CONTROL OF TUTU (*CORIARIA SARMENTOSA*) BY HERBICIDES

F. A. MEEKLAH and R. B. MITCHELL

*Field Research Section, Invermay Agricultural Research Centre,
M.A.F., Mosgiel*

Summary

2,4-D either in granules or spray, was shown to give acceptable control of tutu (*Coriaria sarmentosa*) with only minor transient effects on the associated pasture species. The optimum rate as granules was 16.8 kg/ha, but as aqueous spray the lowest rate tested of 4 kg/ha or 4 kg/2200 litres of water as a directed spray gave complete control. 2,4-D was as efficient as 2,4,5-T and more efficient than picloram mixtures, killing tutu faster thus reducing potential hazards to stock. Picloram and dicamba also gave complete control, but these eradicated all herbs including clover (*Trifolium repens*) with a consequent increase in bare ground.

INTRODUCTION

THE development of extensive grazing country by subdivision topdressing and oversowing is rendered more hazardous, so far as stock management is concerned, by the presence of tutu (*Coriaria sarmentosa*) which is not only very toxic but also palatable to some stock. Tutu responds vigorously to the improved fertility (Bascand Pers. comm.) although at later stages in pasture improvement it may be inhibited to some extent by pasture competition and stock trampling.

Cattle losses due to this weed may be high. Because of the greater emphasis at present on beef production on the class of country on which tutu occurs, it has been important to study its control by herbicides while endeavouring not to harm the improved pasture species associated with it.

This paper reports control studies carried out in the Te Anau region, an area typified by light stony soils, temperate climate and rainfall of about 1020 mm.

MATERIALS AND METHOD

Two experiments studied the effect of foliar application. In experiment A the materials were applied with a standard "gorse gun" adequately wetting the foliage to the point of run-off, the mean quantity of spray mixture applied was 1700 litres/ha. In experiment B materials were applied by Oxford Precision sprayer in a spray volume of 500 litres/ha, while in experiments C, D and E granular herbicides were applied by hand.

The following formulations were used in Exps. A and B—

butyl ester 2,4,5-T	36% a.i.
butyl ester 2,4-D	36% a.i.
amine salt of picloram	7.5%/amine salt of 2,4,5-T 20% a.i.
amine salt of picloram	5%/amine salt of 2,4-D 20% a.i.

Scrub Weeds

Times of application, assessments of control and cover and stage of tutu growth including details of herbicide treatments are shown in Tables 1 and 2. Apart from Exp. C, generally all tutu was 36 to 60 cm high and of unknown age although well established when treated.

The soil type was Te Anau yellow brown loam intergrade.

Soil organic matter levels at sites C, D and E were:

Exp. C 12.5% Exp. D 14.6% Exp. E 10.5%

RESULTS

Foliar application

Following directed application of herbicides through a gorse gun at high volumes the resulting tutu control was excellent with 2,4-D while 2,4,5-T was slightly though not markedly poorer. These two materials did not differ in their effect on clover content.

Generally both formulations of picloram gave poorer tutu control than 2,4-D or 2,4,5-T alone although picloram/2,4,5-T at the high rate gave very good control. The low rate of picloram/2,4-D was markedly poorer than 2,4-D alone, while all picloram treatments reduced clover content.

In Exp. B all treatments gave complete tutu control, no regrowth being evident 19 months after treatment. The inclusion of diquat to speed foliar kill having no effect on the efficiency of 2,4,5-T. 2,4-D which was only slightly slower in this respect tended to cause less clover damage.

Granular application

Granular herbicides in Exp. C gave complete tutu control except for small amounts persisting at 4.5 kg/ha picloram and with the 3 rates of 2,4-D (Table 2). Clover was eliminated by picloram while only partial recovery occurred with dicamba. Clover content in 2,4-D plots increased, probably through reduction in tutu competition, while bare ground increased through application of picloram and dicamba.

Reduced rates of picloram and dicamba in Exps. D and E failed to give acceptable control of tutu without severe reductions in clover content. Observations 7 months after application in Exp. D showed that while only 4% clover was present in dicamba versus 48% in 2,4-D plots, satisfactory levels were present 12 months after application. However in picloram plots, clover did not re-establish until 21 months after treatment.

Similarly, Exp. C, 28 months after application, showed clover growth normal in quantity and habit in dicamba plots, but absent in picloram plots except for a little at 4.5 kg/ha.

DISCUSSION

Foliar application using water as a carrier showed the ester of 2,4-D to be as efficient as 2,4,5-T and better than mixtures containing picloram. The lower rate of 4 kg 2,4-D/ha or 2 kg/1100 litres gave satisfactory tutu control with only transient effects on desirable species such as clover and grass.

2,4,5-T plus diquat killed tutu faster than 2,4,5-T alone, but had little advantage in speed over 2,4-D used alone. As with 2,4-D the lowest rate of 2,4,5-T (4 kg/ha) or 2 kg/1100 litres of water was adequate, however where overall, as opposed to directed spraying was practised it was noted that clover content tended to be reduced with 2,4,5-T.

Scrub Weeds

Granular materials have considerable attraction as a means of applying herbicides to scattered irregular areas of shrubby herbs such as tutu. No equipment is necessary for spreading, weather conditions are less important, while the weight carried to the site is less, say 168 kg with 10% 2,4-D granules, compared with 500 kg of water used in Exp. B. In this investigation the rates of granules tested were initially too high causing subsequent long term soil sterilisation with picloram and to a lesser extent, dicamba.

2,4-D granules were consistently satisfactory for tutu control at the rate of 16.8 kg/ha, and by interpolation it is possible to deduce from the responses noted in Table 2 that probably 15 kg/ha would be a satisfactory recommendation, particularly on sites where soil organic matter could be anticipated to be less than the 10 to 15% measured in these experiments.

One of the major management problems associated with tutu control is the stock "with holding" period required after treatment while dying but still poisonous plants disintergrate sufficiently for safe stock access. As tutu usually infests extensive areas of developing grassland with only moderate to low stocking rates, a period of no grazing during the growing season usually means that control of the block is impaired. If however infested areas could be identified through previous mapping or by location of the previous season's debris, granule treatment just prior to emergence could control tutu with little or no emergence of dying but toxic shoots.

TABLE 1: EFFECT OF FOLIAR APPLICATION OF HERBICIDES ON TUTU AND PASTURE AT 28/10/71

EXP. A—Gorse gun application 16/3/70; fruiting stage. Assessed 19 months post treatment.

	kg/1100 litres	% Tutu Control	% Cover Grass	% Cover Clover	% Bare ground
2,4,5-T	4	95	52	33	13
2,4,5-T	2	95	48	43	8
2,4-D	4	99	62	33	3
2,4-D	2	99	50	40	10
picloram/2,4,5-T	0.75/2	95	74	10	16
picloram/2,4,5-T	0.37/1	89	63	23	13
picloram/2,4-D	0.5/2	84	70	18	12
picloram/2,4-D	0.25/1	65	75	16	8

EXP. B — Boom sprayer application, 17/3/70: later flowering stage. Assessed 9 months post treatment.

	kg/ha	% Tutu control	% Cover clover
2,4,5-T	4	100	8
2,4,5-T	8	100	8
2,4,5-T+diquat	3.5+0.25	100	20
2,4,5-T+diquat	7.0+0.25	100	10
2,4-D	4	100	23
2,4-D	8	100	37

TABLE 2: GRANULAR HERBICIDES FOR TUTU CONTROL —
EXPS. C, D AND E

Materials applied and species % cover approx. 12 months after application*

	kg/ha	% Tutu					% Grass					% Clover					Bare ground				
		Exp.	C	D	E		C	D	E			C	D	E			C	D	E		
control picloram 2%	Nil	39	—	6	39		23	37	18			30	49	31			10	0	6		
	2.25	—	—	7	15		—	60	29			—	17	2			—	0	42		
	3.4	—	—	5	6		—	72	26			—	17	0.5			—	0	49		
	4.5	1	1	1	4		71	91	36			0	4	0			28	0	46		
	6.7	0	—	—	—		64	—	—			0	—	—			36	—	—		
	9.0	0	—	—	—		58	—	—			0	—	—			41	—	—		
dicamba 5%	7.8	—	—	3	12		—	37	27			—	53	1			—	0	41		
	11.8	—	—	4	5		—	33	28			—	57	0			—	0	47		
	15.7	0	0	1	1		53	31	24			15	65	0			31	0	57		
	23.5	0	—	—	—		45	—	—			9	—	—			46	—	—		
	31.4	0	—	—	—		34	—	—			7	—	—			59	—	—		
2,4-D 10%	8.4	—	—	1	6		—	39	30			—	45	52			—	—	—		
	11.2	4	—	—	—		36	—	—			43	—	—			17	—	—		
	12.6	—	—	Tr	5		—	36	32			—	55	52			—	0	4		
	16.8	1.5	1.5	Tr	0.5		47	36	33			47	55	54			4	0	6		
	22.4	0.5	0.5	—	—		49	—	—			41	—	—			8	—	—		

* Exp. C, applied 12/10/70, at tutu emergence

Exp. D, applied 15/3/71, late fruiting stage

Exp. E, applied 14/12/71, flowering stage

CONCLUSIONS

The results indicate that on this soil type picloram and dicamba granules at 4.5 to 9.0 kg/ha and 15.7 to 31.4 kg/ha respectively will give almost complete tutu control. This high degree of control is accompanied by eradication of all herbs including clover with a consequent increase in bare ground.

2,4-D granules on the other hand caused significant reductions in tutu cover, the 16.8 and 22.4 kg/ha rates particularly reducing tutu to a very low level. 16.8 kg would appear to be the optimum rate as no advantage was shown by increasing the rate to 22.4 kg. 2,4-D caused slight reduction in clover cover in the first season only with slight increase in bare ground, however in the following season clover cover was similar or slightly higher than in controls and sward vigour and balance was noted to be very good.

This study suggests that if high rates of picloram or dicamba granules are used drastic effects on the associated and desirable species will occur. Similar effects will occur if picloram and to a lesser extent 2,4,5-T is included in foliage sprays. On the other hand 2,4-D as a granule or spray (butyl ester) treatment, can give acceptable control with only minor transient effects on the associated pasture species.

ACKNOWLEDGEMENTS

To H. McRobb for assistance throughout this study, and to Lands and Survey Dept. for provision of sites and assistance.