THE TOLERANCE OF TREE LUCERNE TO SOME SOIL-APPLIED HERBICIDE

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SUMMARY

Ten pre-emergence herbicides were applied 12 days after sowing tree lucerne (*Chamaecytisus palmensis*) seed in one trial, in October 1983, at a site at Ashley Dene Farm, Springston, Canterbury. Plant establishment was reduced by diuron but not by chlorpropham, cyanazine, methabenzthiazuron, metribuzin, pendimethalin, prometryn, terbumeton/terbuthylazine, terbutryn and simazine. Subsequent tree growth was not reduced by any of the herbicides tested.

INTRODUCTION

A considerable research effort is currently being directed towards the evaluation of tree lucerne as an alternative grazing plant in areas of the South Island which are prone to summer drought. The trees are usually planted as rooted seedlings into bare ground and kept weed free using non-residual herbicides applied inter-row by directed spray or rope-wick applicators. The use of residual herbicides had not been considered due to an absence of tolerance data. The need for more research became evident when the currently used weed control methods failed to prevent re-establishment of perennial weeds and successive flushes of annual grasses and broadleaved weeds.

The objective of this experiment was to screen on tree lucerne, a number of soil applied pre-emergence herbicides which have been shown to be useful in other woody perennial crops (Cox *et al* 1982) and peas (Fryer and Makepeace 1978).

METHOD

The trial site was at Ashley Dene Farm, Springston on a non-irrigated Lismore stony silt loam in a paddock fallowed and cultivated from lucerne. The seed supplied from DSIR Lincoln, was pre-treated (to break dormancy) by immersion in boiling water for 3 minutes and inoculated and sown on 13 October 1983, 2.0 cm deep and 7.5 cm apart in rows 37 cm apart. A single block eight rows wide by 90 m long was sown, across which the plots, 3 m long by 2 m wide, were located. The treatments (Table 1) were allocated at random to each of four replicates.

The herbicides were applied on 25 October 1983 using a compressed nitrogen-powered knapsack boom sprayer using Teejet 8002 nozzles operated at 210 kPa and delivering 200 litres/ha.

Plots were hand weeded when necessary to minimise weed interference until assessment on 7 February 1984. The treatments were assessed by counts of all plants in six 1 m lengths of row and by measurement of the maximum height of 10 randomly selected trees per plot.

RESULTS

Rainfall during the experimental period (Oct. to Feb.) totalled 221 mm (Lincoln data) which was 14% above the long term average (1941-1970) for these months. However, the rainfall for the month of November (21 mm) was 60% below the long term November average.

The major weed species which occurred in the untreated plots were, in order of predominance, spurrey (*Spergula arvensis*), storksbill (*Erodium cicutarium*), subterranean clover (*Trifolium subterraneum*), fathen (*Chenopodium album*) and black nightshade (*Solanum nigrum*).

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TABLE 1: Herbicides and rates (kg/ha).

herbicide	rate (kg ai/ha)	trade name/formulation
chlorpropham	3.0	CIPC 40% EC
cyanazine	1.5	Herbitrol 50% WP
diuron	2.4	Karmex 80% WP
methabenzthiazuron	2.1	Tribunil 70% WP
metribuzin	0.35	Sencor 70% WP
pendimethalin	1.65	Stomp 330E 33% EC
prometryn	1.0	Gesagard 50% EP
terbumeton/terbuthylazine	2.0	Caragard 500FW 50% SN
terbutryn	1.5	Igran 500FW 50% SN
simazine	1.5	Simazine 80 80% WP

The results are presented in Figure 1; the herbicides caused no significant differences in percent establishment (of seed sown) and plant height when compared with untreated (t-test, 5% level).

Emergence of seedlings occurred from about 12 days after treatments were applied until mid-December and by February, when assessed, plant establishment was only 17% of seed sown in untreated plots. The poorest establishment resulted from treatment with diuron (11%) and the best plant establishment occurred with metribuzin, pendimethalin and simazine (22%, 23% and 21% respectively) while establishment in all other treatments was similar to the untreated.

Plant vigour, as assessed by height was closely correlated with percentage establishment of seed ($r=0.97$). The mean height of plants on metribuzin, pendimethalin and simazine plots tended to be larger than on untreated plots (59 cm, 64 cm and 65 cm respectively) while all other treatments gave results similar to the untreated.

DISCUSSION

The generally poor establishment of tree lucerne plants may have been attributable to poor seed germination due to low viability, faulty scarification or unsuitable climatic or soil conditions after planting. However a sufficient number of plants established to enable treatments to be compared.

The higher than normal rainfall conditions experienced during the trial combined with the stony nature of the Lismore soil type would be expected to have facilitated herbicide injury to the emerging seedlings. However, all herbicides except diuron gave plant populations similar to, or slightly better than untreated and height was not reduced by any of the herbicides. Therefore it would seem that the tree lucerne has tolerance to all the herbicides except diuron which does not seem to be tolerated at the rate used in this experiment.

Since tree lucerne seedlings appear to be tolerant to the residual herbicides compared in this experiment, an adequate pre-emergence weed control programme ought to be obtainable for a wide range of weed species. Further testing of these materials, except perhaps diuron, is warranted and will be necessary to identify "safe" rates for field application.

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Fig. 1: Mean establishment (% of seed sown) and mean height (cm) of tree lucerne after treatment with 10 pre-emergence herbicides at Ashley Dene, Springston, in October 1983.

(dotted lines = mean of untreated)

REFERENCES

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