THE CONTROL OF SWEET BRIER WITH GRANULAR HERBICIDES

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Summary

A series of field trials studied the effect of picloram, 2,3,6-TBA and dicamba on sweet brier *(Rosa rubiginosa)* when applied as basal granules to individual bushes. Picloram was the most efficient and reliable treatment, with rates of 2 g a.i./sq. yd reaching maximum efficiency but 1 g still achieving acceptable results. 2,3,6-TBA and dicamba at 8 g a.i./sq. yd were less efficient but dicamba warranted further testing. Application in late winter gave optimum results.

INTRODUCTION

SWEET BRIER *(Rosa rubiginosa)* is a problem weed of many extensive hill properties, particularly those situated in dry inland areas of the South Island. Control in the past has been largely by the application of basal sprays of 2,4,5-T in diesel oil (at a concentration of 1 in 20). Personal observation of many commercial trials and other treated areas has indicated that 2,4,5-T in oil will, if carefully applied, be approximately 75% reliable in giving complete control of sweet brier without subsequent regrowth. Within two years the dead canes usually are in an advanced state of decay and present no problem to grazing stock. If 2,4,5-T in oil is poorly applied, reliability may drop to 40 or 50%.

Picloram is now replacing 2,4,5-T for sweet brier control. Various areas of sweet brier commercially treated with foliage sprays of picloram/2,4,5-T mixtures (concentration usually 1 in 200) have shown that the material is extremely reliable, with probably over 90% of bushes treated being killed without subsequent regrowth.

However, for various reasons there is a demand for granular herbicides as a simple method of application, and trials commenced in 1964 to study their effectiveness and optimum rate of application.

MATERIALS AND METHOD

Picloram 2% granules, 2,3,6-TBA 20% granules and dicamba 10% granules were the formulations used, except for a 10% picloram granule in the 1964 pilot trials. The rates shown in this report are in grams a.i. per 6 in. basal diameter bush. All were applied by hand within the drip-line of bushes in spring at the early to late bud stage (September-early October), except one series of 3 trials where application was in autumn, and one trial which studied times of application.

Selected bushes of approximately 6 in. basal diameter were chosen; the area enclosed within the drip-line of such bushes was approximately 1 sq. yd.

TABLE 1: 1965-7 SERIES, MEAN % DEAD WOOD PER BUSH

	Otokia	*Nenthorne*	*Patearoa*	*Dansey's*	*Tara*
Date applied	Oct. '65	Oct. '65	Oct. '65	Oct. '65	Oct. '65
Rainfall (in.—first 12 mon)	24	19	13	21	20
picloram (grams)					
1					81
2	83	100	100	100	81
4	93	100	100	100	100
6	97	100	100	100	100
2,3,6-TBA (grams)					
4	35	67	92	96	25
6	41	88	88	96	38
8	43	92	100	86	51
Control	20	10	20	16	0

		Cromwell		*Tarras*		*Cardrona*	
Date applied		Sept. '65	Feb. '66	Sept. '65	Feb. '66	Sept. '65	Feb. '66
Rainfall (in.—first 12 mon)		16	14	16	12	25	18
picloram (grams)							
1	2.2 g	100	96	96	98	78	69
2	3.3 g	100	99	100	98	100	54
4	4.4 g	100	100	100	100	100	91
6	5.5 g	100	100	100	100	93	94

There were 5 replicates of any one treatment and both in 1965 and 1966 trials were laid down in the Taieri Catchment (4 sites), Clutha Catchment (3 sites) and Waitaki Catchment (1 site). Assessments of percentage dead wood per bush, etc., were made 18 to 26 months after treatment.

RESULTS

1965-7 Series (See Table 1)

Picloram gave very good control at all rates and sites, except for Otokia, Tara Hills and Cardrona, where rates of 2 and 1 g were poor, and even 4 to 6 g were unsatisfactory at Otokia. In addition, there was some indication on the three trials in the Clutha Catchment that autumn (February, 1966) application was less efficient than spring, particularly under higher rainfall conditions.

2,3,6-TBA was invariably less efficient than picloram.

It was noted that the use of picloram resulted in an area of bare ground which is extensive (approximately 4 ft diameter) in areas of low rainfall and may persist for 18 months. The use of 2,3,6-TBA reduced both the area and persistence of bare ground below treated bushes.

On sloping sites some lateral movement of picloram residues was noted.

Stems of killed bushes were brittle and soon distintegrated and disappeared through stock movements.

1966-8 Series (See Table 2)

Again picloram was the most efficient with only one of the driest areas (Patearoa) proving to be a problem site in that control with picloram took over two years to achieve, 2,3,6-TBA again failed to be as efficient as picloram: on the two sites (Nenthorne and Cromwell) where 2,3,6-TBA was more reliable, neither rainfall nor soil type was common to both sites. Dicamba included at one rate only, 8 g, proved to be only slightly more efficient than 2,3,6-TBA, but still not comparable to picloram at all sites; however, it was noted at one of the driest sites, Patearoa, that speed of kill was very much faster than picloram.

Again it was noted that appreciable quantities of bare ground occurred below treated bushes, with both dicamba and picloram persisting for longer periods than 2,3,6-TBA on the drier sites.

Reliability

An important factor in results is the reliability of kill — *i.e.,* the number of bushes completely killed per number treated — because the use of granules is likely to be concentrated on areas where access by cheaper sprays is very unlikely. Labour costs per bush are likely to be high and repeat visits to control survivors will be highly uneconomic.

A summary of all bushes treated by spring application over the two seasons is shown in Table 3. Picloram reached a peak of reliability at rates above 3 g; however, 91% reliability of kill from 1 g was very acceptable in relation to the much lower reliability of 2,3,6-TBA and to a lesser extent, dicamba.

Time of Application Triai

Table 4 shows the results in terms of mean percentage dead wood/bush of an application of picloram 1, 2 or 3 g and 2,3,6-TBA 6 g for each month from June to October.

In taking the mean of the three most efficient treatments, picloram 1, 2 and 3 g, there is a trend towards more efficient control from June to October.

The mean of rate of picloram for all months indicates that a peak of efficiency is reached at 2 g and an increase to 3 g gives no improvement.

Reliability (the number of bushes completely killed per number of bushes treated at any one rate or time) was also greater towards the latter end of winter; a comparison of the mean of rate of picloram for all months shows that reliability is 76% for 1 g and 96% for both 2 and 3 g; 2,3,6-TBA gave only 72% reliability.

The mean area of bare ground below treated bushes, noted 18 months after the final application, showed a mean of 0.7, 2.9, and 2.9, and 2.1 sq. ft for 1, 2, 3 g picloram and 6 g 2,3,6-TBA, respectively.

Control by Granules Applied on an Area Basis

To test whether a low rate of herbicide granules applied overall on a specific area would give acceptable control of sweet brier, picloram (2% granules) at 10, 20 and 30 oz, and 2,3,6-TBA (20% granules) at 6 and 10 lb were applied to a dense area of sweet brier. Eighteen months later, 90 to 100% kill of aerial growth of sweet brier was obtained from 20 and 30 oz picloram, and 10 lb 2,3,6-TBA, but basal regrowth occurred from

TABLE 2: 1966-8 TRIALS, MEAN % DEAD WOOD PER BUSH

	Otokia	*Nenthorne*	*Patearoa*	*Dansey's*	*Cromwell*	*Tarras*	*Cardrona*	*Tara*
Date applied	Oct. '66	Oct. '66	Oct. '66	Oct. '66	Oct. '66	Oct. '66	Oct. '66	Oct. '66
Rainfall (in. — first 12 mon)	25	17	11	21	15	18	24	22
picloram (grams)								
1	100	100	100	100	100	100	83	100
2	100	100	100	100	100	100	100	100
4	100	100	100	100	100	100	100	91
2,3,6-TBA (grams)								
4	75	79	36	66	80	88	75	96
6	72	100	62	71	100	75	98	57
8	77	100	84	83	100	77	72	89
dicamba 8 g	100	100	100	83	100	73	85	98
Control	Tr.	5	nil	nil	nil	nil	nil	20

TABLE 3: RELIABILITY: No. OF BUSHES KILLED PER No. TREATED

(Summary of spring applications only)

	No. Killed	*No. Possible*	*Reliability %*
picloram (grams)			
1	41	45	91
2 & 2.2	75	80	94
3.3	15	15	100
4	63	65	97
4.4	15	15	100
5.5	15	15	100
6	24	25	96
2,3,6-TBA (grams)			
4	25	65	38
6	33	65	51
8	40	65	62
dicamba 8 g	32	40	80

TABLE 4: TIME OF GRANULE APPLICATION 1967-8. RESULTS: % DEAD WOOD PER BUSH

	Month Applied				
	Jun.	*Jul.*	*Aug.*	*Sept.*	*Oct.*
1. picloram 1 g/bush	96	87	82	92	97
2. picloram 2 g/bush	82	100	100	100	98
3. picloram 3 g/bush	100	92	99	100	99
4. 2,3,6-TBA 6 g	94	92	88	66	86
5. Control	nil	4	3	0	0

approximately 35, 30 and 70% of bushes, respectively. Both materials resulted in the elimination of all broadleaved species in the base of the plot, but at the high rates of picloram there was more dead matter and bare ground.

DISCUSSION

Both in efficiency — *i.e.*, the average amount of dead wood per bush — and reliability, picloram has been shown to be a better material for sweet brier control than is 2,3,6-TBA or dicamba, although the latter warrants further testing. A reliability of 91% for picloram at 1 g is very good considering the range of rainfall and soil types. However, it should be noted that this result was obtained largely in the 1966-8 series: in the previous year when results were more variable, the 2 g rate achieved only 88% reliability. Winter application, approaching and during the time of full mobilization of root reserves (August-October), appears the most effective.

It would be difficult to predict sites where poor control is likely to occur, but it is probable that sites where rainfall is high and soil fertile (*e.g.*, Otokia and Cardrona) are likely to cause trouble. With 2,3,6-TBA, it is not easy to link unreliability with soil type or rainfall, but there is a trend towards greater reliability on the drier sites, although the efficiency at the two driest sites, Patearoa and Cromwell, gave opposite results.

Unfortunately, the total depletion of cover below picloram-treated bushes is a serious drawback. If a farmer wishes to control sweet brier he may have to accept a proportional loss of herbage, but where soil erosion is a problem the loss in vegetative cover may not prove acceptable. Certainly there is little justification for aerial distribution of picloram granules without further study of the rates necessary for efficient sweet brier control without serious depletion of cover: it should be noted that 1 g/sq. yd is equivalent to 170 oz/acre. In this paper it was shown that 30 oz picloram may not give wholly acceptable sweet brier control while vegetative cover in this trial was reduced but not seriously depleted. On arid sites, conditions are such that, even after herbicide residues have dissipated, regeneration of cover may be prolonged, and over 18 months sterilization was noted at several sites.

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