WEED CONTROL IN LUCERNE ESTABLISHMENT

T. P. PALMER

*Crop Research Division, Department of Scientific and Industrial
Research, Lincoln*

Summary

Lucerne was sown at 5, 10, 15 lb per acre with barley, peas, linseed and alone, and sprayed with MCPB for fathen control. Fathen control in one year in one trial had no effect on yield in a subsequent year. In another trial, unsprayed plots failed completely while the rest established poorly.

LUCERNE is a valuable crop or pasture plant in lower rainfall areas once it is established, but in many situations produces little during the year when it is sown. During this establishment phase, it can be severely infested with annual weeds. Many of these weeds can be controlled by post-emergence spraying with chemicals (see Allen, in Langer, 1967), but the effect of such weed control on subsequent production from lucerne stands is not well documented, and farmer experience suggests that lucerne will tolerate heavy weed infestation during the seeding year without permanent detriment.

Lucerne is sometimes sown with cover-crops, and seed rates used vary from about 5 lb per acre to about 15 lb per acre, with about 8 to 10 lb as the usual. Variations in weed control treatments, sowing rates, and returns from cover crops all influence the direct costs of establishment or the loss of profits associated with establishing lucerne.

A series of trials to compare effects of variations in these treatments was commenced at Crop Research Division in 1966.

Trial Sown 1966:

Soil Type: Paparoa sandy loam.
Previous history: Pasture, winter fallow.
Sowing date: October 5, 1966.

Treatments:

Sown with barley, peas, linseed, alone.
Seeding rates: 5 lb, 10 lb, 15 lb per acre.

All plots sown with crop were sprayed with 10 oz of MCPB on November 17 for weed control. One lucerne treatment was similarly sprayed, and one not sprayed. Vegetation on the plots was analysed and weighed on December 16, crop yields were estimated, and production from the lucerne plots weighed from October 26, 1967, onwards.

RESULTS

From Table 1 it can be seen that plots sown with cover crops had fewer lucerne plants than plots sown alone. Spraying had no effect on numbers of plants, and numbers of plants were in direct proportion to seeding rates.

TABLE 1: NUMBERS OF LUCERNE PLANTS PER FOOT OF ROW
DECEMBER 16, 1966

Sown with					Sowing Rates (lb)			Ave.
					5	10	15	
Barley	....	....	....	....	5.5	8.5	11.3	8.2
Peas	....	....	....	....	3.8	7.0	11.5	7.5
Linseed	....	....	....	....	5.0	6.8	10.3	7.3
Lucerne (sprayed)	....	....	....	....	6.8	11.8	17.8	12.0
Lucerne (not sprayed)	....	....	....	....	5.5	12.5	18.5	12.3
Average	....	....	....	....	5.3	9.3	13.8	—

TABLE 2: RELATIVE GREEN WEIGHTS OF LUCERNE
DECEMBER 16, 1966

Sown with					Sowing Rates (lb)			Ave.
					5	10	15	
Barley	....	....	....	....	92	100	156	116
Peas	....	....	....	....	64	167	167	133
Linseed	....	....	....	....	160	160	260	193
Lucerne (sprayed)	....	....	....	....	160	343	561	354
Lucerne (not sprayed)	....	....	....	....	295	561	734	530
Average	....	....	....	....	154	266	376	—

Table 2 shows that plots with cover crops had a lower yield of seedling lucerne than plots sown alone, and sprayed plots had a lower yield than unsprayed plots. Yields of lucerne were higher from the higher seeding rates.

The main weed in the trial was fathen (*Chenopodium album*), with stork's bill (*Erodium* spp.), spurrey (*Spergula arvensis*), chickweed (*Stellaria media*), shepherd's purse (*Capsella bursa-pastoris*) as minor weeds. Composition by weight of the vegetation on the plots is given in Table 3.

TABLE 3: GREEN WEIGHTS OF WEEDS AND CROP, GRAMS
PER SQUARE FOOT
DECEMBER 16, 1966

					Crop Fathen Other Spp.			Total
Barley	....	....	....	....	83	18	18	120
Peas	....	....	....	....	90	18	27	135
Linseed	....	....	....	....	39	31	28	98
Lucerne (sprayed)	....	....	....	....		44	26	70
Lucerne (not sprayed)	....	....	....	....		43	28	71

Total amount of vegetation was greater on the plots sown with crop, but amounts of weed species considerably less.

CROP YIELDS

Because of bird damage, the linseed was not harvested, but was estimated to yield 15 cwt per acre, which would give a gross return of \$52 per acre. The barley yielded 77 bushels per acre, which at 85 cents per bushel would gross \$65 per acre, and the peas 34 bushels per acre which at \$1.60 would gross \$54 per acre.

The main difference between the sprayed and unsprayed lucerne plots at this stage was that stork's bill replaced fathen as the dominant plant in the sprayed plots.

LUCERNE YIELDS 1967-68

In Tables 4 to 8 lucerne yields from the various treatments are given in lb dry matter per acre from each cut.

TABLE 4: YIELDS OF LUCERNE IN LB D.M./ACRE
(CUT OCTOBER 26, 1967)

Sown with	Sowing Rates (lb)			Ave.
	5	10	15	
Barley	5,069	5,210	5,123	5,133
Peas	6,398	5,406	5,275	5,692
Linseed	6,180	5,276	4,992	5,483
Lucerne (sprayed)	4,687	4,338	4,033	4,352
Lucerne (not sprayed)	4,044	4,087	4,524	4,218
Average	5,276	4,863	4,789	4,976

TABLE 5: YIELDS OF LUCERNE IN LB D.M./ACRE
(CUT DECEMBER 11, 1967)

Sown with	Sowing Rates (lb)			Ave.
	5	10	15	
Barley	1,792	2,176	2,352	2,105
Peas	2,320	2,576	2,512	2,468
Linseed	2,304	2,192	2,336	2,277
Lucerne (sprayed)	2,448	2,720	2,136	2,434
Lucerne (not sprayed)	2,848	2,976	2,928	2,917
Average	2,342	2,528	2,453	2,441

TABLE 6: YIELDS OF LUCERNE IN LB D.M./ACRE
(CUT JANUARY 26, 1968)

Sown with	Sowing Rates (lb)			Ave.
	5	10	15	
Barley	2,184	2,344	2,200	2,242
Peas	2,296	2,216	2,304	2,272
Linseed	2,568	2,264	2,392	2,408
Lucerne (sprayed)	2,328	2,152	2,216	2,232
Lucerne (not sprayed)	2,576	2,416	2,624	2,538
Average	2,390	2,278	2,347	2,338

TABLE 7: YIELDS OF LUCERNE IN LB D.M./ACRE
(CUT MARCH 14, 1968)

Sown with	Sowing Rates (lb)			Ave.
	5	10	15	
Barley	2,296	2,264	2,280	2,280
Peas	2,160	2,368	2,392	2,306
Linseed	2,496	2,376	2,360	2,410
Lucerne (sprayed)	2,392	2,208	2,480	2,360
Lucerne (not sprayed)	2,312	2,376	2,504	2,397
Average	2,331	2,318	2,403	2,350

TABLE 8: TOTAL YIELD FOR YEAR OF LUCERNE
IN LB D.M./ACRE

Sown with	Sowing Rates (lb)			Ave.
	5	10	15	
Barley	11,341	11,994	11,955	11,762
Peas	13,174	12,566	12,483	12,740
Linseed	13,548	12,108	12,080	12,577
Lucerne (sprayed)	11,855	11,418	10,865	11,378
Lucerne (not sprayed)	11,780	11,855	12,580	12,070
Average	12,340	11,988	11,993	12,106

DISCUSSION

Over the first productive year of this trial, previous treatment, whether spraying for fathen control, variation in sowing rates between 5 lb and 15 lb per acre, or sowing with various cover crops, did not greatly affect production of lucerne. In this instance, the most profitable treatment would have been to sow the lucerne at 5 lb per acre with barley or peas, which would be sprayed for weed control for the sake of the crop, not the lucerne. If the lucerne were sown alone, no benefit was gained by spraying for fathen control.

TRIAL SOWN 1967

A similar trial to that sown in 1966 was sown in 1967.

Treatments were:

Sowing rates; 5 lb, 10 lb per acre.

Cover crops: Peas, barley, linseed, rape.

Lucerne alone sprayed with 10 oz of MCPB for fathen control.

Lucerne alone not sprayed for fathen control.

Establishment on all plots was very poor, and on the plots sown with barley, and on the plots not sprayed for fathen control, the lucerne was a failure. There was an average of 340 fathen plants per square foot on the trial, and with the apparently poor conditions for lucerne establishment, this amount of weed competition, or of competition from the fairly vigorous barley, was sufficient to prevent lucerne establishment.

GENERAL DISCUSSION

From results from these two trials, it appears that, when conditions are reasonable for lucerne establishment, inclusion of treatments to control annual weeds and high seeding rates are not reflected in higher yields of lucerne in subsequent years. Where conditions are marginal or sub-marginal for lucerne establishment, sowing with an aggressive cover crop such as barley, or failure to control a heavy weed infestation, may result in failure of the lucerne.

Some more fundamental questions must be answered before useful general conclusions can be drawn from work on weed control in seedling lucerne. It is not known what are minimum numbers of lucerne plant per unit area for high or maximum production, but the most economical method of sowing would be to aim at establishing this minimum number. The effects of weeds, diseases, insect pests or soil conditions on seedling establishment could then be investigated. Annual weeds, if they do not cause lucerne mortality, cannot permanently affect production from stands.

REFERENCE

Langer, R. H. M. (ed), 1967: *The Lucerne Crop*. A. H. & A. W. Reed, Wellington.