WEED CONTROL IN BLACK CURRANTS

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SUMMARY

Herbicides were tested for control of weeds in young established black currants *(Ribes nigrum)*. Dichlobenil and chlorthiamid controlled Californian thistles *(Cirsium arvense)* while simazine, diuron and terbumeton/terbuthylazine gave better control of annual weeds. Mixtures of these two groups of chemicals are recommended for further study. Terbacil and bromacil as directed applications both damaged black currants. Stonecrop *(Sedum acre)*, which was resistant to simazine, was satisfactorily controlled with diuron.

INTRODUCTION

Some growers establishing plantations of black currants in the South Island use black polythene strip which, if laid effectively, may last for 2-3 years and give excellent weed control at the base of the crop. However where the polythene breaks down or insufficient labour is available for weed control during the early years of establishment, then herbicides may need to be used.

In this paper we report the results from field trials where herbicide mixtures were tested for control of weeds in the second and third years after black currant establishment. We also report the results of field trials studying alternative herbicides in a plantation where stonecrop had invaded following several years use of simazine.

MATERIALS AND METHOD

Three experiments were laid down at Edendale, Southland on a Waikiwi silt loam (soil organic matter 9%), and two at Outram, Otago on a Clutha silt loam (OM 4%). The cultivar was Magnus in all cases.

Herbicides were applied in 500 litres water/ha by precision sprayer while granular herbicides were applied by hand. All herbicides, rates and times of application are shown in the appropriate tables. Herbicides were 'directed' to avoid contamination of the base of the black currant bushes, except in Experiment 1 where the target included the lowest 5 cm of each bush. Weeds were assessed as percentage ground cover, or on a 1 to 5 scale where 1 = very poor to 5 = very good weed control. The mean scores of two and sometimes three independent observers is shown.

RESULTS

Exp. 1: The effect of directed sprays for control of established weeds in 14 month old black currants (Edendale)

The bushes in this experiment had been used 14 months previously for a study of various herbicides on newly planted cuttings. No residual effects on either black currants or weed community were evident except that dichlobenil and terbumeton/terbuthylazine had given better Californian thistle and annual weed control respectively resulting in weed community differences.

At the time of application (2.9.80) black currant buds were opening and a few were described as 'leafy buds'. Established weeds present were chickweed *(Stellaria media)*, grasses, volunteer cereals, shepherd's purse *(Capsella bursa-pastoris)*, spurrey *(Spergula arvensis)*, clovers *(Trifolium* spp*)* and docks *(Rumex* spp*)*. Few Californian thistles had emerged at this stage.

TABLE 1: Experiment 1: Effect of partially directed sprays in young black currants. % weed cover following a directed spray applied 2.9.80 to black currants planted 18.7.79.

Herbicide and rate kg/ha	Assessed 10.10.80		Assessed 23.6.81	
	Thistles	Annual weeds	Thistles	Annual weeds & grass
terbumeton/terbuthylazine 3.75	10 a	2 b	6 cd	4 d
terbumeton/terbuthylazine 5	22 a	0.0 b	11 bcd	1 d
terbumeton/terbuthylazine 10	15 a	0.0 b	2 d	0.0 d
dichlobenil 4.5	0.5 cd	38 a	4 d	71 ab
dichlobenil 6	0.0 d	34 a	4 d	26 c
dichlobenil 12	0.0 d	29 a	6 cd	47 bc
simazine 1 + glyphosate 1.6	13 a	0.0 b	25 abc	2 d
simazine 1.5 + glyphosate 1.6	16 a	0.0 b	32 a	4 d
simazine 2 + glyphosate 1.6	16 a	0.0 b	28 ab	0.0 d
chlorthiamid 5	6 ab	43 a	8 bcd	71 ab
chlorthiamid 7.5	1 bcd	46 a	5 cd	76 ab
chlorthiamid 10	2 cd	44 a	6 cd	62 ab
simazine 1 – dicamba 0.3 + glyphosate 1.6	7 a	0.0 b	34 a	8 d
simazine 1.5 + dicamba 0.45 + glyphosate 1.6	12 a	0.0 b	32 a	1 d
simazine 2 + dicamba 0.6 + glyphosate 1.6	13 a	0.0 b	34 a	6.5 d
untreated	8 a	85	5 cd	91 a
CV %	(1)	(2)	80	62
LSD 5%			20	32

(1) Original data shown, but analysis carried out on log transformed data and
(2) untreated controls also omitted from comparison with chemical treatments

The terbumeton/terbuthylazine and dichlobenil treatments were applied to the same plots as the previous year. The results of two assessments for ground cover by weeds are shown in Table 1. Terbumeton/terbuthylazine at all rates continued to give good control of all weeds except thistles.

Dichlobenil maintained good thistle control but failed to give acceptable control of other weeds. Chlorthiamid controlled thistles at rates above 5 kg/ha but also failed in controlling other weeds.

Simazine with added glyphosate and dicamba gave excellent control of all weeds but thistles; this may have been because few thistles had emerged at the time of application. Basal buds on black currants treated with these mixtures were killed but those just below the soil surface emerged subsequently. No effect was noted on either buds or subsequent foliage growing above the target area, nor was there any apparent effect on growth or general vigour of bushes in these or any other treatments.

Exp. 2 & 3: Comparison of herbicide mixutures for control of weeds established in the alleys between black currant hedges (Edendale).

Here the aim was to knock down existing vegetation, eradicate Californian thistles, and maintain weed free conditions until late winter when a routine programme using paraquat/simazine could commence. Exp. 2 was laid down (10.3.81) on Californian thistles, but to spray at their original height of 90 cm would have endangered black

currants, in leaf, on either side. Thistles were therefore mown to a height of 25 cm 10 days before treatment.

TABLE 2: Experiments 2 & 3: Effect of directed herbicide mixtures applied 13.3.81 for post-harvest weed control in black currant alleys, % ground cover of weeds.

Treatment	kg/ha	Exp. 2 Californian thistles 9.11.81	Exp 3 other weeds at 14.4.81	Exp 3 other weeds at 9.11.81
simazine	2.5	21 b	1 ab	23 ab
+ glyphosate	1.44			
simazine	3.75	25 ab	trace b	4 bc
+ glyphosate	2.1			
diuron	3.0	19 b	6 a	36 ab
+ glyphosate	1.44			
diuron	4.5	16 b	2 ab	11 bc
+ glyphosate	2.1			
simazine	2.5	19 b	4 ab	4 bc
+ dicamba	0.6			
simazine	2.5	41 a	4 ab	7 bc
+ dicamba	0.15			
+ MCPA	0.30			
simazine	2.5	43 a	1 ab	12 bc
+ amitrole T	4.4			
diuron	3.0	44 a	1 ab	10 bc
+ amitrole T	4.4			
simazine	2.5	28 ab	1 ab	5 c
+ glyphosate	1.08			
+ dicamba	0.6			
control - untreated		30 ab	18	75 a
CV %		(1)	155	(1)
LSD 5%			5.4 (2)	

(1) Original data shown, but analysis carried out on log transformed data
(2) Untreated controls omitted from comparison with chemical treatments

Assessment for % weed cover the following spring (Table 2) showed that poor control of thistles resulted although the under-storey of annual weeds was negligible under the thistles, with a mean of 8% cover in untreated plots.

In Experiment 3 the same treatments at the same date were applied to a mixed community of chickweed, ragwort *(Senecio jacobaea)*, dandelion *(Taraxacum officinale)*, grasses and willow weed *(Polygonum persicaria)* varying from 10 to 60% cover. Marked reductions in % weed cover the following spring are shown in Table 2, the higher rates of simazine and diuron giving significant weed control where glyphosate alone was the additive. However of the three additives dicamba gave better results than amitrol or glyphosate.

Exp. 4: Evaluation of herbicides mixtures for weed control in established black currants (Outram)

Herbicides selected as possible replacements for simazine were applied on 4.10.79 as directed sprays to black currants infested with stonecrop. Table 3 shows the result of assessment for stonecrop control and bush damage on 27.12.79 when the fruit was nearly ripe. Damage symptoms were confined to the foliage and consisted of chlorotic and discoloured tissue with leaf necrosis in severe cases.

TABLE 3: Experiment 4: Evaluation of directed herbicide mixtures in five-year-old black currants. Stonecrop control and black currant bush damage at 27.12.79, where 1 = very poor to 5 = very good stonecrop control, and 1 = very little to 5 = severe bush damage.

	stonecrop control	bush damage
terbacil 1.6 kg/ha	4.8	2.5
terbacil 3.2	5.0	4.0
lenacil 1.6	1.8	1.2
lenacil 3.2	2.0	1.8
diuron 0.8/bromacil 0.8	4.5	3.5
diuron 1.6/bromacil 1.6	5.0	4.2
terbumeton/terbuthylazine	2.9	1.4
terbumeton/terbuthylazine	3.9	2.1
diuron 1.5/paraquat 0.56	4.9	1.9
dichlobenil 6.0	1.9	2.0
dichlobenil 8.5	2.2	1.6
diuron 1.5/CIPC 2.0	2.1	2.2
untreated	1.0	1.9
CV %	14	29
LSD 5%	0.65	1.0

Except in the case of diuron/paraquat, good stonecrop control was usually associated with increased bush damage. Terbacil and bromacil are clearly not safe to use even at doses of 1.6 and 0.8 kg/ha respectively.

Exp. 5: Evaluation of diuron plus additives in established black currants (Outram)

Diuron 1, 1.5 and 2 kg/ha plus paraquat, diquat, or a mixture of both were applied (6.10.80) as a directed spray to stonecrop infested black currants. No fruit yields were obtained but diuron caused no visible effects on either foliage or the standing crop of fruit. Diuron gave better control of stonecrop than simazine and maintained similar weed free conditions for the season. Paraquat and the diquat/paraquat mixture were better additives than diquat for stonecrop control.

It was concluded that diuron could be substituted for simazine at equivalent rates for weed control together with similar crop tolerance.

DISCUSSION

A pattern was clearly established in Exp. 1, where the herbicides tested gave control of either annual or perennial weeds but not both. Terbumeton/terbuthylazine and simazine both gave good control of annual weeds for several months, although the lowest rate of these herbicides was only marginally efficient. Dichlobenil and chlorthiamid gave good control of thistles with the former initially being more effective. Rates of chlorthiamid probably need to be above 6 kg/ha for maximum efficacy and although initial suppression of thistles by terbumeton/terbuthylazine was unsatisfactory, some suppression may be achieved in the long run.

However most growth of black currants occurs from late spring to mid-summer. the crop tends to 'top-out' about February with little stem extension or leaf production from then on (K.R. McIntosh, pers comm), indicating early to mid season control of weeds is more important than late season control.

No effects on the crop were noted from successfully directed sprays in Exps. 2 & 3, however judging by the amount of Californian thistles which emerged the following spring it must be assumed that the trimming operation carried out prior to spraying reduced herbicide uptake through insufficient foliage area. Glyphosate as an additive reduced thistle cover more than did amitrole T, but there was little difference between

additives in controlling the more varied mainly annual weed community in Exp. 3. If 6 monthly applications of residual herbicides are required, it would appear that the lower rates of simazine (2.5 kg/ha) and diuron (3 kg/ha) may be adequate, although the first four treatments in Exp. 3 suggest that these rates may be too low. Simazine is probably the most widely used herbicide in established black currants (Cox 1980; Fryer *et al* 1980). Results from Exp. 4 confirm that uracil based herbicides, except the herbicidally weak lenacil, are not safe to use where alternatives to simazine are sought. However diuron had no visible effect on black currants while giving good control of the simazine resistant stonecrop. Further study with various additives, indicated that diuron could be substituted for simazine at equivalent rates for weed control together with visibly similar crop tolerance.

ACKNOWLEDGEMENTS

Thanks are due to the growers on whose properties the work was carried out, and to Dr G.H. Jowett for biometrical advice and assistance.

REFERENCES

Cox, T.I. 1982: Herbicides for berryfruit. Aglink HPP222, Ministry of Agriculture & Fisheries, Wellington.

Fryer, J.D. and Makepeace, R.J. 1978. *In Weed Control Handbook,* Vol II, Recommendations. Blackwell, Oxford.