BRIEF COMMUNICATION: Live weight and body condition of single- and twin-bearing Merino ewes

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INTRODUCTION

Merino ewes in New Zealand are bred primarily for wool production but also potentially go through several reproductive cycles. While knowledge of live weight and body condition throughout the reproductive cycle in relation to pregnancy and lactation status would be useful to farmers, few data are available under New Zealand grazing conditions. The aim of this experiment was firstly to profile the live weight and body condition score (BCS) of Merino ewes throughout one reproductive cycle. Secondly, the profiles were used to investigate the influence of live weight and condition score on pregnancy diagnosis outcome and the probability that ewes diagnosed as pregnant were lactating at tailing.

MATERIALS AND METHODS

An age-balanced flock of approximately 300 four- and six-tooth ewes were joined with four full-mouthed Merino rams from 2 May (d0) to 5 June 2006 (d34). Pregnancy diagnosis was conducted using an ultrasound scanner on d79 to identify whether ewes were non-pregnant (n = 27; Pregnancy rank = 0), carrying a single foetus (n = 183; Pregnancy rank = 1) or carrying twin foetuses (n = 85; Pregnancy rank = 2). The 27 ewes that were non-pregnant were removed from the flock on d79. The ewes' udders were palpated at tailing on d191 to identify ewes that were not lactating as an indication of whether they were rearing a lamb at that time. Forty nine ewes identified as non-lactating were removed. In addition 26 ewes died or went missing during the experiment. Numbers present at each time point are detailed in Figure 1. The number of ewes available for measurement at any time point varied due to the vagaries of mustering.

All ewes were shorn at one of three different times; mid-pregnancy (d106), late-pregnancy (d141) or post-lambing (d191), with each group balanced for pregnancy rank. Fleece weight was added to the post-shearing live weight of the shorn ewes to make the live weights of the shorn and unshorn ewes comparable. The time of shearing was included in the statistical models to eliminate any effect it may have had on the results. At joining, pregnancy diagnosis, mid-pregnancy, late-pregnancy, tailing and weaning (d283) ewes were weighed and their BCS assessed on a scale of 1 (Emaciated) to 5 (Obese).

The ewes were run on the Lincoln University Mt. Grand Station, Hawea Flat, New Zealand and managed according to commercial farming practices with approval from the Massey University Animal Ethics Committee.

Statistical analyses were carried out using SAS (2001). Ewe live weight and BCS were analysed as repeated measures using the mixed procedure with linear models. The fixed effects of shearing treatment, day of measurement, pregnancy rank and the interaction of day by pregnancy rank, and the random effect of ewe were considered.

A logistic regression procedure was used to analyse the effects of live weight and BCS on pregnancy rank; live weight at joining and pregnancy diagnosis were fitted as covariables and ewe birth-year and BCS at joining and pregnancy diagnosis were considered as fixed effects. This procedure was also used to analyse the probability that a ewe that was diagnosed as pregnant at scanning was lactating at tailing, considering the

FIGURE 1: Live weight (Circular symbol) and body condition score (Triangular symbol) profiles of mature Merino ewes throughout one reproductive cycle with measurements at d0 (Joining), d79 (Pregnancy scanning), d106 (Mid-pregnancy), d141 (Late preganacy), d191 (Tailing) and d283 (Weaning) for single (n = 183, 181, 181, 183, 175, and 144 respectively (Solid line)) and twin-bearing (n = 85, 5, 85, 84, 74, and 53 respectively (Dashed line)) ewes. Asterisk indicates significant difference (P <0.05) between single- and twin-bearing ewes at that time point.

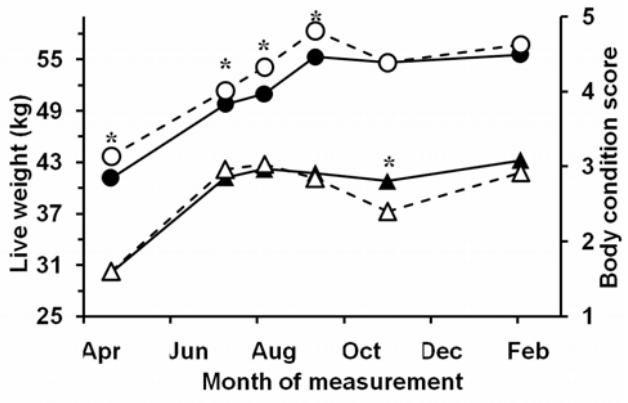

TABLE 1: Probability of a ewe that was diagnosed pregnant at d79 lactating at tailing (d191): Regression coefficients, standard errors, odds ratios, 95% confidence intervals for the odds ratios and probability levels from logistic regression of mid-pregnancy live weight (d106), live weight at lamb tailing and pregnancy rank of Merino ewes (n = 235).

	Regression coefficient	Standard error	Odds ratio	95% confidence interval	Significance
Live weight mid-pregnancy (kg)	0.21	0.064	1.23	1.09 – 1.40	**
Live weight tailing (kg)	-0.23	0.059	0.80	0.71 – 0.89	***
Pregnancy rank					
1	0.56	0.200	3.09	1.42 – 6.71	**
2	0.00		1.00		

fixed effects of BCS at all time points, ewe birth-year and pregnancy rank. Ewe live weights at all time points were fitted as covariables. Non-significant (P >0.05) variables were removed from each model to determine final solutions; significant effects are detailed in the results.

RESULTS AND DISCUSSION

Live weight and BCS profiles of single- and twin-bearing ewes are shown in Figure 1. Ewes were lighter than the targeted 50 kg live weight at joining as a result of a shortage of feed over summer. Single-bearing ewes weighed less at joining, pre-lambing and lambing, but weighed more at weaning than twin-bearing ewes, in agreement with Waters *et al.* (2000). It may be beneficial to feed ewes well, particularly twin-bearing ewes, in the later stages of pregnancy to minimise any loss in body condition.

There was no difference in live weight or BCS at joining or pregnancy diagnosis between ewes that were identified as being pregnant or non-pregnant. In contrast, Waters *et al.* (2000) found a significant effect of ewe live weight at joining on whether the ewe conceived: however in agreement with the current experiment, McInnes and Smith (1966) showed no difference in live weight or BCS at joining between ewes that conceived and those that did not. There is wide between-year and between-property variation in Merino ewe live weights. As a consequence; this experiment may not be representative of results on other properties or in other years.

Ewes that were diagnosed as pregnant but not lactating at tailing accounted for 19.5% of the total number of ewes present at tailing, indicating that substantial lamb losses had occurred. The cause of the lamb losses was not assessed. Table 1 details the factors that affected the probability of a ewe lactating at tailing given it was pregnant at scanning. Single-bearing ewes had a higher probability of lactating at tailing than twin-bearing ewes of the same live weight at mid-pregnancy and tailing. Furthermore; ewes that were heavier mid-pregnancy were more likely to be lactating at tailing, a result consistent with that of Behrendt *et al.* (2006). These results indicate that feeding the ewe well during early and mid-pregnancy to achieve a high live weight at mid-pregnancy may increase the likelihood of the ewe lactating and rearing a lamb to tailing. The negative relationship between live weight at tailing and the probability of a ewe that was diagnosed pregnant, lactating at tailing was probably a consequence of, rather than a contributor to, it not rearing a lamb.

In conclusion, the twin-bearing ewes in the experimental flock were heavier than their single-bearing counterparts for the majority of the reproductive cycle. Live weight increased from joining to a peak in late-pregnancy and then declined to tailing in twin-bearing ewes, at which time it remained similar until weaning. Live weight of single-bearing ewes remained stable from late-pregnancy onwards. BCS followed the same trend until mid-pregnancy when it decreased, particularly in twin-bearing ewes. Based on lactation status, single-bearing Merino ewes were more likely to rear a lamb to tailing compared with twin-bearing ewes. Ewes that were heavier in mid-pregnancy had a greater chance of rearing a lamb to tailing.

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