

## Soil acidification under permanent pastures in NE Victoria

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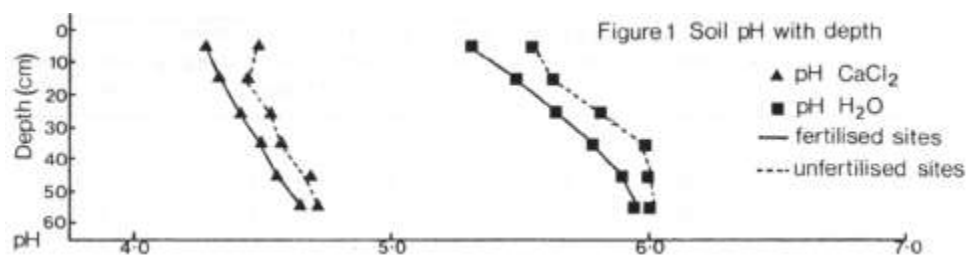
Soil acidification under sub-clover pastures is occurring in some parts of southern Australia with pH decreases of about 1 unit in the surface 10 cm reported (1, 2, 3). Subsoil acidification well below the surface 10 cm depth has also been reported (2). Paired soil profiles were sampled from fertilised and unfertilised parts of farms in the above 600 mm rainfall zone of N.E. Victoria in spring 1986 to determine whether acidification had occurred.

### Methods

Sampling depth was to 60 cm; the surface 10 cm sample consisted of 30 bulked cores and the 5 remaining profile samples (10 cm increments), 5 bulked cores each. Thirteen soils were sampled; 5 granite, 5 sedimentary, 2 alluvial and 1 gneissic. Most of the areas had been cleared between 1880 and 1920 and were first fertilised with superphosphate between 1940 and 1958. Soil pH (in 1:5 water and in  $\text{CaCl}_2$ ), total P (4) and titratable acidity (1) were determined for each sample.

### Results and discussion

Soil pHs for all soils are presented in figure 1. There was a slight pH decrease with P application, although this was significant only at the 10% level. Nevertheless, there was a clear trend towards acidification with fertiliser use. The average pHs for 0-10 cm samples were 4.49 and 4.28 in  $\text{CaCl}_2$ , and 5.58 and 5.31 in water, for unfertilised and fertilised sites respectively.



Mean total P concentrations for unfertilised and fertilised pairs were 344 and 465 ppm respectively; with fertilised soils receiving in total 110-570 kg P/ha. Where P application increased total P by greater than 40%, buffering capacity (as estimated by titratable acidity) was increased.

The amount of  $\text{CaCO}_3$  estimated to be needed to restore soil pH in the 0-10 cm zone of fertilised sites to that of the unfertilised sites, ranged from 0-1.4 t  $\text{CaCO}_3$ /ha; whereas to increase the pH to 6.0, 2.0-7.8 t  $\text{CaCO}_3$ /ha was calculated to be required.

Whilst fertilised soils under sub. clover pastures were more acid than unfertilised soils, the amount of acidification found was less severe than reported previously (1, 2, 3).

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