



EXPRESS RESULTS:

Wheat Germplasm Management Interaction

2019/20 SA Crop Technology Centre Yield Results (*Provisional*)

Sown: 16 April 2019

Harvested: 15 January 2020

Rotation position: 1st Cereal after Broad Bean

Soil Type: Neutral-slightly alkaline Organosol (Peat soil) – high organic matter (0-30cm)

Key Messages:

- The 16 April sowing date was too early for the spring wheats and resulted in significant frosting.
- The highest yielding cultivars were the slightly shorter season winter wheats Annapurna and RGT Accroc, which averaged approximately 11t/ha, up from a maximum of 10.5t/ha in 2018.
- The longer season, later flowering cultivars such as Conqueror and Tabasco proved a little too long season with yields around the 9-10t/ha.
- There was a significant interaction between cultivar and management with more disease resistant cultivars such as Tabasco and Annapurna showing little benefit from additional fungicide, nitrogen and PGR, compared to DS Bennett and Conqueror.
- Protein levels indicated that yield potential was satisfied with the majority of grain samples in the 10.5 – 11% range.

Table 1. Grain yield (t/ha) under three management levels

Cultivar	Management Level			Mean
	High Input	Standard Input	“Grazed” Input	
	Yield t/ha	Yield t/ha	t/ha	
Manning (Winter control)	10.44 c-f	9.88 fgh	9.86 fgh	10.06
Beaufort (Spring control)	6.74 l	5.35 m	4.60 n	5.56
DS Pascal (Spring)	5.01 mn	4.94 mn	4.74 mn	4.90
Annapurna (Winter)	11.20 a	10.86 a-d	9.98 efg	10.68
Conqueror (Winter)	9.35 hi	8.71 jk	8.58 jk	8.88
RGT Accroc (Winter)	11.07 ab	10.93 abc	9.75 gh	10.58
RGT Calabro (Winter)	10.29 d-g	10.58 b-e	8.62 jk	9.83
Tabasco (Winter)	10.08 efg	10.09 efg	8.93 ij	9.70
Trojan (Spring)	3.73 o	3.51 o	3.14 o	3.46
DS Bennett (Winter)	9.03 ij	8.16 k	8.29 k	8.49
LSD Cultivar p = 0.05		0.36 t/ha	P val	<0.001
LSD Management p=0.05		0.56 t/ha	P val	0.011
LSD Cultivar x Man. P=0.05		0.62 t/ha	P val	<0.001

Please read the notes accompanying these express results for interpretation

Winter – winter wheat, Spring – spring wheat, “Grazed” Management – simulated grazing with mechanical defoliation. Grazed spring wheats received a reduced fungicide input compared to standard (no GS31 spray).

Yield figures followed by different letters are considered to be statistically different ($p=0.05$), for example a yield of 9.35 hi is considered statistically different to 8.71 jk but not to a yield of 9.03 ij.

Plot yields: To compensate for edge effect a full row width (22.5cm) has been added to either side of the plot area (equal to plot centre to plot centre measurement).

Table 2. Grain Protein (%) under three management levels

Cultivar	Management Level			Mean
	High Input	Standard Input	“Grazed” Input	
	Protein %	Protein %	Protein %	
Manning (Winter control)	10.6 jk	10.8 ij	11.3 hi	10.9
Beaufort (Spring control)	12.5 f	13.6 bcd	13.4 cd	13.1
DS Pascal (Spring)	12.9 ef	13.8 bc	14.0 b	13.5
Annapurna (Winter)	11.0 ij	11.6 gh	12.0 g	11.5
Conqueror (Winter)	10.6 jk	11.0 ij	11.0 ij	10.9
RGT Accroc (Winter)	10.3 kl	10.8 j	11.0 ij	10.7
RGT Calabro (Winter)	10.8 ij	10.8 j	11.1 ij	10.9
Tabasco (Winter)	10.7 jk	10.6 jk	10.6 jk	10.6
Trojan (Spring)	13.1 de	15.0 a	15.0 a	14.3
DS Bennett (Winter)	9.7 m	10.1 lm	10.6 jk	10.1
LSD Cultivar p = 0.05		0.16 %	P val	<0.001
LSD Management p=0.05		0.24 %	P val	<0.001
LSD Cultivar x Man. P=0.05		0.45 %	P val	<0.001

Table 3. Test Weight (kg/hL) under three management levels

Cultivar	Management Level			Mean
	High Input	Standard Input	“Grazed” Input	
	Test Weight (kg/hL)	Test Weight (kg/hL)	Test Weight (kg/hL)	
Manning (Winter control)	78.1 h	79.7 efg	78.2 h	78.7
Beaufort (Spring control)	76.2 i	74.0 j	72.4 k	74.2
DS Pascal (Spring)	80.1 efg	77.9 h	78.7 gh	78.9
Annapurna (Winter)	82.4 ab	82.5 ab	81.7 a-d	82.2
Conqueror (Winter)	71.7 k	71.1 k	71.2 k	71.3
RGT Accroc (Winter)	80.8 cde	81.1 b-e	79.7 efg	80.5
RGT Calabro (Winter)	80.4 def	80.6 def	79.3 fgh	80.1
Tabasco (Winter)	71.0 k	70.9 k	68.5 l	70.2
Trojan (Spring)	79.2 fgh	78.7 gh	78.8 gh	78.9
DS Bennett (Winter)	82.8 a	82.1 abc	82.3 ab	82.4
LSD Cultivar p = 0.05		0.85 kg/hl	P val	<0.001
LSD Management p=0.05		1.25 kg/hl	P val	0.136
LSD Cultivar x Man. P=0.05		1.47 kg/hl	P val	0.008

Table 4. Approximate date of pseudo stem erect (GS30), mid flowering (GS65) under standard management, dry matter (DM) removed in simulated grazing (mechanical defoliation) management at GS30 and grain yield reduction associated with grazing.

Phenology (GS30 and GS65), Dry matter removal (GS 30) and yield decrease with grazing				
	Date	Date	DM *	Yield reduction
Cultivar	GS30	GS65	Kg/ha GS30	(t/ha)
Manning (Winter control)	30 Jul	5 Nov	1262	0.02
Beaufort (Spring control)	24 Jun	8 Oct	411	0.75
DS Pascal (Spring)	21 Jun	8 Oct	341	0.20
Annapurna (Winter)	12 Aug	28 Oct	1486	0.88
Conqueror (Winter)	30 Jul	11 Nov	1153	0.13
RGT Accroc (Winter)	12 Aug	28 Oct	1576	1.18
RGT Calabro (Winter)	12 Aug	28 Oct	1450	1.96
Tabasco (Winter)	12 Aug	11 Nov	1462	1.16
Trojan (Spring)	21 Jun	8 Oct	304	0.37
DS Bennett (Winter)	30 Jul	28 Oct	1296	+0.13

* Provisional data means presented with no statistical analysis in the express results

Table 5. Details of the three management levels (kg, g, ml/ha).

Plant pop'n:		180 seeds/m ² (150 plants/m ² target) - all three managements		
		Standard Input (grazed*)	Standard Input	High Input
Grazing:		✓	----	----
Seed treatment:		Vibrance/Gaucha	Vibrance/Gaucha	As standard + Systiva
Basal Fertiliser:	16 April	145kg MAP	145kg MAP	145kg MAP
Nitrogen**:				
	11 July – 1 August	87 kg Urea (40 N)	87 kg Urea (40 N)	87 kg Urea (40 N)
	16 August	87 kg Urea (40 N)	87 kg Urea (40 N)	87 kg Urea (40 N)
	26 August – 30 August	87 kg Urea (40 N)	87 kg Urea (40 N)	87 kg Urea (40 N)
	3 September – 9 September	---	---	87 kg Urea (40 N)
Total N Applied:		120 N	120 N	1600 N
PGR**:				
	30 Jul – 3 September		Mod. 200ml + Errex 1.3L	Mod. 200ml + Errex 1.3L (split GS30 & GS32)
Fungicide**:				
	GS31-32	Prosaro 300ml	Prosaro 300ml	Opus 500ml
	GS39	Radial 840ml	Radial 840ml	Radial 840ml
	GS65	Prosaro 300ml	Prosaro 300ml	Prosaro 300ml

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

* Mechanically defoliated, **Timings of PGRs and fungicides were adjusted to take account of the differences in spring (s) and winter wheat (w) phenology (development).

Available Soil Nitrogen (10th April) – 445.1 kg N/ha (0 – 60cm) prior to sowing

Meteorological Data- SA Crop Technology Centre

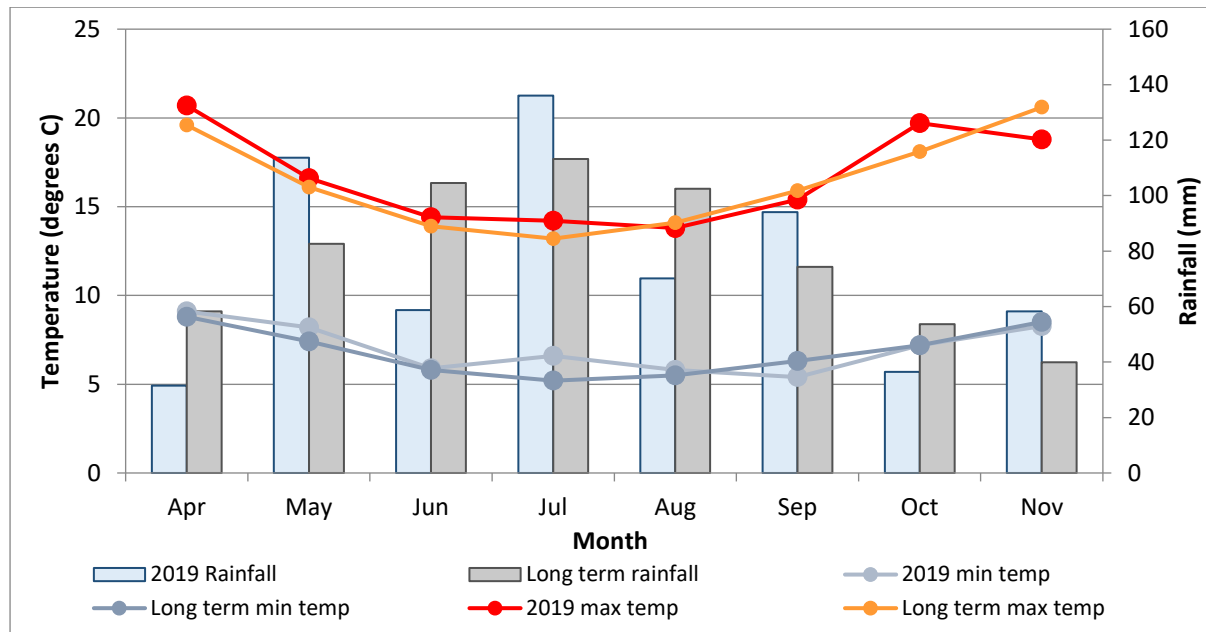


Figure 1. 2019 growing season rainfall and long-term rainfall (1877-2019) (recorded at Millicent), 2019 min and max temperatures and long-term min and max temperatures recorded at Mount Gambier (1941-2019) for the growing season (April-November). *Rainfall April to November= 598.8mm.*

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