

## 2. MFMG Wheat Trials

### PART B. MFMG Wheat Nutrition (Granular Fertiliser vs. Liquid Fertiliser) Trial

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#### KEY MESSAGES

- MFMG and SARDI funded a wheat nutrition (Granular vs. Liquid) scoping study at three sites (Sherwood, Frances and Conmurra).
- The aim was to evaluate wheat production with either granular or liquid fertiliser inputs.
- Planning is underway to expand this study in 2019 and an application for additional funding submitted.

#### Background

In 2018 SARDI and MFMG undertook a wheat nutrition scoping study at three sites – Sherwood, Frances and Conmurra. The aim of the trial was to evaluate wheat production with the use of either granular fertiliser or liquid fertiliser inputs at seeding on three different soil types.

#### Trial Design

At each site, five different fertiliser treatments (Table 1) were applied 'in-furrow' at sowing including farmer practice of 100 kg DAP/ha. Ammonium polyphosphate (APP) was applied at two rates (20 L and 60 L/ha) both with and without the addition of Foundation LM (a fertiliser biocatalyst) at 5 L/ha. An additional application of urea (100 kg/N) was made to all treatments in early spring.

An NDVI [normalised difference vegetation index (a measure of vegetation density and condition)] measurement was taken in July and August at each site.

#### Product Formulation

DAP	N 18.0 % P 20.0 %
APP	N 15.4 % P 22.0 %

#### **Sherwood**

The Sherwood trial was sown on 6 June 2018. Scepter wheat, an AH variety, was used in the trial (seeding rate 225 seed/m<sup>2</sup>). Urea was applied on 3 October 2018.

#### **Frances**

The Frances trial was sown on 24 May 2018. Scepter wheat, an AH variety, was used in the trial (seeding rate 225 seed/m<sup>2</sup>). Urea was applied on 6 September 2018.

#### **Conmurra**

The Conmurra trial was sown on 23 May 2018. LRPB Trojan wheat, an APW variety, was used in the trial (seeding rate 225 seed/m<sup>2</sup>). Urea was applied on 6 September 2018.

**Table 1:** The five treatments evaluated and rates applied.

Application Timing		Product	Rate/ha
	'In furrow'		
At Sowing	Treatment 1	DAP	100 kg
	Treatment 2	APP	20 L
	Treatment 3	APP	20 L
		Foundation	5 L
	Treatment 4	APP	60 L
	Treatment 5	APP	60 L
		Foundation	5 L
Spring	All Treatments	Urea	100 kg N

## Trial Results

### Sherwood

The grain yield at Sherwood ranged from 2.31 t/ha to 3.27 t/ha with a site mean grain yield of 2.86 t/ha. The highest yielding treatment at Sherwood was Treatment 5 [APP (60 L/ha) plus Foundation LM (5 L/ha)], which out yielded all other treatments except Treatment 4 [APP (60 L/ha)] and Treatment 1 [DAP (100 kg/ha)]. Measures of NDVI did not differ between treatments (Table 3). Grain quality at harvest was similar and all treatments achieved ASW1 with protein being a limiting factor to achieving maximum H1 grade.

**Table 2:** Sherwood Wheat Nutrition Trial grain yield and quality.

Treatment (In-Furrow)	Units of N applied	Units of P applied	Yield t/ha	1000 grain weight (g/1000 seed)	Test Weight (kg/hl)	Protein (%)	Screenings (%)	Grade Achieved
Treatment 1	18	20	3.09 ab	46.1	84.0	9.9	0.7	ASW1
Treatment 2	3	4	2.72 bc	46.1	84.0	9.9	0.9	ASW1
Treatment 3	3	4	2.31 c	46.1	84.2	10.0	0.6	ASW1
Treatment 4	9	13	2.90 ab	45.3	83.9	9.9	0.7	ASW1
Treatment 5	9	13	3.27 a	45.6	84.3	9.9	0.7	ASW1
Mean			2.86	45.84	84.08	9.92	0.72	
P value (0.05)			0.013	0.792	0.811	0.986	0.758	
LSD			0.417	NS	NS	NS	NS	
CV%			9.9	0.4	0.2	1.1	22.1	

NS – not significant

Means followed by same letter do not differ significantly

**Table 3:** Sherwood Wheat Nutrition Trial NDVI Measures.

Date	18-Jul	16-Aug
Treatment	NDVI	NDVI
(In-furrow)		
Treatment 1	0.21	0.40
Treatment 2	0.19	0.37
Treatment 3	0.19	0.33
Treatment 4	0.19	0.39
Treatment 5	0.20	0.38
Mean	0.20	0.37
P value (0.05)	0.112	0.147
LSD	NS	NS
CV%	4.4	6.4

NS - Not Significant

#### Trial Inputs (all plots)

2018 Date	Product and Rate/ha				
	Fertiliser	Herbicide	Fungicide	Insecticide	Other
6-Jun Sowing	In-Furrow treatments as listed in Table 1.	Roundup PowerMax 2.5L Cavalier 75mL Sakura 118g TriAllate 1.6L			Seed Treatment Gaucho 600 240mL / 100 kg seed Raxil T 100mL / 100 kg seed
27-Jun				Lorsban 500mL	
23-Aug			Prosaro 150mL	Lorsban 500mL	
7-Sep		Buctril 2.0L Lontrel 150mL			
3-Oct	Urea (100kg N)				
8-Oct			Prosaro 150mL	Lorsban 500mL	

#### Frances

The grain yield at Frances ranged from 3.64 t/ha to 4.87 t/ha with a site mean grain yield of 4.29 t/ha (Table 4). The highest yielding treatment at Frances was Treatment 2 [APP (20 L/ha)], which out yielded all other treatments except Treatment 3 [APP (20 L/ha) plus Foundation LM (5 L/ha)] and Treatment 4 [APP (60 L/ha)]. Treatment 4 had the highest NDVI measures in both July

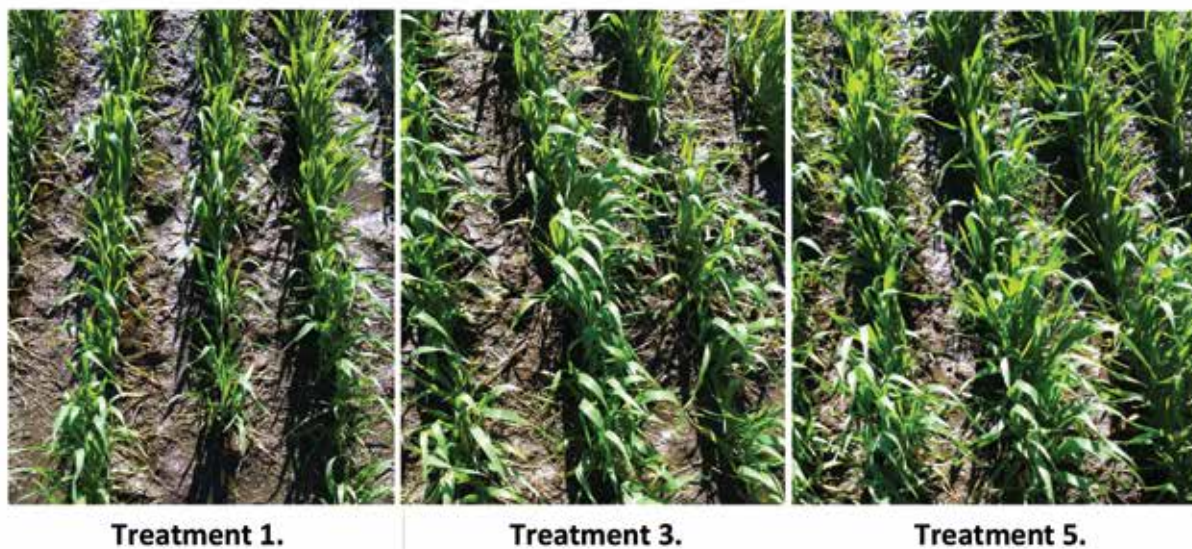
and August (Table 5). The 1000 grain weight was also highest for Treatment 2 (51.5 g/1000 seed). Other measures of grain quality were similar between treatments and all achieved H2 with protein being a limiting factor to achieving maximum H1 grade (Table 4). Figure 1 shows three treatments, Treatment 1, Treatment 3 and Treatment 5 at Frances in mid-August 2018.

**Table 4:** Frances Wheat Nutrition Trial grain yield and quality.

Treatment (In-Furrow)	Units of N applied	Units of P applied	Yield t/ha	1000 grain weight (g/1000 seed)	Test Weight (kg/hl)	Protein (%)	Screenings (%)	Grade Achieved
Treatment 1	18	20	3.64 c	49.0 c	78.9	11.5	0.7	H2
Treatment 2	3	4	4.87 a	51.5 a	78.9	11.8	0.3	H2
Treatment 3	3	4	4.62 ab	49.9 bc	78.7	11.5	0.4	H2
Treatment 4	9	13	4.27 abc	50.7 ab	78.6	11.6	0.4	H2
Treatment 5	9	13	4.07 bc	50.3 abc	78.9	11.5	0.4	H2
Mean			4.29	50.3	78.8	11.6	0.4	
P value (0.05)			0.007	0.01	0.87	0.20	0.29	
LSD			0.627	1.33	NS	NS	NS	
CV%			5.0	4.2	0.2	6.2	29.6	

NS – not significant

Means followed by same letter do not differ significantly



**Figure 1:** Treatments 1, 3 and 5 at Frances in mid-August 2018.

**Table 5:** Frances Wheat Nutrition Trial NDVI Measures.

Date Treatment (In-furrow)	04-Jul NDVI		14-Aug NDVI	
Treatment 1	0.22	b	0.58	c
Treatment 2	0.20	c	0.64	b
Treatment 3	0.21	bc	0.63	bc
Treatment 4	0.25	a	0.70	a
Treatment 5	0.22	b	0.64	b
Mean	0.22		0.64	
P value (0.05)	<.001		0.004	
LSD	0.013		0.047	
CV%	3.9		5.5	

*Means followed by same letter do not differ significantly*

#### Trial Inputs (all plots)

2018 Date	Product and Rate/ha				
	Fertiliser	Herbicide	Fungicide	Insecticide	Other
18-May		Roundup PowerMax 2.5L Cavalier 75mL			Meta Slug and Snail Pellet 7.5kg
24-May Sowing	In-Furrow treatments as listed in Table 1	Terbyne Xtreme 1.2kg Sakura 118g TriAllate 1.6L		Lorsban 500mL Alpha Forte 80mL	Seed Treatment Gaucho 600 240 mL / 100 kg seed Raxil T 100mL / 100 kg seed
18-Jun					Meta Slug and Snail Pellet 7.5kg
7-Sept		Buctril 2.0L	Prosaro 150mL	Lorsban 500mL Alpha Forte 80mL	Meta Slug and Snail Pellet 7.5kg
8-Oct			Prosaro 150mL	Lorsban 500mL	
6-Sept	Urea (200kg N)				

## Conmurra

The grain yield at Conmurra ranged from 7.03 t/ha to 7.69 t/ha with a site mean grain yield of 7.44 t/ha (Table 6). The highest yielding treatment was Treatment 5 [APP (60 L/ha) plus Loveland LM (5 L/ha)]. All treatments except Treatment 3 out yielded the standard farmer practice Treatment 1 [(DAP (100 kg/ha))]. Differences in NDVI were observed at the July measure with

Treatment 1 recording the highest measure. By August however, measures were similar (Table 7). At harvest, Treatment 2 had lower test weight than all treatments except Treatment 1 and also had lower protein levels than all other Treatments but still adequate to achieve maximum grade. Other measures of grain quality were similar between treatments and all achieved maximum APW1 grade.

**Table 6:** Conmurra Wheat Nutrition Trial grain yield and quality.

Treatment (In-Furrow)	Units of N applied	Units of P applied	Yield t/ha	1000 grain weight (g/1000 seed)	Test Weight (kg/hl)	Protein (%)	Screenings (%)	Grade Achieved
Treatment 1	18	20	7.03 b	44.3	81.2 ab	11.7 b	0.7	APW1
Treatment 2	3	4	7.58 a	44.3	80.9 a	11.4 a	1.0	APW1
Treatment 3	3	4	7.34 ab	44.7	81.4 b	11.7 b	0.7	APW1
Treatment 4	9	13	7.56 a	44.9	81.3 b	11.7 b	0.5	APW1
Treatment 5	9	13	7.69 a	45.4	81.5 b	11.8 b	0.6	APW1

Mean			7.44	44.7	81.3	11.7	0.7	
P value (0.05)			0.016	0.18	0.01	0.01	0.32	
LSD			0.37	NS	0.32	0.19	NS	
CV%			3.6	2.1	0.8	1.5	24.9	

NS – not significant

Means followed by same letter do not differ significantly

**Table 7:** Wheat Nutrition Trial NDVI Measures.

Date	26-Jul	15-Aug
Treatment	NDVI	NDVI
(In-furrow)		
Treatment 1	0.48 a	0.74
Treatment 2	0.47 a	0.75
Treatment 3	0.47 ab	0.73
Treatment 4	0.43 c	0.73
Treatment 5	0.44 bc	0.73
Mean	0.46	0.74
P value (0.05)	0.008	0.603
LSD	0.03	NS
CV%	5.4	3.3

NS - not significant

Means followed by same letter do not differ significantly



## Trial Inputs (all plots)

2018 Date	Product and Rate/ha				
	Fertiliser	Herbicide	Fungicide	Insecticide	Other
3-May Sowing	In-Furrow treatments as listed in Table 1.	Roundup PowerMax 2.5L Cavalier 75mL Sakura 118g TriAllate 1.6L		Alpha Forte 80mL	Seed Treatment Gaucho 600 240mL / 100 kg seed Raxil T 100mL / 100 kg seed
19-Jun			Folicur 145mL	Lorsban 500mL Alpha Forte 80mL	
7-Jun		Buctril 2.0L Lontrel 150mL Starane Advanced 500mL			
23-Aug			Prosaro 150mL	Lorsban 500mL	
6-Sep	Urea (100 kg N)				
8-Oct			Prosaro 150mL	Lorsban 500mL	



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