

gle concentration, applied to two sizes of conifer species growing in a nursery. Indications are, however, that where herbicides are the most practical means of controlling wilding conifer seedlings, glyphosate, metsulfuron, or picloram should be considered for application during the active growing season. Further field testing is needed to produce more detailed recommendations and to determine likely impact on native grassland vegetation surrounding wilding conifers.

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Post-control regeneration of vulpia

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Summary.

The annual grass vulpia is rapidly becoming a weed of pastures and is difficult to control. A field experiment in 1988-90 comparing the effectiveness of paraquat and glyphosate as spray-topping treatments on control of *Vulpia* spp. showed that:

- i) the optimum application time for glyphosate was earlier than for paraquat
- ii) control can be improved by increasing the application rate
- iii) control by spray-topping is transient and needs to be supplemented with other inputs (e.g., fertilizer) for longer term control.

Introduction

Vulpia (mainly *Vulpia bromoides* (L.) S.F. Gray and *V. myuros* (L.) C.C. Gmelin) is a naturalized winter growing annual grass with many undesirable attributes. Recently, it has become a major component of pastures in southern Australia.

Footnote:

This paper was presented at the First International Weed Control Congress, 17-21 February 1992, Melbourne, but did not appear in the proceedings.

Once it has invaded a pasture, vulpia is difficult to remove because of inherent tolerance to selective grass herbicides. Spray-topping in the spring with paraquat or glyphosate, or application of simazine in the winter, reduces the initial incidence of vulpia but the length of the control period is not well defined.

Materials and methods

During 1988-90, a field experiment was conducted at Bathurst NSW to investigate the longevity of control of vulpia after imposing spray-topping treatments of glyphosate and paraquat during spring 1988. The treatments were: recommended rates of glyphosate (0.16 kg ha⁻¹ a.i.) and paraquat (0.1 kg ha⁻¹ a.i.) and double rates, each applied at four different development stages (65, 78, 88, 90% peeping – seedhead visible); and an unsprayed control

Spray-topping is a technique where low rates of knockdown herbicide are applied to emerging seedheads of weeds (mainly annual grasses) in spring. The aim is to sterilize the seeds and reduce regeneration in the following season.

Results

Regeneration in 1989 was significantly reduced by spray-topping, the degree of control increasing as the rate of herbicide increased and as the timing of herbicide application approached the optimal time. Numbers of vulpia seedlings were reduced from 21 319 m⁻² on the unsprayed control to 3346 and 5040 m⁻² for recommended rates of paraquat and glyphosate, respectively and at the double rate, numbers were further reduced by 46% and 51%, respectively. Over the four application times, control on the paraquat plots increased with later application (73 to 91%) while that for glyphosate decreased (88 to 46%).

However, regeneration in 1990, after two opportunities for vulpia to seed, was greater (4193 vs. 15 535 m⁻²) where the degree of control was higher when measured in the first season after herbicide application (1989). Indeed, where no herbicide was applied in 1988, vulpia seedling numbers, while higher in 1989, were lower in 1990 (21 319 vs. 7809 m⁻²) when compared with the treatments sprayed in 1988.

Conclusions

Results show the importance of timing of herbicide application on degree of vulpia control obtained. Where initial control is poor, increasing the application rate may be an option.

The second year results are contrary to what is expected after spray-topping, and indicate the rapidity of regression if other factors (e.g., livestock management, fertilizer) are not also integrated into the control program to slow the rate of reinvasion.