CONTROL OF WINGED AND SLENDER WINGED THISTLES

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Summary

Eight trials are described. MCPA, MCPB, 2,4-D and 2,4-DB gave poor control of seedlings but good control of thistles 8-15 cm diam. MCPA and 2,4-D amine gave satisfactory control of larger thistles but MCPB and 2,4-DB did not. 2,4-D ester was inferior to MCPA or 2,4-D amine except on mature plants. Slender winged thistles (*Carduus pycnocephalus*) appeared more difficult to kill than winged thistles (*C. tenuiflorus*). Spraying in late autumn or early winter suppressed clovers least. Subterranean clover (*Trifolium subterraneum*) was damaged appreciably by 2,4-DB and severely by 2,4-D.

INTRODUCTION

Winged thistle is common throughout New Zealand as a weed of pasture, especially on steep ground, and in some districts also of lucerne (*Medicago sativa*) and arable crops. It shows a greater tendency to grow in patches than Scotch thistle (*Cirsium vulgare*) or nodding thistle (*Carduus nutans*). Slender winged thistle occurs in many parts of New Zealand but is common mainly in certain districts subject to drought, where it may often be seen growing among winged thistles. The two species are seldom distinguished although usually quite different when mature.

Hormone weedkillers have long been used against these thistles with varying results. High rates of 2,4-D — up to 2 kg/ha — have been used but do not always give good control, and often cause excessive damage to clovers, especially subterranean clover which is valuable in many places where winged and slender thistle grow. It is better to use a treatment which will cause less damage to clovers at a time favourable to good control of thistles. Accordingly, herbicides were tested mainly at rates 0.5-1.0 kg/ha. In two successive years, commonly used hormone weedkillers were applied

- (1) as soon as it was clear most thistles had germinated
- (2) when thistles had grown 8-15 cm diam.
- (3) at the large rosette stage
- (4) when most thistles were growing stalks and a few seed heads had formed.

Trials were located on heavy ground sloping steeply to the north at the head of a gully on the farm of Transport Holdings Ltd, 10 km from Tasman Bay. The site is well elevated, and free from heavy frost but subject to summer drought. A good mixture of perennial ryegrass (*Lolium perenne*), white clover (*T. repens*) and subterranean clover was grazed by sheep and cattle.

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Pasture Weeds

MATERIALS AND METHODS

The following materials were sprayed in water at 100 litres/ha without addition of other material:

MCPA	as potassium salt
MCPB	as sodium salt
2,4-D	as diethanolamine salt
2,4-D	as mixed butyl esters
2,4-DB	as sodium salt.

A hand-sprayer was used which gave droplets rather finer than from commonly used fan nozzles. Square plots of area 10 m² were used, six for each treatment, one randomly placed in each block.

Thistle control was scored subjectively on a 0-10 scale, which took account of size as much as number of thistles. In 1969 thistles were also counted. Clover vigour was scored subjectively on a 0-10 scale, taking into account both white and subterranean clovers. Least significant differences for $P < 0.05$ were calculated according to Student's t test but with variance pooled for all treatments.

RESULTS

The four trials done in 1969 are summarised in Table 1. Winged and slender winged thistles were assessed without regard to species. The trials were repeated in 1970, beginning a month sooner as appropriate for the earlier germination of thistles. 2,4-DB was not used because it had performed poorly in 1969. Results are summarised in Table 2.

TABLE 1: 1969 Trials

		Thistle Control		Clover vigour
		0-10 scale	percent killed	0-10 scale
Sprayed 24 April Assessed 31 Oct.				
MCPA	0.5 kg/ha	4.8	40	7.6
MCPB	1 kg/ha	5.8	40	8.2
2,4-D amine	0.5 kg/ha	5.0	52	6.2
2,4-D ester	0.5 kg/ha	3.2	0	6.0
2,4-DB	1.0 kg/ha	3.8	43	7.0
Untreated		0	—	8.2
L S D		2.0	—	1.6
Sprayed 23 June Assessed 31 Oct.				
MCPA	1 kg/ha	6.3	88	7.3
MCPB	1 kg/ha	5.5	74	7.0
2,4-D amine	1 kg/ha	6.0	84	5.0
2,4-D ester	1 kg/ha	6.7	84	3.0
2,4-DB	1 kg/ha	4.5	53	6.3
Untreated		0.8	—	8.3
L S D		2.5	—	1.1

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TABLE 1: 1969 Trials Cont'd

		Thistle Control		Clover vigour
		0-10 scale	percent killed	0-10 scale
Sprayed 26 Aug. Assessed 31 Oct.				
MCPA	0.5 kg/ha	6.5	92	6.2
MCPB	1 kg/ha	3.0	61	5.7
2,4-D amine	0.75 kg/ha	6.0	87	3.2
2,4-D ester	0.75 kg/ha	4.7	84	2.3
2,4-DB	1 kg/ha	2.7	59	4.0
Untreated		0.7	—	8.0
L S D		1.7	—	0.8
Sprayed 3 Oct. Assessed 25 Nov.				
MCPA	1 kg/ha	9.0	98	—
MCPB	1 kg/ha	5.8	69	—
2,4-D ester	1 kg/ha	8.5	100	—
Untreated		0.8	—	—
L S D		1.9	—	—

TABLE 2: 1970 Trials

Thistle control in arbitrary units (0-10 Scale)

Treated	12 March		22 April		25 June		12 Oct	
Assessed	7 Aug		23 Nov		12 Oct		23 Nov	
	kg/ha		kg/ha		kg/ha		kg/ha	
MCPA	0.5	4.6	0.5	6.4	0.75	7.4	1	4.8
MCPB	1	3.4	1	6.8	1.25	4.6	1.5	1.2
2,4-D amine	0.5	4.0	0.5	5.6	0.75	5.4	1	6.2
2,4-D ester	0.5	2.8	0.5	6.0	0.75	4.4	1	7.4
Untreated		0.4		0.0		0.0		0.2
L S D		2.7		2.0		2.6		0.8

Winged and slender winged thistles were mixed throughout the trial site sprayed in August 1969. In November surviving thistles were identified as to species and counted, with the results given in Table 3. Slender winged thistle appeared less susceptible to the herbicides than winged thistle but small numbers and variability between blocks prevented this being statistically significant.

Variegated thistles growing in the trial area were poorly controlled by spraying in March, but those sprayed six weeks later were all killed.

Cotula australis (*Cotula australis*), growing in small amount throughout the trial areas, showed no effect from any spray treatment.

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TABLE 3: Percentage control of slender winged and winged thistles treated August 1969

Treatment	Slender winged thistles	Winged thistles
MCPA	91	94
MCPB	45	64
2,4-D amine	86	88
2,4-D ester	81	88
2,4-DB	55	69
Untreated	0	0

DISCUSSION

Slender winged thistle has been regarded more tolerant of hormone weedkillers than winged thistle and this paper gives further support to this belief from comparison of thistles the same age growing on the same site.

2,4-DB performed poorly as expected, and caused some damage to subterranean clover. It can be recommended for control of winged or slender winged thistle only in lucerne, where however it often gives unsatisfactory control. MCPB performed better in the trials than 2,4-DB. At 1 kg/ha it controlled small thistles as well as MCPA at 0.5 kg/ha but damaged subterranean clover as much. Where white clover is the only clover, MCPB might be useful for control of winged or slender winged thistles in late autumn. In the presence of subterranean clover, MCPA at a lower rate is to be preferred.

The water-soluble 2,4-D amine controlled the thistles in a manner similar to MCPA, but damaged the subterranean clover much more. 2,4-D ester controlled thistles no better than MCPA or 2,4-D amine except when they were in stalk, and in spring gave excessive damage to both white and subterranean clover.

A surprising result was the poor control of seedling thistles both years. Control was poor with all chemicals but was worst with 2,4-D ester. It appears that winged and slender winged thistles are harder to kill as seedlings than as plants 8-15 cm diam. A similar result was obtained with variegated thistles sprayed when their true leaves were the same size as their cotyledons.

A close watch of the trial areas showed almost all thistles germinated within a short period in autumn. An appreciable number of thistles sprayed in April or June survived, but grew slowly for many months so that they never covered much ground, nor formed much seed. In contrast thistles allowed to grow until spring covered much more ground and were a greater nuisance, even after they were all killed. Spraying in spring causes much greater clover damage and is difficult with wheeled vehicles on steep ground when rapid clover growth makes pasture very slippery.

The author therefore recommends the use of light rates of MCPA in April-June when thistles are 8-15 cm diam., and the acceptance as a satisfactory result of such killing and stunting of winged and slender winged thistles as this provides. Killing all thistles appears not to be an attainable objective without heavy clover damage.