



Breed Improvement Article

Genetic Evaluation

By Sean McGrath

Hopefully all seedstock breeders have some interest in genetics. Genetic selection and application is what the seedstock industry is all about. In other words, breeding better bulls and then getting them put into use in the commercial beef industry.

The first part of this equation is quite a difficult challenge. Most breeders will readily and accurately point out that our cattle are pretty darn good already. Of course the challenge of improving something that is already a quality product is much more daunting than improving a subpar product. Limousin cattle are already noted for efficient lean meat production and their ability to cross well with in a variety of commercial cowherds, particularly those with a strong British influence.

Because the challenge of improving upon an already quality product is so large, breeders have agreed to work together through a common association to collect information on their cattle, and pool that information so that it can be leveraged together in a genetic evaluation. Each breeder benefits from their own data and also the contribution of data from other breeders. The Canadian database is combined with the American dataset to result in a large amount of information about Limousin genetics being used in the genetic evaluation. The resulting EPDs that are calculated from this database can be directly compared across herds to select for a variety of traits, from docility to growth to carcass characteristics. This ability to compare seedstock across the entire population of Limousin cattle, gives us more power to select better replacement stock and thus improve the merit of the breed. While the EPDs are definitely not the only thing to consider in selecting breeding stock, they are a useful tool, and contain much more information about the animal's genetics than a simple rank, index or adjusted weight.

Traditionally, we have only been able to include information on those animals that were a high percentage of Limousin, and we were not able to include any of the information on their non-Limousin relatives in the pedigree. This summer marks the first multi-breed evaluation of Limousin seedstock. This multi-breed evaluation is the result of a year long study between the CLA, the North American Limousin Foundation, and the University of Georgia. What this means is that information from non-Limousin cattle in the pedigrees of many of our purebred and recorded stock can now be included in the genetic evaluation. This is important because genes from these non-Limousin have been captured into the Limousin population through the use of foundation dams. Additionally, there is some interest in hybrid seedstock, for example $\frac{1}{2}$ Angus/ $\frac{1}{2}$ Limousin sires, the ability to accurately evaluate the genetic merit of these animals is important in making sure that these genetics are applied properly in the commercial industry. As well, the new evaluation gives the potential to accurately capture many useful traits from other breeds. For example, a highly proven AI sire of another breed may be used to add marbling into a Limousin seedstock line. The multi-breed evaluation provides a tool to accurately assess the relative merit of the offspring from this sire. Currently hybrid seedstock are much more prevalent in the United States, however there is growing interest in Canada.

As well, the MBE incorporates EPD information from Angus and Red Angus animals as calculated by their respective breed associations. In other words, Angus and Red Angus sires being used in Limousin herds enter the Limousin evaluation with substantial information in place about their genetic merit. The MBE also accounts for heterosis, or hybrid vigour expressed by calves of any breed combination, or by the dam of the calf. For example a hybrid dam may express more milk production and thus improve the performance of her calf. By accounting for, and removing the impacts of this heterosis, the EPDs reflect the true genetic merit of the individual.

As well, the Multi-Breed Evaluation, provides a tool to begin looking at Limousin genetics in the commercial beef industry and accurately identify which animals are best suited to specific production systems. Not only does this add value to the commercial producer by allowing them to use the appropriate genetics, it also adds value to a broader range of Limousin genetics as different types of animals are better suited to each production system. This could be compared to using a monkey wrench to pound nails. While the wrench may work, if we can find the right "genetic hammer" to use we will be much further ahead. Of course, customer support by the breeder, and the use of other tools such as visual appraisal will also come into play.

For most Limousin animals, little difference will be seen in the published EPDs. There may be some large differences in those animals that are a lower percentage Limousin blood, as we are now able to include much more information from their ancestry in the evaluation.

There are basically two keys to the successful participation in genetic evaluation from a breeder perspective. The first is submitting complete data. Sending information on only a portion of the cowherd can seriously impact results within a herd. For example, if a breeder reports only the top ½ of their calf crop, it is not possible to know from the information given that they are the top ½ (there is no bottom ½ reported). Thus the cattle in the top ½ of the herd are now the top and bottom half of the herd. This discounts those animals that should appear as superior. The second area of extreme importance is to accurately identify management groups. Calves that are managed together (example: in the same pasture) should be grouped together. Calves that are treated differently (example: show string calves) should not be grouped together.

These are the two biggest causes of error in genetic evaluation. Accurate, whole herd records will result in useful and accurate genetic evaluation results.