Nitrogen response of eight wheat varieties – Gilgandra 2015

Greg Brooke
NSW DPI, Trangie

Introduction

Nitrogen (N) is the nutrient most required by wheat. It is essential for growth and development, yield and grain protein levels. In recent seasons in Central West NSW there has been a significant trend towards very low grain protein with more than 30% of grain receivals meeting ASW or lower specifications. Protein levels of <10.5% in a prime hard variety usually indicate that insufficient N levels have not only limited grain protein concentrations, but also yield. Soil testing for N levels before sowing remains an important budgeting tool. It is the most useful indicator of whether additional applied N, to support crop growth and to maximise yield and grain protein potential, is needed within a given season. Consideration must also be given to starting soil water and target yield. This trial aimed to determine the effect of N application rates on the yield and grain quality of eight popular bread wheat varieties at Gilgandra in central NSW in 2015.

Site details

Location:	**Gilgandra**
Co-operator:	**Kevin Kilby**
Soil type:	**Red loam**
2014 crop:	**Canola**
2013 crop:	**Wheat**
Sowing date:	**12 May 2015**
Starting moisture:	**Very wet at sowing to below 120 cm (216 mm rain recorded January–May)**
In-crop rainfall:	**196 mm June–October**
Fertiliser:	**90 kg/ha Granulock Z Extra at sowing**
Fungicide:	**2.5 L/t flutriafol (500 g/L) fungicide on fertiliser; prothioconazole (210 g/L) + tebuconazole (210 g/L) at 300 mL/ha on 21 August and 15 September**
Starting N:	**104 kg N/ha (0–60 cm)**
Harvest date:	**16 November 2015**

Treatments

Variety	Dart(ф), EGA Gregory(ф), Kiora(ф), Lancer(ф), Spitfire(ф), Sunmate(ф), Suntop(ф) and Viking(ф)
Nitrogen (N)	0, 20, 40, 80, 160 kg N/ha at sowing, and 40+40 (40 kg N/ha applied at both sowing and GS31). All N applied as urea.

Key findings

This site was very responsive to nitrogen (N) application. Yield and protein increased in all varieties, even up to the highest applied rate of 160 kg N/ha.

Yield averaged across varieties increased from 2.80 t/ha with no application of N up to 3.58 t/ha with the application of 160 kg N/ha.

Grain protein levels across varieties rose from 9.8% (nil applied N) to 12.4% with 160 kg N/ha.

Screening levels were not affected by N application rates up to 80 kg N/ha but rose slightly from 2.7% to 3.8% with 160 kg N/ha.

Kiora(ф) was the only variety which produced screening levels above 5% which were exacerbated by higher N application rates of 80 and 160 kg N/ha.

Results

Table 1. *Effect of various nitrogen treatments on the yield, grain protein and screening levels of eight bread wheat varieties – Gilgandra 2015*

Variety	N treatment	Predicted yield (t/ha)	Protein (%)	Screenings (%)
Dart	0	2.71	10.0	3.4
	20	2.99	10.3	1.9
	40	3.25	10.3	2.7
	40 + 40	3.32	10.9	2.6
	80	3.41	11.0	2.3
	160	3.48	11.8	5.0
EGA Gregory	0	2.88	9.2	2.3
	20	3.17	9.6	1.9
	40	3.43	9.9	1.5
	40+40	3.49	10.6	1.5
	80	3.58	11.2	2.0
	160	3.65	12.2	3.0
Kiora	0	2.57	9.6	4.4
	20	2.86	9.7	4.1
	40	3.11	10.4	4.7
	40+40	3.18	11.0	5.1
	80	3.27	11.4	9.0
	160	3.34	13.2	9.4
Lancer	0	2.73	10.8	1.3
	20	3.02	10.6	1.7
	40	3.27	11.0	1.1
	40+40	3.34	11.3	1.4
	80	3.43	11.7	1.1
	160	3.50	12.9	1.5
Spitfire	0	2.63	10.8	2.8
	20	2.92	10.8	2.0
	40	3.18	10.9	2.1
	40+40	3.24	11.8	1.7
	80	3.33	11.8	1.3
	160	3.40	13.5	1.8
Sunmate	0	2.86	9.7	2.7
	20	3.14	9.8	2.4
	40	3.40	9.9	2.0
	40+40	3.47	10.3	2.0
	80	3.56	10.3	1.7
	160	3.63	11.5	2.5
Suntop	0	2.94	9.5	2.4
	20	3.23	9.8	2.3
	40	3.49	9.9	2.0
	40+40	3.55	10.4	1.9
	80	3.64	10.5	1.9
	160	3.71	12.1	3.9
Viking	0	3.12	8.7	1.7
	20	3.41	9.0	1.2
	40	3.67	10.1	1.5
	40+40	3.73	10.6	2.4
	80	3.82	11.1	2.2
	160	3.89	12.1	3.3
	LSD (P = 0.05)	0.120	0.66	1.87

Summary

There were strong responses in yield and grain protein to all rates of applied N in all varieties.

Conditions at sowing were very wet. There was no effective in-crop rainfall after August which, combined with temperatures above 35 °C in September, resulted in a hard finish to the season. Despite this, moderate grain yields were obtained and screening levels were generally low with no negative effect from even moderate to high N application rates except for increased screening levels at 80 kg N/ha and 160 kg N/ha in Kiora.

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