THE EFFECT OF UNDER-NUTRITION DURING EARLY PREGNANCY IN MERINO EWES

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Summary

Merino ewes, aged 1½ and 2½ years, were severely restricted in nutrition from the day of mating, or from 21 days post mating. Both groups lost 30 per cent of their mating bodyweight by day 60 of pregancy, after which they were grazed with the control group which was not restricted at any time.

Neither restricted group differed significantly from the control group in number of ewes which remained pregnant. It thus appears that management practices restricting ewes in early pregnancy would not adversely affect the numbers of lambs born.

I. INTRODUCTION

Bennett, Axelsen and Chapman (1964) reported that under-nutrition in early pregnancy reduced the numbers of lambs born to light 1½ year old Merino ewes but not to heavy five year old Border Leicester x Merino ewes. Weight, age and breed were confounded in the comparison of these two groups, so a further experiment was conducted to examine the effect of age in Merino ewes of similar weight, and the effect of time of nutritional restriction.

II. MATERIALS AND METHODS

Merino ewes, aged 1½ and 2½ years, were joined to harnessed Merino rams from April 1, 1964 on annual grass-subterraneum clover pastures. Ewes marked by rams were allocated to treatments each day. Allocations were made so that: (i) age groups were equally distributed amongst all treatments, (ii) bodyweights at joining were similar for both age and treatment, and (iii) the distribution of matings over time was similar for each treatment.

Rams remained with all groups in order to detect any ewes returning to service during a period equal to another four oestrus cycles.

Treatments were as follows:

Group A — severely restricted nutrition (poor quality phalaris hay fed in yards) from day of first mating (April 2) to lose 30 per cent of their mating bodyweight by day 60 of pregnancy (June 9). The ewes were actually restricted for 66 to 87 days (mean of 78 days) to June 27.

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Group B — severely restricted nutrition from 21 days after first mating (April 22) to lose 30 per cent of their mating bodyweight by day 60 of pregnancy. The ewes were actually restricted for 45 to 66 days (mean of 57 days) to June 27.

Group C — grazed on pasture, and nutrition not restricted.

The aim was for the ewes in groups A and B to lose a substantial amount of weight within four weeks of their mating date. This was achieved as both groups lost 20 per cent of their mating bodyweight by day 20 of their restriction, but weight loss had to be slower for the remaining period to prevent excessive deaths. From day 60 to day 78 of pregnancy, ewes were held at the same weight. After restriction (June 27), these groups grazed on pasture with group C.

III. RESULTS AND DISCUSSION

The starvation resulted in ewes losing 32.1 ±0.6 per cent of their mating weight in group A, and 30.0t0.5 per cent in group B. Mortality rates were 12, 5 and 0 per cent for groups A, B and C respectively. Ewe weights and reproductive data are represented in Table 1. Ewe nutrition on pasture was above maintenance requirements as group C gained weight throughout pregnancy.

TABLE 1

Bodyweight and reproduction of ewes

Group Treatment	A Restricted from Day of Mating		B Restricted from 3 weeks after Day of Mating		C Control	
Age of ewe at mating (years)	1½	2½	1½	2½	1½	2½
Weight at mating (kg)	36	32	36	32	36	32
Weight at 60 days (kg)	24	22	25	22	41	36
Weight prior to lambing (kg)	37	35	38	37	47	45
Total no. of ewes (239-39-4=196:—)	42	22	44	22	42	24
Pregnant (to 1st service) (%)	93	82*	73	82†	83	83
Returned to service (%)	2	0	16	18	17	17
Non Pregnant (%)						
Non Return	5	18	11	0	0	0

* 3 ewes in this group eviscerated by foxes and pregnancy could not be confirmed. They have been discarded from the analysis.

† Includes only set of twins in experiment. One ewe was eviscerated by foxes and pregnancy could not be determined. It has been discarded from the analysis.

χ^2 Tests for proportion of ewes Pregnant to initial mating

Source	d.f.	χ^2	Signif.
Ages	1	0.01	N.S.
Treatments	2	4.09	N.S.
Interaction	2	2.02	N.S.
Treatments within 2½ year old ewes	2	0.02	N.S.
Treatments within 1½ year old ewes			
(A + B *v.* C)	1	0.01	N.S.
(A *v.* B)	1	5.22	P<0.05

Of the 239 ewes originally allocated to the experiment, 39 failed to mate in the first 21 days and were discarded. Before treatment B commenced, 11 ewes returned to service in each of groups B and C (mean cycle length 17±0.3 days). These ewes did not differ in mating weight 34.6t0.7 kg) from the remainder of the group (34.7t0.3 kg). One ewe in group A returned to service at 36 days, and this difference (i.e. A v. B + C) was significant ($\chi_1^2 = 9.9$, $P<0.005$). This difference in returns to service indicates that nutritional restriction suppressed overt oestrus as has been demonstrated in other experiments. However, as no laparotomies were performed, the period of reproductive failure in the different groups was not ascertained, and no clear interpretation is possible. Post mortems of dead ewes revealed that they were pregnant. Four ewes, which had been eviscerated by foxes so that pregnancy could-not be determined, were rejected from the analysis. At lambing, it was found that six ewes in group A and five in group B were not pregnant and had not returned to service.

Despite these differences in ewes returned to service and ewes dry, the overall effect of treatment on proportion of ewes pregnant to first service was not significant, but treatment A differed significantly from treatment B ($\chi^2 = 5.22$, $P<0.05$) in the 1½ year old ewes. However, neither treatment differed significantly from the control (χ^2_{11} − A v. C = 1.81 NS and χ^2_1 − B v. C = 1.54 NS).

The percentage of ewes pregnant to first service was higher than normally obtained from Merino ewes joined to Merino rams in the autumn (75 per cent in Morley, Axelsen and Bennett 1963, 1964).

Of the ewes that did lamb to first service, lamb deaths were 23, 19 and 24 per cent for groups A, B and C respectively, and were not significantly different. Lambing percentages (number of lambs alive from first service to total number of ewes) were 63, 58 and 64 per cent for groups A, B and C respectively.

Edey (1966) summarised current information on the effects of nutrition in early pregnancy upon embryo survival. Briefly, the data of the majority (El Shiekk et *al*. 1955; Hoxsey et *al*. 1960; Hulet ***et*** *al*. 1962; Bellows ***et*** *al*. 1963; the aged crossbreds of Bennett, Axelsen and Chapman 1964; Hodge 1966; and treatment A 1½ year old and all 2½ year old ewes in this experiment) have shown no disadvantages from nutritional restriction to early pregnancy, and some have shown an advantage in terms of embryo survival or lambs born. The data which show some disadvantages (all of which are barely significant) can be found in Bennett, Axelsen and Chapman (1964) and Edey (1965, 1966) plus treatment B 1½ year old ewes in this experiment. The differences between treatments in this experiment are again confined to 1½ year old Merinos and, since these were heavier than the 2½ year old ewes, the differences between age groups would not appear to be due to bodyweight.

The treatments imposed on these ewes were severe enough to cause mortality but did not produce significant effects on number of ewes pregnant. It is, therefore, concluded that management practices in which feed is saved by restricting ewes in early pregnancy (and which would normally be less severe than those imposed here) would not adversely affect the numbers of lambs born to Merino ewes whish were either 1½ or 2½ years old at joining.

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