

Lime Application to Non-Arable Farms.

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The need for treatment of the effects of soil acidification on non-arable soils is common in the NSW tablelands environment (Cumming, 1991). Past agronomic practices have suggested that lime be incorporated into the soil to obtain benefits from applying it. This requirement is challenged in this paper.

Methods

Superfine lime at 3.25 t/ha was applied to the surface of a sandy loam soil derived from granite near Roslyn, NSW in 1982. This amount of lime was sufficient to raise $\text{pH}_{(\text{water})}$ to 5.8-6.0 ($\text{pH}_{(\text{CaCl}_2)}$ 5.0). A high sulphur phosphate fertiliser was applied to raise P levels from the 10 ppm Bray, considered below optimal for a normal clover-perennial grass pasture. The limed area of the paddock was compared with a comparative unlimed area under similar grazing, fertiliser and pasture management conditions. In 1991, measurements were made of soil aluminium, manganese

and phosphorus and dry matter production. A similar soil was sampled to 20 cm in 1990 to determine the change in pH.

Table 1. Effects of surface-applied lime and P fertiliser on soil chemistry and spring pasture production on the southern tablelands of NSW.

Treatment	Parameter	Result	Yield (kg/DM/ha)	
			- P	+ P
Limed soil	pH_{Ca}	4.8	1450	2650
	pH_{w}	5.7		
	Bray P	18 ppm		
	Aluminium	0 ppm		
	Manganese	5 ppm		
Unlimed soil	pH_{Ca}	4.3	1520	1700
	pH_{w}	5.3		
	Bray P	18 ppm		
	Aluminium	7 ppm		
	Manganese	17 ppm		

Results and Discussion

Measurements showed an improvement of the soil to at least 20 cm after liming. Soil pH and exchangeable calcium improved, with reductions in soil aluminium and manganese to depth. Soil P was also raised to adequate levels (18 ppm). Pasture yield was 12% greater where P fertiliser was applied alone, but 83% greater where both lime and P were applied (Table 1). This illustrates the need for both adequate phosphorus and sulphur nutrition together with amelioration of the acid soil parameters aluminium and manganese. It also indicates better phosphorus utilisation after liming.

Surface liming of acid soils provides a cheap option for non-arable areas. Substantial benefits can accrue in terms of pasture productivity with attention to phosphorus and sulphur nutrition. Use of surface liming will reduce the usual high cost of lime incorporation, optimise pasture production and alleviate or prevent soil acidification.

Reference

Cumming, R.W (1991). Long-term effects of lime in extensive pasture areas of Australia. In "Plant-Soil Interactions at Low pH". Eds. R.J. Wright, V.C. Baligar and R.P. Murrmann, Kluwer, Netherlands. pp. 453-464