

## Effects of liming on legume content of a dairy pasture on the north coast of new south wales

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Despite widespread interest in the response of various legumes to melioration of soil acidity, there are no reported examples of beneficial effects of liming on the relative performance of legumes in competition with grass species. This paper documents such a response.

### Methods

The experiment was carried out on a dairy farm near The Channon on the north coast of N. S. W. Soil analysis indicated a pH (1:5, soil:0.01M CaCl<sub>2</sub>) of 4.1, exchangeable aluminium accounts for 30% of total exchangeable cations, exchangeable Mn was measured at 826 uM and soil organic carbon at 2.5%. A basal fertilizer application consisted of: Trifos, 500 kg/ha; MgSO<sub>4</sub>, 80 kg/ha; Potash (KCl), 100kg/ha; CuSO<sub>4</sub>, 15 kg/ha; ZnSO<sub>4</sub>, 15kg/ha; Borax, 7 kg/ha; and NaMo<sub>4</sub>, 50 g/ha. Lime was applied at rates of 0, 1, 2, 4 and 8 t/ha to 20 m<sup>2</sup> plots in a random block design with 4 replicates. The lime was thoroughly incorporated into the soil to 10 cm depth with a rotary hoe. The pasture was sown as a mixture of *Lolium perenne* cv Ellett (40 kg/ha), *Trifolium pratense* cv Redquin (5 kg/ha), and *T. rrpens* cv Haifa (2 kg/ha). Legume seeds were inoculated with a commercial strain of *Rhizobium trifolium* and lime-pelleted. Plots were "crash grazed" after each harvest.

### Results and discussion

Total herbage production and the percent contribution of legumes to yield responses to liming in three sequential harvests:

Harvest date: 11-07-88			24-11-88		20-01-89	
Lime t/ha	Yield kg/ha	Clovers %	Yield kg/ha	Clovers %	Yield kg/ha	Clovers %
0	454	0.3	2299	8.8	3088	6.3
1	542	na	2735	19.5	3635	32.9
2	590	1.2	2829	25.1	3497	38.4
4	644	1.8	3058	24.6	3980	41.7
8	794	na	3480	19.3	4240	38.3
LSD (P=0.05)	276	0.3	946	14.3	967	31.5

The dry matter response in the first harvest occurred primarily through increased production of the grass component of the pasture, and may well have been a response to increased mineralization of organic nitrogen following liming. In the two later harvests, the response to lime was largely attributable to an increase in the legume component. These responses suggest that the clovers are more sensitive than ryegrass to soil acidity. This experiment is being repeated at 10 other sites in northern New South Wales to improve the prediction of legume responses to the liming of acid soils.