CONTROL OF MEADOW BARLEY GRASS IN PASTURE BY THE USE OF HERBICIDES

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Summary

Herbicides commonly used for barley grass (*Hordeum* spp) control were tested on meadow barley grass (*H. secalinum*). High rates of carbetamide or propyzamide gave good control, but pasture damage was severe. A high rate of ethofumesate gave reasonable control and left a good pasture cover although clovers were eliminated for some months. 2,2-DPA or TCA gave good control when applied at high rates in late July or early August but pasture damage was severe. A mixture of TCA + 2,2-DPA gave good control with minimal pasture damage when applied at higher rates.

INTRODUCTION

Meadow barley grass, although almost certainly present for some years, was first identified in New Zealand in January 1975 (Popay 1976). It occurs in pastures and along roadsides on the flat land near Porangahau in southern Hawkes Bay and has more recently been found further inland, near Wanstead.

Little is known about the effect of this species on stock health and animal products but it appears less damaging than common barley grass (*H. murinum*). Because it is a perennial species it may require reasonably moist soil throughout the year and is therefore unlikely to spread very far into dry hill country. However, it could become a constituent of many flat, east-coast pastures and care should be taken to prevent its spread.

Eradication of the species is probably impractical at this stage but information on chemical control is needed to help eliminate outbreaks in new areas.

METHODS

A trial was laid down in each of the three years 1976, 1977 and 1978 on a farm on Hunter's Road, Porangahau. In all three trials herbicides were applied with a propane-powered knapsack sprayer using a 1.5 m boom operating at 207 kPa applying 220 litres/ha. Plot size was 1.5 x 5 m and treatments were arranged in four randomised blocks. The ground was very wet at all times of spraying in all trials. At the time of spraying the 1976 trial the vegetation was long and ungrazed: the trial area was subsequently grazed by cattle, which tended to camp on certain plots. Both the 1977 and 1978 trials were on short, sheep-grazed pasture. The herbicides used, their rates of application and the dates on which they were applied are shown in Table 1.

Assessment of meadow barley grass control was by counting seed heads in a number of small quadrats placed at intervals along each plot. In the 1976 and 1977 trials ten quadrats, each 200 x 200 mm, were used per

Pasture Weeds

plot and, in the 1978 trial, four quadrats each 450 x 450 mm were used. Seed head numbers were assessed in late December each year. Visual estimates of ground cover of grasses, clovers and weeds were made at least once during the duration of each trial.

For statistical analysis of the data, a square root transformation was used. Data presented in the tables are back-transformed means, with LSDs back-transformed and modified to fit the mid-range of the data (D. F. Wright pers comm).

RESULTS

TABLE 1: Numbers of meadow barley grass seed heads/m² as a percentage of those on untreated plots.

Year of trial		1976	1977		1978	
Date of spraying		5 July	20 June	5 Aug.	14 June	26 July
Date of assessment		23 Dec.	29 Dec.		28 Dec.	
Herbicide Rate (kg/ha)						
carbetamide	1.5	105	-	-	-	-
	3.0	52	61	98	23	15
	6.0	-	4	0	0.5	0.1
2,2-DPA	2.0	-	131	107	145	126
	4.0	-	103	52	138	2
ethofumesate	1.0	69	-	-	-	-
	2.0	65	77	88	52	71
	4.0	-	19	9	8	14
propyzamide	0.25	-	98	126	113	101
	0.5	6	140	76	35	120
	1.0	4	-	-	-	-
TCA	8.0	-	88	79	104	14
	12.0	-	71	42	94	0.7
TCA + 2,2-DPA*	2.5 + 0.4	-	116	135	108	106
	4.4 + 0.8	-	116	120	114	78
	5.0 + 0.9	2	-	-	-	-
	6.3 + 1.1	2	-	-	-	-
untreated (actual numbers)		100 (255)	100 (124)		100 (141)	
LSD (p = 0.05)		32.5	39.2		19.4	
(p = 0.01)		43.1	51.9		25.6	

* a proprietary mixture containing 63% TCA and 11% 2,2-DPA

All the materials tested gave some reduction in seed head numbers in at least one trial, but even at the highest rates used eradication was not achieved consistently with any material. Carbetamide at 6.0 kg/ha gave nearly complete control. In the only year in which propyzamide at 1.0 kg/ha and TCA + 2,2-DPA at 5.0 + 0.9 or 6.3 + 1.1 kg/ha were tested, they also gave very good control. Ethofumesate at 4.0 kg/ha gave reasonably good control. 2,2-DPA at 4.0 kg/ha and TCA at 12.0 kg/ha only gave good control when applied in late July or early August and results varied from one year to the next.

With all treatments there was some reduction in pasture cover for the first one or two months after spraying. By late December, however, pasture cover was as good as on unsprayed plots for all ethofumesate

Pasture Weeds

treatments, although clover cover was drastically reduced. TCA + 2,2-DPA gave only slight reductions in pasture cover at that stage, whereas rates of 2,2-DPA or TCA which gave reasonable control of meadow barley grass also caused long-term pasture damage. High rates of propyzamide and carbetamide left 60-100% bare ground for over 5 months after spraying.

DISCUSSION AND CONCLUSIONS

Elimination of meadow barley grass with herbicides at rates selective to pasture species is unlikely. Where eradication is desirable, most of the usual total vegetation control materials would probably be adequate.

For partial control in pastures, carbetamide or propyzamide is probably too damaging to pastures, except perhaps where swards are rich in clovers. Ethofumesate eliminates clovers for some time but its use results in a good grass cover. At the rates required for reasonably good control of meadow barley grass, the costs of applying these materials would probably be uneconomic. A mixture of TCA and 2,2-DPA applied at rates of 5.0 + 0.9 and 6.3 + 1.1 kg/ha gave good control with minimum pasture damage in the one year in which these rates were tested.

Although no experimental work has been done on alternative methods of controlling meadow barley grass, observations on farms where it occurs have indicated that hard grazing during the spring reduces the density of seed heads emerging in the summer. Cultivation and cropping appears to eliminate the problem. Seeds are not likely to survive long in the soil (Popay 1975) but fence line populations need to be treated to reduce the chances of re-invasion.

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