# Is there any advantage of early weaning of twin lambs born to yearlings?

F.J. MULVANEY[1,2]*, S.T. MORRIS[1], P.R. KENYON[1], P.C.H. MOREL[1] and D.M. WEST[1]

[1]Institute of Veterinary, Animal and Biomedical Sciences, Massey University, Private Bag 11-222, Palmerston North 4442, New Zealand
[2]New South Wales Department of Animal Industry, Locked Bag 6006, Orange, New South Wales 2800, Australia
*Corresponding author: fraser.mulvaney@industry.nsw.gov.au

## ABSTRACT

The objective of the current study was to investigate the effect of weaning twin lambs born to yearlings at 9, 11 or 13 weeks of age on the live weight of the yearling and her lambs. The yearlings and the lambs were allocated to one of three weaning treatment groups (9-week versus 11-week versus 13-week) on Day 1. Each treatment group was balanced for yearling and lamb live weight. At Week 13, all lambs were removed from the remainder of the experiment but the yearlings were monitored for a further six weeks. The yearlings and lambs were offered *ad-libitum* levels of herbage throughout the experimental period and the pre- and post-grazing mass was monitored weekly. The yearlings and lambs were weighed on Days 1, 7, 14, 21 and 28 while yearlings were weighed again on Days 35, 42 and 70. Pre- and post-grazing mass was monitored weekly. Yearling live weight did not differ ($P > 0.05$) between treatment groups on Days 1, 35 or 70. Lamb live weight did not differ ($P > 0.05$) on Days 1, 14 or 28. These results indicate that there is no advantage of early weaning of twin lambs born to yearlings on the live weight of the yearling or her lambs.

**Keywords:** hogget, weaning, lamb, live weight

## INTRODUCTION

The perceived negative effect of yearling breeding of ewe lambs, seven to nine months of age at ram introduction, on two-year old performance is a major reason why New Zealand farmers do not join their yearlings with the ram (Kenyon *et al*., 2004) such that in 2007, only 31% of yearlings wintered were joined with the ram (Statistics New Zealand, 2007). In support of this, Baker *et al*. (1981), McMillan and McDonald (1983) and Kenyon *et al*. (2008) reported that yearlings that raised a lamb were lighter as a "two-tooth" when next being bred at 18 to 20 months of age, and had a poorer reproductive performance at their second lambing than those that were not bred as a yearling.

Yearlings that are twin-bearing tend to be heavier than single-bearing yearlings at the time of breeding (Kenyon *et al*., 2006). However, their live weight at weaning has been reported to be similar to that of single-bearing yearlings (Morris *et al*., 2005) indicating that twin-bearing yearlings gain less live weight during lactation compared to single-bearing yearlings. As observed in mature ewes, twin lambs born to yearlings are lighter at weaning than singleton born lambs (Morris *et al*., 2005; Mulvaney *et al*., 2010). Early weaning of twin lambs born to yearlings is a potential method to minimise the apparent negative effect on the yearling live weight However, any change in weaning age should have a minimum impact on the live weight of the twin lambs reared by those yearlings.

In the case of mature ewes, early weaning when the lambs are less than eight weeks of age, has had variable effects on lamb growth. Some researchers (Rattray *et al*., 1976; Furnival & Corbett 1976; Geenty 1979; Smeaton *et al*., 1979; Earl *et al*., 1990) have reported reduced lamb growth rate and lamb survival. Conversely, other researchers (Furnival & Corbett 1976; Rattray *et al*., 1976; Smeaton *et al*., 1979; Earl *et al*., 1990) have reported that weaning lambs born to mature ewes at eight weeks of age did not affect lamb growth rate. Rattray *et al*. (1976) reported that eight week old lambs that were reared by mature ewes had a sufficiently developed rumen to ferment herbage. This indicates that the growth of lambs weaned older than eight weeks of age should not be restricted due to the ability to compensate the milk requirement with herbage.

Mulvaney *et al*. (2009) reported that later weaning at 10 versus 14 weeks of age of singleton lambs born to yearlings had no effect on lamb growth rate. Lambs born to yearlings are normally weaned at approximately 14 weeks of age. In addition, Earl *et al*. (1990) and Caneque *et al*. (2001) reported that weaning lambs born to mature ewes at seven to nine weeks of age reduced dressing out percentage up to 18 weeks of age compared to not weaned, therefore very early weaning of lambs may negatively affect dressing out percentage.

Early weaning of singleton lambs born to mature ewes has been reported to increase (Corbett & Furnival, 1976 (6 versus 12 weeks of age); Smeaton *et al*., 1979 (8 versus 14 weeks of age)) or have no affect (Earl *et al*., 1990 (seven versus nine weeks of age); de Nicolo *et al*., 2006 (nine versus 13 weeks of age)) the ewe live weight compared to

later weaned ewes. The only study that has investigated the impact of early weaning of lambs born to yearlings (Mulvaney *et al*., 2009 (10 versus 14 weeks of age) has reported an increase in yearling live weight from weaning earlier. However, this study did not differentiate between single- and twin-reared lambs.

The objective of the present experiment was to examine the effect of weaning at nine, 11 or 13 weeks of age on the live weight of yearlings rearing twins and their offspring.

## MATERIALS AND METHODS

### Animals and experimental design

At an average lamb age of nine weeks (63 days, range 56-70 days, D1), seventy-seven Composite yearlings (½ Romney and ½ Finn) with a mean live weight of 57.2 ± 0.6 kg (range 47-71 kg) and their 154 twin lambs with a mean individual live weight of 21.4 ± 0.3 kg (range 16-29 kg) were allocated to one of three weaning age treatments of 9-week versus 11-week versus 13-week. The weaning age treatment groups were balanced for yearling and lamb live weight. Yearlings and their lambs were then further divided so that half of the yearlings (Y) and their lambs (L) were allocated to either Group A or Group B which were managed in separate paddocks. On D1 the 9-week-old lambs were weaned. Group A contained half of the 9-week yearlings (9Y) while their lambs remained in Group B, half of the 11-week yearlings (11Y) and their lambs (11L) and half of the 13-week yearlings (13Y) and their lambs (13L); Group B contained half of the 9-week lambs (9L) while their dams remained in Group A, half of the 11-week yearlings (11Y) and their lambs (11L) and half of the 13-week yearlings (13Y) and their lambs (13L). On D14 the 11-week old lambs were weaned by transferring their dams to the other group. On D28 the 13-week –old lambs were weaned by removing all lambs from the study. The yearlings remained in the study until D70. Table 1 outlines the composition of each group for D1, D14 and D28.

**TABLE 1**: Experimental design; group composition for Days 1, 14 and 28 of the study. The code 9, 11 and 13 indicates the mean age in weeks when the group is to be weaned; Y = Yearling dam; L = Lamb.

| Day of trial | Group A | Group B |
|---|---|---|
| D1 | 9L (Dams in Group B) | 9L (Dams in Group A) |
| | 9Y (Lambs in Group B) | 9Y (Lambs in Group A) |
| | 11Y and their lambs | 11Y and their lambs |
| | 13Y and their lambs | 13Y and their lambs |
| D14 | 9L (Dams in Group B) | 9L (Dams in Group A) |
| | 9Y (Lambs in Group B) | 9Y (Lambs in Group A) |
| | 11L (Dams in Group B) | 11L (Dams in Group A) |
| | 11Y (Lambs in Group B) | 11Y (Lambs in Group A) |
| | 13Y and their lambs | 13Y and their lambs |
| D28 | 13Y weaned - All lambs removed from study and yearling dams managed as one group thereafter. | |

### Animal measurements

Yearlings and their lambs were weighed, unfasted, within an hour of being removed from pasture, on D1, D7, D14, D21 and D28. Yearlings were also weighed on D35, D42 and D70.

### Herbage measurement and analysis

The yearlings and lambs were managed on a total area of 11 ha of a mixed sward of perennial ryegrass (*Lolium. perenne*) and white clover (*Trifolum. repens*). The pre- and post-grazing herbage mass of the six paddocks was monitored weekly and determined using a rising plate metre (Ashgrove Pastoral Products, Palmerston North).

Plucked herbage samples were collected on D1 and D35 for each group and one sample collected on D70. The samples were dried in a convection oven for 12 hours at 105°C. The crude protein and energy content was determined via near-infrared-spectrometry (Bruker MPA NIR spectrophotometer, Ettlingen, Germany). The resultant near-infrared spectra were analyzed using Optic user software (OPUS) version 5.0.

### Data analysis

Yearling live weight and lamb live weight were analysed using the repeated measures procedure (SAS, 2005). The fixed effect of weaning age treatment was included in the model for comparing yearling and lamb live weight. The live weight of the yearlings at D1 was included in the model for yearling live weight for all days and the individual lamb age were included in the model for lamb live weight as covariates.

## RESULTS

### Herbage quality

The pre- and post-grazing mass during the entire experimental period was 1,860 ± 135 (standard error) and 1,370 ± 70 kg dry matter (DM)/ha, respectively. The crude protein content of the herbage offered was 22.7 and 20.9% on D1 for Group A and Group B, respectively, 23.7 and 25.7% on D35 and 15.8 % on D70. The metabolisable energy (ME) content of the herbage offered was 11.4 and 12 MJ ME/kg DM on D1 for Groups A and B, respectively, 11.7 and 12.3 MJ ME/ kg DM on D35 for Groups A and B, respectively and 11.8 MJ ME/ kg DM on D70.

**FIGURE 1**: The effect of weaning lambs at 9 weeks, 11 weeks or 13 weeks of age on the mean live weight of twin lambs born to yearlings during the 4 week (28 day) period of weaning.
—♦— = Weaned at 9-weeks of age;
– –▲– – = Weaned at 11-weeks of age;
....■.... = Weaned at 13-weeksof age.
Error bars indicate the standard error of the mean.

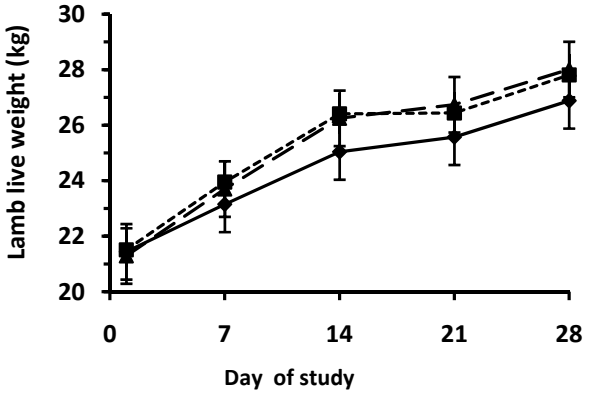
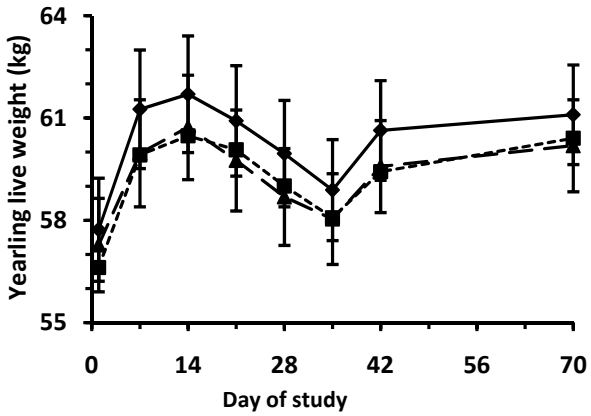



**FIGURE 2**: The effect of weaning lambs at 9 weeks, 11 weeks or 13 weeks of age on the mean live weight of their yearling dams during the 4 week (28 day) period of weaning.

—♦— = Weaned at 9-weeks of age;
– –▲– – = Weaned at 11-weeks of age;
....■.... = Weaned at 13-weeksof age.
Error bars indicate the standard error of the mean.




**Yearling and lamb live weight**

Weaning age treatment had no effect (P >0.05) on lamb live weight from D1 to D28 (Figure 1) or yearling live weight from D1 to D70 (Figure 2).

## DISCUSSION

The objective of the present study was to investigate the effect of weaning lambs at either nine, 11 or 13 weeks of age on the live weight of the yearling dam and their lambs when lambs born to yearlings are normally weaned at approximately 14 weeks. Previous studies that have involved early weaning of lambs reared by mature ewes (Furnival & Corbett, 1976; Rattray *et al*., 1976; Geenty 1979) and yearlings (Mulvaney *et al*., 2009) have reported no affect of early weaning on lamb live weight which is similar to the results of the current experiment. Weaning 3-5 week old lambs reduced lamb survival (Rattray *et al*., 1976) and growth rate (Rattray *et al*., 1976; Geenty 1979). In addition, Rattray *et al*. (1976) reported that eight week old lambs, reared by mature ewes, had a sufficiently developed rumen to ferment herbage. The lambs in the present experiment were at least eight weeks of age when they were weaned. At this age, the rumen should have been capable of fermenting herbage and this may help explain why the age at weaning did not impact on lamb live weight.

Mulvaney *et al*. (2009) reported that offering 9.4 MJ ME/kg DM and early weaning of single and twin lambs, improved yearling liveweight gain. Therefore, weaning twin lambs reared by yearlings early would have been expected to relieve the burden of raising twin lambs and possibly enhance their live weight. However, yearling live weight in the present experiment was not affected by the weaning age of the lamb. This suggests that, under favourable pastoral conditions, early weaning is not necessary to improve yearling live weight.

Potential factors affecting the extent of early weaning on yearling and lamb live weight include herbage availability and quality (Furnival & Corbett 1976; Mulvaney *et al*., 2009). In the present experiment, herbage availability remained between 1,400 and 1,850kg DM/ha and the herbage had a high energy content (11.4-12.3 MJ ME/ kg DM) indicating that the herbage availability and quality was not limiting. Therefore, further studies may consider investigating the potential interaction between herbage availability and quality and weaning age on the live weight of the yearling and its lambs.

## CONCLUSION

These results show that early weaning of twin lambs reared by yearlings did not show any advantage over relatively later weaning. This indicates that early weaning is needed as a technique to increase yearling live weight under favourable pastoral conditions. Further studies should consider investigating the effects of early weaning and different levels of nutrition that model less favourable pastoral conditions.

## ACKNOWLEDGEMENTS

The authors would like to thank Mr Graeme Poole for his technical assistance and Massey University, Beef and Lamb New Zealand and the C. Alma Baker Trust for providing financial assistance for this study.

## REFERENCES


Baker, R.L.; Clarke, J.N.; Diprose, G.D. 1981: Effect of mating Romney yearlings on lifetime production – preliminary results. *Proceedings of the New Zealand Society of Animal Production* **41**: 198-203.

Caneque, V.; Velasco, S.; Diaz, M.; Perez, C.; Huidobro, S.; Lauzurica, S.; Manzananares, C.; Gonzalez, J. 2001: Effect of weaning age and slaughter weight on carcass and meat quality of Talaverana breed lambs raised at pasture. *Animal Science* **73**: 85-95.

Corbett, J.L.; Furnival, E.P. 1976: Early weaning of grazing sheep: 2. Performance of ewes. *Australian Journal of Experimental Agriculture and Animal Husbandry* **16**: 156-166.

deNicolo, G.; Morris, S.T.; Kenyon P.R.; Morel, P.C.H. 2006: Effect of weaning pre- or post-mating on performance of spring-mated ewes and their lambs in New Zealand. *New Zealand Journal of Agricultural Research* **49**: 255-260.

Earl, C.R.; Dunstan, E.A.; Stafford, J.P.; Male, R.H.; Rowe, J.P. 1990: Early weaning of crossbred lambs. *Proceedings of the Australian Society of Animal Production* **18**: 192-195.

Furnival, E.P.; Corbett, J.L. 1976: Early weaning of grazing sheep: 1. Growth of lambs. *Australian Journal of Experimental Agriculture and Animal Husbandry* **16**: 149-155.

Geenty, K.G. 1979: Effects of weaning age on export lamb production. *Proceedings of the New Zealand Society of Animal Production* **39**: 202-210.

Kenyon, P.R.; Pinchbeck, G.L.; Perkins, N.R.; Morris, S.T.; West, D.M. 2004: Identifying factors which maximise the lambing performance of hoggets: a cross sectional study. *New Zealand Veterinary Journal* **52**: 371-377.

Kenyon, P.R.; Morel, P.C.H.; West, D.M.; Morris, S.T. 2006: Effect of liveweight and teasing of ewe hoggets prior to breeding on lambing pattern and weight of singleton lambs. New Zealand Journal of Agricultural Research 49: 341-347.

Kenyon, P.R.; Proctor, L.; Morel, P.C.H.; Morris, S.T.; West, D.M. 2008: The effect of breeding ewe lambs on subsequent two-year-old ewe performance. *Livestock Science* **115**: 206-210.

McMillan, W.H.; McDonald M.F. 1983: Reproduction in hoggets and its effect on 2-year-old performance. New Zealand Journal of Agricultural Research 26: 437-442.

Morris, S.T.; Kenyon, P.R.; West, D.M. 2005: Effect of hogget nutrition in pregnancy on lamb birthweight and survival to weaning. New Zealand Journal of Agricultural Research 48: 165-175.

Mulvaney, F.J.; Morris, S.T.; Kenyon, P.R.; West, D.M.; Morel, P.C.H. 2009: The effects of weaning at 10 or 14 weeks of age on liveweight changes in the hogget and her lambs. *Proceedings of the New Zealand Society of Animal Production* **69**: 68-70.

Mulvaney, F.J.; Morris, S.T.; Kenyon, P.R.; West, D.M.; Morel, P.C.H. 2010: Effect of nutrition around the time of breeding and during pregnancy on yearling liveweight change and live weight and survival of their offspring. *Proceedings of the New Zealand Society of Animal Production* **70**: 91-95.

Rattray, P.V.; Morrison, M.C.L.; Farquhar, P.A. 1976: Performance of early-weaned lambs on lucerne and pasture. *Proceedings of the New Zealand Society of Animal Production* **36**: 179-183.

SAS, 2005: Statistical analysis system. SAS Institute Inc. Cary, North Carolina, USA.

Smeaton, D.C.; Knight, T.W.; Sumner, R.M.W. 1979: Effect of early weaning on ewe liveweight and ovulation rate at mating. 1978/79 Annual Report Agricultural Research Division, Ministry of Agriculture, Wellington New Zealand. p. 171-172.

Statistics New Zealand, 2007: Agricultural production statistics. Statistics New Zealand, Wellington, New Zealand. http://www.stats.govt.nz/browse_for_stats/industry_sectors/ agriculture-horticulture-forestry/agriculturalproduction_hotpjun07final.aspx. [Accessed 1 May 2011]