INDUSTRY INNOVATIONS: PROVISIONAL HARVEST YIELD RESULTS – April Sown Wheat

2023 WA Frankland River Crop Technology Centre

Sown: 29 April 2023
Harvested: 13 December 2023
Rotation position: First cereals after canola
Soil type & management: Forest gravel loam

The Germplasm Evaluation Network (GEN) is a FAR Australia Industry Innovations initiative that tests crop performance across FAR Australia's national network of Crop Technology Centres. GEN sites are situated in higher yielding regions of the country and test crop performance plus and minus fungicide. FAR Australia provides the control varieties and breeders enter their chosen lines for evaluation.

Objectives:

To assess the yield performance of a range of winter and spring wheats, managed with and without fungicide, sown in late April in the Frankland River (WA) environment.

Key Points:

- *Grain yields of the highest yielding wheats (5t/ha) were approximately 1t/ha **lower** than highest yielding barleys (approx. 6t/ha) sown at the same time, on the same site.*
- *Below average spring rainfall in the critical period of September and October is likely to have reduced yield potential in this trial.*
- *In general spring wheat germplasm was higher yielding than winter wheats, this was particularly the case with longer season, later developing winter wheat varieties such as RGT Cesario and RGT Waugh which flowered well into October.*
- *The highest yielding wheats were IGW6754 (Genie), Kinsei and Denison. Overall, there was little evidence of disease in the trial, and the response to fungicide was relatively small (0.17t/ha mean), although there was a very small (0.1%) significant reduction in % screenings as a result of the fungicide programme.*
- *In mid – late September when crops were heading, there was a strong correlation between development stage and final yield, with cultivars showing earlier flowering resulting in higher final grain yields.*
- *Overall, test weights were low with an average of approximately 70kg/hL.*
- *In general, test weights were poor although the highest yielding cultivars produced higher test weights (71.3 – 72.6kg/hL) with grain proteins of 10.7-10.8%.*
- *The screenings for IGW6754 (Genie) were significantly higher (6.7%) than Denison and Kinsei.*

Issue date 8th January 2024

Table 1. Influence of fungicide on the grain yield (t/ha) of wheat cultivars plus and minus fungicide.

	Management Level		
	Untreated	**Full protection**	**Mean**
Cultivar	**Yield t/ha**	**Yield t/ha**	**Yield t/ha**
Ilabo (w)	3.82 -	4.00 -	**3.91** e
Scepter (s)	4.41 -	4.55 -	**4.48** bc
Kinsei (s)	4.66 -	5.28 -	**4.97** a
RGT Accroc (w)	4.07 -	3.88 -	**3.98** e
IGW6754 (Genie) (s)	4.93 -	5.21 -	**5.07** a
IGW6755 (s)	3.87 -	4.14 -	**4.00** de
SWW21-0001 (w)	4.35 -	4.43 -	**4.39** cd
Denison (s)	4.59 -	5.08 -	**4.83** ab
Willaura (s)	3.73 -	4.21 -	**3.97** e
V14051-165 (w)	4.32 -	4.63 -	**4.47** bc
V14051-172 (w)	3.82 -	4.27 -	**4.04** de
RGT Waugh (w)	3.03 -	2.62 -	**2.82** f
RGT Cesario (w)	3.16 -	2.69 -	**2.92** f
Mean	**4.06 -**	**4.23 -**	
LSD Cultivar p = 0.05	0.40	**P val**	<0.001
LSD Management p = 0.05	ns	**P val**	0.347
LSD Cultivar x Man. p = 0.05	0.57	**P val**	0.166

Note: W = Winter Wheat, S = Spring Wheat

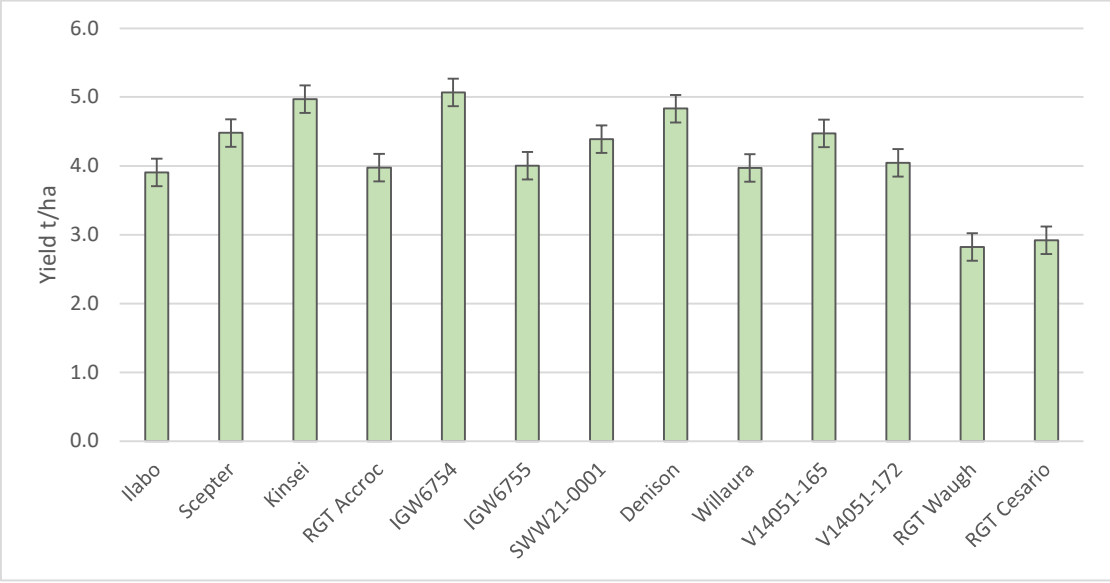

Figure 1. Influence of cultivar on the grain yield (t/ha) using a mean of fungicide treated and untreated (there were no significant differences in yield due to fungicide application) LSD= 0.40 (based on mean of treated and untreated).

While a 0.62t/ha increase in yield was produced when fungicide was applied to Kinsei, it was not statistically significant. There was a trend for a small yield response to fungicide application, except for the latest developing cultivars RGT Cesario and RGT Waugh.

Table 2. Influence of fungicide on the grain quality (% protein, test weight and screenings) of wheat cultivars plus and minus fungicide.

		Grain quality assessments		
	Cultivar	**Protein (%)**	**Test Weight (kg/hL)**	**Screenings (%)**
1.	Ilabo	11.3 bcd	66.0 e	3.3 ef
2.	Scepter	12.2 a	71.0 ab	1.9 g
3.	Kinsei	10.8 cde	71.3 ab	3.4 ef
4.	RGT Accroc	11.4 bc	70.9 ab	3.1 f
5.	IGW6754	10.7 de	72.6 a	6.7 b
6.	IGW6755	11.4 b	66.0 e	7.2 b
7.	SWW21-0001	10.6 e	68.6 cd	6.1 bc
8.	Denison	10.8 cde	72.7 a	3.0 fg
9.	Willaura	11.2 b-e	67.0 de	10.6 a
10.	V14051-165	11.1 b-e	69.6 bc	4.4 de
11.	V14051-172	10.7 de	69.3 bc	5.0 cd
12.	RGT Waugh	12.8 a	70.5 abc	2.3 fg
13.	RGT Cesario	12.1 a	70.3 bc	2.8 fg
	LSD = 0.05	0.6	2.2	1.1
	Cultivar p-Value	<0.001	<0.001	<0.001
1.	No Fungicide	11.4 -	69.1 -	5.1 a
2.	Full Fungicide	11.3 -	70.2 -	4.1 b
	LSD = 0.05	ns	ns	0.6
	Disease Management p-Value	0.770	0.088	0.015
	Disease Management x Cultivar	**Protein (%)**	**Test Weight (kg/hL)**	**Screenings (%)**
	No Fungicide			
1.	Ilabo	11.1 -	65.7 hi	3.3 g-k
2.	Scepter	12.2 -	71.1 a-d	2.0 jk
3.	Kinsei	10.9 -	69.9 c-f	4.0 e-i
4.	RGT Accroc	11.4 -	70.2 cde	3.1 g-k
5.	IGW6754	11.0 -	71.3 a-d	8.0 bc
6.	IGW6755	11.9 -	65.0 hi	7.7 bc
7.	SWW21-0001	10.8 -	67.7 e-h	7.2 bc
8.	Denison	10.8 -	72.0 a-d	3.6 f-j
9.	Willaura	11.9 -	63.6 i	12.6 a
10.	V14051-165	10.9 -	69.9 c-f	4.2 e-h
11.	V14051-172	10.6 -	69.6 c-f	5.3 de
12.	RGT Waugh	12.6 -	70.7 b-e	2.2 jk
13.	RGT Cesario	11.9 -	71.5 a-d	2.8 h-k
	Full Fungicide			
1.	Ilabo	11.6 -	66.3 ghi	3.4 f-k

2.	Scepter	12.2	-	70.9	a-d	1.8	k
3.	Kinsei	10.7	-	72.6	abc	2.8	h-k
4.	RGT Accroc	11.4	-	71.5	a-d	3.1	g-k
5.	IGW6754	10.5	-	73.9	a	5.3	de
6.	IGW6755	11.0	-	66.9	fgh	6.7	cd
7.	SWW21-0001	10.5	-	69.4	d-g	5.0	ef
8.	Denison	10.8	-	73.4	ab	2.5	ijk
9.	Willaura	10.6	-	70.4	b-e	8.5	b
10.	V14051-165	11.2	-	69.2	d-g	4.6	efg
11.	V14051-172	10.9	-	69.0	d-g	4.6	efg
12.	RGT Waugh	12.9	-	70.3	b-e	2.5	ijk
13.	RGT Cesario	12.4	-	69.2	d-g	2.7	h-k
	LSD = 0.05	ns		3.1		1.6	
	Cultivar x Disease Mang. p-Value	0.030		0.029		0.005	

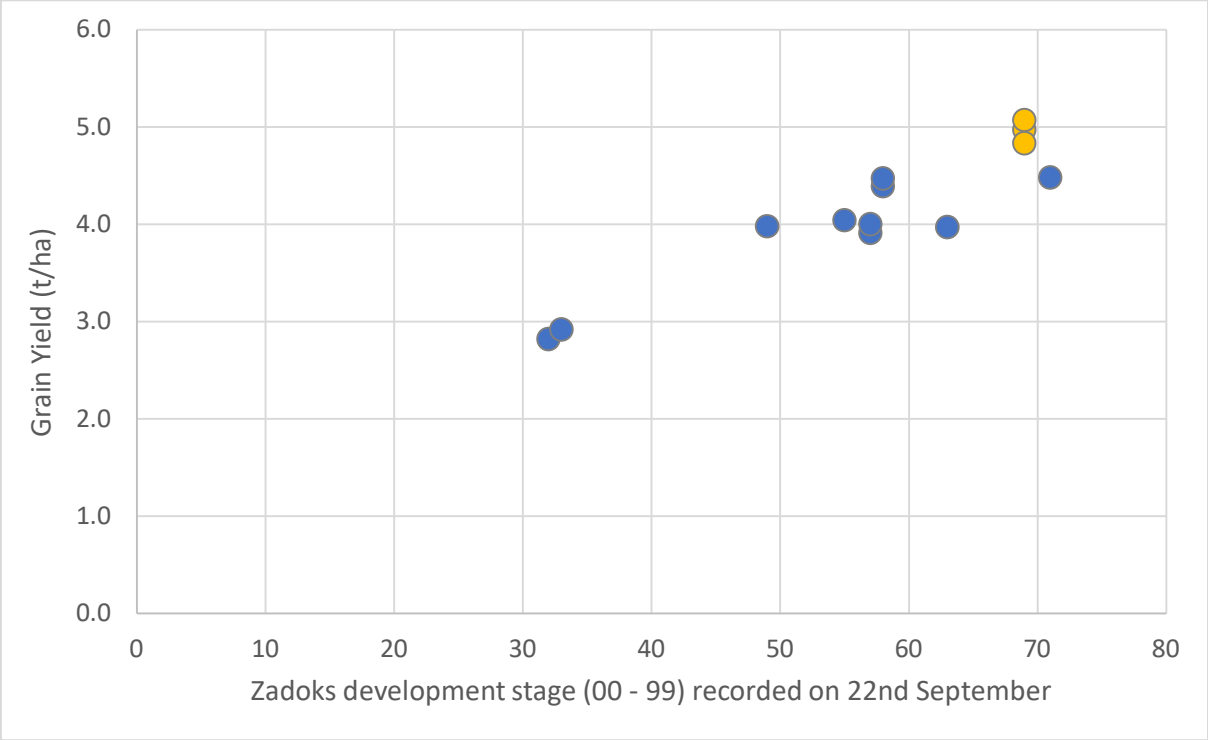

Figure 2. Influence of development stage (recorded on 22nd September) on final grain yield (t/ha). (three orange markers – Denison, Kinsei and IGW6754 (Genie) the three highest yielding varieties)

On 22nd September there were significant differences in crop phenology (speed of development) with four varieties having finished flowering (Kinsei, IGW6754 (Genie), Denison all at GS69), with Scepter being the most advanced at the watery ripe stage GS71 having flowered in late August. The data would suggest, that in this trial, mid-September was the flowering sweet spot which is approximately 1 – 2 weeks earlier than previous seasons and similar sowing dates.

Table 3. Trial input and management details (kg, g, ml/ha).

Sowing date:		**29 April**	
Harvest date:		**13 December**	
Seed rate:		180 seeds/m2	
Basal fertiliser:	29 Apr	169kg MAP/MOP/MnSO4 (66%/29%/5% blend)	
Herbicide:	29 Apr	Triflurex 2L/ha	
		Overwatch 1.25L/ha	
Nitrogen:	12 June	55 kg N/ha	
	13 July	32 kg N/ha	
	2 Aug	23 kg N/ha	
		121 kg N/ha (incl 11 kg N/ha at sowing)	
Fungicide:		**Untreated**	**Full Protection**
	GS31	----	Prosaro 0.30 L/ha
	GS39	----	Radial 0.84 L/ha
	GS61-71	----	Opus 0.50 L/ha

** RGT Accroc, RGT Cesario, and RGT Waugh were not treated with a third fungicide.*

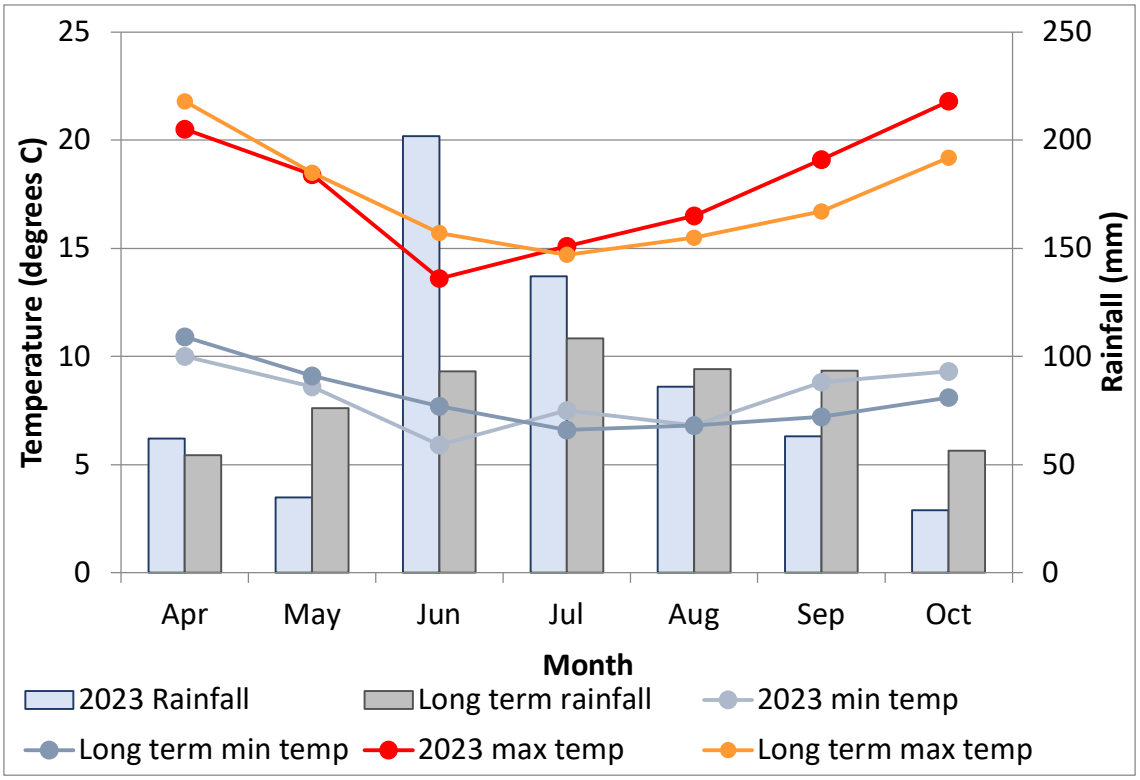

Figure 3. 2023 growing season rainfall, long-term rainfall, 2023 min and max temperatures, and long-term temperatures recorded at Rocky Gully (1996-2023). *Growing season rainfall April to October= 613 mm.*