Lime for cereals on acid soils in northern New South Wales

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It has been known for some time that wheat and barley grow poorly on some acid sandy soils of the Pilliga Scrub, though more recently it has been shown that triticale and some oat cultivars will grow. The introduction of lupins and hence legume nitrogen, to these infertile soils (1) has made cereal growing a proposition.

Methods

A factorial split-plot (lime x cereals) experiment (with lime as main plots) was set up near Binnaway with lime broadcast and cultivated in on 6th February, 1981. The soil was a coarse sand (90-120 cm deep) overlying decomposing sandstone, as follows:

Depth (cm)	pH (water)	% Exchangeable Al
0-15	4.5	56
15-30	4.4	79
30-60	4.3	86
60-90	4.5	85

The site had frown lupins the previous year. Fertilizer applied at seeding was 52 kg ha N as urea (applied between the drill rows) and 18 kg ha P as double superphosphate.

Results and Discussion

Table 1. Effect of lime rate on grain yield in 1981 and on pH of surface soil three and nine months after application.

	Crop grain yields kg ha^{-1}					pH (0-15 cm)	
Lime rate t ha^{-1}	Lara barley	Banks wheat	Eagle wheat	Satu triticale	West oats	13 May	26 Nov.
0	40	80	110	1290	1120	4.5	4.8
1.24	420	220	400	1500	1500	4.6	5.2
2.48	510	410	540	1560	1480	4.7	5.7
4.96	1050	690	700	1730	1660	4.8	6.0

There was a dry autumn, and hence lime had little effect on surface soil pH by seeding. However, by late November surface pH had increased substantially with increasing lime application.

The acid sensitive-crops (wheat and barley) gave very large percentage grain yield increases with lime application. However, even at the highest lime rate their yield was below that of oats and triticale with no lime. It is also of note that oats and triticale gave absolute yield responses to lime similar to those of barley and wheat.

Economics of lime application will depend on residual effects, and these will be monitored for a number of years, as will changes in p11.

1. Doyle, A. D. and Herridge, D. F. (1980). Inter.Congress on Dryland Farming. Adelaide (In press).