

Concentration of copper in subterranean clover compared to *Polymorpha medic* under field conditions

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Much is known about the concentration of copper in sub-clover (*Trifolium subterraneum* L) (1) but the concentration of this element in recent commercial varieties of burr medic (*Medicago polymorpha* L) is unknown. If concentrations of copper in burr medic are lower than sub-clover, stock grazing medic-based pastures may have a lower intake of copper than stock on sub-clover pasture.

Methods

Trials were sown in May and June of 1985 and 1986. All were of split plot design, with species as main plots and copper treatments as sub-plots. Copper was applied to the soil pre-seeding as copper sulphate. Plants were sampled by hand, taking exposed leaves plus petioles in the sward. This technique is employed in commercial plant analysis and is representative of most material consumed by sheep. Copper concentrations were determined at CSBP's Bayswater Laboratory. Sampling times ranged from 5 weeks after sowing to mid-flowering. Plots were periodically exposed to grazing between samplings.

Results and discussion

Copper concentrations in young growth of burr medic was consistently between 14 and 48% lower than those in sub-clover (Table 1). This was observed over a range of soil types, climatic regions, sampling periods and copper supply.

Table 1: Concentration of copper (ppm) in young leaves plus petioles of sub-clover and medic at five field locations of different soil types. (pH of surface 10cm, 5:1 water).

Location	Soil Type (pH)	Copper Sulphate applied (kg/ha)	Sub-Clover	Burr Medic	Sig. diff. between spp.
Lancelin 1985	Deep grey sand (6.9)	0	2.9	2.2	$p < 0.05$
		2	4.3	2.9	
		4	6.9	3.8	
		8	8.1	4.2	
Wannamal 1986	Brown gravelly sandy loam (6.4)	0	4.4	2.7	$p < 0.05$
		1	5.2	3.5	
		2	5.9	3.8	
		4	6.6	4.3	
Cranbrook 1986	Grey loamy sand (5.8)	0	12.1	10.2	$p < 0.01$
		8	6.1	5.1	
Greenhills 1986	Brown clay loam (6.1)	0	9.4	6.0	$p < 0.01$
Mt Ney 1986	Loam over clay (6.3)	0	6.5	5.6	$p < 0.05$

It is necessary to determine whether the lower Cu concentration in medic is due to (i) a lower internal requirement for Cu than sub-clover; (ii) a higher external requirement for Cu than sub-clover or (iii) a combination of (i) and (ii). It is possible that, on certain soils, subterranean clover based pastures may provide adequate copper for ruminants while burr medic under the same conditions may contain insufficient copper.

1. Reuter, D.J. Loneragan, J.F. Robson, A.D. and Tranthim - Fryer, D.J. (1981). Aust. J. Agric Res 32, 267-282.

