CONTROL OF GORSE AND SWEET BRIER WITH PICLORAM

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Summary

Picloram was applied as a foliar spray to gorse (*Ulex europaeus*) and sweet brier (*Rosa rubiginosa*) at monthly intervals over the October to March period. On both gorse and sweet brier, the months of October, November and December gave best results. This is being checked in subsequent trials. Basal application to sweet brier appears promising, though some variation in results on different soil types is possible.

INTRODUCTION

ONE of the first requirements in field-testing a new chemical is to discover the optimum time for application. As a check on uniformity of behaviour this must eventually be determined for a variety of soils and climates. In this paper are described the results from the first year's applications to gorse and sweet brier.

One point regarding scrub weed control which needs emphasis is that various interpretations are placed on the word "kill". Many people talk of a "kill" of scrub weeds sprayed in November, and assessed in April or May. Where picloram is concerned, it could be the next April or May before the final result can be judged. For this reason, data referring to final kills are restricted to trials conducted in 1963–4, although a similar series was conducted in 1964–5.

APPLICATION RATES

Although rates of herbicide for scrub weed control must ultimately be expressed in terms of dilutions, the amount of active ingredient needed to kill the plants concerned must be known beforehand. This is even more important where the chemical involved has a long residual soil life and may be taken up by both foliar and root absorption.

In these preliminary trials, therefore, aimed mainly at comparing times of treatment, rates are expressed in terms of active ingredient per bush. These rates can be converted to per acre ones simply by calculating from some arbitrarily-chosen density of bushes.

GORSE

(*Ulex europaeus*)

In October, 1963, a series of monthly foliar applications was begun on individual gorse bushes ranging from 3 to 5 ft tall. Treatments employed were:

Material	*Grams per Bush*
1. Picloram	1.0
2. Picloram	2.0
3. Picloram/2,4,5-T ester or amine*	0.5/3.0
4. 2,4,5-T ester	3.0

* Ester in October, February and March; amine in November, December and January.

The soil involved is a loess overlying basalt with an average annual rainfall of 30 in. Table 1 sets out conditions at each time of application, while Table 2 gives the number of bushes finally killed by each treatment.

TABLE 1: CONDITIONS AT TIMES OF APPLICATION TO GORSE

Month Applied	*Stage of Growth*	*Soil Moisture*
October, 1963	Full flower	Dry
November	Late flower — early pod	Dry
December	Early pod, new growth hardening	Intermediate
January, 1964	Green pod, new growth hard	Dry
February	Mature seed	Dry
March	Second flowering commencing	Intermediate

TABLE 2: NUMBER OF GORSE BUSHES KILLED
(4 bushes per treatment)

Month	*Treatments*			
	1	*2*	*3*	*4*
October	4	4	4	4
November	4	4	4	3
December	3	4	4	3
January	2	3	2	1
February	2	4	4	2
March	3	3	4	2

SWEET BRIER

(*Rosa rubiginosa*)

Foliar Application

Immediately following the arrival of a small quantity of picloram in late April, 1963, spray applications were made to sweet brier bushes ranging from 5 to 8 ft tall. It was estimated that more than 50% of sweet brier foliage had fallen before treatment. Each rate of application was applied to five bushes and the numbers finally killed are set out in Table 3.

TABLE 3: APPLICATIONS TO SWEET BRIER AND FINAL KILL

Material	*Grams per Bush*	*Plants Killed (5 treated)*
Picloram	0.5	Nil
Picloram	1.0	2
Picloram	2.0	4

In October, 1963, a time-of-application spraying trial was begun on bushes 5 to 8 ft in height. The soil is a silt loam overlying an old shingle fan with an annual rainfall of about 20 in. Treatments employed were:

Material	*Grams per Bush*
1. Picloram	1.0
2. Picloram	2.0
3. Picloram/2,4,5-T ester	0.5/2.0
4. Picloram/2,4,5-T ester	1.0/1.3

Table 4 shows the conditions at each time of application, while Table 5 gives the number of bushes finally killed.

TABLE 4: CONDITIONS AT TIMES OF APPLICATION TO SWEET BRIER

Month Applied	*Stage of Growth*	*Soil Moisture*
October, 1963	Full leaf	Intermediate
November	Early flower	Dry
December	Late flower — early fruit	Dry
January, 1964	Full fruit	Dry
February	Hips ripening	Dry
March	Leaves beginning to fall	Dry

TABLE 5: NUMBER OF BUSHES KILLED
(4 bushes per treatment)

Month	*Treatments* 1	2	3	4
October, 1963	4	4	4	4
November	4	4	4	4
December	4	4	2	4
January, 1964	2	1	0	0
February	0	2	0	0
March	2	0	1	0

Seed Viability

Seed, where available, was collected in June, 1964, from bushes treated with picloram at the 1 g rate and subjected to the tetrazolium test for viability. At the same time, seed from bushes sprayed wih 2,4,5-T ester in March, 1964, underwent the same test.

Results in Table 6 are the mean of tests on two lots of 100 seeds.

TABLE 6: VIABILITY OF SWEET BRIER SEED AFTER TREATMENT

Treatment	*% Positive Viability Reaction*
October, 1963	No seed set
November	No seed set
December	Nil
January, 1964	59
February	80
March	78
2,4,5-T (March)	90
Untreated control	80

Pelleted Application

Picloram pellets were applied in August, 1964, to sweet brier bushes 6 to 8 ft tall and 12 to 24 in. basal diameter. Rates of application were one and two grams active ingredient per 6 in. basal diameter, each rate applied as a concentration about the base and as a thinner coverge extending out to the "drip line". In terms of 7.2% pellets, these rates represent 0.5 and 1.0 oz per 6 in. basal diameter. The soil is a deep alluvial loam with an annual rainfall of about 45 in.

It will probably be spring, 1965, before the final result will be known. So far the only difference visible between the two methods of distribution is in the amount of bare ground present. The lower rate with drip-line distribution has 30% bare ground, while with basal distribution 90% bare ground remains on the more-restricted area covered. At the higher rate the comparable figures for bare ground are 75% and 100%, respectively.

Foliage kill has proceeded very slowly since treatment and, even at the higher rate, was not complete 8 months later. Herbicidal activity did, however, appear to be continuing.

Bushes of 6 to 12 in. basal diameter were treated in December, 1963, by A. R. Dingwall with a basal spray application of 2.0 and 4.0 g per bush. The heavier rate killed all four bushes while the lower rate killed three out of four. Bushes of similar size near the Lewis Pass, growing on a stony soil under 50 to 60 in. annual rainfall and treated in September, 1964, with picloram pellets at one, two and four grams per bush, have also given encouraging results. Inspected 8 months after treatment, each rate had apparently killed 4 out of 5 bushes.

Recent Trials

Among the more recent trials is an aerial one using a proprietary mixture of picloram and 2,4,5-T, and a further time-of-application ground-spraying one. Final results cannot yet be assessed but points of interest emerging from the aerial trial include the survival of

matagouri (*Discaria toumatou*), 3 ft high *Pinus nigra* var *laricio* (distorted), tutu (*Coriaria sarmentosa*) and viper's bugloss (*Echium vulgare*).

The problem of soil residue from ground-boom or aerial application of picloram is being investigated as a separate study.

DISCUSSION

The fact that the same compound of 2,4,5-T was not used in the mixture with picloram throughout the gorse trial robs that treatment of some comparability. However, viewed alongside the results from the 2,4,5-T ester alone, the choice of amine or ester does not seem significant.

Over the six monthly applications, the mixture of 0.5 g picloram and 3.0 g 2,4,5-T per bush killed as many bushes as 2.0 g of picloram alone (22 out of 24). On the other hand, 2,4,5-T alone at 3.0 g per bush killed only 15 out of 24.

The months of October, November and December appear at this stage to be the best time for treatment of both gorse and sweet brier. The unusually dry spring of 1963 suggests that adequate soil moisture might not be the only reason for success at that time. For gorse, the presence of soft, new growth over the spring months might facilitate foliar absorption of the water-soluble compounds.

One feature of interest concerning sweet brier is that application of picloram at what appears to be the best time will also prevent formation of viable seed in that season.

Picloram can also be used on sweet brier as a basal application, the pelleted formulation being most convenient. Basal spray application on a free-draining soil in December was quite successful. However, there is at present a sharp difference between results from two trials with pellets laid down in spring, 1964. On a stony soil under 50 to 60 in. of rain annually, the result is most pleasing, whereas on a deep silt loam under 45 in. of rain, results at this stage are disappointing. Certainly there was denser grass growth on the silt loam but this might be just incidental, the proportion of soil colloids present perhaps being the critical factor. This is something which should be kept in mind.

At this stage it appears that on free-draining soils the rate of basal application necessary will be about one to two grams active ingredient per 6 in. of basal diameter. This represents about ⅜ to ¾ oz of 10% pellets and 1¾ to 3½ oz of 2% pellets per 6 in. basal diameter.

In both the gorse and sweet brier time-of-application trials, Treatment 3 contains picloram and 2,4,5-T in a ratio similar to that in the proprietary mixture available in New Zealand. Diluted at 1:200 with water and applied at 2½ pints per bush, the rate of application in active ingredient would be similar to Treatment 3, in the time-of-application trials.

Little is yet known about the length of time picloram at various rates will remain active in New Zealand soils. Indications are that the time will be relatively long. For this reason and because of its toxicity to clovers (*Trifolium* spp.) at extremely low concentration, broadcast application of picloram should be approached with caution.

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