

TRIAL REPORT

Fulltec Efficacy on Wheat Disease
Conmurra, SA, 2019



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TABLE OF CONTENTS

SUMMARY	3
INTRODUCTION	4
<i>Aims</i>	<i>4</i>
<i>Chronology of events</i>	<i>4</i>
<i>Products</i>	<i>4</i>
<i>Treatments</i>	<i>4</i>
RESULTS	5
<i>Table 1 – Crop phytotoxicity at 14 and 27 DA-A</i>	<i>5</i>
<i>Table 2 – Septoria sp. severity and incidence of flag leaf at 14 DA-A</i>	<i>6</i>
<i>Table 3 – Septoria sp. severity and incidence of flag leaf -1 at 14 and 27 DA-A</i>	<i>7</i>
<i>Table 4 – Septoria sp. severity and incidence of flag leaf -2 at 14 and 27 DA-A</i>	<i>8</i>
<i>Table 5 – Septoria sp. severity and incidence of flag leaf -3 at 14 and 27 DA-A</i>	<i>9</i>
<i>Table 6 – Crop yield per tonne at 140 DA-A</i>	<i>10</i>
<i>Table 7 – Grain quality at 170 DA-A.....</i>	<i>11</i>
DISCUSSION	12
CONCLUSIONS	13
APPENDICES	14
<i>Appendix i - Trial details</i>	<i>14</i>
<i>Appendix ii - Plot data</i>	<i>17</i>
<i>Appendix iii - Weather data</i>	<i>24</i>
<i>Appendix iv - Photographs</i>	<i>26</i>

SUMMARY

A trial was conducted near Naracoorte in 2019 to evaluate and quantify the effect Fulltec Cube and Absortec Copper has on *Septoria tritici* sp. visual effects and grain quality in wheat (*Triticum aestivum* cv. Mace).

Fulltec Cube was applied at rates of 200 and 400 ml/ha in combination with a fungicide tank mix containing Prosaro at 150 ml/ha. Absortec Copper was applied at rates of 1000 and 2000 ml/ha also in a tank mix containing Prosaro at 150 ml/ha. All applications were made with a hand boom at a water rate of 100 L/ha to growth stage BBCH 39 wheat.

Crop phytotoxicity, disease incidence and disease severity assessments were taken 14 and 27 days after application A (DA-A). Crop yields were taken at 140 DA-A and grain quality analysis was taken post-harvest.

INTRODUCTION

Aims

1. To evaluate and quantify the visual impact of Cubo (Fulltec Cube) and Absortec Copper on wheat.
2. To evaluate and quantify the impact on grain yield and quality of Cubo (Fulltec Cube) and Absortec Copper on wheat.

Chronology of events

Date	Days after application A & B (DA-A/DA-B)	Crop stage		Event
		BBCH scale	Description	
26-Aug-2019	0	39	Flag leaf fully emerged	Pre-application disease assessment
26-Aug-2019	0	39	Flag leaf fully emerged	Application A foliar spray
10-Sep-2019	14	39-42	Flag leaf fully emerged to early booting	Disease severity and incidence assessment
10-Sep-2019	14	39-42	Flag leaf fully emerged to early booting	Crop phytotoxicity
23-Sep-2019	27	45-55	Late booting to head 50% emerged	Disease severity and incidence assessment
23-Sep-2019	27	45-55	Late booting to head 50% emerged	Crop phytotoxicity
14-Jan-2020	140	89	Grain ripe	Harvest

Products

Product	Active ingredient	Active ingredient concentration (g/L or g/kg)	Form type
Prosaro	210 g/L Prothioconazole + 210 g/L Tebuconazole	420	SC
Hasten	704 g/L Ethyl and Methyl esters of canola oil fatty acids	704	EC
Fulltec Cube	N/A	17.8	SC
Absortec Copper	N/A	N/A	SC

Treatments

Trt No.	Treatment Name	Form Conc	Form Unit	Rate	Rate Unit	Other Rate	Other Rate Unit
1	Untreated Control						
2	Prosaro	420	g/L	150	ml/ha	63	g ai/ha
3	Prosaro	420	g/L	150	ml/ha	63	g ai/ha
	Hasten	704	g/L	1	% v/v	704	g ai/ha
4	Prosaro	420	g/L	150	ml/ha	63	g ai/ha
	Fulltec Cube	17.8	%	200	ml/ha	35.6	g ai/ha
5	Prosaro	420	g/L	150	ml/ha	63	g ai/ha
	Fulltec Cube	17.8	%	400	ml/ha	71	g ai/ha
6	Prosaro	420	g/L	150	ml/ha	63	g ai/ha
	Absortec Copper			1000	ml/ha		
7	Prosaro	420	g/L	150	ml/ha	63	g ai/ha
	Absortec Copper			2000	ml/ha		

RESULTS

Table 1 – Crop phytotoxicity at 14 and 27 DA-A

Assessment Date					10-Sep-2019	23-Sep-2019
Assessment Type					PHYGEN	
Assessment Unit					%	
Reporting Basis					1	PLOT
Crop Stage Majority					41	49
Crop Stage Minimum/Maximum					37 42	45 55
Trt-Eval Interval					14 DA-A	27 DA-A
Trt No.	Treatment Name	Rate	Rate Unit	Appl Code	17	18
1	Untreated Control				0.0-	0.0-
2	Prosaro	150ml/ha		A	0.0-	0.0-
3	Prosaro	150ml/ha		A	0.0-	0.0-
	Hasten	1% v/v		A		
4	Prosaro	150ml/ha		A	0.0-	0.0-
	Fulltec Cube	200ml/ha		A		
5	Prosaro	150ml/ha		A	0.0-	0.0-
	Fulltec Cube	400ml/ha		A		
6	Prosaro	150ml/ha		A	0.0-	0.0-
	Absortec Copper	1000ml/ha		A		
7	Prosaro	150ml/ha		A	0.0-	0.0-
	Absortec Copper	2000ml/ha		A		
LSD P=.05					.	.
Standard Deviation					0.00	0.00
CV					0.0	0.0
Levene's F					0.00	0.00
Levene's Prob(F)					0.00*	0.00*
Skewness					.	.
Kurtosis					.	.
Replicate F					0.000	0.000
Replicate Prob(F)					1.0000	1.0000
Treatment F					0.000	0.000
Treatment Prob(F)					1.0000	1.0000

Means followed by same letter or symbol do not significantly differ (P=.05, LSD).

Table 2 – Septoria sp. severity and incidence of flag leaf at 14 DA-A

Assessment Date					10-Sep-2019		10-Sep-2019	
					FLAGLE -			
Part Assessed					PESSEV		PESINC	
					% LAI			
Assessment Type					1		LEAF	
Assessment Unit					41		41	
Reporting Basis					37 42		37 42	
Crop Stage Majority					14 DA-A		14 DA-A	
Crop Stage Minimum/Maximum								
Trt-Eval Interval								
Trt No.	Treatment Name	Rate	Rate Unit	Appl Code	9		10	
1	Untreated Control				0.0-		0.0-	
2	Prosaro	150ml/ha		A	0.0-		0.0-	
3	Prosaro Hasten	150ml/ha 1% v/v		A	0.0-		0.0-	
4	Prosaro Fulltec Cube	150ml/ha 200ml/ha		A	0.0-		0.0-	
5	Prosaro Fulltec Cube	150ml/ha 400ml/ha		A	0.0-		0.0-	
6	Prosaro Absortec Copper	150ml/ha 1000ml/ha		A	0.0-		0.0-	
7	Prosaro Absortec Copper	150ml/ha 2000ml/ha		A	0.0-		0.0-	
LSD P=.05								
Standard Deviation					0.00		0.00	
CV					0.0		0.0	
Levene's F					0.00		0.00	
Levene's Prob(F)					0.00*		0.00*	
Skewness					.		.	
Kurtosis					.		.	
Replicate F					0.000		0.000	
Replicate Prob(F)					1.0000		1.0000	
Treatment F					0.000		0.000	
Treatment Prob(F)					1.0000		1.0000	

Means followed by same letter or symbol do not significantly differ (P=.05, LSD).

Table 3 – Septoria sp. severity and incidence of flag leaf -1 at 14 and 27 DA-A

Assessment Date	10-Sep-2019	23-Sep-2019	10-Sep-2019	23-Sep-2019
Part Assessed	FL-1 -			
Assessment Type	PESSEV		PESINC	
Assessment Unit	% LAI			
Reporting Basis	1 LEAF			
Crop Stage Majority	41	49	41	49
Crop Stage Minimum/Maximum	37 42	45 55	37 42	45 55
Trt-Eval Interval	14 DA-A	27 DA-A	14 DA-A	27 DA-A
ARM Action Codes		AL	AL	
Trt Treatment	Rate	Appl		
No. Name	Rate Unit	Code		
1 Untreated Control			11	23
2 Prosaro	150ml/ha	A	12	24
3 Prosaro	150ml/ha	A		
Hasten	1% v/v	A		
4 Prosaro	150ml/ha	A		
Fulltec Cube	200ml/ha	A		
5 Prosaro	150ml/ha	A		
Fulltec Cube	400ml/ha	A		
6 Prosaro	150ml/ha	A		
Absortec Copper	1000ml/ha	A		
7 Prosaro	150ml/ha	A		
Absortec Copper	2000ml/ha	A		
LSD P=.05	0.79	N/A	N/A	15.38
Standard Deviation	0.67	0.12t	0.57t	13.04
CV	211.18	70.99t	94.41t	69.35
Levene's F	1.596	1.891	0.739	1.229
Levene's Prob(F)	0.178	0.11	0.622	0.315
Skewness	4.7905*	1.9292*	0.3216	1.7251*
Kurtosis	26.349*	3.2301*	-1.6378*	2.1583*
Replicate F	1.616	1.659	2.371	1.660
Replicate Prob(F)	0.1862	0.1751	0.0630	0.1749
Treatment F	1.957	22.732	2.274	21.474
Treatment Prob(F)	0.1038	0.0001	0.0630	0.0001

Means followed by same letter or symbol do not significantly differ (P=.05, LSD).

AL = Data transformed using log transformation of X+1 with resulting letter of separation applied to original means

Table 4 – Septoria sp. severity and incidence of flag leaf -2 at 14 and 27 DA-A

Assessment Date	10-Sep-2019	23-Sep-2019	10-Sep-2019	23-Sep-2019
Part Assessed	FL-2 -			
Assessment Type	PESSEV		PESINC	
Assessment Unit	% LAI			
Reporting Basis	1 LEAF			
Crop Stage Majority	41	49	41	49
Crop Stage Minimum/Maximum	37 42	45 55	37 42	45 55
Trt-Eval Interval	14 DA-A	27 DA-A	14 DA-A	27 DA-A
ARM Action Codes	AL			
Trt Treatment	Rate	Appl		
No. Name	Rate Unit	Code		
1 Untreated Control			13	22
2 Prosaro	150ml/ha A		12.6a	21
3 Prosaro	150ml/ha A		6.7b	14
Hasten	1% v/v A		6.9b	22
4 Prosaro	150ml/ha A		10.4ab	
Fulltec Cube	200ml/ha A		17.5d	
5 Prosaro	150ml/ha A		7.9b	
Fulltec Cube	400ml/ha A		19.8bcd	
6 Prosaro	150ml/ha A		7.0b	
Absortec Copper	1000ml/ha A		18.6cd	
7 Prosaro	150ml/ha A		7.7b	
Absortec Copper	2000ml/ha A		25.3bc	
LSD P=.05		N/A	7.27	15.47
Standard Deviation		0.15t	6.17	13.12
CV		18.95t	27.32	16.5
Levene's F		0.481	1.822	0.463
Levene's Prob(F)		0.818	0.123	0.831
Skewness		-0.1628	0.7216	-0.4141
Kurtosis		-0.5638	0.5278	-0.9911
Replicate F		10.763	1.169	6.426
Replicate Prob(F)		0.0001	0.3471	0.0004
Treatment F		2.533	18.480	1.249
Treatment Prob(F)		0.0419	0.0001	0.3102

Means followed by same letter or symbol do not significantly differ (P=.05, LSD).

AL = Data transformed using log transformation of X+1 with resulting letter of separation applied to original means

Table 5 – Septoria sp. severity and incidence of flag leaf -3 at 14 and 27 DA-A

Assessment Date	10-Sep-2019	23-Sep-2019	10-Sep-2019	23-Sep-2019
Part Assessed	FL-3 -			
Assessment Type	PESSEV		PESINC	
Assessment Unit	% LAI			
Reporting Basis	1 LEAF			
Crop Stage Majority	41	49	41	49
Crop Stage Minimum/Maximum	37 42	45 55	37 42	45 55
Trt-Eval Interval	14 DA-A	27 DA-A	14 DA-A	27 DA-A
ARM Action Codes			AS	AS
Trt No.	15	19	16	20
Treatment Name				
Rate				
Unit				
Appl Code				
1 Untreated Control	47.3a	75.3a	100.0-	100.0-
2 Prosaro	150ml/ha A 29.6c	60.5b	100.0-	100.0-
3 Prosaro	150ml/ha A 42.6ab	33.7d	100.0-	95.0-
Hasten	1% v/v A			
4 Prosaro	150ml/ha A 38.8abc	54.3bc	100.0-	100.0-
Fulltec Cube	200ml/ha A			
5 Prosaro	150ml/ha A 36.8bc	52.3c	98.3-	100.0-
Fulltec Cube	400ml/ha A			
6 Prosaro	150ml/ha A 39.1ab	55.3bc	100.0-	100.0-
Absortec Copper	1000ml/ha A			
7 Prosaro	150ml/ha A 35.8bc	59.5bc	100.0-	100.0-
Absortec Copper	2000ml/ha A			
LSD P=.05	9.39	8.11	N/A	N/A
Standard Deviation	7.96	6.88	0.08t	0.17t
CV	20.65	12.32	0.79t	1.66t
Levene's F	1.064	0.847	1.00	2.12
Levene's Prob(F)	0.403	0.543	0.441	0.076
Skewness	0.3109	-0.4395	-6.4807*	-5.1543*
Kurtosis	-0.3823	0.0737	42.0*	27.4949*
Replicate F	9.636	1.919	1.000	1.000
Replicate Prob(F)	0.0001	0.1206	0.4346	0.4346
Treatment F	2.886	19.475	1.000	2.120
Treatment Prob(F)	0.0243	0.0001	0.4435	0.0802

Means followed by same letter or symbol do not significantly differ (P=.05, LSD).

AS = Data transformed using square root transformation of X+0.5 with resulting letter of separation applied to original means

Table 6 – Crop yield per tonne at 140 DA-A

Assessment Date					14-Jan-2020
Assessment Type					YIELD
Assessment Unit					T-MET
Reporting Basis					1 ha
Crop Stage Majority					89
Crop Stage Minimum/Maximum					89 89
Trt-Eval Interval					140 DA-A
Trt No.	Treatment Name	Rate	Rate Unit	Appl Code	26
1	Untreated Control				6.392-
2	Prosaro		150ml/ha	A	6.804-
3	Prosaro		150ml/ha	A	6.850-
	Hasten		1% v/v	A	
4	Prosaro		150ml/ha	A	6.697-
	Fulltec Cube		200ml/ha	A	
5	Prosaro		150ml/ha	A	6.798-
	Fulltec Cube		400ml/ha	A	
6	Prosaro		150ml/ha	A	6.767-
	Absortec Copper		1000ml/ha	A	
7	Prosaro		150ml/ha	A	6.737-
	Absortec Copper		2000ml/ha	A	
LSD P=.05					0.4087
Standard Deviation					0.3466
CV					5.16
Levene's F					0.733
Levene's Prob(F)					0.626
Skewness					-0.7486*
Kurtosis					0.666
Replicate F					3.314
Replicate Prob(F)					0.0168
Treatment F					1.170
Treatment Prob(F)					0.3481

Means followed by same letter or symbol do not significantly differ (P=.05, LSD).

Table 7 – Grain quality at 170 DA-A

Assessment Date				13-Feb-2020			
				PROCON	MOICON	HLW	SCREENING
Assessment Type				%		%	
Assessment Unit				%		%	
Reporting Basis				1 PLOT			
Crop Stage Majority				99			
Crop Stage Minimum/Maximum				99 99			
Trt-Eval Interval				170 DA-A			
Trt No.	Treatment Name	Rate	Appl Code	27	28	29	30
1	Untreated Control			11.75-	10.97-	69.15-	1.50-
2	Prosaro	150ml/ha	A	11.35-	11.02-	65.28-	1.47-
3	Prosaro Hasten	150ml/ha 1% v/v	A A	11.50-	11.10-	63.12-	1.55-
4	Prosaro Fulltec Cube	150ml/ha 200ml/ha	A A	11.38-	11.08-	67.85-	1.15-
5	Prosaro Fulltec Cube	150ml/ha 400ml/ha	A A	11.53-	11.03-	66.20-	0.98-
6	Prosaro Absortec Copper	150ml/ha 1000ml/ha	A A	11.48-	11.05-	61.68-	1.65-
7	Prosaro Absortec Copper	150ml/ha 2000ml/ha	A A	11.37-	11.03-	63.52-	1.48-
LSD P=.05				0.337	0.197	5.357	0.532
Standard Deviation				0.286	0.167	4.543	0.451
CV				2.49	1.51	6.96	32.27
Levene's F				0.551	1.549	0.648	1.374
Levene's Prob(F)				0.765	0.191	0.692	0.252
Skewness				0.3152	0.2076	-0.3123	0.7255
Kurtosis				0.1389	1.3405	-0.0196	0.9497
Replicate F				10.149	1.716	2.998	2.274
Replicate Prob(F)				0.0001	0.1614	0.0260	0.0724
Treatment F				1.407	0.417	2.091	1.684
Treatment Prob(F)				0.2445	0.8617	0.0840	0.1594

DISCUSSION

The trial was conducted in an established wheat crop sown using knife point and press wheel seeding system. The initial application was applied at BBCH growth stage 39. The trial was managed according to local agronomic practises.

Crop phytotoxicity assessments taken at 14 and 27 days after application A (DA-A) recorded no visual crop phytotoxicity across all treatments. The treatments were safe to the crop in relation to crop phytotoxicity when applied under the conditions of the trial (Table 1).

Septoria tritici sp. incidence and severity was assessed at 14 and 27 DA-A to determine the effect the different treatments would have on disease levels and hence crop health. Tank mixes containing Prosaro plus Hasten resulted in the highest level of disease control across all treatments. Septoria sp. leaf area infected (LAI) was up to 65% less in comparison with untreated plots at flag -2 at 27 DA-A. Prosaro plus Hasten also saw a significant reduction in incidence level higher up the crop canopy with 71.7% less disease presence in comparison with the untreated.

Applications of the tank mixes containing Prosaro and either Fulltec Cube or Absortec Copper achieved similar levels of Septoria sp. control to that of applications of Prosaro alone. At 27 DA-A Prosaro and the tank mixes of Fulltec cube and Absortec copper at both rates, achieved disease infection levels of approximately 55-60%, 20-25 % and 1% or lower on flag leaf -3, -2 and -1 respectively. These trends were also reflected in disease incidence levels with tank mixes containing Absortec Copper and Fulltech Cube achieving statistically similar amounts to that of Prosaro alone.

Both Absortec Copper and Fulltec Cube tank mixes both achieved similar levels of disease control. No significant difference in Septoria LAI percentage or incidence occurred between the two products at both 14 DA-A and 27 DA-A throughout the crop canopy (Table 2-5).

Grain yield was statistically similar across all treatments. All treatments resulted in yields of approximately 6.5 to/ha. While statistically similar in yields, the untreated recorded the lowest yield of 6.392 ton/ha in comparison to highest yield of 6.850 ton/ha achieved by the Prosaro plus Hasten treatment. This corresponds with foliar assessment trends (Table 6).

No significant differences occurred across all treatments in relation to grain quality assessments. Protein percentage was approximately 11.5% for all treatments. Moisture content was approximately 11% for all treatments. Hectolitre weight (HLW) was similar for all treatments, with approximately 60-65 kg. Grain screenings were also statistically similar; however, Prosaro plus Fulltec Cube at 400ml/ha tended to record lower screenings by 0.5% in comparison to the untreated of 1.50% (Table 7).

CONCLUSIONS

Fulltec Cube and Absortec Copper applications did not result in any visual crop damage in regards to crop phytotoxicity at 14 and 27 DA-A.

Fulltec Cube or Absortec Copper did not significantly increase the efficacy of Prosaro and thus improve plant visual health, with solo Prosaro applications displaying similar *Septoria tritici* sp. control in comparison to Fulltec Cube and Absortec Copper.

Prosaro plus Hasten achieved the highest level of *Septoria* sp. control of all treatments under the conditions of the trial.

No significant improvements in grain yield or quality were achieved through applications of Fulltec Cube or Absortec Copper.

APPENDICES

Appendix i - Trial details

Trial Site Information

Treated Plot Width: 2 m
 Treated Plot Length: 12 m
 Treated Plot Area: 24 m²
 Treatments: 7
 Replications: 6
 Study Design: RACOBL Randomized Complete Block (RCB)

Previous

No.	Crop	Year
1.	CANOLA	2018
2.	WHEAT	2017

Cooperator/Landowner

Cooperator: Nick Wight
 Address 1: "Jemalong"
 City: Conmurra
 State/Prov: SA
 Postal Code: 5271
 Mobile No.: 0409 821 505
 Country: AUS Australia

Crop Description

Crop 1: C TRZAS, Triticum aestivum Spring wheat
 BBCH Scale: BCER
 Entry Date: Aug-28-2019
 Variety: Sceptre
 Planting Date: May-18-2019
 Planting Rate: 100 kg/ha
 Depth: 1.5 cm
 Rows per Plot: 5
 Planting Method: DIRDRI direct drilled
 Row Spacing: 0.20 m
 Planting Equipment: PP plot planter
 Seed Bed: FRIABL friable
 Soil Moisture: SLIWET slightly wet, moist

Maintenance

No.	Date	Type	Maintenance Product Name	Form Conc	Form Unit	Form Type	Description	Rate	Rate Unit
1.	May-18-2019	FERT	Granulock Z				Banded Below Seed	100	kg/ha
2.	May-18-2019	FERT	Granular Urea				Banded Below Seed	50	kg/ha
3.	Aug-30-2019	FERT	Urea	46	% N	SG	46-0-0	100	kg/ha

Application Description

A
Application Date Aug-27-2019
Appl. Start Time 9:30 AM
Appl. Stop Time 11:00 AM
Application Method SPRAY
Application Timing 37
Application Placement FOLIAR
Applied By Jessamy Bennett
Appl. Entry Date Sep-5-2019
Air Temperature Start, Stop 12 12 C
% Relative Humidity Start, Stop 63 63
Wind Velocity+Dir. Start 9 KPH NW
Wind Velocity+Dir. Stop 9 KPH NW
Wet Leaves (Y/N) Y yes
Soil Moisture SLIWET
% Cloud Cover 70

Application Equipment

A
Appl. Equipment HBM025
Equipment Type SPRAYE
Operation Pressure 300 kPa
Nozzle Type IDK
Nozzle Size 120-01
Band Width 1 m
Boom Height 50 cm
Boom Flow Rate cm
Ground Speed 4.68 KPH
Carrier WATER
Application Amount 100 L/ha
Mix Size 2 liters

Crop Stage at Each Application

A
Crop 1 Code, BBCH Scale TRZAS BCER
Stage Majority, Percent 37
Stage Minimum, Percent 37
Stage Maximum, Percent 39

Trial plan

Rep	Blk							
6	6	4	2	1	5	6	7	3
	Plot	601	602	603	604	605	606	607
5	5	6	1	7	2	3	4	5
	Plot	501	502	503	504	505	506	507
4	4	7	3	6	4	5	2	1
	Plot	401	402	403	404	405	406	407
3	3	2	4	5	1	7	3	6
	Plot	301	302	303	304	305	306	307
2	2	1	7	3	6	2	5	4
	Plot	201	202	203	204	205	206	207
1	1	3	5	4	7	1	6	2
	Plot	101	102	103	104	105	106	107

Assessment Techniques

Assessment type	Scale	Method
Crop Phytotoxicity	0-100	0 = No discolouration evident 10 = Negligible, discolouration barely seen 20 = Slight, discolouration clearly seen 30 = Moderate discolouration, recovery expected 40 = Substantial discolouration, some effects probably irreversible 50 = Majority of plants discoloured, highly likely irreversible effects 60 = Nearly all plants discoloured, mostly irreversibly 70 = Severe discolouration 80 = Increasing level of discolouration 90 = Increasing level of discolouration 100 = Total discolouration of crop
Disease Severity – Leaf Area Infected (LAI)	0-100	0 = no leaf area infected 100 = total leaf area infected (per leaf – 10 samples from each plot)
Disease Incidence	0-20	20 plant samples from each plot assessed for presence of disease on all leaves
Crop Grain Quality (Wheat)	Protein (%) Hectolitre wt. (kg) Screenings (% w/w)	Grain quality analysis was conducted by the Kalyx Australia branch in Young.
Crop Grain Yield	t/ha	Yield was taken in a small plot harvester. The grain was weighed using an off board weighing system and a kg/plot value recorded. This value was then converted to t/ha.

Statistical interpretation

All data from this trial was analysed using a confidence limit of 95%, unless otherwise specified. All mention of significant differences contained within this report refer to statistically significant differences. Levene's test was used to test for homogeneity.

If homogeneity was not met then the data was transformed using the appropriate transformation. The ANOVA table provides the original means with the transformed letters of separation. The calculation of F values is developed from transformed data units and as the LSD is calculated from these values it will also apply to the transformed data. This means that comparison of treatment means needs to rely on the letters of significance and not the LSD.

Data table abbreviation guide

Assessment Type

PESSEV = pest severity

PESINC = pest incidence

PHYGEN = phytotoxicity - general / injury

YIELD = yield

PROCON = protein content

MOICON = moisture content

HLW = weight 100 Ltr (hl)

Assessment Unit

% = percent

kg = kilogram

T-MET = ton (metric=1000 kg)

LEAF = leaf

PLOT = total plot

ha = hectare

ARM Action Codes

AL = Data transformed using log transformation of X+1 with resulting letter of separation applied to original means

AS = Data transformed using square root transformation of X+0.5 with resulting letter of separation applied to original means

Appendix ii - Plot data

Table 1 - Crop phytotoxicity at 14 and 27 DA-A

Assessment Date						10-Sep-2019	23-Sep-2019
Assessment Type						PHYGEN	
Assessment Unit						%	
Reporting Basis						1 PLOT	
Crop Stage Majority						41	49
Crop Stage Minimum/Maximum						37 42	45 55
Trt-Eval Interval						14 DA-A	27 DA-A
Trt No.	Treatment Name	Rate	Rate Unit	Appl Code	Plot	17	18
1	Untreated Control				105	0.0	0.0
					201	0.0	0.0
					304	0.0	0.0
					407	0.0	0.0
					502	0.0	0.0
					603	0.0	0.0
					Mean =	0.0	0.0
2	Prosaro	150ml/ha		A	107	0.0	0.0
					205	0.0	0.0
					301	0.0	0.0
					406	0.0	0.0
					504	0.0	0.0
					602	0.0	0.0
					Mean =	0.0	0.0
3	Prosaro Hasten	150ml/ha 1% v/v		A A	101	0.0	0.0
					203	0.0	0.0
					306	0.0	0.0
					402	0.0	0.0
					505	0.0	0.0
					607	0.0	0.0
					Mean =	0.0	0.0
4	Prosaro Fulltec Cube	150ml/ha 200ml/ha		A A	103	0.0	0.0
					207	0.0	0.0
					302	0.0	0.0
					404	0.0	0.0
					506	0.0	0.0
					601	0.0	0.0
					Mean =	0.0	0.0
5	Prosaro Fulltec Cube	150ml/ha 400ml/ha		A A	102	0.0	0.0
					206	0.0	0.0
					303	0.0	0.0
					405	0.0	0.0
					507	0.0	0.0
					604	0.0	0.0
					Mean =	0.0	0.0
6	Prosaro Absortec Copper	150ml/ha 1000ml/ha		A A	106	0.0	0.0
					204	0.0	0.0
					307	0.0	0.0
					403	0.0	0.0
					501	0.0	0.0
					605	0.0	0.0
					Mean =	0.0	0.0
7	Prosaro Absortec Copper	150ml/ha 2000ml/ha		A A	104	0.0	0.0
					202	0.0	0.0
					305	0.0	0.0
					401	0.0	0.0
					503	0.0	0.0
					606	0.0	0.0
					Mean =	0.0	0.0

Table 2 - Septoria sp. severity and incidence of flag leaf at 7 and 14 DA-A

Assessment Date Part Assessed Assessment Type Assessment Unit Reporting Basis Crop Stage Majority Crop Stage Minimum/Maximum Trt-Eval Interval						27-Aug-2019	10-Sep-2019	27-Aug-2019	10-Sep-2019
						FLAGLE -			
						PESSEV		PESINC	
						% LAI 1 LEAF			
						37 35 39 0 DA-A	41 37 42 14 DA-A	37 35 39 0 DA-A	41 37 42 14 DA-A
Trt No.	Treatment Name	Rate	Unit	Appl Code	Plot	7	9	8	10
1	Untreated Control				105	0.0	0.0	0.0	0.0
					201	0.0	0.0	0.0	0.0
					304	0.0	0.0	0.0	0.0
					407	0.0	0.0	0.0	0.0
					502	0.0	0.0	0.0	0.0
					603	0.0	0.0	0.0	0.0
					Mean =	0.0	0.0	0.0	0.0
2	Prosaro	150ml/ha	A		107		0.0		0.0
					205		0.0		0.0
					301		0.0		0.0
					406		0.0		0.0
					504		0.0		0.0
					602		0.0		0.0
					Mean =		0.0		0.0
3	Prosaro Hasten	150ml/ha 1% v/v	A A		101		0.0		0.0
					203		0.0		0.0
					306		0.0		0.0
					402		0.0		0.0
					505		0.0		0.0
					607		0.0		0.0
					Mean =		0.0		0.0
4	Prosaro Fulltec Cube	150ml/ha 200ml/ha	A A		103		0.0		0.0
					207		0.0		0.0
					302		0.0		0.0
					404		0.0		0.0
					506		0.0		0.0
					601		0.0		0.0
					Mean =		0.0		0.0
5	Prosaro Fulltec Cube	150ml/ha 400ml/ha	A A		102		0.0		0.0
					206		0.0		0.0
					303		0.0		0.0
					405		0.0		0.0
					507		0.0		0.0
					604		0.0		0.0
					Mean =		0.0		0.0
6	Prosaro Absortec Copper	150ml/ha 1000ml/ha	A A		106		0.0		0.0
					204		0.0		0.0
					307		0.0		0.0
					403		0.0		0.0
					501		0.0		0.0
					605		0.0		0.0
					Mean =		0.0		0.0
7	Prosaro Absortec Copper	150ml/ha 2000ml/ha	A A		104		0.0		0.0
					202		0.0		0.0
					305		0.0		0.0
					401		0.0		0.0
					503		0.0		0.0
					606		0.0		0.0
					Mean =		0.0		0.0

Table 3 - Septoria sp. severity and incidence of flag leaf -1 at 0, 14 and 27 DA-A

Assessment Date	27-Aug-2019	10-Sep-2019	23-Sep-2019	27-Aug-2019	10-Sep-2019	23-Sep-2019				
Part Assessed	FL-1 -									
Assessment Type	PESSEV			PESINC						
Assessment Unit	% LAI									
Reporting Basis	1 LEAF									
Crop Stage Majority	37	41	49	37	41	49				
Crop Stage Minimum/Maximum	35 39	37 42	45 55	35 39	37 42	45 55				
Trt-Eval Interval	0 DA-A	14 DA-A	27 DA-A	0 DA-A	14 DA-A	27 DA-A				
Trt Treatment	Rate	Appl								
No. Name	Rate	Unit	Code	Plot	5	11	23	6	12	24
1 Untreated Control				105	0.0	0.0	3.0	0.0	0.0	60.0
				201	0.0	0.4	5.5	0.0	20.0	50.0
				304	0.0	0.8	5.5	0.0	40.0	70.0
				407	0.0	4.5	9.0	0.0	80.0	100.0
				502	0.0	0.2	3.0	0.0	10.0	60.0
				603	0.0	0.7	7.5	0.0	20.0	90.0
				Mean =	0.0	1.1	5.6	0.0	28.3	71.7
2 Prosaro	150ml/ha	A		107		0.0	0.5		0.0	10.0
				205		0.5	0.5		10.0	10.0
				301		0.0	1.0		0.0	20.0
				406		0.0	1.0		0.0	10.0
				504		0.2	2.5		10.0	40.0
				602		0.0	2.0		0.0	30.0
				Mean =		0.1	1.3		3.3	20.0
3 Prosaro	150ml/ha	A		101		0.2	0.0		10.0	0.0
Hasten	1% v/v	A		203		0.0	0.0		0.0	0.0
				306		0.0	0.0		0.0	0.0
				402		0.0	0.0		0.0	0.0
				505		0.0	0.0		0.0	0.0
				607		0.0	0.0		0.0	0.0
				Mean =		0.0	0.0		1.7	0.0
4 Prosaro	150ml/ha	A		103		0.0	0.5		0.0	10.0
Fulltec Cube	200ml/ha	A		207		1.6	0.0		40.0	0.0
				302		0.0	0.0		0.0	0.0
				404		0.7	1.0		20.0	20.0
				506		0.2	1.0		10.0	20.0
				601		0.7	0.0		20.0	0.0
				Mean =		0.5	0.4		15.0	8.3
5 Prosaro	150ml/ha	A		102		0.0	0.0		0.0	0.0
Fulltec Cube	400ml/ha	A		206		0.4	0.5		20.0	10.0
				303		0.2	1.5		10.0	20.0
				405		0.2	0.0		10.0	0.0
				507		0.0	0.0		0.0	0.0
				604		0.0	0.5		0.0	10.0
				Mean =		0.1	0.4		6.7	6.7
6 Prosaro	150ml/ha	A		106		0.0	0.0		0.0	0.0
Absortec Copper	1000ml/ha	A		204		0.6	0.5		30.0	10.0
				307		0.2	0.0		10.0	0.0
				403		0.4	0.0		20.0	0.0
				501		0.0	0.0		0.0	0.0
				605		0.0	1.0		0.0	10.0
				Mean =		0.2	0.3		10.0	3.3
7 Prosaro	150ml/ha	A		104		0.0	0.5		0.0	10.0
Absortec Copper	2000ml/ha	A		202		0.0	0.5		0.0	10.0
				305		0.0	0.5		0.0	10.0
				401		0.4	0.5		20.0	10.0
				503		0.2	1.0		10.0	20.0
				606		0.0	4.4		0.0	70.0
				Mean =		0.1	1.2		5.0	21.7

Table 4 - *Septoria sp.* severity and incidence of flag leaf -2 at 0, 14 and 27 DA-A

Assessment Date	27-Aug-2019	10-Sep-2019	23-Sep-2019	27-Aug-2019	10-Sep-2019	23-Sep-2019				
Part Assessed	FL-2 -									
Assessment Type	PESSEV			PESINC						
Assessment Unit	% LAI									
Reporting Basis	1 LEAF									
Crop Stage Majority	37	41	49	37	41	49				
Crop Stage Minimum/Maximum	35 39	37 42	45 55	35 39	37 42	45 55				
Trt-Eval Interval	0 DA-A	14 DA-A	27 DA-A	0 DA-A	14 DA-A	27 DA-A				
Trt Treatment	Rate	Appl								
No. Name	Rate	Unit	Code	Plot	3	13	21	4	14	22
1 Untreated Control				105	0.5	9.5	29.5	10.0	70.0	100.0
				201	0.0	10.5	42.0	0.0	100.0	100.0
				304	0.0	14.0	34.5	0.0	80.0	100.0
				407	6.5	24.0	52.0	30.0	100.0	100.0
				502	0.5	10.5	49.0	10.0	90.0	100.0
				603	0.0	7.2	49.0	0.0	80.0	100.0
				Mean =	1.3	12.6	42.7	8.3	86.7	100.0
2 Prosaro	150ml/ha	A		107		5.1	28.0		50.0	90.0
				205		9.5	23.5		70.0	100.0
				301		8.5	27.5		100.0	100.0
				406		9.2	24.5		100.0	100.0
				504		4.2	27.5		90.0	100.0
				602		3.4	28.5		70.0	100.0
				Mean =		6.7	26.6		80.0	98.3
3 Prosaro	150ml/ha	A		101		7.0	2.5		50.0	40.0
Hasten	1% v/v	A		203		12.5	13.5		100.0	70.0
				306		4.7	6.0		60.0	70.0
				402		6.7	9.5		80.0	80.0
				505		7.5	5.5		70.0	80.0
				607		2.7	8.0		50.0	80.0
				Mean =		6.9	7.5		68.3	70.0
4 Prosaro	150ml/ha	A		103		5.0	14.5		50.0	70.0
Fulltec Cube	200ml/ha	A		207		14.7	24.5		100.0	90.0
				302		14.0	20.5		90.0	90.0
				404		15.0	20.0		80.0	100.0
				506		5.4	17.0		90.0	90.0
				601		8.0	8.7		70.0	70.0
				Mean =		10.4	17.5		80.0	85.0
5 Prosaro	150ml/ha	A		102		2.1	10.0		50.0	60.0
Fulltec Cube	400ml/ha	A		206		13.5	20.5		100.0	90.0
				303		8.0	28.5		90.0	100.0
				405		14.0	23.5		90.0	100.0
				507		2.4	11.0		50.0	90.0
				604		7.2	25.5		100.0	100.0
				Mean =		7.9	19.8		80.0	90.0
6 Prosaro	150ml/ha	A		106		5.0	19.2		80.0	90.0
Absortec Copper	1000ml/ha	A		204		9.5	18.5		100.0	90.0
				307		9.7	15.0		70.0	100.0
				403		9.0	25.0		90.0	90.0
				501		3.4	15.5		70.0	100.0
				605		5.4	18.5		100.0	80.0
				Mean =		7.0	18.6		85.0	91.7
7 Prosaro	150ml/ha	A		104		4.5	25.0		60.0	90.0
Absortec Copper	2000ml/ha	A		202		12.0	28.0		90.0	90.0
				305		10.0	21.0		80.0	100.0
				401		6.7	13.5		90.0	90.0
				503		6.7	25.5		70.0	90.0
				606		6.4	39.0		70.0	100.0
				Mean =		7.7	25.3		76.7	93.3

Table 5 - Septoria sp. severity and incidence of flag leaf -3 at 0, 14 and 27 DA-A

Assessment Date	27-Aug-2019	10-Sep-2019	23-Sep-2019	27-Aug-2019	10-Sep-2019	23-Sep-2019				
Part Assessed	FL-3 -									
Assessment Type	PESSEV			PESINC						
Assessment Unit	% LAI									
Reporting Basis	1 LEAF									
Crop Stage Majority	37	41	49	37	41	49				
Crop Stage Minimum/Maximum	35 39	37 42	45 55	35 39	37 42	45 55				
Trt-Eval Interval	0 DA-A	14 DA-A	27 DA-A	0 DA-A	14 DA-A	27 DA-A				
Trt Treatment	Rate	Appl								
No. Name	Rate	Unit	Code	Plot	1	15	19	2	16	20
1 Untreated Control				105	19.0	41.5	78.0	100.0	100.0	100.0
				201	17.5	57.0	76.0	90.0	100.0	100.0
				304	23.5	52.0	79.0	100.0	100.0	100.0
				407	23.0	69.0	77.0	90.0	100.0	100.0
				502	17.0	30.0	72.0	100.0	100.0	100.0
				603	24.5	34.0	70.0	100.0	100.0	100.0
				Mean =	20.8	47.3	75.3	96.7	100.0	100.0
2 Prosaro	150ml/ha	A		107		22.0	54.0		100.0	100.0
				205		32.0	68.0		100.0	100.0
				301		37.0	64.0		100.0	100.0
				406		36.5	52.0		100.0	100.0
				504		28.5	67.0		100.0	100.0
				602		21.5	58.0		100.0	100.0
				Mean =		29.6	60.5		100.0	100.0
3 Prosaro	150ml/ha	A		101		35.5	23.0		100.0	90.0
Hasten	1% v/v	A		203		57.0	50.0		100.0	100.0
				306		40.0	28.0		100.0	80.0
				402		51.0	36.0		100.0	100.0
				505		34.0	33.0		100.0	100.0
				607		38.0	32.0		100.0	100.0
				Mean =		42.6	33.7		100.0	95.0
4 Prosaro	150ml/ha	A		103		22.5	59.0		100.0	100.0
Fulltec Cube	200ml/ha	A		207		54.0	58.0		100.0	100.0
				302		42.0	61.0		100.0	100.0
				404		39.0	45.0		100.0	100.0
				506		28.5	52.0		100.0	100.0
				601		47.0	51.0		100.0	100.0
				Mean =		38.8	54.3		100.0	100.0
5 Prosaro	150ml/ha	A		102		19.5	54.0		90.0	100.0
Fulltec Cube	400ml/ha	A		206		55.0	57.0		100.0	100.0
				303		37.0	48.0		100.0	100.0
				405		56.0	61.0		100.0	100.0
				507		16.5	40.0		100.0	100.0
				604		37.0	54.0		100.0	100.0
				Mean =		36.8	52.3		98.3	100.0
6 Prosaro	150ml/ha	A		106		25.0	59.0		100.0	100.0
Absortec Copper	1000ml/ha	A		204		54.0	56.0		100.0	100.0
				307		41.5	59.0		100.0	100.0
				403		43.0	53.0		100.0	100.0
				501		23.0	53.0		100.0	100.0
				605		48.0	52.0		100.0	100.0
				Mean =		39.1	55.3		100.0	100.0
7 Prosaro	150ml/ha	A		104		33.5	59.0		100.0	100.0
Absortec Copper	2000ml/ha	A		202		33.0	72.0		100.0	100.0
				305		35.0	58.0		100.0	100.0
				401		50.0	40.0		100.0	100.0
				503		38.0	58.0		100.0	100.0
				606		25.5	70.0		100.0	100.0
				Mean =		35.8	59.5		100.0	100.0

Table 6 - Crop yield per kg at 140 DA-A

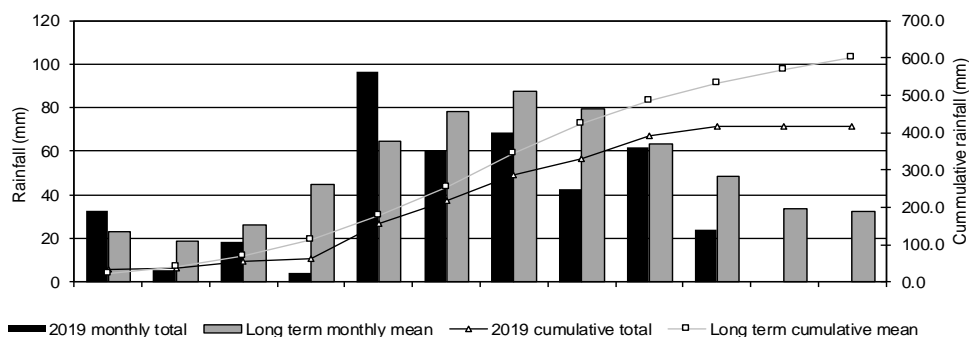
Assessment Date						14-Jan-2020	
Assessment Type						YIELD	
Assessment Unit						kg	
Reporting Basis						1 PLOT	
Crop Stage Majority						89	
Crop Stage Minimum/Maximum						89 89	
Trt-Eval Interval						140 DA-A	
Trt No.	Treatment Name	Rate	Rate Unit	Appl Code	Plot	25	
1	Untreated Control				105	7.849	
					201	7.483	
					304	8.058	
					407	7.238	
					502	8.079	
					603	7.700	
					Mean =	7.735	
2	Prosaro	150ml/ha		A	107	8.409	
					205	8.028	
					301	8.097	
					406	8.002	
					504	8.443	
					602	8.415	
					Mean =	8.232	
3	Prosaro Hasten	150ml/ha 1% v/v		A A	101	7.958	
					203	8.110	
					306	8.034	
					402	8.237	
					505	8.374	
					607	9.019	
					Mean =	8.289	
4	Prosaro Fulltec Cube	150ml/ha 200ml/ha		A A	103	6.847	
					207	7.869	
					302	8.603	
					404	8.648	
					506	8.314	
					601	8.338	
					Mean =	8.103	
5	Prosaro Fulltec Cube	150ml/ha 400ml/ha		A A	102	7.130	
					206	7.949	
					303	8.631	
					405	8.128	
					507	8.661	
					604	8.855	
					Mean =	8.226	
6	Prosaro Absortec Copper	150ml/ha 1000ml/ha		A A	106	8.462	
					204	8.373	
					307	7.951	
					403	7.150	
					501	8.277	
					605	8.919	
					Mean =	8.189	
7	Prosaro Absortec Copper	150ml/ha 2000ml/ha		A A	104	7.481	
					202	8.326	
					305	8.314	
					401	8.133	
					503	8.302	
					606	8.356	
					Mean =	8.152	

Table 7 - Grain quality at 170 DA-A

Assessment Date Assessment Type Assessment Unit Reporting Basis Crop Stage Majority Crop Stage Minimum/Maximum Trt-Eval Interval						13-Feb-2020			
						PROCON	MOICON	HLW	SCREENING
						%		kg	
						1 PLOT 99 99 99 170 DA-A			
Trt No.	Treatment Name	Rate	Unit	Appl Code	Plot	27	28	29	30
1	Untreated Control				105	11.80	10.80	67.10	1.20
					201	11.60	11.00	68.30	1.10
					304	11.40	10.80	64.50	2.50
					407	11.80	11.00	76.10	1.60
					502	12.50	11.00	71.60	1.60
					603	11.40	11.20	67.30	1.00
					Mean =	11.75	10.97	69.15	1.50
2	Prosaro	150ml/ha	A	107	10.60	10.90	70.70	1.10	
				205	11.50	11.00	68.70	1.90	
				301	11.50	11.00	53.10	2.80	
				406	11.40	11.10	63.70	1.50	
				504	11.50	11.10	71.50	0.70	
				602	11.60	11.00	64.00	0.80	
				Mean =	11.35	11.02	65.28	1.47	
3	Prosaro Hasten	150ml/ha	A	101	11.10	11.50	53.20	2.60	
				203	11.40	10.80	62.70	1.50	
				306	11.40	11.10	63.50	1.50	
		1% v/v	A	402	11.40	11.40	63.50	1.10	
				505	11.90	10.80	66.00	1.00	
				607	11.80	11.00	69.80	1.60	
				Mean =	11.50	11.10	63.12	1.55	
4	Prosaro Fulltec Cube	150ml/ha	A	103	11.10	11.10	63.50	0.70	
				207	11.20	11.10	70.80	0.50	
		200ml/ha	A	302	11.20	10.90	62.90	1.60	
				404	11.30	11.10	62.10	1.70	
				506	11.70	11.00	72.40	1.20	
				601	11.80	11.30	75.40	1.20	
				Mean =	11.38	11.08	67.85	1.15	
5	Prosaro Fulltec Cube	150ml/ha	A	102	10.80	11.10	69.90	0.70	
				206	11.60	11.10	67.00	0.70	
		400ml/ha	A	303	11.80	11.00	60.10	1.40	
				405	10.90	10.90	66.20	0.80	
				507	11.90	10.90	68.00	1.10	
				604	12.20	11.20	66.00	1.20	
				Mean =	11.53	11.03	66.20	0.98	
6	Prosaro Absortec Copper	150ml/ha	A	106	11.20	11.00	59.60	2.00	
				204	11.40	10.90	54.80	1.80	
		1000ml/ha	A	307	11.40	11.10	59.50	1.80	
				403	11.00	11.00	70.30	1.20	
				501	12.20	11.10	58.90	1.50	
				605	11.70	11.20	67.00	1.60	
				Mean =	11.48	11.05	61.68	1.65	
7	Prosaro Absortec Copper	150ml/ha	A	104	10.80	11.10	59.60	1.70	
				202	11.20	11.00	61.30	1.20	
		2000ml/ha	A	305	11.10	11.10	60.40	1.70	
				401	11.00	11.30	63.20	1.40	
				503	12.40	10.60	68.40	1.50	
				606	11.70	11.10	68.20	1.40	
				Mean =	11.37	11.03	63.52	1.48	

Appendix iii - Weather data

2019 rainfall data - Lucindale post Office , SA
 Observations were drawn from Lucindale post Office (station 26016).



2019 daily rainfall data - Lucindale post Office , SA.

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1						↓	15.0		↓			
2						↓	1.8	0.4	9.4		↓	
3					1.4	7.4			5.6	0.6	↓	
4									0.2		20.0	
5											6.8	
6									8.0			
7	30.0								↓		5.0	
8					22.4	↓		3.0	↓	2.8	3.2	
9	0.8	↓			3.0	↓	1.8	15.0	12.4			
10		↓			9.8	↓		↓	0.4	4.0		
11		2.2	↓		↓	8.4	10.0	↓				
12		2.4	7.8		↓	22.4	5.0	12.0		↓		
13		1.0			1.6	2.6	↓			↓		
14						7.4	↓	2.8		2.6		
15					0.2	↓	6.6					
16						↓	0.6	0.8		1.0		
17						4.4	1.0	↓		4.0		
18	1.6			1.0	↓	7.0	1.4	↓		0.6		
19				↓	↓	0.4	5.0	5.2		↓		
20				↓	25.0			0.4		↓		
21				↓	3.4			1.0	↓	2.6		
22				↓		↓			↓			
23				2.2		↓	14.6		24.2			
24					1.8	0.4	3.6	↓	0.8			
25			2.8		↓		1.4	↓				
26					↓			1.0		↓		
27				↓	14.4		↓			↓		
28				↓			↓	1.0	↓	6.0		
29				1.0	6.6	↓	0.6		↓			
30			↓			↓			1.0			
31			8.0		7.2			↓				

Summary statistics												
2019 monthly total	32.4	5.6	18.6	4.2	96.8	60.4	68.4	42.6	62.0	24.2		
2019 cumulative total	32.4	38.0	56.6	60.8	157.6	218.0	286.4	329.0	391.0	415.2	415.2	415.2
Long term monthly mean	23.2	18.9	26.2	44.5	64.3	78.3	87.4	79.3	63.2	48.4	33.8	32.3
Long term cumulative mean	23.2	42.1	68.3	112.8	177.1	255.4	342.8	422.1	485.3	533.7	567.5	599.8

2019 maximum & minimum temperature data - Robe Airfield , SA

Observations were drawn from Robe Airfield (station 26105).

Date	Jan		Feb		Mar		Apr		May		Jun		Jul		Aug		Sept		Oct		Nov		Dec	
	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max
1	7.1	21.7	5.8	23.3	10.6	38.0	10.4		11.8	19.3	11.9	14.1	11.5	14.0	5.5		10.2	15.3	3.0	22.0	15.2	25.9		
2	13.4	22.6	9.7	30.6	19.2	37.2	4.1	22.8	8.5	18.3	10.4	14.3	12.0	15.7	8.2	13.2	1.3	13.8	10.8	23.4	14.4	18.9		
3	11.2	34.5	13.0	30.5	17.9	23.9	9.8	18.9	9.9	18.2	8.7	13.0	8.7		10.5	14.3	4.0	15.6	12.6	15.0	7.0	17.7		
4	17.6	21.4	16.1	22.2	9.3	22.7	11.1	29.4	11.9	15.8	8.2	12.8	6.3	15.1	9.3	14.8	4.6	16.8	10.7	16.4	10.9	15.8		
5	13.9	19.6	14.4	25.4	14.9	21.8	13.5	32.7	7.9	16.3	6.6	12.9	5.5	17.8	3.7	15.9	6.2	16.3	9.3	24.4	9.2	17.4		
6	6.2	20.6	14.1	27.5	10.7	17.9	14.5	18.5	6.3	17.5	10.4	14.6	7.9	19.4	9.6	16.2	8.9	13.5	14.1	15.8	13.3	17.5		
7	15.1	21.0	15.4	23.6	5.8	19.8	6.3	19.7	3.5	18.8	4.8	14.5	11.8	15.9	2.5	12.6	9.1	13.4	3.9	16.4	10.9	16.7		
8	12.4	21.0	15.7	21.4	8.5	21.8	13.8	20.4	11.3	16.6	4.4	16.1	7.5	15.6	7.4	13.8	10.1	14.6	6.9	14.2	8.6	14.5		
9	8.1	19.6	13.7	19.6	10.9	24.4	9.6	16.8	10.6	12.6	6.5	15.8	7.2	15.5	6.3	11.3	8.7	13.8	8.6	14.9	9.3	14.5		
10	4.1	21.5	14.7	21.0	13.7	20.0	10.6	16.0	9.0	15.1	11.1	17.1	10.4	14.5	6.3	12.9	3.7	13.9	2.2	14.4	10.9	19.4		
11	10.3	30.7	16.2	22.0	14.9	21.0	10.2	17.3	9.9	16.5	7.2	18.8	9.4	15.7	7.2	12.8	1.4	20.1	4.7	16.3	5.1	27.1		
12	16.4	21.7	12.3	18.2	14.6	18.7	4.8	21.4	12.2	17.1	11.5	16.8	11.4	13.3	4.6	12.2	12.3	15.8	7.4	19.7	11.1			
13	13.0	23.2	11.4	19.5	9.4	20.1	11.2	20.7	13.4	16.4	12.3	16.7	8.1	13.0	4.8	13.0	4.0	15.5	8.6	22.8				
14	12.1	29.3	13.4	20.4	4.3	20.5	12.9	22.0	9.7	18.9	9.1	16.3	9.6	14.2	4.7	15.4	3.1	17.8	13.0	17.0				
15	16.4	36.6	8.7	21.7	12.1	20.9	9.7	25.4	8.8	16.6	6.1	15.1	10.5	13.9	8.4	16.9	13.0	19.6	4.3	17.1				
16	16.7	30.8	9.7	23.6	9.1	22.4	14.7	27.9	3.6	18.3	6.8	16.6	11.4	14.4	11.3	14.2	9.2	13.9	9.9	16.3				
17	18.4	26.7	10.6	31.4	11.1	21.9	18.0	19.8	4.3	20.7	4.4	15.8	10.7	15.3	1.9	15.5	0.8	13.7	8.5	15.0				
18	16.8	21.7	15.4	21.3	14.8	25.3	10.7	17.9	5.0	21.0	9.2	12.9	3.9	15.5	7.8	13.2	1.6	17.5	11.3	16.7				
19	9.8	21.5	14.8	20.3	9.2	25.6	6.7	26.8	11.4	21.6	0.3	12.9	1.3	15.1	6.7	13.8	7.2	24.9	8.8	15.7				
20	10.3	24.2	14.6	21.2	15.2	23.7	13.9	32.0	12.8	18.6	2.6	13.5	7.5	18.5	9.9	15.0	13.0	18.6	10.4	15.7				
21	15.0	24.9	13.9	20.4	15.1	21.3	15.1	18.1	14.1	18.8	-2.1	14.4	10.9	14.8	11.7	14.9	9.4	13.8	8.9	16.8				
22	12.2	29.6	9.7	22.9	16.6	26.4	6.2	17.9	6.5	19.1	-0.5	13.3	10.6	15.9	11.1	15.1	8.2	14.3	5.7	24.7				
23	15.7	29.3	11.9	27.1	16.6	22.1	1.3	18.6	3.0	18.9	-2.7	13.7	9.5	13.6	10.2	14.8	8.2	14.6	5.7	28.8				
24	16.1	40.1	13.5	33.1	13.1	24.0	4.3	18.2	7.8	19.6	-2.2	11.7	9.6	15.4	9.4	15.2	5.9	15.2	12.7	32.2				
25	19.5	22.5	14.1	33.8	11.4	16.9	12.6	19.3	13.7	16.2	3.1	15.3	11.7	15.4	7.1	13.3	2.3	15.5	13.1	18.0				
26	15.6	23.4	16.7	25.5	11.1	18.9	12.6	16.4	11.3	16.9	1.0	17.1	11.6	14.5	1.9	14.3	5.9	18.5	8.5	16.1				
27	14.3	23.7	12.2	30.8	5.5	20.7	11.8	15.6	8.0	14.8	7.8	19.5	3.6	13.8	3.7	15.1	10.8	14.5	11.4	17.0				
28	9.1	23.6	12.9	27.6	5.5	22.1	12.8	17.2	10.8	15.7	11.2	20.2	7.3	13.6	10.4	13.2	2.2	14.9	0.8	20.1				
29	9.9	24.0			9.5	17.0	9.6	17.9	7.3	12.2	11.3	13.7	8.5	14.5	3.9	14.0	9.8	15.1	1.6	25.0				
30	7.6	29.6			8.7	16.5	5.1	22.6	6.9	13.8	9.0	15.5	6.8	12.9	0.2	15.4	3.2	15.6	8.6	29.7				
31	15.9	20.8			10.8	17.9			11.4	14.4				4.6	12.5	4.2	18.3		14.6	35.0				
Summary statistics																								
	Jan		Feb		Mar		Apr		May		Jun		Jul		Aug		Sept		Oct		Nov		Dec	
	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max
Min/Max	4.1	40.1	5.8	33.8	4.3	38.0	1.3	32.7	3.0	21.6	-2.7	20.2	1.3	19.4	0.2	18.3	0.8	24.9	0.8	35.0	5.1	27.1		
2019 monthly mean	12.9	25.2	13.0	24.5	11.6	22.3	10.3	21.0	9.1	17.2	6.3	15.2	8.6	15.0	6.8	14.4	6.6	15.9	8.4	19.8				
Longterm monthly mean	12.9	24.6	12.9	24.4	11.4	23.2	9.6	20.6	8.8	17.5	6.5	15.3	6.8	14.6	7.1	15.2	7.9	16.7	8.6	19.0	10.6	21.5	11.9	23.1

Appendix iv - Photographs

Photographs for each treatment on 10th of September available on the Kalyx live website

Photographs below depict control of *Septoria* sp. in wheat



Photograph 1

Growth stage BBCH 37, disease present prior to application A



Photograph 2

All treatment comparison at 14 DA-A, treatments 1-7 from left to right.



Photograph 3

Treatment 5 at 14 DA-A



Photograph 4

Flag leaf-3 disease levels present in untreated at 14 DA-A.