

# Wool Quality

---

## SIL Technical Note

---

Relates to: Selection to improve wool quality traits

Written by: Mark Young

Date: 28 July 2005

---

### Summary

Wool quality traits for mid-micron to finer wools can be subjected to more accurate genetic selection through use of focused sub-indexes within standard SIL economic selection indexes.

These include a main Wool sub-index focusing on fleece weight and diameter together with a Wool Quality sub-index that includes information on variability in fibre diameter, curvature, length and colour (yellowness and brightness).

The Wool sub-index is expected to have a greater impact on the overall index than the Wool Quality sub-index. The importance of fibre diameter and of other wool quality traits increases as average fibre diameter decreases.

### Background

SIL has developed new selection indices for fine-woolled sheep with a stronger emphasis on wool quality. Due to the curved relationship between fibre diameter and wool value, SIL has four indexes to focus on mid-micron, medium-fine, fine and super-fine woolled sheep.

There are two key differences between the SIL Dual Purpose and the SIL Mid-Micron/ Fine Wool indexes. Firstly, the main Wool sub-index (or Goal Trait Group) includes a breeding value for fibre diameter. It is placed here rather than in the Wool Quality sub-index because of the fundamentally important relationship it has with fleece weight. Secondly, a new sub-index, Wool Quality, has been added to the Overall index to focus on key measures of wool quality related to processing and end-use.

### Genetics of Wool and Wool Quality

Good news here, as wool traits are moderately to highly heritable (35-60%). However, there are some associations that are strong which we must work against e.g. fleece weight vs. fibre diameter. The last two traits are in the same Wool sub-index because there is a positive genetic relationship but a negative economic relationship between them.

Wool Quality focuses on five key measures of quality associated with processing and end-use. These are – coefficient of variation for fibre diameter (CVFD), fibre curvature (CURV), fibre effective length (LENG), yellowness (Y-Z) and brightness (Y).

### Recording Wool and Wool Quality data

Fleece weights may be recorded as either greasy or clean. It does not affect the evaluation significantly if historic data is of one type while recent data is of the other. Nor does it matter much if some farms/ flocks record clean weight while others record greasy weight. However, if clean fleece weight data is available SIL recommends you enter this on the system where it is available together with greasy weights for all sheep. **SIL does NOT use the clean yield% measurement** to derive clean fleece weight or to predict BVs for wool traits.

Fibre diameter is best measured by objective test. Assessed diameter can be used but it is less accurate as a predictor of true fibre diameter. Likewise, other predictor traits for wool quality are best measured from objective tests of wool samples.

If the Wool Quality sub-index is to be used effectively, a reasonable number of sheep should have wool samples tested for quality traits. Otherwise there will be poor discrimination between sheep for genetic merit of wool quality. You should consider testing the top 15% or the top 30 ram lambs/ hoggets, whichever is the greater number.

Some breeders assess overall merit for “wool quality” and place a score on this for each sheep assessed. This can be recorded on the SIL system and printed on reports but SIL does NOT use it in the prediction of genetic merit for Wool Quality.

#### Genetic evaluation

For the main Wool sub-index, SIL predicts breeding values (BV) for the fleece weight and fibre diameter from measurements on the same traits. Greasy or clean fleece weights are used to predict breeding value for fleece weight.

For the Wool Quality sub-index, SIL predicts breeding values (BV) for the five quality traits using information on fleece weight (clean or greasy) and test measurements for average fibre diameter, CV of fibre diameter, curvature, staple length and staple strength, yellowness and brightness. Both staple strength and staple length are used to predict the BV for fibre length.

SIL uses the performance of relatives in genetic evaluations. So genetic merit for wool quality can be assessed in sheep that have not been tested themselves. Given the cost of fleece testing, it is recommended that a reasonable number of sheep have wool samples tested (see above). Otherwise many sheep will have predicted breeding values from actual measurements made on only a few wool samples.

#### Reporting on Wool Quality

SIL recommends the use of the Wool and Wool Quality sub-indexes, rather than component BVs, on reports. These are simply the BVs multiplied by their economic weightings. It has the advantage of showing how much impact each sub-index has on the overall index of economic merit. The units for all indexes are the same – cents per ewe lambing – and in all cases, larger, positive values are better. A separate Technical Note reports on the breeding values used in each sub-index, and their economic weightings.

This recommendation is made to help make reports easier to understand for ram-buyers. They can see the economic impact of wool traits relative to merit in other traits.

If you require more detail, you can report on key quality traits as BVs if you wish. SIL does NOT recommend the use of actual test measurements on reports.

#### Selecting for Wool Quality

For the main Wool sub-index (or Goal Trait Group) the breeding value for fibre diameter has a negative economic weighting. For Mid-Micron sheep this is negative and small, so while it will tend to favour finer fibre diameter sheep, the effect is expected to be minor given the dominant effect of weight on fleece returns. However, as fibre diameter decreases for the Fine Wool indexes (Fine Wool Medium, Fine Wool Fine and Fine Wool Super-fine) fibre diameter has an increasing effect on the relevant Wool sub-index.

Relative to the main Wool sub-index, the Wool Quality sub-index has less impact on the overall index for the Mid-Micron and Fine Wool indexes. However the relative importance varies from having a modest effect in the finer wools to only a very small effect in the Mid-Micron index. Despite this, the Wool Quality sub-index is useful for monitoring change in wool quality traits over time and to identify animals with extreme genetic merit for wool quality (very good or very poor).

#### Need more information?

Contact your SIL bureau, local SIL adviser or call 0800-745-435 (0800-SIL-HELP).