

Available sulphur levels in Mallee soils

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Over a period of years, the availability of soil sulphur (S) to plants has been determined at localities throughout the Victorian Mallee. This paper reports results for three soil types and discusses the feasibility of establishing relationships between plant responses and S applied as fertilizer.

Methods

Thirty-six sites were sampled by taking 40-50 soil cores, 2.5 cm by 15 cm deep, at each site. Cores were composited at each site then analysed for available S(1). At Walpeup, the distribution of available S down three soil profiles on different soil types was determined by extracting cores at 15 cm intervals down each profile to 90 cm.

Results and Discussion

Seventy-eight per cent of the surface soils (0-15 cm) had available S concentrations below 5.6 ppm; 22% were below 3.0 ppm (Table 1). In the 0-15 cm layer, 5.6 ppm is a critical concentration below which pasture is expected to respond to S fertilizer(2).

Table 1: Concentration of available sulphur (ppm) in surface soil (0-15 cm)

Number of sites	Available sulphur
8	>5.6
28	< 5.6
17 of the 28	< 4.0
8 of the 28	< 3.0

Data presented in Table 2 clearly show a trend to increasing S concentration in the deeper subsoil, gradation being more pronounced in the shallow sand and sandy loam profiles.

Table 2: Concentration of available sulphur (ppm) down the soil profile

	Depth (cm)				
	0-15	15-30	30-45	45-60	60-90
Deep sand	3.2 (20)*	3.0 (7)	3.2 (7)	4.4 (7)	9.0 (7)
Shallow sand	2.8 (20)	6.2 (9)	5.3 (9)	23.0 (9)	71.8 (9)
Sandy loam	3.8 (20)	4.0 (20)	9.8 (20)	38.0 (20)	83.8 (20)

*Figures in brackets indicate the number of samples composited

Whilst surface soil concentrations are relatively low and are sub-optimal for pasture legumes, the levels of S below the surface layer may adequately meet plant demands once roots reach this zone. The variability between soil profiles, with respect to S concentration, suggests caution in the use of surface soils alone in assessing S status.

Long-term experiments in the Mallee with S fertilizers have largely been restricted to soil types similar to sandy loam and responses by cereals and pastures have been minimal. The low S concentration in deep

sands suggest a need for additional research, especially with species which have high demands for S, i.e., pasture legumes and cruciferous crops.

1. Peverill, K. I., Briner, G. P., and Walbran, W. I. 1974. Trans. 10th Inst. Cong. Soil Sci., Moscow, 11:174-178.

2. Peverill, K. I., and Briner, G. P. 1974. Proc. XII Inter. Grasslands Cong., Moscow, 449-456.