THE RELIABILITY OF HERBICIDES FOR BARLEY GRASS CONTROL

F. A. MEEKLAH and H. McROBB

Invermay Agricultural Research Centre, M.A.F., Mosgiel

Summary

The reliability of current herbicide recommendations for barley grass (*Hordeum* spp) control was examined at six sites in Otago. TCA 12.5 kg/ha, and to a lesser extent propyzamide 0.6 kg/ha, were the most variable, while ethofumesate 2 kg/ha, carbetamide 3 kg/ha, and TCA 5 kg/2,2-DPA 0.9 kg were the least variable.

INTRODUCTION

It has been shown (Meeklah *et al* 1970, Moffat *et al* 1970, Hartley *et al* 1972, Wasmuth *et al* 1972) that a number of herbicides can be used to control barley grass (*Hordeum* spp.) in New Zealand.

Within the Otago/Southland area recommendations can be made for the use of propyzamide, carbetamide, TCA, TCA/2,2-DPA, and ethofumesate, but only a few sites were involved in their evaluation. To test whether these recommendations are reliable over a wider range of conditions, a standard trial including the above herbicides was laid down over a number of sites from North to South Otago, and maintained under the normal grazing routine at each farm.

MATERIALS and METHOD

Six sites infested with barley grass were located in Otago by the Farm Advisory Division of the Ministry of Agriculture. Each site was sprayed with herbicides at the appropriate rate and time for barley grass control (see Table 2 for details). Trial design was a four replicate randomised block on each site. Soil organic matter was determined at each site (see Table 1). Soil moistures were also determined, the majority were within the normal range 25 to 35% for this time of year, and details are not shown. The trials were open for grazing according to the normal routine on each farm except during the necessary with-holding periods. Visual assessments of percent cover by three independent observers were made in December, during seed production by barley grass. Where biennial thistle control was considered necessary by the farmer

TABLE 1: LOCALITY, % SOIL ORGANIC MATTER, AND
GRAZING PATTERN FOR ALL SITES

Locality	Soil type	Organic matter	Grazing Management
Totara	Timaru silt loam	6.4%	Set stocking, young cattle
Wainakarua	Claremont silt loam	6.9%	Set stocking, sheep
Waikouaiti	Waikouaiti silt loam	11.0%	Set stocking, sheep
Allanton	Clutha silt loam	5.3%	Set stocking, sheep
Clarksville	Taieri silt loam	5.0%	Set stocking, sheep
Balclutha	Pomahaka fine sand	3.3%	Set stocking, sheep and cattle

Barley Grass and Ragwort

an overall basal treatment of 1.5 kg/ha MCPB was applied in September, i.e. at Wainakarua and Waikouaiti, but at the latter site MCPB was ineffective.

RESULTS

Barley grass control (Table 2)

Propyzamide, 0.6 kg/ha and TCA 12.5 kg/ha gave poor results at Waikouaiti for reasons unknown, possibly these two herbicides were more sensitive to the higher level of soil organic matter at this site. TCA was also poor at Totara, but all materials were adversely affected at this site. Ethofumesate 2 kg/ha, carbetamide 3 kg/ha and TCA 5 kg/2.2-DPA 0.9 kg/ha gave very good control at all six sites.

TABLE 2: BARLEY GRASS COVER % AT DECEMBER 1973

Chemical Rate kg/ha Site	Treatment rate and time					control
	ethofumesate		propyzamide		TCA/ 2,2-DPA	
	2 June	0.6 June	3.0 July	5/0.9 Sept.	12.5 Sept.	
Totara	1.4	1.5	1.1	2.1	6.6	9.0
Wainakarua	0.1	0.8	0.8	0.03	0.3	54.4
Waikouaiti	0.05	7.1	0.5	0.1	5.3	76.9
Allanton	nil	nil	nil	nil	nil	14.0
Clarksville	nil	0.02	0.02	nil	nil	29.0
Balclutha	0.2	1.7	0.4	0.4	0.6	56.0

Effect on other grasses and clover (Table 3)

Replacement species following barley grass control by ethofumesate were largely other grasses, principally perennial ryegrass (*Lolium perenne*). TCA/2,2-DPA and TCA also encouraged other grasses but clovers also increased. Propyzamide and carbetamide severely affected most grasses with subsequent slow recovery, although cocksfoot (*Dactylis glomerata*) and white clover (*Trifolium repens*) were less affected.

TABLE 3: COVER % OF OTHER GRASSES, CLOVER AND BROAD-LEAFED WEEDS AT DECEMBER, 1973

Site	Treatment					control
	ethofume- sate	propyza- mide	carbete- mide	TCA/ 2,2-DPA	TCA	
OTHER GRASSES						
Totara	70	40	28	50	44	54
Wainakarua	99	77	77	95	92	37
Waikouaiti	87	40	29	85	75	17
Allanton	100	55	48	78	69	62
Clarksville	100	12	32	45	42	19
Balclutha	60	10	6	24	21	25
CLOVER						
Totara	5	21	16	10	14	15
Wainakarua	2	4	3	0.1	2	9
Waikouaiti	0.5	8	13	6	3	6
Allanton	nil	43	49	24	31	22
Clarksville	0.3	84	65	54	57	22
Balclutha	36	37	30	69	74	10
BROAD-LEAVED WEEDS						
Totara	24	39	29	39	35	20
Waikouaiti	11	24	27	7	12	nil
Allanton	0.2	4	3	0.2	nil	nil
Balclutha	nil	33	42	6	5	4

Barley Grass and Ragwort

Effect on weeds other than barley grass (Table 3)

On some sites, broad-leaved weeds, particularly biennial thistles, tended to replace dead barley grass. These were less frequent in ethofumesate plots, but often more frequent with propyzamide and carbetamide.

DISCUSSION

Ethofumesate, carbetamide and TCA/2,2-DPA at the appropriate rate and time of application gave reliable control of barley grass over a range of sites from North to South Otago. Propyzamide was only slightly less reliable as was TCA alone, however, the reduction in barley grass cover remained very good.

The poorer results in relation to untreated controls were obtained at Toatira, where the longer grazing interval by cattle presumably caused two effects. It reduced the density of barley grass but encouraged rank growth. This suggests that control under cattle grazing is likely to be less successful. Similar results were obtained under cattle grazing in preliminary trials in the previous year (Meeklah, unpublished data).

However, elimination of barley grass may lead to an increase in other weeds, this effect may be reduced on some sites by the use of ethofumesate, if there is a sufficient nucleus of ryegrass to fill the void. On the other hand ethofumesate reduces clover incidence, this may be a disadvantage if thistles replace dead barley grass and clover, but where ryegrass increases a subsequent beneficial effect may be the depletion of excess fertility by vigorous ryegrass production.

Finally it was noticeable in the above study, that no barley grass sites for experimental use were offered from properties where rotational grazing is practised. Thus it may be of importance in future investigations of barley grass incidence, to survey the relative importance of the weed under rotational grazing and set stocking.

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