HERBICIDE TOLERANCE OF SAINFOIN

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Summary

Sainfoin (*Onobrychis viciifolia*), a perennial leguminous crop similar to lucerne (*Medicago sativa*) has potential as an alternative to lucerne with the added advantage of suppressing bloat. The results of trials reported here show that trifluralin, EPTC, 2,4-DB, MCPB, propyzamide, paraquat, cyanazine, simazine, metribuzin, terbacil and oryzalin had no toxic effect on sainfoin at rates based on recommendations for their use in lucerne.

INTRODUCTION

Sainfoin is a legume agronomically similar to lucerne that has potential as a bloat suppressant. As with lucerne, weed control in this crop is important for optimum production. In North America sainfoin is managed similarly to lucerne, and is often grouped with lucerne in terms of herbicide use and tolerance (Waddington 1971; Sexsmith and Hanna 1971; Fryer and Makepeace 1972). There have been no reports however, from New Zealand, of herbicide use on mature sainfoin and only one report (Henderson 1977) of herbicides used during establishment. This paper reports on two trials which looked at the tolerance of sainfoin to a number of herbicides commonly used for weed control in lucerne.

MATERIALS AND METHODS

Trials were conducted at Reporoa and Ruakura on a Whenuaroa stony silty sand and a Te Kowhai silt loam respectively.

Trial 1 at Reporoa tested nine herbicides each at two rates (Table 1) applied during winter dormancy to a two year old sainfoin stand. Assessment was made by means of dry matter production, herbage dissections and a population count.

Trial 2 at Ruakura tested two pre-plant soil incorporated (ppsi) and three early post-emergence herbicides at two rates (Table 2). Assessment was by sainfoin population counts. This trial was repeated as a glasshouse pot trial using Horotiu sandy loam and standard screening techniques (Rahman and Cox 1975). Both field trials were of randomised block design with four replicates.

The herbicides used in the field were applied with a precision sprayer delivering 380 litres/ha and, where relevant, incorporated to a depth of 5 cm by raking in two directions. The herbicides used in the pot trial were applied with a moving platform pot sprayer applying 308 litres/ha and, where necessary, incorporated by hand to a depth of 5 cm.

RESULTS AND DISCUSSION

Of the herbicides tested on mature sainfoin cyanazine, terbacil, simazine, oryzalin, paraquat and metribuzin all resulted in higher sainfoin yields (Table 1). Hexazinone significantly reduced production and populations compared with control ($P < 0.01$) while asulam and 2,2-DPA reduced production significantly ($P < 0.05$) for the first cut only.

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New Crops

TABLE 1: Herbicide tolerance of mature sainfoin.

Herbicides Applied 2/8/77	Rates kg/ha	1st Cut 16/11/77		2nd Cut 2/2/78		Population+ 23/2/78
		% Sainfoin	Sainfoin DM+	% Sainfoin	Sainfoin DM+	
paraquat	0.5	87	113			99
	1.0					
asulam	1.5	73	78*	66	93	85
	3.0					
cyanazine	2.0	96	147	97	152	115
	4.0					
simazine	1.0	87	129			109
	2.0					
2,2-DPA	2.5	68	69**	84	96	99
	5.0					
metribuzin	0.7	82	107			102
	1.5					
hexazinone	2.0	99	47**	92	48*	48**
	4.0					
terbacil	0.7	94	136			119
	1.5					
oryzalin	1.0	86	113			112
	2.0					
untreated		74	100 (3070 kg/ha)	71	100 (2320 kg/ha)	100 (33/m ²)
CV %		37	26	35	40	20

+ dry matter or plant no. as % of that for untreated.

* significantly less than control ($P < 0.05$).

** significantly less than control ($P < 0.01$).

Trifluralin and EPTC left satisfactory populations at establishment (Table 2) and sainfoin was tolerant to propyzamide, 2,4-DB and MCPB at the 2-4 true leaf stage. Although the EPTC treatment resulted in some chlorosis of the second true leaf and the 2,4-DB treatment caused some twisting of the sainfoin, these effects were only noted in the pot trial.

These results only show if a herbicide is toxic to sainfoin at rates at which it would be expected to be applied to lucerne, and give no indication as to whether sainfoin would tolerate lower rates. However, if applied at a lower rate the level of weed control may not be acceptable. The susceptibility to 2,2-DPA was expected as it is also toxic to lucerne although the damage to that crop is not so severe. The effect of asulam was unexpected considering the tolerance of other legumes to this material. Although sainfoin is never completely dormant during the winter terbacil, simazine and cyanazine had no effect on the crop. Paraquat "browned off" the top growth but the sainfoin recovered by the time of the first cut in late spring. The effect of 2,2-DPA and asulam was typified by curling of leaves and stems and stunting of the plant while the effect of hexazinone was characterised by the rapid removal of smaller or weaker plants from the stand.

The other herbicides used in these trials had no toxic effect on sainfoin. However, further trial work with some of these herbicides, to determine their most economical rates for weed control in sainfoin, is required to confirm these results before firm recommendations can be made.

New Crops

TABLE 2: Herbicide tolerance of sainfoin during establishment.

Herbicides	Rates kg/ha	Population+	
		Field Sown 24/4/78	Glasshouse Planted 21/4/78
trifluralin*	1.0	111	98
	2.0		
EPTC*	4.0	108	92
	8.0		
propyzamide	1.5	91	100
	3.0		
2,4-DB	1.0	84	100
	2.0		
MCPB	1.0	96	100
	2.0		
untreated		100 (160/m ²)	100
LSD		33	26
CV %		11.87	8.7
+ % of untreated			

* PPSI field treatments applied 10 days prior to sowing and glasshouse treatments same day as planting.

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