CHEMICAL WEED CONTROL IN LUPINS

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Eighteen herbicides were evaluated for crop tolerance and weed control in *Lupinus angustifolius* cv. 'Uniwhite'. Tolerance was good with all pre-plant and pre-emergence applied chemicals but the post-emergence treatments were generally quite damaging and only chloroxuron did not adversely affect the crop. Dinitramine 0.5 and 1.0 kg/ha applied pre-plant and chloroxuron 0.75 kg/ha applied post-emergence were the only treatments resulting in seed yields significantly higher than from the untreated control.

INTRODUCTION

Varieties of lupins (*Lupinus angustifolius*) grown for seed have shown promise as a valuable protein source. Unfortunately they do not provide good competition against weeds. Taylor (1962) stated that triazines generally show good safety towards lupins.

Four trials were conducted during 1974-75 to determine the tolerance of lupins (*Lupinus angustifolius* cv. 'Uniwhite') to specific herbicides and to evaluate each for weed control.

MATERIALS AND METHODS

'Uniwhite' lupins were sown in Tai Tapu clay loam soil on 23 September 1974 at the rate of 135 kg/ha (18 cm rows) and began to emerge after eleven days. The treatments (Tables 1 and 2) were arranged in a randomized complete block design using three replicates and a plot size of 2 by 10 m. All herbicides were applied with a bicycle-wheel plot sprayer delivering 224 litres/ha at 210 kPa and a rotary hoe was used to incorporate pre-plant treatments to the recommended depths. Seed was direct headed on 20 February 1975. Soil moisture reserves were sufficient to maintain satisfactory growth except towards the end of the growing season.

RESULTS AND DISCUSSION

The main weeds encountered were Californian thistle (*Cirsium arvense*), cornbind (*Polygonum convolvulus*) and wild turnip (*Brassica campestris*). In all trials damage due to grazing by hares caused substantial uncontrolled variation in plot yield so that large treatment effects were necessary before significant differences were established. The 48% yield increase from weeding, shown as non-significant in Table 2, would be significant using a one-sided test.

Lupins showed good tolerance to all pre-plant and pre-emergence herbicide treatments except RH 2915. This chemical caused some initial injury to emerging seedlings, but recovery was rapid. Of the pre-plant herbicides, only dinitramine 0.5 and 1.0 kg/ha gave a significantly better yield than untreated, and none was equivalent to hand weeding. This lack of yield response reflects the effect of failure to control wild turnip rather than susceptibility to the chemicals.

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TABLE 1: PRE-PLANT AND PRE-EMERGENCE HERBICIDES FOR WEED CONTROL IN LUPINS

Chemical	Pre-plant ¹ Rate (kg/ha)	Incorporation Depth (cm)	Chemical	Pre-emergence ² Rate (kg/ha)
dinitramine	0.5; 1.0	3 to 4	atrazine	1.0; 2.0
EPTC	2.0; 4.0	6 to 7	cyanazine	1.0; 1.5
fluchloralin	0.5; 1.0	4 to 5	dinoseb amine	1.5; 3.0
nitralin	1.0; 2.0	4 to 5	linuron	0.75; 1.5
penoxalin	0.75; 1.5	4 to 5	methabenzthiazuron	2.0; 4.0
trifluralin	0.75; 1.5	4 to 5	metribuzin	0.5; 1.0
			penoxalin	0.75; 1.5
			prometryne	0.5; 1.0
			propyzamide	0.5; 1.0
			RH-2915	0.5; 1.0
			simazine	0.75; 1.5

¹ Applied on 22.9.74.² Dinoseb amine applied on 1.10.74, all other treatments applied on 26.9.74.TABLE 2: SEED YIELDS OF LUPINS TREATED WITH POST-EMERGENCE¹ HERBICIDES

Chemical	Rate kg/ha	Crop Tolerance ² 27.11.74	% Weed control 27.11.74	Yield % of Untreated
atrazine	0.6	7.3	93	95 cd
	1.2	5.8	95	43 efg
bentazone	0.75	5.0	85	51 defg
	1.5	2.2	91	0
chloroxuron	0.75	10.0	82	183 a
	1.5	10.0	98	125 abc
methabenzthiazuron	0.8	6.3	93	78 cdef
	1.3	4.3	98	31 fg
metribuzin	0.4	6.0	96	76 def
	0.8	5.0	97	24 g
prometryne	0.4	6.8	85	81 cde
	0.8	6.8	97	70 defg
hand weeded		10.0	100	148 ab
untreated		10.0	00	100 bcd
untreated control yield kg/ha				900
CV %				30.2

¹ Dates of herbicide application — bentazon and metribuzin 25.10.74.
all other treatments 1.11.74.² Tolerance rating (0 = no tolerance; 10 = complete tolerance).

No pre-emergence herbicide treatments gave significantly better seed yield than was obtained from the untreated control. This can be partially attributed to the high levels of variation in the trials. However, weed control was observed to be superior with atrazine, cyanazine, metribuzin, RH 2915 and simazine.

New Crops

The post-emergence treatments gave good weed control, but all other than chloroxuron adversely affected the crop (Table 2). Only this treatment yielded significantly greater than untreated and equivalent to hand weeding. Both bentazon and metribuzin applied three weeks after emergence, severely damaged the crop.

In general, lupins show good tolerance to the pre-plant herbicides but use of these chemicals will depend on economic considerations, and the weed species present. A similar situation exists with pre-emergence herbicides; however, because of the variability experienced, further trial work is required. Of the post-emergence herbicides, crop tolerance ratings indicate only chloroxuron to be worth further investigation. Possibly some of the less damaging chemicals would be useful at lower rates.

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REFERENCE

- Taylor, R. L., 1962. Weed control in lupins. *Proc. 15th N.Z. Weed and Pest Control Conf.*: 160.

(Chairman's Summary Continued).

was tolerant to all of them except EPTC, although only napropamide provided sufficient weed control to enable a measurable dry-matter yield. Of the pre-emergence treatments metribuzin and linuron gave excellent weed control and were the only pre-emergence treatments to provide significantly higher yields. MCPB and metribuzin were the most promising post-emergence treatments.

Some difficulty was experienced when reading several of these papers in finding the critical weed control data to support conclusions which had been drawn and frequently descriptive phrases appeared to substitute for factual information. It was suggested to authors that whilst all six papers undoubtedly have added considerably to our knowledge of herbicides use in these new crops, some papers could have been markedly improved if more critical data had been included.