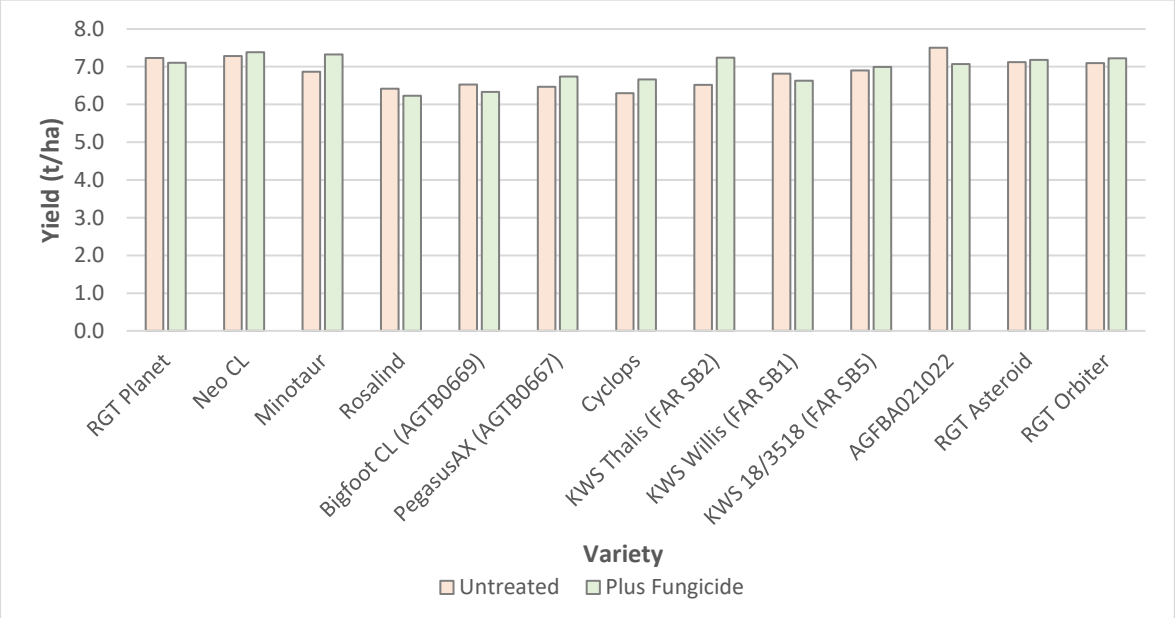

Figure 1. Influence of variety and fungicide application on grain yield (t/ha). Variety ($LSD_{0.05}$ = 0.59, P-value = 0.005), Fungicide management and Fung x Variety interaction differences were not significant – May 15 sown.

Table 2. Influence of variety and fungicide application on the grain protein (%) and test weights (kg/hL) – December 10 harvest.

	Management Level											
Variety	**Untreated**		**Plus Fungicide**		**Mean**		**Untreated**		**Plus Fungicide**		**Mean**	
	Protein %		**Protein %**		**Protein %**		**Test weight kg/hL**		**Test weight kg/hL**		**Test weight kg/hL**	
RGT Planet	11.1	-	11.0	-	**11.1**	**ef**	66.6	-	66.7	-	**66.6**	**cd**
Neo CL	10.7	-	10.8	-	**10.7**	**f**	68.4	-	68.2	-	**68.3**	**ab**
Minotaur	11.1	-	11.1	-	**11.1**	**ef**	69.0	-	68.7	-	**68.8**	**a**
Rosalind	11.9	-	11.4	-	**11.6**	**bc**	67.4	-	68.0	-	**67.7**	**a-d**
Bigfoot CL	12.0	-	12.1	-	**12.1**	**a**	68.7	-	68.7	-	**68.7**	**a**
PegasusAX	11.6	-	11.4	-	**11.5**	**bcd**	67.8	-	68.7	-	**68.3**	**ab**
Cyclops	11.5	-	11.8	-	**11.7**	**ab**	67.4	-	68.4	-	**67.9**	**abc**
KWS Thalis	11.4	-	11.1	-	**11.2**	**de**	67.0	-	68.2	-	**67.6**	**a-d**
KWS Willis	11.4	-	11.2	-	**11.3**	**b-e**	66.9	-	67.5	-	**67.2**	**bcd**
KWS 18/3518	11.6	-	10.9	-	**11.3**	**cde**	65.8	-	67.0	-	**66.4**	**d**
AGFBA021022	11.5	-	11.1	-	**11.3**	**b-e**	66.6	-	67.1	-	**66.9**	**cd**
RGT Asteroid	11.5	-	11.1	-	**11.3**	**b-e**	67.1	-	68.3	-	**67.7**	**abc**
RGT Orbiter	10.9	-	11.1	-	**11.0**	**ef**	67.0	-	66.6	-	**66.8**	**cd**
Mean	**11.4**	**-**	**11.2**	**-**	**11.3**		**67.4**	**b**	**67.8**	**a**	**67.6**	
Variety	**LSD p = 0.05**		0.4		**P val**	<0.001	**LSD p = 0.05**		1.3		**P val**	0.002
Management	**LSD p = 0.05**		ns		**P val**	0.089	**LSD p = 0.05**		0.4		**P val**	0.030
Var. x Man.	**LSD p = 0.05**		ns		**P val**	0.336	**LSD p = 0.05**		ns		**P val**	0.951

Table 3. Influence of fungicide on the retention (% > 2.5mm) and screenings (% < 2.2mm) of barley varieties plus and minus fungicide – December 10 harvest.

	Management Level											
Variety	**Untreated**		**Plus Fungicide**		**Mean**		**Untreated**		**Plus Fungicide**		**Mean**	
	Retention %		**Retention %**		**Retention %**		**Screenings %**		**Screenings %**		**Screenings %**	
RGT Planet	86.5	-	89.8	-	**88.2**	**g**	2.6	-	2.4	-	**2.5**	**a**
Neo CL	94.2	-	95.1	-	**94.7**	**a-d**	1.5	-	1.7	-	**1.6**	**c**
Minotaur	94.7	-	95.5	-	**95.1**	**abc**	1.5	-	1.7	-	**1.6**	**c**
Rosalind	93.4	-	94.5	-	**94.0**	**bcd**	1.8	-	1.5	-	**1.6**	**c**
Bigfoot CL	96.4	-	96.4	-	**96.4**	**a**	1.5	-	1.6	-	**1.5**	**c**
PegasusAX	91.5	-	90.8	-	**91.1**	**ef**	1.8	-	1.8	-	**1.8**	**bc**
Cyclops	95.4	-	96.3	-	**95.8**	**ab**	1.9	-	1.3	-	**1.6**	**c**
KWS Thalis	91.3	-	90.1	-	**90.7**	**f**	2.4	-	2.1	-	**2.2**	**ab**
KWS Willis	94.4	-	95.2	-	**94.8**	**a-d**	1.7	-	1.5	-	**1.6**	**c**
KWS 18/3518	89.0	-	93.1	-	**91.0**	**ef**	2.6	-	2.1	-	**2.4**	**a**
AGFBA021022	93.7	-	94.8	-	**94.2**	**bcd**	1.8	-	1.9	-	**1.8**	**bc**
RGT Asteroid	91.2	-	94.4	-	**92.8**	**de**	2.0	-	1.5	-	**1.8**	**bc**
RGT Orbiter	92.9	-	93.6	-	**93.2**	**cd**	1.9	-	2.1	-	**2.0**	**abc**
Mean	**92.7**	**-**	**93.8**	**-**	**93.2**		**1.9**	**b**	**1.8**	**a**	**1.8**	
Variety	**LSD p = 0.05**		0.4		**P val**	<0.001	**LSD p = 0.05**		1.3		**P val**	0.002
Management	**LSD p = 0.05**		ns		**P val**	0.089	**LSD p = 0.05**		0.4		**P val**	0.030
Var. x Man.	**LSD p = 0.05**		ns		**P val**	0.336	**LSD p = 0.05**		ns		**P val**	0.951

Table 4. Influence of fungicide application and variety on plot disease infection levels (%) of Net form of net blotch (NFNB) and Spot form of net blotch (SFNB)– assessed October 17.

	Management Level											
Variety	**Untreated**		**Plus Fungicide**		**Mean**		**Untreated**		**Plus Fungicide**		**Mean**	
	NFNB %		**NFNB %**		**NFNB %**		**SFNB %**		**SFNB %**		**SFNB %**	
RGT Planet	38.8	a	16.3	b	**27.5**		1.8	de	0.0	f	**0.9**	
Neo CL	3.3	e-h	0.3	h	**1.8**		0.0	f	0.0	f	**0.0**	
Minotaur	2.0	fgh	0.0	h	**1.0**		4.8	ab	0.8	ef	**2.8**	
Rosalind	2.3	fgh	0.0	h	**1.1**		5.3	a	0.3	f	**2.8**	
Bigfoot CL	1.5	fgh	0.3	h	**0.9**		0.0	f	0.5	ef	**0.3**	
PegasusAX	8.5	cd	4.5	d-g	**6.5**		1.8	de	0.3	f	**1.0**	
Cyclops	1.8	fgh	1.3	gh	**1.5**		0.5	ef	1.3	def	**0.9**	
KWS Thalis	7.5	cd	7.8	cd	**7.6**		1.0	ef	0.3	f	**0.6**	
KWS Willis	1.0	gh	0.8	gh	**0.9**		1.8	de	0.0	f	**0.9**	
KWS 18/3518	3.3	e-h	2.8	e-h	**3.0**		5.3	a	0.0	f	**2.6**	
AGFBA021022	0.0	h	0.0	h	**0.0**		3.8	bc	1.0	ef	**2.4**	
RGT Asteroid	10.0	c	1.5	fgh	**5.8**		1.3	def	0.3	f	**0.8**	
RGT Orbiter	6.8	cde	5.5	def	**6.1**		2.5	cd	0.3	f	**1.4**	
Mean	**6.7**	-	**3.1**	-	**4.9**		**2.3**	**a**	**0.4**	**b**	**1.3**	
Variety	**LSD p = 0.05**		3.0	**P val**	<0.001		**LSD p = 0.05**		0.9	**P val**	<0.001	
Management	**LSD p = 0.05**		ns	**P val**	0.062		**LSD p = 0.05**		0.8	**P val**	0.005	
Var. x Man.	**LSD p = 0.05**		4.2	**P val**	<0.001		**LSD p = 0.05**		1.3	**P val**	<0.001	

Table 5. Influence of fungicide application and variety on plot disease infection levels (%) of Scald and Leaf rust (LR)– assessed October 17.

	Management Level											
Variety	**Untreated**		**Plus Fungicide**		**Mean**		**Untreated**		**Plus Fungicide**		**Mean**	
	Scald %		**Scald %**		**Scald %**		**LR %**		**LR %**		**LR %**	
RGT Planet	3.3	-	1.3	-	**2.3**	**bc**	0.0	d	0.0	d	**0.0**	
Neo	0.0	-	0.0	-	**0.0**	**c**	3.3	a	0.0	d	**1.6**	
Minotaur	6.3	-	0.0	-	**3.1**	**b**	3.8	a	1.3	c	**2.5**	
Rosalind	0.0	-	0.0	-	**0.0**	**c**	0.0	d	0.0	d	**0.0**	
Bigfoot CL	10.3	-	6.3	-	**8.3**	**a**	2.3	b	0.0	d	**1.1**	
PegasusAX	0.0	-	0.0	-	**0.0**	**c**	0.0	d	0.0	d	**0.0**	
Cyclops	7.3	-	0.0	-	**3.6**	**b**	3.8	a	1.3	c	**2.5**	
KWS Thalis	0.0	-	0.0	-	**0.0**	**c**	2.3	b	0.0	d	**1.1**	
KWS Willis	0.0	-	0.0	-	**0.0**	**c**	0.0	d	0.0	d	**0.0**	
KWS 18/3518	0.0	-	0.0	-	**0.0**	**c**	1.3	c	1.0	c	**1.1**	
AGFBA021022	0.0	-	0.0	-	**0.0**	**c**	0.0	d	0.0	d	**0.0**	
RGT Asteroid	0.0	-	0.0	-	**0.0**	**c**	0.0	d	0.0	d	**0.0**	
RGT Orbiter	0.0	-	0.0	-	**0.0**	**c**	0.0	d	0.0	d	**0.0**	
Mean	**2.1**	**-**	**0.6**	**-**	**1.33**		**1.3**	**a**	**0.3**	**b**	**1.3**	
Variety	**LSD p = 0.05**		2.8	**P val**	<0.001		**LSD p = 0.05**		0.6	**P val**	<0.001	
Management	**LSD p = 0.05**		ns	**P val**	0.194		**LSD p = 0.05**		0.3	**P val**	0.001	
Var. x Man.	**LSD p = 0.05**		ns	**P val**	0.078		**LSD p = 0.05**		0.8	**P val**	<0.001	

Table 5. Trial input and management details (kg, g, mL/ha, L/ha).

Sowing date:		**15 May**	
Harvest date:		**10 December**	
Seed rate:		200 seeds/m^2	
Basal fertiliser:	15 May	100 kg/ha MAP	
Pre-em herbicide:	14 May	TriflurX 1.50 L/ha	
		Overwatch 1.25 L/ha	
Broadleaf herbicide:	5 Sept	LVE MCPA 570 0.40 L/ha	
		Lontrel Advanced 0.08 g/ha	
		Paradigm 25 g/ha	
		Expedient 0.5 L/ha	
Nitrogen:	2 Sept	206 kg urea/ha (95 kg N/ha)	
Fungicide:		**Untreated**	**Plus Fungicide**
	2 Sept	----	Prosaro 0.30 L/ha
	3 Oct*	----	Aviator Xpro 0.5 L/ha

Please note rapid growth resulted in booting spray being missed. The label timing cut off for Aviator Xpro is booting (GS45).

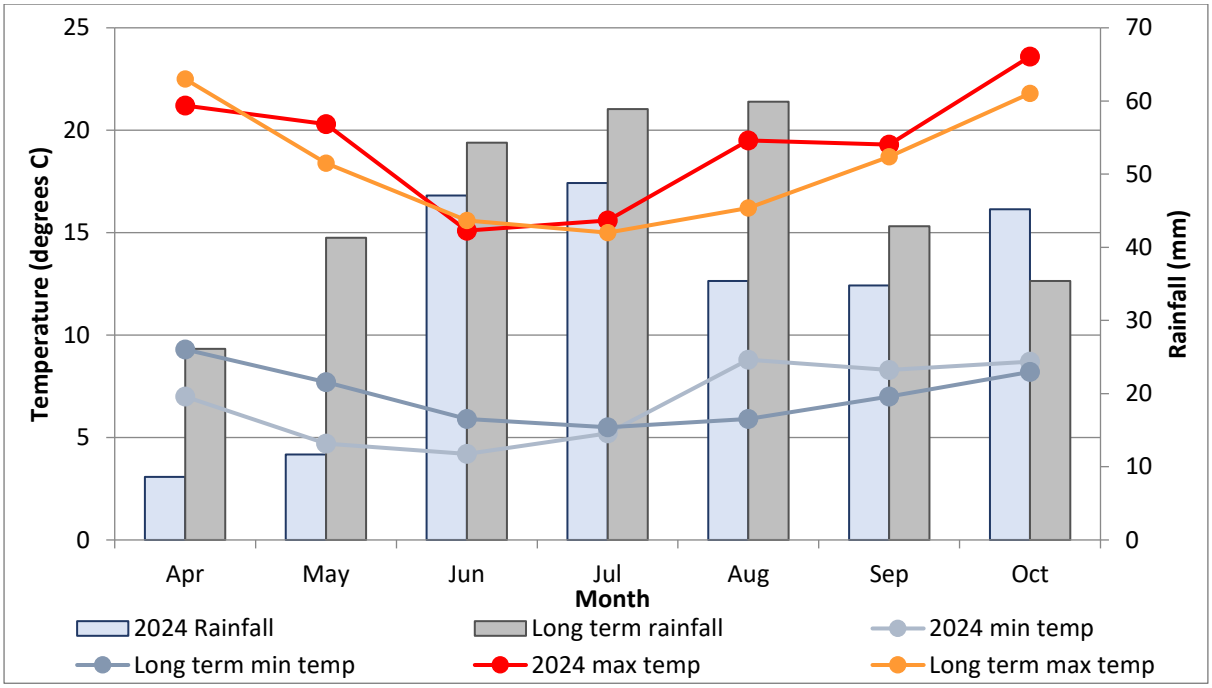

Figure 4. 2024 growing season rainfall and long-term rainfall recorded at Bordertown Industrial Estate (2002-2024). 2024 min and max temperatures, and long-term temperatures recorded at Keith (1906-2024). *Growing season rainfall April to October= 232 mm.*

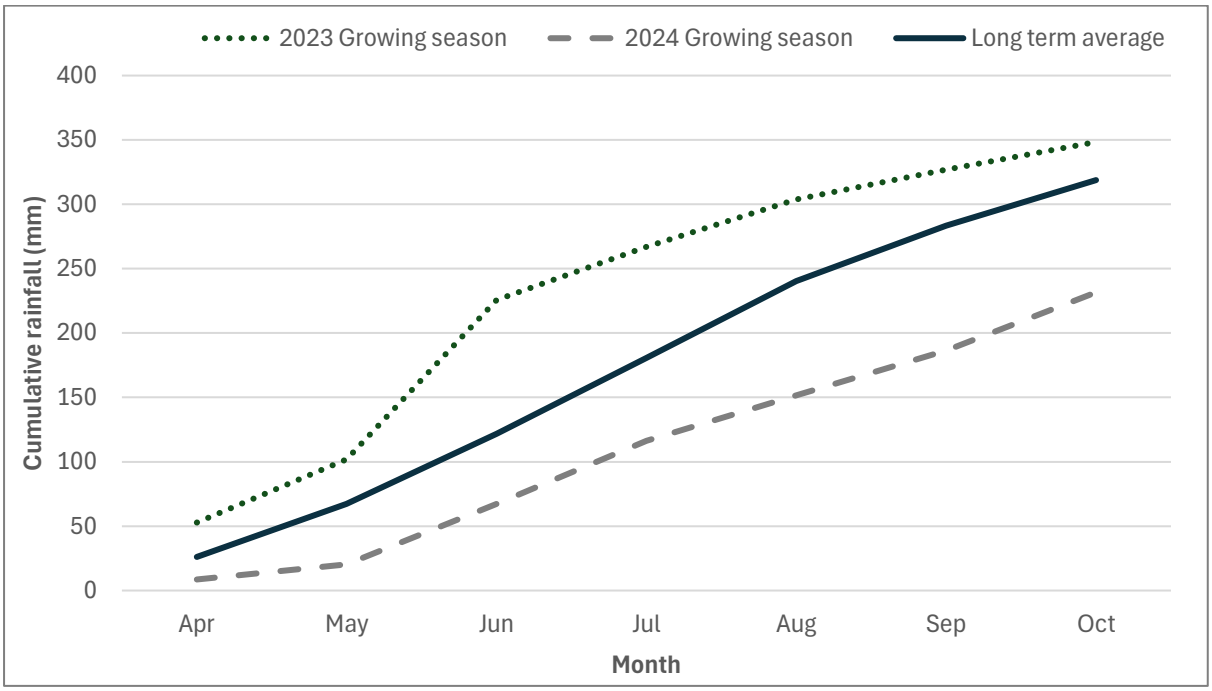

Figure 5. Cumulative growing season rainfall for 2023, 2024 and the long-term average for the growing season (April-October).

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