An option for managing triplet bearing ewes on extensive properties

B.C. THOMSON and P.D. MUIR

On-Farm Research Ltd. P.O. Box 1142, Hastings 4156, New Zealand

ABSTRACT

Heavier ewe live weights and the trend toward composite genetics has resulted in an increasing proportion of triplet bearing ewes within a flock. On some extensive properties, triplet lambs have much lower survival rates. This work examined the effect on lamb survival and the profitability of shifting scanned triplet ewes to an intensive property for lambing. Scanned triplet bearing ewes on a large extensive property were allocated to two groups; Intensive (150 ewes) and Extensive (770 ewes). Intensive ewes were transported to a smaller downland property prior to lambing and the Extensive ewes remained on the farm and were managed normally. Weaning percentages were higher under intensive management (222% lambs weaned/ewe present at weaning) than under extensive management (171%). The intensive property also had higher lamb weaning weights per ewe (58.2 vs 47.2 kg lamb weaned/ewe scanned). Differences in survival between the properties suggest there is a significant potential to reduce death rate in triplet lambs. Returns on feed consumed were modelled using Farmax® and were 21.1 and 17.1 c/kg dry matter consumed over the trial period on the respective properties. In addition, removal of the triplet bearing ewes from the extensive property freed up resources which could be used to improve the performance of other stock.

Keywords: sheep; triplet; management; survival.

INTRODUCTION

An increase in the national lambing percentage from 112% to 125% over the last 10 years (Rhodes, 2007) is associated with an increase in the number of triple-born lambs (Thomson *et al.*, 2004; Muir *et al.,* 2005). Triplet-born lambs are smaller, slower to suckle, have poorer survival rates, and tend to grow slower than twin- and single-born lambs (Dwyer *et al.,* 2005; Muir *et al.,* 2005; Thomson *et al*., 2004). Low rates of lamb survival impact on the profitability of a sheep production enterprise and have welfare implications. Strategies need to be developed to improve lamb survival, particularly in triplet lambs. In the Poukawa Elite Lamb Flock, mortality rates of triplet lambs of 23% (Thomson *et al.,* 2004) tend to be lower than on extensive properties. A mortality rate of 35% has been reported across five large properties under extensive management conditions (Nicoll *et al.,* 1999).

The aim of this experiment was to evaluate the transferring of scanned triplet-bearing ewes from an extensive to an intensive property for lambing. After weaning the ewes were to be returned to the extensive property and the lamb returns allocated between the extensive and intensive properties.

MATERIALS AND METHODS

Nine hundred and twenty 4-tooth and 6-tooth Romney ewes were scanned as carrying triplets and shorn on 23 July on an 'extensive' commercial property in the Taupo area. Ten days later, the ewes were tagged, weighed and randomly assigned into two groups balanced for live weight; an Intensive group of 150 ewes and an Extensive group of 770 ewes. On the 4 August, ewes the Intensive group were transported to the Poukawa Research Farm in Hawkes Bay. The extensive group remained on the extensive commercial property.

Extensive management

On 13 September, the ewes in the Extensive group (E) were re-weighed and treated with Ultravac 5 in 1, Arrest Hi-Min for parasites, a mineral lamb drench and Cypercare for lice and set stocked at between 3.5 and 5 ewes/ha. Pasture covers ranged from 705 to 1,337 kg dry matter (DM)/ha. Paddocks were flat and ranged from 10 to 17 ha each and although there were rows of pine trees on some boundaries to provide shelter, the majority of each paddock was relatively exposed. During lambing, ewes were shepherded as per normal for this block. This involved a daily check and pick up of dead lambs and ewes. A total of 206 lambs, in groups of 20 to 40 per paddock, were tagged and weighed during lambing as indicator animals. The number of dead lambs and ewes in each paddock was recorded. An assessment was made as to the likely cause of death of each ewe. Pasture covers were recorded in the middle of lambing on 4 October, and ranged from 1,021 to 2,190 kg DM/ha. At docking on 10 November the tagged lambs and all ewes were weighed and a sub sample of 10 to 15 ewes in each mob were condition scored. Ewes were drenched with Arrest and lambs were treated with B_{12}, Flypel and drenched with Lamb First. From docking, cattle were used to maintain pasture quality as necessary. At weaning on 13 January, all ewes were weighed along with

TABLE 1: Lamb survival under the Intensive and Extensive management conditions.

Parameter	Intensive	Extensive		Tagged	
	Tagged	Tagged	Total	χ^{2} [1]	P value[1]
Ewes allocated	143	81	770		
Lambs tagged	365	202	-		
Tagged lambs/ewe at tagging (%)	255	249	-	0.45	0.50
Lambs docked/ ewes allocated (%)	216	184	154	16.9	0.001
Lamb loss tagging to docking (%)	15.3	26.2	-	3.71	0.054
Lambs weaned/ewes allocated (%)	213	174	153	11.07	0.001
Lamb loss docking to weaning (%)	1.0	5.4	0.8	2.75	0.10
Ewe losses (%)	4.2	18.5	9.2	2.06	0.15
Lamb loss tagging to weaning (%)	16.7	30.2	-	4.70	0.03
Lamb loss to weaning (%)	28.0	-	48.1[2]		

[1]Statistical analysis between tagged lambs of both groups.
[2]Estimated assuming same number of lambs born per ewe (dead or alive) as under the Intensive system.

tagged lambs and a sub-sample of 96 untagged lambs. A sub-sample of ewes was condition scored.

Intensive management

On arrival at the Poukawa Research Farm on 4 August, the ewes were drenched with Triton and condition scored. Ewes were re-weighed and condition scored at the same time as the Extensive ewes were set stocked. Ewes were set stocked at 5 ewes/ha in small 2 to 3 ha sheltered, flat paddocks with pasture covers of 1,200 to 1,600 kg DM/ha. These ewes were intensively shepherded twice per day and if necessary assisted. Any ewes and lambs that had problems were relocated to a woolshed. Every two days, ewes that had not lambed were 'drafted off'. Within 24 hours of birth, live lambs were tagged, weighed and tailed using a rubber ring. All details of fostering, artificial rearing and assistance provided to the ewe or the lamb were recorded. All lambs and ewes were re-weighed and the lambs treated for flystrike prevention on 9 November in order to match the docking regime on the extensive property. All ewes and lambs were weighed at weaning on the 13 January and ewe condition score measured.

Statistical and financial analysis

Variables were analysed using the generalised linear model in Genstat and where necessary data was normalized using a logit transformation. Financial returns were modelled using Farmax® (Marshall *et al.,* 1991). Since data on pasture covers and ewe and lamb live weights were only available over the period of the trial, financial returns were only calculated between lambing and weaning for the two trial groups.

The assumptions used were:

- Ewe live weight – Valued at $1.50/kg both pre-lamb and at weaning. This takes into account the lighter ewes at weaning on the Intensive property (67.5 vs 76.8 kg) and the higher ewe loss rate on the Extensive property (9.2 vs 4.1%).
- Lamb value – Lambs were valued at $1.98/kg live weight at weaning on the 13 January.
- Ewe transport – Costed at $4.60 per head to transport ewes to Poukawa and back.

RESULTS AND DISCUSSION

There were differences in ewe mortality of 4.1% versus 9.2% for the Intensive and Extensive groups, respectively. On the intensive property, early intervention probably meant problems were treated as they developed, as 60% of the ewe deaths on the Extensive property were directly related to lambing issues compared to none on the Intensive property.

Lamb mortality post tagging and estimated total mortality was higher under Extensive management at 17% versus 30% and 28% versus 48% respectively (Table 1).

Ewes were all scanned as carrying triplets but because only a sub-sample of lambs were tagged at birth on the Extensive property, the total number of lambs born per ewe on the Extensive property was assumed to be the same as on the Intensive property. It was found that only 21% of lambs on the Extensive property were reared as triplets right through to weaning as compared to 62% on the Intensive property (Table 2). The mean lamb weight at docking was heavier in the extensive situation but there was no difference when lambs of the same rearing rank were compared (Table 2). The higher lamb and ewe survival rates in the Intensive group meant that in spite of the slightly lower average lamb weaning weight, the Intensive system resulted in a higher total weaning weight per ewe scanned

TABLE 2: Effect of rearing rank (to docking) on lamb liveweight (kg) at birth, docking and weaning.

Parameter	Property	Rearing rank			Mean
		1	2	3	
Percentage of lambs	Extensive	25.4	49.4	21.0	
	Intensive	5.4	30.3	62.0	
Birth weight (kg)	Extensive	4.91	4.74	4.81	4.82
	Intensive	4.95	4.64	4.10	4.68
	Mean	4.93	4.74	4.57	
Docking weight (kg)	Extensive	13.9	15.5	12.7	14.1
	Intensive	16.9	15.4	13.0	15.1
	Mean	15.4[b]	15.5[b]	12.8[a]	
Weaning weight (kg)	Extensive	27.8[b]	28.4[b]	25.9[a]	28.5[b]
	Intensive	31.7[c]	28.6[b]	25.2[a]	27.4[a]
	Mean	29.8[b]	28.5[b]	25.6[a]	

[abc] values are significantly different P <0.05

TABLE 3: Live weight (kg) and liveweight gain (g/d) of tagged lambs under Intensive and Extensive management and the gross margins for each system. SED = Standard error of difference.

Parameter	Intensive	Extensive	SED	P value
Birth weight (kg)	4.46	4.51	0.14	0.72
Docking weight (kg)	13.6	13.9	0.3	0.32
Gain tagging to docking (g/d)	248	258	7	0.16
Weight of lamb docked (kg)/ewe scanned	30.8	25.1	1.7	0.001
Weaning weight (kg)	26.7	27.4	0.4	0.10
Gain docking to weaning (g/d)	200	216	5	0.001
Weight of lambs weaned (kg)/ewe scanned	58.2	47.4	3.0	0.001
Average gain tagging to weaning (g/d)	222	229	5	0.15
Gross margin (c/kg DM)	21.1	17.1		

TABLE 4: Comparison of ewe performance on the Intensive and Extensive properties. SED = Standard error of difference.

Time	Measurement	Intensive		Extensive		SED	P value
		Mean	Number measured	Mean	Number measured		
Shearing	Live weight (kg)	71.1	150	72.0	829	0.6	0.14
	Condition score	4.2	150	-	-	-	-
Pre-lamb	Live weight (kg)	81.4	143	80.7	829	0.6	0.22
	Condition score	3.8	27	3.6	62	0.1	0.012
Docking	Live weight (kg)	74.4	139	77.7	664	5.5	0.55
	Condition score	3.1	139	3.5	142	0.1	0.001
Weaning	Live weight (kg)	67.5	139	76.8	700	3.1	0.003
	Condition score	3.4	139	3.3	34	0.5	0.93

than in the Extensive system (Table 3). Ewes were in good condition prior to lambing and were generally very good mothers based on mothering ability scores and observation, with good sized, vigorous lambs. Nevertheless, the estimated survival rate achieved on the extensive property of 52%, was worse than 65% reported by Nicoll *et al.* (1999) for 30,000 ewes from five extensive properties. This was probably due to the three storms which occurred during and shortly after the lambing period. The 28% lamb mortality rate which occurred on the Intensive property was lower than the 39% previously reported for triplet lambs born to Romney ewes on the same property (Thomson *et al.,* 2004). This may be attributable to differences in ewe genetics or the later lambing date in the present study of October versus August.

Transporting ewes to the Intensive property for lambing and the return of these ewes after weaning, along with a 50:50 sharing of lamb returns showed a return of 21.1 cents/kg DM consumed. On the other hand, the ewes left on the Extensive property showed returns of 17.1 cents/kg DM consumed. If labour is included the returns would reduce to 19.5 and 16.5 c/kg DM for the Intensive and Extensive properties, respectively. Labour costs were calculated at $7.50 per ewe for the intensive property and $2.90 per ewe for the extensive property. This was based on a labour unit @ $20/hour and using 0.5 labour units for a month for the 770 ewes on the Extensive property and 0.25 labour units for a month for the 150 ewes on the Intensive property.

Ewes on the Intensive property gained more live weight from shearing to lambing than ewes on the Extensive property, but they lost more live weight and body condition post-lambing (Table 4). The greater liveweight loss in the ewes under Intensive management was probably because they reared more lambs (Table 2) and the later lambing date (October) meant they were compromised because of the onset of summer dry conditions. These conditions are typical of the area of lambing in August, with lambs being sold off their mothers in November and December, to give the best match of animal demand with feed supply/quality. Transferring triplet ewes to an intensive farm which is not summer dry is likely to give better ewe and lamb live weights and higher returns.

The real difficulty in calculating the financial benefits lies in valuing the benefits of removing the triplet ewes from an extensive property. Since triplet ewes are normally lambed at relatively low stocking rates, their removal may provide more feed and better lambing paddocks for the remaining ewes rearing single and twin lambs. The benefits of transferring ewes to an intensive property means that better value can be derived from surplus spring feed without a large capital investment. Returns of 19.5 c/kg DM consumed to 21.1 c/kg DM consumed are high for spring pasture, particularly since the late scanning date means these ewes are only wintered for a few weeks.

CONCLUSIONS

This work has demonstrated that it is feasible to transfer triplet bearing ewes from a large scale extensive property to a smaller, more intensive property and improve triplet lamb survival and returns. The extent of this benefit will be greatest under adverse feed or weather conditions and is likely to be greatest when the triplet ewes on extensive properties are also faced with difficult terrain. The opportunity for profit sharing will depend on the value to the extensive property of removing the triplet ewes and providing better feed for the remaining stock classes combined with the opportunity cost of spring feed on the intensive property.

ACKNOWLEDGEMENTS

To John Lane, Graham Wallace and Stuart Macmillan for managing the ewes at Poukawa. To Dr Geoff Nicoll, Dave Plummer, Julie Hanna and Brian Gibson, of Landcorp Farming Ltd for willing co-operation with this project. This work was undertaken with funding from Meat and Wool New Zealand and Landcorp Farming Ltd.

REFERENCES

Dwyer, C.M.; Calvert, S.K.; Farish, M.; Donbavand, J.; Pickup, H.E. 2005: Breed, litter and parity effects on placental weight and placentome number and consequences for the neonatal behaviour of the lamb. *Theriogenology* **63**:1092-1110.

Marshall, P.R.; McCall, D.G.; Johns, K.L. 1991: Stockpol: A decision support model for livestock farms. *Proceedings of the New Zealand Grassland Association* **53**: 137-140.

Morris, S.T.; Kenyon, P.R.; Burnham, D.L.; Everett-Hincks, J.M. 2003: The effects of sward height on twin and triplet birth weights and survival rates to weaning. *Proceedings of the New Zealand Society of Animal Production* **63**: 152-154.

Muir, P.D.; Thomson, B.C.; Knight, T.W. 2005: Factors affecting lamb survival. *Proceedings of the Society of Sheep and Beef Cattle Veterinarians of the New Zealand Veterinary Association* **35**: 73-82.

Nicoll, G.B.; Dodds, K.G.; Alderton, M.J. 1999: Field data analysis of lamb survival and mortality rates occurring between pregnancy, scanning and weaning. *New Zealand Society of Animal Production* **59**: 98-100.

Rhodes, T. 2007. FlockMaster - A Meat and Wool New Zealand initiative supporting opportunities to improve flock performance. *Proceedings of the Society of Sheep and Beef Cattle Veterinarians of the New Zealand Veterinary Association* **37**: 165-167.

Thomson, B.C.; Muir, P.D.; Smith, N.B. 2004: Litter size, lamb survival, birth and twelve week weight in lambs born to cross-bred ewes. *Proceedings of the New Zealand Grassland Association* **66**: 233-237.