4.1.3 ASSESSING THE IMPACT OF NITROGEN RATE AND TIMING ACROSS 2 DIFFERENT SOWING RATES FOR KELLALAC WHEAT (HAMILTON, VIC)

Abstract:
The effect of nitrogen manipulation on grain yield and quality was masked by the inability to control foliar disease in the trial and the effect on yield of the dry October period. High base soil nitrogen levels resulted in high grain protein levels with little difference between treatments. The best net return was achieved using only the 10 kg/ha nitrogen at sowing. It did not pay to apply any post sowing nitrogen. Grain quality parameters such as test weight and thousand grain weights were extremely disappointing.

Researchers:
Dominic Bolton, Colin Hacking, Southern Farming Systems Ltd

Background:
This trial is a follow up to canopy trials conducted in previous years. It is believed that higher yields and grain quality can be achieved through manipulation of crop canopies by nitrogen management and sowing rate.

Objectives:
- To assess the effect of nitrogen rate and timing on wheat yield and grain quality
- To assess the impact of sowing rate on grain yield and quality

Methodology:
A fully randomised block design was used with 4 replicates of each treatment. Plot length was 10 metres and bed width was 1.7 metres. All treatments were sown on raised beds.

2 different sowing rates were used, namely 100 and 200 seeds per square metre. Nitrogen was applied at different rates and at different timings as shown in Table 1

Location: Hamilton
Growing Season Rainfall: (Apr – Nov) = 430 mm
Sowing Date: 11th May 2004
Harvest Date: 13th January 2005
Variety: Kellalac

Table 1 : Treatment List

Trt.	Sowing Population (plants per square metre)	Sowing Nitrogen kg/ha	GS31 Nitrogen kg/ha	GS39 Nitrogen kg/ha	Total Nitrogen kg/ha
1	100	10	0	0	10
2	100	10	150	0	160
3	100	10	0	150	160
4	100	10	75	75	160
5	100	10	75	75	160
6	100	10	112.5	112.5	235
7	200	10	150	0	160
8	200	10	0	150	160
9	200	10	75	75	160

Results:

Table 2: Yield and Grain Quality

Trt	Yield kg/ha	Protein %	Screen %	Test Weight [1]kg/hl	TGW grams	Grain Price $	Cost of post Sowing N	Net Return [2]$/ha
7	1,647	12.15	5.51	61.96	29.94	155.00	139.50	115.78
6	1,603	12.67	6.13	[1]58.85	29.05	155.00	209.25	39.22
5	1,463	12.82	6.12	[1]58.53	28.41	155.00	139.50	87.26
4	1,425	12.35	5.17	62.21	29.77	155.00	139.50	81.38
9	1,370	12.28	5.99	62.81	29.24	155.00	139.50	72.85
8	1,301	12.75	5.30	[1]61.99	29.80	155.00	139.50	62.15
1	1,298	10.58	5.38	62.23	29.15	155.00	0.00	201.19
3	1,166	13.05	5.77	[1]59.98	30.45	155.00	139.50	41.23
2	1,158	12.72	6.12	[1]56.92	28.61	155.00	139.50	39.99
Avg	**1,381**	**12.37**	**5.72**	**60.72**	**29.38**	**155.00**		**82.34**
LSD 5%	**434.78**	**0.778**	**1.87**	**6.71**	**2.73**			
CV	**26.21**	**6.90**	**20.10**	**8.08**	**6.16**			

[1] Grain with a test weight of less than 62.00 kg/hl does net meet AWB feed standards.
[2] Base grain price of $155/tonne FOB. Cost of applied nitrogen Urea $430/Tonne, so cost of N = $0.93 per kg. Gross margin /ha = yield * grain price minus cost of post sowing nitrogen

Discussion:

Yield results are suspect because of the high CV figure which indicates high variability. This was possibly due to environmental influence but also the fact that no fungicide was applied to the trial, therefore resulting in variable disease pressure across the plots. No reliance therefore should be placed on the yield results.

The site was reasonably high in soil nitrogen at planting, which resulted in small responses from in crop applied nitrogen. This can be seen from the high grain protein reading of treatment 1 (10.58 %) which only had 10 kg/ha nitrogen applied at sowing.

The highest grain protein level (13.05 %) was in Trt 3 where 150 kg/ha nitrogen was applied at GS39. (Table 2)

Test Weight readings were extremely low with an average of 60.72 kg/hl. In fact, Trts 6,5,8,3 and 2 did not even meet feed standards. No treatments met ASW standards of 74 kg/hl. Consequently protein levels above 10% were not financially rewarded.

There was no significant difference between screening levels and 1,000 grain weights across all treatments. The 1,000 grain weights were extremely low.