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Brief communication

FLUSHING RESPONSES FROM HEAVY AND LIGHT EWES

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INTRODUCTION

With the recognition of the separate effects of ewe mating weight ("static") and the flushing response ("dynamic") on ewe reproductive performance in the 1960s (Coop, 1966), ewe liveweight at mating has received the most emphasis. There has, however, been little response in the national lambing percentage since that time. It is common practice in many areas of the country, especially those prone to autumn drought, to allow ewes to gain weight during the spring and early summer feed surplus, but inevitably many of these ewes are losing weight during the drier period prior to and during mating.

For these reasons the response of heavy and light ewes to a range of pre-mating pasture allowances was examined.

EXPERIMENTAL, RESULTS AND DISCUSSION

Coopworth and Perendale ewes (50/group) that differed in liveweight (induced by differential feeding during the preceding spring and summer) were offered, for 6 weeks prior to a synchronized entire mating, three allowances of ryegrass–white clover pasture (pre-grazing 2500 to 3000 kg DM/ha). Ovulation rate was measured by laparoscopy.

The average weights of the light and heavy ewes at commencement of feeding were, respectively: Coopworth, 44.6 and 60.4 kg (unfasted basis), 41.7 and 57.6 kg (fasted basis); Perendale, 42.8 and 59.4 kg (unfasted), 40.3 and 56.6 kg (fasted basis).

The results are summarized in Table 1. At any given allowance, intake per ewe was similar but weight loss was greater or weight gains were lesser for the heavy ewes ($P < 0.01$) than for the light ewes of both breeds, illustrating the higher requirements of the heavy ewes for maintenance and gain.

The Perendales had a significantly higher ($P < 0.05$) proportion of multiple ovulations than the Coopworths (Table 1 and Fig. 1), and there was a significant interaction ($P < 0.05$) with

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TABLE 1: RESPONSES OF LIGHT AND HEAVY EWES OFFERED DIFFERENT AUTUMN HERBAGE ALLOWANCES (kg DM/ewe/day)

	Light			*Heavy*		
	1.2	*2.5*	*3.9*	*1.2*	*2.5*	*3.9*
Coopworth						
DM intake (kg/ewe/day)	0.95	1.32	1.31	0.84	1.32	1.51
Weight change (g/ewe/day)	−88	75	149	−149	37	61
Ovulation rate (ova/ewe)	1.22	1.62	1.82	1.50	1.94	1.86
Perendale						
DM intake (kg/ewe/day)	0.92	1.25	1.29	0.95	1.27	1.31
Weight change (g/ewe/day)	−34	127	105	−92	17	80
Ovulation rate (ova/ewe)	1.29	1.71	2.08	1.71	1.98	2.16

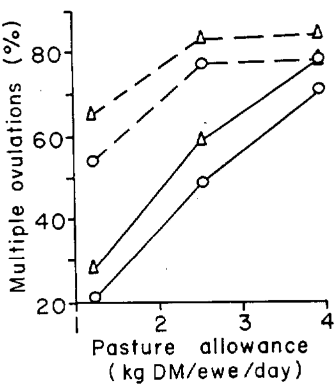

FIG. 1: *The influence of pasture allowance on the proportion of multiple ovulations for the heavy* (- - -) *and light* (——) *Coopworths* (o) *and Perendales* (Δ)

feeding level due to initial body weights of the ewes (Fig. 1). The proportion of multiple ovulations tended to level off at the middle allowance for the heavy ewes but continued to increase in almost linear fashion for the light ewes.

When initial (LW_1) and final (LW_2) fasted liveweights were included in a logit model with breed, feed allowance and body condition, the significant terms were the product of initial and final weights ($P<0.05$) and breed ($P<0.05$). The estimated equation is:

$$\log_e [P/(1-P)] = BR + 0.11\ (LW_1) + 0.40\ (LW_2) - 0.0040\ (LW_1 \times LW_2)$$

where BR is –14.73 for Coopworths and –14.29 for Perendales, and P is the proportion of multiple ovulations.

To illustrate the model, the probability of obtaining a multiple ovulation is shown in a contour plot in Fig. 2. That shown is for Perendales, but plots are similar for both breeds. The importance of both the "dynamic" and "static" effects is shown clearly. For example, ewes of different initial weights that maintain themselves over the flushing period demonstrate the "static" liveweight effect with the heavier ewes having a greater probability of a multiple ovulation, *e.g.*, 45 kg, 64% probability; 60 kg, 87% probability. The effect of weight change over the flushing

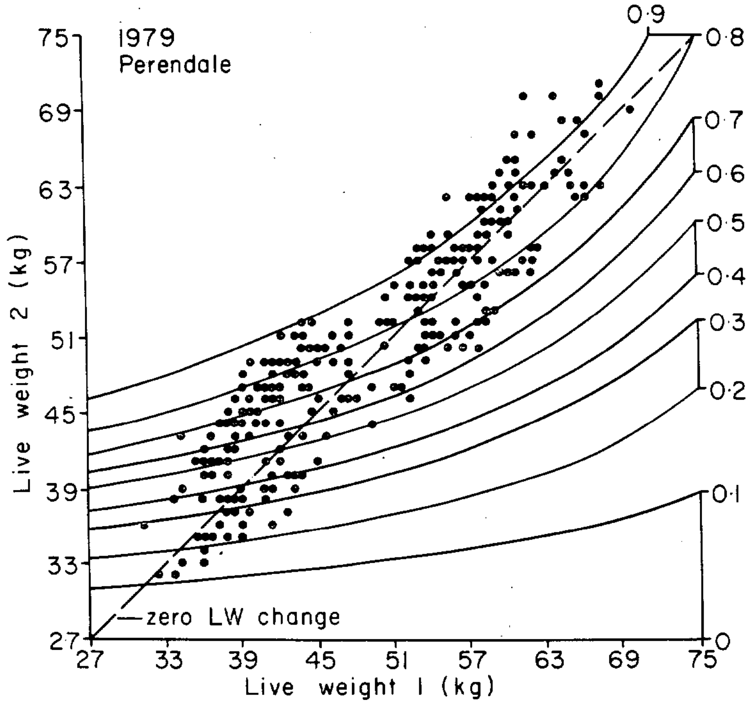

FIG. 2: *Contours of probability of a multiple ovulation for the Perendale ewes over a range of pre-flushing and pre-mating liveweights (1 and 2, respectively). The probability values are on the right and top perimeters of the figure.*

period ("dynamic effect") is also shown in Fig. 2, demonstrating the beneficial effect of gain and the detriment of weight loss. For example, a mating weight (LW_2) of 51 kg may have arisen from pre-flushing weights of 45, 51 and 57 kg due to 6 kg gain, weight stasis or 6 kg loss. The probability of multiple ovulation (Fig. 2) is 87, 79 and 68%, respectively. The importance of weight gain is shown, as is the relatively high responsiveness of light ewes compared with heavy ewes. For a given weight change (loss or gain), more probability contours are crossed for light ewes than for heavy ewes. The marked responsiveness of light ewes is illustrated by a 45 kg ewe that gains 6 kg (*i.e.*, LW_2 = 51 kg) having a similar probability of multiple ovulation as a 60 kg ewe that does not change weight.

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REFERENCE

Coop, I. E., 1966. *World Review of Anim. Prod., 4*: 69-78.