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WOOL GROWTH OF EWES DURING AUTUMN ON HILL COUNTRY

R. M. W. SUMNER and D. C. SMEATON

Whatawhata Hill Country Research Station, Hamilton

SUMMARY

Increasing herbage allowance (~ 2.5, 5.0, 7.5, 10.0 and 12.5 kg total DM/head/d) of hill-country pasture containing 75% dead material and a pre-grazing herbage mass of 2000 to 2500 kg total DM/ha were offered to 290 mixed-age Romney, Coopworth and Perendale ewes for 6 weeks pre-mating. The order of ranking for wool growth rate changed between summer (Romney, Coopworth, Perendale) and early autumn (Perendale, Romney, Coopworth). Wool growth increased curvilinearly with feeding level and was more responsive to feeding level than liveweight gain.

INTRODUCTION

Short term differential feeding of ewes under lowland conditions during the autumn influences wool growth rate (Sumner and Rattray, 1980) as well as liveweight gain and ovulation rate (Rattray *et al.*, 1980). Individual breeds also vary in their relative productivity between different environments (Dalton *et al.*, 1978).

This paper reports wool growth responses for a trial in which different allowances of pasture were offered to groups of Romney, Coopworth and Perendale ewes for 6 weeks pre-mating on hill country.

EXPERIMENTAL

TRIAL DESIGN

Increasing allowances (~ 2.5, 5.0, 7.5, 10.0 and 12.5 kg total DM/head/d) of pasture with a pre-grazing herbage mass of 2000 to 2500 kg total DM/ha were offered to 290 mixed-age Romney, Coopworth and Perendale ewes derived from existing flocks at Whatawhata (Dalton *et al.*, 1980) in a 5 x 3 factorial design for 6 weeks pre-mating (Smeaton *et al.*, 1981).

PASTURE MEASUREMENTS

The pasture measurement techniques used have been described by Smeaton *et al.* (1981).

WOOL MEASUREMENTS

All ewes were shorn in November 1978 with half of each breed group subsequently shorn in May 1979 and all shorn in November

1979 as part of a trial on the effects of multiple shearing (Sumner, 1980). Wool samples were clipped from the mid-side region of 200 ewes at the start and end of the differential feeding period and prior to the May shearing. The ewes unshorn in May were again clipped before the November shearing. The wool patch sample was scoured and the yield determined. Mean daily wool growth before, during and after the feeding period was obtained by proportioning greasy fleece weight from the post-treatment shearing according to the relative growth rate on the clipped patch, with allowance for yield. The mean and standard deviation of fibre diameter of each clipped sample was measured (Lynch and Michie, 1976).

RESULTS AND DISCUSSION

Pasture and Intake

The offered pastures contained ~75% dead material. Herbage allowances were 0.6, 1.1, 2.0, 2.1 and 3.3 kg green DM/head/d and estimates of residual herbage after grazing were 1150, 1500, 1950, 1900 and 1950 kg total DM/ha respectively.

Liveweight Gain

Mean (±SD) full liveweights at the commencement of differential feeding were 44.4 (±4.8), 46.6 (±3.3) and 46.1 (±2.6) kg for the Romney, Coopworth and Perendale ewes respectively. The order of ranking of the breeds for liveweight gain during the treatment period was Coopworth, Romney, Perendale (Table 1).

Wool Growth

Ewe age and all interaction terms were not significant for the measured wool parameters.

Both daily wool growth and mean fibre diameter differed between breeds during the trial (Table 1). The breed ranking for both parameters changed between treatment periods. During the summer the Perendale had the lowest growth rate and the Romney the finest wool, while during the treatment period the Perendale had the fastest growth rate and the coarsest wool. Wool production in the Romney and Coopworth was similar with the Coopworth being always coarser than the Romney.

The increase in wool growth of the Perendale in the early autumn is in marked contrast to the liveweight trends for the breed. The Perendale lost weight while the Romney was static and the Coop-

TABLE 1: LEAST SQUARE MEANS FOR LIVEWEIGHT GAIN AND WOOL MEASUREMENTS

Treatment	*Liveweight Gain (g/d)*	*Wool Growth (g/d)*		*Mean Fibre Diameter (μm)*		*Greasy Fleece Weight (kg)*
		Summer	*Pre-mating*[1]	*Summer*	*Pre-mating*[1]	
Breed: Romney	3	11.7	9.2	36.1	34.9	2.21
Coopworth	13	11.1	8.9	37.1	35.6	2.12
Perendale	−12	10.2	10.0	37.4	37.2	2.02
s.e. of difference	7	0.3	0.3	0.5	0.3	0.06
Feeding allowance: 2.5	−60		7.7		34.6	1.99
(pre-mating only) 5.0	11		9.5		36.2	2.03
7.5	11	11.0	9.7	36.8	35.6	2.19
10.0	17		9.9		36.2	2.21
12.5	29		10.1		37.0	2.17
s.e. of difference	9	—	0.4	—	0.4	0.07
Breed effect	**	***	***	*	***	**
Feeding effect	***	n.s.	***	n.s.	***	**
Covariate	—	—	***	—	***	—

[1] Adjusted by covariance for values of parameter at start of feeding period when testing significance. All interaction terms not significant.

worth increased in weight. This apparent contradiction may be largely due to an inherent wool growth characteristic whereby the Perendale attains its seasonal maximum for wool growth approximately a month later than either the Romney or Coopworth (Bigham *et al.,* 1978) rather than an active redirection of nutrients from body tissue mobilisation to wool. The between-period trends for mean fibre diameter of each breed were similar to those of daily wool growth, supporting the contention that the effect for the Perendale may be due to a later seasonal maximum in fibre growth.

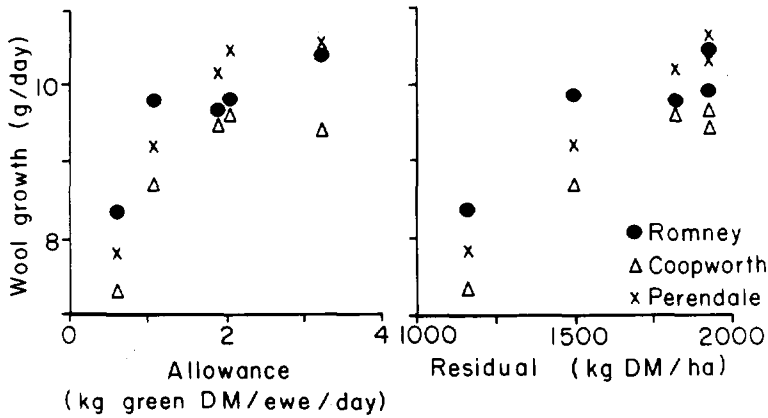

FIG. 1: *Relationship between wool growth and pasture measurements.*

The overall effect of these wool growth trends was for the Romney to have the heaviest and the Perendale the lightest mean fleece weight in May.

Both liveweight gain (Smeaton *et al.,* 1981) and wool growth (Fig. 1) were curvilinearly related to increased levels of feeding. Wool growth was however more responsive than liveweight gain to higher feeding levels. The relationship between liveweight gain and wool growth was biased because of the small range in gains achieved.

Ranking for the correlation between mean wool growth and residual DM (R = 0.95, P $<$ 0.001) and mean wool growth and green herbage allowance (R = 0.94, P $<$ 0.001) were in accordance with a previously reported trial in hill country conditions (Sumner *et al.,* 1981).

The wool growth response to increased feeding was sufficient to cause a curvilinear response in greasy fleece weight. The economic benefits from the extra wool alone due to high levels of feeding on hill country pre-mating would appear to be up to 50c per head at present wool prices.

Mean fibre diameter followed a similar response pattern to wool growth rate relative to the two pasture parameters.

Possible reasons for the lack of response in animal production parameters to increasing allowances in this trial have been suggested by Smeaton *et al.* (1981) to be due to the high proportion of dead material in the offered pastures and the low levels of standing green DM/ha. The offered pastures were typical of much North Island hill country during the early autumn after a period of prolific summer growth.

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