

## ESTIMATES OF REPEATABILITY FOR WOOL TRAITS MEASURED BY OFDA2000

R. BEHRENDT, K. KONSTANTINOV and C. GLOAG

Dept Primary Industries, Primary Industries Research Victoria - Hamilton, Private Bag 105, Hamilton Vic 3300

The OFDA2000 is a portable instrument capable of the on-farm measurement of fibre properties of greasy wool, and was designed for use as an aid to sheep selection or wool classing. Studies have shown that OFDA2000 results are highly correlated with clean measurements (Behrendt *et al.* 2001) and are of similar precision to the Australian and New Zealand Standard for laboratory testing of midside wool samples. However, the capture, recording and storage of mean fibre diameter (MFD) measurements represent a significant investment by the wool producer. Previous studies using conventional laboratory midside testing have shown that rankings on MFD can be highly repeatable between years, allowing utilisation of measurements from younger animals in subsequent years (Andrews *et al.* 1997). This study sought to confirm whether OFDA2000 measurements of MFD had similar levels of repeatability.

The OFDA2000 measurements were performed on an adult ewe flock (n=828) with 10 age groups in April 2001. The same flock (n=727) was measured again at the following shearing in 2002. A single staple was selected from the midside and pin bone site of each animal and measured for a range of fibre properties using an OFDA2000 instrument. A standard repeatability mixed model was used for the analysis as follows;  $Y = Xb + Za + Wp + e$ , where  $y$  is the vector of observations (traits),  $b$  is a fixed vector containing the mean and age of the dam as a regressor,  $a$  is a random animal effect,  $p$  is a permanent environmental effect and  $e$  is the random residual effect. All calculations were performed using ASREML software (Gilmour *et al.* 2000).

**Table 1. Estimates of repeatability with standard error for OFDA2000 measurements on midside and pin bone staples in a ewe flock with multiple age groups for 2 adjacent shearings.**

OFDA2000 measurement	Midside		Pin Bone	
	Repeatability estimate	s.e.	Repeatability estimate	s.e.
Mean fibre diameter ( $\mu\text{m}$ )	0.80	0.025	0.79	0.028
Coefficient of variation of fibre diameter (%)	0.61	0.027	0.56	0.037
Coarse edge measure ( $\mu\text{m}$ )	0.60	0.029	0.64	0.026
Comfort factor (%)	0.53	0.340	0.48	0.052
Spinning fineness ( $\mu\text{m}$ )	0.79	0.025	0.78	0.025
Fibre curvature (degrees/mm)	0.89	0.112	0.78	0.105
Staple length (mm)	0.61	0.237	0.39	0.132
Estimated point of break (length from tip, mm)	0.04	0.040	0.16	0.047
Minimum fibre diameter along profile ( $\mu\text{m}$ )	0.70	0.061	0.66	0.075
Maximum fibre diameter along profile ( $\mu\text{m}$ )	0.76	0.022	0.73	0.022

Table 1 shows the repeatability of OFDA2000 measurements on midside and pin bone staples sampled from the ewe flock in 2001 and 2002. The estimates for repeatability for midside and pin bone MFD are both high with a low standard error indicating that the MFD rankings between both years were similar. Other wool measurements, such as coefficient of variation of fibre diameter and curvature, were also moderately repeatable, while staple length and estimated point of break were less repeatable. This is expected, as the rankings of these traits are more likely to be influenced by seasonal variation. Interestingly, both the minimum and maximum fibre diameter along the profile were highly repeatable between years. It was concluded that the MFD, as estimated from midside staples or pin bone staples using OFDA2000, is highly repeatable between years, allowing wool producers to use single measurements at a young age for ranking in clip preparation and culling decisions in later years.

ANDREWS, R.N., LAND, J.T.J. and DODDS, K.G. (1997). *Wool Tech. Sheep Breed.* **45**, 35-50.

BEHRENDT, R., FERGUSON, M. and GLOAG, C. (2001). *Proc. Assoc. Adv. Anim. Breed. Genet.* **14**, 281-284.

GILMOUR, A.R., CULLIS, B.R., WELHAM, S.J. and THOMPSON, R. (2000). 'ASREML - NSW Agriculture Biometric Bulletin No. 3.' (NSW Agriculture, Orange Agricultural Institute: Orange, NSW.)

Email: ralph.behrendt@dpi.vic.gov.au