Each time a beef producer attends a bull sale, they will inevitably be supplied with a catalogue containing a range of information regarding the lots on offer. Catalogues not only vary considerably in shape and size but also in terms of the information contained within them, ranging from basic pedigree and performance information through to comprehensive sets of BREEDPLAN estimated breeding values (EBVs), selection index values, structural soundness assessments and gene marker results. While this information can be overwhelming, understanding and using the sale catalogue correctly provides buyers with the opportunity to have confidence they are purchasing the best possible bull for their operation.

This article aims to concentrate on the correct interpretation and use of the BREEDPLAN EBV and selection index information contained within bull sale catalogues.

What is an EBV?

While it is not possible to determine a sale animal’s true genetic merit, it is possible to try and estimate it from the pedigree and performance information recorded by stud breeders for the animal and its relatives. EBVs are just that — estimated breeding values.

EBVs are reported in the units in which the measurements are taken (for example, kilograms for weight EBVs) and are expressed as the difference between an individual animal’s genetic merit and a genetic benchmark to which the animal is compared. This benchmark can roughly be described as a historical genetic level for that particular breed of animal. As such, a 600-day weight EBV of +41 means the animal is genetically superior by 41kg at 600 days compared with the historical genetic benchmark of the relevant cattle population.

The historical genetic benchmark for each breed will be different, so only EBVs for animals within a particular breed can be directly compared.
Available EBVs

EBVs are now produced by BREEDPLAN for 18 economically important traits. These traits currently include weight, fertility, carcass and other traits (see Table 1).

There are also trial EBVs being produced in some breeds for net feed intake (two EBVs), tenderness, structural soundness (six EBVs) and flight time.

A full set of 18 EBVs is unlikely to be available on each sale animal, particularly sale animals less than 24 months of age. Where a particular EBV is not available, it is most likely that adequate information has not been recorded on either that animal or its relatives for the trait for BREEDPLAN to calculate an EBV.

When looking at EBVs in a sale catalogue, it is of utmost importance that bull buyers understand exactly what each different EBV is describing.

For EBVs such as 600-day weight this can be quite simple (growth to 600 days), but for some EBVs such as days to calving, this may not be so clear.

Comparing averages

The first step when interpreting an EBV in a sale catalogue is to compare it to the current breed average EBV (the current genetic level for the breed). This will give you an indication of how the animal compares with other animals within that breed for each particular trait.

A set of breed average EBVs should be included in the explanatory notes with each sale catalogue and could look similar to Table 2.

If we consider a sale animal with a 600-day weight EBV of +41, comparison to the above example breed average 600-day weight EBV of +30 indicates the animal is genetically superior to the current genetic level of the breed for growth to 600 days. Taking this further, it can be calculated that the animal is actually 11kg (41-30) genetically heavier at 600 days compared with the current genetic level of the breed.

Comparing percentile bands

Comparison with the breed average EBVs can be taken further by comparing the animal’s EBVs to the percentile bands table to assess exactly where the animal ranks within the breed for each trait.

As with the breed average EBVs, a percentile bands table should be enclosed in the explanatory notes of all sale catalogues and may look similar to Table 3.

If we consider the sale animal in the above example with a 600-day weight EBV of +41, comparison with the percentile bands table indicates the animal is in fact ranked in the top 20% of the breed for 600-day weight (see circled information Table 3).

Comparing sire EBVs

In the previous example, we have determined the sale animal is ranked in the top 20% of the breed for 600-day weight. But what does that mean in real terms? EBVs can also be used to predict the difference in output that will be observed if two different sale bulls are purchased for a herd.

To demonstrate this, let’s compare animals. The first bull has a 600-day weight EBV of +41, while the second bull has a 600-day weight EBV of +30 (breed average). Comparing these animals shows a difference in 600-day weight EBV of 11kg. As these bulls will only contribute to half of the genetic makeup of their progeny (the other half coming from the dam), only half of this difference in EBV will be passed on to their progeny.

It can be estimated that calves from the first sale bull would be on average 5.5kg heavier at 600-days than those from the second bull, if they were joined to the same cows. Extending this to a single year’s drop of 50 calves, this difference equates to a potential production difference of 275kg in liveweight by the time the calves reach 600 days of age.

Considering accuracy

When evaluating any EBV in a sale catalogue, it is also important to consider the EBV ‘accuracy’. By definition, an EBV is an estimate of an animal’s true genetic merit. To provide cattle producers with a measure of the reliability of the estimate, BREEDPLAN produces an accuracy figure with each EBV. The accuracy provides a measure of the stability of the EBV and indicates the amount of information that has been used in the calculation of that EBV.

When considering EBV accuracy values in a sale catalogue, the following guide may be useful:

Less than 50% accuracy — the EBVs are preliminary. EBVs in this range will have been calculated based on little information. These EBVs could change substantially as more direct performance information becomes available on the animal.

A 50–74% accuracy — the EBVs are of medium accuracy. EBVs in this range will usually have been calculated based on the animal’s own performance and some limited pedigree information. EBVs of this accuracy are typical of EBVs on sale animals and can be used with confidence.
A 75–90% accuracy — the EBVs are of medium-to-high accuracy, EBVs in this range will usually have been calculated based on the animal’s own performance coupled with the performance for a small number of progeny. More than 90% accuracy — the EBVs are a high accuracy estimate of the animal’s true breeding value. It is unlikely that EBVs will change considerably with addition of more progeny data.

EBV accuracy values are particularly important at multi-vendor sales as vastly different amounts of performance information may have been recorded on animals from different studs.

But, while buyers need to consider the accuracy of an EBV it is still important to compare animals’ EBVs regardless of accuracy. Where two animals have the same EBV however, the animal with the higher accuracy would normally be used more heavily than the bull with the lower accuracy as the results can be predicted with more confidence.

Selection index values

In addition to BREEDPLAN EBVs, a range of selection index values can also be presented in sale catalogues for each individual lot. These are often titled $Indexes or BreedObject Indexes. Selection indexes simplify the selection of sale animals using EBVs.

Selection indexes combine the BREEDPLAN EBVs for an animal with an economic weighting (based on costs of production and returns on outputs for a particular production scenario), to produce a single value of an animal’s genetic potential for a given commercial production scenario and market. Selection indexes enable buyers to make balanced selection decisions, taking into account the relevant growth, carcass and fertility attributes of each animal to identify the sale animal that will be most profitable for their particular commercial enterprise.

Interpreting selection indexes

Selection indexes are expressed as ‘net profit per cow mated’ for a defined commercial production scenario and market. For example, comparing a bull with an index of +$60 with a bull with an index of +$30, allows a buyer to estimate the difference in net profit from the progeny of the bulls would be $15 per cow mated (60-30 x ½) in that particular commercial production scenario and market. If the two bulls were joined to the same 200 cows during their breeding life, this would equate to a difference of (200 x $15) = $3000.

Using selection indexes

As a guide to using selection indexes to select animals in a sale catalogue, bull buyers can complete the following steps:

- Identify which is the most relevant selection index.
- Rank animals on the selection index.
- Consider which individual EBVs is of most importance.

Tailor the relevance

Given a selection index provides a single value of an animal’s genetic value for a particular commercial production scenario and market, producers need to firstly identify the index of most relevance to their production system and market.

To identify the most relevant index:

- Consider the description of the selection index.
- Take into account the main profit drivers within the production system that the selection index is describing.
- Evaluate the relative emphases that are being put on each EBV within the selection index.

This process is critical — using the wrong selection index will potentially compromise any subsequent selection production decisions.

Ranking animals by index

When the selection index of most relevance has been identified, the values available on each animal in the sale catalogue can be interpreted and used in a similar manner to the BREEDPLAN EBVs. Effectively, selection indexes can be considered an ‘EBV for profit’.

Selection indexes can firstly be used to rank and compare the expected difference in profitability between the progeny of the different sale animals. Secondly they can be used to evaluate where an animal ranks for profitability in that particular commercial production scenario and market compared with other animals of the same breed. This can be done by comparing an animal’s selection index value to the current breed average value, and to the percentile table.

EBVs still matter

While selection indexes combine all the available EBV information to provide an indication of an animal’s overall genetic merit, it is still important to pay attention to the animal’s individual EBVs for traits of particular importance.

For example, cattle producers may pay attention to:

- Milk EBVs if they are looking to turn some calves off as vealers.
- IMF EBVs if they are want to specifically improve the marbling in their herd.

In order to make optimal use of selection index values and BREEDPLAN EBVs, set maximum/minimum EBV ranges for the individual traits of particular importance. Rank animals firstly on the selection index of relevance, but then exclude any animals whose individual EBVs fall outside the acceptable range.

For example, in the situation stated above where a bull is being selected for use over heifers, the sale animals can be ranked on a particular selection index but then any animal with a calving ease direct EBV below a certain level be excluded from selection. If calving ease direct EBVs are not available, then excluding animals with a birth weight EBV above a certain level might be a suitable alternative.

When producers understand clearly the information contained within bulk sale catalogues they can combine this information with visual assessment for other traits of importance that may not be accounted for in the EBVs (for example, structural soundness and temperament). This approach will ensure buyers make optimal use of the information contained in the sale catalogue and make an informed bull purchasing decision.

MORE INFORMATION

Descriptions of each EBV and the different selection indexes should be included in the explanatory notes included in each sale catalogue, or alternatively a full explanation is available from the Tip sheets page within the Technical area of the BREEDPLAN website (breedplan.une.edu.au).

A copy of the breed average selection indexes and percentile table should be available in the explanatory notes on each sale catalogue, or alternatively a copy can be accessed from the Breed specific documents link in the Technical area of the BREEDPLAN website (breedplan.une.edu.au).

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