BLACKBERRY CONTROL WITH GLYPHOSATE

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Summary

Blackberry (*Rubus* spp) in trials was adequately controlled with glyphosate at rates from 1.4 - 3 kg/ha both boom and hand-gun applied. Slashing blackberry up to 40 days after treatment as an aid to improved pasture renovation and utilisation did not affect long term control.

INTRODUCTION

Blackberry remains one of the more important and persistent scrub weed species in the warmer, high rainfall areas of New Zealand (Thompson 1977). Although present throughout New Zealand it is particularly troublesome in Northland, Taranaki, Poverty Bay and Hawkes Bay (Forgie *et al* 1977). In the past considerable difficulty was experienced controlling blackberry with 2,4,5-T due to poor translocation of that material and to the strong rhizomatous perennial nature of blackberry. Over the years a number of additives to 2,4,5-T have been tried (Taylor and Patterson 1969; Upritchard 1969; Moffat 1965; Forgie *et al* 1977). The addition of picloram helped in reducing crown regrowth especially in the higher rainfall areas of Taranaki and Waikato. However, considerable crown regrowth still occurs with some growth forms and in some areas notably Hawkes Bay, Poverty Bay and Northland (Forgie *et al* 1977).

Thompson (1977) reported, from his Waikato trials, that glyphosate at 2.0 and 4.0 kg/ha give better control of blackberry than did 2,4,5-T plus picloram. This paper will report on a number of recent trials looking at the efficacy of glyphosate for blackberry control. All but one of the experiments were conducted on blackberry (*Rubus fruticosus* agg.) with one trial on cut-leaved blackberry (*Rubus laciniatus*). No attempt was made to differentiate any of the forms and sub-forms of blackberry on the trial sites.

METHOD

All but one of the trials reported were sprayed with a hand-gun. Glyphosate treatments were applied to wet the foliage but not to the point of run-off. Hand-gun pressure was 1000 kPa and spray solution was calibrated to apply 1000 litres of spray solution per hectare. 2,4,5-T plus picloram treatments were applied with a hand gun at 1725 kPa to wet the foliage to the point of run-off and application rates were in the region of 2200 litres/ha.

Glyphosate hand-gun rates used were 144, 216, 288 and 360 g/100 litres of water. Boom applications were at 1.4, 2.2 and 2.9 kg/ha. 2,4,5-T plus picloram hand-gun rate was 200 + 50g/100 litres of water. Except where stated no additional surfactant was added. All treatments were applied in early March except for the Pio Pio trial which was treated in mid-April. Blackberry plants were making active growth at all times of treatment.

All experiments were of randomised block design with three or four replicates, but plots were not necessarily adjacent. Plot size varied with experiment dependent on site limitations. Plant numbers ranged from one plant per plot to a number of plants per plot.

Slashing of plots where it occurred was done with either rotary or drum flail mowers. Oversowing mixtures included 'Grasslands Nui' ryegrass (*Lolium perenne*) plus white clover (*Trifolium repens*) hand applied without the addition of fertilizer or any soil disturbance.

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RESULTS AND DISCUSSION

The only cut-leaved blackberry trial, conducted at Mangakahia, Northland, was sprayed 9.3.79 on a dairy farm site. Despite heavy rain showers which occurred shortly after spraying, glyphosate at both 216 and 288 g/100 litres of water rates gave significantly better results than did the 2,4,5-T plus picloram treatment at 342 days after treatment ($P \leq 0.01$) (Table 1). No slashing was done on this trial.

TABLE 1: Control of blackberry by glyphosate: % untreated (visually assessed)

Treatment	Rate g/100 litres of water	Application rate litres/ha	Site		
			Pio Pio DAT*379	Umawera DAT*342	Mangakahia DAT*342
untreated			0 c	0 d	0 C
glyphosate	144	1000	-	77.5 bc	-
glyphosate	216	1000	96.5 a	90.0 ab	92.0 A
glyphosate	288	1000	90.0 a	94.0 a	93.0 A
glyphosate	360	1000	93.3 a	98.0 a	-
2,4,5-T plus picloram	200 + 50	2200	55.8 b	65.0 c	41.7 B
CV%			4.5	5.8	15.5

* days after treatment

Control of blackberry with glyphosate at all rates assessed one year after treatment gave significantly better results than did the standard 2,4,5-T plus picloram ($P \leq 0.05$) (Table 1). Where regrowth did occur there were marked differences between the two chemicals. Regrowth from glyphosate treatment was largely cane regrowth and this was confined to leaf buds which initiated growth in the spring following autumn treatment. In most instances, this bud initiation failed to survive further chemical activity from within the plant, the leaf buds became chlorotic and tightly curled as secondary die back occurred from the cane tips and moved back down the stems to the crown. Regrowth which occurred from 2,4,5-T plus picloram treatment was from the crown, while the treated canes tended not to regrow. Brown-off and eventual kill of the glyphosate treated plots was slow compared to 2,4,5-T + picloram treatments. Cane deterioration did not occur to any marked extent for some 200 days after treatment on the glyphosate treatments (Table 2).

TABLE 2: Control of blackberry by glyphosate with time; % untreated (visually assessed)

Treatment	Rate g/100 litres of water	Application rate litres/ha	Days after treatment			
			43*	286	314	379
untreated			0	0 C	0 C	0 c
glyphosate	216	1000	10	95.3 A	92.5 A	96.5 a
glyphosate	288	1000	10	95.8 A	93.5 A	90.0 a
glyphosate	360	1000	10	92.5 A	94.5 A	93.3 a
2,4,5-T plus picloram	200 + 50	2200	100	67.5 B	59.5 B	55.8 b
CV%			CV%	6.1	10.9	4.5

* leaf brown out only

From a comparison in a trial at Walton, boom spraying of glyphosate was compared with hand-gun application and assessed 310 days after treatment. No differences were recorded between methods of application (Table 3). It must be noted, however, that extra surfactant (alkylphenol ethylene oxide condensate) was added to the hand-gun mixes (120 g/100 litres water).

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TABLE 3: Boom versus hand-gun application of glyphosate for blackberry untreated. % control (visually assessed)

Treatment	Rate* kg/ha	Application method	Days after treatment 310
untreated			0
glyphosate	2.4	Hand-gun	90
glyphosate	2.9	Hand-gun	99
glyphosate	3.6	Hand-gun	98
glyphosate	1.4	Boom	96
glyphosate	2.2	Boom	98
glyphosate	2.9	Boom	99

* Estimated for hand-gun applications

- Slashing of treated and untreated canes was used as a management tool to assess :—
- The relative effects of the herbicide treatments on pasture renewal after blackberry control.
 - To ascertain if slashing and oversowing assisted or reduced control, and
 - How soon after application slashing could be carried out without affecting levels of control.
- Slashing and oversowing aided pasture re-establishment and in glyphosate treated plots both grasses and clovers established well although there was still some pasture damage visible on the Pio Pio site 286 days after spray treatment and 240 days after oversowing (Table 4). The clover recovery and establishment on glyphosate treated plots was good relative to slashed only plots. This was to be expected due to complete soil inactivity of the glyphosate treatment (Sarfaty and Scherp 1973; Hance 1976). The 2,4,5-T plus picloram plots, however, still had no clover present one year after spraying or oversowing (Table 4).

TABLE 4: Results of oversowing after post treatment slashing of blackberry assessed 300 days after treatment

Treatment	Rate g/100 litres of water	visual assessment*			
		Grass Umawera	vigour Pio Pio	Clover Umawera	vigour Pio Pio
untreated		0	10	6	10
glyphosate	144	6	-	10	-
glyphosate	216	6	9	10	9
glyphosate	288	8	10	10	8
glyphosate	360	6	10	10	8
2,4,5-T plus picloram	200 + 50	10	10	0	0

* 0 = no vigour; 10 = good vigour

Slashing of treated blackberry plants did not markedly affect glyphosate treatment levels of control, but early slashing aided the 2,4,5-T plus picloram treatment (Table 5).

CONCLUSIONS

This work confirms the earlier findings of Thompson (1977) that rates of 1.4 to 3.0 kg/ha glyphosate can provide acceptable levels of control of blackberry. Slashing of top growth after treatment did not affect the activity of glyphosate which may take up to 200 days to prevent vestigial regrowth. Slashing does, however, allow pasture renewal by oversowing, thus converting unproductive land back into utilisable production.

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TABLE 5: Effect of times of slashing post treatment on blackberry control assessed 300 + days after treatment; % control

Treatment	Rate g/100 litres of water	Days between spraying and slashing		
		40	64	121
untreated		0	0	0
glyphosate	144	-	97	95
glyphosate	216	95	98	90
glyphosate	288	100	92	95
glyphosate	360	100	97	92
2,4,5-T plus picloram	200 + 50	98	90	65

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REFERENCES

- 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.
- Hance, R.J., 1976. Adsorption of glyphosate by soils. *Pesticide Sci.* 7: 363-366.
- Moffat, R.W., 1965. A summary of investigations with picloram on certain scrub weeds. *Proc. 18th N.Z. Weed and Pest Control Conf.*: 17-23.
- Sarfaty, A.B. and Scherp, L.A., 1973. Preliminary investigations in Australia and New Zealand and with the mono (isopropylamine) salt of glyphosate. *Proc. 4th Asian-Pacific Weed Sci. Conf.*: 1: 209-214.
- Taylor, R.D. and Patterson, T.M., 1969. Control of scrub weeds with 2,4,5-T plus dicamba. *Proc. 2nd N.Z. Weed and Pest Control Conf.*: 178-179.
- Thompson, A., 1977. New herbicides for blackberry control. *Proc. 30th N.Z. Weed Pest Control Conf.*: 76-79.
- Upritchard, E.A., 1969. Formulations of picloram with 2,4,5-T for brush weed control. *Proc. 22nd N.Z. Weed and Pest Control Conf.*: 180-186.