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PERFORMANCE OF EARLY-WEANED LAMBS ON LUCERNE AND PASTURE

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SUMMARY

Three experiments are described where lambs were weaned at the following ages: 4, 6 and 8; 3.5 and 12; and 4, 6 and 8 weeks, respectively, on to lucerne and in the third experiment on to lucerne or ryegrass/white clover pasture. In the third experiment the lambs weaned at 4 weeks of age were 2.6 kg lighter than the later weaned (8 week) lambs at 18 weeks, and had a higher mortality rate. The growth rate of the early-weaned lambs in the second experiment was approximately 50% of the growth rate of the late-weaned lambs and many of the former died of starvation. In the third experiment there were no deaths and growth of the early-weaned lambs (4 weeks) was satisfactory on both lucerne and pasture, although they were approximately 1.0 and 2.0 kg lighter, respectively, than later weaned lambs (8 weeks) at 12 weeks. Lucerne-fed lambs gained at higher rates, being 1.5 to 2.5 kg heavier at 12 weeks.

INTRODUCTION

UNDER conditions of feed shortage where the ewe is competing with her lambs for available feed, such as summer drought or at very high stocking rates, or under highly intensive systems such as twice-yearly lambing, it may be advantageous to wean early in order to lower overall feed requirements and aid farm management. Lambs have been successfully weaned at 3 to 5 weeks of age on to lucerne grown in Canterbury (Jagusch *et al.*, 1970). This paper describes three experiments where lambs were early weaned on to lucerne or ryegrass/white clover pasture grown at Ruakura.

EXPERIMENTAL

The three experiments are summarized in Table 1. The experiments were conducted during September to November each year. None of the lambs had access to lucerne before weaning.

The pastures and lucerne were at a vegetative stage of growth, and grazing was on an *ad libitum* basis. All animals had free access to salt licks.

At three weeks of age the lambs were docked and received a pulpy kidney vaccination, which in the last two trials was com-

TABLE 1: SUMMARY OF EXPERIMENTS

Year	Breed	Weaning Ages (wk)	Feed
1973	Romney × Dorset	4, 6, 8	Lucerne
1974	Dorset × Dorset	3.5, 12	Lucerne
1975	Dorset × Dorset		
	Dorset × Border		
	Leicester — Romney	4, 6, 8	Lucerne and pasture

bined with a selenium supplement. At weaning all lambs were drenched with thiabendazole, and in the 1974 and 1975 trials drenching and selenium injections were continued at monthly intervals.

In the 1975 experiment, to measure reticulo-rumen weights, 4 animals were killed within 2 hours of grazing at each weaning age, and 4 from each treatment were killed at 12 weeks of age. In addition 4 lambs from the 4 week weaning groups were killed at 8 weeks of age.

TABLE 2: LIVeweIGHTS AND DEATHS: 1973 EXPERIMENT

	Age at Weaning (wk)		
	4	6	8
Lambs (No.)	20	20	20
Liveweight (kg) at:			
Birth	3.9	3.7	4.0
4 weeks	10.8	10.8	10.6
6 weeks	11.6	13.1	13.0
8 weeks	14.3	14.7	15.8
18 weeks	28.2	29.8	30.8
Deaths (No.)	4	2	1

RESULTS AND DISCUSSION

In the 1973 trial (Table 2) weaning at 4 and 6 weeks of age checked growth rates relative to weaning at 8 weeks and differences in liveweight still existed at 18 weeks of age. Losses were higher in the earlier weaned lambs and were diagnosed as enterotoxaemia ("pulpy kidney", $n = 4$), selenium deficiency ("white muscle", $n = 2$) and red gut ($n = 1$). These occurred usually within one week of weaning. Early weaning *per se* would not have been the specific cause of death in the last two categories, but whether it induced the enterotoxaemia is unclear.

The growth rate of the early weaned lambs in the 1974 experiment (Table 3) was approximately 50% of that of the lambs

TABLE 3: LIVEWEIGHTS AND DEATHS: 1974 EXPERIMENT

						Age at Weaning (wk)	
						3.5	12
Lambs (No.)	....	....	....	....	....	40	75
Liveweight (kg) at:							
Birth	....	....	....	....	....	4.0	4.2
3.5 weeks	....	....	....	....	....	9.9	10.2
12 weeks	....	....	....	....	....	17.3	23.4
Deaths (No.)	....	....	....	....	....	13	1

weaned at 12 weeks. Many of the early-weaned lambs scoured badly and losses were drastically high (Table 3), occurring over a 4-week period after weaning. Post-mortem results revealed that, although the rumens contained fermenting lucerne, most of the animals had almost completely metabolized their fat depots. Although it is not uncommon for early-weaned lambs to mobilize fat while they continue to gain and deposit protein (Mitchell and Jagusch, 1972) these post-mortem results suggested that most of the deaths were due to starvation. Some of the animals also had associated infections such as lung abscess, pneumonia or arthritis. By the age of 3 weeks most lambs would have started eating pasture (Joyce and Rattray, 1970), and would be capable of some rumen fermentation (Walker and Walker, 1961). The rumen develops to adult proportions from weeks 3 to 8, and the rate of development is dependent on the amount of solid food eaten (Wardrop and Coombe, 1960; 1961; Franklin *et al.*, 1964; Corbett, 1968). The lambs in the 1974 trial were lighter than those in the former experiment, and probably because of competition with the ewes had not consumed sufficient pasture dry matter prior to weaning to induce rumen development to a capacity that would permit sufficient intake of lucerne to sustain reasonable growth rates or survival. On the other hand, the lucerne could have been of lower quality in the second year but this is not borne out by "whole plant" *in vitro* organic matter digestibility results (75.8 vs 75.1%).

The liveweight changes of the lambs grazing lucerne and pasture in 1975 are shown in Table 4. No lambs died in this experiment. Growth rates were quite satisfactory at the three weaning ages on both feeds. However, lambs weaned at 4 and 6 weeks of age suffered slight weaning checks compared with those weaned at 8 weeks. These were more marked and persistent on pasture than on lucerne. This would presumably be due to the

TABLE 4: LIVEWEIGHTS: 1975 EXPERIMENT

	Age at Weaning (wk)					
	Pasture-fed			Lucerne-fed		
	4	6	8	4	6	8
Lambs (No.)	14	10	10	14	10	10
Liveweight (kg) at:						
Birth	4.2	3.9	4.1	4.1	4.2	4.1
4 weeks	12.8	—	—	12.9	—	—
6 weeks	14.4	16.7	—	14.6	16.3	—
8 weeks	17.4	19.1	19.6	18.0	19.6	19.7
10 weeks	20.9	22.0	22.3	22.0	22.5	23.3
12 weeks	23.2	24.5	25.1	25.7	26.5	26.5

more fibrous nature of the pasture. *In vitro* organic matter digestibility of the pasture declined from 80.4 to 77.5%, while the lucerne maintained digestibility at 80.2%.

Table 5 contains the dressing percentage and the reticulo-rumen weights (both full and empty) expressed as a percentage of liveweight, for lambs that had been suckling ewes prior to slaughter. This shows that the rumen develops with age as pasture becomes a larger proportion of the diet (Joyce and Rattray, 1970) and this leads to a decline in dressing percentage.

The dressing percentage and reticulo-rumen weights of the weaned lambs are shown in Table 6. This shows that earlier weaning and ingestion of solid feed hastens rumen development, as the greater the interval between weaning and slaughter, the greater the relative rumen size. This is most marked in lambs weaned at 4 weeks and killed at 8 weeks (compare with 8-week-old suckling lambs in Table 5).

Similar to the results of McLean *et al.* (1965) rumen fill was much greater on pasture than on lucerne (Table 6), and would be due to the faster rate of passage of the latter through the rumen. Except in the case of the 8-week-old lambs this did not lead to differences in dressing percentage. This finding is similar to those of

TABLE 5: SUCKLING LAMBS: DRESSING PERCENTAGE AND PROPORTION OF RETICULO-RUMEN

	Age (wk)		
	4	6	8
Dressing percentage	54.8	54.2	51.1
Full reticulo-rumen (% LW)	2.7	4.4	7.5
Empty reticulo-rumen (% LW)	0.8	1.0	1.5

TABLE 6: WEANED LAMBS: DRESSING PERCENTAGE AND PROPORTION OF RETICULO-RUMEN

Age at Weaning (wk)	Age at Slaughter (wk)	Dressing %		Full Reticulo-rumen (% LW)		Empty Reticulo-rumen (% LW)	
		Pasture	Lucerne	Pasture	Lucerne	Pasture	Lucerne
4	8	46.7	48.5	14.1	10.6	2.6	2.4
4	12	47.8	47.9	11.1	8.5	2.4	2.2
6	12	47.9	47.6	11.1	7.4	2.2	2.1
8	12	50.2	50.4	10.0	7.3	2.0	1.9

Ratray and Joyce (1970) where, in a comparison of ryegrass and white clover, differences in rumen fill were balanced by opposite differences in weights of other parts of the viscera and wool. Although the reticulo-rumens of the lucerne lambs were substantially smaller in volume, their walls were much thicker and more heavily papillated, leading to quite similar empty weights. The papillation would be in response to the types and amounts of VFAs produced by rumen fermentation (Omar *et al.*, 1964).

CONCLUSIONS

Satisfactory growth rates can be obtained from lambs weaned as early as 4 weeks of age on to high quality lucerne or pasture, provided their rumens are reasonably well developed. In some cases such a practice can be disastrous if intake is limited by reticulo-rumen capacity. Lucerne appears to be more suitable than ryegrass/white clover pastures for such early weaning practices.

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