

### Trial 8. Influence of Plant Growth Regulation on Durum Yield and Profitability under Irrigation

**Protocol objective:** To assess the impact of grazing and plant growth regulation on durum wheat sown in late May.

**Location:** Kerang, Victoria

**FAR Code:** FAR D21-09-2

**Sown:** 21<sup>st</sup> May 2021

**Cultivar:** DBA Aurora

**Harvested:** 8<sup>th</sup> Dec 2021

**Rotation position:** Faba Beans (2020), Dryland vetch/brown manure (2019), Wheat (2018)

**Soil Type:** Neutral medium grey clay

**Irrigation:** Surface, 4 applications total of 410mm (4.1 ML/ha)

**GSR:** April-October 160mm. Total water available 570mm

#### Key Messages:

- Grazing was effective in reducing crop height, but resulting grain yield was lowest in the trial, although it was not significantly different to the untreated control.
- Treatments did vary in their effect on lodging, but increased lodging did not necessarily result in decreased yield.
- Highest yield was from treatment 3 (split application of Errex 750 @ 0.65 l/ha + Moddus Evo @ 0.1 l/ha applied at GS30 and GS32) which was also the most effective treatment for reducing lodging.
- The application of the micronutrients manganese and copper had no effect on lodging.
- All PGR treatments did not influence grain protein, screenings or test weight.

**Table 1.** Treatment summary – application timing, product and rate. (GS30 5 August, GS31-32 9 August, GS32 16 August, GS39 8 September)

Treatment	GS30	GS31-32	GS32	GS39
<b>1 Untreated</b>				
<b>2</b>		E 1.3 l/ha ME 0.2 l/ha		
<b>3</b>	E 0.65 l/ha ME 0.1 l/ha		E 0.65 l/ha ME 0.1 l/ha	
<b>4</b>		E 1.3 l/ha ME 0.2 l/ha		PGR 0.75l/ha
<b>5</b>		ME 0.4 l/ha		
<b>6</b>		ME 0.4 l/ha		ME 0.2 l/ha
<b>7</b>	Micronutrient Mn + Cu			
<b>8</b>		Grazed GS22&31		

E = Errex 750 582 g/l chlormequat

ME = Modus Evo 250 g/l trinexapac-ethyl

PGR = Product not registered for use in Australia on wheat

Micronutrient: MnCO<sub>3</sub> 400 g/l @ 1.0 l/ha, CuO<sub>2</sub> 500g/l @ 0.5 l/ha

Released: 27 Sept 2022

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**Table 2.** Canopy measurements – Plant height (cm) and lodging score (0-500 scale 0 = no lodging) assessed on 6 December

Treatments	Plant Height (cm)	Lodging Score
1 Untreated	96.3 a	370 a
2	90.0 bc	278 b
3	88.8 c	37 e
4	85.0 d	68 de
5	92.5 bc	205 bc
6	90.0 bc	181 c
7	96.3 a	375 a
8	88.8 c	140 cd
<b>P val</b>	<0.001	<0.001
<b>LSD</b>	3.4	89
<b>cv%</b>	2.5	29.9

Lodging Score (scale 0-500): Degree of lodging (0-5) multiplied by % of plot affected

In relation to reducing crop height, treatment 4 (Errex 750 @ 1.3 l/ha + Moddus Evo 0.4 l/ha @ GS32 plus PGR @ GS39) was the most effective.

Lodging was first noted on 8 November and at harvest, treatment 3 (split application of Errex 750 @ 0.65 l/ha + Moddus Evo @ 0.1 l/ha applied at GS30 and GS32) was the most effective at reducing lodging. The control and the micronutrient treatments had similar lodging scores, indicating that the micronutrient mix of Cu and Mn had no effect on straw strength and standing power.

Grazing at GS22 and GS31 saw plant height and lodging reduced. Grazing also produced 0.78 t/ha of biomass removed from the treatment. Biomass assessments at the end of flowering saw little difference between the grazed treatment (9.83 t/ha) and the control (10.35 t/ha) ( $p = 0.444$ ), however it did reduce grain yield.

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**Table 3.** Influence of PGR treatment, grazing and micronutrient on grain yield (t/ha) and quality

Treatments	Yield (t/ha)	Protein (%)	Screenings (%)	Test Weight (kg/hl)
1 Untreated	8.46 bc	12.9	1.3	83.2
2	8.91 ab	13.5	1.2	82.9
3	9.53 a	12.9	1.4	83.1
4	8.69 bc	13.6	1.1	83.0
5	8.63 bc	13.1	1.4	82.5
6	8.51 bc	13.4	1.2	83.4
7	8.86 ab	13.3	1.3	82.8
8	8.04 c	12.8	1.2	83.5
<b>P Val</b>	0.011	0.097	0.595	0.501
<b>LSD</b>	0.69	ns	ns	ns
<b>cv%</b>	5.4	2.1	18.6	0.9

Highest yield was produced by the split application of Errex 750 @ 0.65 l/ha + Moddus Evo @ 0.1 l/ha applied at GS30 and GS32, which was also the most effective treatment for reducing lodging. Other treatments that were statistically similar to this treatment and significantly improved yield above that of the control were treatment 2 (Errex 750 @ 1.3 l/ha + Moddus Evo 0.2 l/ha @ GS31-2) and treatment 7 (micronutrient application), which gave poor lodging control.

Grain protein, screenings and test weight were not influenced by any of the treatments.

### **SAGI statistical analysis (Predicted values for Yield, Harvest dry matter, test weight, screenings and grain protein)**

The following statistical analysis of key harvest assessments has been carried out by SAGI. This analysis uses spatial statistical analysis to refine predicted values for key assessment values.

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Table 1: Harvest Traits for the PGR treatments

PGR	Grain Yield (t/ha)	Test Weight (kg/hL)	Protein (%)	Screening (%)
Treatment1	8.42 ± 0.19 - ab	83.12 ± 0.56 -	12.61 ± 0.23 - a	1.29 ± 0.14 -
Treatment2	9.07 ± 0.19 - bc	82.65 ± 0.56 -	13.33 ± 0.23 - bc	1.16 ± 0.14 -
Treatment3	9.49 ± 0.19 - c	83.2 ± 0.56 -	12.81 ± 0.23 - ab	1.42 ± 0.14 -
Treatment4	8.65 ± 0.19 - abc	83.15 ± 0.56 -	13.65 ± 0.23 - c	1.1 ± 0.14 -
Treatment5	7.97 ± 0.19 - a	83.61 ± 0.56 -	12.83 ± 0.23 - ab	1.2 ± 0.14 -
Treatment6	8.79 ± 0.19 - abc	82.98 ± 0.56 -	13.14 ± 0.23 - abc	1.23 ± 0.14 -
Treatment7	8.71 ± 0.19 - abc	82.38 ± 0.56 -	12.82 ± 0.23 - ab	1.34 ± 0.14 -
Treatment8	8.5 ± 0.19 - ab	83.33 ± 0.56 -	13.19 ± 0.23 - abc	1.24 ± 0.14 -

Note: values expressed as mean ± standard error of prediction  
- no subscripts relevant for this response

A summary of the experiment statistics is below:

Table 2: Key statistics for each response analysed

Statistic	Grain Yield (t/ha)	Test Weight (kg/hL)	Protein (%)	Screening (%)
LSD	0.486	1.017	0.360	0.331
Mean	8.700	83.050	13.050	1.250
PGR_p-value	0.002	0.360	0.000	0.596
CV	6.195	1.272	4.264	21.108

## Frances SA

*Irrigated trials conducted at the Frances irrigated research centre 2021 were managed by SARDI*

### Trial 1. Nitrogen Use Efficiency Trial – Nitrogen Rates

**Project Objective:** To assess the impact of nitrogen (N) rate on wheat under Overhead irrigation.

**Location:** Frances SA

**FAR Code:** FAR W21-03-3

**Sown:** 20<sup>th</sup> May 2021

**Cultivar:** Rockstar

**Harvested:** 23rd Dec 2021

**Rotation position:** Lucerne pasture (2020)

**Soil Management:** Direct drilled into sprayed out lucerne pasture

**Irrigation:** Centre Pivot Irrigation, 2 applications totalling 50 mm

**GSR:** April-October 339mm. Total water available 389mm

**Starting N:** 66kg/ha (0-90cm)

### Key Messages:

- A grain yield of 8.98 t/ha was achieved with an application of 250 kg/ha of nitrogen (N).
- There was no significant difference in yield for nitrogen applications ranging from 250 – 350 kg N/ha.

Released: 27 Sept 2022

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