

Problems of fertility related to long periods of pasture improvement and management in a small urban water supply catchment

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Town water for Goulburn in the N.S.W. southern tablelands, comes in part from the Pejar Catchment, 25 km north of the city. Pasture improvement in the 14000 ha catchment commenced in 1936 but pasture production and ground cover has declined in recent years, with concern about accelerated siltation of the water storage.

A new dam of 9000 ml has been constructed. Solutions to the pasture problems are urgently required, so that recommendations on pasture management and soil conservation measures, can be made.

The decline in pasture production is most serious on light textured soils derived from granite and sedimentary rocks; these soils are similar to those in large areas throughout south-east Australia and are widespread through the Pejar Gatchment. Selected soil chemical data for three sites are shown in Table 1.

TABLE I. Effect of time under improved pasture on soil pH, aluminium and manganese.

SITE	YEARS OF PASTURE	GROUND COVER (%)	pH		Al (me/100g)		Mn (me/100g)
			1:5 Water	CaCl ₂ ¹	Exch ²	CaCl ₂ ¹	CaCl ₂ ¹
A	0	95	6.10	4.90	.002	.001	.02
B	50	85	5.25	4.54	.02	.01	.18
C	53	65	4.80	4.08	.14	.03	.14

Footnote: 1. Extraction in 0.01M CaCl₂
2. Extraction in 1M KCl

Acid soil factors (low pH, high aluminium and manganese) are clearly involved, at least at site C. Field experimentation on the interaction of liming and phosphorus is in progress at sites B and C.

Preliminary results from pot experiments using sub-clover, rape, lucerne and barley indicate a strong lime x phosphorus interaction, with lower requirements for phosphorus in the presence, than in the absence of lime (C.H. Williams - personal communication).

Formulation of a suitable land management programme for the catchment is dependent on improvement of existing ground cover. Soil loss is related to average ground cover, with a rapid increase in soil loss and erosion as ground cover declines (Lang 1978). This situation exists in areas of high acidity.

Soils with a pH 5.5 are being delineated within the Pejar Catchment. Soils with a long history of pasture improvement, reduced ground cover and low pH values are being tested for lime requirement and suitable recommendations issued. This approach to pasture management should reduce the silt load into Pejar Dam.

Lang, R.D. (1978). Proc. Agric. Eng. Conf. (Toowoomba) 78/8:127