DONAGHYS
PERFORMANCE FIRST

Spread and Spray Trial – Central Canterbury

The objective of spread spray trial was to measure the relative effect of spreading and spraying of differing urea rates (with or without LessN) on pasture dry matter growth. The trial was conducted on a Rolleston dairy farm. It was started on 26th February 2009 and finished on 24th March 2009. The trial area was irrigated ryegrass-white clover based pasture under normal dairying conditions. Residual pasture dry matter base line was recorded on 26th February (soil temperature 18.5^{0}C) and treatments were applied on same day. Pasture growth was assessed on Day 26 after treatment application.

The trial comprised 10 treatments in a randomised block design (Table 1) with 5 replications that provided a total of 50 plots.

Results

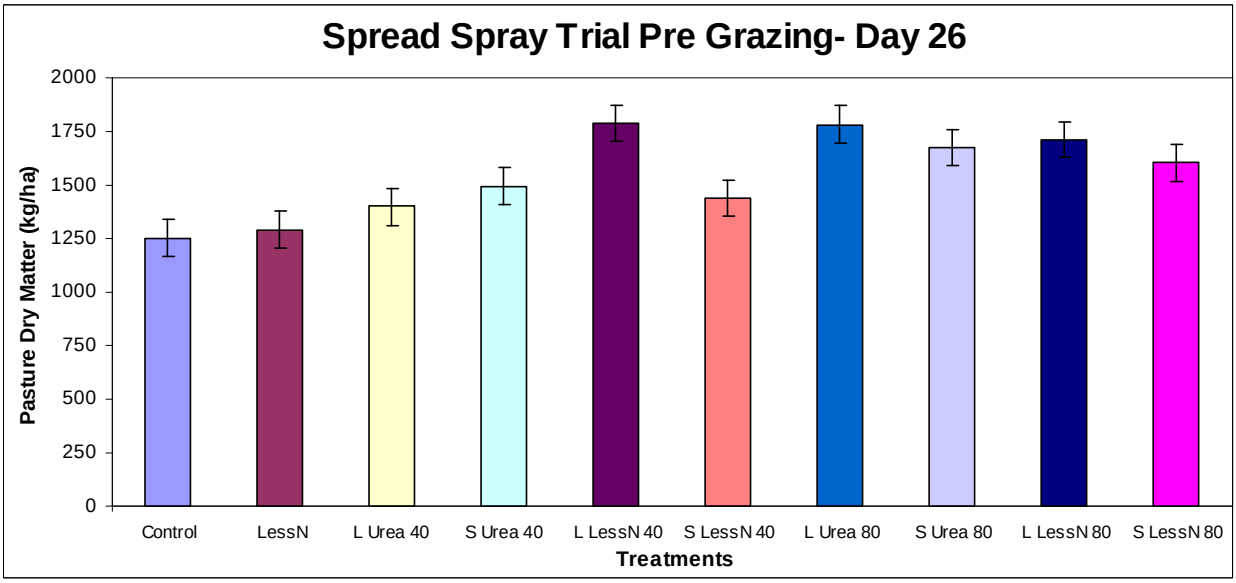
The results are presented in Table 1. Nitrogen response was calculated on the kg of dry matter grown per kg of nitrogen applied.

Table 1: Pasture dry matter assessed by Grass master probe on Day 26

Treatment*	Dry matter (DM) Kg/ha Day 26**	N response DM/Kg N
Control	1253 ^{c}	
LessN	1291 ^{c}	
Sprayed Urea 40	1398 ^{c}	7.9
Spread Urea 40	1496 ^{bc}	13.2
Sprayed LessN 40	1787 ^{a}	29.0
Spread LessN 40	1438 ^{bc}	10.1
Sprayed Urea 80	1782 ^{a}	14.4
Spread Urea 80	1673 ^{ab}	11.4
Sprayed LessN 80	1711 ^{ab}	12.4
Spread LessN 80	1604 ^{b}	9.5
LSD 5%	**171**	
P	**<0.001**	

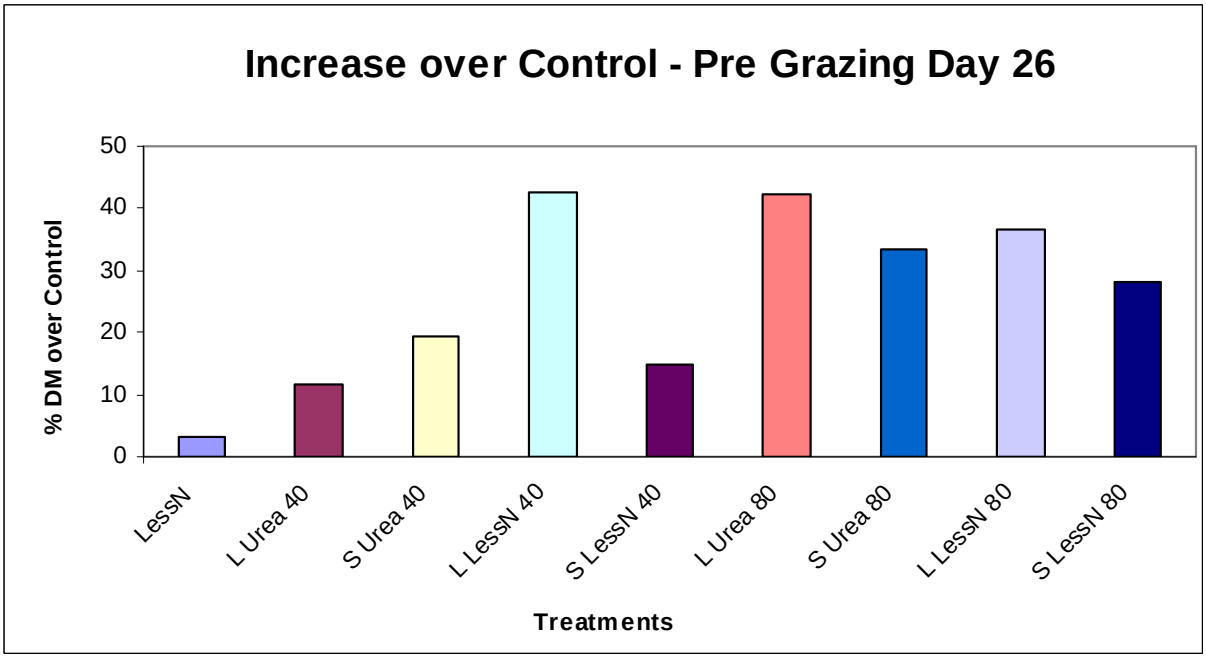
* In Spread treatments, urea was applied as granules direct to the soil surface of each plot. Where LessN was applied, this was with dissolved urea in the sprayed treatments and with an equivalent amount of volume of water (200 L/ha) when nitrogen was not sprayed. The 40 and 80 values refer to kg of urea applied (40 kg/ha urea or 80 kg/ha urea).

** Treatments within the same column that share the same letter are not statistically significantly different from each other (95% confidence level).



Results

- All the liquid (L) urea treatments with the exception of 40kg/ha Urea without LessN (not statistically significant), were consistently superior in dry matter production compared with the corresponding solid (S) urea treatments.
- The LessN system (40 kg/ha urea sprayed (L) on with LessN) was the best performing treatment on basis of the nitrogen applied. LessN system produced statistically significantly higher DM growth compared to solid Urea 40 with or without LessN, Liquid urea 40 and Solid LessN 80 treatments. The LessN system treatment produced similar dry matter production compared to when double the amount of nitrogen was applied either in solid or liquid treatments.
- Overall the urea sprayed (liquid) treatments with or without Less N performed well in terms of nitrogen response when compared to the spread (solid) treatments with the exception of sprayed urea 40 treatments.



Conclusion

The LessN system was the most efficient treatment for nitrogen response and outperformed solid urea at the same nitrogen rate and matched solid urea at a double rate. LessN by itself will sometimes elicit a significant pasture response but this is less likely when the pasture is significantly limited by nitrogen uptake.

Soil Analysis:

The soil was a light Lismore silt loam with low natural fertility but having been developed with fertiliser. The low phosphorus availability showing in the soil test is actually reasonable for a Lismore soil and may not be significantly limiting. Similarly the potassium level may not be significantly limiting in this soil. The low available N level is probably reflective of a reasonably low organic matter level in the light soil and indicates a good scope for response to nitrogen addition which was reflected in the response rates seen in this experiment. The low available soil nitrogen may have limited the ability of the LessN to work in the absence of foliar nitrogen application and there may be little plant nitrogen for the LessN to act synergistically with.

Analysis		Level Found	Medium Range	Low / Medium / High
pH		5.5	5.8 - 6.3	
Olsen P	(mg/L)	16	20 - 30	
Potassium	(me/100g)	0.34	0.50 - 0.80	
Calcium	(me/100g)	6.7	6.0 - 12.0	
Magnesium	(me/100g)	1.17	1.00 - 3.00	
Sodium	(me/100g)	0.24	0.20 - 0.50	
CEC	(me/100g)	13	12 - 25	
Base Saturation	(%)	65	50 - 85	
Volume Weight	(g/mL)	0.97	0.60 - 1.00	
Sulphate-S	(mg/kg)	10	7 - 15	
Available N (15cm Depth)	(kg/ha)	95	150 - 250	
Base Saturation		K 2.6	Ca 51	Mg 8.9	Na 1.9
MAF Units		K 7	Ca 8	Mg 26	Na 11
Anaerobically Mineralisable N		65 ug/g			