SIMAZINE TOP UP FOR CONTROLLING WILD RADISH, *RAPHANUS RAPHANISTRUM* L., DOUBLEGEE, *EMEX AUSTRALIS* STEINH., AND OTHER WEEDS IN LUPINS

D.J.Gilbey
Western Australian Department of Agriculture, Baron-Hay Court
South Perth W.A. 6151

Summary. Field trials to study the effect of topping up with post-emergence applied simazine for weed control in lupins were carried out at several locations in the Western Australian lupin growing area over three years. Wild Radish, *Raphanus raphanistrum* L., Doublegee, *Emex australis* Steinh. and several other weeds were selectively reduced in the crop. The technique is considered to be a useful part of the weed control strategy for lupins.

INTRODUCTION

On the light lupin growing sandy soils of Western Australia, pre-emergence application rates of simazine are essentially a compromise between maximum weed control and minimum crop damage, so consequently some weeds often survive after seeding.

When this research project commenced in 1987, wild radish was considered to be the most troublesome weed of lupin crops because of its capacity to survive pre-emergence herbicides. Topping up with post-emergence applied simazine controlled the weed (1) and it was necessary to clearly define the rate and time of application for best results. The principle of top up is based on residue studies which showed that 4 to 5 weeks is a good approximation for the half life of simazine when it is applied immediately before sowing on the relatively light soils of Western Australia (1).

After 1987 the objective of developing a simazine top up strategy for weed control in lupins changed from wild radish to total weed control with emphasis on the control of doublegee. Radish, and most of the grass weeds can now be controlled with post-emergence herbicides, but there are no satisfactory products other than simazine that control doublegee, silvergrass *Vulpia* Sp. and other plants in families such as the Asteraceae and Polygonaceae.

This paper reports the results of field trials from 1987 to 1989 at several regional locations in Western Australia, which studied the effect of topping up with simazine on wild radish and other weeds in lupins.

METHODS

Field trials were carried out at nine sites throughout the lupin growing areas of Western Australia to study the effect of time and rate of post-emergence simazine applications on weeds and lupins. Factorial treatments in randomised complete blocks with three replications were applied to lupins that had been sprayed with simazine pre-emergence. The rates of application are shown in the figures. Times of application in 1987 were 2, 5 and 7 weeks, in 1988 1, 2 and 4 weeks, and in 1989 0, 2, and 4 weeks. Nil herbicide and nil post-emergence herbicide treatments were included in each block. Assessments were visual ratings, weed and lupin plant counts, grain yields and grain contamination but for the purposes of this paper only weed counts and grain yields are presented.

TRIAL SITE LOCATIONS

1987	1988	1989
Geraldton	Geraldton	Marchagee
Three Springs	Northam	York
Ballidu	Coorow	
Quairading		

RESULTS AND DISCUSSION

Simazine that was applied before seeding effectively controlled the weeds on many of the sites and surviving populations were too low for any effect of the post-emergence applications to be detected, so only the results from particular sites where a response was detected are presented or discussed.

Wild radish was reduced at Geraldton in 1987 by simazine that was sprayed two and five weeks after seeding while spraying at seven weeks had no effect on the weed (Fig. 1). There was no response to the increase in rate of application. Results from the Geraldton site in the following year supported this and it is concluded that simazine at 375 g/ha. applied two weeks after seeding lupins achieved best control of this weed.

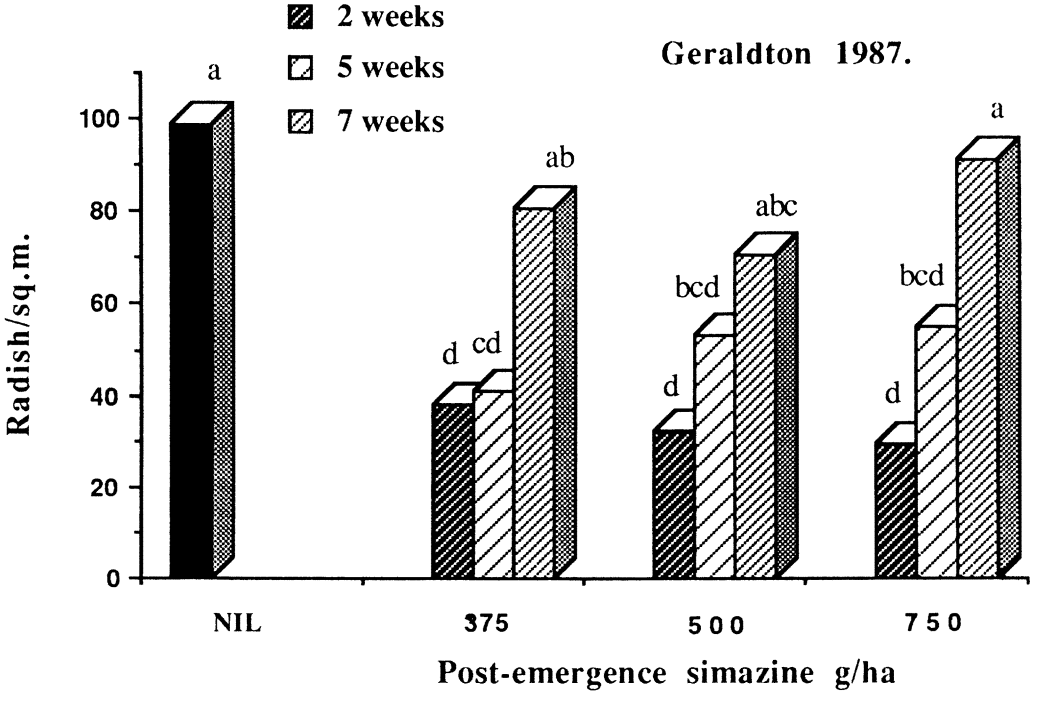

Figure 1. The Effect of Simazine Top Up on Wild Radish.

Columns headed by the same letter do not differ significantly (p = 0.05) using Duncans Multiple Range Test.

In 1988, Doublegees were controlled in lupins by post-emergence applied simazine at Northam and Coorow, and as no effect of time or rate of application was detected it was concluded that 375-750g/ha. applied within four weeks of seeding gave satisfactory control of the weed.

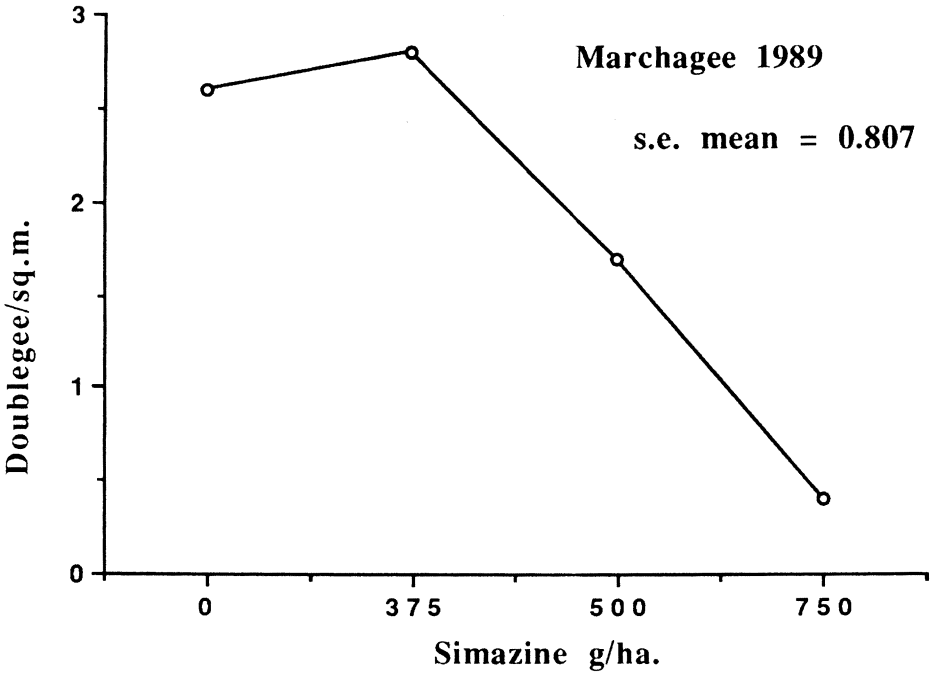

Figure 2. The Effect of Simazine Top Up on Doublegee

Responses to post-emergence applied simazine on doublegee were again detected at Marchagee (Fig. 2) and York in 1989, where control of this weed was directly related to the rate of application. Time of application had no effect, and best doublegee control was achieved with 750g/ha applied four weeks after seeding.

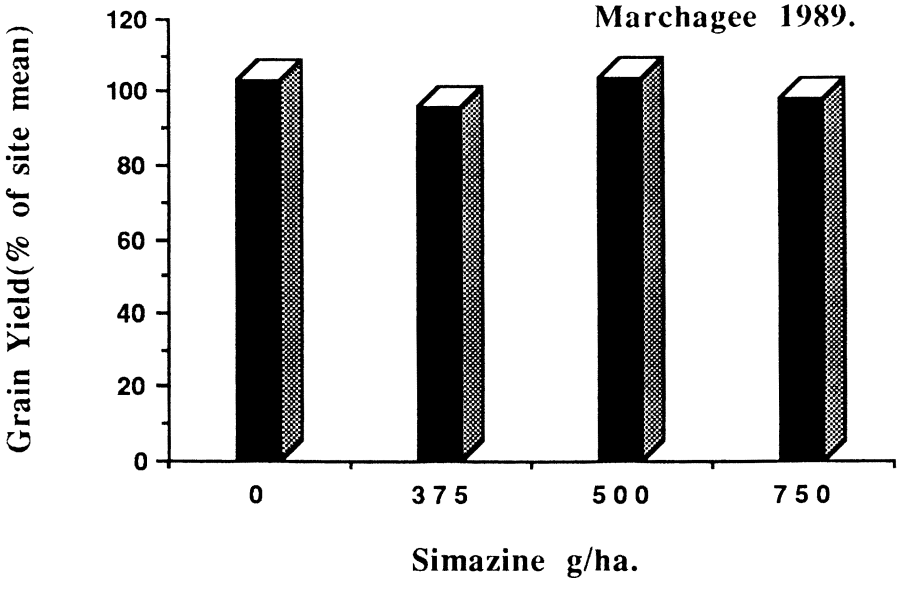

Figure 3. The Effect of Simazine Top Up on Grain Yield.

Other weeds that responded to simazine top up were Capeweed, *Arctotheca calendula* L., Subterranean clover, *Trifolium subterraneum* L., Annual Ryegrass, *Lolium* sp. and Brome grass, *Bromus diandrus* Roth. Data collected on these weeds came mainly from the trials in 1988 and showed that, with the exception of subterranean clover which responded to the rates of application up to 750g/ha, the best control of these weeds was achieved by spraying 375g/ha simazine within two weeks of seeding the lupins.

The lupin grain yield was increased at Geraldton in 1987, but otherwise grain yields from the remaining trials over the three years were not significantly affected by the post-emergence applied simazine, so no direct yield benefit was detected. Neither was there a yield penalty and the grain yields from Marchagee in 1989 are representative of the response in the majority of the trials (Fig. 3).

The potential advantages of the top up technique are reduced contamination of the grain by weed seeds, particularly when Wild Radish is present in the crop, and reduced weed infestations in following crops. The technique is considered to be a useful component of the total weed control strategy for lupins which relies mainly on the effect of the pre-emergence simazine application. In all trials it was the pre-emergence simazine that reduced weeds most substantially, resulting in grain yield increases. Topping up further reduced weeds in some situations at a relatively low cost (approx. $4 to 7 /ha).

ACKNOWLEDGEMENTS

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REFERENCES

1. Gilbey D.J. and Piper T.J. 1987. Proc. 8th. Aust. Weeds Conf. Sydney. pp.204-7.