INDUSTRY INNOVATIONS: PROVISIONAL HARVEST YIELD RESULTS – April Sown Wheat

2023 VIC Crop Technology Centre (Gnarwarre)

Sown: 30 April 2023
Harvested: 12 January 2024
Rotation position: First cereals after faba beans
Soil type & management: Duplex grey clay over brown clay

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 against two regional controls (RGT Accroc & Rockstar), sown in late April in the Gnarwarre (Vic) HRZ environment.

Key Points:

- *There was a significant yield interaction (<0.001) between variety and fungicide application, with the red grained winter wheats showing good disease resistance to stripe rust and little yield response to fungicide.*
- *In contrast, the milling wheats and RGT Accroc were badly affected with disease, again principally stripe rust but also Septoria tritici blotch (STB).*
- *The highest yielding cultivars were the red winter wheats RW 71608 and AGFWH010222 at 6.76t/ha and 6.72t/ha respectively, but they were not significantly better than Anapurna, FAR WW2, RGT Waugh and AGTW005.*
- *With rainfall well below the long-term average in the months between July and October, Septoria tritici blotch (STB) infection did not develop on the upper leaves of the canopy.*
- *With this lower rainfall, winter wheats with slightly quicker development (RW 71608 and AGFWH010222) tended to be higher yielding.*
- *There were significant grain quality interactions with quality parameters of individual varieties being differentially affected by the application of fungicide.*

Issue date 31st 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**
Anapurna (w)	5.55 ef	6.17 a-e	**5.86**
Rockstar (s)	2.40 i	5.65 def	**4.02**
RGT Accroc (w)	4.21 g	5.91 b-f	**5.06**
Genie (IGW6754) (s)	3.16 h	5.89 b-f	**4.52**
IGW6755 (s)	4.42 g	5.77 c-f	**5.10**
Willaura (s)	3.04 h	5.32 f	**4.18**
AGTW005 (w)	6.45 ab	6.26 a-d	**6.35**
RGT Waugh (w)	5.81 c-f	6.47 ab	**6.14**
RW 71608 (w)	6.17 a-e	6.76 a	**6.46**
AGFWH010222 (w)	6.26 a-d	6.72 a	**6.49**
FAR WW2 (w)	6.19 a-d	6.33 abc	**6.26**
Mean	**4.88**	**6.11**	**5.49**
LSD Cultivar p = 0.05	0.44	**P val**	<0.001
LSD Management p = 0.05	0.60	**P val**	0.007
LSD Cultivar x Man. p = 0.05	0.62	**P val**	<0.001

Note: w = Winter Wheat, s = Spring Wheat

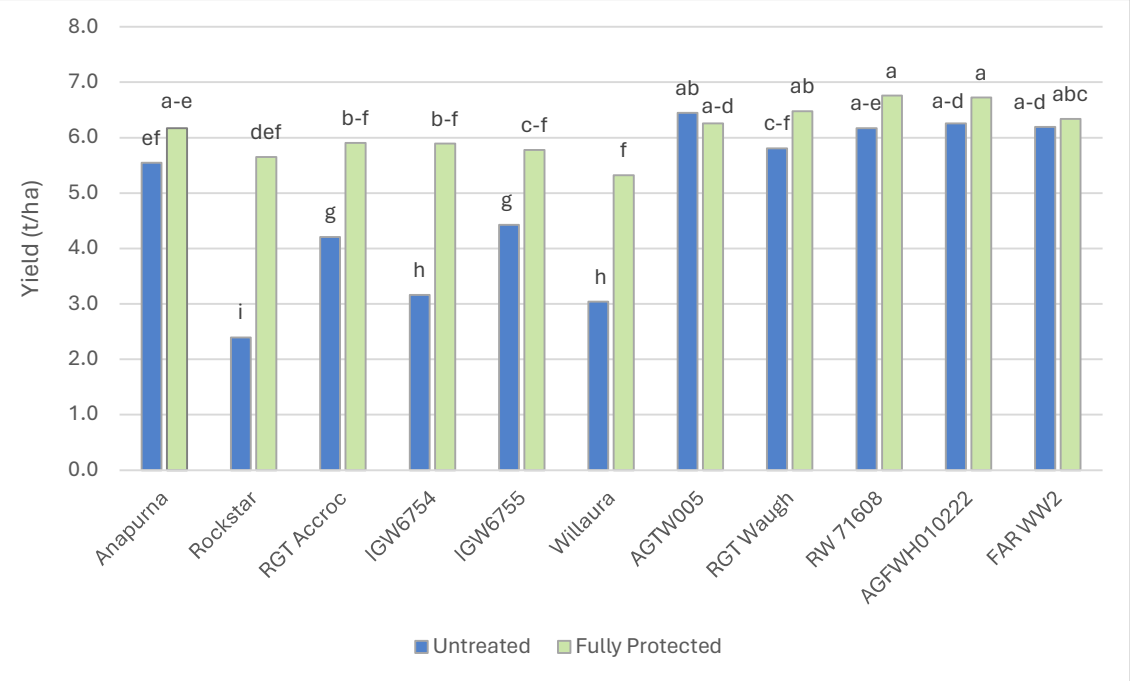

Figure 1. Influence of cultivar and fungicide on grain yield (t/ha, error bars +/- LSD 0.05).

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.	Anapurna (w)	12.3	75.6	3.6
2.	Rockstar (s)	10.8	68.2	3.1
3.	RGT Accroc (w)	11.2	75.7	2.2
4.	Genie (IGW6754) (s)	11.0	73.7	3.7
5.	IGW6755 (s)	11.3	73.7	2.3
6.	Willaura (s)	10.8	67.8	4.2
7.	AGTW005 (w)	12.1	75.1	2.1
8.	RGT Waugh (w)	12.5	71.6	2.7
9.	RW 71608 (w)	11.6	73.1	2.9
10.	AGFWH010222 (w)	11.2	76.0	3.1
11.	FAR WW2 (w)	11.7	74.6	2.6
	LSD = 0.05	0.3	0.6	0.4
	Cultivar p-Value	<0.001	<0.001	<0.001
1.	Untreated	11.4 -	72.3	3.4
2.	Full Protection	11.6 -	74.0	2.6
	LSD = 0.05	ns	0.4	0.2
	Disease Management p-Value	0.095	0.001	<0.001
	Cultivar x Disease Management	**Protein (%)**	**Test Weight (kg/hL)**	**Screenings (%)**
	No Fungicide			
1.	Anapurna (w)	12.2 abc	75.0 cde	3.9 bc
2.	Rockstar (s)	10.9 j-m	64.5 k	4.1 b
3.	RGT Accroc (w)	10.9 klm	75.0 cde	2.4 efg
4.	Genie (IGW6754) (s)	10.7 klm	71.8 h	4.5 b
5.	IGW6755 (s)	11.2 g-k	73.3 fg	2.4 efg
6.	Willaura (s)	11.0 h-l	66.3 j	5.6 a
7.	AGTW005 (w)	11.9 bcd	74.9 cde	2.1 fg
8.	RGT Waugh (w)	12.6 a	71.5 h	2.8 de
9.	RW 71608 (w)	11.6 d-g	73.0 g	3.3 d
10.	AGFWH010222 (w)	11.0 i-m	75.9 ab	3.2 d
11.	FAR WW2 (w)	11.5 d-g	74.4 de	2.6 ef
	Full Protection			
1.	Anapurna (w)	12.3 ab	76.1 ab	3.4 cd
2.	Rockstar (s)	10.6 lm	71.8 h	2.1 fg
3.	RGT Accroc (w)	11.5 d-h	76.4 a	2.0 g
4.	Genie (IGW6754) (s)	11.3 f-j	75.6 abc	2.8 de
5.	IGW6755 (s)	11.4 e-i	74.2 ef	2.1 fg
6.	Willaura (s)	10.5 m	69.2 i	2.9 de
7.	AGTW005 (w)	12.3 ab	75.3 bcd	2.2 fg
8.	RGT Waugh (w)	12.4 a	71.8 h	2.6 efg
9.	RW 71608 (w)	11.7 def	73.3 fg	2.5 efg
10.	AGFWH010222 (w)	11.5 d-h	76.1 ab	2.9 de
11.	FAR WW2 (w)	11.8 cde	74.7 de	2.5 efg
	LSD = 0.05	0.46	0.9	0.6
	Cultivar x Disease Mang. p-Value	0.011	<0.001	<0.001

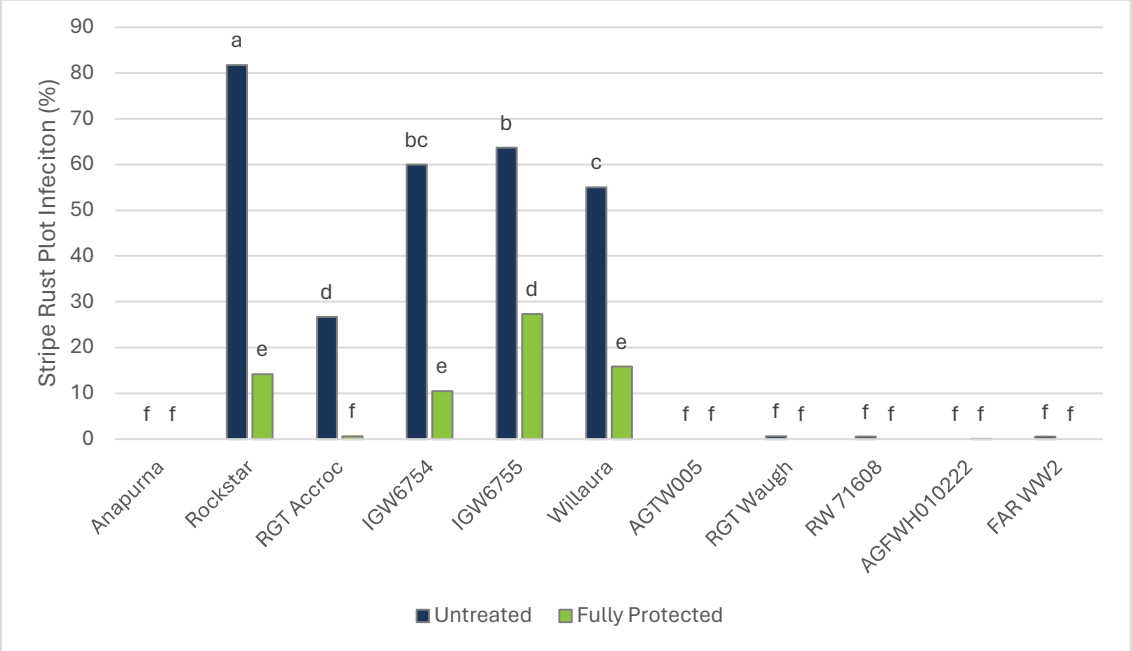

Figure 2. Influence of cultivar and fungicide on stripe rust plot infection (p = <0.001, LSD = 8.5), assessed on 27 September.

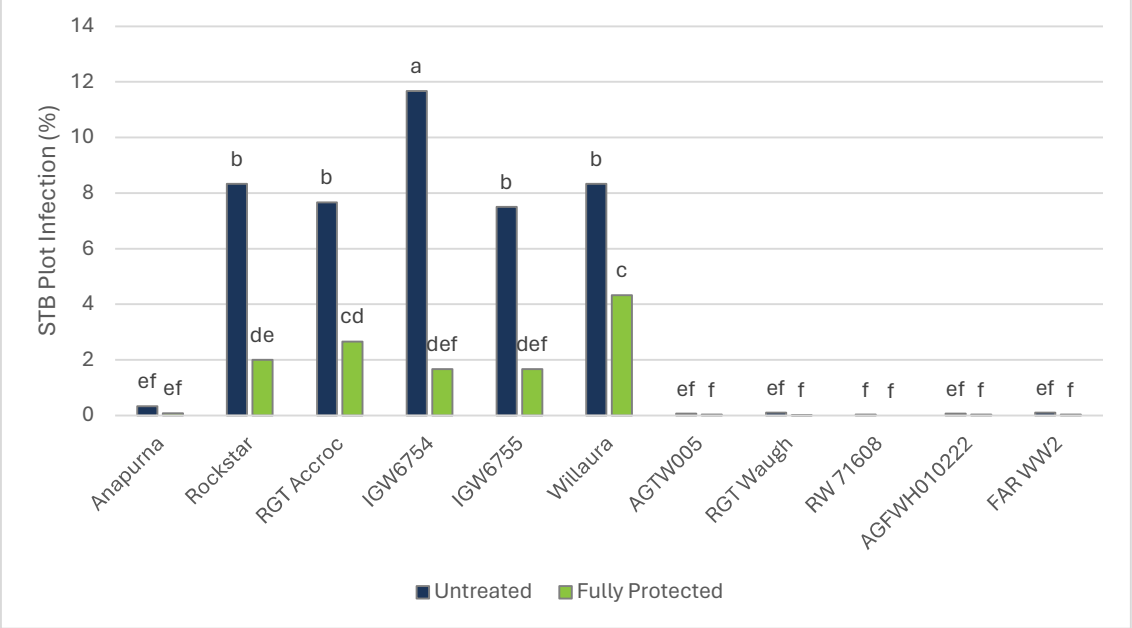

Figure 3. Influence of cultivar and fungicide on Septoria tritici blotch (STB) plot infection (p = <0.001, LSD = 1.9), assessed on 27 September.

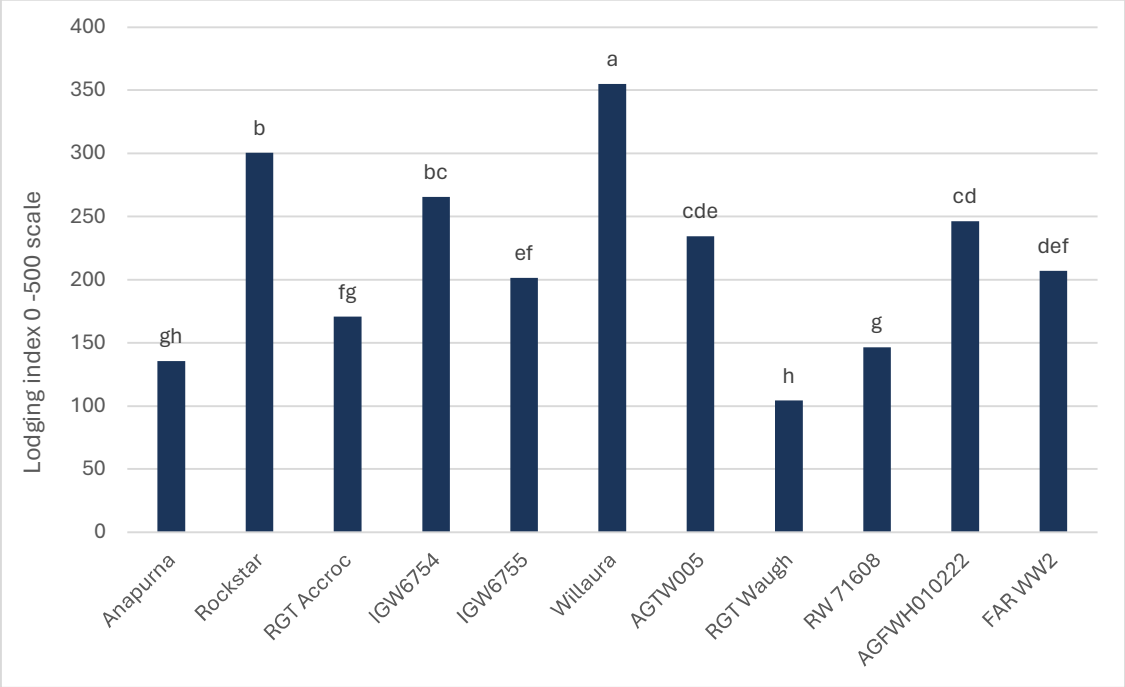

Figure 4. Influence of cultivar on lodging at harvest, 12 January (p = <0.001, LSD = 41.8).

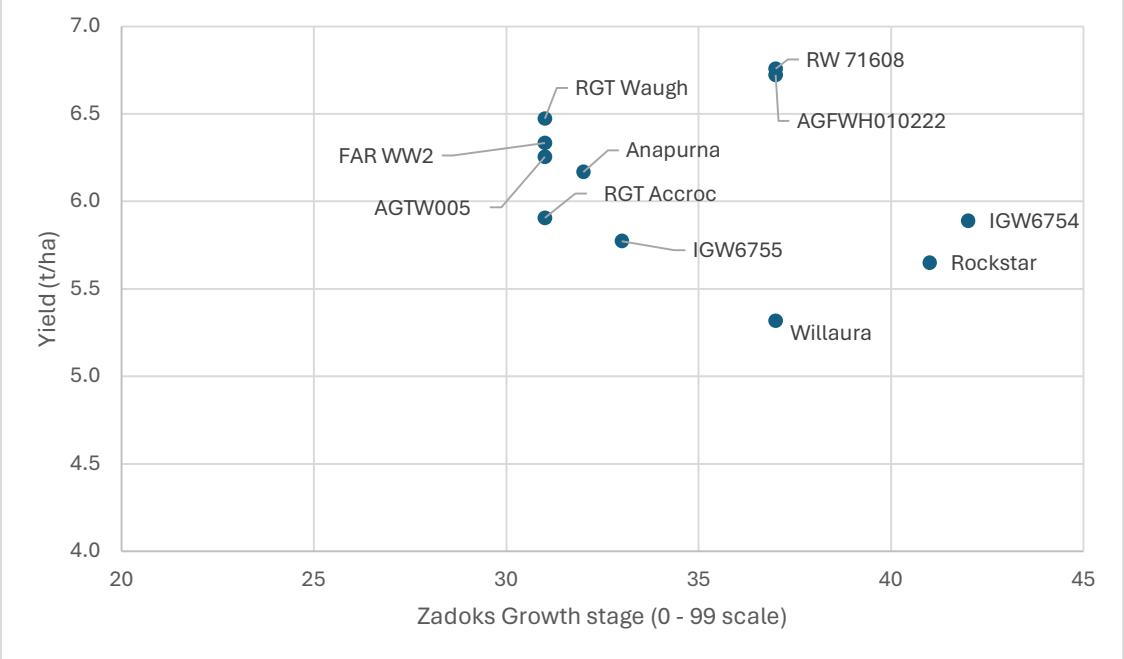

Figure 5. Different cultivar development stages during stem elongation (Zadoks growth stage reference) - assessed (28 August) compared with grain yield (t/ha).

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

Sowing date:		**30 April**	
Harvest date:		**12 January**	
Seed rate:		180 seeds/m2	
Basal fertiliser:	11 May	100 kg MAP	
Pre-em herbicide:	9 May	Treflan 2 L	
		Overwatch 1.25 L/ha	
		Paraquat 2.4 L/ha	
Post-em herbicide:	2 June	Mateno Complete 0.75 L/ha	
		LVE MCPA 570 0.45 L/ha	
		Lontrel Advanced 0.1 L/ha	
Nitrogen:	6 July	50 kg N/ha	
	28 Aug	100 kg N/ha	
Fungicide:		**Untreated**	**Full Protection**
	GS31	----	Prosaro 0.30 L/ha
	GS39	----	Aviator 0.50 L/ha
	GS59-61	----	Opus 0.50 L/ha

Meteorological Data

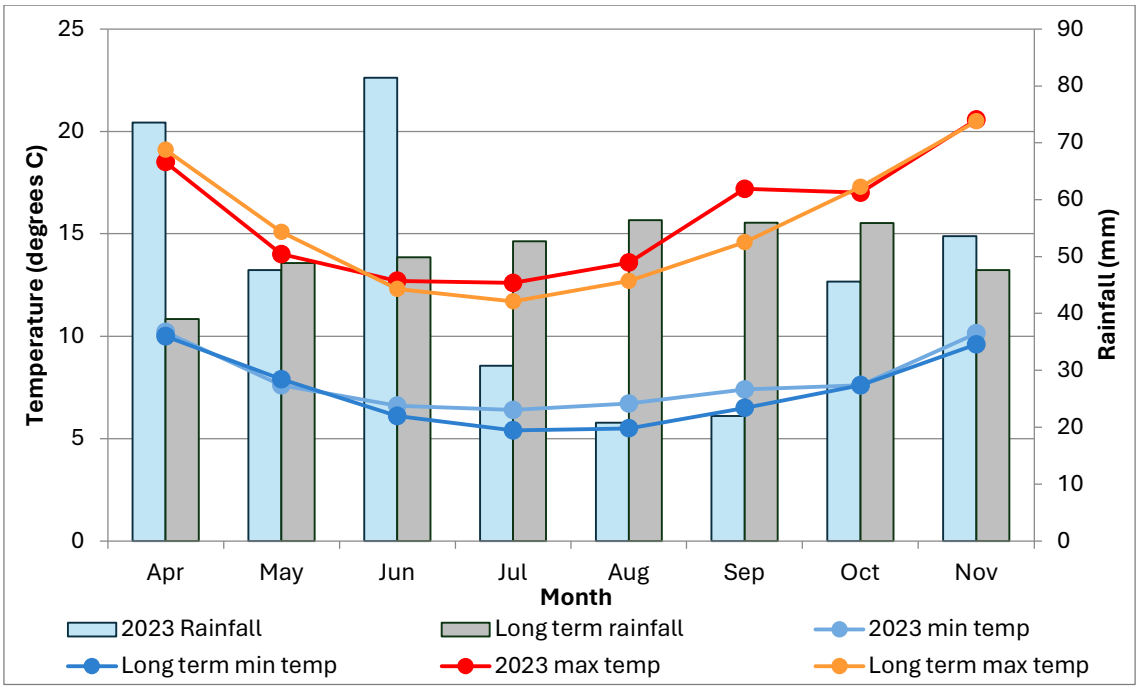

Figure 6. 2023 growing season rainfall and long-term rainfall recorded at Winchelsea Post Office (1898 -2023) and long-term min and max temperatures recorded at Mount Gellibrand (2000 to 2023) for the growing season (April to November). *Rainfall April to November = 375.4mm.*

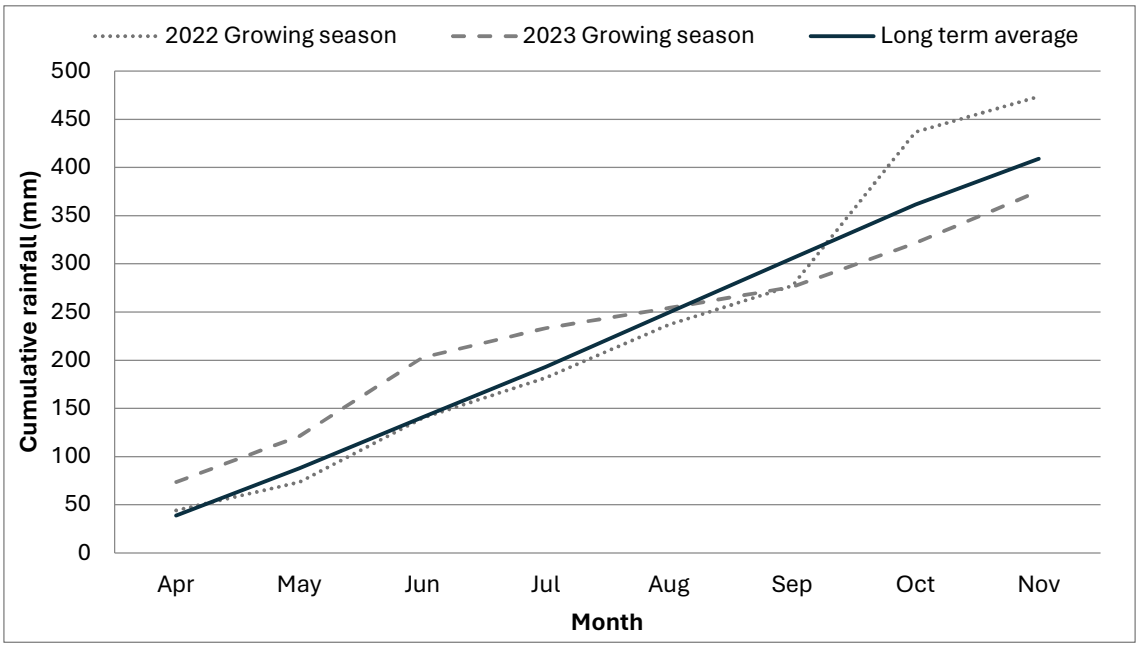

Figure 7. Cumulative growing season rainfall for 2022, 2023 and the long-term average for the growing season (April-November).

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