



Shorthorn Sale Catalogue 2001

Why use EBVs instead of raw records?

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The importance of genetics to beef producers

The reason you buy a bull is to get calves. And hopefully the calves make you money. An important component of a calf's performance is the genes it receives from its parents, half from the sire and half from the dam. The genes are the blueprint for future performance.

When buying the bull his **true value** is the genes that he carries for economically important traits, and you would like to know as much about them as possible. However, currently this is not possible (this may change in the future with advances in molecular genetics). Fortunately, we can **estimate** the effect of his genes, using performance data from various sources, to calculate estimated breeding values (EBVs). EBVs are the best tool available for cattle producers to determine the genetic differences between animals, both bulls and cows.

Genetics and the environment

Having set the blueprint (genetics) for an animal, its actual performance (for example, its weaning weight) will be a combination of the genes it receives from its parents and the environment it is raised in. The environment includes effects such as: amount and quality of feed, heat, humidity, disease, parasites, management.

The simple formula is:

$$\text{performance} = \text{genes} + \text{environment}$$

When comparing prospective purchases we want to determine which bull is going to produce better progeny (for example heavier steers). The genes those bulls carry for weight is the important thing NOT their own weight. This is because differences in their actual weight could simply be the result of differences in the feeding history of the bulls. As an example, one bull may be 200kg lighter but has been pasture reared compared to the other that has been grain fed. Differences in weight also arise simply because of differences in age. **When looking at a bull, what you see is NOT always what you get in his progeny!** This is especially the case at multi-vendor sales where bulls have been prepared by different methods. It is also the case when comparing bulls across sales. EBVs are the only reliable basis for making comparisons across groups.

Is this the case with marbling scans?

Absolutely!

The raw ultrasound marbling scan record on an animal is the result of genes and the rearing environment. The bull with the highest marbling scan may not be the bull that produces the highest marbling progeny. To determine differences in expected progeny marbling, the raw scan data needs to be used to compute an intramuscular fat EBV.

Can EBVs change?

Yes!

Remember, EBVs are estimates, and they can change as more data are added. The more data, the more accurate the EBV, and the less

likely they are to change. The accuracy figure (printed with the EBVs) is a percentage between 1-100. The higher the number the more accurate the EBV. However, you should make selections on the EBVs not the accuracies. Even at low accuracies the EBVs are the best piece of information on an animal regarding its genes.

Can EBVs predict the actual progeny performance?

No!

The EBVs can only be used to determine differences in expected performance of progeny of two bulls (or cows). This is because as stated earlier, the expected future performance will be the result of the genes and also the future environment. We can't predict what the "environment" will be next year! This includes the type and age of cows they are mated to. So what can we do? The EBVs provide an estimate of the expected difference in the progeny of two bulls; the actual performance will also depend on mother nature and your management inputs.

Should you select on just one EBV?

No!

Many traits in beef production affect profit. EBVs exist for many traits, including those associated with growth, carcass and fertility (and others are being developed). A successful breeding program will consider all traits that affect profit in their operation and then ensure a correct emphasis is placed on the necessary EBVs. This can be a somewhat difficult task but it has been made simpler with the advent of \$EBVs. In brief, an economic analysis is done for a commercial producer (or breed standard cases exist). The results are used to set the breeding direction and then the various EBVs on bulls (and cows) are combined into a single \$EBV for profit. This allows potential purchase stock (and even AI bulls) to be compared on a single EBV figure.

Do we need EBVs or visual selection?

Both!

EBVs

- best indicators of animals genetic capacity
- calculated only for traits under genetic control
- calculated using all available information to form the estimate (pedigrees, individual performance, relatives, and related traits)
- the calculation of EBVs allows for environmental differences (accounts for the environmental part of the performance record)
- comparisons can be made across herds, years, ages, and paddock groups
- EBVs can be calculated for traits you cannot always see eg marbling
- EBVs can be used by the seedstock breeder to breed better cattle (make genetic progress)
- EBVs can be used by the commercial producer to buy better bulls

Visual assessment

- essential to assess physical and structural soundness
- reasonable indicator of current health
- indicator of temperament

So when choosing bulls, you need to use both the EBVs and visual assessment. Firstly, use the EBVs to narrow down potential purchases. This can be done weeks before the sale when you have plenty of time to work it through. Once you have a list of suitable bulls, spend time looking at those bulls to check that they have the appropriate physical characteristics that you require.

