THE EFFECT OF SPRAYING ON FAT LAMB PRODUCTION

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SUMMARY

CLOVER suppression in pastures treated with ethyl ester of 2,4-D in late spring has been associated with a highly significant depression in the growth rate of lambs. Partial recovery of clovers did not improve relative liveweight gains. Prima facie evidence exists of the importance of the clover component in increasing the nutritive value of pasture for fat lamb production. It is suggested that the nutritive value of the intake on treated areas was restricted first by the initial suppression of clovers and later by the growth form of recovering clovers.

INTRODUCTION

Field observation has suggested that reduced growth rate in lambs has followed clover suppression in fattening pastures sprayed with hormone-type weedkillers. This was confirmed at Invermay Research Station in the 1955/56 season and reported to this Conference in 1956 (1).

Both the ethyl ester of 2,4-D and MCPA applied at 1lb. acid equivalent per acre reduced the clover content of the pasture and resulted in a significant reduction in the growth rate of lambs over a grazing period of 2 months. The full effects of the treatments were, however, masked by extremely dry conditions in the second month which combined with consistent heavy grazing not only prevented recovery in clover growth but also severely reduced the clover content of untreated pasture.

In replicated mowing trials Maclean (2) has shown that applications of 2,4-D at the spring flush caused severe damage to white clover and significantly reduced pasture yields, this latter effect persisting into the autumn though clover had by then recovered. Summer applications caused little if any damage in terms of ground cover of clover and only small reductions in pasture yields. Autumn applications were again associated with a period of susceptibility.

Meeklah (3) found that summer application of 2,4-D in a season where active growth was still being made caused severe clover suppression and reductions in yield persisting for 2 months after application.

Though it appears that more or less complete recovery of clovers can only be expected if favourable growing conditions follow and grazing is lenient, the effect of even a relatively short period of suppression on the productivity of grazing animals needs to be fully understood.

EXPERIMENTAL AREA

Twelve acres of 5-year-old pasture fully dominant in perennial ryegrass and white clover were divided into six 2-acre paddocks. Three were allotted at random to the spray treatment and each paired with an appropriate control. Replication of treatments was used to increase the reliability of the lamb production data. The design did not therefore provide for the full analysis of pasture production and composition differences. The apparent uniformity of pasture composition was confirmed by point analysis before treatment and a moderate infestation of Californian thistle covered the area. The pasture was heavily grazed before subdivision, but at the time of treatment had recovered to the 3in. level.

SPRAY TREATMENT

To avoid further subdivision with watering and access difficulties one spraying treatment only was applied. Ethyl ester of 2,4-D implicated in clover suppression effects and widely used for the control of difficult perennials in pasture was applied at 1lb. acid equivalent per acre in 10 gallons of water on 14/11/56 in the early morning of a hot, dry day. On the following day 0.31 in. of rain was recorded.

STOCKING AND MANAGEMENT

Two days after treatment the area was stocked. Ninety Romney ewes with single lambs approximately 2 months of age were drafted from a larger group composed of 10 days lamb drop. A relatively high degree of uniformity in age, initial liveweight, and stage of lactation was thus obtained. After being tagged and weighed 15 ewes and lambs were randomised into each of the 6 paddocks. In anticipation of pasture control difficulties a further 2 dry ewes per acre were added. The initial stocking rate was therefore 9½ ewes and 7½ lambs per acre.

Consistent rain fell throughout November and December and feed became difficult to control. All paddocks were topped with the mower on 27/11/56 both for pasture control and to reduce a strong growth of Californian thistle on the control areas. Stocking rates were again increased on 13/12/56 by the addition of a further 5 dry ewes per acre for a period of 7 days, after which satisfactory control was maintained with the experimental animals for the remainder of the trial period.

Lambs were weighed at the midpoint and at the conclusion of experimental grazing, 16/1/57.

PASTURE MEASUREMENTS

Total pasture production was measured by frame enclosures placed immediately after the application of treatments. Herbage from these frames was dissected into grass and clover components at each cut.

Repeated point analyses of 24 permanent quadrats, 4 in each paddock, indicated the changing status of the clover within those delineated areas. The 5 per cent. initial difference in clover content (Table 2, 16/11/56) is characteristic only of the particular quadrats analysed, as preliminary point analysis had established the essential similarity of all 6 paddocks.

Neither method of evaluation is strictly indicative of the relative intake of grass and clover by the free grazing animal under set stocking. Dissection of herbage cut from frames is more comparable to intake under conditions of periodic rapid grazing following spelling. Point analysis on the other hand will not necessarily indicate the amount of clover readily available for grazing, particularly where active growth is retarded, the leaves small, and the growth form prostrate.

RESULTS

Typical signs of clover damage were seen and graphic differences emerged in the frame enclosures after 3 weeks, when suppression of active growth was virtually complete. Herbage dissection at this time recorded 26 per cent. and 3 per cent. in control and treated frames respectively. Point quadrats at this time showed a lesser decline in clover density, but the growth form was prostrate and characteristic of the dormant plant (Table 2).

Under favourable conditions for pasture growth and the absence of grazing a complete recovery of clover in frame enclosures was recorded by January. The clover status of quadrats also improved, but it is possible that the pressure of continuous grazing did not allow complete recovery. Further improvement followed the conclusion of experimental grazing and a reversion to periodic grazing and spelling in the autumn.

Pasture production data are presented in Table 1.

Table 1—PASTURE PRODUCTION IN LB. DRY MATTER PER ACRE

		Clover	Grass	Total
Period ending 10/12/56	Control	910 (26%)	2590	3500
	2,4-D	80 (3%)	2590	2670
	Difference	830	—	830
Period ending 16/1/57	Control	650 (39%)	1010	1660
	2,4-D	500 (39%)	780	1280
	Difference	150	230	380

A loss of total dry matter production of the order of 24 per cent. but falling short of statistical significance has been recorded in each of the 2 sub-periods. In the first this is shown to be entirely associated with the clover fraction which was significantly lower. In the second, however, grass production also had declined on treated areas.

Though this lower production became evident in the closer grazing of treated paddocks toward the concluding stages of the trial, at no time was stock intake restricted and it will be recalled that even in mid-December pasture control with additional sheep was still necessary.

Changes in clover density in point analysis quadrats are shown in Table 2.

Table 2—WHITE CLOVER AS A PERCENTAGE OF THE SWARD

	16/11/56	14/12/56	18/1/57	27/3/57
Control	34	35	39	44
2,4-D	30	26	33	37
Sig. of difference	NS	1%	NS	NS

At the analysis of 14/12/56 only, did it significantly differ from control.

GROWTH RATE OF LAMBS

Over-all lamb growth rates were satisfactory, particularly when seasonal conditions favoured both parasite infestation and disorders of the feet. In the first month the liveweight of control and treated lambs increased at 0.54lb. and 0.46lb. per day respectively, falling to 0.32lb. and 0.28lb. per day in the second month. It was apparent that in spite of an improvement in clover levels the quality of the pastures was declining in the summer, following a tendency of the ryegrass to seed.

Lamb liveweight gains (mean of 45 lambs per treatment) are recorded in Table 3.

Table 3—LIVEWEIGHT GAINS IN LB.

Period ending	Control	2,4-D	Difference
11/12/56	13.93	11.87	2.06
16/1/57	11.38	9.64	1.74
Total	25.31	21.51	3.80

Analysis of variance showed the difference in liveweight gain of 3.80lb. to be significant at the 1 per cent. level. A marked uniformity in the performance of lambs on similarly treated paddocks indicated that little of the variance could be associated with pasture or unknown differences in such paddocks.

This loss represents 14lb. dressed lamb per acre.

DISCUSSION

Total liveweight gains in this trial are very similar to those obtained in the previous season. In the 1955/56 trial the greater part of the liveweight

differential appeared at the end of the first month under conditions of extreme clover suppression but abundant available feed. In the following dry period when the clover content of both treated and control areas had declined still further the daily rate of liveweight gain dropped by half. It was nevertheless similar in both groups.

The relationship of these gains to the strongly contrasting pasture conditions led to the suggestion that the lamb growth rate was less a function of feed availability than of the differing nutritive value of the pastures when clover suppression was at a maximum.

In the 1956/57 trial a difference in growth rate again followed clover suppression. However, the partial recovery of clovers in the later stages of grazing was not associated with a recovery in the growth rate of treated lambs relative to control. It is probable that the prostrate growth form of the clovers resulted in reduced intake and the nutritive balance still lay in favour of the untreated pasture, the clover of which continued to make active growth.

Valid conclusions depend on a reliable estimate of the total intake of the grazing animal and the digestibility and nutritive value of that intake. Where selective grazing can operate under ample feed conditions small differences in measured sward composition do not necessarily imply differences in the nutritive value of the feed intake. Prima facie evidence does exist, however, of the importance of the clover element in pasture for fat lamb production.

Significant differences in lamb growth rate develop in the period of suppression. Later pasture spelling may assist more rapid recovery, but even the possibility of complete recovery under favourable conditions will not reduce the importance of the loss already sustained. This loss may, however, be the most acceptable alternative, particularly where thistle infestation is so dense as to render the paddock unsuitable for fat lamb grazing or where only a small proportion of total area for fattening is involved. The recognition of the direct effects of clover suppression on production will then become one of many factors to be considered in the enlightened management of grazing pasture.

REFERENCES

1. Lewis, K. H. C. Proc. 9th N.Z. Weed Control Conference 1956, Page 101.
2. Maclean, S. M. Proc. 9th N.Z. Weed Control Conference 1956, Page 94.
3. Meeklah, F. A. Proc. 10th N.Z. Weed Control Conference 1957.

DISCUSSION

Q.—Where bloat is a problem is it a good idea to spray to reduce the clover contents?

A.—I doubt if it is a sound practice, as we are dependent on clovers for a good pasture. The results may be less bloat, but also less production.