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BLACKBERRY CONTROL WITH TRICLOPYR

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Summary

The results of 20 trials conducted in New Zealand showed triclopyr to have considerably more activity on blackberry (*Rubus fruticosus* agg.) than 2,4,5-T. High volume applications of triclopyr at 200-400 g/100 litres made during summer and autumn provided excellent control. As a blanket treatment triclopyr 4-8 kg/ha looks a promising treatment. The addition of picloram improved activity when applied to the difficult-to-control blackberry types growing in drier regions.

INTRODUCTION

Blackberry is widespread throughout New Zealand, more particularly in the Northland, Taranaki, Poverty Bay and Hawkes Bay regions of the North Island. Considerable difficulty is experienced in controlling blackberry with 2,4,5-T and strong regrowth of basal crown shoots usually occurs after spraying.

Moffat (1965) and Upritchard (1969) both demonstrated the addition of picloram to 2,4,5-T substantially reduced crown regrowth and practical usage has substantiated this. Best results from this mixture are obtained in the higher rainfall areas such as Taranaki and Waikato, but some regrowth still occurs on the harder-grazed, low-growing types found in Hawkes Bay and Northland unless high rates are used. The high cost of picloram restricts the use of these high rates and there is a need therefore for a more cost-efficient alternative to 2,4,5-T. During the search for an alternative, the new herbicide triclopyr was identified as being particularly active on many New Zealand brushweeds, including hard-to-kill species of the Rose family (MacDiarmid 1977).

This paper reports two years field trials conducted in New Zealand comparing triclopyr with 2,4,5-T and 2,4,5-T/picloram mixtures on various blackberry types.

METHOD

Application Single or double-replicated plots varying in size from 20-100m² were sprayed either:

- a) with a brushgun at 1500 kPa, applying 5000-8000 litres/ha to the point of run-off (high volume trials), or
- b) with a 2m handheld boom using 730231 nozzles at 220 kPa applying a total of 550 litres/ha in two passes (blanket application trials).

Formulations Triclopyr as the butoxyethanol ester (EC) and as the triethylamine salt (A) was compared to 2,4,5-T as the butyl ester. Picloram was added as the potassium salt.

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Assessments Regrowth suppression ratings were made at regular intervals, usually by two or more observers either on a visual percentage scale or by counting the number of bushes regrowing relative to the number originally sprayed. The results of all the most recent assessments are presented in the tables as percent control.

RESULTS AND DISCUSSION

High Volume Trials

The results presented in Table 1 and 2 show that triclopyr is considerably more active on blackberry than 2,4,5-T, the latter achieving at its best only 50% control. Applications during summer and autumn while the plants were still actively growing but had some mature growth, i.e. flowers and berries, showed that rates of triclopyr alone at 200-400 g (g = g/100 litres spray mix) or in mixture with picloram at half the rate, provided excellent control.

TABLE 1: Percent regrowth suppression — East Coast/Northland high volume trials

TRIAL NO.		1	2	3	4	5	6	7
MONTH APPLIED		Jan	Feb	Feb	Mar	Apr	May	May
TREATMENT	g/100 litres ME*	15	14	15	13	20	12	7
triclopyr EC	100	80	83	67	65	—	60	70
triclopyr EC	150	—	70	65	—	—	70	68
triclopyr EC	200	65	60	76	65	92	88	100
triclopyr EC	300	60	90	79	—	—	—	98
triclopyr EC	400	—	—	—	90	—	98	—
triclopyr A	200	60	50	—	—	—	—	—
triclopyr EC + picloram	100 + 25	75	78	86	—	—	—	98
triclopyr EC + picloram	200 + 50	80	93	95	93	100	100	100
2,4,5-T	200	20	40	10	—	27	—	15
2,4,5-T	400	—	—	—	50	—	35	—
2,4,5-T + picloram	100 + 25	70	50	—	—	—	—	88
	200 + 25	—	—	84	85	82	80	85

ME* = Months elapsed since treatment

The difference in susceptibility to herbicides of blackberry growing in various regions of the North Island is clearly evident. Lower rates of herbicide were required in the higher rainfall areas of Taranaki and Waikato (Table 2) and 100 g triclopyr was generally sufficient to provide greater than 90% control. By comparison, in the drier regions of Northland and the East Coast (Table 1), this same level of control was only achieved with 300-400g triclopyr or from a mixture applying 200g triclopyr and 50g picloram. Below these levels there was little rate response. Presumably the combination of years of stock grazing

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(including goats) and dry soil conditions has resulted in bushes with only a small amount of top growth in proportion to their root system, making complete root kill with foliar herbicides difficult to achieve. The existence of different species, which may differ in their herbicide susceptibility as found by Amor (1975), is also not discounted.

TABLE 2: Percent regrowth suppression — Taranaki/Waikato high volume trials

TRIAL NO.		8	9	10	11	12	13
MONTH APPLIED		Nov	Feb	Feb	Apr	June	June
TREATMENT	g/100 litres ME*	16	22	12	12	18	9
triclopyr EC	100	90	94	92	66	30	—
triclopyr EC	200	100	99	100	96	50	70
triclopyr EC	300	100	—	—	—	—	70
triclopyr EC	400	—	97	—	—	70	—
triclopyr A	200	100	—	100	—	50	40
triclopyr EC + picloram	100 + 25	80	96	98	100	50	30
triclopyr EC + picloram	200 + 50	100	98	—	95	80	40
2,4,5-T	200	—	0	0	46	10	20
2,4,5-T	400	40	0	—	—	10	—
2,4,5-T + picloram	100 + 25	60	73	100	87	—	—
	200 + 50	90	98	100	96	10	30

ME* = Months elapsed since treatment

Trial 8 laid down in spring (Table 2) suggests that triclopyr is relatively more active at this time of year than the 2,4,5-T/picloram mixture. A high rate of 2,4,5-T/picloram (200g + 50g) was required to give as good results as 100g triclopyr.

Results from two winter applications in Taranaki to senescent foliage and canes were poor. Even 400g triclopyr gave only 70% control, but there was a considerable improvement in one trial from the addition of picloram. 2,4,5-T alone or with picloram gave poor results in both trials.

Blanket Application trials

The results of seven blanket application trials are presented in Table 3. In all trials 2,4,5-T at 4-8 kg/ha gave unacceptable results. On the other hand, regrowth control of 70-95% was normally achieved with triclopyr between 6 and 8 kg/ha, and in 3 trials 4 kg/ha gave good control and looks a promising treatment. The addition of picloram improved control, particularly in the late April-June period. The 2,4,5-T/picloram combination was inferior to triclopyr in all trials which suggests triclopyr may be relatively more active as a low volume treatment.

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TABLE 3: Percent regrowth suppression — Blanket application trials

TRIAL NO.		14	15	16	17	18	19	20
MONTH APPLIED		Jan	Jan	Feb	Feb	Apr	Apr	Jun
TREATMENT	kg/ha ME*	13	4.5	13	14	12	12	11
triclopyr EC	2	59	—	54	—	—	17	—
triclopyr EC	4	94	80	80	65	55	28	45
triclopyr EC	6	87	88	—	70	—	76	—
triclopyr EC	8	80	95	—	45	75	79	68
triclopyr A	4	81	75	—	—	—	48	—
triclopyr EC + picloram	4 + 1	91	89	—	70	86	82	63
triclopyr EC + picloram	8 + 1	92	—	—	100	—	—	73
2,4,5-T	4	—	—	39	—	—	—	—
2,4,5-T	8	0	38	—	35	18	0	28
2,4,5-T + picloram	4 + 1	84	81	46	25	74	31	50

ME* = Months elapsed since treatment

It was noted in the course of this series of trials that the degree of regrowth suppression changes little after the first full growing season and hence a period of 12 months after application is considered sufficient for a clear understanding of herbicide activity.

Translocation Study

In order to study the movement of triclopyr within blackberry, a small study was conducted on young shoots labelled *in situ* on bushes. Two treatments were applied. Either the end 15 cm (tip immersion) or a single older leaf 40-50 cm from the tip (leaf translocation) was immersed in a beaker containing various dilutions of triclopyr in water plus surfactant. The rate required (ppm) to kill the tip after 25 days is shown below:

	Leaf translocation	Tip immersion
triclopyr A	500	100
2,4,5-T	2000	100

The results show triclopyr readily translocated 40-50 cm along the shoot, and was at least four times more toxic than 2,4,5-T to the growing tip. No other mature leaves on the shoot were markedly affected. However, there was no difference between the two herbicides in their contact activity, as measured by tip immersion. Their only effect on the shoot was to cause necrosis of the entire immersed length.

The ready translocation of triclopyr to young growing shoots in this study may help explain the good results achieved from low

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volume application in the field trials. In studies using labelled 2,4,5-T, Richardson (1976) showed that only low levels of 2,4,5-T were translocated to the root systems of *R. procerus*, and that these were insufficient to prevent regeneration. The field trial results indicate that triclopyr is relatively more effective than 2,4,5-T in this respect also.

CONCLUSION

Triclopyr offers a very suitable alternative to 2,4,5-T for controlling blackberry. Its ready translocation within the plant provides excellent regrowth suppression from either high or low volume applications.

Further trial work is necessary to establish the optimum time for treatment, the most cost efficient aerial broadcast rate and the desirability of triclopyr/picloram combinations. Further comparisons of the ester and amine formulations of triclopyr are also warranted, as the data presented suggest the ester may be more active.

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