

Nitrogen strategies for protein management – Salmon Gums

Summary of results

- ◆ Grain protein was increased by all times and combinations of timing of nitrogen fertiliser compared to no additional fertiliser.
- ◆ Site variability limits the conclusions that can be drawn from this demonstration.

Site Information	
Group	Salmon Gums Croppers
Trail location	8 km S from Salmon Gums
Farmer	Rory and Christine Graham
Soil Type	sandy loam over clay
Organic Carbon	1.4% OC
Available N ppm	not tested
Actual annual rainfall	418 mm (Jan-Oct)
Ave annual	340 mm
Growing Season Rainfall (GSR)	304 mm (May-Oct)
Ave GSR	209 mm
Yield Potential (t/ha)	4.1 t/ha
Yield Actual (t/ha)	2.3 –3.2 t/ha
Paddock History	
2002	poor pasture
2001	pasture
2000	wheat
Seeding Date	25 April 2003
Variety	Camm
& Sowing Rate	50 kg/ha
Base Fertiliser	MAP max 40 kg/ha with amsul 75 kg/ha topdressed 24 April

Aim

To develop an understanding of foliar nitrogen applications and their effect on grain protein compared to sowing applications under normal paddock conditions.

Design

Plots were treated across the normal direction of working. A nearest neighbour design with every third plot as a control treatment of 120 kg/ha ammonium sulphate was conducted. The same rate of nitrogen was applied to each plot for the range of products and timings applied (except the nil nitrogen plot and one three times of application).

What happened

25 kg/ha of nitrogen was applied to most plots. The rate was selected using the Nitrogen Calculator based on paddock history, OC content and a target yield of 2.5 t/ha at 11% protein.

There was a staggered crop germination from the early sowing but all plots were similarly affected. This made some of the early counts and assessments difficult. The crop was infected with stem rust but two fungicide applications gave some control of the disease.

There was a fertility gradient across the site indicated by the tiller counts and grain yields. To interpret the data across the gradient,

the yields and protein were adjusted to reflect expected yields based on adjacent control plots. These adjusted results form the basis for the discussion.

All nitrogen treatments increased grain yield and/or protein. Flexi-N at late tillering appears an odd result compared to the early tillering and flowering applications of the same rate. The early tillering application of Flexi-N appears to be the most effective with the highest yield and return of any treatment. Apart from the tillering applications, all treatments appear to give similar yield and protein. A single application will be easier and cheaper than split applications of nitrogen, however if additional nitrogen is required because of good

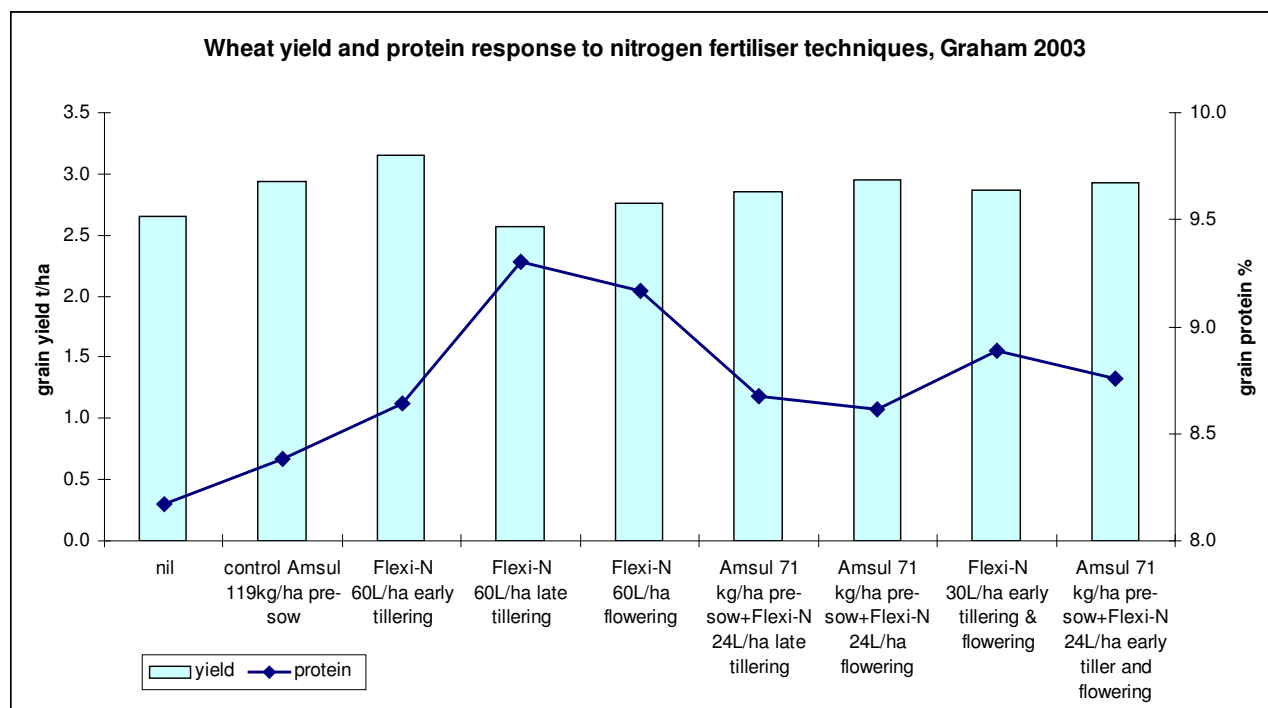
seasonal conditions, delayed top-ups will be effective with followup rain on a moist soil profile.

Uptake of nitrogen appears similar for all treatments with an additional 5-8 kg/ha of N in grain when calculated from yield and protein.

Table 1: grain results from techniques of nitrogen management for protein.

treatments and application dates	kgN/ha	tiller density /sqm.on 25/7&7/8	yield t/ha	protein %	nitrogen efficiency	\$/ha return to fertiliser*
nil	0	319	2.7	8.2		
control 119kg/ha Amsul pre-sow 24/5	25	352	2.9	8.4	21%	\$20
Flexi-N 60L/ha early tillering 12/6	25	226	3.2	8.6	39%	\$59
Flexi-N 60L/ha late tillering 13/8	25	243	2.6	9.3	15%	-\$3
Flexi-N 60L/ha flowering 15/9	25	238	2.8	9.2	25%	\$25
Amsul 71 kg/ha presow+Flexi-N 24L/ha late tillering	15+10	215	2.9	8.7	22%	\$17
Amsul 71 kg/ha presow+Flexi-N 24L/ha flowering	15+10	319	3.0	8.6	26%	\$27
Flexi-N 30L/ha early tillering & flowering	12.5+12.5	300	2.9	8.9	27%	\$26
Amsul 71 kg/ha presow+Flexi-N 24L/ha early tiller and flowering	15+10+10	268	2.9	8.8	20%	\$18

* returns based on adjusted yield and protein of each treatment.



Yields were slightly above and protein well below target levels. The Nitrogen Calculator indicates that a 3t/ha crop with 9% protein would require an equivalent nitrogen application.

Take care with these results as the trial was not replicated, stem rust was more severe at one end of the trial and the site appeared to have a fertility gradient.