CONTROL OF GORSE BUSHES WITH A MOTORISED KNAPSACK SPRAYER

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SUMMARY

2,4,5-T was applied to different groups of small, scattered gorse bushes each month for a year. At one site the use of a gorse gun was compared with a motorised knapsack mistblower sprayer with ultra-low volume (ULV) attachment. At the other site two rates of herbicides were applied through the mistblower. Observations on treated bushes were continued for at least 18 months. Application using the gorse-gun gave good control between November and February, but poor control between April and August. Use of the mistblower resulted in very good control regardless of time of application.

INTRODUCTION

Holmes (1974) reported on the successful control of gorse with 2,4,5-T applied in July with a mistblower (without ULV attachment). Since the introduction of the ULV attachment, the mistblower with the attachment has been regularly used for the application of 2,4,5-T to isolated gorse bushes in some parts of New Zealand. It is claimed that this technique gives good control of small gorse bushes at any time of the year.

Although there is little published information on the effectiveness of the gorse-gun for applying 2,4,5-T it is commonly accepted (Moffatt 1973) that it gives good control of gorse if used during the active growth season of gorse, i.e. November to February. The experiments described here were designed to compare the effectiveness of gorse-gun and mistblower at different times of the year and to examine the effects of different rates of 2,4,5-T applied through the mistblower.

MATERIALS AND METHODS

The 2,4,5-T used in these experiments was in the form of butyl ester (IWD Weedone Hi-ester-T; 720 g a.i./litre). The mistblower was a Solo Junior (10 litre tank) fitted with a Solo ULV attachment. The ULV orifice size was 4, i.e. the biggest hole. The gorse-gun was a Winstone spray pistol with a No. 4 tip and was operated at about 750 kPa.

Two experiments were conducted, one at Haurongo Field Research Area and the other on the property of R.W. Garden, Kahuterawa Road, both sites were close to Palmerston North. At both sites isolated gorse bushes were permanently identified and individual bushes were assigned at random to the different treatments.

At Haurongo the bushes were about 3-4 years old and average height in November 1980, when the experiment started, was about 75 cm. When the last herbicide applications were made in November 1981, average height of previously untreated bushes was about 100 cm. At each application date (see Fig. 1) 10 bushes were treated with the mistblower and 10 with the gorse-gun. The concentration of 2,4,5-T applied through the gorse gun was the recommended rate of 2.5 g ai/litre of water and the bushes were sprayed to run-off. With the mistblower 68 g ai of 2,4,5-T/litre of water was used for applications made between November and April, and 90 g ai/litre for application at other dates. These rates were as recommended by the suppliers of the ULV attachment. When using the mistblower, the bushes were sprayed so that all parts were wetted, but they were not sprayed to run-off. An average sized bush at Haurongo took 35 seconds to spray with the mistblower and 140 ml of herbicide solution was used.

Proc. 36th N.Z. Weed and Pest Control Conf.

At the lowest application rate (68 g ai/litre), 8.7 g 2,4,5-T was applied to the bush. With the gorse-gun, a comparable bush was sprayed in 60 seconds and 3.2 litres of solution was used, equivalent to 8.0 g 2,4,5-T.

At Kahuterawa Road, the bushes used had been burnt in April 1978 and had then regrown from the stumps. Average height of the regrowth at the start of the experiment was 45 cm and at the date of the last spraying a year later, was 60 cm. At each application date (see Fig. 1), 20 bushes were treated with the mistblower, 10 of these with the recommended rates of 2,4,5-T (see above) and 10 at a higher rate (90 g ai/litre from November to April; 120 g ai/litre at other times).

All treated bushes were examined at monthly intervals, when they were scored for brown-out on a scale from 0 (no brown-out) to 10 (complete brown-out). Any subsequent regrowth was noted. Bushes were assumed to be dead if they showed no regrowth 18-24 months after treatment.

RESULTS

Fig. 1 shows the mean brown-out score of treated bushes at 3 months after treatment. Bushes treated with either gun or mistblower rapidly became completely brown when herbicide was applied between November and February. At other times of the year brown-out was slower. Following applications made with the mistblower in April, May or June, it was 10 or 11 months before all green vegetation on all bushes became brown. Brown-out was much slower following gun application than after mistblower applications and for gun treatments applied between April and August, the mean brown-out score never exceeded 8.6 before bushes started to regrow. The bushes at Hauorongo took longer to brown-out than those at Kahuterawa Road, possibly because of the differences in size.

Fig. 1: (left) Effect of method (Hauorongo) and rate (Kahuterawa Rd.) of 2,4,5-T application on mean brown-out score at three months after treatment.

Fig. 2: (Above) Effect of method of 2,4,5-T application on number of bushes killed (Key as for Fig. 1).

In the treatments applied with the mistblower at Hauorongo in October 1981 and November 1981, one bush on each occasion showed a low brown-out score. These two bushes may not have been properly sprayed but they have been included in the results.

The number of bushes killed by each treatment at Hauorongo is shown in Fig. 2. All bushes treated with the mistblower (except for the two mentioned above) died. Gun application between November and March killed eight to ten of the ten treated bushes, but only a few bushes died following application at other dates.

At Kahuterawa Road, all bushes were killed at all rates and dates of application with the mistblower with the exception of two bushes treated in May at 90 g of 2,4,5-T/litre.

DISCUSSION

These results confirm the belief that gun application, whilst effective between November and February, gives poor control of gorse bushes at other times of the year. It is possible that increasing the concentration of 2,4,5-T during the winter months may improve effectiveness, but clearly gorse is much harder to kill outside of its active growing season.

The motorised knapsack sprayer with ULV attachment proved to be a very effective means of controlling gorse bushes. Although brown-out of bushes was slow when herbicide was applied in autumn or winter, almost all the treated bushes eventually died. A total of 360 bushes were treated in these experiments and only 4 survived, two possibly because of inadequate spraying. The bushes were probably as big as could be conveniently treated with a mistblower. It would be difficult to get adequate coverage of larger bushes.

The reasons for mistblower application being so much more effective than the gorse-gun are not known. The mistblower uses a very high concentration of 2,4,5-T which may be a contributing factor. Another possible explanation is that the dispersal of fine droplets in an air-blast gives a better coverage of all parts of the plant than the large droplets produced by the gun. It is well known (Thompson 1975; Field and Phung Hong Thai 1979) that 2,4,5-T translocation within a gorse plant is very limited and it is therefore necessary for all parts of the plant to be treated. This is presumably particularly important at those times of the year when gorse is less susceptible.

ACKNOWLEDGEMENTS

We wish to thank Dr M.J. Hartley for consultation in planning this work, H.T. Phung and L.A. Lyttle for helping with the assessments and Mr R.W. Garden for use of his gorse bushes.

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