BRIEF COMMUNICATION: The effect of weaning at 10 or 14 weeks of age on liveweight changes in the hogget and her lambs

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INTRODUCTION

Kenyon *et al.* (2004) revealed via a survey, that a major reason why New Zealand farmers do not breed ewe hoggets (7-9 months old) is perceived detrimental effects on two-tooth breeding live weight, resulting in reduced two-tooth reproductive performance. Kenyon *et al.* (2008) confirmed this by showing hoggets that lambed had reduced two-tooth live weight and condition score at breeding. A potential means of minimising any potential negative effects on a young dam's live weight is early weaning of her offspring. Lambs born to mature ewes have been weaned at eight weeks of age with no detrimental effect on lamb growth rate (Rattray *et al*., 1976; Smeaton *et al*., 1979; Earl *et al.*, 1990). However, weaning lambs at three to five weeks of age reduced lamb survival and liveweight gain when compared to lambs weaned at 12 weeks of age (Rattray *et al*., 1976). Geenty (1979) suggested weaning lambs at four to six of weeks of age could remove herbage competition between the ewe lamb dam and its lamb, particularly when pasture supply was limited. The New Zealand Sheep Council (2000) suggested lambs need to a minimum of 16 kg live weight if they are to be weaned early. Early weaning has led to an increase in ewe live weight when compared to later weaning (Corbett & Furnival, 1976; Smeaton *et al*., 1979; Earl *et al*., 1990). These data suggest hoggets could be weaned relatively early without any detrimental effects on their lambs. The objective of the current experiment was to examine the effect of weaning lambs born to hoggets at 10 weeks of age.

MATERIAL AND METHODS

Experimental design and animals

One-hundred-and-sixty hoggets that had been offered two levels of nutrition during pregnancy were used in this experiment. The pregnancy nutritional regimens were 'medium' to achieve a total liveweight gain in the hoggets of 100 g/d from ram introduction until lambing and 'high', where the hoggets were offered *ab libitum* pasture with the aim of them achieving a liveweight gain of 200 g/d from ram introduction until lambing.

Ten weeks after lambing the hoggets (mean live weight 47 kg) and their lambs (mean live weight 19 kg) were allocated to one of two groups, early wean or suckling, for the period 10 to 14 weeks after the average lambing date. The mean litter size was 1.30 and 1.33 for the 'early wean' and 'suckling' treatment groups, respectively. The groups were balanced for previous hogget pregnancy nutritional treatment, lamb birth rank and sex of lamb. In one group, half of the lambs were weaned at an average age of 73 days post lambing (age range of 50 to 84 days old) ('early wean'), while the other half remained unweaned ('suckling') for the duration of the experimental period. Hogget live weight, lamb birth date and lamb live weight of the groups were not significantly different at 10 weeks. The treatment groups were replicated in separate paddocks. Within each paddock, there were 'early wean' hoggets without their lambs, 'early wean' lambs without their dams and 'suckling' lambs and their dams. Each group were rotated around 8 paddocks.

PASTURE MEASUREMENT

Each treatment group was grazed on an area of 19 hectares of perennial ryegrass (*Lolium. perene*) and white clover (*Trifolium. repens*). Hoggets and lambs grazed a pasture mass between 1,200 and 2,200 kg DM/ha throughout the four week treatment period. Pasture mass was determined using a rising plate metre (Ashgrove Pastoral Products, Palmerston North).

Pasture analysis

Plucked herbage samples were taken from each paddock at the start of the experiment when the lambs were an average of 10 weeks of age. The paddocks were again sampled when the lambs were 12 and 14 weeks of age. Individual grass samples were dried in a convection oven at 105°C for 24 hours. Crude protein content of the herbage was determined by total combustion (LECO model, AOAC 968.06). Metabolisable energy was calculated from *in vivo* digestibility (0.163*digestible organic matter dry matter content), and neutral detergent fibre and acid

TABLE 1: Average daily live weight change (kg/d) of ewes that lambed as a hogget and their lambs for four weeks after the lambs were either weaned at 10 weeks of age or allowed to suckle for a further four weeks. Means within rows with different superscripts differ significantly (P <0.05).

Treatment group	Number	Average time since lambing		
		10-12 weeks	12-14 weeks	10-14 weeks
Hoggets				
Early weaning	81	0.38 ± 0.03[a]	-0.26 ± 0.02[b]	0.06 ± 0.01[b]
Suckling	79	0.33 ± 0.02[a]	-0.34 ± 0.02[a]	0.00 ± 0.01[a]
Lambs				
Early weaning	73	0.18 ± 0.03[a]	-0.05 ± 0.02[a]	0.07 ± 0.01[a]
Suckling	73	0.16 ± 0.02[a]	-0.05 ± 0.02[a]	0.06 ± 0.01[a]

detergent fibre were determined using a Tecator Fibretec System (Robertson & van Soest, 1981).

Animal measurements

Hoggets and lambs were weighed within an hour off pasture, at the start of the experiment when the lambs were 10 weeks of age and again two and four weeks later.

Data analysis

Hogget and lamb live weight were analysed using the Generalised Linear Model procedure (SAS, 2005). Fixed effects of birth rank, sex of lamb and the age at weaning and their interactions were tested for each parameter. Non-significant (P >0.05) interactions were removed and the model re-run. Individual lamb age and paddock group were used as a covariate.

RESULTS AND DISCUSSION

Hoggets and their lambs grazed pasture, with an average of 15.5 % crude protein, 9.4 MJ metabolizable energy (ME) / kg dry matter (DM), 42.7 % neutral detergent fibre and 23.6 % acid detergent fibre for the duration of the four week experimental period. The metabolisable energy content at week 10, 12 and 14 post-lambing was 9.3, 8.6 and 10.1 MJ ME / kg DM, respectively.

Treatment group and lamb birth rank had no affect (P >0.05) on lamb live weight gain throughout the four week experimental period (Table 1).

Hogget live weight change was not affected (P >0.05) by treatment group during weeks 10 to 12 post-lambing. 'Early wean' hoggets lost less weight (-0.26 ± 0.02 kg/d) (P <0.05) from weeks 12 to 14 post-lambing than suckling hoggets (-0.34 ± 0.02 kg/d). Over the entire period, 'early wean' hogget live weight change (0.06 ± 0.01 kg/d) was greater (P <0.05) than the 'suckling' hoggets (0.00 ± 0.00 kg/d).

Weaning prior to eight weeks of age has been shown to reduce lamb growth rate (Corbett & Furnival, 1976; Furnival & Corbett, 1976; Rattray *et al*., 1976; Geenty, 1979). In the current experiment early weaning at an average of 10 weeks of age did not affect lamb liveweight change. Early weaning in the current experiment was when individual lambs ranged from 7 to 12 weeks of age, therefore, rumen development should have been completed (Rattray *et al.,* 1976) and would not restrict lamb growth rate. Hafez (1952) reported that hoggets had lower milk yields and shorter lactations compared to mature ewes. This may suggest lambs born to hoggets may suckle for a shorter period of time and begin to ingest herbage at a younger age, further limiting the impact of early weaning.

Furnival and Corbett (1976) stated a greater pasture availability during lactation led to a reduction in the lamb growth check observed immediately post-weaning and reduced the effect of early weaning on lamb live weight. In the current experiment, herbage mass was managed to ensure it was within the range of 1,200 and 2,200 kg DM/ha, so that the, lambs would not experience any restriction to their intake. Nevertheless it may be worthwhile to repeat the current experiment with higher quality herbage to determine if a similar result would still occur.

Early weaning increased hogget live weight gain in the current experiment which supports Smeaton *et al.* (1979). Early weaning in the current experiment occurred, at an average lamb age of 10 weeks when it is probable the hoggets were still lactating. Both treatment groups lost live weight when the lambs were between 12 to 14 weeks of age. However, pasture remained at the same quality and the availability remained within the range of 1,200 and 2,200 kg DM/ ha during the entire four week treatment period. The pasture quality (9.4 MJ / kg DM) throughout the experiment is poorer than

what most farmers would expect and may have affected the treatment groups in a negative manner.

Smeaton *et al.* (1979) stated early weaned mature ewes were heavier at the subsequent breeding, however this difference did not equate to the expected increase in ovulation rate of 7 %. It is unknown if the small difference of 1.6 kg in live weight observed in the current experiment would have been present at the subsequent breeding and whether it could be large enough to affect two-tooth breeding performance. Future studies should attempt to measure this. Fogarty *et al.* (1992) found a longer suckling period increased the period to first oestrus and the lambing interval when mature ewes were bred to lamb in spring.

CONCLUSION

Under the conditions of the current experiment, lambs born to hoggets were weaned at an average of 10 weeks of age with no detrimental effect on lamb live weight. Hoggets whose lambs were weaned when they were 10 weeks of age gained more live weight during the following four weeks than those hoggets who were allowed to continue to suckle their lambs. This might suggest early weaning as a potential strategy to increase two-tooth breeding live weight. It is unknown if the liveweight differences for hoggets and lambs observed in this trial would have been of a similar magnitude if the sheep had have been offered higher quality herbage. Future studies should monitor whether the increase in hogget live weight achieved by early weaning is retained until joining as a two-tooth.

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