WINTER TREATMENT OF GORSE WITH PICLORAM/ 2,4,5-T, COMPARED WITH 2,4,5-T AND 2,4,5-T PLUS DIQUAT

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Summary

A summary of results from 22 ground application trials on gorse (*Ulex europaeus*) treated during the winter period of April to August is presented and discussed. The picloram/2,4,5-T, (potassium salt/ester), formulation gave more consistent regrowth suppression than 2,4,5-T ester alone or 2,4,5-T in combination with diquat.

INTRODUCTION

THE stage and vigour of the growth of a perennial brush weed at the time of herbicide treatment can have a considerable effect on the result obtained and on the dosage of herbicide required. In the case of gorse, (*Ulex europaeus*), it is generally accepted that the most cost efficient control is obtained by treating during or just after the period of maximum soft terminal shoot growth which normally occurs in New Zealand during the November/February period. Much gorse is sprayed outside this optimum "soft growth" period due to the pressure of other farm management practices and to the limited availability of spray contractors at this time. Results from treatment outside this period of application are often satisfactory with 2,4,5-T. However, greater variability and poorer final regrowth suppression can occur as treatment extends further into the dormant stage of plant growth during winter.

There are a number of practical and economic advantages in being able to treat gorse throughout the year and in particular during the winter period.

- (a) Winter treatment allows for better utilisation of spray contractors labour and plant.
- (b) The demands of other farm operations for labour are normally lower at this time.
- (c) The farmer's financial position is normally more clearly defined by the early autumn, allowing better planning of his gorse land development programme and thereby reducing the risk of "stop-go" approach.
- (d) The treatment of brushweeds with hormone type herbicides in the close proximity to vineyards is restricted by law to the May/August period.

Results of out-of-season treatments of gorse with mixtures of 2,4,5-T with diquat or paraquat have been reported by Williams and Palmer (1969). The effectiveness of picloram/2,4,5-T for gorse control during the summer period of application has been previously demonstrated by Moffat (1965), Upritchard (1969). This paper presents results of trials

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conducted with a picloram/2,4,5-T mixture applied between April and August in comparison with the standard treatments of 2,4,5-T and diquat plus 2,4,5-T. This period can be defined as out-of-season or winter treatment.

EXPERIMENTAL

The commercially available formulations of picloram/2,4,5-T (potassium salt/iso-octyl ester), 2,4,5-T (butoxyethanol and butyl ester) and diquat were used in the trials.

Treatments used in all trials were:—

<i>Active Ingredient</i>	<i>Concentration Grams per 100 litres</i>
picloram/2,4,5-T	25/100
2,4,5-T	180
2,4,5-T + diquat	180+25

High volume treatments were applied with standard brush gun equipment at 1400 to 1700 kPa applying 35 to 70 litres of spray mix per plot with two replications per treatment. Trials were laid on typical dense stands of gorse 1 to 2 m high and sprayed just to the point of run-off. Sites were situated in Waikato, Hawke's Bay, North Taranaki, Wairarapa, North Canterbury and Otago. Visual ratings were made by at least two independent observers using a 0 to 10 scale, 0 indicating no effect, 10 being the maximum effect. Ratings made up to 6 months after treatment were based on the evaluation of brown-off of foliage and upper stems. Suppression of shoot regrowth was evaluated at inspections made 6 months or more after treatment.

RESULTS AND DISCUSSION

Mean visual ratings of regrowth suppression from 22 trials are presented in Fig. 1 in graphical form to indicate general trends. Only ratings for regrowth suppression more than 6 months post treatment are presented.

The standard errors calculated for the regression coefficients for each treatment are presented in Table 1.

TABLE 1:

<i>Treatment</i>	<i>Regression Coefficient</i>	<i>Standard Error</i>
picloram/2,4,5-T	0.054 aA	0.012
2,4,5-T	0.160 bB	0.206
2,4,5-T+diquat	0.200 bB	0.035

The variation of results with the picloram/2,4,5-T treatment was markedly less than the other two treatments. A test of the significance between the regression coefficients of the treatments showed picloram/2,4,5-T significantly different from 2,4,5-T and 2,4,5-T+diquat. There was no significant difference between the 2,4,5-T and 2,4,5-T+diquat treatments.

The picloram/2,4,5-T formulation consistently gave a high level of regrowth suppression which was maintained throughout the evaluation period in the majority of the trials. The treatments of 2,4,5-T alone

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and of 2,4,5-T in mixture with diquat were more inconsistent both in the initial level of control achieved and also in the marked reduction in regrowth suppression.

The mean ratings for brown-off assessed 3 to 4 months after treatment for 9 trials situated at different sites and treated at various times within the April/August period are presented in Table 2.

TABLE 2:

<i>Treatment</i>	<i>Mean Rating</i>	<i>Range</i>
picloram/2,4,5-T	6.6	4.4 to 8.6
2,4,5-T	5.9	3.8 to 7.5
2,4,5-T+diquat	8.6	7.1 to 10.0

The addition of diquat to 2,4,5-T markedly increased the initial rate of brown-off compared with the other two treatments.

The mean ratings for brown-off and regrowth suppression of three trials applied in July are presented in Table 3. These three trials were selected on the basis that they were assessed from the second annual active growth period until at least 18 months following application.

TABLE 3: TRIAL 4029 NORTH TARANAKI

<i>Treatment</i>	<i>Means Ratings</i>				
<i>(Months post treatment)</i>	3	7	9	15	24
picloram/2,4,5-T	5.4	9.4	9.4	9.0	8.0
2,4,5-T	3.8	9.7	8.8	7.0	4.8
2,4,5-T+diquat	9.6	8.0	7.4	5.3	2.5

TRIAL 021 NORTH CANTERBURY

<i>Treatment</i>	<i>Means Ratings</i>				
<i>(Months post treatment)</i>	3	7	18	24	29
picloram/2,4,5-T	8.5	10	10	10	9.9
2,4,5-T	6.1	8.5	7.2	7.6	7.5
2,4,5-T+diquat	8.6	8.7	8.2	8.0	7.8

TRIAL 083 NORTH CANTERBURY

<i>Treatment</i>	<i>Means Ratings</i>			
<i>(Months post treatment)</i>	2	7	11	19
picloram/2,4,5-T	2.5	10	10	10
2,4,5-T	2.5	10	9.5	10
2,4,5-T+diquat	7.8	9.6	9.6	9.2

These results demonstrate the consistency of the picloram/2,4,5-T treatment. 2,4,5-T alone and in mixture with diquat gave comparable control in Trial 083, but where brown-off was not complete at 7 months, subsequent assessments for suppression of regrowth reduced with time. With the picloram/2,4,5-T treatment, regrowth control was more persistent even where initial brown-off was not complete.

The series of trials summarised in this paper are considered comparable to the normal farm usage of herbicides for gorse control. Treatments were applied on a wide range of sites, differing sizes and age of gorse, different growth conditions and different applicators. In view of the variability of these major factors it is not surprising that the variability in results between trials was in some instances marked. The variability between treatments within trials was of a much lower order. When assessed on the degree of regrowth suppression at the longest period from application, picloram/2,4,5-T was the best treatment in 16 of the trials and equal to the 2,4,5-T or 2,4,5-T+diquat treatments in five trials. 2,4,5-T alone was the best treatment in only one trial. The addition of diquat to 2,4,5-T did not improve the final degree of regrowth suppression obtained in any of these winter treatments.

There were no apparent differences in regrowth suppression between the different months of application.

Regrowth suppression ratings were divided into two groups according to the rainfall and climate of the trial sites:

- (1) The drier east coast areas with an annual rainfall of under 750 mm.
- (2) The more humid west coast North Island sites with rainfall exceed-1250 mm.

The mean ratings of the last evaluation of the three treatments for all trials grouped according to sites were:

	<i>Low Rainfall (< 750 mm)</i>	<i>Medium/High Rainfall (> 1250 mm)</i>
picloram/2,4,5-T	9.5	9.3
2,4,5-T	7.5	7.3
2,4,5-T+diquat	6.5	6.6

Differences in climate did not appear to affect the relative performance of any treatment.

Winter treatment of gorse with picloram/2,4,5-T gave a similar degree of control to summer applications of this formulation at the same dosage, Upritchard (1973). Winter treatment with 2,4,5-T gave less reliable results than summer treatment.

Commercial out-of-season ground applications with picloram/2,4,5-T during the past two years have confirmed the trial results and also the need for complete spray coverage of foliage to obtain a high degree of control. As much gorse is on steep and broken country, access to ground application equipment can be difficult during wet winter months. Initial investigations of aerial applications of picloram/2,4,5-T at a minimum of 1+4 kg/ha show promise but further time is required to determine final regrowth suppression.

CONCLUSIONS

The picloram/2,4,5-T formulation at 25/100g/100 litres applied to gorse between April and August gave a consistently high level of control over an extended period.

2,4,5-T at 180 g alone or with the addition of diquat at 25 g gave a lower overall degree of control and was less consistent.

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