GROWTH, FERTILITY AND WOOL PRODUCTION OF YOUNG MERINO EWES FED DIFFERENT LEVELS FROM 7 TO 19 MONTHS OF AGE.

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SUMMARY

Merino hoggets aged seven months were fed three different levels of nutrition for 101 days during winter and two different levels from the end of winter until mating at 19 months of age.

Compensatory growth of 42 to 63% was demonstrated between the end of hogget wintering (12 months of age) and mating at 19 months of age. The compensatory growth was 65 to 86% by lambing at 24 months of age.

The level of feeding during winter did not affect reproductive performance at two years of age but the importance of high level feeding from the end of winter until mating to ensure satisfactory reproductive performance was demonstrated. High plane feeding between the end of winter and mating resulted in more ewes mated during the first 17 days (86.9% *v.* 47.9%), fewer ewes not mated after three cycles (1.7% *v.* 18.6%) and fewer barren ewes (14.0% *v.* 34.0%).

Restricted feeding in either winter or the post-winter period resulted in lighter fleeces, with post-winter feeding having the greater effect.

INTRODUCTION

On many properties in the South Island high country Merino ewes are not joined with rams until two and a half years of age. Difficulties in rearing hoggets result in small ewes at 19 months of age and many runholders prefer to grow their replacements for a further year before subjecting them to the stresses of pregnancy and lactation. This practice of not mating ewes until two and a half years of age results in the loss of one year's reproductive potential.

The effects of feeding level of hoggets in winter and the spring-summer period on liveweight, wool production and reproductive performance at two years of age were measured in a trial at the Tara Hills High Country Research Station.

EXPERIMENTAL

Four-hundred-and-eighty Merino hoggets, previously grazed on improved tussock, were divided into three groups of 160 on May 29, 1973, at seven months of age. The high plane group were fed lucerne hay *ad libitum,* while the medium and low plane groups

were offered 80 and 60%, respectively, of the high plane ration. Hay feeding continued for 101 days until September 7.

From September 7 until two-tooth mating on May 9, 1974, half of each winter group was lightly stocked at 3 per ha on an improved tussock hill block (high plane) and the remainder was stocked at 10 per ha on a similar block (low plane). Liveweights were recorded monthly until mating at 19 months of age and also at shearing at two years of age. Shearing was in September at both the one and two year stages and lambing commenced in October. Compensatory growth was calculated as the percentage of the difference in weight gain during the period of differential feeding which was recovered during the post-treatment period.

Harnessed rams were joined with the ewes at a ratio of 1:60 for three cycles from May 9 to July 1, 1974. Marks were recorded every 17 days and crayon colours changed. Ewes not marked by the rams were examined by laparotomy following the removal of the rams and any ovarian activity was noted. Neck tags were fitted to ewes before lambing and the lambing date and birth rank recorded.

RESULTS AND DISCUSSION

Figure 1 shows the liveweight changes of each group. Liveweights averaged 22.8 kg at the start of the trial. The daily dry matter intake of lucerne hay was 0.92, 0.74 and 0.55 kg for hog-

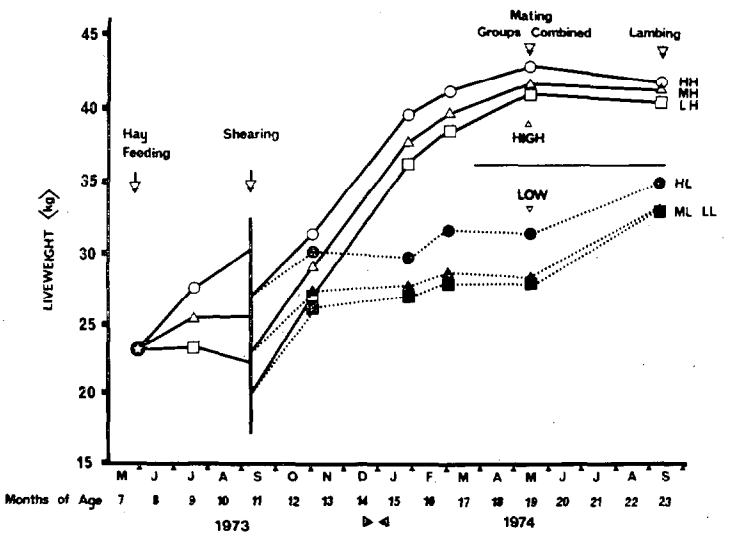

FIG. 1: *Hogget liveweight changes.*

gets fed high, medium and low plane, respectively. By the end of winter the high plane hoggets had gained 4.4 kg more liveweight than the medium plane group and 7.5 kg more than the low plane group. Mortalities during winter were negligible, with one hogget dying in the high and medium plane groups.

Some compensatory growth was evident during the post-winter period (Table 1). Where the post-winter feeding level was high, the medium and low plane winter groups compensated 56.3 and 62.5% of the end of winter difference, respectively, by mating. With low plane feeding after winter, the compensatory growth was 42.2 and 62.9% for the medium and low plane winter groups, respectively. These results are in close agreement with Drew *et al.* (1973) who imposed similar restrictions on Romney hoggets. The compensatory growth from the end of winter until lambing ranged from 64.6 to 85.9% (Table 1).

TABLE 1: LIVEWEIGHT CHANGES (kg) AND PERCENTAGE COMPENSATORY GROWTH

Feed Level			*End Winter*	*End Winter*
During Winter	*Post Winter*	*Winter* (101 *days*)	*to Mating* (244 *days*)	*to Lambing* (361 *days*)
H	H	6.7	16.6	9.7
M	H	2.3	19.0	13.4
			(56.3)	(85.9)
L	H	—0.6	21.1	15.4
			(62.5)	(77.8)
H	L	6.8	4.1	3.8
M	L	2.3	6.0	6.7
			(42.2)	(64.6)
L	L	—0.8	8.9	13.7
			(62.9)	(79.7)

In parentheses: percentage compensatory growth expressed relative to winter high plane.

The liveweight gain of the hoggets fed low plane in the post-winter period would be similar to the performance of hoggets on many unimproved high country runs. However, in this trial hoggets grew poorly as a result of restricted feed quantity whereas on unimproved runs feed quality would be the limiting factor.

At mating at 19 months of age the post-winter high plane groups weighed 12.6 kg more than the low plane groups. All groups were then grazed together and between mating and lambing the difference was reduced to 6.5 kg, representing 51.7% compensatory growth.

Liveweights at hogget shearing and at mating are shown with the reproductive performance in Table 2. The level of feeding of hoggets during winter had no carryover effect on subsequent lambing performance but the post-winter feeding level had a profound effect. Where hoggets were fed high plane during the post-winter period, more were mated during the first 17 days (86.9 *v.* 47.9%), fewer were not mated after three cycles (1.7 *v.* 18.6%) and fewer were barren (14.0 *v.* 34.0%). These differences were all highly significant ($P < 0.01$). Laparotomy examination of unmated ewes showed that all ewes in the post-winter high plane group had ovulated but 7% of the ewes joined with the ram in the post-winter low plane group had not shown any ovarian activity. There were no significant differences between treatments in twinning or percentage of ewes mated which lambed.

TABLE 2: REPRODUCTIVE PERFORMANCE (PER 100 EWES AT MATING)

Feed Level During Winter	*Post Winter*	*Oct. Wt. (kg) (12 months)*	*Mating (kg) (19 months)*	*Mated in Cycle 1*	*Lambing to Cycle 1*	*Not Mated after 3 Cycles*	*Barren*	*Twinning*
H	H	26.7	43.3	88.3a	63.6ab	1.3a	15.6abc	6.5a
M	H	22.9	41.9	85.1a	60.8ab	0.0a	14.9ab	1.4a
L	H	19.9	41.1	87.2a	70.5a	3.8ab	11.5a	1.3a
H	L	27.1	31.2	55.8ab	39.0bc	10.4bc	27.3bcd	1.3a
M	L	22.5	28.5	39.7b	27.4c	28.8d	42.5d	2.7a
L	L	19.5	28.4	47.0b	28.8c	18.2cd	33.3cd	1.5a

Within each column, means bearing the same letter do not differ at $P < 0.05$.

These results confirm earlier work of Drew *et al.* (1973) who concluded that level of feeding in winter did not affect 2-year-old reproductive performance but spring-summer nutrition was of great importance. However, in their work with Romneys twinning was the factor most affected, whereas in the present trial with Merinos post-winter nutrition influenced barrenness. Other work with Merinos (Allison *et al.*, 1974) also showed that twinning at two years of age was at a constant level and not related to liveweight prior to mating. Coop and Clark (1966), in a study involving Merinos and halfbreds, showed that barrenness exceeded 20% at mating weights below 32 kg and reduced to only 8 to 12% at mating weights of 41 to 45 kg. A similar trend was evident in the present trial, although barrenness levels were higher,

Fleece weights are shown in Table 3. Restricted feeding during winter resulted in lighter hogget fleeces and there was also some carry-over effect on 2-year-old fleece weights. Low plane feeding during the post-winter period had a large effect on 2-year-old fleece weights resulting in a mean reduction of 1.4 kg. The post-winter level of nutrition had a greater effect on wool weight than the winter level, probably owing to the restriction occurring over a longer period which also coincided with the months of maximum wool growth (Story and Ross, 1960).

TABLE 3: LIVEWEIGHT AT SHEARING AND GREASY FLEECE WEIGHT (kg)

Feed level		*Liveweight*		*Liveweight*	*Fleece Weight*
During Winter	*Post-Winter*	*at Hogget Shearing*	*Hogget Fleece Weight*	*at 2-year-old Shearing*[1]	*at 2 years of age*
H	H	26.7	3.16a	36.4	5.45a
M	H	22.9	2.95b	36.3	5.32ab
L	H	19.9	2.83c	35.3	5.23b
H	L	27.0	3.19a	30.8	4.15c
M	L	22.5	2.94b	29.2	3.90d
L	L	19.5	2.72c	29.3	3.80d

Within each column, means bearing the same letter do not differ at $P < 0.05$.

[1] Shorn liveweight.

This trial has shown that, apart from a small difference in fleece weight, there was no advantage in feeding Merino hoggets to gain 6.7 kg during winter compared with hoggets fed a maintenance ration. High level feeding from the end of winter to ensure good liveweights at mating was essential for satisfactory wool production and lambing performance at two years of age.

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