CONTROL OF JERSEY CUDWEED (*GNAPHALIUM LUTEO-ALBUM*) IN ASPARAGUS

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Jersey cudweed (*Gnaphalium luteo-album*) has in the last 3 years become a problem in asparagus blocks in both the Waikato (A Rahman pers. comm.) and Hawkes Bay. It is largely a weed of open areas where less frequent cultivation is carried out, such as in open pasture or waste land. It is ideally suited to asparagus beds and is capable of completely covering the field. The plant competes with the asparagus crop and interferes with harvesting. It is an annual to perennial species with upright stems up to 50 cm tall that carry spherical flower heads about 2 cm in diameter. The leaves which are narrow with rounded tips and crinkled edges, are very hairy and silvery white in appearance.

As residual herbicides commonly used in asparagus did not appear to be giving adequate control of this weed, trials were carried out in the Hawkes Bay to investigate and improve the level of control.

Two trials were carried out during the 1988 and 1989 seasons. The first trial was primarily to establish whether triazine herbicides were no longer controlling the weed, and the second trial was to evaluate herbicide mixtures to improve the control. Both trials were carried out on an established asparagus crop (cv. Mary Washington) growing on a Paki Paki coarse sandy loam soil near Hastings. A randomised complete block design was used with 3 x 5 m plots and four replicates. Application of treatments was made with a small plot precision sprayer using fan nozzles at 200 kPa in 300 litres of water/ha. In 1988 glyphosate (Roundup) was applied at 1.44 kg/ha, with the addition of the penetrant Pulse at 0.25% v/v, prior to application of the residual herbicides. This pre-treatment was applied to half the trial site in 1989 so that the effect of the residual treatments could be evaluated against both the existing and germinating cudweed. The triazines used were simazine (Gesatop 500 FW) and terbuthylazine (Gardoprim 500 FW) alone and formulated in mixture with terbumeton (Caragard 500 FW). A formulated mixture of terbuthylazine with diuron (Fenican 570 FW) and a tank mixture with metolachlor (Dual 960 EC) were also tested.

In Trial 1 the pre-treatment application of glyphosate was made on 5.9.88 followed 4 days later by the residual treatments. The following year (Trial 2) similar applications were made on 6 and 14 September 1989, respectively.

Assessments were carried out at 3 to 4 week intervals until close up at the end of November, for percent bare ground and number of weeds/m². For Trial 2 the Jersey cudweed population was divided into two classes viz, seedlings <5 cm diameter and

TABLE 1: Mean number of Jersey cudweed plants 12 weeks after treatment in Trial 1.

Treatment	kg ai/ha	No/m ²
+ glyphosate (4 days previous)	1.44	
terbuthylazine + terbumeton	2.5 + 2.5	7.8 cd C*
terbuthylazine + terbumeton	5 + 5	2.5 cd C
terbuthylazine + metolachlor	5 + 3	1.3 d C
terbuthylazine	10	14.5 c C
simazine	10	46 b B
untreated control	—	70 a A
		C.V. 17.1%

*Numbers with no letter in common are significantly different at $P < 0.05$ (lower case letters) or $P < 0.01$ (capital letters).

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mature plants > 5 cm diameter so that the effects of the treatment on germination could be ascertained.

In Trial 1 all the triazine herbicides gave a highly significant reduction in the number of cudweed with terbuthylazine alone or in mixture significantly better than simazine (Table 1). It was concluded that, apart from simazine, the triazine based treatments were giving adequate control of Jersey cudweed. However, the number surviving the terbuthylazine + terbumeton mixture of 2.5 + 2.5 kg/ha and terbuthylazine 5 kg/ha was only marginally acceptable.

In Trial 2 glyphosate significantly reduced the overwintering cudweed population. Terbuthylazine alone or in mixtures gave a highly significant level of control of seedlings (Table 2) similar to Trial 1 but with higher numbers of surviving Jersey cudweed. Simazine gave no significant reduction in the seedling population with or without the pre-application of glyphosate and had no effect on germinating seedlings. The level of control achieved by triazines in this trial would be considered commercially unacceptable and indicated the need for an additional herbicide. The addition of metolachlor to terbuthylazine improved the level of control especially of germinating seedlings. The addition of diuron to terbuthylazine gave a highly significant improvement in the level of control compared to triazines alone, and was the only mixture that did not require the prior application of glyphosate for maximum control. Although there was no significant difference between metolachlor and diuron, the latter always showed a slightly greater level of control.

TABLE 2: Mean number of Jersey cudweed plants 11 weeks after treatment in Trial 2.

Treatment	kg ai/ha	No./m ²		Total
		<5 cm diam.	>5 cm diam.	
terbuthylazine + diuron	2.6 + 2.6	0 dC*	0 dB	0 dD
terbuthylazine + metolachlor	5 + 3	2 cdC	22 bA	24 cdBCD
terbuthylazine + terbumeton	2.5 + 2.5	14 cdBC	21 bA	35 bcBC
terbuthylazine	5	28 bcBC	29 aA	57 bB
simazine	5	137 aA	27 abA	164 aA
+ glyphosate (8 days previous)	1.44			
terbuthylazine + diuron	2.6 + 2.6	0 dC	0 dB	0 dD
terbuthylazine + metolachlor	5 + 3	1 cdC	5 cdB	6 cdD
terbuthylazine + terbumeton	2.5 + 2.5	16 bcdBC	7 cB	23 cdBCD
terbuthylazine	5	41 bB	0 dB	41 bcB
simazine	5	135 aA	5 cdB	140 aA
untreated (no residual)	—	135 aA	25 abA	160 aA
	C.V.	19.2%	15.8%	29.3%

*Numbers with no letter in common are significantly different at $P < 0.05$ (lower case letters) or $P < 0.01$ (capital letters).

The conclusions from these trials are that triazines alone do not appear to be sufficiently active to control cudweed satisfactorily with or without an earlier application of glyphosate. The addition of metolachlor to terbuthylazine improved the control of seedlings to give satisfactory results following an application of glyphosate. A mixture of terbuthylazine and diuron gave excellent control of over-wintering and germinating cudweed without the need for glyphosate.