Effects of teasing and nutrition on the duration of the breeding season in Romney ewes

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ABSTRACT

Seventy-nine Romney ewes were allocated to high (H) or low (L) pasture allowances from 27 January. Half of each group (R) was joined with teaser rams on 9 February while the other half (I) remained isolated from rams until 10 March.

R ewes exhibited oestrus 13 days earlier than the I ewes but there was no effect of nutrition. L ewes had fewer oestruses than H ewes (7 *v* 9) and more abnormal oestrous intervals (16% *v* 7%). There was a negative relationship between number of oestruses and GGT levels and a positive relationship with live weight. There was no effect of teasing on the number of oestruses, thus R ewes returned to anoestrus 16 days earlier than I ewes. Similarly L ewes returned to anoestrus 20 days earlier than H ewes.

Keywords Sheep; breeding season; ram teasing; nutrition; facial eczema; Romney ewes

INTRODUCTION

Knight *et al.* (1979) found that over the 6 weeks post-joining, teaser rams marked only 54% of the barren ewes and there was a large variation between years. Similarly in a survey of reproductive failure in the North Island, 12 to 22% of the ewes mating but failing to conceive in the first 2 weeks of joining did not return to service in the subsequent 6 weeks (T. W. Knight, unpublished), possibly because they had become anoestrous. Hight *et al.* (1976) found 17% of mature Romney ewes had only 1 or 2 oestruses.

Factors affecting the number of oestruses in the breeding season are unknown, but the decline with decreasing live weight in the number of barren ewes marked by teaser rams (Knight *et al.*, 1979) suggests live weight may be important.

This paper presents data on the effects of live weight and stimulation by rams on the onset and cessation of the breeding season in mature Romney ewes.

MATERIALS AND METHODS

On 27 January, 79 mature Romney ewes which had been isolated from rams for 3 months were randomly divided into 2 groups and differentially grazed on a high (H) or low (L) pasture allowance. The allowances were adjusted so that H ewes gained 3 kg and L ewes lost 8 to 10 kg by 6 April and then maintained weight. The ewes were weighed on 27 January and every 10 to 18 days thereafter.

Six vasectomised Dorset rams fitted with harnesses and crayons were placed with half of each group (HR and LR) on 9 February. The other half (HI and LI) was isolated at least 200 m from rams. Crayon colours were changed every 14 days and mating marks recorded every 3 to 4 days. Rams alternated between grazing groups.

Laparoscopies to identify ewes that had ovulated were performed on all ewes on 28 January, 2 February, 13 February and thereafter every 14 days until 10 March. HI and LI ewes were transferred to their respective R group when they had ovulated; and all remaining I ewes joined their R group on 10 March. It is assumed that all Romney ewes have at least one silent ovulation before their first oestrus (Kelly *et al.*, 1976). All ewes with intervals of 27 days from last oestrus were laparoscoped and ewes were classed as anoestrus if they failed to exhibit oestrus or ovulate for 40 days. Because of an outbreak of facial eczema from 3 to 8 April, ewes were bled on 22 April and their gamma-glutamyltransferase (GGT) levels determined.

Live weights, GGT, date of first and last oestrus and number of oestruses were analysed by analysis of variance. The GGT concentration on 22 April and the live weight on 24 April were included as covariates. The proportion of ewes ovulating and the proportion of abnormal oestrous intervals were analysed using a Fisher-Irwin test.

RESULTS

Adhesions to the reproductive tract excluded 5 ewes from the experiment and another 2H and 4L ewes died. Two LI ewes failed to exhibit oestrus although both ewes ovulated once (13 February and 9 April).

One ewe had a GGT level of 358 IU/l and the other 39 IU/l and their respective live weights were 39 kg and 42 kg on 4 May. Both ewes were excluded from subsequent results.

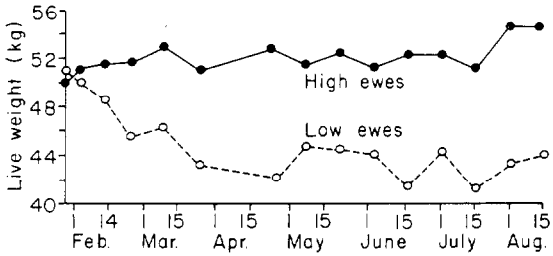

FIG. 1 Live weights of the high (H) and low (L) pasture allowance ewes.

Grazing treatments produced large differences ($P < 0.001$) in live weight but there were no differences between I and R ewes in each grazing treatment (Fig. 1). LR ewes had higher GGT concentrations than the other groups which caused a nutrition × teasing treatment interaction ($P < 0.01$) (Table 1).

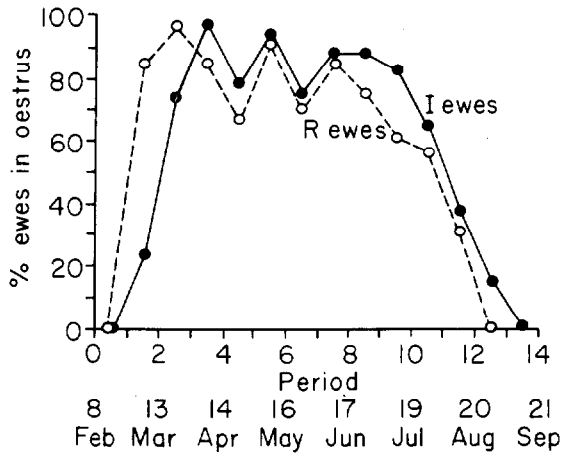

FIG. 2 Percentage of R and I ewes exhibiting oestrus in each of the 14, 17-day periods.

The number of oestruses increased by 0.14 per 1 kg increase in live weight ($P < 0.01$) and decreased by 0.7 oestruses per 100 IU/l increase in GGT ($P < 0.01$). The effect of pasture allowance on number of oestruses was removed by including live weight as a covariate but was still significant ($P < 0.05$) when GGT concentration was included.

TABLE 1 Effect of teasing and pasture allowance on number of oestruses and length of the breeding season in Romney ewes (means not corrected for live weights or GGT concentrations).

Treatment group	No. ewes	GGT (IU/l)	No. oestruses	Day of first oestrus	Day of last oestrus	% intervals > 27 days	% intervals < 13 day
HR	17	81	9.1	67	207	2.2	2.9
HI	19	80	8.7	81	216	2.6	5.8
LR	16	167	7.3	67	180	6.9	9.9
LI	15	87	7.6	80	205	8.3	7.3

One ewe had ovulated by 3 February. Four days after ram introduction 20% of the R ewes had ovulated compared with 5% of the I ewes ($P = 0.059$). More R ewes had ovulated than I ewes by 23 February (88% *v* 26%, $P < 0.001$) and this difference was still apparent on 10 March (100% *v* 77% $P = 0.003$). There was no effect of allowance on the proportion of ewes ovulating.

R ewes exhibited first oestrus 13 days earlier than I ewes ($P < 0.001$) but there was no effect of pasture allowance (Table 1, Figs. 2 and 3). When GGT concentrations were included as a covariate the date of first oestrus was delayed 2.5 days per 100 IU/l ($P < 0.05$).

L ewes had fewer ($P < 0.01$) oestruses than H ewes (Table 1) and a lower percentage in oestrus in each of the 14, 17-day mating periods (Fig. 3). None of the H ewes had less than 4 oestruses compared with 9% of the L ewes. There was no effect of teasing on the number of oestruses (Table 1, Fig. 2).

A higher ($P < 0.001$) proportion of the oestrous intervals were of abnormal length for L than H ewes. This occurred for both intervals less than 13 days ($P = 0.046$) and greater than 27 days ($P = 0.006$) (Table 1). Teasing had no effect on the proportion of abnormal oestrous intervals. Silent ovulations occurred in 75% of the oestrous intervals greater than 27 days.

The end of the breeding season was earlier in L than H ewes ($P < 0.01$) and in R than I ewes ($P < 0.05$) (Table 1, Figs. 2 and 3). The date of last oestrus increased 1.5 days per 1 kg increase in live weight ($P < 0.05$) and decreased 10.2 days per 100 IU/l increase in GGT ($P < 0.01$). The effects of pasture allowance were removed by including live weight as a covariate but not GGT concentrations.

Silent ovulations occurred after the last oestrus in 7% of the H ewes and 21% of the L ewes ($P = 0.14$).

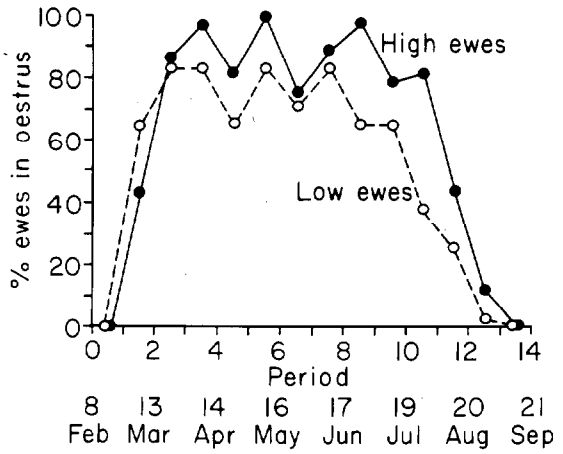

FIG. 3 Percentage of high (H) and low (L) pasture allowance ewes exhibiting oestrus in each of the 14, 17-day periods.

DISCUSSION

Although low live weight and/or subclinical facial eczema reduced the number of oestruses and increased the number of abnormal oestrous intervals, this on its own only explains a small proportion of the failure of teaser rams to identify barren ewes. Knight *et al.* (1979) found that over the month after joining ended (i.e. on 28 April-22 May) teaser rams failed to mark 56 to 67% of the barren ewes. Over these same periods 0 to 6% of H ewes and 13 to 24% of L ewes failed to exhibit oestrus. One such additional factor could be the efficiency of the teaser rams at marking oestrous ewes since 6 to 19% of H ewes and 15 to 40% of L ewes only had 1 oestrus in this period.

Another factor could be the occurrence of more acute outbreaks of facial eczema. The overall effect of facial eczema in this experiment was to suppress oestrous activity. Similarly D. C. Smeaton (unpublished) found a decreasing percentage of ewes ovulating with increasing GGT levels.

The mean number of oestruses was similar to the numbers of ovulations in the breeding season reported by Kelly *et al.* (1976) but much higher than the number recorded by Hight *et al.* (1976) for mature Romney ewes. These workers found 34 to 35% had less than 4 oestruses compared with 0 to 9% in the present experiment. The 2 to 8% of oestrous intervals greater than 27 days, with 75% having silent ovulations, was similar to the incidence of 9% silent ovulations in Romney ewes in the breeding season reported by Kelly *et al.* (1976). Silent ovulations at the end of the breeding season are not a major occurrence in the Romney.

Although stimulation of the ewe with teaser rams caused an earlier onset of ovulatory activity with oestrus occurring 12 to 14 days earlier it did not increase the number of oestruses per ewe. The earlier onset of the breeding season was accompanied by an earlier return to anoestrus. This suggests the duration of the breeding season is independent of its time of onset.

REFERENCES

Hight G. K.; Jury K. E.; Lang D. R. 1976. Hill country sheep production. VI Oestrous incidence and ovulation rate in Romney and Border Leicester × Romney ewes. *New Zealand journal of agricultural research* **19**: 35-39.

Kelly R. W.; Allison A. J.; Shackell G. N. 1976. Seasonal variation in oestrous and ovarian activity of five breeds of ewes in Otago. *New Zealand journal of experimental agriculture* **4**: 209-214.

Knight T. W.; Dalton D. C.; Hight G. K. 1979. Identification of barren ewes by vasectomised rams. *New Zealand journal of experimental agriculture* **7**: 125-130.