

The effect of glean residues on growth and nodulation of medic in an alkaline dark brown sandy loam

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Glean (Chlorsulfuron) is an effective herbicide used to control several broadleaf weed species in cereal crops at application rates of 15-25 g/ha. However, Glean is known to persist in alkaline soils. These residual effects are of concern because many crops and pasture species used in cereal rotations are sensitive to Glean. Work done by Thill *et al.* (1) indicates that residual concentrations in the soil after application rates as low as 7.5 g formulation/ha may cause damage to some crops. This poster presents the results of an experiment to examine the effect of Glean herbicide on the growth and nodulation of annual *Medicago*.

Methods

The experiment was conducted in an alkaline calcareous sandy loam (pH 8.6 in water), classification Gc 1.12 (2). The soil was collected from a long term field trial at Avon, South Australia (34°14'S.. 138°18'E.) and had never been treated with Glean. The soil was moistened prior to mixing with the herbicide and incubated for 48 h. A 0.03 gg/mL. solution of Glean was mixed through the soil to give concentration levels equivalent to 0.02, 0.04, 0.08 and 0.16 g a.i./ha. The experiment included an untreated control. Seven *Medicago truncatula* cv. Cyprus seeds were sown in each pot and the soil surface was covered with polythene beads to reduce soil evaporation. Pots were incubated at 20°C in a root temperature tank in a glasshouse. The experiment was a randomised block design with 5 replicates. five pots of each treatment were harvested 20 days after seeding and the remainder after 40 days. At harvest, length of the main root was measured and the numbers of nodules counted. Roots and shoots were oven dried for dry weight determinations. Total length of root was estimated using the method of Tennant (3), and lateral length was calculated.

Results and discussion

Application of Glean significantly reduced shoot and root growth and nodulation by *Rhizobium* at concentrations as low as 0.02 g a.i./ha which is 0.125% of the rate applied to cereals (Table 1). Glean herbicide applied at 0.16 g a.i./ha, which is approximately 1% of the recommended rate of application to cereals, reduced the numbers of nodules per plant to less than 10% of untreated (Table 1).

Table 1. The effect of Glean on Cyprus medic in an alkaline soil after 40 days.

Glean conc (g a.i./ha)	Shoot dw (mg)	Root dw (mg)	Lateral length (cm)	Taproot length (cm)	Nodule no.
0	60.84	18.12	145.90	12.82	11.3
0.02	47.88 ^{a*}	14.68	104.10*	10.26*	7.6*
0.04	50.47*	8.60*	51.97*	9.77*	3.5*
0.08	35.44*	10.66*	35.20*	7.12*	2.0*
0.16	35.66*	8.84*	17.94*	6.06*	0.9*
L.s.d (P=0.05)	8.16	4.77	25.98	1.03	1.9

^{a*} indicates treatments significantly different from the control. References

1. Thill, D.C., Zamora, D.L. and Salhoff, C.R. 1982. Western Society *Weed Science Research Progress Report*. pp. 232-234.

2. Northcote, KU.. Hubble, G.D.. Isbell. R.F., Thompson. C.H. and liettenay. E. 1975. A description of Australian Soils. CSIRO, Australia.

3. Tennant. D. (1975). J.Ecol. 63, 995-1001.