RELATIONSHIP BETWEEN TOTAL FIBRE DIAMETER VARIATION AND STAPLE STRENGTH

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There is considerable interest in the relationship between staple strength (SS), fibre diameter (FD) and the coefficient of variation of fibre diameter (c.v.(FD)). Bigham et al. (1983) suggested that the diminution in FD is the main cause of reduced SS whereas Hansford and Kennedy (1988) illustrated that minimum FD does not determine SS and concluded that it is the rate of change of FD along the staple that is the determinant. Variation in FD within a staple is due to both variation in FD along and between the fibres of a staple. The aim of this study was to examine the relationship between total fibre diameter variation within a -sample and SS.

Midside fleece samples were collected from two hogget flocks (A and B) sired by the same group of rams. The two flocks *were* run separately under different nutritional conditions such that flock A was maintained at a 10 kg heavier live weight than flock B. Estimates of SS, FD and c.v.(FD) were obtained using an ATLAS and an FDA200. The results were grouped into single-unit classes of c.v.(FD) and the mean SS for each class calculated. Simple linear regressions were then plotted for each data set (Fig. 1 and 2).

Means($\pm$s.d.) for flock A (n=237) *were* SS 36.1($\pm$10) N/ktex, FD 18.8 ($\pm$1.5)u and c.v.(FD) 23.6($\pm$2.7), and for flock B (n=213) were SS 25.2($\pm$7.8) N/ktex, FD 17.6($\pm$1.2)u and c.v. 26.7($\pm$2.6). Mean SS, FD and c.v.(FD) values *were* all significantly different (P<0.001) between flocks . The c.v.(FD) for both flocks was normally distributed. The correlation coefficients between class c.v.(FD) and class mean SS in flocks A and B were r=0.82 and 0.89 respectively. The correlation between the combined data was r=0.83. These relationships show that between 70 and 80% of the variation in SS can be explained by the c.v.(FD) within a sample irrespective of mean fibre diameter. These results suggest that it may be possible to develop a model for estimating SS utilising estimates of both along and between fibre c.v.(FD) to aid in sheep selection once the genetic and environmental parameters are more accurately established.
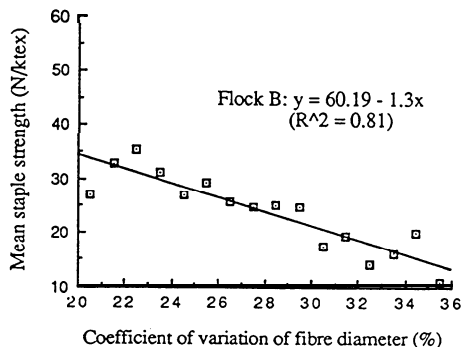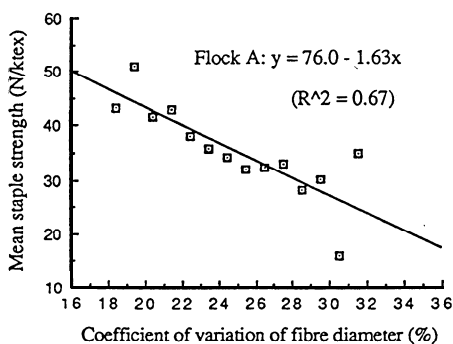

Fig. 1 and 2. Relationship between SS and c.v.(FD) for hogget flocks A and B

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