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BRIEF COMMUNICATION

The effect of sward height on twin and triplet lamb birth weights and survival rates to weaning

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The differential allocation of pasture between ewes of different bearing/rearing ranks requires a knowledge of the relationship between herbage allowance, intake and production. Few experiments have been conducted in which responses to different pasture allowances have been examined for triplet-bearing/rearing ewes, particularly under continuous stocking management. Published feed requirements for ewes rearing triplets have often been extrapolated from those defined for twin-rearing ewes (Geenty & Rattray 1987). The sward surface guidelines for feeding single- and twin-bearing ewes have been published and researched under New Zealand conditions (Parker & McCutcheon 1992; Morris *et al*., 1993a, 1993b; Morris *et al*., 1994).

There is anecdotal evidence for varying lambing performance and lamb growth rates for triplet-bearing/rearing ewes under pastoral grazing conditions. The national average lambing percentage is increasing to beyond 120% (MWIES 2002). The proportion of triplets in flocks lambing above 150% increases at the expense of single-born lambs (Amer *et al*., 1999).

The aim of the research communicated in this paper was to compare ewe and lamb performance in twin- and triplet-bearing/rearing ewes offered various sward height allowances.

METHOD

Post-pregnancy scanning (62 days after the mid point of mating (P62), all ewes conceived during a 17 day mating period) 186 Romney ewes (including 96 twin- and 90 triplet-bearing ewes and evenly split between 2-tooth and mixed-age ewes) were randomly allocated to four nutritional treatments (each replicated and balanced for both ewe age and pregnancy rank) during the period from P64 to parturition (2, 4, 6 and 8 cm sward height representing a poor, normal, generous and overgenerous feed supply). Within the first 24 hours, of birth ewes were weighed (date of weighing = LI) and transferred to one of two sward heights (4 and 8 cm sward height, representing feeding recommendations for twins and a generous allowance for triplets). The treatment/replicates paddocks averaged 1.5 ha, resulting in an average stocking rate of 12 ewes/ha. If the actual sward height fell below the treatment height, then an additional area was added to ensure the correct sward height was offered. Ewe live weights were measured on P69, P132, L1 and at weaning (L87). All lambs were weighed within 12 hours of birth, sexed, tagged and identified to their dam. At weaning, lambs were weighed and a survival rate to weaning calculated.

Eight ewes died prior to lambing (seven triplet and one twin bearing) and one ewe diagnosed as a triplet had a litter size of four. These nine ewes were subsequently deleted from the data set.

Liveweights of ewes and lambs were subjected to analysis of variance using the statistical analysis package SAS (1985). Pre-lambing ewe liveweights were calculated on numbers of lambs born. Any ewes that gave birth to twin or triplet lambs but only reared one lamb (or lost all lambs) were discarded from the ewe liveweight data at L87. Ewes that gave birth to triplets but reared twins were included as twin-rearing ewes at the L87 analysis. Sex of lamb, ewe age (two tooth or mixed age) and replicate were used as a fixed effects in model and date of birth as a covariate. The proportion of lambs surviving to weaning was analysed as a bionomial trait using the SAS (SAS, 1985) procedure for categorical data modelling (CATMOD). Lambs that were born as twin or triplet and reared as a single, or born as triplet and reared as twin were included in the lamb survival model but not in lamb weaning weight data.

RESULTS AND DISCUSSION

The average herbage mass as assessed by monthly calibrated rising plate meter on each of 2, 4, 6 and 8 sward heights during pregnancy were 750 ± 53, 1180 ± 53, 1591 ± 53 and 1974 ± 53kg DM/ha, respectively. During lactation, the 4 and 8 cm sward height treatments had average masses of 1174 ± 67 and 2024 ± 77 kg DM/ha.

Ewes grazing the 2cm sward height during pregnancy were significantly ($P<0.01$) lighter at P132 and within 24 hours of partuition than ewes grazing 4, 6 or 8 cm sward heights (Table 1). There was no advantage in feeding ewes a more generous allowance than 4 cm sward height. Ewes that had grazed 2 cm swards during pregnancy tended to be lighter at weaning than those grazing 4, 6 or 8 cm sward heights (Table 1). Interestingly, ewes grazing a sward height of 8 cm during pregnancy and then transferred to 4 cm in lactation tended to be lighter than ewes grazing a either a 4 ($P = 0.07$) or 6 ($P = 0.12$) cm sward during pregnancy and then transferred to 4 cm sward during lactation. There was no litter size by sward height interaction and no effect of litter size on pregnancy or lactation ewe live weights.

Triplet-born lambs were 0.9 kg lighter ($P<0.05$) than twins and this difference increased in those lambs reared as triplets to 4.4 kg at weaning (Table 2). Lamb losses to weaning were 14% in twin- born lambs and 32% in triplet-

TABLE 1: The effect of litter size and sward height on ewe live weights (±SEM) at P69, P132, L1 and L87. Means within treatments having different superscripts are different P<0.05.

	(n)	P69	P132	L1	(n)	L87
Litter size						
2	95[1]	50.0±1.1	67.7±1.4	58.2±1.7	102[2]	61.6±0.7
3	82	53.1±1.1	69.4±1.4	58.4±1.7	26	62.3±0.7
Sward height[3]						
2-4					14	57.7±1.8^{a}
2-8	45	52.2±0.8	59.5±1.0^{a}	49.1±1.2^{a}	15	60.5±1.7^{ab}
4-4					16	64.3±1.6^{bc}
4-8	44	52.9±0.8	70.8±1.0^{b}	61.2±1.1^{b}	19	63.7±1.6^{bc}
6-4					17	63.7±1.6^{bc}
6-8	43	53.3±0.8	71.3±1.0^{b}	60.9±1.1^{b}	15	64.6±1.6^{bc}
8-4					16	60.6±1.6^{ab}
8-8	45	52.7±0.8	72.7±0.9^{b}	61.7±1.1^{b}	16	66.7±1.6^{c}

[1]Numbers include only those that gave birth to twin and triplets

[2]Numbers include only those ewes rearing twins (including those that gave birth to triplets but reared as twins) or triplets

[3]The first number denotes the sward height from P70-148; the second letter denotes the sward height from L1-L87.

TABLE 2: The effect of litter size and sward height on lamb birth and weaning live weights (kg) (±SEM) and on the proportion (%) of lambs surviving to weaning. Means within treatments having different superscripts are different (P<0.05).

	n	Birth weight	n	Weaning Weight	Proportion
Litter size					
2	191[1]	4.6±0.1^{b}	140	27.4±0.4^{b}	1.85±0.21[3] (86)^{b4}
3	238[1]	3.7±0.1^{a}	78	23.0±0.5^{a}	0.77±0.14 (68)^{a}
Sward height[1]					
2-4			28	24.4±0.8	1.28±0.39 (78)
2-8	105	3.8±0.1^{a}	34	24.8±0.7	2.92±0.73 (94)
4-4			36	25.9±0.7	1.90±0.44 (87)
4-8	108	4.2±0.1^{b}	42	25.7±0.7	2.15±0.47 (90)
6-4			36	26.6±0.7	1.90±0.44 (87)
6-8	103	4.1±0.1^{b}	34	26.6±0.7	1.97±0.47 (88)
8-4			36	25.8±0.7	1.77±0.41 (85)
8-8	113	4.3±0.1^{b}	36	25.2±0.7	2.25±0.53 (90)

[1]This includes birth weight of all lambs born and those subsequently reared as single or in case of triplets reared as a twin which do not appear in weaning weight data.

[2]The first number denotes the sward height from P70-148; the second letter denotes the sward height from L1-L87.

[3]Logit – transformed.

[4]Back-transformed (%).

born lambs. These mortality rates are similar to those recorded by Scales *et al*. (1986) (14.7 and 33.0% for twin- and triplet-born lambs, respectively) but much higher than the 18.1% observed in triplet-born lambs by Rohloff *et al*. (1982). Kenyon *et al*. (2002), using sheep from the same flock as reported in this paper, observed mortality rates of 19.7 and 40.7% in twin- and triplet-born and reared lambs. Triplet- born lambs reared as twins were significantly (P<0.05) lighter (data not shown) than twin-born and reared lambs but heavier than triplet-reared lambs (25.1±0.5 vs 27.4±0.4 vs 23.0±0.5, respectively). Lambs born to ewes grazing the lowest herbage allowance (2cm swards) were lightest at birth (P<0.01) but sward height during pregnancy or lactation had no effect on weaning weight or lamb survival to weaning.

The results suggest ewes rearing triplets should be fed allowances of 4 cm or better during pregnancy, however, there is no need to feed above 4 cm in pregnancy or lactation to optimise lamb weaning weights and lamb survival. These are similar sward height targets that Morris *et al*. (1993a), Parker and McCutcheon (1992) and Morris *et al*. (1994) suggested for single- and twin-bearing/rearing ewes. This data set suggests that farmers who separate multiple (twin and triplet) bearing ewes before lambing on pregnancy status probably do not have to graze these two groups separately to achieve optimum lamb production.

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