CHEMICAL CONTROL OF BLACKBERRY IN NORTHLAND

P.W. SHANNON and J.M. LESLIE

Agricultural Research Division, MAF, Private Bag, Whangarei

SUMMARY

The use of 2,4,5-T, 2,4,5-T/picloram, glyphosate, fosamine, and triclopyr, for blackberry (*Rubus fruticosus*) control was investigated. 2,4,5-T, 2,4,5-T/picloram, or triclopyr gave near-complete cane knockdown 5-7 months after application in spring or autumn. Glyphosate or triclopyr gave the most regrowth suppression 1 year after autumn application, while 2,4,5-T/picloram gave the most regrowth suppression after spring application. None of the treatments completely killed the blackberry. Picloram residues in the soil inhibited clover seedling germination for up to 9 months following spraying. Soil residues of triclopyr caused little inhibition of clover seedling germination after 3 months.

INTRODUCTION

Blackberry is a significant weed of New Zealand pastureland (Northcroft 1927) which has proved difficult to control in Northland (Forgie *et al* 1977). The degree of blackberry control achieved in Northland using 2,4,5-T and 2,4,5-T/picloram has often proved unsatisfactory (Dempsey 1981). It was decided to compare three new materials with these two herbicides. The materials, all of which have been reported to give a high degree of regrowth control in blackberry, were glyphosate (Thompson 1977; Yortt and Atkinson 1980); triclopyr (Forgie *et al* 1977; MacDiarmid 1977); and fosamine (Cornwell *et al* 1978).

Hand-gun application of spray chemicals can result in wastage of chemical unless care is taken to avoid over-application. The trial programme compared the use of a hand-gun to apply chemicals at the dilution-rates recommended by the manufacturer with hand-gun application of chemicals at a fixed rate per hectare. Autumn spraying is generally recommended for blackberry control but some spraying is also done in spring. Amor (1975) reported that picloram applied in October gave good control.

METHOD

Trials were conducted at four sites in Northland, and treatments were applied in autumn (April-May) and spring (November-December). All chemicals were applied using a hand-gun, with a number four tip at 220 kPa.

Spray treatments are summarised in Table 1. Before treatment, the amount of water required to achieve coverage to the point of run-off was determined by spraying a known area of blackberry with water. Spray mixtures were then made up to apply the selected rates/ha. All spot-spray treatments were applied at 1:100 dilutions, except for 2,4,5-T/picloram, which was applied at 1:75.

There were three replicates at each site, in a randomised complete block design. Main plot treatments were chemicals by time of year, while sub-plots compared spot-spray with rate/ha application. Main plots were 10 x 10 m. Sites were selected on the basis of even contour and uniform blackberry cover, with the stands being well-established and not grazed or slashed within the previous two years.

Five to seven months after spraying, cane knockdown was visually assessed, and all aerial portions were cut and removed. After a further 5-7 months, visual regrowth assessments were repeated.

Proc. 35th N.Z. Weed and Pest Control Conf.

At intervals of 3-6 months over the year following spraying, soil samples were collected from each of the control, triclopyr and 2,4,5-T/picloram treated plots. These samples were used to bioassay the soils for chemical residues harmful to legumes, using white clover (*Trifolium repens*) as the test plant (Rahman and Cox 1975). The degree of clover damage was visually assessed using the scoring system devised by MacDiarmid (1975), with 0 being no damage and 10 germination failure.

The cane knockdown and regrowth scores were analysed using non-parametric techniques, while the bioassay results were subjected to analyses of variance.

RESULTS AND DISCUSSION

Knockdown

There were no differences between the broadcast and spot-spraying techniques in terms of either knockdown or regrowth; nor were between-site differences significant. Thus, the combined site analyses for the mean effects of the broadcast and spot-spray treatments are reported in Table 1. The lack of difference between broadcast and spot-spraying treatments was not unexpected, as the application rates achieved for each chemical were not greatly different (Table 1).

TABLE 1: Application rates of chemicals, and the degree blackberry knockdown and regrowth control achieved after autumn and spring spray applications. (Means of spot-spray and rate/ha treatments).

Chemical	Application rate		Spraying time			
	rate/ha	spot-spray kg/ha	% knock- down	% regrowth	% knock- down	% regrowth
2,4,5-T	4.0	4.4	90 A ¹	80 A	90 A	70 B
fosamine	4.8	5.8	50 B	70 AB	40 B	80 B
glyphosate	3.0	4.3	60 B	40 B	70 B	60 B
triclopyr	6.0	5.7	100 A	40 B	80 A	50 B
2,3,5-T/picloram	2.0/0.5	3.2/0.8	100 A	60 B	100 A	30 B
control	—	—	0 C	100 A	0 C	100 A

¹ The lettering is based on multiple comparisons made using Friedman's rank sums. Results (within columns) with different letters are different at $P < 0.01$.

Although a high degree of knockdown was given by some chemicals applied in autumn, no treatment achieved complete regrowth suppression. The greatest degree of suppression from autumn treatment was given by triclopyr or glyphosate. With the exception of triclopyr, there was no relationship between the degree of knockdown and regrowth suppression.

Regrowth

Spring applications gave less control than did autumn applications. Regrowth tended to be more rapid, with crown regrowths appearing after 2 months on the spring 2,4,5-T treated plots compared with 3-4 months with the autumn 2,4,5-T treatment. Although there were no significant differences between spring treatments, the 2,4,5-T/picloram treatment appeared to give a greater and more uniform degree of suppression than the other treatments, as reported by Amor (1975).

These results should be applied with caution, as apparent control may be due to regrowth suppression rather than plant death (Amor 1974), which apparently occurred with glyphosate and fosamine in the North Hokianga district (Dempsey 1981). This, combined with the occurrence of regrowths on all treatments in the present trials, shows that follow-up treatment is likely to be needed on blackberry after the initial spray application.

Bioassay results showed that picloram residues significantly restricted clover seedling establishment for up to 6 months following both times of spraying. The degree

of damage 6 months after treatment (scores between 3 and 9, with a mean of 8) indicated that clover re-establishment would have been difficult for at least this period. Triclopyr residues caused slight seedling damage 3 months after spraying (damage score of 1) and none thereafter, so that clover establishment should be possible from 3 months after spraying onwards, and possibly sooner. However, clovers were generally slow to re-colonise, being absent from all 2,4,5-T/picloram and many triclopyr plots 12 months after spraying. Re-seeding would therefore be necessary at the conclusion of a spraying programme for the rapid re-introduction of clovers to improve pasture vigour and assist in preventing blackberry re-infestation.

CONCLUSIONS

Blackberry control in Northland using chemicals is difficult. For autumn spray application, glyphosate or triclopyr should give the best regrowth suppression. Spring spray applications are most likely to give good control when 2,4,5-T/picloram is used. Regardless of the chemical used, repeat applications will be necessary and further work is needed to determine the optimum frequency and timing of repeat chemical applications. Picloram residues are likely to cause problems with clover re-establishment for at least 6 months following spraying, while triclopyr residues should give no trouble after 3 months.

ACKNOWLEDGEMENTS

The authors are indebted to T.E. Dawson, H.M. Morgan, W.B. McMeiken, and E.N. Honore, for technical assistance. The contribution of the farmers concerned — Messrs L. Ringrose, C. Vallance, N. Morunga, and J. Davies — is also gratefully acknowledged. Dr A. Rahman carried out the bioassays, and Mr M. Upsdell performed the statistical analyses.

REFERENCES

- Amor, R.L. 1974. Ecology and control of blackberry (*Rubus fruticosus* L. agg.). III. Response of *R. procerus* to mechanical removal of top growth and to foliage applied herbicides. *Weed Res.* 14: 239-243.
- Amor, R.L., 1975. Ecology and control of blackberry (*Rubus fruticosus* L. agg.). IV. Effect of single and repeated applications of 2,4,5-T, picloram and amino-triazole. *Ibid* 15: 39-45.
- Cornwell, M.J., Coakley, A. and Moore, R.W., 1978. Control of blackberry with fosamine. *Proc. 31st N.Z. Weed and Pest Control Conf.*: 66-68.
- Dempsey, G.P., 1981. Failure of fosamine and glyphosate to give long-term control of blackberry in Northland. *Proc. 34th N.Z. Weed and Pest Control Conf.*: 152-155.
- Forgie, C.D., Saunders, D.G. and MacDiarmid, B.N., 1977. Blackberry control with triclopyr. *Proc. 30th N.Z. Weed and Pest Control Conf.*: 71-75.
- MacDiarmid, B.N., 1975. Soil residues of picloram applied aerially to New Zealand brushweeds. *Proc. 28th N.Z. Weed and Pest Control Conf.*: 109-114.
- MacDiarmid, B.N., 1977. Properties and activities of triclopyr on some New Zealand brushweeds. *Proc. 30th N.Z. Weed and Pest Control Conf.*: 66-70.
- Northcroft, E.F., 1927. The blackberry pest. I. Biology of the plant. *N.Z. J. Agric.* 34: 376-388.
- Rahman, A. and Cox, T.I., 1975. Bioassay techniques for the determination of herbicide residues. *Proc. 28th N.Z. Weed and Pest Control Conf.*: 96-100.
- Thompson, A., 1977. New herbicides for blackberry control. *Proc. 30th N.Z. Weed and Pest Control Conf.*: 76-79.
- Yortt, M.L. and Atkinson, G.C., 1980. Blackberry control with glyphosate. *Proc. 33rd N.Z. Weed and Pest Control Conf.*: 177-180.