WEED CONTROL IN LUCERNE

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Summary

Results of three trials at the Wairakei Research Station carried out in 1968-9 season have shown that (1) direct drilling into chemically treated turf can compare favourably with cultivation, (2) better establishment and good weed control can be obtained by soil incorporating trifluralin and benefin before seeding, (3) established lucerne was completely tolerant to all weedicides used, except for a mixture of 2,4-DB and HZ 3456. Terbacil 2 lb and GS 13528 2 lb gave the longest control of weeds. No significant increases in yield of lucerne resulted from eliminating the weed competition present.

DIRECT DRILLING

Two half-acre areas of differing soil types were sown into lucerne. One quarter-acre on each soil was sown into conventionally cultivated ground, and the other quarter-acre directly drilled into turf treated with 2,2-DPA 5 lb + 2 oz dicamba per acre, followed by 4 oz paraquat per acre three weeks later. Both areas were adequately topdressed and seed was sown on November 7. Areas were grazed off on January 22, 1969, and harvested on April 23, giving the following yields of dry matter per acre.

	<i>Oruanui Sand</i>	<i>Atiamuri Sand</i>
Cultivated	1,710 lb	1,420 lb
Direct drilled	1,730 lb	1,560 lb

ESTABLISHMENT TRIAL

The same cultivated area as for the direct drilled trial was sown to evaluate whether lucerne seedlings established in a completely weed-free environment would result in a more vigorous and high yielding stand.

There were 6 replicates, randomized block, plot size 60 ft by 12 ft.

Chemical treatments were applied on November 1 and immediately double-discd in, and plots sown one week later. Four individual assessments of percentage of weeds present were made prior to a yield cut being made as given in Table 1.

TABLE 1: ESTABLISHMENT TRIAL

<i>Treatment</i>	<i>Total DM (lb/acre)</i>	<i>Weeds (%)</i>	<i>Lucerne (lb/DM)</i>
1. Control	1,320	58.5	550
2. Tyne harrowed	1,370	45.75	740
3. Trifluraline 0.5 lb	1,430	37.0	200
4. Trifluraline 1 lb	1,520	20.5	1,200
5. Benefin 1.5 lb	1,410	43.0	800
6. Benefin 3.0 lb	1,720	11.5	1,520

ESTABLISHED LUCERNE TOLERANCE

Tolerance of established lucerne to weedicides; plot size 27 ft by 5 ft 8 in., 5 replicates, randomized block. Chemicals applied on September 6, 1968, on to a stand of lucerne established in 1959 when plants were just emerging from the dormant stage. Major weeds present were *Poa annua* and chickweed (*Stellaria media*).

Yield cuts and herbage dissection samples were taken on the first and third cuts, and green yields only on second cut, and dry matter on fourth cut. Results are given in Table 2.

DISCUSSION

DIRECT DRILLING

Previous research has shown that weeds should be thoroughly killed by chemical treatment prior to sowing lucerne, as the lucerne seedlings establish better away from competition in a weed-free environment. Normal cultivation costs are high and, as pumice soils have a natural tilth, considerable rolling is often required to compact this soil again to ensure adequate consolidation, which is most essential to ultimate success.

As lucerne is playing an increasing role in raising the productivity of the pumice soils, direct drilling could become an important method of establishing this crop; particularly could this be so on areas where the contour is already suitable for harvesting, owing to previous levellings. Steeper areas where cultivation would be difficult and could cause erosion could also be established into lucerne for grazing alone. On areas very exposed to wind, direct drilling also could have a place. Using this method of establishment would substantially reduce costs, which would accelerate the number of areas established into lucerne, thereby increasing productivity on pumice soils, and the region generally.

ESTABLISHMENT TRIAL

Lucerne as a seedling cannot compete very successfully with strong weed competition. Experience shows that little production is obtained for the first growing season, as it takes this time for the plants to establish firmly. If these seedlings could be established in a completely weed-free environment, a more vigorous and high yielding stand should result.

Previous experience of establishing lucerne in this area has shown that, provided sufficient plants survive the first season, they have the ability to compete with sorrel (*Rumex acetosella*) the following season, with little

TABLE 2: ESTABLISHED LUCERNE TOLERANCE TRIAL

Treatment	10/12/68			20/1/69 lb/acre Green	4/3/69		28/4/69		Green Wt. lb/acre Total of 4 cuts
	Lucerne	Other Species	Total		lb DM/acre Lucerne	Total	lb DM/ acre Total		
paraquat 2 oz ...	2,950 aA	750 abABC	3,700 aAB	14,890 aA	2,630 aA	2,640 aA	1,300 aA	1,300 aA	50,520 aA
carbetamide 2 lb ...	2,840 aA	870 abAB	3,710 aAB	14,150 abA	2,350 abAB	2,450 aAB	1,130 abA	1,130 abA	47,680 aA
asulam 1.5 lb ...	2,730 aA	850 abAB	3,590 abAB	13,990 abA	2,520 aAB	2,570 aA	1,210 abA	1,210 abA	47,280 aA
GS 13528 2 lb ...	2,620 aA	30 cC	2,650 dD	11,830 cB	2,530 aAB	2,440 aAB	1,240 abA	1,240 abA	47,400 aA
Terbacil 1 lb ...	2,850 aA	440 abcABC	3,280 bcBC	13,910 abA	2,550 aA	2,560 aA	1,220 abA	1,220 abA	46,040 aA
Terbacil 2 lb ...	2,910 aA	70 cBC	2,990 cdCD	13,300 bA	2,550 aA	2,550 aA	1,210 abA	1,210 abA	43,320 aA
2,4-DB 1 lb/HZ 3456 1 lb ...	850 bB	300 bcABC	1,150 eE	8,990 dC	2,100 bB	2,130 bB	1,070 bA	1,070 bA	28,840 bB
RH 315 2 lb ...	2,850 aA	650 abABC	3,500 abAB	14,340 abA	2,400 abAB	2,430 aAB	1,150 abA	1,150 abA	46,240 aA
Control ...	2,850 aA	970 aA	3,810 aA	14,450 aA	2,490 aAB	2,560 aA	1,180 abA	1,180 abA	49,400 aA
CV %	17.1	75.2	8.6	6.2	9.0	8.4	12.1	12.1	13.1

depletion of yields. If this is so, it could well be that, as plant survival until the pre-dormant stage even on the control area appears adequate, next season's yields of lucerne may not be so spectacularly different. Pre-plant soil incorporated chemicals have never previously been evaluated in this area, and, at the higher rates of benefin and trifluralin, the resultant freedom from weeds and increased plant density may well contribute economically to increased yields in succeeding years. In this experiment lucerne tolerance to trifluralin was satisfactory. This is not usual and benefin should be the control employed.

ESTABLISHED LUCERNE TOLERANCE

Mismanagement of lucerne on pumice soils, caused by lack of adequate nutrients and injudicial grazing in particular, lead to the invasion of weeds and the subsequent running out of the stand.

From the results obtained, it is apparent that, when a stand of lucerne is adequately supplied with nutrients and good management, no loss of production occurs when only the more annual type of weeds are predominant. In these circumstances, weeds contributed 25% of the total yield in the first cut on the control plots, and by the third cut contributed only 2.7% of the total yield. This then shows that *vigorous* lucerne has the ability to compete with annual type weeds.

Annual type weeds do, however, make the physical part of the first harvesting of lucerne extremely difficult in that they cause repeated blockings of the mower. For this reason alone, and more particularly so if barley grass (*Hordeum murinum*) is present, the use of weedicides even in the more vigorous stands of lucerne could well be justified.

It is in the less vigorous, less well-managed stands that chemicals can really assume importance in knocking out competition. This would need to be carried out before any improvements and recommendations for the use of adequate nutrients would result in any real lasting effect.

ACKNOWLEDGEMENTS

To Imperial Chemical Industries (N.Z.) Ltd., Hamilton, and in particular to P. P. Williams, for the use of their drill, discussion on rates, and encouragement; to L. Prior of Elanco Products for supplying the trifluralin and benefin; to B. Burney for applying the chemicals in the tolerance trial; to the laboratory staff at Ruakura for the dissections made; to D. Wright of Biometrics section for the statistical analyses, the authors record their grateful thanks.