# A COMPARISON OF METHODS OF RANKING THE WOOL WEIGHT OF MERINO RAMS WITHOUT COMPLETE SHEARING

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## I. INTRODUCTION

The Merino stud industry sells 70% of its flock rams at 1-1½ years of age (Short and Carter 1955). The buyer wishes to see an animal in the fleece when making his selection; consequently no fleece weight records can be available for rams at this age. Some method of assessing fleece weight rank is needed which will still allow the buyer to see wool on the animal.

Several suggestions have been made for overcoming this problem. Morley, Lockhart and Davis (1955) found a multiple correlation of 0.8 between clean fleece weight and clean wool production per unit area, plus body weight. Roberts (1959) suggested that fleece weight could be estimated accurately if only one side of a ram were shorn, leaving the other half of the fleece in position. Williams and Dun (1962) reported that the weight of a "shoulder strip" sample was useful for ranking unshorn rams for greasy fleece weight, the correlation between sample weight and fleece weight being 0.8.

This paper presents observations aimed at determining the increase in accuracy of ranking which might be obtained by the shearing of two strips, one from each shoulder, and also the accuracy of half-shearing relative to the shoulder strip method.

## II. MATERIALS AND METHODS

### *(a) Sampling techniques*

#### *(i) Strip shearing*

The rams were marked with coloured scourable raddle on the mid-point of the back above the shoulder to locate the start of the shoulder strip and on the middle point of the sample site ("mid-strip position"). When the ram was standing the "mid-strip" positions on each side were located on the intersection of a horizontal line passing through the mid-side and the line of the shoulder strip. For sampling, the rams were placed in the normal shearing position and the leg on the side to be sampled was straightened by an assistant to allow accurate shearing. Wool was removed with standard shearing equipment to produce a strip 2½ in. (6.4 cm) wide commencing at the mid-point of the back above the shoulder and terminating at the margin of wool growing on the foreleg.

#### *(ii) Half -shearing*

With the ram in a standing position the mid-dorsal and mid-ventral lines were marked with raddle. The half fleece was then shorn from the left side.

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### *(iii) Notation*

The following notation is used to distinguish the various weights of wool shorn.

| | |
|---|---|
| GSW (R) | is the weight of the unscoured ("greasy") strip from the right side |
| GSW (L) | is the greasy strip weight from the left side |
| GSW (T) | is the total greasy strip weight from both left and right side |
| GWW (½) | is the weight of greasy wool shorn from the left side of the sheep and includes half the belly wool |
| GWW | is the total weight of greasy wool shorn from the sheep and includes the belly wool. |

### *(iv) Relative selection efficiency*

Each sheep was allotted to one of five grades, described by Roberts ***et al*** (1961), according to the wool production estimated by each of the three methods (Table 2). The mean total wool production of the sheep in each of the five grades was used to calculate selection differentials for each method. Relative efficiency of selection as defined by Riches and Turner ( 1955) is then the ratio of the selection differential obtained for each grade by one method compared with the selection differential obtained from total wool weight.

## *(b) Flocks*

### *(i) Flock I*

Five hundred and twenty six, 16 month old strongwool Merino rams were sampled by the shoulder strip method in December. Fifty four of these were selected at random and were half shorn. In the following January all remaining wool was shorn from each ram and weighed.

### *(ii) Flocks 2 and 3*

Half-shearing was also applied to two other flocks of strong wool rams from the same stud as Flock 1. In Flock 2 there were 85 rams, 16 months old, which had been shorn 11 months previously; in Flock 3 there were 76 similar rams which had been shorn 10 months previously.

TABLE 1

***Correlation coefficients between weights of greasy wool from two shoulder strips and greasy wool weight***

| | Greasy Wool Weight | Greasy Sample Weight* (Total) | Greasy Sample Weight* (Left) |
|---|---|---|---|
| Greasy Sample Weight (Right) | 0.72 | 0.93 | 0.75 |
| Greasy Sample Weight (Left) | 0.70 | 0.93 | . |
| Greasy Sample Weight (Total) | 0.74 | . | . |

*degrees of freedom 524; all correlations were highly significant

## III. RESULTS

### *(a) Flock 1*

From the 526 ram samples, simple correlation coefficients were calculated between GWW, GSW(R), GSW(L) and GSW(T). (Table 1). All correlations were highly significant and there were no significant differences between any of the sampling methods in their correlation with GWW.

The correlation coefficients between GWW and each of the sampling methods used on the 54 half-shorn rams of Flock 1 were 0.93 for GWW(½) and 0.79 for GSW (T). The difference between these coefficients was significant. ($P<0.05$).

### *(b) Flocks 2 and 3*

The correlation coefficients calculated between GWW(½) and GWW were, $r = 0.96$ (d.f. = 83, $P<0.01$) in Flock 2 and $r = 0.92$ (d.f. = 74, $P<0.01$).

### *(c) Efficiency of selection in Flock 1*

The relative efficiency percentages (Table 2) for GWW (½) appear to be consistently higher than those for GSW (T).

TABLE 2

***Grade means and relative selection** efficiency for **greasy wool weight by two methods** of fleece **sampling***

| Grades | No. in Class | Mean Greasy Wool Weight (kg) | Selection by Greasy Sample Weight (Total) | | Selection by Greasy Wool Weight (Half) | |
|---|---|---|---|---|---|---|
| | | | Mean (kg) | Efficiency % | Mean (kg) | Efficiency % |
| Super, top 5% | 3 | 7.73 | 7.27 | 61 | 7.45 | 77 |
| A next 15% | 8 | 7.31 | 7.13 | 77 | 7.27 | 95 |
| B next 30% | 17 | 6.76 | 6.72 | 82 | 6.76 | 100 |
| C next 30% | 17 | 6.27 | 6.09 | 167 | 6.27 | 100 |
| D next 20% | 9 | 5.50 | 6.18 | 32 | 5.50 | 100 |
| All Sheep | 54 | 6.54 | | | | |

Table 3 contains a comparison of the mean greasy wool weights and the efficiency of selection of 526 rams on the basis of GWW and GSW(T). The considerably greater number in these estimates removes sampling errors possible in the values of Table 2.

As an alternative method of assessing the accuracy of the methods under study, a comparison was made of the number of rams selected into each class with the number selected by greasy wool weight. The analysis showed that a method based on greasy sample weight [GSW (T)] would have selected 19 out of 26 graded "super" by GWW, 38 out of 80 "A grade" and 54 out of 105 "D grade."

## IV. DISCUSSION

The correlations in Table 1 are in accord with the finding of Williams and Dun (1962) who found that there is little advantage in using the sum of the two shoulder strips in lieu of either alone.

TABLE 3

***Grades** means **and** efficiency* of ***selection for greasy wool weight*** of ***summed right and** Left **strips versus whole fleece***

(n = 526)

| Grades | Mean Greasy Wool Weight (kg) | Selection by Greasy Sample Weight (Total) | |
|---|---|---|---|
| | | Mean (kg) | Efficiency (%) |
| Super | 7.50 | 7.04 | 75 |
| A | 6.59 | 6.31 | 69 |
| B | 5.90 | 5.86 | 82 |
| C | 5.32 | 5.40 | 78 |
| D | 4.59 | 4.86 | 75 |
| All sheep | 5.68 | | |

The half-shearing method is more accurate for ranking sheep for greasy wool weight than shoulder sampling. One of the causes of the increased accuracy is the greater contribution to total wool weight variation made by the half-fleece sample. However, the half fleece method presents the practical problem of increased shearing costs due to handling the rams twice.

Selection based on shoulder strip sample weights (Table 2) is at least twice as efficient as selection by visual classing taking the efficiency of classing of 30% as reported by Riches and Turner (1955). In addition, strip sampling offers the opportunity to rank and select rams in the complete two-tooth flock rather than the reserve flock which comprises usually about 10% of the rams born. On the other hand, strip sample weights incorrectly rank a number of sheep by comparison with half and full greasy fleece weights and this will restrict its use to a preliminary grading. In order to increase the accuracy of the strip method it seems likely that a greater quantity of wool could be shorn from an area intermediate in size to the strip and the half shearing area.

Although the wool weights referred to in this paper have all been on a greasy basis, the ultimate criterion in selection is clean wool weight. The work of Lockhart (1955) and Scott (1959) has suggested that yield estimates derived from the scouring of the mid-strip sample will be sufficiently accurate for clean fleece weight ranking.

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