

Effect of lime and/or superphosphate on the profitability of a grazing enterprise

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The objective of the trial was to determine whether the application of lime and/or superphosphate (SSP) to acidic soils is profitable in a grazing enterprise. The trial site was located on a sandy clay loam at Frampton, near Cootamundra, on the South-West Slopes of NSW. Average annual rainfall is approximately 630mm.

The trial consisted of 4 unreplicated treatment 'paddocks' on an established phalaris and sub-clover pasture. The treatments were 250kg/ha SSP; 250kg/ha SSP + 2.5t/ha lime; 125kg/ha SSP + 2.5t/ha lime and 125kg/ha SSP. The trial commenced in 1998 with a one-off application of lime; superphosphate has been applied annually. Merino wethers were set stocked on the site. Initially, pH_{Ca} ranged from 4.2-4.3 at 0-10cm depth and 4.8-4.9 at 10-20cm. Aluminium levels ranged between 0-30% in the top 20cm, the highest levels being found in the 5-15cm layer.

The following results are based on 2 years of data collection. The trial is not replicated and is relying on trends over time. Stocking rates were increased in 2000 by 20% on the 250kg SSP treatments and by 14% in the 125kg SSP treatments. This has had a significant impact on the profitability of the treatments illustrated in table 1.

Table 1. Cost of production and profit

	250kg/ha SSP		250kg/ha SSP + 2.5t/ha Lime		125kg/ha SSP + 2.5t/ha Lime		125kg/ha SSP	
	1999	2000	1999	2000	1999	2000	1999	2000
Cost of Production (\$/kg Wool Clean)	5.03	3.68	5.48	4.02	5.05	3.45	4.25	3.08
Profit (\$/ha)	-7.03	187.87	-27.19	234.59	-19.09	112.25	12.11	108.61

The cost of the lime has been spread over a 10 year period (including 10% interest). SSP = single superphosphate.

- *Profit (\$/ha)* in 2000 was highest in the 250kg/ha SSP treatments. This was attributed to a lower micron (approximately 20 μ m), influenced by an extra 1.75 sheep/ha (~ 2.1 DSE/ha) than the 125kg/ha SSP treatments. Fleece weight/ha was relatively similar between treatments.
- *Cost of production* for all paddocks decreased in 2000 in response to an increase in stock numbers.
- *Wool staple profiling* was conducted to observe the affect of pasture dry matter on fibre diameter.
- *Sheep body weights* were relatively consistent, with variations being attributed to available dry matter and small stocking rate differences.
- pH_{Ca} increased over 3 years in the limed treatments by 1.0-1.5 units in the top 5cm and by 0.2-0.3 units in the 5-10cm layer. Sampling of 2.5cm intervals in 2001 showed the lime had moved down to approximately 7.5cm depth.
- *Aluminium %* in the top 5cm of the limed treatments had been reduced to zero over 3 years. Reductions in aluminium % in the 5-10cm layer ranged from 11-22%.
- *Pasture quality* (digestibility %, metabolisable energy, crude protein) did not appear to vary significantly between treatments, at this stage.
- *Botanical composition* appeared to be more favourable in the limed treatments, where phalaris content remained relatively stable (declined in the unlimed treatments) and annual ryegrass content had declined. All treatments experienced a significant increase in sub clover content.

The results to date show that cost of production, stocking rate, fibre diameter and fleece weight (kg/ha) are sensitive in determining profit (\$/ha). In 1999 the 125kg/ha SSP treatment was more profitable due to higher

fleece weight (kg/ha) and lower cost of production. In 2000 the 250kg/ha SSP + 2.5t/ha lime was more profitable due to increased stocking rate, higher fleece weight (kg/ha) and lower micron (higher wool prices).

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