

DO SHEEP WITH SOFT ROLLING SKINS PRODUCE WOOL MORE EFFICIENTLY THAN SHEEP WITH OTHER SKIN TYPES?

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Sheep with 'soft rolling skins' (SRS™) have been reported to be less susceptible to micron 'blowout' with increased nutrition compared to sheep with other skin types, namely heavy tight skin (HTS) and flat skin (FS) (Watts 1995). It has also been reported that wool fibres grow faster on the rolling skin sheep. If this is the case, wool growers are likely to benefit from greater returns due to more even diametered fibres within the fleece and additional wool growth through added staple length. The aim of this work was to determine whether sheep classed as having SRS have a mean fibre diameter that is less sensitive to increases in nutrition and produce longer fibres compared to HT or FS sheep.

Six wethers with SRS, six wethers with FS and six wethers with HT skin were selected from a flock of 600 Merino wethers (24 months, 30 to 45 kg). All sheep were placed on a diet of 78% oaten chaff, 20% lupins and 2% mineral supplement. The sheep were fed 490 g per day (maintenance) for 28 days followed by a 28 day *ad libitum* period. Feed intake was estimated daily during the *ad libitum* period and liveweights of all sheep were measured weekly. Mean fibre length growth rate (LGR) and fibre diameter (FD) were measured during the last 5 days of the maintenance and *ad libitum* diets using the ³⁵S-cysteine autoradiographic technique (Downes *et al.* 1967). Skin biopsies were collected from each sheep two hours after an intradermal injection of colchicine on day 28 of the maintenance and *ad libitum* periods for the estimation of mean cell birth rate (CBR; Hynd *et al.* 1986).

Bodyweight and average daily feed intake were similar between sheep of each skin type ($P > 0.05$) and feed intake was significantly greater during the *ad libitum* period. The change in intake resulted in significant increases in FD, LGR and CBR in all skin types ($P < 0.05$). At both levels of intake the fibres from SRS was significantly finer than the wool from FS ($P = 0.012$) and HTS ($P = 0.004$; Table 1) and SRS had a significantly lower increase in FD compared with FS ($P = 0.018$) and HTS ($P = 0.005$; Table 1.) with the increase in nutrition. Overall, LGR of SRS tended to be greater than HTS and FS ($P = 0.073$) but only reached significance during the *ad libitum* period (Table 1). There was no significant difference in the mean cell birth rate between each of the skin types on the *ad libitum* diet ($P > 0.05$; Table 1).

Table 1. Mean fibre diameter (FD, μm), mean fibre length growth rate (LGR, $\mu\text{m}/\text{day}$) and mean cell birth rate (CBR, cells/ $8\mu\text{m}$ bulb sections/hour) of sheep with soft rolling skin (SRS), flat skin (FS) or heavy tight skin (HTS) offered a diet of oaten chaff (78%), lupins (20%), and minerals (2%) at maintenance or *ad libitum* (means \pm standard error of the mean)

	Maintenance			<i>Ad libitum</i>		
	SRS	FS	HTS	SRS	FS	HTS
FD	14.2 ^a \pm 0.31	15.9 ^b \pm 0.42	16.1 ^b \pm 0.63	17.3 ^a \pm 0.39	20.2 ^b \pm 0.58	20.8 ^b \pm 0.99
LGR	308 \pm 11.0 (n=5)	276 \pm 39.8 (n=2)	282 \pm 6.2 (n=4)	467 ^a \pm 12.4 (n=5)	420 ^b \pm 17.6	422 ^b \pm 7.9
CBR	1.94 ^a \pm 0.156	2.40 ^b \pm 0.108	2.05 ^{ab} \pm 0.143	2.44 \pm 0.182	2.70 \pm 0.194	2.43 \pm 0.068 (n=5)

Values within a row of each diet with different superscripts are significantly different ($P < 0.05$)

The FD of SRS was less sensitive to changes in nutrition compared with the other skin types, and the SRS also tended to have a greater fibre LGR than sheep with FS and HTS. This was not due to a greater cell birth rate but may be related to the timing and extent of inner root sheath hardening, and/or the rate of keratin synthesis. Further research is required to determine the cause of the greater length of fibre in sheep with SRS.

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