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Objective measurement and the stud breeder

By B. Beetson, Adviser, Sheep and Wool Branch

The movement towards sale of wool by certificate and sample highlights the significance of objective measurement in the Merino stud breeders' selection of his top rams. This article suggests how stud breeders should use the Department of Agriculture's Flock Testing Service to gain genetic progress in wool producing ability without loss of visual buyer appeal. Studs' use of the service will be evaluated in 1974.

At the beginning of this century the Merino sheep in Western Australia cut only 2.25 kg of wool a head. Since then, production per head has doubled.

Improved nutrition has been given credit for much of this improvement, but in fact its contribution is probably limited. Sheep in the pastoral areas have shown the same trends as those in the agricultural areas, and while agricultural area sheep are better fed than they were 70 years ago, the nutrition of sheep in the pastoral areas has, if anything, deteriorated.

It must therefore be accepted that there has been a real genetic improvement in wool production in Western Australian Merinos, and that the Merino stud breeders have contributed to this.

However, there is also ample evidence to show that the rate of genetic gain can be improved if the stud breeder combines his expertise with objective measurement of his sheep's wool producing ability.

The Department of Agriculture's Flock Testing Service provides the facilities which allow him to do this.

The service began in 1958, and in 1962 the Department set up its Wool Testing Laboratory to measure wool characteristics both for the Merino breeding industry and for its own experimental flocks throughout the State.

As there was a limit to the number of samples the Laboratory could handle, it was decided to restrict the service to Merino studs. At the time, 80 per cent of the rams used by the wool industry were sold by registered studs, and it was reasoned that genetic gain in the studs would quickly spread to the rest of the industry, whereas genetic gain in flocks not providing rams to the industry would only benefit those individual flocks.

As one ram produces about 40 progeny a year and one ewe produces, on average, less than one lamb, the service was further restricted to measurement of rams.

It was decided that we should test, for each contributing stud, the top 15-month-old rams from which replacements were to be chosen. The aim of this is to help the studmaster make the final selection of his own ram replacements.

Stud breeders are urged to send the laboratory mid-side samples of wool from their heaviest cutting rams (after visual culling) equal in number to 10 times the number of replacements required.

If breeders select the animals for sampling on the basis of greasy fleece weights, much genetic gain is achieved before the samples are forwarded. If they select the rams on purely visual grounds there may be no initial selection pressure for wool production, but the service still gives large benefits if a reasonably large number of rams is sampled. Selecting the top 10 per cent
on performance provides a worthwhile selection differential regardless of how the group is chosen.

**Characteristics measured**

Clean wool weight and fibre diameter are the main measurements provided for each sample; these have been provided for the past 10 years. With the introduction of sale by sample and certificate, they are the main characters on which wool is now sold.

The way in which the Department suggests the stud breeder can make full use of his own skills and the figures provided by the Flock Testing Service is:

- The rams should be shorn both as weaners and as hoggets. After weaner shearing and preliminary culling, the rams from which replacement sires are to be selected are run in one mob. If this is not possible, results from different mobs should be treated separately.
- Before and after hogget shearing further culling eliminates undesirable animals. About 15 per cent of the mob are normally culled for faults.
- The potential keepers are fleece-weighted at the hogget shearing and many are eliminated on greasy fleece weight alone.
- The heaviest cutters are mid-side sampled and the samples sent to the laboratory. The ideal number of samples is 10 times the number of replacements to be kept. At least 200 grams of wool is needed per sample.

**Example:**

- Ten replacements are wanted from a mob of 500 entires.
- After weaner shearing, 60 are culled for faults.
- Before hogget shearing, 60 are culled for face cover and other faults.
- During hogget shearing a random sample of about 30 are fleece-weighted (and sampled) to give an idea of the likely range in fleece weights. From then on only enough of the heavier fleeces are sampled to give the required number of samples.
- After hogget shearing excessively wrinkled rams and any with other overlooked faults are culled from the sampled group.
- From the remaining samples the total 100 on fleece weight are sent to the laboratory.

At the Department of Agriculture's Wool Laboratory, a 100 gram sub-sample of greasy wool is taken from each sample, and put through a miniature scour which closely approximates industrial scours.

**Fleece Measurement Service**

**flock statistics—1972**

<table>
<thead>
<tr>
<th>Size of Flock—Rams Sold 1970</th>
<th>Number of Flocks</th>
<th>Number of Flocks Fleece Measuring 1972</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>1000 &amp; over</td>
<td>4</td>
<td>3</td>
<td>75</td>
</tr>
<tr>
<td>750–999</td>
<td>2</td>
<td>1</td>
<td>50</td>
</tr>
<tr>
<td>500–749</td>
<td>6</td>
<td>2</td>
<td>33</td>
</tr>
<tr>
<td>250–499</td>
<td>31</td>
<td>11</td>
<td>35</td>
</tr>
<tr>
<td>50–249</td>
<td>181</td>
<td>60</td>
<td>33</td>
</tr>
<tr>
<td>49 or less</td>
<td>167</td>
<td>23</td>
<td>14</td>
</tr>
<tr>
<td><strong>391</strong></td>
<td><strong>100</strong></td>
<td><strong>26</strong></td>
<td></td>
</tr>
</tbody>
</table>

* Total merino studs registered W.A. = 542; 391 studs sold rams in 1970.

**MERINO RAMS SOLD IN W.A.—1970**

<table>
<thead>
<tr>
<th>Rams from studs which use fleece measurement</th>
<th>17,624</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total studs measuring samples 1972 = 128</td>
<td></td>
</tr>
<tr>
<td>28 did not sell rams this year</td>
<td></td>
</tr>
<tr>
<td>Number of studs measuring more than 50 samples = 63</td>
<td></td>
</tr>
</tbody>
</table>

The clean wool is oven-dried and weighed. This weight, with a standard 16 per cent added for "regain", represents the percentage yield. The sample is taken into a controlled atmosphere room (kept at constant temperature and humidity) where it is teased and a 2.5 g sub-sample is put in the "Sonic A" fineness metre for fibre diameter measurement.

The results, clean wool weight order and percentage yield and fibre diameter, are presented on a computer print-out.

The breeder makes the final selection from the top clean wool producers within the desired fibre diameter range.

**Influence on the industry**

The table below shows the percentage of studs of different sizes which use the service. It indicates that half the studs selling more than 500 rams to the industry each year use fleece measurement. Although many smaller studs don't use the service, we know that most of these buy rams from the larger studs and therefore should benefit from genetic gains in those large studs—so long as the larger studs make effective use of the figures provided.

We know that several bigger studs do make full use of the laboratory, but until we make a stud-by-stud assessment of how the service is in fact being used we can only guess how useful the service is to the industry.

A survey will be carried out in 1974 to investigate studs' use of the service so that its value to the industry can be properly assessed.

Meanwhile we are left with these thoughts:

- The service is benefiting the industry.
- There is still plenty of room for improvement. In some cases breeders may send in samples but not use the results as an aid to selection.
- Many smaller studs do not use the service themselves but buy their ram replacements from studs which do. They gain the benefits of progress made in the bigger studs.