

Maximising lamb growth rate – just what is possible in a high performance system

P.D. MUIR, N. B. SMITH and J.C. LANE

*On-Farm Research Ltd, Poukawa Research Farm, P.O. Box 1142, Hastings
paul@on-farm.co.nz*

Abstract

This study set out to demonstrate what could be achieved in terms of lamb growth rates under controlled experimental conditions. Ewes with high breeding values for progeny growth rate were selected from within a flock of 900 ewes and mated using AI to a ram with a high breeding value for progeny growth rate. Of the 70 ewes mated, 44 reared 75 lambs (170%) to 12 weeks of age. Lamb birth weights averaged 4.8 kg. Ewes and lambs were fed on pasture covers between 1800 and 2600 kg DM/ha throughout lactation. At 12 weeks of age, the average weight of all lambs in the mob averaged 39 kg. Average growth rate of all lambs from birth to 12 weeks was 409 g/d, with single, twin and triplet lambs averaging 437, 407 and 380 g/d respectively. The best individual lamb grew at 549 g/d and weighed 51.6 kg at 12 weeks. This demonstration sets a new benchmark for both mob and individual lamb growth rates and indicates what can be achieved with a combination of genetics for growth, ewes with good milking ability and good pasture feeding conditions.

Keywords: breeding value, lamb growth rate, milking ability, pasture quality

Introduction

Pre-weaning lamb growth rate is a key component of profitable sheep farming systems. Faster growing lambs are likely to be slaughtered earlier and/or be heavier at slaughter than their slower growing counterparts. More importantly, faster growing lambs are more efficient in converting pasture to saleable meat because of the lower ratio of maintenance to total feed requirements (Rattray 1981). From a farmer perspective, fast growing lambs are less likely to be sold on a discounted store lamb market. A wide range of factors interact to affect lamb growth rate, including ewe live weight and body condition, ewe milking ability, pasture quality and quantity and the genetic ability of the lamb to grow. These factors were reviewed by Kerr (2000).

There are many anecdotal claims for lamb growth rates above 400 g/d on pasture, but many of these are word of mouth or media reports. Frequently they pertain to the first draft from a mob of lambs where there is limited data on birth date and birth weight, both of which are often unknown or ignored. In the

New Zealand literature, there are very few records of lamb growth rate (mob averages) above 300 g/d. Parker & McCutcheon (1992) reported growth rates of 317 g/d in single lambs reared by Border Leicester x Romney ewes up to 6 weeks of age. Muir *et al.* (1999) reported growth rates to 12 weeks of 338 g/d for predominantly single lambs reared by Poll Dorset ewes. Muir *et al.* (2000) also reported a high mean lamb growth rate (374 g/d) of single lambs reared from birth to 12 weeks of age by East Friesian x Romney ewes.

The aim of this demonstration was to see what lamb growth rates could be achieved when selected sire and ewe genetics for growth were combined with high quality pasture and good pasture covers throughout lactation.

Methods

The Poukawa Elite Lamb project was established to demonstrate a high performance system. It comprises a highly recorded, mixed ewe breed flock with approximately 900 ewes and a progeny test for terminal sires. The performance of ewes over four years was analysed and the ewes ranked on the basis of their progeny's liveweight gains after correcting for birth rank and sex. The top 70 ewes (all East Friesian x Romney ewes) were synchronised with CIDR's and artificially inseminated using semen from the top ranked sire for progeny growth. This was a Suffolk ram whose Breeding Value for progeny liveweight at 12 weeks was +3.37 kg above the flock average of 29.9 kg. The average 12 week lamb weight was standardised to 150% lambing to remove between-year variations and averaged over 4 years.

Ewe body weight and condition scores were recorded pre-joining, pre-lambing and 12 weeks post-lambing. After scanning on the 16th May, all 539 ewes in lamb to the AI programme were managed as a single mob. A week before the expected lambing date ewes were drafted into single, twin and triplet groups and set stocked. At this point the selected ewes in this study were managed and set stocked as a separate mob. Within 24 hours of birth lambs were weighed and tagged and then re-weighed at 12 weeks of age. Ewes and lambs were grazed on a new autumn sown pasture consisting of perennial ryegrass (Meridian AR1), white clover (Grassland Sustain, Prop) and

Table 1 Ewe liveweights and body condition scores recorded pre-joining, pre-lambing and 12 weeks after lambing.

	— Liveweight (kg) —		Condition score Mean (\pm SEM)
	Mean (\pm SEM)	Range	
Pre-joining	74.3 \pm 0.98	64 – 99	2.7 \pm 0.05
Pre-lambing	86.5 \pm 0.78	74 – 96	2.8 \pm 0.04
12 weeks post-lambing	87.6 \pm 1.33	71 – 112	3.0 \pm 0.08

Table 2 Mean (\pm SEM) lamb birth weight, liveweight at 12 weeks of age, liveweight gain to 12 weeks of age and efficiency of production (kg lamb liveweight reared to 12 weeks/kg ewe pre-joining weight).

	Number of lambs	Birth weight (kg)	Liveweight at 12 weeks (kg)	Liveweight gain (g/d)	Efficiency of production
Singles	14	5.2 \pm 0.22	41.5 \pm 1.19	437 \pm 13.1	0.55
Twins	52	4.9 \pm 0.12	38.9 \pm 1.63	407 \pm 7.4	1.05
Triplets	9	4.3 \pm 0.20	35.3 \pm 1.08	380 \pm 10.7	1.48
Average	75	4.8 \pm 0.10	39.0 \pm 0.57	408 \pm 6.5	0.89

Table 3 Birth weights, liveweights at 12 weeks of age and liveweight gains to 12 weeks of age for the heaviest single lamb, and the heaviest sets of twin and triplet lambs.

	Birth weight (kg)	Weight at 12 weeks (kg)	Liveweight gain (g/d)
Single	5.5	51.6	549
Twins	5.0	41.7	453
Triplets	4.4	37.4	396

subterranean clover (Leura). Pasture covers on offer were maintained between 1800 and 2600 kg DM/ha from lambing until the end of lactation.

Results

Of the 70 ewes inseminated, 49 (63%) held to AI. Five ewes lost lambs and were excluded from the dataset. Forty four ewes reared 75 lambs (170%) to 12 weeks of age. These ewes had a mean liveweight of 74.3 and 87.6 kg pre-joining and at 12 wks post lambing respectively (Table 1). Mean ewe body condition score was 2.7 pre-joining. Because of the AI programme, lambing was relatively synchronised and occurred over 8 days with a mean lambing date of 30th July. Lambs averaged 4.8 kg at birth and 39 kg at 12 weeks of age (Table 2) and at a typical dressing out percentage of 45% for milk fed lambs, average estimated carcass weights would have been 17.6 kg. Average lamb growth rate from birth to 12 weeks was 409 g/d, with single, twin and triplet lambs averaging 437, 407 and 380 g/d respectively (Table 2).

The fastest growing individual was a single ram lamb which grew at 549 g/d and weighed 51.6 kg at 12 weeks (an estimated carcass weight of 23.3 kg). The best set of triplets grew at 396 g/d and averaged

37.4 kg at 12 weeks (Table 3). In terms of productive efficiency, ewes in this study reared an average of 0.89 kg of lamb liveweight/kg of ewe to 12 weeks of age.

Discussion

Some of the most comprehensive commercial data on pre-weaning lamb liveweight gains in New Zealand is available from benchmarking groups. One of these is FB 2000, a group of 80 South Canterbury farmers who collect data from 400000 lambs annually (T. Fraser pers.

comm.). In 2002, the mean liveweight gain from birth to weaning was 282 g/d (range 195-340 g/d). Similar lamb growth rates were recorded from birth to weaning on 6 North Island properties, with single and twin lamb growth rates averaging 273 g/d (range 229-311) and 220 g/d (range 159-279), respectively (Litherland & Lambert 2000). Even the average growth rates for the few triplets lambs in this demonstration were greater than these values and for those reported previously in single lambs by Parker & McCutcheon (1992), Muir *et al.* (1999, 2000). The average liveweight gain of 409 g/d appear to be the highest level of pre-weaning lamb growth rates documented under New Zealand conditions.

The level of feeding offered to the ewes in this study is well above what would be likely to occur in commercial practice. This is supported by the large increase in ewe liveweight (+ 13 kg) and body condition scores (+ 0.3) that occurred from pre-joining to 12 weeks post-lambing. Muir *et al.* (2000) calculated that twin lambs required about a third of their energy from pasture by 6 wks of age and therefore the high pasture covers in this demonstration would have provided the opportunity for the twin and triplet lambs to select high quality, highly digestible pasture. This would have substituted for reducing milk intake in later lactation and enabled high growth rates to be maintained. Nevertheless, the high pasture covers needed to achieve these performance levels would have carried an economic cost and returns per hectare would no doubt have been maximised with a higher stocking rate and better feed utilisation.

Although the breed base of the elite flock contained East Friesian x Romney, Finn x Romney, Poll Dorset x Romney and purebred Romney, the top 70 ewes selected on the basis of progeny growth rates were

all East Friesian x Romney. These ewes had a body condition score of 2.7 pre-joining and whilst this might seem light for a ewe of 74 kg, East Friesian x Romney ewes have been shown to have a condition score 0.45 lower than Romney ewes at the same liveweight and when fed under identical feeding conditions (Muir unpublished data). Muir *et al.* (2000) also showed that East Friesian x Romney produced about 30% more milk on a volume basis and 20% more milk on an energy basis. They suggested that this contributed to the 40 to 50 g/d increase in lamb growth rate of lambs reared by East Friesian x Romney ewes as compared to those reared by Finn x and Romney ewes. The breed make-up of the selected ewes and the previous data on milking abilities demonstrate the likely importance of the ewe breed when considering how to maximise lamb growth rates.

Conclusions

Whilst the results achieved in the present study were obtained in selected ewes which were fed under extremely good feeding conditions in a controlled research situation, they demonstrate that lamb growth rates of 400 g/d are achievable at a high lambing percentage. It also demonstrates a large gulf between what is achievable and what happens in reality and that there is considerable scope for improving the performance of New Zealand sheep flocks.

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