

Effect of surface applied lime on establishment and persistence of perennial pastures

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Surface application of lime is the only method possible when direct drilling pastures. The positive effect on pasture establishment of lime incorporation into cultivated seedbeds is well accepted but there is little data on the effect of surface applied lime on pasture establishment or persistence.

METHOD

A small plot trial was sown at Braidwood in August 1999. Single species were direct drill sown in a randomised block design with 4 replicates. Seven perennial ryegrass, seven cocksfoot, six tall fescue and six phalaris cultivars were sown in 15m long plots. Lime had been surface applied 11 months prior to sowing at 2.5 t/ha to one half of every plot.

The soil is a granite derived sandy loam overlaying a clay subsoil. Soil tests revealed moderate acidity with 0-10 cm pH 4.3 and 10-20 cm pH 4.2. CEC values were 3.4 & 2.5 meq/100g and percent aluminium 9.6 and 16.6 respectively for the two sampling depths. At depth the soil pH rose to 5.0 at 30-40cm. Surface liming increased pH (0-10cm sample) by 0.8 and aluminium fell from 10% to less than 1%. However soil testing of an adjacent site limed at the same rate and cored at 2.5cm intervals, showed that the lime effect was still confined to the top 5cm after 12 months.

Plant establishment was recorded 18 weeks after sowing and subsequent persistence counts made in late summer 2001 and 2002. Basal presence of live plants was recorded using a 1m² quadrant with 100 divisions.

RESULTS

Table 1 appears to show a small positive effect of surface applied lime on establishment. However, the major effect to date is species not lime driven. Perennial ryegrass established well and had the highest basal percentage 4½ months after sowing but declined markedly following very dry conditions in the spring-summer of 2001-02. By comparison, the other grass species had increased basal cover (due to enlargement of the crown rather than recruitment of new plants) although lime appeared to have little effect on their persistence.

DISCUSSION

There may be several factors involved in the minimal response to lime. First it is common, even in strongly acid soils, that the top 2.5 to 5cm is non acidic (buffered by higher organic matter). In addition, when sown 11 months after surface application, the lime had only ameliorated the top 5cm of soil. Below 5cm the more acidic layer with relatively high levels of aluminium remained. Finally, persistence may be more influenced by surface applied lime in future years as the lime ameliorates the soil to a greater depth over time.

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Table 1: Persistence counts (basal presence per metre square)

Grass species	Ryegrass			Fescue			Cocksfoot			Phalaris		
	1999	2001	2002	1999	2001	2002	1999	2001	2002	1999	2001	2002
Limed	71	62	27	41	64	62	52	76	72	39	47	54
Non limed	62	63	23	37	55	59	50	72	67	34	43	51
Limed diff	+9	-1	+4	+4	+9	+3	+2	+4	+5	+4	+4	+3