EFFECT OF GRASS-SELECTIVE HERBICIDES ON CERTAIN PASTURE AND WEED SPECIES

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Grass weeds can be a major hindrance to the growth and development of arable crops. Species such as annual poa (*Poa annua*) can quickly form a ground cover which may affect crop seedling establishment, and later compete with the crop for moisture and nutrients. At harvest weeds can cause contamination of crops, such as lucerne hay or clover seed crops.

Selective post-emergence herbicides are available which have the ability to control grass weeds in broadleaf crops. Rahman *et al.* (1985) have adequately described the action of these materials. Results from trials conducted in the North Island in recent years have been reported, but because weed grass species, crops, and climatic conditions differ from those of the southern areas of New Zealand, results may bear only partial significance to this region. This paper reports findings from a preliminary study of the efficacy of five grass selective herbicides in Otago.

The trial was carried out at the Invermay Farm near Mosgiel on a recent alluvial Wingatui silt loam soil, and a 16-year-old perennial ryegrass/white clover pasture. The trial area was grazed by sheep and the sward allowed to regrow to approximately 15 cm prior to applying treatments. Individual plots 8 x 1.5 m and treatments including an untreated control were arranged in a fully randomised block design with four replications. The herbicides fluazifop-butyl (Fusilade), diclofop-methyl (Hoegrass 36 EC), haloxyfop (Gallant), quizalofop-ethyl (Zero) and clethodim (Centurion 240 EC) were applied at recommended rates and with recommended adjuvants on 24 October 1991. They were applied in 300 litres/ha of water at 200 kPa through 8002 fan nozzles, using a modified Oxford precision sprayer.

Pasture samples were taken pre-treatment on 24 October 1991 to measure sward species composition by harvesting two 0.03 m² samples per plot to 1 cm height and bulking within each replicate (Table 1). Post-treatment harvests were taken on 2 December 1991 and 22 January 1992 by harvesting four 0.1 m² quadrats per plot. Samples were dissected into component pasture species, dried and percentage composition of each species calculated. Data were subjected to analysis of variance. Between the post-treatment harvests, on 17 December 1991, the trial area was cut with a sickle mower and all topped vegetation removed.

A visual inspection 14 days after treatment showed that haloxyfop and clethodim were having the most immediate suppressive effect on grasses. There was slight burning of white clover (*Trifolium repens*) leaves by haloxyfop and quizalofop-ethyl.

Dissection results from post treatment cuts (Table 1) show that haloxyfop caused the largest reduction in the proportion of most grass species and except for yorkshire fog (*Holcus lanatus*) quizalofop-ethyl performed equally well, especially by the second harvest. The remaining treatments failed to give control of some species such as soft brome (*Bromus hordeaceas*) and rough-stalked meadow grass (*Poa trivialis*). Perennial ryegrass (*Lolium perenne*) and cocksfoot (*Dactylis glomerata*) as well as 'other grasses' viz timothy (*Phleum pratense*), crested dogtail (*Cynosurus cristatus*) and browntop (*Agrostis tenuis*) were controlled by most treatments by the time of the second harvest. Perennial ryegrass appeared initially to be tolerant to fluazifop-butyl, as previously reported by Hartley (1984) using higher rates of application.

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White clover did not appear to be affected by the herbicides, as was found earlier by Rahman *et al.* (1983), and the proportions shown in Table 1 largely correspond to the degree of variation in composition of grass species caused by herbicides.

Information derived from this trial provides a basis for more intensive research on the efficacy of grass-selective herbicides in the Otago-Southland region.

TABLE 1: Pre-treatment pasture composition and effects of herbicides on grasses at two harvests shown as percent total dry matter.

	Pre-treatment pasture	Herbicides and rates (kg ai/ha)					untreated	LSD (0.05)
		fluazifop -butyl	diclofop -methyl	haloxy -fop	quizalofop -ethyl	clethodim		
	24.10.91	0.25	1.125	0.25	0.133	0.180	-	
Harvest 2.12.91								
Ryegrass	28.4	17.7	7.8	3.7	7.2	3.3	29.8	9.4
Cocksfoot	3.4	0.8	3.2	0	0.1	0.1	6.0	5.9
Annual poa	3.3	7.2	2.1	1.3	9.3	0.3	0.9	8.4
Rough-stalked meadow grass	35.5	14.7	44.0	5.8	6.5	21.3	29.7	11.3
Soft brome	0	6.0	21.2	0.2	0.1	3.2	13.5	6.5
Barley grass	5.3	0.2	0.3	0.1	0.1	0.1	0.7	0.6
Yorkshire fog	10	0	3.1	0	21.9	0.8	4.3	12.4
Other grasses	4.8	3.3	5.0	1.7	1.3	2.5	8.6	7.4
White clover	3.3	26.7	6.1	41.4	21.8	32.4	3.9	10.2
Dead matter	3.6	18.9	5.3	38.2	25.1	25.9	2.9	9.5
Weeds	1.7	4.8	2.2	7.7	6.7	10.3	0.6	4.5
Total grasses	90.7	49.9	86.7	12.8	46.5	31.6	93.5	-
Harvest 22.1.92								
Ryegrass		6.4	2.7	0.1	1.1	0.3	16.2	3.7
Cocksfoot		0.4	2.7	0.2	0	0.4	14.6	5.5
Annual poa		0.06	3.0	0.03	0.1	0	0.1	3.5
Rough-stalked meadow grass		0.4	3.4	0.03	0.05	3.5	4.4	2.4
Soft brome		18.8	21.9	0.2	0	9.6	7.0	10.2
Barley grass		0	2.9	0.03	0	0.3	1.8	2.4
Yorkshire fog		2.8	4.3	0	9.0	2.2	3.1	6.4
Other grasses		0.4	4.9	0	0.3	1.2	6.6	4.4
White clover		63.5	43.0	94.2	83.6	68.0	23.0	17.3
Dead matter		3.6	10.4	0.7	1.4	2.9	22.2	5.9
Weeds		3.7	0.9	4.5	4.3	11.6	1.1	8.1
Total grasses		29.3	45.8	0.6	10.5	17.5	53.8	-

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