



technical brief

Breedplan and the Bull Buyer

Bob Freer

Bull buying decisions are generally based on differences that are observed, or may be measured, between the bulls being compared.

Better fed bulls will generally look better than lesser fed bulls – but they may not breed as well. Differences in feeding are not passed onto the progeny, only differences in the animal's genetics are.

If you are to buy bulls to fit your herds breeding objective, you need to remove the influence of non-genetic differences from what you see, otherwise your judgement may be biased towards bulls that are better fed, rather than better bred.

Removing non-genetic influences can be done by Breedplan, a genetic evaluation program that, by adjusting for known non-genetic influences, allows you to directly compare bulls on the basis of their genetic merit for 17 commercially important traits regardless of differences in the background environment or age of the bulls being compared.

The difference in performance between a bull and the breed benchmark is given as an **Estimated Breeding Value (EBV)** and are reported in units of measurement, eg, kg of weight, mm of fat depth.

EBVs can be above (+) or below (-) the breed benchmark.

EBVs are calculated from performance information on the animal, its parents, progeny and its close relatives within the breed. This information is adjusted for differences in age of animal, age of dam, & for differences between herds, years, season of calving, management effects & for mating and selection biases. The heritability of the trait is also taken into account.

EBVs are “breed specific – you cannot compare the EBVs for Shorthorn bulls with the EBVs of bulls from another breed.

EBVs help bull buyers because they ...

- take into account performance of a bull's relatives, eg ;sire, dam, half-sibs and progeny (if available), as well as its own performance record.
- use industry standard language that means the same where ever you are.
- allow you to compare bulls on the basis of how they will breed, rather than how well they have been fed.
- can be used to estimate the performance of progeny, and the outcome of bull buying decisions
- are particularly useful to identify differences for "hard to see" traits such as milking ability, marbling & birth weight.

EBVs can be used to compare bulls in several ways...

(i) **to the breed percentile** – this tells you whether the bull is in the top 10%, 20% etc of the breed for a particular trait. Percentile tables are available on this website.

(ii) **directly with other bulls**, even from different herds or backgrounds., based on the estimated difference in performance of their progeny.

The progeny advantage of one bull compared to another is *half* the difference between their EBVs for the particular trait.

Example... two sires differ in their EBV for 600 day weight by 20kg.

Breedplan estimates that the progeny of the higher EBV sire will, on average, be 10kg heavier at 600 days of age than the progeny of the lower EBV bull, other things being equal.

(iii) **to the current breed average**. This reflects the average of the breed today rather than against the fixed benchmark set some years ago. It is updated each year.

The current average is published each year in the breed's Sire Summary, and is available on this website.

Don't forget -. not all of the traits that we need to consider when buying bulls are evaluated by Breedplan and a common sense approach is required.

Before making your selection using EBVs, exclude bulls that are unsound, have poor temperament, or the wrong muscling or maturity pattern for your particular market, and - keep a balance between growth, maternal & carcass traits.

Selection Indexes help you balance selection emphasis across a number of traits. *See page 3 for more on Selection Indexes.*

What do EBVs tell me about a bull ?

Birth Weight (B Wt– kg) - estimates differences between animals for birth weight. The lower the birth weight EBV of a sire, the lower is the birth weight potential of his progeny.

Milk (kg) estimates an animals maternal effect on the 200 day weight of progeny. For bulls, the EBV estimates how much the weight of his daughters calves at weaning is influenced by the sire's genetic contribution to his daughter's milking and mothering ability.

The higher the Milk EBV, the better milkers the bull's daughters will be...if you are selecting a terminal sire (that is, not retaining replacement heifers), the milk EBV is not relevant for your breeding objective and you can concentrate on the best growth/carcass bulls.

200 Day Wt (kg) estimates differences between animals in live weight at 200 days due to the effect of growth genes. For most markets you are better to select for 400 or 600 day weight EBVs as you want growth beyond weaning.

400 Day Wt.(kg) estimates genetic differences between animals in live weight at 400 days of age. Place emphasis on this EBV if you are producing steers destined for the domestic and/or yearling steer market.

600 Day Wt.(kg) estimates differences in live weight at 600 days of age. Place emphasis on this EBV if you are breeding for the heavy weight markets or want to extend the growth potential of progeny.

Carcase Wt (CW- kg) estimates genetic differences between animals for Hot Standard Carcass Weight at 650 days of age.

Eye Muscle Area (EMA – sq cm) estimates differences in EMA at the 12/13th rib in a 300kg steer carcass. Bulls with higher positive (+) EBVs can be expected to produce progeny with a relatively larger eye muscle area than the progeny of bulls having lower or minus (-) EBVs.

Better muscled steers are higher yielding than lighter muscled steers at the same weight.

Fat Depth (Rib/P8 – mm)– estimates genetic differences in fat depth at the 12/13th rib or the P8 site in a 300kg steer carcass. Bulls with positive (+) EBVs can be expected to produce progeny that will be relatively fatter at 300kg carcass wt than will progeny of bulls with minus (-) EBVs.

Carcass Yield (RBY%) – estimates genetic differences in % retail beef yield in a 300kg steer carcass. Bulls with positive EBVs for RBY% can be expected to produce progeny that are higher yielding @ 300 kg HSCW than progeny from negative sires. Selection for this trait needs to be balanced with other growth and fertility traits.

Intra-muscular Fat % (IMF%) – estimates genetic differences in intra-muscular fat (marbling) at the 12/13th rib in a 300kg steer carcass. Selection of bulls with higher, positive EBVs for IMF will improve marbling performance of their progeny compared to bulls with lower IMF% EBVs.

Scrotal Size (SS – cm) estimates genetic differences in scrotal size (scrotal circumference). Bulls with higher positive (+) EBVs for Scrotal Size are expected to produce male progeny that are relatively more fertile and produce both male & female progeny that reach puberty at an earlier age.

Calving Ease (CE - %) estimates the genetic difference in calving ease (% unassisted calves from 2 year old heifers) - more positive EBVs indicate easier calving. **CE-DIR** indicates the relative ease by which a sire's calves are born ex 2 yr old heifers, whilst **CE-DTRS** indicates how easily his daughters will calve as 2yr olds.

Gestation Length (GL – days)) estimates genetic differences in the number of days from the date of conception to calving. Shorter GL is generally associated with lighter birth weight, easier calving and improved rebreeding performance of dams.

What does ACCURACY of an EBV mean ?

An EBV is an *estimate* of the bull's genetic merit, calculated by Breedplan from the information that is available about the bull and its relatives at the time of the analysis.

The estimate is recalculated as further information becomes available that more accurately reflects the bull's true breeding value (eg; progeny information). Recalculation using this additional information can cause the EBV to change from the original estimate.

Accuracy ratings reflect the stability of the EBV to possible change, given the amount of performance information available to calculate it. The accuracy is reported as a percentage (%), ranging from 0 - 99, and is generally printed in *italics* below the EBV in sale catalogues.

Because rising 2 year old sale bulls don't yet have progeny recorded, the accuracy of their EBVs is lower (40% to 75%) than for progeny proven bulls (75% to 99%). This means that their EBVs are less stable and could change when progeny information becomes available. Even though the EBV for a trait may change, the relative ranking of the bull remains fairly stable.

Even at the relatively lower levels of accuracy associated with young bulls, EBVs are still the best available estimate of a bull's genetic potential.

Shorthorn Selection Indexes

Selection Indexes take the hard work out of knowing how much emphasis to give to each of the growth, fertility, maternal and carcass EBVs when selecting a commercial herd sire.

An index is in fact a **multi-trait EBV** that estimates the combined value of an animal's traits to your chosen market goal - reflecting the earning capacity of a sire per cow joined in a self-replacing commercial herd.

They focus on what drives profit in a commercial herd, (for example; calving ease, weaning rate, sale weight, yield and maintenance cost, plus marbling in some markets), the relative economic importance of those traits, and the best weighting of Breedplan EBVs to give optimum long-term profit outcome for the whole herd.

Indexes are reported as an EBV, in units of relative earning capacity (\$'s), per cow joined, for a given market, reflecting both the short-term profit generated by a sire through the sale of his progeny, and the longer term profit generated by his daughters in a sustainable cow herd.

Animals can be compared using selection index values in the same manner as comparing them using EBVs for single traits, but instead of considering all the traits, you can use the index value to screen or select animals on their combined trait impact on the long-term profitability of your herd.

Individual trait EBVs can then be used to fine tune your selection within the bounds of acceptable performance for your herd, eg., you might screen out bulls that have a birth weight EBV higher than what you are comfortable with for your herd.

Importantly, indexes take into account conflict between traits, for example; if you select for growth rate (which increases profit potential) you will also increase birth weight, which will increase the risk of calving difficulty which will be a cost). Indexes apply a discount for these conflicts to give you a net profit figure derived from both the positive and negative association across all traits.

Shorthorn selection indexes are available for the following markets.

Domestic Supermarket index – targets a self-replacing herd in a temperate environment, producing pasture grown and finished steers with a 475kg turn-off at 17 months of age, with no emphasis on marbling. Calving ease is given strong emphasis in this index.

Domestic Restaurant Index – targets a self-replacing herd in a temperate environment, producing pasture grown and finished steers, turn-off weight of 475kg at 17 months of age, with a slight emphasis on marbling to assist MSA grading. As there is less emphasis for calving ease than the Supermarket index, it is more suitable for selecting sires to go over mature cows. If selecting sires for use on heifers using this index, a suitable cut-off for birth weight should be applied.

Export Maternal Index – targets a self-replacing herd in a temperate environment, producing feeder steers destined for the Japanese B3 export market. (pasture grown to approximately 400kg live weight then 220 day long-fed to 650kg LW at 25mm fat depth). This index has a medium emphasis on calving ease and a strong emphasis on marbling.

Shorthorn SB3 Carcass index – This index concentrates on traits of importance for the production of mid-fed Japanese export steers. The SB3 index is well suited for the selection of terminal sires - considered in isolation this index ignores some important considerations for female performance.

Using Shorthorn selection indexes.

1 – select the index that best fits your marketing objective.

2 – list bulls under consideration on the basis of the index you have chosen.

3 – screen out bulls that do not meet your requirements for structural soundness, temperament or maturity type.

4 – screen out bulls that are above your thresh-hold values for a particular trait, for example; birth weight.

You now have a list of bulls that are ranked for differences in estimated earning capacity, per cow joined, for your enterprise.

Note - Not all sale bulls will have selection indexes available. Selection indexes are only reported where appropriate traits have been recorded