

## New Zealand Society of Animal Production online archive

This paper is from the New Zealand Society for Animal Production online archive. NZSAP holds a regular annual conference in June or July each year for the presentation of technical and applied topics in animal production. NZSAP plays an important role as a forum fostering research in all areas of animal production including production systems, nutrition, meat science, animal welfare, wool science, animal breeding and genetics.

An invitation is extended to all those involved in the field of animal production to apply for membership of the New Zealand Society of Animal Production at our website [www.nzsap.org.nz](http://www.nzsap.org.nz)

[View All Proceedings](#)

[Next Conference](#)

[Join NZSAP](#)

The New Zealand Society of Animal Production in publishing the conference proceedings is engaged in disseminating information, not rendering professional advice or services. The views expressed herein do not necessarily represent the views of the New Zealand Society of Animal Production and the New Zealand Society of Animal Production expressly disclaims any form of liability with respect to anything done or omitted to be done in reliance upon the contents of these proceedings.

This work is licensed under a [Creative Commons Attribution-NonCommercial-NoDerivatives 4.0 International License](http://creativecommons.org/licenses/by-nc-nd/4.0/).



You are free to:

**Share**— copy and redistribute the material in any medium or format

Under the following terms:

**Attribution** — You must give [appropriate credit](#), provide a link to the license, and [indicate if changes were made](#). You may do so in any reasonable manner, but not in any way that suggests the licensor endorses you or your use.

**NonCommercial** — You may not use the material for [commercial purposes](#).

**NoDerivatives** — If you [remix, transform, or build upon](#) the material, you may not distribute the modified material.

<http://creativecommons.org.nz/licences/licences-explained/>

## INTAKE AND GROWTH PERFORMANCE OF GRAZING LAMBS WEANED AT 4 AND 12 WEEKS OF AGE

K. G. GEENTY

*Templeton Agricultural Research Station, Canterbury*

A. R. SYKES

*Lincoln College, Canterbury*

### SUMMARY

The herbage intakes of lambs weaned at 4 (W4) and 12 (W12) weeks of age were measured by chromic oxide dilution. Intakes were higher for W4 (55, 78 and 91 g DM/kg<sup>0.75</sup>/d) than W12 (47, 56 and 63 g DM/kg<sup>0.75</sup>/d) at 6, 9 and 12 weeks respectively. Total energy intakes were 0.87, 0.99 and 1.12 and 1.65, 1.44 and 1.14 MJ ME/kg<sup>0.75</sup>/d respectively. Herbage and energy intakes of both groups were similar between 16 and 24 weeks.

Total energy consumed per kg of final liveweight between weeks 4 and 24 was 21% higher for W12 than for W4 lambs and 69% higher if requirements for ewe milk synthesis were included.

Weaned lambs showed a tendency to preferentially select clover.

### INTRODUCTION

One of the advantages suggested for the early weaning of lambs has been a more efficient utilisation of pasture for lamb production (Jagusch *et al.*, 1970; Rattray *et al.*, 1976; Geenty, 1979a). There have been few quantitative measurements of herbage intakes of early weaned lambs.

The present experiment measured components of DM intake by lambs weaned at 4 and 12 weeks of age in relation to growth rate.

### MATERIALS AND METHODS

#### ANIMALS AND MANAGEMENT

Forty-two ewes (Poll Dorset or Dorset Horn) rearing single lambs (either single-born or twin-born and reared as singles) were used. Twenty lambs were weaned at a mean age of 4 weeks (W4) and the remainder at 12 weeks (W12), both groups being grazed together following weaning. The groups were allocated fresh pasture each day.

Lambs were removed progressively for comparative slaughter studies (see Table 1), the results of which are not reported here.

## PASTURE MEASUREMENTS

The weights of herbage present before and after grazing were measured by sward sampling at intervals of 3 days. Dissections into botanical components were carried out on fresh herbage, *in vitro* digestibilities of dry matter (DDM) determined on freeze-dried material and DM estimates made by oven drying at 80°C to constant weight.

## HERBAGE INTAKE

Estimates of DM intake were obtained in two ways: from faecal dilution of chromic oxide and sward sampling. Six Cr<sub>2</sub>O<sub>3</sub> estimates were made between 6 and 24 weeks of age (see Fig. 2); lambs were dosed twice daily with Cr<sub>2</sub>O<sub>3</sub> for 10 days and faeces collected at the same times during the final 5 days. Estimates of mean intake were made for ewes and lambs and for weaned lambs based on herbage disappearance between sward samples taken before and after grazing.

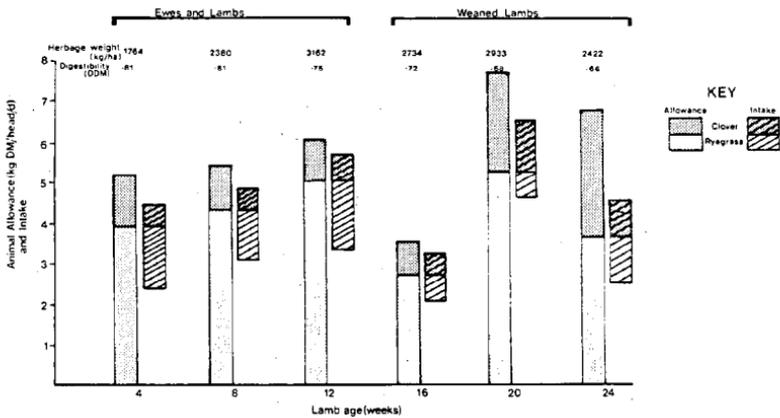


FIG. 1: Herbage weight, Digestibility, Animal Allowance, Botanical Composition and Estimated Intake.

## EWE MILK PRODUCTION

Ewe milk production was estimated by sample milking (Geenty, 1979b) when lambs were aged 6, 9 and 12 weeks. It was assumed that lambs consumed all milk produced.

## ENERGY INTAKE

Dietary energy consumption of lambs was calculated from Cr<sub>2</sub>O<sub>3</sub> dilution estimates of intake. Nutritive values used for ewes milk were 19% total solids (Geenty, 1979b), DDM of .98 (Jagusch and Mitchell, 1971) and energy content of 4.7 MJ ME/kg (Jagusch and Coop, 1971). The ME of herbage was calculated from *in vitro* digestibilities and the standards of MAFF (1975).

## RESULTS AND DISCUSSION

### SWARD SAMPLING MEASUREMENTS

Mean monthly values for weight (kg/ha) botanical composition, and digestibility of herbage offered, animal allowance and intake (kg/head/d), based on sward samples obtained before and after grazing, are shown in Fig. 1. Herbage offered showed a typical reduction in *in vitro* digestibility during late spring/summer (Ulyatt, 1978). Apparent intakes of herbage of 2.0-2.5 kg DM/head/d by lactating ewes were similar to those reported by Rattray and Jagusch (1978) at comparable allowances. Similarly, the estimated herbage intakes of 1.0-2.0 kg DM/head/day by weaned lambs aged 3-6 months were comparable with those of Jagusch *et al.* (1979), also obtained by difference. They were, however, 20% higher than theoretical estimates of requirements based on the standards of MAFF (1975) applied to the actual lamb liveweights and growth rates.

Changes in sward botanical composition during grazing showed that weaned lambs tended to select clover in preference to ryegrass, especially when compared to the combined intake of ewes and lambs. This selective grazing may be important for maintenance of high digestible energy intakes (Hughes *et al.*, 1980) and may have contributed to the comparatively good growth rates observed over this period.

### CHROMIC OXIDE DILUTION MEASUREMENTS

Mean liveweights, DM intakes estimated from Cr<sub>2</sub>O<sub>3</sub> dilution, ewe milk yields and estimated metabolisable energy intakes (MEI) of W4 and W12 lambs are given in Table 1. Lamb liveweight changes and energy intakes are shown in Fig. 2. W4 lambs suffered a typical check in growth following early weaning (Geenty, 1979a) resulting in a mean growth rate of 201 g/d between birth and 12 weeks of age compared with 281 g/d for W12 lambs. As a con-

TABLE 1: LAMB LIVELWEIGHT (kg), EWE MILK YIELD (g/d), AND HERBAGE INTAKES OF LAMBS (g DM AND MJ ME/HEAD/d) BASED ON SAMPLE MILKINGS AND Cr<sub>2</sub>O<sub>3</sub> DILUTION

Mean lamb age (weeks)		6		9		12		16		20		24	
group (3)		No.	Wt.										
Lamb live weight (1)	W4	20	14.2 (217)	12	17.9 (185)	11	21.7 (181)	11	21.7 (146)	9	31.1 (189)	2	37.5 (229)
	W12	22	16.7 (272)	18	22.5 (290)	14	27.1 (219)	9	30.8 (132)	5	35.6 (171)	3	41.1 (196)
	SE (d)		1.02		1.05		1.15		0.76		0.44		1.20
	signif.		*		**		**		**		**		*
Lamb DM Intake (2)	W4		400 (55)		680 (78)		919 (91)		882 (77)		971 (74)		1010 (67)
	W12		387 (47)		575 (56)		746 (63)		867 (66)		1037 (71)		1103 (68)
	SE (d)		53.8		73.2		56.5		84.0		73.4		211
	signif.		NS		NS		**		NS		NS		NS
Ewe milk yield	W12		1880		1670		930						
	SE (m)		14		10		133						
Lamb energy intake (2)	W4		5.16 (0.87)		8.57 (0.99)		11.30 (1.12)		10.23 (0.89)		9.71 (0.74)		10.10 (0.67)
	W12		13.64 (1.65)		14.92 (1.44)		13.55 (1.14)		10.05 (0.77)		10.37 (0.71)		11.03 (0.68)
	SE (d)		0.92		1.02		0.86		0.97		0.74		1.79
	signif.		**		**		*		NS		NS		NS

(1) lamb growth rate (g/d) from birth and between successive intake trials in brackets;

(2) intake/kg<sup>0.75</sup>/d in brackets;

(3) W4 = lambs weaned at 4 weeks of age,  
W12 = lambs weaned at 12 weeks of age.

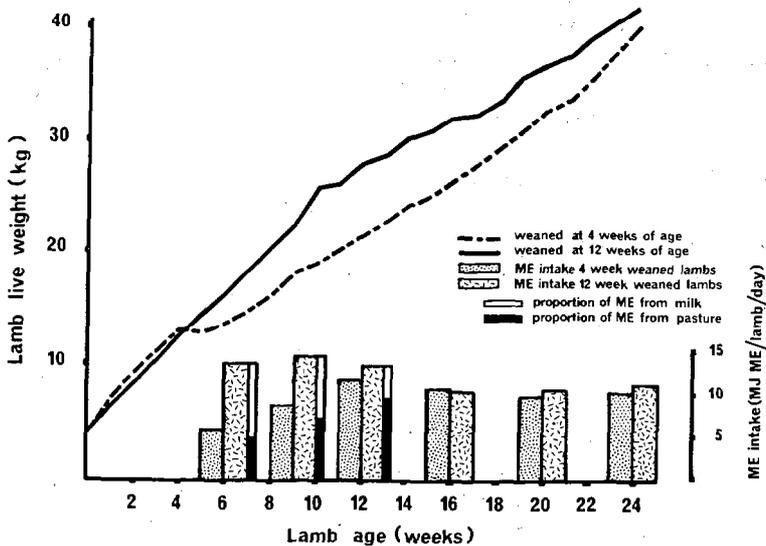


FIG. 2: Mean Lamb Liveweight Changes and ME Intakes.

sequence W12 lambs were on average 18% heavier between weeks 4 and 24 of the experiment. The growth rate of both groups between 12 and 24 weeks of age was similar (approx. 180 g/d).

W4 lambs appeared to compensate for early weaning by having 17%, 39% and 44% higher herbage DM intakes per  $\text{kg}^{0.75}$  than W12 lambs at 6, 9 and 12 weeks of age, respectively. Despite this compensatory effect W4 lambs showed marked reductions in total MEI of 47% and 31% per  $\text{kg}^{0.75}$  at 6 and 9 weeks when milk accounted for 65% and 50%, respectively, of the MEI of W12 lambs. The total MEI of lambs in both groups was similar at 12 weeks of age when milk still comprised 32% of MEI for W12 lambs. Herbage and ME intakes were similar for both groups between weeks 16 and 24.

The total daily MEI of W12 lambs between weeks 6 and 16 in relation to liveweight and growth rate were in general similar to the standards for outdoor lambs of MAFF (1975). W4 lambs showed markedly reduced MEI values during weeks 6 and 9 and their ability to sustain comparatively good growth rates during this period was probably due to the mobilisation of body-fat reserves (Fennessy *et al.*, 1972). This will be more clearly established when body composition data are available.

The MEI of both W4 and W12 lambs during weeks 20 and 24 was 28% and 41% lower, respectively, than theoretical estimates of requirements for grazing lambs of similar weight and growth rate (MAFF, 1975). These relatively low estimates were possibly due to lambs selecting herbage of higher digestibility than that offered (on which digestibility values were based). Substitution of digestibilities of .78-.80 for these periods gave estimates similar to theoretical values. This clearly emphasises the need to use oesophageally fistulated animals, even on well managed ryegrass-clover swards, particularly during the late spring/summer period, to obtain precise estimates of the digestibility of herbage consumed (Langlands, 1969).

### CONCLUSION

Weaning lambs at 4 weeks of age caused a marked reduction in energy consumption between weeks 4 and 12. Total MEI of lambs weaned at 4 and 12 weeks were 1285 and 1716 MJ ME respectively between 4 and 24 weeks of age. Thus in relation to final live weight (MJ ME/kg) lambs weaned at 12 weeks consumed 21% more energy. If the theoretical energy cost of milk synthesised by the ewe is taken into account (644 MJ ME) the difference increased to 69%.

Therefore early weaning of lambs contributes to greater flock productivity by not only diverting more highly digestible herbage to the lamb than to the ewe, and avoiding wasteful synthesis of milk by the ewe, but also by improving the energetic efficiency of lamb growth.

### ACKNOWLEDGEMENTS

To S. R. Young for technical assistance, M. Moller and T. J. Leitch for help in the field, Jill Gardiner for Cr<sub>2</sub>O<sub>3</sub> determinations, Sarah Hughes for *in vitro* digestibilities, and the Winchmore Herbage Laboratory for dissections.

### REFERENCES

- Fennessy, P. F.; Woodlock, M. R.; Jagusch, K. T., 1972. *N.Z. Jl agric. Res.*, 15: 802.  
Geenty, K. G., 1979a. *Proc. N.Z. Soc. Anim. Prod.*, 39: 202.  
Geenty, K. G., 1979b. *N.Z. Jl agric. Res.*, 22: 241.  
Hughes, T. P.; Poppi, D.; Sykes, A. R., 1980. *Proc. N.Z. Soc. Anim. Pròd.*, 80: 68.  
Jagusch, K. T.; Clark, V. R.; Jay, N. P., 1970. *N.Z. Jl agric. Res.*, 13: 808.  
Jagusch, K. T.; Coop, I. E., 1971. *Proc. N.Z. Soc. Anim. Prod.*, 31: 224.  
Jagusch, K. T.; Mitchell, R. M., 1971. *N.Z. Jl agric. Res.*, 14: 434.

- Jagusch, K. T.; Rattray, P. V.; Oliver, T. W.; Cox, N. R., 1979. *Proc. N.Z. Soc. Anim. Prod.*, 39: 254.
- Langlands, J. P., 1969. *Anim. Prod.*, 11: 379.
- MAFF, 1975. *Energy Allowances and Feeding Systems for Ruminants*. Ministry of Agriculture, Fisheries and Food. Technical Bulletin 33, HMSO, London.
- Rattray, P. V.; Morrison, M. C. L.; Farquhar, P. A., 1976. *Proc. N.Z. Soc. Anim. Prod.*, 36: 179.
- Rattray, P. V.; Jagusch, K. T., 1978. *Proc. N.Z. Soc. Anim. Prod.*, 38: 121.
- Ulyatt, M. J., 1978. *Proc. N.Z. Agron. Soc.*, 8: 119.