Nitrogen response of eight wheat varieties – Coolah 2015

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Key findings

This site was fairly unresponsive to nitrogen (N) application. Yield and screenings did not significantly change with increasing rates of N, but there were moderate responses in grain protein to all rates of applied N in all varieties.

The 40 kg N/ha at sowing + 40 kg N/ha in crop treatment had a significant increase in grain protein above the 40 kg N/ha at sowing only treatment in all varieties, but was not significantly different from the 80 kg N/ha at sowing treatment.

Introduction

Nitrogen (N) is the nutrient most required by wheat. It is essential for growth and development, and yield and grain protein levels. In recent seasons in Central West NSW there has been a significant trend towards very low grain protein levels 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 if more applied N is needed to support crop growth and to maximise yield and grain protein potential 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 rate on the yield and grain quality of eight popular bread wheat varieties at Coolah in central NSW in 2015.

Site details

Location:	**Coolah**
Co-operator:	**"Binnia Creek"**
Soil type:	**Black basalt**
2014 crop:	**Wheat**
Sowing date:	**13 June 2015**
Starting moisture:	**Very wet at sowing to below 120 cm (315 mm rain January–May)**
In-crop rainfall:	**228 mm June–October**
Fertiliser:	**90 kg/ha Trifos at sowing**
Fungicide:	**Prothioconazole (210 g/L) + tebuconazole (210 g/L) applied at 300 mL/ha on 14 September and 7 October**
Insecticide:	**300 g/ha pirimicarb (500 g/kg) 7 October (aphids)**
Starting N:	**93 kg N/ha (0–60 cm)**
Harvest date:	**8 December 2015**

Treatments

Variety	Dart(Φ), EGA Gregory(Φ), Kiora(Φ), Lancer(Φ), Spitfire(Φ), Sunmate(Φ), Suntop(Φ) and Viking(Φ)
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).

Nitrogen applied as urea, pre-drilled immediately prior to sowing, with exception of the 40 + 40 treatment which had 40 kg N/ha pre-drilled at sowing and 40 kg N/ha top dressed at GS31.

Results

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

Variety	N rate (kg/ha)	Yield (t/ha)	Protein (%)	Screenings (%)
Dart	0	4.1	12.0	4.9
	20	4.1	12.4	5.2
	40	4.1	12.9	5.2
	40+40	4.1	13.4	4.9
	80	4.1	13.2	5.4
	160	4.1	13.6	5.1
EGA Gregory	0	4.4	10.8	2.8
	20	4.4	11.3	3.2
	40	4.5	11.7	3.1
	40+40	4.5	12.2	2.9
	80	4.5	12.0	3.3
	160	4.5	12.4	3.0
Kiora	0	4.2	11.7	3.5
	20	4.2	12.1	3.9
	40	4.2	12.6	3.8
	40+40	4.2	13.1	3.6
	80	4.2	12.9	4.0
	160	4.2	13.3	3.7
Lancer	0	3.8	12.7	2.6
	20	3.8	13.1	2.9
	40	3.8	13.6	2.9
	40+40	3.8	14.1	2.6
	80	3.8	13.9	3.1
	160	3.8	14.3	2.8
Spitfire	0	4.2	12.6	2.1
	20	4.2	13.1	2.5
	40	4.2	13.5	2.4
	40+40	4.2	14.1	2.2
	80	4.2	13.9	2.6
	160	4.2	14.2	2.3
Sunmate	0	4.3	11.2	3.1
	20	4.3	11.7	3.4
	40	4.3	12.1	3.4
	40+40	4.3	12.6	3.2
	80	4.3	12.5	3.6
	160	4.3	12.8	3.3
Suntop	0	4.2	10.9	2.6
	20	4.2	11.4	3.0
	40	4.3	11.8	3.0
	40+40	4.3	12.4	2.7
	80	4.3	12.2	3.1
	160	4.3	12.5	2.8
Viking	0	3.9	10.9	3.8
	20	3.9	11.4	4.1
	40	4.0	11.8	4.1
	40+40	4.0	12.3	3.8
	80	4.0	12.1	4.3
	160	4.0	12.5	3.9
	LSD (P=0.05)	0.12	0.28	0.53

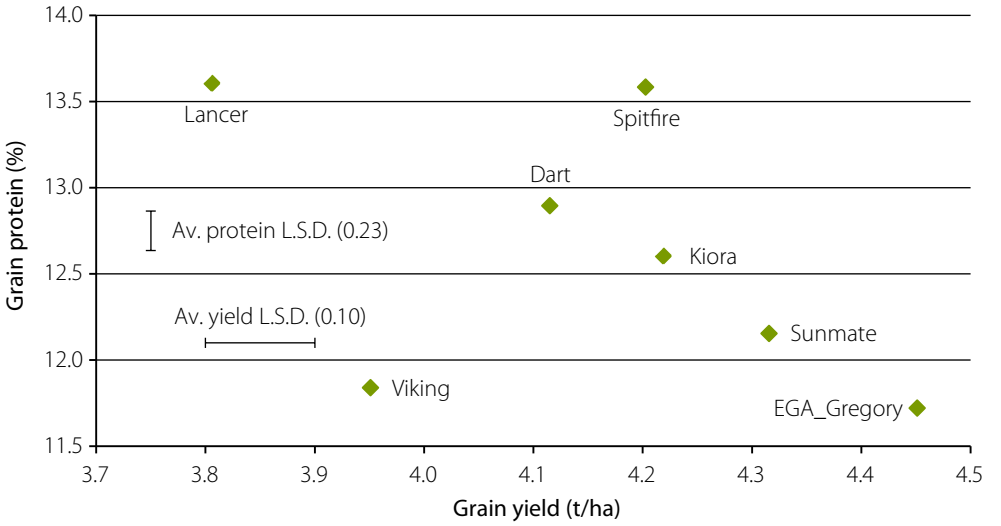

Figure 1. *Protein dilution relationship of eight bread wheat varieties across nitrogen rates – Coolah 2015*

Summary

There were moderate responses in grain protein to all rates of applied N in all varieties. The 40 kg N/ha at sowing + 40 kg N/ha in-crop treatment showed a significant increase in grain protein above the 40 kg N/ha at sowing only treatment in all varieties, but was not significantly different from the 80 kg N/ha at sowing treatment.

Screening levels were low, with only Dart above 5% in some treatments. Dart, being the quickest variety in this trial, flowered and reached grain filling ahead of the other varieties, most likely causing it to be filling grain and losing green leaf during the hotter and drier part of September. The slower varieties probably benefited more from the late spring rains in this season.

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