

Interactions Between Planes of Nutrition During Early and Late Pregnancy

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The deleterious effect of low planes of nutrition in late pregnancy on lambing and lamb growth is well recognised. However factors of considerable importance which have not yet been extensively studied are (1) the interaction between plane of nutrition in early and mid pregnancy and bodily condition in late pregnancy, and (2) reactions to low planes of nutrition during late pregnancy and lactation.

Experiments have now been carried out in which groups of ewes in the field were subjected to high and low planes of nutrition from mating to four weeks *ante-partum* (a.p.) with sub-groups then subjected in pens to high. (ad Lib.) and low planes of nutrition from four weeks a.p. to lambing, and from lambing to six weeks *post partum* (p.p.) .

To provide an indication of the effect of the planes of nutrition on the body condition of the ewes, and so their energy and protein reserves (since body weight is not a sufficient guide) the ewes were "condition scored". This score was determined by manual palpation of the lumbar area. The range was from 5, indicating extreme fatness, where palpation indicated a convex surface and spinous processes barely palpable, to 0, indicating emaciation, where palpation gave the impression of almost complete absence of tissue between the skin and the bone in the angle between the lumbar transverse and spinous processes. A score of 2 to 3 was equivalent to "store condition". Observations have shown a useful degree of repeatability and between observer consistency in the scoring.

Some summarized results of two years observations are recorded in Tables 1 and 2. Main points of interest are:-

- (1) That although a previous high plane of nutrition, resulting in good body condition, buffered the effect of a low plane of nutrition in late pregnancy on *peri-natal* lamb mortality when the low plane was not extremely low (HL, LL comparison in 1956) it did not buffer it when the low plane was very low (HL, LL comparison in 1957), despite a higher food consumption of the initially L ewes.
- (2) That in neither year did a return to a high plane of nutrition during the last month of pregnancy modify appreciably the effects of the earlier low plane on *peri-natal* lamb mortality lamb birth weight, or lamb growth (comparison of HH and LH in 1956 and 1957).
- (3) That low planes of nutrition up to four weeks a.p. had an appreciable effect on lamb growth, of the order of that imposed by the high and low planes of nutrition after lambing.

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TABLE I.
Effect of Differential Planes of Nutrition on Lambing.

1956—approx. 30 ewes lambing per group

Plane of Nutrition		Mean change in weight 4-0 weeks a.p. lb	Body-weight at lambing lb	Mean condition score at lambing	Mean birth weight of lambs lb	Total peri-natal lamb mortality (including those in ewes which died) as % of lambs carried
From lambing up to 4 weeks a.p.	From 4-0 weeks a.p.					
High	High (6.8 lb S.E. per week)	+8	108	2.5	7.6	18
Low	High (8.0 lb S.E. per week)	+4	83	0.9	6.9	41
High	Low (5.2 lb S.E. per week)	+7	107	2.7	7.6	14
Low	Low (5.2 lb S.E. per week)	+6	85	0.7	7.4 (sig. difference due to H up to 4 weeks a.p.)	50

1957—approx. 48 ewes lambing per group

High	High (7 lb S.E. per week)	+4	106	3.5	8.1	9
Low	High (7.2 lb S.E. per week)	+8	91	2.7	7.7	26
High	Low (3.2 lb S.E. per week)	-5	97	2.6	6.8	24
Low	Low (3.2 lb S.E. per week)	-4	79	1.7	6.4 (sig. difference due to both treatments)	31

TABLE II.
Mean Increase in Six Week Weight of Lambs Due to High Versus Low Planes of Nutrition.

Year	Differential Planes of Nutrition		
	Mating to 4 weeks a.p.	4 to 0 weeks a.p.	0 to 6 weeks p.p.
1956	(21 lb difference in mean weight of ewes) 5.25 lb**	(6.8-8.0 lb v. 5.2 lb S.E. per week) N.S. 0.8 lb	(14.0 v. 7.0 lb S.E. per week) 3.5 lb**
1957	(19 lb difference in mean weight of ewes) 2.35 lb**	(7.0 v. 3.2 lb of S.E. per week) 1.55 lb*	(12.0 v. 5.2 lb S.E. per week) 5.3 lb**

*Significant at the 5 per cent. level.

**Significant at the 1 per cent. level.

Applied indications are that where pregnant ewes have been on a sufficiently low plane of nutrition to result in appreciable weight loss, a return to a high plane of nutrition must be made some time before four weeks **a.p.** to eliminate the adverse effects of the low plane of nutrition on lamb birth weights, **peri-natal** mortality and lamb growth. Also, although good condition of ewes **may** buffer the effects of a moderately low plane of nutrition in late pregnancy, it has no appreciable buffering effect with very low planes. The results indicate the necessity for taking account of body condition (and/or previous plane of nutrition, the two being confounded) as **well** as body weight in designing and interpreting nutritional experiments with lambing ewes.