

COMPARISON OF AUTO-RADIOGRAPHY AND SIFAN FOR MEASURING WOOL FIBRE DIAMETER PROFILES

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Whilst fibre diameter remains the single most important property in determining the value of wool, increasing interest is being placed on along-fibre variation of diameter. With the recent development of on-farm testing, fibre diameter profiling can provide a means of improving staple strength, as it has been shown that the rate of change of fibre diameter (Hansford and Kennedy 1988) is as important as minimum fibre diameter (Bigham *et al.* 1983) in determining staple strength.

The Sifan (single image fibre analyser, BSC Electronics, Perth) was developed to measure the diameter profile of a single fibre, and to stretch and break the fibre while measuring its force-extension curve. This study was designed to ascertain whether Sifan gives comparable results to the established method of auto-radiography for the measurement of mean fibre diameter (MFD) in fibre diameter profiles. As recommended, Sifan was used to measure the diameter of fibres every 40 μm along their length, while the auto-radiography fibres were measured once per week for 30 weeks. Measurements were made on wool fibres from sheep given a changing level of nutrition designed to cause large changes in rate of wool growth. The sheep were from genetically high and low-producing flocks (9 Fleece Plus and 9 Fleece Minus wethers, NSW Department of Agriculture). For each sheep, 20 fibres from the left shoulder were sampled for auto-radiography, and 30 from the left mid-side for Sifan. The mean fibre diameter of a mid-side fleece sample was also determined using Laserscan. Data were analysed using the General Linear Models procedure of SAS.

Table 1. Least squares means \pm s.e.m. of mean fibre diameter measured by Sifan, auto-radiography and Laserscan (μm).

Flock	Sifan	Auto-radiography	Laserscan
Fleece Plus	25.3 \pm 1.8a	27.7 \pm 1.8c	21.9 \pm 1.8b
Fleece Minus	23.0 \pm 1.8b	22.7 \pm 1.8b	21.4 \pm 1.8b

Means with different letters are significantly different ($P < 0.05$)

It was expected that the mean fibre diameter of the auto-radiography profiles would be lower than the Sifan profiles due to differences in the sampling sites (i.e. shoulder *v.* mid-side). This was not the case with the Fleece Plus or Minus flocks, with the shoulder measurement being significantly coarser with auto-radiography than with Sifan for the Fleece Plus flock (Table 1), but no significant difference with the Fleece Minus flock. There was no significant difference between methods for the Fleece Minus flock when compared with the Laserscan result, but the Fleece Plus flock was coarser according to both Sifan and auto-radiography compared with Laserscan. This indicates that the methods give, on average over flocks, a similar result, but may give differing results in different flocks.

This is the first time these 2 techniques have been compared. The results indicate that the methods are quite comparable, on average, and either could be used in a Merino breeding program.

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HANSFORD, K.A. and KENNEDY, J.P. (1988). *Proc. Aust. Soc. Anim. Prod.* **17**, 415.

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