HARVEST YIELD RESULTS

Wheat G.E.M (Genotype x Environment x Management) Trial

2021 Tasmania Crop Technology Centre

Hyper Yielding Crops Project (FAR2004-002SAX)

A Grains Research & Development Corporation (GRDC) investment

Sown: 29 April 2021
Harvested: 22 January 2022
Rotation position: 1st Wheat following Poppies
Soil type: Chromosol
Irrigated: Supplementary irrigation based on 40mm was applied to trial during grain fill

Key Messages:

- Wheat yields recorded in the GRDC's Hyper Yielding Crops project are the highest since the record-breaking season of 2016 when RGT Accroc and Calabro yielded 16 and 17t/ha respectively as part of the GRDC's Hyper Yielding Cereals project (FAR00003).
- There was a significant interaction between cultivar and management indicating that cultivars responded differently to the various management strategies applied.
- The extra inputs applied under high input (additional fungicide, PGR and N fertiliser) increased productivity by 1.5t/ha and more with Anapurna, RGT Accroc, Scepter and Trojan but generated no statistically significant yield improvements with Big Red, RGT Cesario and Tabasco, although there was a trend towards higher yields.
- Mechanical defoliation (grazing) reduced yield with all varieties except Trojan, although yield reductions were not statistically significant.
- There was no significant lodging recorded in the trial, so it was unlikely that PGRs were the key input underlying the performance of the higher input. In addition, nutrition work at the HYC Centre showed no response to nitrogen N levels above approximately 200kg N/ha.
- From other studies and knowledge that revealed RGT Cesario, Tabasco and Big Red generated smaller yield increases from high input, the primary difference was due to disease control.
- The more disease susceptible cultivars Trojan, Scepter, RGT Accroc and Anapurna gave greater responses to the more intensive disease management strategies.
- The noticeably later maturity of the northern European cultivar Tabasco resulted in higher screening than all other cultivars tested.

Seven wheat cultivars (two spring milling wheats and five feed winter wheats) were grown under three levels of management at the Tasmania HYC irrigated research Centre, Hagley. The influence on yield and quality is presented in Tables 1 & 2. Table 3 outlines the management strategies.

Issued: 23 February 2022

Table 1. Influence of management strategy/input on cultivar grain yield (t/ha).

	Management Level			
	Standard Input Management	**Grazed Standard Management**	**High Input Management**	**Mean**
Cultivar	**Yield t/ha**	**Yield t/ha**	**Yield t/ha**	**Yield t/ha**
Big Red (Winter)	14.00 bcd	13.20 def	14.80 ab	**14.00**
Anapurna (Winter)	13.00 ef	12.00 g	14.50 ab	**13.20**
RGT Accroc (Winter)	13.30 c-f	12.50 fg	14.90 ab	**13.60**
Tabasco (Winter)	12.70 efg	12.00 g	12.50 fg	**12.40**
RGT Cesario (Winter)	14.30 abc	13.50 cde	15.20 a	**14.30**
Scepter (Spring)	5.40 k	5.30 k	8.80 i	**6.50**
Trojan (Spring)	6.70 j	7.00 j	10.60 h	**8.10**
Mean	**11.30 b**	**10.80 b**	**13.00 a**	**11.72**
LSD Cultivar p = 0.05		0.30t/ha	P val	<0.001
LSD Management p = 0.05		0.20t/ha	P val	<0.001
LSD Cultivar x Man. P = 0.05		0.60t/ha	P val	0.039

Table 2. Influence of treatment on grain quality - protein (%), test weight (kg/hL) and screenings (%).

Variety	**Mgmt. Level**	**Protein**	**Test Weight**	**Screenings**
		%	**Kg/hl**	**%**
Big Red	**Standard**	11.3 hij	77.9 abc	1.7 e-h
Anapurna	**Standard**	12.3 g	76.5 bcd	2.6 cd
RGT Accroc	**Standard**	10.8 jk	74.1 d-g	1.9 d-g
Tabasco	**Standard**	10.3 kl	72.6 gh	4.0 a
RGT Cesario	**Standard**	11.9 gh	76.5 bcd	1.3 gh
Scepter	**Standard**	15.4 ab	70.5 hi	1.9 d-g
Trojan	**Standard**	14.4 cd	69.6 i	2.4 cde
Mean		**12.3 a**	**74.0 b**	**2.2 -**
Big Red	**Grazed**	10.8 jk	78.3 ab	1.4 fgh
Anapurna	**Grazed**	11.4 hi	77.4 abc	2.8 bc
RGT Accroc	**Grazed**	10.8 jk	75.6 b-f	1.4 fgh
Tabasco	**Grazed**	10.2 l	72.8 e-h	3.1 bc
RGT Cesario	**Grazed**	10.9 ij	76.9 bcd	1.1 h
Scepter	**Grazed**	15.7 a	71.2 hi	1.3 fgh
Trojan	**Grazed**	13.9 de	72.7 fgh	1.7 e-h
Mean		**12.0 b**	**75.0 ab**	**1.8 -**
Big Red	**High**	11.5 hi	79.9 a	2.0 d-g
Anapurna	**High**	12.9 f	77.7 abc	2.1 def

Issued: 23 February 2022

RGT Accroc	**High**	11.7	gh	75.7	b-e	1.4	fgh
Tabasco	**High**	11.4	hi	73.4	e-h	3.5	ab
RGT Cesario	**High**	11.9	gh	78.0	abc	1.1	h
Scepter	**High**	14.8	bc	75.4	c-g	1.5	fgh
Trojan	**High**	13.5	ef	76.7	bcd	1.3	gh
Mean		**12.5**	**a**	**76.7**	**a**	**1.8**	**-**
Grand Mean		**12.3**		**75.2**		**2.0**	
LSD Cultivar p = 0.05		0.3		1.7		0.4	
LSD Management p = 0.05		0.3		1.7		ns	
LSD Cultivar x Man. P = 0.05		0.6		2.9		0.8	
P val Cultivar		<0.001		<0.001		<0.001	
P val Management		0.017		0.023		0.561	
P val Cultivar x Man.		<0.001		0.151		0.364	

Table 3. Details of the management levels (kg, g, ml/ha).

Sowing Date:		**29-April**		
Plant pop'n:		180 seeds/m^2		
Seed Treatment:		100kg/ha MAP (10 kg N/ha included in total N below)		
Basal Fertiliser:		Vibrance & Gaucho		
		Standard	**"Grazed" GS30**	**High**
Grazing	GS30	---	✓	---
Nitrogen (N):	GS26	40 N kg/ha	40 N kg/ha	50 N kg/ha + 12 S kg/ha
	GS30-31	80 N kg/ha	80 N kg/ha	100 N kg/ha
	GS33	80 N kg/ha	80 N kg/ha	100 N kg/ha
Total N:		**210 N kg/ha**	**210 N kg/ha**	**260 N kg/ha**
PGR:	GS30	---	---	Moddus Evo 100mL/ha & Errex 650ml/ha
	GS32	---	---	Moddus Evo 100mL/ha & Errex 650ml/ha
Fungicide:	GS00	---	---	Systiva & Flutriafol
	GS31	Opus 500ml/ha	Opus 500ml/ha	Prosaro 300ml/ha
	GS39	FAR F1-19 750ml/ha	FAR F1-19 750ml/ha	FAR F1-19 750ml/ha
	GS59-61	---	---	Opus 500ml/ha

All other inputs of insecticides and herbicides were standard across the trial.

**Timings of fungicides and PGRs were adjusted to take account of the differences in spring and winter wheat phenology (development). Mechanical defoliation representing grazing was conducted at GS30.*

Meteorological Data – Tasmanian Crop Technology Centre

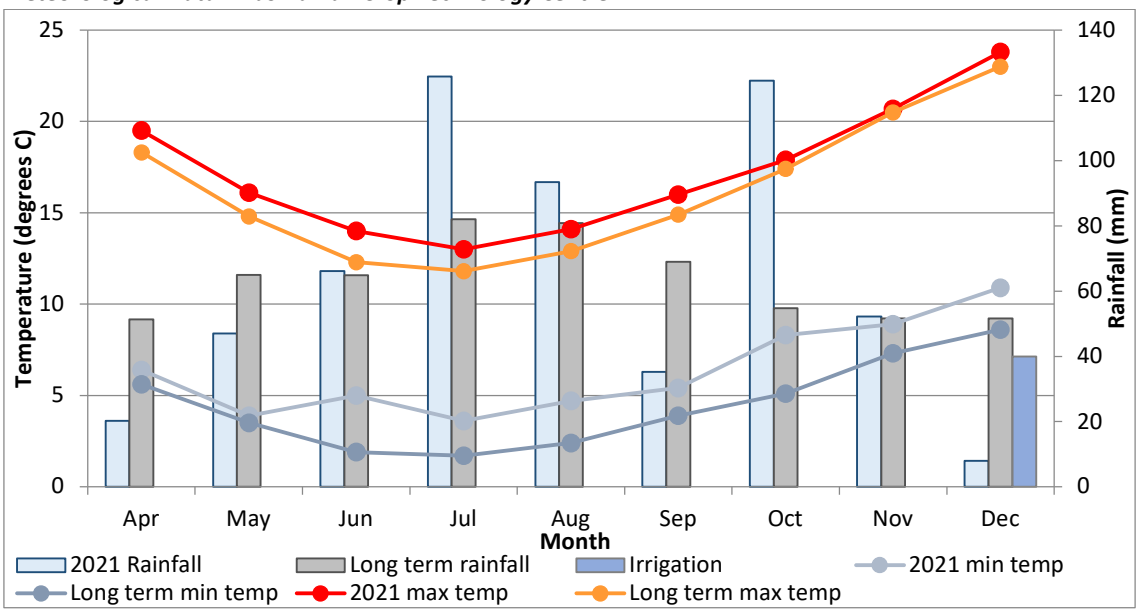

Figure 1. 2021 growing season rainfall and long-term rainfall (1978-2021) (recorded at Westbury (Birralee Road)), 2021 min and max temperatures and long-term min and max temperatures (1980-2021) (recorded at Launceston (Ti Tree Bend)). *Rainfall April to December (with supplementary irrigation) = 612.6mm.*

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