BENEFIN: PRE-EMERGENCE WEED CONTROL IN LUCERNE

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Summary

Benefin, incorporated at three rates before sowing, was compared with a post-emergent application of 2,4-DB for weed control in lucerne. Benefin at 1.5 lb/acre effectively controlled fathen (*Chenopodium album*), the main weed, and increased the dry matter yield of lucerne in the first cut tenfold: treatment with 2,4-DB doubled the lucerne yield.

INTRODUCTION

THE USE of benefin, the pre-emergent, soil-incorporated selective herbicide (N-butyl-N-ethyl trifluoro-2,6, dinitro-*p*-toluidine) an analogue of trifluralin, has been briefly described by Crowell (1965): an indication of selectivity to lucerne was given. Langer (1967) has described the effect of reducing light intensity on the growth of young lucerne plants. Allen (1967) pointed to the need to reduce competition from annual weeds during crop establishment to increase plant numbers or seedling vigour and briefly reviewed work on pre-emergent herbicides. Palmer (1968) concluded that annual weeds could affect production by increasing lucerne mortality.

With a gradually increasing acreage of lucerne and its possible use for dried products, further information on weed control both in the early and the mature stages is required: the elimination or reduction of competition at, and shortly after, seedling emergence could also have a marked effect on the long-term productivity of lucerne. The present paper gives the first season's results of a trial in which benefin was incorporated at different rates and compared with 2,4-DB applied post-emergence. Rates of application are given in terms of active ingredient per acre.

EXPERIMENTAL METHODS

The trial was located on a Hatfield silt loam soil at Chertsey, Canterbury. Treatments were applied in 25 gal/acre to plots, 12 × 60 ft, arranged in randomized blocks with four replicates.

Treatments were as follows:

1. Untreated.
2. 2,4-DB (16 oz) applied at the 3-true-leaf stage.
3. benefin (0.75 lb) incorporated before drilling.
4. benefin (1.5 lb) incorporated before drilling.
5. benefin (3.0 lb) incorporated before drilling.

Benefin was applied on November 1, 1968 and incorporated by cross-cultivation three times with off-set disc harrows set to cut to a depth of 5 in. and harrowed and rolled. Inoculated lucerne (variety certified Marlborough, Waiau strain) was drilled on November 6 at 20 lb/acre (60% germination) with 1½ cwt superphosphate and 1½ cwt of lime per acre. One ton of lime was applied before cultivation. 2,4-DB was applied on December 19, 1968. Lucerne and weeds were cut about one inch above ground-level and collected from an area 3 × 3 ft, selected at random within each plot. Weeds and lucerne were separated for dry matter measurements.

RESULTS AND DISCUSSION

Mainly fathen (*Chenopodium album*) with some shepherd's purse (*Cap-sella bursa-pastoris*) and mouse-ear chickweed (*Cerastium glomeratum*) germinated during the early stages of lucerne growth and by mid-December, established Californian thistle (*Cirsium arvense*) had recovered in patches over the trial area irrespective of chemical treatment. The percentage plant cover was visually assessed on December 19, at the time of application of 2,4-DB, and lucerne and weeds sampled on January 28, 1969: the results are given in Table 1.

The assessment of plant cover of December 19 shows that, in treatments 1 and 2, before 2,4-DB was applied, fathen was predominant and probably competing strongly with the seedling lucerne plants, particularly for light. The effects of this early competition were severe. Whereas 2,4-DB only doubled the dry matter yield of lucerne, benefin at 1.50 lb increased lucerne yields tenfold, indicating a marked benefit from pre-emergence weed control under these conditions. Benefin, at the highest rate of 3.0 lb appeared to suppress lucerne slightly and did not control shepherd's purse. Yield of lucerne in Treatments 1 and 2 was significantly lower than the mean lucerne yield of the benefin treatments.

After the trial area was mown for hay, marked differences in the extent of regrowth were evident, with the untreated plots showing restricted growth of lucerne. A plant count on April 15, 1969, indicated a lower plant mortality in the benefin treatments. It is likely, therefore, that late summer and autumn production and possibly production during the second year will differ between the different treatments.

TABLE 1: EFFECT OF BENEFIN AND 2,4-DB APPLICATION ON PERCENTAGE PLANT COVER AND DRY MATTER YIELD OF LUCERNE AND WEEDS

Treatment (lb)		%Cover*				Yield (lb DM/acre)		Lucerne Plants
		LU	FH	OW	BG	Lucerne	Weeds	per sq. ft on 15/4/69
1. Untreated		20	63	3	14	106	3634	24
2. 2,4-DB 1.00		16	77	1	6	208	1461	20
3. benefin 0.75		39	10	8	43	733	564	31
4. benefin 1.5		51	5	5	40	1072	221	30
5. benefin 3.0		40	0	10	51	872	172	28

*LU = Lucerne. FH = Fathen. OW = Other weeds. BG = Bare ground.
% Cover Visually Assessed.

ACKNOWLEDGEMENTS

The author wishes to thank W. Hood for the provision of the trial site and co-operation in laying down the trial and R. N. Arnst for assistance with field work.

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