Sulphur status of pasture legumes in the semi-arid wheatbelt

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Sulphur is not regarded as a limiting plant nutrient for medics and lucerne in the Central Western wheatbelt of New South Wales, although few field trials have been conducted (Glendinning et al. 1974). With the increasing usage of low sulphur, high phosphorus fertilisers for wheat growing, the likelihood of legume pastures becoming sulphur deficient now needs to be re-examined.

Sulphur was included as a treatment in a glasshouse programme investigating the nutrient status of the four major agronomic soil groups of the Central West. Test plants consisted of medics, subterranean clover and lucerne, appropriate to the particular soil group in question. Nutrient treatments were applied according to either a nutrient omission or addition design. Most trials were grown over the winter period and once the plants commenced flowering, the tops were harvested and dried. The table shows the significant ($P<0.05$) yield responses (g/pot) to sulphur.

Table 1. Yield responses (g/pot) to sulphur by legumes grown under glasshouse conditions.

SOIL GROUP	Gradational Red Earth				Mallee	Hard Red	
LEGUME	Barrel Medic Jemalong* 1978	Barrel Medic Jemalong* 1979	Barrel Medic Cyprus	Sub. Clover Nungarin	Barrel Medic Jemalong	Lucerne WL 318 Cut 1	Lucerne WL 318 Cut 2
ALL NUTRIENTS	4.60	6.55	5.11	6.30	12.5	7.58	2.60
ALL-SULPHUR	2.03	3.07	2.94	3.51	10.2	3.77	0.84
Response (%)#	127	113	74	79	23	101	210

* nutrient addition design
\# the difference as a percentage of the minus sulphur treatment

Responses to sulphur were first obtained in 1978 with Jemalong barrel medic on the gradational red earth; the same trial was resown in 1979, attempting to exhaust the sulphur supply. A similar response was obtained. However, on the hard red soil the lucerne regrowth doubled the percentage response of the first cut, suggesting a greater exhaustion of the sulphur supply of the ALL-SULPHUR treatment.

Of the four soil groups tested in this programme, the three lighter-textured red soils have been shown to be sulphur responsive to a range of legumes. The fourth soil, a grey clay of alluvial origin, has a satisfactory sulphur status. Thus the unexpected and repeated appearance of sulphur responses on the red soils cannot be ignored, particularly since the collection of the soils from fallowed sites would favour the mineralisation of sulphur.

Field evaluation of the glasshouse responses is in progress and should establish if current fertiliser practices should be re-assessed to maintain pasture productivity. The early recognition of any potential sulphur deficiencies would prevent a serious decline in pasture productivity and benefit both livestock and cereal enterprises.

Glendinning, J.S., Walker, M.H., and Weir, R.G. (1974). in "Handbook on Sulphur in Australian Agriculture". (Ed. K.D. McLACHLAN) (C.S.I.R.O.: Melbourne).