CONTROL OF GORSE SEEDLINGS BY LOW RATES OF HERBICIDES

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SUMMARY

Herbicides were applied to gorse (*Ulex europaeus*) in spring and summer. Good control of grazed gorse seedlings up to three years old was obtained with 2,4,5-T or triclopyr at 1.5 kg/ha applied in December, February or April. Triclopyr at 1.5 kg/ha also gave good control in October. Higher rates of herbicide or the addition of picloram did not improve control of existing seedlings or affect further establishment. Over the two years of observation under grazing the gorse seedling population declined by 90% without herbicide treatment.

INTRODUCTION

A major problem in long term gorse control is that of controlling seedlings. Gorse is a prolific seed producer (Ivens 1978a) and has hard seed that can persist in the ground for many years (Moss 1960). A major flush of seed germination occurs shortly after clearing of the standing gorse (Ivens 1978a). Good pasture establishment and intensive grazing by sheep can give a high level of seedling control (Hartley and Phung 1979; Hartley *et al* 1980; Ivens 1979). Where grazing control fails herbicides may be necessary.

Most published work on gorse control by herbicides has been concerned with mature or regrowth gorse. Ivens (1977, 1978b) tested the sensitivity of young pot grown gorse seedling to various herbicides and Preest (1980) measured effects of herbicides on young gorse seedlings grown in bare ground. There appears to be no published work on herbicidal control of young gorse in pasture so the work reported here was conducted to examine the effects of different herbicides and dates of application.

SITE HISTORY

A moderately steep gully side on Raumai hill soil, near Palmerston North, had been cleared from established gorse by root raking, in December 1977, and oversown with 20 kg 'Grasslands Nui' perennial ryegrass (*Lolium perenne*) and 3 kg 'Grasslands Huia' white clover (*Trifolium repens*) /ha in May 1978. The area was topdressed with 250 kg superphosphate/ha. Establishment was poor and the area was oversown again in April 1979 with the same seed mixture and 375 kg superphosphate/ha. Pasture establishment was again very poor and the area reverted to browntop (*Agrostis tenuis*) and Yorkshire fog (*Holcus lanatus*) with negligible clover. A soil test taken in July 1979 showed pH = 5.3, Ca = 1, K = 3, P (Olsen) = 4 and Mg = 13 (MAF Quick Test). In spring 1979 there was a high population of gorse seedlings (120/m²). Of these about 60% had germinated that spring (cotyledons still attached) while the rest would have been 6-18 months old but were still small (< 10 cm) having been grazed and/or starved of nutrients.

METHOD

Treatments, as shown in Table 1, were applied to different 10 x 1.5 m plots in October and December 1979, February, April and December 1980. Treatments were applied by Oxford Precision Sprayer in 220 litres/ha at 210 kPa. There were four replicates in a randomised block design.

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In October 1979 the numbers of soft (cotyledons present) and hard (spiny) gorse seedlings present were counted from eight relocatable 400 cm² quadrats per plot. Counts were made again from the same locations before each treatment was applied and at intervals (initially 2 monthly) after treatment, for 11-25 months.

Plots were grazed by sheep a few days before treatment and spelled for a few weeks after treatment. Between treatments plots were grazed as necessary to control pasture growth.

RESULTS AND DISCUSSION

Table 1 shows the mean numbers of soft and hard gorse seedlings present at the time of treatment and 2-4 months after treatment. The 2 month assessment is shown for the soft seedlings to minimise the complication of new germinations between treatment and counting. This assessment was too early for the hard seedlings as many were dying but still showed some green. Hard seedling survival is shown at 4 months. Later counts of hard seedlings showed very little change after the 4 month counts.

There was little difference between herbicides, rates and times of application with the exception of the low rate of 2,4,5-T in October. All other treatments and times gave good control of both soft and hard seedlings. The December 1980 treatment gave 100% control of hard seedlings on all but one plot. At this treatment time the seedlings could have been up to 3 years old but were still small (< 15cm high) as a result of grazing.

An examination of new seedling numbers, at intervals after treatment, showed the residual herbicide, picloram had had no measurable effect on the establishment of new seedlings. The effect of treatment on clover was not measured because of the sparsity of clover on the whole site.

Over the 25 months of observations the gorse population declined under grazing in the absence of herbicides by 90% (Fig. 1). Previous work has shown that more than 99% of gorse seedlings can be destroyed in 6 months, by grazing, where the pasture competition is strong (Hartley and Phung 1982). The relatively high survival under grazing alone in this work probably occurred because the weak pasture provided insufficient competition or carried insufficient stock to obtain adequate grazing for gorse control. The 10 plants/m² remaining would have been quite enough to re-establish a dense gorse stand had herbicides not been used.

TABLE 1: Summary of gorse seedling numbers/m² before and after treatment.*

Treatment	Rate kg/ha	Date of treatment									
		1979		1980		1979		1980			
		Oct	Dec	Feb	Apr	Dec	Oct	Dec	Feb	Apr	Dec
		soft seedlings					hard seedlings				
2,4,5-T	1.5	11	0	0	1	0	13	1	3	0	0
2,4,5-T	3.0	0	0	0	0	0	2	0	2	0	0
2,4,5-T + picloram	1.5+0.375	1	0	0	1	0	0	0	0	0	0
2,4,5-T + picloram	3.0+0.75	0	0	0	0	0	0	0	0	2	0
triclopyr	1.5	0	0	2	0	0	0	0	2	0	0
triclopyr	3.0	0	0	5	0	1	1	0	0	1	0
triclopyr + picloram	1.5+0.375	0	6	0	0	0	0	1	1	0	0
triclopyr + picloram	3.0+0.75	0	0	0	0	0	0	0	0	0	4
untreated		44	22	3	0	9	55	62	24	9	18
mean of treatments		1.5	0.8	0.9	0.3	0.1	2.0	0.3	1.0	0.4	0.5
mean pre-treatment		73	33	18	6	8	46	40	55	54	14
mean % control		98	98	95	95	98	96	99	98	99	96

*Soft seedlings counted 2 months after treatment; hard seedling 4 months except February treatment counted 8 months after treatment.

Fig. 1: Number of gorse seedling /m² on untreated plots between October 1979 and November 1981.

CONCLUSION

This work indicates that where grazing fails to control gorse seedlings low rates of herbicide provide an alternative. Good gorse seedling control was given by 2,4,5-T and triclopyr at 1.5 kg/ha between December and April. These rates were adequate for seedlings up to 3 years old where they had been kept small by grazing.

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