ESTABLISHMENT OF TREE LUCERNE IN HILL COUNTRY

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Tree lucerne (*Chamaecytisus palmensis*) is a browse shrub which may be useful for providing feed during seasonal shortages in hill country. Establishment can be by oversowing or by transplanting seedlings. In this work, both methods were tried. The effects of some herbicides, a molluscicide and a fungicide on seedling establishment were examined, as were the effects of herbicides on the growth and survival of transplanted seedlings.

The experiments were carried out on a steep northerly hill face at the Wanganui Research Area. The main pasture species were browntop (*Agrostis capillaris*), paspalum (*Paspalum dilatatum*), ratstail (*Sporobolus africanus*) and danthonia (*Rytidosperma* spp.).

Oversowing

Herbicides (Table 1) were applied to pasture plots in October 1985. On the same day, scarified tree lucerne seed (80% viable) was broadcast at 14 kg/ha (c. 50 seeds/m²). Inoculated seed was 1. untreated; 2. treated with metalaxyl (Ridomil) at 3 g ai/kg seed before sowing; 3. mixed with methiocarb (Mesurol) at 1.2 kg ai/ha just before sowing; 4. treated with metalaxyl and mixed with methiocarb. The 16 treatments (3 herbicides + untreated x 2 fungicide treatments x 2 molluscicide treatments) were arranged in four randomised blocks. Individual plot size was 1.5 x 3 m. Pasture height at time of treatment averaged 25 cm, with patches up to 60 cm. Seedlings were counted 30 days after sowing, and in April 1986. The pasture was grazed by sheep in January for 4 days.

TABLE 1: Average number (/m²) of tree lucerne seedlings following oversowing at c 50 seeds/m² and treatment of pasture with herbicides.

Assessment date	Un-treated	Herbicide			LSD (5% level)
		TCA + 2,2-DPA 4.4 + 0.8 kg ai/ha (Teedal)	paraquat 1.2 kg ai/ha (Gramoxone)	glyphosate 1 kg ai/ha (Roundup)	
Nov 1985	0.13	0.31	0.62	3.07	0.21
April 1986	0.02	0	0.07	0.18	0.07

Seedling emergence (Table 1) averaged 6% in glyphosate-treated plots and less than 1% in other treatments. Only glyphosate markedly reduced the amount of pasture. The addition of fungicide, molluscicide or both did not significantly affect seedling establishment.

In April, all seedlings were 15-25 cm high and above the pasture canopy. Numbers of seedlings had declined, although glyphosate treatment still had the highest number. Glyphosate plots were densely covered with Scotch and Californian thistles (*Cirsium vulgare*, *C. arvense*), nightshades (*Solanum* spp.) and red root (*Amaranthus* spp.), whereas there was dense pasture in the other plots.

Herbicides applied at transplanting

Tree lucerne seedlings (30-40 cm high) were transplanted into plots in August 1985, 12 days after each plot had been treated with either glyphosate or paraquat. Plot size was 2 m x 10 m, with 10 plants at 1 m intervals in a single row along the centre of the plot.

Some plots received no further treatment. In others simazine, methabenzthiazuron or metribuzin were applied over the top of plants in both glyphosate and paraquat treated plots, 2 days after transplanting. The eight treatments were arranged in four randomised blocks.

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Grass and weed cover were visually assessed in November 1985 and March 1986. Tree lucerne plants were counted and their heights measured in January 1986.

Survival rate of tree lucerne plants was 87% and was unaffected by herbicide treatment. Many of the missing plants had been dug out by hares.

None of the herbicides appeared to damage the tree lucerne, but some of them increased growth (Table 2) presumably by reducing pasture competition. Glyphosate produced a fairly consistent but non-significant increase in plant height compared to paraquat. Of the post-plant treatments, only metribuzin significantly increased plant height after an earlier paraquat treatment.

TABLE 2: Average height (cm) of tree lucerne plants in January 1986, following treatment of pasture with herbicides at the time of transplanting in August 1985.

herbicide	Post-plant (kg ai/ha)	Pre-plant	
		paraquat 1.2 kg ai/ha	glyphosate 1.0 kg ai/ha
untreated		54	64
simazine	2 (Simazol 5A)	55	61
methabenzthiazuron	1.4 (Tribunil)	58	76
metribuzin	0.7 (Sencor)	75	71
LSD (5% level)			17.5
Mean		60.4	67.8
LSD (5% level)			8.76

These results were related to the effects of the herbicides on the pasture. Vegetation regrew more quickly in the paraquat plots than in the glyphosate plots, with the former being invaded by paspalum and the latter with thistles and other weeds.

Herbicides for established transplants

Three herbicides were examined for their effects on tree lucerne and, in a separate experiment, on pasture. Fluazifol-butyl (Fusilade) at 0.6 kg ai/ha, sethoxydim (Alloxol-S) at 2 kg ai/ha or haloxyfop (Gallant) at 1.5 kg ai/ha were applied in late October 1985 over the top of tree lucerne plants which had been transplanted in August 1985. Each plot was 10 x 1 m and included a single row of 10 plants. An untreated control was included, and there were eight replicates of the four treatments. The area had been treated with glyphosate at the time of transplanting, so few pasture species were present by late October. Wetting agent or crop oil was added to the herbicide sprays according to the manufacturers' specifications. The tree lucerne plants were observed regularly for any herbicide effects.

Fluazifop-butyl at 0.2, 0.4 or 0.6 kg ai/ha, sethoxydim at 0.8, 1.6 or 2 kg ai/ha or haloxyfop at 0.5, 1.0 or 1.5 kg ai/ha were applied to 3 x 3 m plots of pasture in October 1985. The nine herbicide treatments and an untreated control were arranged in four randomised blocks. Dry matter and species composition were assessed in each plot in December 1985 and in March 1986.

There was no sign of any adverse effect of any of the herbicides on the tree lucerne plants. Sethoxydim at all rates and haloxyfop at the highest rate were the most effective in reducing the grass content and total dry matter of the pasture. Clover and weed content increased in these plots. The effects were still evident in March.

Conclusions

Herbicide treatment was essential for the successful over-sowing of tree lucerne seed into pasture. Glyphosate was the best of the herbicides tested. There was no evidence that either fungicide treatment of the seeds, or molluscicide enhanced establishment.

Glyphosate was more effective than paraquat as a pre-transplant herbicide for subsequent plant growth. Simazine, methabenzthiazuron and metribuzin did not significantly increase plant growth when applied after glyphosate, but metribuzin did increase growth of tree lucerne when applied after paraquat.

Fluazifop-butyl, sethoxydim and haloxyfop did not affect tree lucerne plants. Sethoxydim was the most effective material in killing grasses and reducing pasture yields.

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