BODY COMPOSITION CHANGES IN RESPONSE TO DIFFERENT FREQUENCY OF FEEDING OF MAINTENANCE RATIONS

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Frequency of feeding affects feed utilisation and energetic efficiency in sheep (Gibson 1981). Black (1974) suggested that for maintenance fed animals, infrequent feeding increased fat. This was supported by results from Searle and Graham (1975) and Afonso and Thompson (1996). In field experiments where animals grazed continuously at maintenance no changes in body composition were reported by Kirton *et al.* (1995). The difference would have implications for the design of animal house experiments, the interpretation of their results and the extrapolation of these results to field situations. This experiment investigated compositional changes in sheep given a maintenance ration that was fed continuously via a belt feeder (C), or once a day (1D), or once every three days (3D).

Fifteen, three month old crossbred wethers were individually penned and fed a pelleted ration at maintenance (SCA 1990). Five animals were randomly allocated to each of the three frequency of feeding treatments. In vivo measurements of carcass muscle, non-fat visceral components (NFVC), subcutaneous fat, intermuscular fat, internal fat and bone were obtained from CT-scans (Jopson *et al.* 1995) at the beginning and end of the experiment and the changes in tissue weights were calculated (Table 1). Mean initial empty body weights were 17.2, 16.8 and 16.2 kg for lambs in treatments C, 1D and 3D, respectively, and mean final weights were 17.1, 17.4 and 17.2 kg respectively.

Table 1. Change in weight (kg ± s.e.) of tissue depots and non-fat visceral components (NFVC) after three months maintenance feeding for animals fed continuously (C), once a day (1D), and once every three days (3D), after adjustment for initial composition

	Carcass muscle	NFVC	Subcutaneous fat	Intermuscular fat	Non-carcass fat	Bone
C	-0.485^{a} ± 0.23	-1.280^{a} ± 0.11	0.423^{a} ± 0.07	0.459^{a} ± 0.08	0.239^{a} ± 0.11	-0.155^{a} ± 0.06
1D	-0.129^{a} ± 0.23	-0.801^{b} ± 0.12	0.449^{a} ± 0.07	0.563^{a} ± 0.08	0.073^{a,b} ± 0.10	-0.035^{a} ± 0.06
3D	-0.064^{a} ± 0.22	-0.205^{c} ± 0.12	0.387^{a} ± 0.06	0.251^{b} ± 0.07	-0.061^{b} ± 0.09	-0.049^{a} ± 0.06

Within columns, means with different superscripts differ significantly (P<0.10).

Lambs that were fed infrequently had lower non carcass fat deposition than lambs fed continuously, and those lambs fed once every 3 days deposited the least intermuscular fat. The result is contrary to the hypothesis of Black (1974) which predicted an increase in fat with infrequent feeding. The higher loss of non fat visceral components in lambs fed continuously may have reduced energetic requirements (Ferrell 1988) which would allow a greater proportion of energy to be deposited as fat in this treatment group. The site of fat deposition within the body differed with feeding frequency.

The frequency with which lambs are allowed access to a maintenance ration will influence estimates for maintenance requirements and this must be considered when interpreting experimental results or using estimates for maintenance requirements as a criterion for improving efficiency.

AFONSO, J. and THOMPSON, J.M. (1996). *Anim. Sci*. **63**, 395-406.
BLACK, J.L. (1974). *Proc. Aust. Soc. Anim. Prod*. **10**, 211-218.
FERRELL, C.L. (1988). *J. Anim. Sci.* **66**(S3), 23-34.
GIBSON, J.P. (1981),. *Anim. Prod*. **32**, 275-283.
JOPSON, N.B., VANGEN, O., KOLSTAD, K. and SEHESTED, E. (1995). *Proc. Aust. Assoc. Anim. Breed. Genet*. **11**, 634-638.
KIRTON A.H., BENNETT, G.L., DOBBIE, J.L., MERCER, G.J.K. and DUGANZICH, D.M. (1995). *NZ J. Agric. Res*. **38**, 105-114.
SCA (1990). 'Feeding Standards for Australian Livestock, Ruminants'. (Standing Committee on Agriculture and CSIRO: Melbourne).
SEARLE, T.W. and GRAHAM, N. McC. (1975). *Aust. J. Agric. Res.* **26**, 355-361.