

A SAMPLING TECHNIQUE FOR RANKING HOGGET RAMS ON WOOL PRODUCTION

By A. J. WILLIAMS *, and R. B. DUN *

Summary

A rapid sampling technique has been developed for ranking young rams in order of their wool production, without the necessity of full shearing. The wool sample is shorn with a single blow of the shearing handpiece, commencing between the shoulders and running vertically down the foreleg to the edge of the wool. The correlation between the sample weight and the greasy fleece weight was 0.83.

I. INTRODUCTION

In medium and strong wool Merino Studs, reserve rams are selected by visual classing, the remaining rams being sold in wool before the two-tooth shearing. The major selection is thus accomplished before there is opportunity to utilize fleece measurement. There is an obvious need for a technique that will enable accurate ranking of young rams on wool production, at the same time retaining the fleece for inspection by buyers.

The weight of wool clipped from a measured area of skin has a correlation of 0.58 with greasy fleece weight (Morley *et al.* 1955). The inclusion of body weight gives a multiple correlation value of 0.79. A correlation of this magnitude permits accurate ranking, but the technique is too laborious for commercial use.

This paper gives details of a rapid sampling technique using the shearing machine.

II. MATERIALS AND METHODS

(a) Sampling Technique

(i) *Mid-side*.—The length of the sampling area was branded on the mid-side of the sheep. The branded strip was then shorn away at skin level with a single blow of the shearing handpiece.

Two variations of the above technique were tested:

(a) Six-inch versus nine-inch strips.

(b) A single mid-side strip versus two separate strips placed on either side of the mid-line.

(ii) *Shoulder*.—With the ram standing squarely, the wool tip in the mid-line of the withers was marked. A single blow with the shearing handpiece was made, commencing at this point and running vertically down the foreleg to the edge of the wool.

(b) Sheep

Two hundred and fifteen rams were used, 13 months old and carrying 9 months wool. They were drawn from the following Trangie flocks—Nucleus (100), Fleece Plus (21), Fleece Minus (40), Crimps Plus (30), Crimps Minus (24).

* New South Wales Department of Agriculture, Agricultural Research Station, Trangie.

TABLE 1

CORRELATIONS BETWEEN GREASY FLEECE WEIGHT AND THE WEIGHT OF WOOL SAMPLED USING
THE SHEARING MACHINE

	Fleece Sampling Method									
	Shoulder Strip		Six-Inch Strip Right Mid-side		Nine-Inch Strip Right Mid-side		2 x Six-Inch Strip Left Mid-side		2 x Nine-Inch Strip Left Mid-side	
	Un-corrected	Corrected for Body Weight	Un-corrected	Corrected for Body Weight	Un-corrected	Corrected for Body Weight	Un-corrected	Corrected for Body Weight	Un-corrected	Corrected for Body Weight
5 Number of Sheep	215	215	104	104	109	109	100	100	109	109
Correlation Between Flocks	0·987	0·997	0·991	0·980	0·991	0·978	0·978	0·987	0·938	0·912
Correlation Within Flocks	0·830	0·870	0·533	0·625	0·481	0·650	0·619	0·711	0·448	0·631
Fiducial Limits (P 0·05) for the Within Flock Correlation	0·783 0·868	0·834 0·899	0·380 0·658	0·492 0·730	0·322 0·613	0·527 0·747	0·483 0·727	0·598 0·796	0·283 0·586	0·502 0·732

All correlations very highly significant, $P < 0·001$

All rams were shoulder sampled, while a random half of each flock received either the 6-inch or 9-inch mid-side strips. The identification of 4 samples (six-inch, mid-side), and 8 samples (two x six-inch, mid-side) was lost, thus slightly reducing the number of rams in these groups.

The weight of greasy fleece grown by these rams was subsequently measured at 16 months of age.

(c) Statistical Analysis

For each flock, correlations were calculated between sample weight and greasy fleece weight. A paired group of correlations was also calculated between sample weight x 12-month body weight 0.6 and greasy fleece weight. To summarise the treatment effects, these correlations were transformed to z values (Snedecor 1956) and examined by analysis of variance with two classifications -i.e. sampling technique and body weight correction-using the method as outlined by Dixon and Massey (1957) for cases where the interaction is not sufficient.

In addition, sample weight-greasy fleece weight correlations between and within flocks were calculated by covariance analysis (Dixon and Massey 1957).

III. RESULTS AND DISCUSSION

Table 1 gives the between and within flock correlations between sample weight and greasy fleece weight; Table 2 shows the analysis of variance on the individual correlations, calculated for each ram flock. The main points are as follows:

(i) The extremely high between flock correlations are expected because of the large differences in production between flocks.

(ii) The within flock correlations are also high, the shoulder sampling technique being considerably more accurate than the mid-side strip.

(iii) Increasing the strip length did not improve the accuracy of mid-side sampling. This was ascribed to the shearer's difficulty in taking more than 6 inches of wool when the fleece tip is matted with medic burr.

TABLE 2

ANALYSIS OF VARIANCE ON THE Z-TRANSFORMED CORRELATION CO-EFFICIENTS,
BETWEEN SAMPLE WEIGHT AND GREASY FLEECE WEIGHT, CALCULATED FOR EACH RAM FLOCK

Source of Variation	Degrees of Freedom	Sum of Squares	Mean Square	F Value
Sampling Technique	1	18.43	4.61	$\dagger 153.7^{***}$
Body Weight Correction	4	0.18	0.18	6.0*
Error	44	1.41	0.13	

* $0.025 > P > 0.01$

*** $P < 0.001$

\dagger The shoulder sampling technique gave a significantly higher correlation with greasy fleece weight, than did the other four techniques, which were not significantly different from each other (Tukey's test, Snedecor 1956).

(iv) The use of body weight as a correction significantly improved the correlations, although with the shoulder sampling technique the actual difference was not great enough to warrant the use of the adjustment in practice. This is to be expected, as the size of the shoulder sample would be influenced by the size of the sheep.

IV. CONCLUSION

Accurate ranking of rams on wool production can be accomplished using the shearing machine and a shoulder sampling technique.

The method is rapid enough (less than two minutes per sheep) for use in the industry as an aid to the visual selection of reserve rams.

V. REFERENCES

- DIXON, W. J., and MASSEY, F. J. (1957).—Introduction to statistical analysis. 2nd Ed. (McGraw Hill: New York).
- MORLEY, F. H. W., LOCKART, L. W., and DAVIS, E. C. (1955).—The value of production from a clipped measured area as an index of fleece weight. *Aust. J. Agric. Res.* 6: 91-98.
- SNEDECOR, G. W. (1956).—Statistical Methods. 5th Ed. (Iowa State College Press: Ames).