A SURVEY OF COMMERCIAL AERIAL GORSE TREATMENTS IN OTAGO - SOUTHLAND 1973 - 1975

C. J. SHARPE and E. A. UPRITCHARD

Ivon Watkins-Dow Limited, New Plymouth

Summary

The results of 44 commercial aerial gorse (*Ulex europaeus*) treatments applied in Otago-Southland during the 1973-74 and 1974-75 seasons were assessed 18-44 months after application, and compared with 17 similar assessments in Canterbury and the North Island. The majority of sites were treated with a proprietary formulation of picloram/2,4,5-T. The results from this treatment were most reliable when applied to gorse less than 1.5 m high and green stemmed. Treatments of 2,4,5-T and dicamba/2,4,5-T gave much poorer control on this gorse type.

INTRODUCTION

The first aerial spraying of 2,4,5-T for gorse control in about 1953 with fixed wing aircraft was reported by Ferens (1955) who concluded that even though complete brownout of gorse could be obtained with 4 kg/ha for up to 6 months, regrowth would normally be expected, and a follow-up treatment such as burning, respraying or use of tractor equipment was necessary. Currie (1959) reported a very similar result with 4 kg/ha 2,4,5-T applied by helicopter in March 1957. 2,4,5-T has continued to be used for aerial application to control gorse up to the present day, but there is little evidence to indicate that improvements in either formulation or application technique have markedly improved control. Ferens' (1955) comment related to fixed wing aircraft "....that in many cases the farmer is prepared to accept a less degree of control from aerial spraying than he would from ground spraying" is still true of 2,4,5-T today, even though the standard use rate has increased to 6-8 kg/ha.

The effectiveness of picloram/2,4,5-T mixtures for control of gorse was first reported by Foreman (1963). This was expanded by Upritchard (1969 and 1973) who found picloram/2,4,5-T mixtures increased the reliability of gorse control compared with 2,4,5-T alone as a high volume ground treatment, and that valid conclusions on the degree of regrowth control could not be made until the second growth season (about 18 months) after treatment.

The first large-scale commercial aerial applications of picloram/2,4,5-T were made in Otago-Southland during the 1970-73 seasons (about 3,000 ha) and the highly variable results suggested that accurate application was as important as rate for achieving acceptable results. As a result of concurrent trial work some standard guidelines were developed for aerial application which consistently gave near complete brownout of gorse. The method was based on two half overlapping passes each of 110-220 litres/ha spray mix with a droplet volume mean diameter (VMD) of 400-560 micrometres applied with wind not exceeding 8 km/h, air temperature not exceeding 20°C and humidity not less than 50%. A large number of helicopters in the South Island were calibrated to meet

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these requirements in 1974 and 1975, and this survey was undertaken to determine how successful the method was for controlling gorse with picloram/2,4,5-T.

SURVEY METHOD

In the Otago-Southland area a total of three companies employing four pilots was operating over the survey period, but information from one pilot was not available. The three pilots remaining were asked to define all their commercial gorse treatments since "calibration" (January 1974) and select those over 1 ha in size and with relatively easy access for detailed study. Treatments included picloram potassium salt/2,4,5-T isooctyl ester (1.1 + 6.6 kg/ha), 2,4,5-T n-butyl ester (8 kg/ha) and dicamba/2,4,5-T esters (1.65 + 6.6 kg/ha) i.e. 22 litres/ha of commercially available formulations. As the pilots' logs were confidential the survey relied on the pilots to nominate "random" jobs which meant that sampling bias could have occurred. Pilot log data indicated about 8,000 ha was treated in the 1974-75 and 1975-76 seasons and that 75-80% of this was treated with picloram/2,4,5-T. Sixty-one sites on 40 farms were visited, estimated to be about 10% of the gorse area treated in Otago-Southland. Seventeen of the sites were not used as 11 were less than two growing seasons old and six (three picloram/2,4,5-T and three dicamba/2,4,5-T) has been resprayed because of inadequate regrowth suppression. Results were assessed by counting 50-100 bushes on a diagonal transect and recording those showing active regrowth. The amount of regrowth occurring was not considered. This method can be regarded as severe, especially on stock sites since many dead bushes which may have broken down and disappeared within 18 months, would not have been included in the rating.

For the Canterbury and North Island surveys, results were only assessed visually for percentage of plants regrowing and only picloram/2,4,5-T sites were visited. In Canterbury, five sites on five farms were treated 15-18 months before inspection with "calibrated" helicopters by two pilots in one company. In the North Island, 14 sites on 14 properties were visited, eight of which were discarded as less than 18 months since treatment. All were sprayed from helicopter but few machines had been "calibrated" and application methods varied considerably.

RESULTS

Prior to the survey it was anticipated that treatments could be compared by using a large number of sites as "replicates". However, 2,4,5-T comparisons proved difficult to find as it was normally applied as a pre-burn desiccant and of the few sites not burned only three had not been resprayed. Results of the survey are shown in Table 1.

Within the picloram/2,4,5-T treatment, the clearest trend is that whippy, green stemmed gorse less than 1.5 m high was more reliably controlled than taller (over 1.5 m) woody stemmed gorse. However, the degree of regrowth control achieved with nearly all picloram/2,4,5-T treatments (mean 25% regrowing) was considerably better than that achieved with dicamba/2,4,5-T (mean 83% regrowing) or 2,4,5-T (mean 100% regrowing).

Geographical location appeared to have little effect on results with picloram/2,4,5-T but it should be noted that only very tall (2-3 m) gorse was treated in the North Island.

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TABLE 1: Aerial gorse survey results.

Treatment Rate (kg/ha) Location	picloram/2,4,5-T 1.1 + 4.4						dicamba/2,4,5-T 1.65 + 6.6		2,4,5-T 6.1-7.9
	Otago-Southland			Canterbury		Nth Is.	Otago-Southland		
Gorse height (m)	>1.5	1-1.5	<1	>1.5	<1.5	2-3	<1.5	>1.5	<1.5
Month applied	XI-IV	X-II	XI-IV	XII-II	XII-II	XI-II	XI-I	XI-XII	XI-I
mean	27	22	20	34	17	31	80	90	100
% regrowth	1-65	5-60	5-40	10-80	10-23	10-85	60-100	80-100	-
Range M.A.T.*	18-32	18-44	18-33	15-18	15-18	27-45	19- 34	19- 24	18-24
No. sites	17	11	7	4	4	9	4	2	3

* M.A.T. = months after treatment

DISCUSSION

The results from picloram/2,4,5-T treatments show a strong trend to better results with treating green stemmed gorse less than 1.5 m high. However, people involved in the survey also observed that old well established gorse that had formed a canopy with little or no leaf growth beneath, was often very successfully controlled, whereas heavily grazed "pincushion" gorse in the "under 1 m" group was more difficult to control.

Also in the "under 1 m" group, four of the seven sites were treated in the second year after a good burn, while the regrowth was still dense and actively growing and less than 0.5 m tall. The excellent control obtained with this treatment suggests that gorse over 1.5 m tall should be chemically desiccated or mechanically crushed then burnt, and that the major chemical attack aimed at the subsequent regrowth. Current trials are aimed at establishing if there is any difference in chemical treatment during the first, second or third growing season after burning. A similar programme is suggested by Balneaves (unpublished) for forestry site preparation, but treating with half the recommended label rates in the two seasons subsequent to the burn.

Another very important aspect of gorse control observed during the survey was the near total lack of follow-up treatment on most of the sites. Most sites were uncultivable steep faces or gullies within an established pasture, so stock management with fencing may not have been practical. However, in the 61 sites surveyed, only 13 farmers (5 North Island and 8 South Island) had carried out follow-up treatment with respraying or stocking, and in all cases had maintained a high degree of regrowth control. While subsequent seedling germination is recognised as a problem, careful management can normally overcome this.

The authors suggest that the first requirement for successful aerial gorse control is near complete brownout of foliage and green stems. If this is not achieved, then heavy basal and stem regrowth invariably occurs regardless of the herbicide used.

CONCLUSIONS

In the Otago-Southland area picloram/2,4,5-T was the dominant formulation used for aerial control of gorse in the 1974-75 and 1975-76 seasons and consistently averaged 66% kill of treated plants, which increased to 80% under most favourable circumstances. 2,4,5-T was mainly used as a pre-burn desiccant treatment and along with dicamba/2,4,5-T was unsatisfactory for long term suppression of gorse regrowth.

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Fixed wing aircraft had virtually disappeared from gorse spraying usage and were replaced by helicopters which offered greater flexibility and accuracy for hill country spraying at competitive costs.

The application technique outlined appears to have greatly increased the reliability of achieving near complete brownout with 4-5 kg/ha of 2,4,5-T, enabling full advantage of the regrowth suppression characteristics of picloram evident in ground treatments, to be achieved in aerial spraying.

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