Understanding the art of sheep improvement

Genetic values are constantly improving, like the animals whose breeding merit they reflect

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Since livestock were first domesticated, humans have striven to improve their performance of by breeding the best with the best. That's why the livestock we see on farms around the world look very different from their ancestors that roamed in the wild. AI and embryo transfer techniques have allowed large numbers of progeny to be produced from superior males and females.

Over time, the efforts of dedicated livestock breeders have resulted in animals that grow faster, produce more milk or more offspring. While breeding for single traits such as increased growth rate or milk yield have been successful in the past, they have often resulted in unintended and undesirable attributes such as increased health problems, reduced fertility, reduced vigour or increased difficulties during birth.

The Irish Sheep Breed Improvement Programme, which is operated by Sheep Ireland, looks at multiple traits which are given different weightings within an economic index (€uroStar index). The reason for doing this is that you can select for desirable traits while not ignoring potentially negative ones.

For example, we want to select for lambs that grow really fast but don't have lambing difficulty and high levels of mortality, or we want to select females that produce lots of milk but have a low incidence of mastitis.

In order to get this information, the €uroStar index evaluates not only the information provided on the animal being evaluated but also looks at the performance of its relatives. This helps to establish whether superior (or inferior) performance is as a result of management or genetic issues.

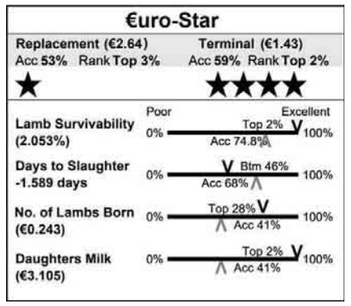
Superior performance as a result of management (i.e. feeding, etc) is not passed on to the offspring by the ram or ewe, whereas superior performance, as a result of genetics, is passed on to the offspring so that they too will perform better.

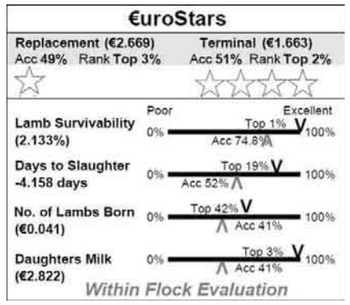
In Ireland, to make it easier to understand the genetic indices, each index is given a star rating. The star rating shows where the predicted performance of that particular animal is, relative to the other sheep in that breed (linked flocks) or within that flock (unlinked flocks).

Unlinked flocks are flocks who have not shared rams with other flocks or had rams in the Central Progeny Test Programme. Therefore, the evaluation is really only comparing the sheep in that flock to the other sheep from the same flock and not with sheep in other flocks within the same breed. You cannot reliably compare the index of sheep from unlinked flocks with indices of sheep from any other flocks.

Sheep farmers who are purchasing rams should ensure that the ram comes from a linked flock. This means that the index represents the predicted genetic merit of that sheep when compared with all those recorded within that breed.

This year, Sheep Ireland has changed the way that indices are presented to help sheep farmers to identify sheep that come from unlinked flocks. See the diagrams below – where evaluations are within the flock, the stars are not shaded and the box will contain the phrase "Within Flock Evaluation".





Over time, indices will change. This is one topic which comes up frequently and it is one of the issues that is a constant source of annoyance for pedigree breeders and commercial farmers alike.

This year, Sheep Ireland updated the economic values and weightings to take into account results from recent Irish research. This has caused some re-ranking of animals but it has resulted in a more accurate reflection of the economic value of the genetic merit or index of these animals.

It is important to remember that indices will continually change as more information becomes available on the performance of an animal or its relations. Therefore, as an animal gets older, and has more progeny, the index will adjust to reflect the performance of those progeny and their relatives. In most cases the changes will be minor, but occasionally individual animals can fall, or rise, dramatically.

So why bother with indices if they are going to change?

Teagasc research consistently shows that high index sheep are more profitable than low index animals. High index animals produce lambs that grow faster, have less lambing difficulty, lower mortality and produce daughters that have higher litter sizes. The "big money" items are reduced mortality and increased lamb crops.

By consistently selecting high-index rams over time the genetic merit of the flock will increase regardless of any individual ram's index falling. The most rapid progress will be achieved where all rams used on the farm are high-index.

Genetic index

A genetic index is the best estimate of an animal's likely genetic merit. Selecting sheep with high accuracies from flocks that are well linked will increase the probability that the index will remain relatively constant.

Rams with lower accuracies are more likely to see changes as there is less information underpinning their evaluation. However, there will always be animals even at high accuracies that will change when new information comes to light. The new information may demonstrate that the original predication was not as accurate as the information available at that time predicted it to be.

Data quality index (DQI) is a measure of the amount of information that an individual flock is supplying to the evaluation. Flocks that have low DQI percentages have only partially submitted data on all the sheep in their flock or they may have submitted the information late. The higher the DQI, the better.

July marks the start of the ram selling season. Sheep farmers selecting rams should firstly select rams on visual and ram soundness examination and then make their final decision based on the index of the ram.

Aim to select rams that are physically sound and have three or more stars on the overall index (terminal for lambs going for slaughter and replacement for lambs being retained as flock replacements). Also, select for a high star rating on other traits that are important to you, i.e. daughters' milk, lamb survival, number of lambs born, days to slaughter, etc.

•More information about performance recording flocks and the indices of rams can be found at www.sheep.ie

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