Differences between Merino strains and studs

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When commercial wool growers select Merino rams they often use the following pattern: the buyers first consider the main strains of Merinos in Western Australia - Bungaree, Collinsville and Peppin. They then study the 550 studs and numerous non-stud ram breeders in this State. Having chosen a breeder, they examine the rams on offer and buy their annual requirements from among these.

Until recently, no objective information has been available on the differences between studs and strains in Western Australia’s agricultural areas. However, as part of a major study at the Department of Agriculture’s Great Southern Agricultural Research Institute, these differences were measured for the Bungaree, Collinsville and Peppin strains, and for four studs within each strain.

About this study

This article is based on part of a comprehensive analysis of data collected on hoggets from 1982 to 1987, in which comparisons were made between the above three strains of Merinos, and between studs representing these strains in Western Australia. There were about 400 adult ewes in each strain, made up of about 100 ewes each from four major studs. All hoggets in the study were run together.

The studs were chosen for their purity in terms of strain, and for their impact on the Merino industry through ram sales. When the initial stock was bought, the 12 studs involved owned about 13 per cent of the State’s stud ewes and accounted for about 20 per cent of horned ram sales.

What are the differences between strains and studs?

Two types of flock characteristics can be defined: those which are measured objectively and those which are assessed visually (that is, subjectively).

Objective measurement

The long term averages for some objectively measured hogget characteristics based on 3,500 hogget fleeces and 1,650 liveweight records are shown in Table 1. Among these traits, only average fibre diameter was significantly different between strains, with this difference being between Bungaree and the other two strains. There was no significant difference in fibre diameter between Peppin and Collinsville. There were no major differences between strains for clean fleece weight, greasy fleece weight or yield.

On the other hand, there were substantial differences between studs for all of the objective traits. Figure 1 shows the average fibre diameter by stud from the finest to the broadest. The Peppin strain studs (P1 to P4), as expected, fall near the fine end, with the Bungaree strain studs (B1 to B4) at the broad end.

Figure 2 shows clean fleece weight in the same stud order as in Figure 1. That is, the clean fleece weight for the finest stud is shown on the left, through to the clean fleece weight for the highest average fibre diameter stud on the right.

To compare values of wool from the studs, information from Figures 1 and 2 can be put together using the 1989-90 Australian Wool Corporation floor prices. Hogget fleece values are shown in Figure 3. There is a strong tendency for finer woollen hoggets to be most profitable under these market conditions. Income from wool ranges from about $26 to $45 per head. The range would probably be less for older sheep as they become broader with age and the price margins for changes in average fibre diameter decrease. Nevertheless, the ranking of flocks on hogget fleece value is a valid indication of lifetime profitability.
1,550 hoggets were observed. A 1 to 5 scale was used for scoring, with 5 being 'best', except for crimps per centimetre which are actual values. For example, very soft handling wool might score 5, as would wool with thick lock, or that was well conditioned.

Among the wool traits, crimps per centimetre (which has a low negative association with average fibre diameter) was higher for the Peppin strain. None of the other visual wool traits differed between strains. The differences between studs were large in all cases.

The physical body traits are related mainly to well being and soundness and have value from a management point of view. Only wrinkle scores were different between strains, with the Peppin being wrinkliest at all sites on the body.

There were no large differences between the strains for liveweight traits, but again, differences between studs are significant (Table 1). The differences between strains were in the direction that many people would expect, which is Bungarees heaviest and Peppins lightest.

**Visual appraisal**

Before the advent of objective measurement, commercial wool growers used visual appraisal exclusively to select replacement stock. Some conservative growers still rely on visual appraisal. Today, however, most growers now combine visual and objective measurements.

Table 2 lists the long term averages for Bungaree, Collinsville and Peppin strains and ranges for studs for visual traits based on 2,300 hogget records for all except wrinkle scores, for which

![Figure 1. Average fibre diameters (microns) for hoggets of four Peppin (P1 to P4), four Collinsville (C1 to C4) and four Bungaree (B1 to B4) studs.](image)

![Figure 2. Clean fleece weights (kg/head) for hoggets of four Peppin (P1 to P4), four Collinsville (C1 to C4) and four Bungaree (B1 to B4) studs.](image)

![Table 1. Long term average production for Bungaree, Collinsville and Peppin strains in a Great Southern environment](table)

![Table 2. Long term averages for visual traits for Bungaree, Collinsville and Peppin strains and ranges for studs (compared on a 1 to 5 scale; 5 is best)](table)
How the commercial ram buyer can use this information

Sheep breeding objectives include the traits that the ram breeder wants to improve and those characteristics that affect clients' incomes.

Commercial wool growers can achieve their breeding objectives by retaining superior breeding stock within a flock, and by choosing a superior source of rams. It is often difficult for wool growers to choose a superior source of rams because there are few estimates of the actual production differences between ram producers.

The results of the work reported here indicate that there is no justification for choosing between strains when buying rams. Among the production characteristics, the only significant differences are in average fibre diameter. In spite of these differences, under present market conditions, selecting the finest stud and ignoring its strain will be more financially rewarding.

Profit from wool sales is made up of several components, the most important of which are clean fleece weight and average fibre diameter. There is a large variation in potential wool income between different studs.

A combination of highest clean fleece weight and lowest average fibre diameter is the most profitable. Although this can be achieved when selecting rams within a stud, it is not an option when selecting amongst the studs. Studs with the lowest fleece weights tend to have the lowest average fibre diameter, although this is not always the case.

Care is therefore needed in balancing the lower fleece weights with the higher returns per kilogram from the finer wool. Sheep from some studs have differences in clean fleece weights which are not sufficiently offset by changes in fibre diameter to maintain the level of income per sheep. Collinsville studs 1 and 2 in the Figures fall into this category; both studs have higher clean fleece weights than the four Peppin studs, and yet fleece values for two Peppin studs exceed those from these two Collinsville studs.

The three studs with the highest clean fleece weights were also amongst the lowest in wool returns per hogget because of their high average fibre diameter.

Choice of stud is a vital part of the process of improving production through selection. Within the sample of studs tested here, a change of stud would have increased hogget wool incomes by $19 per head in 1989-90. The range may be even greater if other studs were included.

It is difficult for the commercial ram buyer to compare different studs. The data reported here are probably the first and only meaningful data on Western Australian studs, but only 12 were investigated out of more than 500 in the State.

One way of comparing different sources of rams is to carry out a progeny test of samples of rams from each stud. This is a large scale project, requiring about 10 to 15 randomly sampled rams from each stud, each with 20 tested progeny. However, if carried out correctly, it is the most accurate method. The test could be conducted over more than one mating, but the data would be more difficult to analyse. Nevertheless, the data presented here suggest that such a test could have substantial benefits to the commercial producer. For example, in a flock of 10,000 sheep, changing studs might yield an extra $100,000 with no added costs.

In-as-much as the visual traits affect the production traits, they may have some value as selection criteria; that is, visual assessment may be used to help predict production. Visual traits may also be useful where these characteristics affect normal sheep management. Excessive side wrinkle may be associated with fly strike or fleece rot in some environments.

Visual assessment may also be useful during preliminary culling to reduce sheep numbers before testing. Selection index methods are being devised to allow this two-stage selection method to be exploited.