STAPLE STRENGTH AND LIVEWEIGHT CHANGE OF SHEEP BRED FOR SOUND AND TENDER WOOL

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Staple strength (SS) is a heritable wool trait and can be improved genetically by appropriate selection (Greeff *et al.* 1997), and by managing the rate of liveweight change (LWC) during summer/autumn (Doyle *et al.* 1995). We tested the hypothesis that sheep bred for high SS produce stronger wool at any given change in liveweight (LW) than sheep bred for low SS.

Merino weaners (n = 40; age 5 to 6 months, LW 33.2 kg, s.e.m. ± 0.58) from the 'Sound' and 'Tender' SS selection flocks (Agriculture Western Australia) were fed to maintain liveweight, or lose and then gain liveweight at 50 or 100 g/day for 112 days. The sheep were weighed at least once per week, and wool-free changes in liveweight (LWC) to the position of break along the staple were calculated using regression analysis. LWC was related to SS estimated from a mid-side sample taken prior to shearing. Full details of the experiment are given by Thompson and Hynd (1998).

The average SS of the 'Sound' and 'Tender' SS flocks were 26.9 and 21.9 N/ktex (P = 0.06), and SS varied significantly (P<0.001) from 34.9 N/ktex for sheep fed to maintain liveweight to 16.7 N/ktex for sheep on the most restricted diet. LWC explained 40 to 45% of the variance in SS between sheep within each flock. There was no significant difference (P>0.05) between selection flocks in the slope of the relationships, which indicated that an increase in LWC of about 10 g/day was associated with an increase in SS of 1.5 N/ktex. The intercept tended to be greater (36.9 vs 31.0; P<0.10) for sheep from the 'Sound' flock than the 'Tender' flock; the average LWC necessary to produce sound wool (30 N/ktex) was -45 and -5 g/day for the 'Sound' and 'Tender' flocks, respectively (Figure 1).

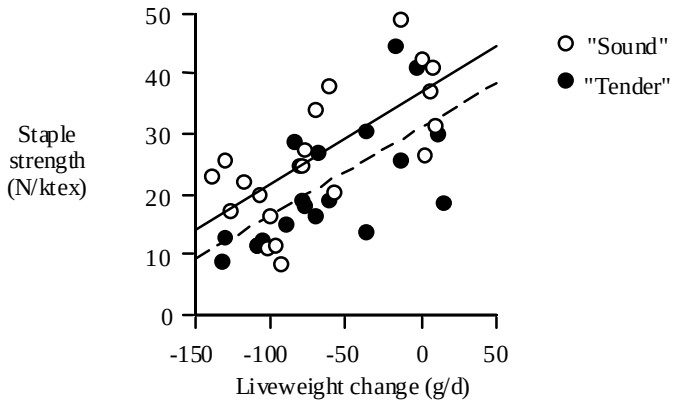

Figure 1. Liveweight change in relationship to staple strength for individual sheep from the 'Sound' and 'Tender' staple strength selection flocks

Multiple regression analysis also revealed that sheep liveweight at the start of the differential feeding period explained an additional 5 to 10% of the variance in SS (P<0.01); a 1 kg increase in initial liveweight was associated with a 1 N/ktex increase in SS.

It is clear that the feeding requirements necessary to produce wool of a specified SS differ for sheep bred for differences in SS, and we conclude that genetic selection and nutritional management should be used in combination to most effectively reduce the production of tender wool in young sheep.

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GREEFF, J.C., RITCHIE, A.J.M. and LEWIS, R. (1997). *Proc. Aust. Assoc. Anim. Breed. Gen.* **12**, 714-8.
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