Hyper Yielding Cereal Project
A FEED GRAIN INITIATIVE

Protocol 1: Wheat Germplasm x Fungicide Interaction – Time of Sowing 1 (April 4)

2019/20 Yield Results (t/ha) *(Provisional)*

Sown: 4 April 2019 **Harvested:** 30 January 2020
Rotation position: 1st Wheat after Poppies

Table 1. Grain yield (t/ha) of 10 cultivars under plus and minus fungicide protection

	Fungicide Management				Response to Fungicide		Bird Damage	
	Full Protection		Nil (untreated)					
Cultivar	**Yield t/ha**		**Yield t/ha**		**t/ha**	**%**	**%**	
RGT Accroc*	10.26	fgh	9.97	gh	0.29	3	3.8	b
Annapurna*	10.18	fgh	9.26	ij	0.92	10	11.9	a
RGT Calabro	12.94	a	11.29	de	1.65	15	0.0	c
RGT Relay	9.81	hi	8.02	k	1.79	22	0.0	c
DS Bennett*	8.86	j	4.26	l	4.60	108	1.9	bc
Conqueror	11.99	bc	9.15	ij	2.84	31	1.3	c
Genius	12.39	ab	10.5	fg	1.89	18	0.6	c
Tabasco	12.14	b	10.71	ef	1.43	13	0.6	c
Manning	11.39	cde	8.99	j	2.40	27	1.3	c
CS170	11.92	bcd	11.28	de	0.64	6	0.0	c
Mean	**11.19**	**a**	**9.34**	**b**	**1.82**	**20**	**2.1**	
LSD Cult. x Fung. P=0.05	0.69 t/ha						3.4%	
P val Cult. x Fung.	<0.001						<0.001	

Please read the notes accompanying these provisional results for interpretation
Figures followed by different letters are considered to be statistically different (p=0.05), for example a yield of 12.39 ab is considered statistically different to 9.81 hi but is considered to be statistically the same as a yield of 11.99 bc.
All varieties are covered under variety license agreements.
**Exercise caution when interpreting absolute yields for these three cultivars as they were affected by bird damage*

The principal diseases were Septoria tritici blotch and leaf rust caused by the pathogens *Zymoseptoria tritici* and *Puccinia triticina* which were present at high levels in the trial.

There was a statistically significant interaction (p=<0.001) between cultivar and fungicide management on yield results indicating that cultivars responded differently to full fungicide protection. DS Bennett and Conqueror were the most responsive to full fungicide protection with RGT

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Accroc and CS170 giving the smallest response to fungicide (Table 1). There was also significant interaction between variety and fungicide management affecting protein, test weight and screenings, indicating that less fungicide responsive cultivars, such as RGT Accroc and CS170, produced smaller improvements in grain quality when fungicides were applied compared to cultivars like DS Bennett which gave significant increases in protein, test weight and screenings as a result of fungicide protection.

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

	Protein				Test Weight				Screening			
	Full Protection		Nil (untreated)		Full Protection		Nil (untreated)		Full Protection		Nil (untreated)	
Cultivar	%				Kg/hl				%			
RGT Accroc	11.4	cd	11.3	cde	79.5	bc	78.8	cd	1.3	f	1.4	f
Annapurna	12.9	a	11.9	b	81.1	a	79.6	bc	1.4	f	1.7	ef
RGT Calabro	11.4	cd	11.2	cde	79.7	bc	78.4	cd	1.7	ef	2.0	def
RGT Relay	11.1	def	10.9	e-h	76.1	ef	74.5	gh	2.6	cd	3.8	b
DS Bennett	11.7	bc	10.9	e-h	79.6	bc	62.9	i	2.6	cd	8.4	a
Conqueror	10.9	d-h	10.4	h	77.4	de	74.0	h	2.0	def	3.1	bc
Genius	11.0	d-g	10.4	h	79.4	bc	78.4	cd	2.1	def	2.0	def
Tabasco	11.2	def	10.6	gh	79.1	bc	78.3	cd	2.1	def	2.3	cde
Manning	10.7	fgh	9.6	i	80.2	ab	77.5	de	1.6	ef	2.1	def
CS170	11.2	def	11.2	def	76.5	ef	75.5	fg	1.7	ef	1.6	ef
Mean	**11.3**	**a**	**10.8**	**b**	**78.9**	**a**	**75.8**	**b**	**1.9**	**b**	**2.8**	**a**
LSD Cult. x Fung.	0.5				1.4				0.9			
P val Cult. x Fung.	0.026				<0.001				<0.001			

Figures followed by different letters are considered to be statistically different (p=0.05)

Table 3. Margin ($/ha) after fungicide and application costs (fungicide cost based on $95/ha and application cost based on $45/ha) have been deducted from the value of additional yield at $350/t.

	Response to Fungicide	Extra income from fungicide	Margin after input cost and application	Return on Investment
Cultivar	**t/ha**	**@$350/t**	**$/ha**	**$ back for every $1 spent**
RGT Accroc	0.29	101.5	-38.5	0.7
Annapurna	0.89	322.0	182.0	2.3
RGT Calabro	1.61	577.5	437.5	4.1
RGT Relay	1.77	626.5	486.5	4.5
DS Bennett	4.52	1610.0	1470.0	11.5
Conqueror	2.80	994.0	854.0	7.1
Genius	1.87	661.5	521.5	4.7
Tabasco	1.42	500.5	360.5	3.6
Manning	2.39	840.0	700.0	6.0
CS170	0.63	224.0	84.0	1.6
Mean	**1.82**	**647.5**	**507.5**	**4.6**

Table 4. Detail of management levels applied

Sowing date:		**4-April**	
Seed Rate:		180 seeds/m^2	
Sowing Fertiliser:		100kg MAP	
Seed Treatment:		Pontiac	
Management:		**Untreated**	**Total Protection**
Fungicide:	GS00	---	Systiva
	GS31	---	Opus 500ml/ha
	GS39	---	Radial 840ml/ha
	GS61	---	Prosaro 300ml/ha
		Overall Inputs	
Nitrogen:	5 Aug	130kg/ha Urea	
	31 Aug	200kg/ha Urea	
	21 Sep	150kg/ha Urea	
PGR:	5 Aug	Moddus Evo 0.2L/ha + Errex 1.3 L/ha	
	26 Aug	Moddus Evo 0.2L/ha	
Insecticide:	1 May	Karate Zeon 0.04L/ha	
	5 Jun	Dominex Duo 0.126L/ha	
	25 Nov	Karate Zeon 0.04L/ha	
Irrigation:	17 Oct	25ml/ha	
	14 Nov	25ml/ha	
	29 Nov	20ml/ha	
	5 Dec	20ml/ha	
	12 Dec	20ml/ha	
	15 Dec	20ml/ha	

Notes:

- Sown in early April, all cultivars responded positively to fungicide protection, giving yield increases between 0.29 – 4.60t/ha (3 - 108%), however response in RGT Accroc were not economically advantageous.
- RGT Calabro was the highest yielding cultivar at both sowing dates achieving 12.94 – 13.07t/ha under fungicide management.
- The greatest margin response to fungicide protection again came from DS Bennett which returned approximately $11.5 for every dollar spent.
- Unfortunately, earlier maturing cultivars in this trial such as RGT Accroc, Annapurna and DS Bennett, suffered bird damage as they reached maturity (>GS85) and results should be treated with caution.

Image 1. 14 November - Location of Protocol 1 (TOS 2) at the 2019 Hyper Yielding Cereals site.

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