SELECTIVE GRASS WEED CONTROL

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SUMMARY

Four selective grass herbicides, alloxym-sodium, fluazifop-butyl, haloxyfop and sethoxydim were tested on seven grass weeds in Hawkes Bay during 1982-84. Haloxyfop was active on all grasses tested. Fluazifop-butyl gave moderate control of couch (*Elytrigia repens*), Indian doab (*Cynodon dactylon*), perennial ryegrass (*Lolium perenne*), barnyard grass (*Echinochloa crus-galli*) and summer grass (*Digitaria sanguinalis*) but was weak on knot-root bristle grass (*Setaria geniculata*) and rough bristle grass (*S. verticillata*). Sethoxydim was inferior to fluazifop-butyl on couch and Indian doab but superior to it on all other species. Alloxym-sodium showed a limited spectrum of good activity. There appeared to be no adverse effect of herbicide on onions, tomatoes, peach seedlings and young grapes.

INTRODUCTION

Grass weeds can become a serious problem in horticultural and field crops because they are very competitive and aggressive. The perennial grasses, such as couch and Indian doab, are particularly troublesome in field crops immediately following pasture because they can pass unnoticed in the pasture and only become obvious after the crop is sown. Annual grasses, such as summer grass, bristle grass and barnyard grass, present a problem because they germinate late, after the crop is sown, and then grow very rapidly in warm weather.

Recently a number of new herbicides have been developed with the potential of selectively controlling grass weeds in crops. Alloxym sodium, fluazifop-butyl (Stewart *et al* 1982) and sethoxydim (Naish *et al* 1982) are now registered in New Zealand while haloxyfop is still in the development stage. All show selectivity between grasses and other plants but their activity varies considerably between grass species (Rahman *et al* 1983). This paper reports some of the differences in activity on grasses in Hawkes Bay.

METHOD

A series of 13 trials was conducted during 1982-84, at various sites in Hawkes Bay to control couch, Indian doab, perennial ryegrass, knot-root bristle grass, rough bristle grass, summer grass and barnyard grass. Couch control was assessed in onions and tomatoes, summer grass in peach seedlings and knot-root bristle grass in young grape vines. Other assessments were made in the absence of crops.

Plot size varied from 2.5 to 30 m by 1 to 1.5 m and there were 3-6 replicates of each treatment. Herbicides were applied in 230 litres/ha at 210 kPa through Teejet 730 154 nozzles, using a propane-pressurised modified Oxford Precision sprayer.

Fluazifop-butyl (Fusilade) was applied with the addition of 1% wetting agent (Agral LN) to the spray mixture while sethoxydim (Alloxol-S), alloxym-sodium (Alloxol) and haloxyfop (Dowco 453) were used with 1% crop oil, (herbicide rates in Tables 1 and 2). Assessments were made by appropriate techniques, including visual estimate of ground cover or herbage mass and counts of individual plants or plant clumps. Results are expressed as percent control except for ryegrass where no untreated plots were left.

Crop yields were taken from both couch trials by harvesting 4 x 1.5 m/plot for onions and 3 m of row/plot for tomatoes. In one summer grass trial, height and diameter of eight peach seedlings/plot were measured. In the other trials no crop measurements were taken.

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RESULTS AND DISCUSSION

The percentage control of various grasses given by the different herbicides is shown in Tables 1 and 2.

Haloxifop showed good activity on all grasses tested, although three applications were necessary to obtain worthwhile control of established knot-root bristle grass. Fluazifop-butyl was the only other herbicide to give reasonable control of couch but it proved very weak on both bristle grasses and was not particularly good on Indian doab. Sethoxydim gave very good control of ryegrass, summer grass and barnyard grass and relatively good control of the bristle grasses but was very poor on couch and Indian doab. Alloxym sodium was only effective on ryegrass and summer grass but was not tested on barnyard grass.

Of the grasses studied, established knot-root bristle grass proved very difficult to control though seedlings were sensitive to sethoxydim and haloxifop. Couch control was greatly improved by repeat applications. Data, not presented, indicate that with fluazifop-butyl and haloxifop, two applications of 0.25 kg ai/ha 6 weeks apart were considerably better than a single application of 1.0 kg ai/ha. Both herbicides showed some residual activity on subsequent couch emergence.

Indian doab also proved difficult to control, particularly during dry conditions in 1983. Glyphosate was also applied to Indian doab with very poor results in 1983 and relatively good results in 1984 under better growing conditions.

The timing of treatment of summer grass (and probably other annuals) depends on the size of plants and the likelihood of further seed germination. When applied to tillered plants (and all advanced stages) sethoxydim gave a better kill than fluazifop-butyl. When applied to young seedlings fluazifop-butyl was equally good because any reduction in kill of existing grass was compensated for by greater soil residual activity as similarly found by Rahman *et al* (1983).

TABLE 1: Grass control

GS at treatment	Couch		Indian doab		Knot-root bristle grass		Barnyard grass
	10-20cm	10-20 cm	20 cm	15cm	10 cm	2-3 tillered	
Treatment date	18.10.83	30.11.83	14.1.83	23.1.84	17.10.83	19.1.84	early flower
Assessed	29.2.84	14.3.84	31.3.83	19.3.84	2.3.84	2.3.84	26.1.84
							19.3.84
Treatment	Rate kg ai/ha	%Control	%Regrowth control		%Control		%Regrowth control
untreated (clumps/m ²)	c.25	65					
fluazifop-butyl	0.25	71(2)					30
	0.5	86(2) + 81(2)	13	77	18#	17	70
	1.0	71	40	77	50#	50	100
	2.0		7 7				
sethoxydim	0.25						60
	0.5	75(3) +	3		61#	81	100
	1.0	76(2)	3		86#	93	100
	2.0		33				
haloxifop	0.25	89(2) + 90(2)		100		90	97
	0.5	90	100#	100	93#	86	100
	0.5	97(2) + 93(2)					
	1.0	92	100*	100	94#	100	100
LSD 5%		10.6 16	22.4	17.9	21.3	-	22.4

() = No. of applications. Retreatment date = 9.1.84 except for those marked with + which indicates sole or extra retreatment on 6.12.83

* = treated 12.2.83

= Applications repeated 1.12.83 and 19.1.84

TABLE 2: Grass control and effect on seedling peaches.

	Rough bristle grass		Summer grass			Ryegrass		
GS at treatment	Early flower	2-3 leaf	3-Stiller	2-3 leaf	Bolting	Vegetative		
Treatment date	23.12.83	23.12.83	24.12.82	15.2.83	15.11.82	15.5.83		
Assessed	19.3.84	23.1.84	31.3.83	31.3.83	18.1.83	10.9.83		
Treatment	Rate kg ai/ha	% Control	% control biomass	Peach ht (cm)	dia (cm)	% control	No./10m²	
untreated			full cover	59	6.4			
fluazifop-butyl	0.25		OF	67	77	10.1	84	
	0.5	3		73	72	9.7	92	53
	1.0			96	77	10.1		48
sethoxydim	0.25			63	70	9.2	93	
	0.5	83		88	71	9.5	92	3
	1.0			100	77	11.7		1
alloxydim- sodium	0.5		30F				88	25
	1.0	50					90	7
haloxyfop	0.125		80F					
	0.25	90	93					
	0.5	100						5
LSD 5%		41.1	25.7	25.8	12.2	1.9	15.9	19
								13

F = Seedlings flowering

Barnyard grass was in early flower when treated. Haloxyfop at 0.25 kg ai/ha killed existing plants and effectively prevented regrowth. Fluazifop-butyl had to be applied at 1.0 kg ai/ha to stop regrowth and even that rate did not kill all mature foliage. Sethoxydim at 0.5 kg ai/ha gave a similar result to fluazifop-butyl at 1.0 kg ai/ha.

Ryegrass was very sensitive to sethoxydim but was relatively resistant to fluazifop-butyl applied in both November and May. Alloxydim-sodium was more effective in May than November while haloxyfop was only tested in May, with good results.

There was no significant adverse effect on crop growth from any herbicide treatments with the possible exception of sethoxydim (1.0 kg ai/ha) and haloxyfop (0.5 kg ai/ha applied twice) on onions. However, haloxyfop at 1.0 kg ai/ha gave the highest onion yield indicating no adverse effect and the yield depression with sethoxydim (1.0 kg ai/ha) was probably caused by poor couch control during December. Tomato yields were not affected by any treatment. All plots were treated with glyphosate for couch control before tomatoes emerged and this may have given the tomatoes an adequate start to avoid couch effect on yield. However, plots with no treatment other than glyphosate were difficult to harvest.

All treatments tested improved the growth of peach seedlings. Though summer grass control was better at higher herbicide rates this was not reflected in peach seedling growth, indicating that a moderate level of summer grass control may be adequate. The grape growth was too variable to measure but there was no observable effect that could be attributed to herbicide treatment.

These new selective grass herbicides have good potential for grass control in crops. However, the variation in activity of different herbicides on different grasses will necessitate careful grass identification if optimal control is to be achieved.

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