# EFFECT OF LAMBING DATE ON THE UTILIZATION OF GRASS/CLOVER AND LUCERNE PASTURES DURING MATING

N. A. THOMSON and K. T. JAGUSCH*
*Lincoln College, Canterbury*

SUMMARY

The utilization of grass/clover and lucerne pastures grazed by ewes lambing early (August 20) and late (September 20) was investigated through the flushing period. To achieve a positive liveweight response in ewes the average single grazing utilizations were: 58%, lucerne early; 54%, grass early; 43%, lucerne late; and 48%, grass late.

There was a significant linear relationship between utilization of grass/clover pasture and liveweight gain ($r = -0.65$) with an 80 g/day decrease in liveweight/10% increase in utilization. Ewes maintained liveweight at a utilization of 65%. Total dry matter available/grazing was the major positive factor affecting utilization and liveweight gain with increasing proportions of dead material in the swards having a negative effect. This effect was more marked in the groups flushed later in autumn. Utilization of lucerne for positive liveweight gain appeared to be affected by the low quality of residual material, 12.4% protein and 54.8% acid detergent fibre. Mating of ewes on lucerne resulted in a significant depression in lambing percentage compared with the ewes mated on grass/clover pastures.

## INTRODUCTION

PRODUCTIVE EFFICIENCY of a sheep pastoral system is dependent on three factors:

(1) The annual dry matter (DM) production.

(2) The proportion of annual pasture production consumed by the grazing animal — *i.e.*, utilization.

(3) The conversion of consumed DM to salable animal products.

To efficiently maximize productivity within a system, management should be such that neither pasture nor animal production is compromised. This can be achieved through a clear definition of the critical phases of ewe nutrition and the factors affecting pasture productivity. Investigations conducted at Lincoln College

*Present address: Ruakura Agricultural Research Centre, Hamilton.

(Coop, 1950; Coop and Hill, 1962; Coop and Clark, 1969) have identified those periods critical to ewe nutrition, namely, at mating, prior to lambing, and after lambing. Factors of management required for optimum growth of grass/clover and lucerne pastures have been documented by Brougham (1968) and Jansen (1975a, b), respectively. The conclusions from these investigations have been drawn in isolation from the pastoral system, yet the compatability of ewe and pasture productivity is not clearly understood.

Since utilization is a major factor governing the overall efficiency of the pastoral system, a knowledge of this and other factors affecting utilization must lead to greater understanding and to ways of improving the pastoral system. This was investigated with ewes grazing either grass/clover or lucerne pastures through the flushing period and the results are reported in this paper.

## EXPERIMENTAL

Coopworth ewes were run under the following four systems:

1. A grass/clover pasture, ewes lambing August 20 (grass early).
2. A grass/clover pasture, ewes lambing September 20 (grass late).
3. A lucerne pasture, ewes lambing August 20 (lucerne early).
4. A lucerne pasture, ewes lambing September 20 (lucerne late).

The ewes were drenched with selenium prior to flushing and mineralized salt licks containing copper, cobalt, and iodine were available to those grazing lucerne.

Grazing management was governed by the following aims:

(a) To achieve an adequate level of available herbage to meet the nutritional requirements of the ewes for growth.
(b) To graze pastures at an intensity and duration known not to affect the subsequent production.
(c) To allow pastures sufficient time to recover such that near maximum DM was produced prior to each grazing.
(d) To feed supplements sufficient to meet requirements when there was a shortfall of pasture.

The stocking rates on the two pastures were calculated from reported annual dryland DM productions in the Lincoln environment (7 000 kg DM/ha grass/clover; 10 000 kg DM/ha lucerne) and the annual DM requirements for a ewe reported by Jagusch and Coop (1971). Stocking rates of 15 and 20 ewes/ha were

employed on the two pastures, respectively. A four-paddock system (0.84 ha/paddock) was adopted for each treatment thus stocking the grass systems at 52 ewes and the lucerne systems at 68 ewes.

Pasture production was measured using the technique of Jones and Haydock (1970). This involved the use of the electronic capacitance meter to determine the "mean reading" for the paddock immediately prior to grazing. Three areas of "mean reading" were protected from grazing with pasture cages. At approximately two-weekly intervals or when stock were shifted off the paddock the three protected areas were cut to determine total available DM (area harvested/sample was 0.28 $m^2$). At the same time the residual DM was similarly determined. All cuts were made to ground level using a shearing hand-piece. Individual samples were collected, washed, and dried for yield determination then bulked and ground for analysis of protein and acid detergent fibre (ADF).

A separate sample from each position selected for total available and residual yield was collected and bulked for botanical analysis into grass, clovers, weeds and dead material for grass pastures, and lucerne, grasses, clover, weeds and dead material for lucerne pastures.

## RESULTS AND DISCUSSION

The aim through the flushing period was to achieve a 7 kg increase in liveweight over a six-week period commencing three weeks prior to mating. While an inverse relationship was found between ewe liveweight gain and pasture utilization with grass/clover swards (Fig. 1), no clear linear relationship could be

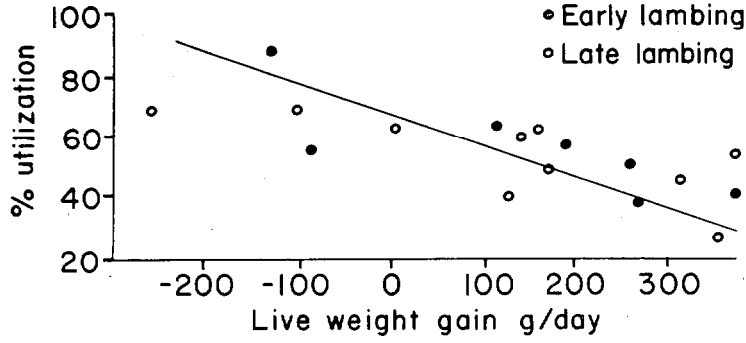


FIG. 1: *Relationship between the percentage utilization of grass/clover pastures, March-July, and liveweight gain* ($r = 0.647$, $P < 0.01$).

TABLE 1: THE INFLUENCE OF TOTAL DM AVAILABLE AND THE PERCENTAGE DEAD MATERIAL ON THE UTILIZATION AND LIVEWEIGHT GAINS RECORDED ON GRASS/CLOVER AND LUCERNE PASTURES ($r^2$ VALUES)

| | *Grass Early* | *Grass Late* | *Lucerne Early* | *Lucerne Late* |
|---|---|---|---|---|
| Affecting LWG: | | | | |
| Total DM | 60.8 | 40.2 | 0.0 | 65.3 |
| % Dead material | 76.6 | 9.3 | 9.6 | 17.0 |
| Affecting utilization: | | | | |
| Total DM | 41.3 | 30.1 | 3.5 | 24.5 |
| % Dead material | 25.5 | 5.1 | 0.0 | 62.4 |

established for lucerne. The desired increase in ewe liveweight was achieved during flushing on pasture at a utilization of about 50%.

The results in Table 1 show the relationship between utilization and liveweight gain and that of the total amount of DM available and the porportion of dead material. With grass/clover pastures the main factor affecting liveweight gain and utilization appears to be the total amount of DM available through the grazing periods. For lucerne pastures (late lambing group) the proportion of dead material in the sward significantly affected utilization. During April the proportion of dead material in lucerne pastures increased dramatically (Table 2). This was influenced by grazing management as the ewes were shifted off the lucerne paddocks when crown shoots were apparent. At this stage little green leaf remained and the remaining plant material was low in protein and high in fibre (Table 2).

TABLE 2: COMPONENTS OF THE RESIDUAL PASTURE RECORDED ON GRASS/CLOVER AND LUCERNE

| | *Grass Early* | *Grass Late* | *Lucerne Early* | *Lucerne Late* |
|---|---|---|---|---|
| Residual yield (av. single grazing) (kg DM/ha) | 1658 | 2311 | 1728 | 2100 |
| % Dead material | 51 | 49 | 54 | 65 |
| % Protein | 14.2 | 17.4 | 13.5 | 11.2 |
| % ADF | 36.8 | 36.7 | 54.2 | 55.4 |

Only 26% of the dead material was eaten. It thus accumulated over a period and affected utilization and liveweight gains at later grazings.

The major findings in this experiment are summarized in Table 3. It can be seen that animals grazed to a bank of feed,

TABLE 3: THE EFFECT OF FLUSHING EWES EARLY AND LATE ON GRASS/CLOVER AND LUCERNE PASTURES ON THE AMOUNT OF DM AVAILABLE, DM INTAKE AND EWE PERFORMANCE

| | *Grass Early* | *Grass Late* | *Lucerne Early* | *Lucerne Late* |
|---|---|---|---|---|
| Av. of single grazing, total DM available (kg DM/ha) | 3709 | 4410 | 4038 | 3782 |
| kg DM available/ewe/day | 3.4 | 5.3 | 4.8 | 4.6 |
| Initial liveweight (kg) | 61.0 | 68.7 | 60.4 | 67.2 |
| Flushing gain (kg) | 8.7 | 4.8 | 9.2 | 4.3 |
| % Utilization | 54 | 48 | 58 | 43 |
| Intake (kg DM/ewe/day) | 1.6 | 1.9 | 2.4 | 2.1 |
| Lambing (%) | 158 | 175 | 115 | 113 |

which in the case of the grass systems persisted into the late autumn. However, cool temperatures affected lucerne production at this stage.

The liveweights of later flushed groups could not be maintained prior to flushing owing to conditions favourable for the growth of grass/clover and lucerne pastures in March. This resulted in the liveweights of these groups being heavier prior to flushing compared with those mated early. The later lambing groups achieved lower flushing gains than those lambing early. This could have resulted from the higher initial liveweight of these ewes, together with the increasing proportions of dead material in the swards, especially that of lucerne pastures.

Utilization of grass/clover and lucerne pastures in the later lambing groups was less than that achieved in the early groups. This, in association with the lower liveweight gains when similar amounts of DM were available, suggested that dead material reduces feed quality and ewes do not flush as well when mated late.

The results indicate that the efficiency of promoting liveweight gain was lower on lucerne than on grass/clover pastures. Vegetative growth of lucerne occurs from the stem apex and it is reported by O'Connor (1970) that these are preferentially grazed in the first three days. Following removal of the stem apex a lag phase occurs, depending on the stage of maturity prior to grazing, before the initiation of a new growth cycle and the appearance of basal shoots. Hence the growth of lucerne in the cages may be proceeding at a maximum rate whilst growth in the grazed areas has temporarily ceased. In the growth of grasses there appears to be no lag phase between partial defoliation and resumption of new growth. Consequently DM intake could have

been over-estimated with lucerne-fed animals by virtue of the cutting technique used.

Significant differences ($P < 0.01$) were recorded in ewe fertility. This was due to a reduction in multiple births and an 8% incidence of abortions in ewes given lucerne.

## CONCLUSIONS

The utilization of grass/clover and lucerne pastures to promote liveweight gain prior to and through mating is similar and of the order of 50%. Mating ewes late to allow pasture to meet the ewes' requirements for lactation in spring did not significantly affect lambing percentage. However, later flushed ewes decreased their utilization of pasture and achieved less gain in liveweight than ewes mated earlier. In the case of lucerne this was related to the accumulation of much fibrous, dead material in the sward which was not apparent in grass clover pastures. Only 77 lambs from 68 ewes fed on lucerne compared with 87 lambs from 52 ewes given grass/clover were born. In terms of the initial definition, therefore, the efficiency of the pastoral system was markedly reduced when ewes were flushed on lucerne.

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