Lucerne

LUCERNE ESTABLISHMENT AND WEED CONTROL

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Summary

Over the period 1969-74 three field trials were conducted to examine the effect of various herbicides on lucerne (*Medicago sativa*) plant number, and yield. Results showed that controlling annual weeds seldom increased seedling survival and only occasionally increased yield.

INTRODUCTION

Weeds associated with lucerne (*Medicago sativa*) establishment can be modified by cropping sequence, sowing date, cultivation, cover crop, herbicides and post-emergence management. In trials at Lincoln two of these, sowing date and herbicides, were examined.

METHODS

Three field trials were conducted with 4, 3, and 4 replicates respectively. Table 1 gives sowing dates and herbicide treatments. Herbicide treatments were chosen to give the best control of the weeds anticipated at each sowing date. Weed and lucerne components were determined from herbage dissection. In trials 1-3 plant counts were made after 5 months, 5 weeks, and 4-7 weeks respectively, and again after 19 months, 5 months, and 5-17 months.

In trial 1, 2,4-DB at 1.10 kg/ha and benfluralin at 1.68 kg/ha gave similar results and the mean of these two treatments is given. In trial 3 nitralin gave similar results at the February and March 1975 sowings and the mean of these two sowing dates are given.

RESULTS AND DISCUSSION

Weed growth

Herbicides always substantially reduced weed growth and where weed yield at the first cut was measured the reduction was always very significant (Table 1). However under some conditions, when not all weeds were controlled, the unaffected species responded more than the lucerne. In trial 2, fathen (*Chenopodium album* agg) was eliminated by 2,4-DB but ryegrass (*Lolium perenne*) and white clover (*Trifolium repens*) increased. In trial 3, chickweed (*Stellaria media*) was the dominant weed in autumn sowings, but its control increased shepherd's purse (*Capsella bursa-pastoris*) and storksbill (*Erodium* spp). Fathen was dominant in the September sowing of trial 3 and benfluralin, although decreasing total weed growth, increased the growth of storksbill.

As sowing was delayed in the spring through to December, the yield of weeds at the first cut declined. However, delaying sowing until December reduces lucerne establishment, nodulation, growth rate, and production (Wynn-Williams 1976).

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TABLE 1: EFFECT OF HERBICIDES ON LUCERNE ESTABLISHMENT AND YIELD

Sowing dates and treatment (kg/ha)										
Trial 1	Trial 2	1974	Trial 3							
Sept. 1969 2,4-DB 1.1 or benfluralin 1.68	Sept. 1972 2,4-DB 1.1	Feb. 26 nitralin 1.12 dinoseb 2.0	March 26 nitralin 1.12 2,4-DB 1.68	May 2 propyzamide 0.84	June 26 2,4-DB 1.68	Sept. 18 benfluralin 1.68	October 18 benfluralin 1.68	Nov. 19 benfluralin 1.68	Dec. 19 benfluralin 1.68	Feb. 18 March 7 nitralin 1.12
Final lucerne density (plant/m ²)										
untreated										
165	155	28	43	11	30	49	56	59	46	26
treated										
172	144	21*	41	8	42**	45	58	62	44	32
Yield 1st cut (kg/ha)										
lucerne										
untreated										
650 ¹	1110	1390	2100	3500 ¹	4010 ¹	880	680	1340	1350	560 ¹
treated										
780	1710**	2570**	800*	3260	4050	1170	1310**	1860**	1500	590
weeds										
untreated										
—	3650	1430	1240	—	—	2050	1940	1210	—	—
treated										
—	880**	370**	690**	—	—	900**	430**	210**	—	—

* Significantly different from untreated at 5% level

** Significantly different from untreated at 1% level

¹ Not 1st cut; previous growth not measured due to low lucerne yield and/or high weed content

— Weed content less than 5% of total yield

Plant density

On no occasion did a herbicide significantly effect the initial density of lucerne plants, and only in two sowings was the final lucerne density altered (Table 1). In February 1974 dinoseb reduced seedling lucerne survival, probably because of unfavourable weather prior to application. In the only June sowing the herbicide increased seedling survival. This supports the statement of Allen (1967) that reduced establishment because of weed competition is relatively rare, and is only likely to occur when abnormal climatic conditions favour weeds or hinder lucerne.

Lucerne yield

The response of lucerne to herbicides was confined to the first cut following sowing and not all were positive or significant (Table 1). In trial 2 and in the October and November sowings of trial 3, significant yield increases followed significant decreases in fathen. A significant yield response occurred in the February 1974 sowing in spite of a significant reduction in plant establishment. In trial 3 significant yield increases occurred on three occasions out of ten when the mean response was 730 kg/ha.

In March 1974 nitralin and 2,4-DB reduced total weed growth but shepherd's purse remained and became so dominant that lucerne yield at the first cut was reduced by 1300 kg/ha.

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CONCLUSION

The use of herbicides in lucerne establishment can only have long term beneficial effects if the weeds present are perennial or if they reduce stand density. Where annual weeds predominate, these trials and a previous one (Palmer 1968), showed that herbicides only increased stand density when conditions for lucerne establishment were less than favourable. At Lincoln, at least, the choice of sowing date should be based on considerations other than the need to avoid weed problems.

If a comparatively weed-free first cut of lucerne is important then the use of a herbicide will achieve this and occasionally will also increase yield. To obtain early and complete weed control as in lucerne stands sown for seed production in the year of sowing, it may be necessary to use two herbicides. No adequate control for storksbill in seedling lucerne is available.

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