

EFFECT OF HERBICIDES ON LOTUS CORNICULATUS

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Introduction

Lotus corniculatus (birdsfoot trefoil) is slow to establish and is susceptible to weed competition in its early stages. EPTC and, to a lesser extent, trifluralin have been used in the United States to reduce this competition, but both have the disadvantage that they must be incorporated after spraying. Several other herbicides which have shown promise for leguminous crops were therefore tested for their toxicity to Lotus corniculatus.

Methods and Materials

The cultivars Franco and Puławska were used for the trial. Ten seeds were sown in John Innes No. 1 compost (loss on ignition - 12%) in 9 cm pots and each combination of treatment and cultivar was replicated five times. The herbicides tested were Acumen (BASF; 20% bentazone, 20% MCPB, 8% MCPA; at 2.5, 5.0 or 10.0 litres product/ha); Basagran MCPB (BASF; 20% bentazone, 20% MCPB; at 3.0, 7.5 or 15 litres product/ha); Benfluralin (Lilly; 18% a.i.; at 5.0, 10.0 or 25.0 litres product/ha); Brasoran (Ciba-Geigy; aziprotryne; at 2.5, 5.0 or 10.0 kg product/ha); Butam (Midox; 72% a.i.; at 2.5, 5.0 or 10.0 litres product/ha); Butralin (Marks; 50% a.i.; at 1.0, 2.0 or 4.0 litres product/ha); Dacthal W75 (Midox; 75% chlorthal-dimethyl; at 8.0, 16.0 or 32.0 kg product/ha); Delozin S (Midox; chlorthal-dimethyl + methazole; at 5.0 or 10.0 kg product/ha); Enide SOW (Midox; 50% diphenamid; at 5.0 or 10.0 kg product/ha); Eptam (Murphy; 72% EPTC; at 1.2, 2.5 or 5.0 litres product/ha); Gesagard (Ciba-Geigy, prometryne; at 2.5, 5.0 or 10.0 kg product/ha); Herbon Pennout (CropSafe; 19.2% endothal sodium; at 2.5, 5.0 or 10.0 litres product/ha); Isopropalin (Lilly; 69% a.i.; at 1.0, 2.0 or 5.0 litres product/ha); Nortron (FBC; 20% ethofumesate; at 2.5, 5.0 or 10.0 litres product/ha); Opogard (Ciba-Geigy; terbutryne + terbuthylazine; at 2.5, 5.0 or 10.0 litres product/ha) and Treflen (Elanco; 48% trifluralin; at 2.5, 5.0 or 10.0 litres product/ha). All were applied in 200 litres/ha water with a Mardrive Laboratory Sprayer. Eptam and Treflen were applied and incorporated the day before sowing; Acumen and Basagran MCPB were applied when the plants were at the 2-3 leaf stage, 3 weeks after sowing, while all other herbicides were applied the day after sowing. The pots were kept in the glasshouse and the plants harvested after five weeks.

Results

There was no significant difference between the responses of the two different cultivars, and therefore the mean response is shown in Table 1.

Discussion

The two post-emergence herbicides, Acumen and Basagran MCPB, were very toxic to Lotus corniculatus even at the lowest rate used; weed control must therefore continue to be carried out with pre-emergence herbicides. The effect of these in the field will depend to some extent on the level of soil organic matter, but the organic matter content of the compost used was within the range normally found in soils in the West of Scotland and it is unlikely that the degree of damage caused in the field will differ greatly from that found in the trial. On that assumption, Brasoran, Gesagard and Opogard are likely to cause unacceptable damage.

EPTC causes no yield reduction even at the highest rate tested, while all other herbicides caused intermediate amounts of damage which may be acceptable if a reasonable level of weed control is achieved.

TABLE 1 Effect of herbicides on germination and total dry weight

Results expressed as percentages of untreated controls.

Herbicide	Rate (litres or kg product/ha)	Germination	Total D. Wt.
Acumen	2.5	96.0	11.5
(bentazone,	5.0	115.3	3.4
MCPB, MCPA)	10.0	99.6	0
Basagran MCPB	3.0	113.1	21.1
(bentazone,	7.5	96.2	0
MCPB)	15.0	108.0	0
Benfluralin	5.0	97.4	95.5
	10.0	102.3	75.7
	25.0	97.4	70.5
Brasoran	2.5	45.2	56.5
(aziprotryne)	5.0	2.2	2.8
	10.0	2.1	1.2
Butam	2.5	102.9	70.7
	5.0	98.6	52.7
	10.0	93.4	43.8
Butralin	1.0	93.3	96.7
	2.0	100.6	53.5
	4.0	106.0	29.5
Dacthal W75	8.0	96.2	94.9
(chlorthal-	16.0	100.1	61.5
dimethyl)	32.0	115.1	54.5
Delezin S	5.0	93.6	99.8
(chlorthal-dimethyl	10.0	101.0	81.1
+methazole)			
Enide 50W	5.0	98.7	91.8
(diphenamid)	10.0	102.3	54.8
Eptam	1.2	100.5	107.9
(EPTC)	2.5	90.7	85.2
	5.0	111.7	110.0
Gesagard	2.5	21.2	20.9
(prometryne)	5.0	0	0
	10.0	0	0
Herbon Pennout	2.5	95.2	87.4
(endothal)	5.0	90.5	63.2
	10.0	85.7	76.6
Isopropalin	1.0	101.0	97.0
	2.0	97.5	70.3
	5.0	97.4	68.6
Nortron	2.5	102.3	124.1
(ethofumesate)	5.0	105.2	96.8
	10.0	79.4	37.3
Opogard	2.5	72.4	58.8
(terbutryne +	5.0	7.1	6.1
terbutylazine)	10.0	2.1	1.6
Treflan	2.5	117.4	78.2
(trifluralin)	5.0	113.0	43.1
	10.0	103.5	23.6
S.E. (log transformation)		9.6	11.6

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