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EFFECT OF GRAZING MANAGEMENT ON HOGGET FLEECE CHARACTERISTICS

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SUMMARY

Increasing pasture allowances (about 50, 75, 100, 150 and 200 g green DM/kg liveweight/d) were offered to groups of between 24 and 60 ewe hoggets of six breeds under either set-stocking, slow rotation or quick rotation grazing systems for 11 months. Quick rotation wools were finest with lower loose wool bulk. Liveweight, greasy and clean fleece weight, mean fibre diameter and degree of yellowness increased linearly with increasing feed allowance while staple length plateaued at the higher feeding levels. Estimated relative economic returns were related to clean fleece weight.

INTRODUCTION

Lifetime productivity of ewes is dependent on their level of feeding as hoggets and their subsequent liveweight (LW) at 2-tooth mating (Hight and Jury, 1973; 1976). Although the amount of herbage on offer is important, grazing management may have an influence if it affects feed quality or pattern of intake (Collin, 1966; Allden and Whittaker, 1970). For this reason a farmlet study was conducted at Whatawhata between 1978 and 1980 to examine the relationship between LW gain of hoggets and pasture availability under three grazing management systems (During *et al.*, 1980). Wool data obtained in 1978 only is reported here.

EXPERIMENTAL

Three management systems were compared as farmlets:
SS — set stocked: stock kept in the same paddock for 40-60 days.
SR — slow rotation: stock shifted every 10 to 14 days.
QR — quick rotation: stock shifted twice weekly.

Increasing allowances of pasture (about 50, 75, 100, 150 and 200 g green DM/kgLW/d were offered to groups of between 24 and 60 ewe hoggets comprising six breeds (Drysdale, Romney, Coopworth, Perendale, Dorset x Romney and Cheviot) between January and December (During *et al.*, 1980).

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All hoggets were shorn as lambs in December 1977 and again in September 1978. A sample of wool for detailed measurement was taken from the right midside region of each at shearing.

RESULTS AND DISCUSSIONS

Liveweight and Wool Growth

Fleece-free LW at hogget shearing (September 1978) and both greasy and clean fleece weight increased linearly with increasing feed allowance. Grazing management did not effect these parameters (Table 1). Fleece weight rankings differed from LW rankings. The order of ranking of the breeds for fleece-free LW was Dorset x Romney and Coopworth; Perendale; Drysdale, Romney and Cheviot. The breed ranking for both greasy and clean fleece weight was Romney and Drysdale; Coopworth; Dorset x Romney and Perendale; Cheviot (Table 1). All interaction terms were not significant.

Relationships between mean wool growth and mean pasture measurements for each farmlet ($n = 15$) were similar to those reported between LW gain and pasture measurements for each farmlet by During *et al.,* (1980). Residual live herbage was the best indicator of clean fleece weight ($r = 0.83$, $P < 0.001$) followed by residual live white clover ($r = 0.78$, $P < 0.001$) and daily herbage allowance ($r = 0.67$, $P < 0.01$).

Fleece Characteristics

All interaction terms for the measured fleece characteristics were not significant.

Staple length was unaffected by grazing management but wool grown on the QR system was finer — 500 fibre count — (Lynch and Michie, 1976) than that on the other two treatments (Table 1). Wool growth of the QR hoggets may have been affected during a long dry period in the autumn of 1978 when they experienced significantly reduced weight gains compared with those in the other two grazing systems. Staple length plateaued at the higher feeding levels in contrast to mean fibre diameter which increased linearly. Apart from the comparatively high growth rate in length of the Drysdale the ranking for the other breeds for staple length was similar to that for clean fleece weight. Ranking for mean fibre diameter was Coopworth; Dorset x Romney, Cheviot and Drysdale; Perendale and Romney. Variability in fibre diameter was

unaffected by either grazing management or feeding level with a breed ranking of Drysdale; Coopworth and Romney; Dorset x Romney; Perendale and Cheviot (Table 1).

Crossbred wools are not sold on measured mean fibre diameter. Data based on subjectively assessed N.Z. Wool Board types (Wiggins and Beggs, 1979) indicate price premiums for crossbred wool (28-33 μm range) are currently approximately 2.2 c/kg (clean) for each micron decrease in mean fibre diameter. The effect of relatively small changes in measured fibre diameter on the auction price of crossbred wools destined for use in carpets is likely to be slight.

Neither yellowness (CIE Y-Z value) nor brightness (CIE Y value) of the wools (Hammersley and Thomspon, 1974) were affected by grazing management. Yellowness increased with plane of feeding while brightness was unaffected (Table 1). Breed ranking for yellowness was Cheviot and Perendale; Coopworth and Drysdale; Romney; and Dorset x Romney while the Drysdale was brighter than the other breeds, all of which were similar.

Recent evaluative trials by the N.Z. Wool Board (Corrigan, unpublished data) indicate that the difference in yellowness between style grades of good style wools is about 1 unit and between poorer style wools is about 1.5 units. It is unlikely that a wool classer would have down-graded a significant proportion of the better-fed wools to a lower style on the basis of the unscoured colour as this tended to be golden rather than the bright yellow associated with unscourability. With crossbred wool currently attracting a premium of approximately 2.5 c/kg (clean) for each unit increase in style (Wiggins and Beggs, 1979) price differentials due to feeding would be slight.

Loose wool bulk (Dunlop *et al.*, 1974) was unaffected by the level of feeding but the QR wool was less bulky than that from the other grazing managements (Table 1). The long dry period during the autumn which possibly affected fibre diameter of the QR group may also have affected the bulkiness of these wools. The magnitude of this difference would be insufficient to influence the bulk of yarn spun from this wool (Elliott and Carnaby, 1980). Breed rankings of Cheviot; Perendale and Dorset x Romney; Drysdale, Coopworth and Romney were similar to those reported by Carnaby and Elliott (1980).

Wool buyers are only beginning to evaluate wool in terms of its assessed loose wool bulk. It is therefore unlikely that the above effects will influence auction price for some time if at all. The biological factors contributing to loose wool bulk are not fully understood.

TABLE 1: LEAST SQUARES MEANS FOR LIVEWEIGHT AND WOOL MEASUREMENTS AT HOGGET SHEARING

Treatment		*No. of Hoggets*	*Fleece Free Liveweight (kg)*	*Fleece Weight Greasy (kg)*	*Fleece Weight Clean (kg)*	*Staple Length (mm)*	*Fibre Diameter Mean (μm)*	*Fibre Diameter S.D. (μm)*	*CIE Values Y*	*CIE Values Y-Z*	*Loose Bulk (cm^3/g)*
Management system:	SS	159	33.9	2.85	2.22	128	32.1	8.5	54.2	4.9	24.9
	SR	166	34.9	2.82	2.19	127	32.1	8.4	53.2	4.6	25.0
	QR	150	34.8	2.75	2.13	127	31.6	8.4	53.0	5.0	23.9
s.e. of difference		—	0.4	0.05	0.05	2	0.3	0.1	0.8	0.2	0.3
Feed allowance:	50	152	29.8	2.36	1.82	117	30.2	8.2	53.0	4.4	24.7
g DM/kgLW/d	75	85	33.4	2.69	2.12	125	31.9	8.4	54.0	4.8	24.8
	100	98	35.3	2.95	2.28	137	32.3	8.6	54.1	4.7	23.8
	150	61	38.2	3.14	2.43	131	33.0	8.8	53.3	5.2	24.5
	200	79	41.0	3.36	2.64	135	33.9	8.4	53.3	5.5	25.6
s.e. of difference		—	0.5	0.07	0.07	2	0.4	0.2	0.3	0.2	0.4
Breed: Drysdale		43	33.1	3.29	2.62	179	31.9	10.6	56.0	4.9	21.4
Romney		49	33.1	3.32	2.64	141	31.5	8.5	52.7	5.2	20.4
Coopworth		84	36.1	3.07	2.46	143	32.6	8.8	53.6	4.8	21.1
Perendale		143	34.6	2.73	2.08	119	31.6	8.1	53.5	4.5	26.4
Dorset x Romney		81	36.5	2.87	2.17	119	32.0	8.3	52.6	5.5	26.1
Cheviot		75	32.2	1.97	1.52	98	31.9	7.9	53.3	4.4	29.2
s.e. of difference		—	0.7	0.08	0.08	3	0.4	0.2	0.7	0.3	0.5
Management effect		—	n.s.	n.s.	n.s.	n.s.	*	n.s.	n.s.	n.s.	*
Allowance effect		—	***	***	***	***	***	n.s.	n.s.	*	n.s.
Breed effect		—	**	***	***	***	*	***	***	***	***

All interaction terms not significant

Overall, the effects of feeding level and grazing management on measured fleece characteristics were small in relation to the effect on fleece weight. The economic return per sheep from wool for each group (within breeds) would therefore be likely to be proportional to clean fleece weight. Similarly the economic return per hectare from wool would be likely to be proportional to clean fleece production per hectare.

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