ESTIMATION OF WOOL FIBRE LENGTH VARIATION IN STAPLE SEGMENTS USING IMAGE ANALYSIS

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Fibre diameter (FD) and length are of major importance to wool processors. Variation in length may be a significant contributor to staple strength variation (de Jong \textit{et al.} 1985), and this experiment examined variation in length in sheep selected for staple strength.

Thirty wether lambs (average FD of 19.8±0.3mm) were selected at shearing when five months old from the low and high staple strength selection flocks at Katanning, WA, on the basis of FD coefficient of variation (FDCV). Three groups of five sheep were selected from within each line to produce the Lamb FDCV groups in Table 1. All weaners were grazed as a flock for 12 months with dyebands placed in the wool on 16 May, 6 June, 31 July and 14 October, 1996. Mid-side samples and dyebands were removed prior to shearing in November. Mid-side wool was measured for FD, FDCV and staple strength. Dyebanded staples were measured for staple length between dyebands, scoured, and the staples cut at the dyebands for the 31 July and 14 October to produce the staple snippet. A bundle of at least 250 fibres was taken from the snippet and all fibres selected were individually laid on to ethanol-flooded glass slides. The ethanol was dried, fibres covered with a glass slide and conditioned at 25°C, 25% relative humidity. The glass edges were sealed with silicone and fibre lengths determined using captured images in image analysis software. Fibres less than the snippet length were examined for broken, shed or re-growth ends. FD of the remainder snippet was determined using Optical Fibre Diameter Analysers.

Staple strength was significantly different between the genotypes. There was no significant difference between staple strength genotypes in fibre length or fibre length variation, but there were significant differences between genotypes and FDCV groups in fibre diameter variation for the period used to determine fibre length. There was no significant linear relationship between fibre length variation and FDCV or staple strength. Of the short fibres examined, 58% were broken fibres and the remainder contained either shed or re-growth ends. Fibre length to snippet length ratio ranged from 1.11 to 1.67. The average fibre length growth rate/day to fibre diameter ratio (L/D) was 17.7.

We could not demonstrate that fibre length variation contributed to the difference between the staple strength genotypes. The technique may be an alternative to the use of radioactive markers to determine L/D ratios. The occurrence of shed fibres during the winter/spring period warrants further investigation.

This work was partly funded by the International Wool Secretariat.