EFFECT OF SAMPLE SITE AND SIRE SOURCE ON WOOL FELTING PROPERTIES

A.C. SCHLINK [A], *J. C. GREEFF* [B] *and A.M. MURRAY* [A]

[A] CSIRO Livestock Industries, Private Bag 5, Wembley, WA 6913
[B] Western Australian Department of Agriculture, Katanning, WA 6317

Felting is a unique property of animal fibres, especially wool. Wool feltability has been shown to have a heritability of 0.31 using a modified Aachen felt ball test (Greeff and Schlink 2001). This study also showed that a large part of genetic variation was explained by ram source. This paper reports the results of studies on the effect of sampling site and sire on wool feltability.

In the first experiment, twenty Merino wethers run as a flock were sampled at annual shearing from nine fleece sampling sites (Denny 1990). Clean scoured wool samples were measured for fibre diameter (FD), curvature and felt ball diameter (Greeff and Schlink 2001). In the second experiment, mid-side samples were collected from a flock of 682 progeny from 17 sires, run at Brookton WA. Sheep were born in June 1999, with lamb shearing in October 1999 and sample shearing in September 2001. FD, curvature and felt ball diameters were measured on clean scoured wool samples.

Fibre diameter for the nine sampling sites averaged (±s.e.m) 18.7(0.1) µm. Sampling sites R1 and S3 FD's were 19.8 and 17.5 µm, respectively, and were significantly different ($P<0.05$) from the fleece average FD. Fleece curvature averaged 104(1) °/mm and felt ball diameter averaged 27.5(0.1) mm with no significant ($P>0.05$) effect of sampling site on parameter outcome. Progeny of the 17 sires had an average FD of 18.8 (0.1) µm, curvature of 81(1) °/mm and felt ball diameter of 26.1(0.1) mm. The progeny average FD from sire groups ranged from 17.4 to 21.4 µm, curvature ranged from 75 to 92 °/mm and felt ball diameter ranged from 25.1 to 27.9 mm. There was a significant linear relationship between felt ball diameter and FD ($r^2=0.44$, $P=0.004$) (Figure 1), and felt ball diameter and curvature ($r^2=0.30$, $P=0.024$) (Figure 2) for sire progeny groups. Using FD and curvature as co-variates did not remove the significant difference between sire progeny groups in felt ball diameter.

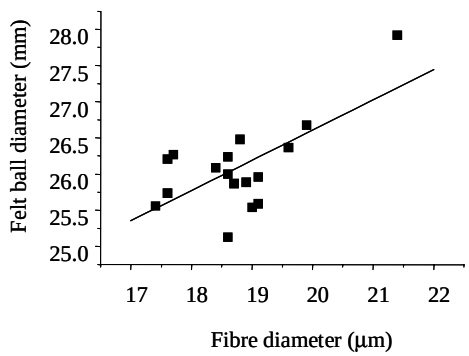

Figure 1. Relationship between felt ball diameter and FD for different sire progeny groups

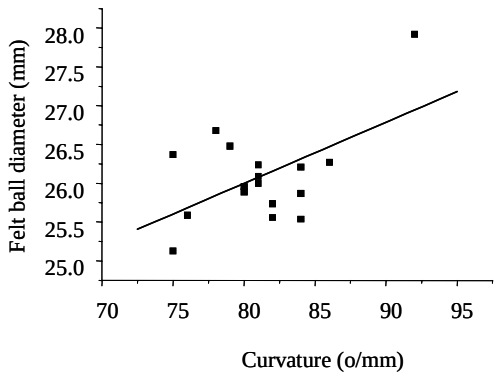

Figure 2. Relationship between average felt ball diameter and curvature for different sire groups

FD variation in the fleece is consistent with previous reports (Denny 1990). However, both curvature and felt ball diameter outcomes were unaffected by fleece sampling. The uniformity of wool feltability across the fleece will result in uniform felt shrinkage across the entire fabric made from single fleeces. There were strong sire effects on the progeny outcomes for felt ball diameter. This outcome is consistent with the report of Greeff and Schlink (2001) that a large part of the genetic variation in felt ball diameter was explained by ram source. These results also confirmed the correlation between FD, curvature and felt ball diameter. These correlations of felt ball diameter with FD and curvature have now been consistently demonstrated in both Merino and Romney sheep. This study has identified sires from commercial sire sources with the potential to produce low or high felting wools.

We wish to thank the Federation of Performance Breeders for making both data and wool samples available from the Yardstick 1999 sire evaluations.

DENNEY, G.D. (1980). *Aust. J. Exp. Agric.* **30**, 463-7.
GREEF, J.C. and SCHLINK, A.C. (2001). *Proc. Aust. Assoc. Anim. Breed. Genet.* **14**, 497-500.

Email: Tony.Schlink@csiro.au