

Interpreting the BREEDPLAN Herd Report



1. INTRODUCTION

The EBVs contained in the report have been calculated by the Agricultural Business Research Institute (ABRI) using the BREEDPLAN genetic evaluation system. This system utilises Best Linear Unbiased Prediction (BLUP) methodology on a full animal, multi-trait model in which all animals, their relatives and ancestors are analysed with their performance information at the same time. Known genetic and non-genetic relationships (correlations) between the various birth, growth, carcass and fertility traits are accounted for within the analysis.

The Animal Genetics and Breeding Unit (AGBU) derived the genetic and phenotypic parameters used for this analysis from selected industry and research databases, together with careful assessment of literature results.

2. THE EBVs

An Estimated Breeding Value (EBV) is an estimate of an animal's true breeding value, or genetic merit. EBVs do not necessarily reflect the animal's observed performance, as observed information is a combination of both genetic and environmental (non-genetic) influences. EBVs are an estimate of the genetic component of the animal's performance.

EBVs allow for comparison of animals born in different years and seasons because they adjust for known environmental differences, such as age of animal, age of dam, birth type, rearing type and nutrition, and adjust for known genetic differences, such as preferential joining and unequal representation between contemporary groups. Whilst EBVs provide the best basis for comparison of the relative genetic merit of animals reared under different environments and management conditions, they can only be used to compare animals analysed within the same evaluation.

EBVs consider all available information including:

- an animal's own performance,
- the relationship between different traits,
- the relationship between animals, and
- the performance of **all animals** in the database across all years of recording.

For across herd comparisons, a full data set is needed. The more information that is available, the more accurate will be the EBVs. BREEDPLAN requires the whole progeny drop and full pedigree information to provide the best and most valid comparisons.

As EBVs incorporate genetic information from all relatives, it is crucial that the pedigree records of animals are accurate. Therefore, please check the pedigree details of animals listed in the reports and if you have any concerns contact BREEDPLAN staff. Similarly, if you have any concerns over missing performance for animals, please contact BREEDPLAN staff.

BREEDPLAN EBVs can be provided for a number of economically important traits. The number of traits analysed and reported will be dependent upon the quantity and quality of data recorded for each trait.

EBVs are expressed as the differences between an animal's genetics and the genetic base to which the animal is compared. The absolute value of any EBV is not critical but rather the difference in EBVs between animals. EBVs are usually reported in the units in which the measurements are taken (e.g. kilograms for the weight EBVs).

More information on the [traits analysed](#) by BREEDPLAN and how to interpret specific EBVs is available from the [Help Centre](#) on the BREEDPLAN website.

3. ACCURACY

By definition, an EBV is an estimate of an animal's true breeding value and therefore it may change with the addition of more pedigree and performance information. An accuracy value is presented with every EBV. The *accuracy* provides a measure of the stability of the EBV and gives an indication of the amount of information that has been used in the calculation of that EBV. The higher the accuracy the lower the likelihood of changes in the animal's EBV as more information is analysed for that animal, its progeny or its relatives.

BREEDPLAN uses all available information to calculate EBVs and calculates EBVs of related (correlated) traits via indirect observations e.g. the EBVs for carcase traits are usually estimated from live animal scanning measurements. These correlated estimates will have lower accuracy than when estimates come from direct observations.

Accuracy cannot account for breeder-influenced data quality issues, such as how well management groups are defined.

The following guide may be useful for interpreting accuracy:

Accuracy range	Interpretation
Less than 50%	EBVs are preliminary and could change substantially as more performance information becomes available.
50 - 74%	Medium accuracy, usually based on the animal's own records and pedigree.
75 - 90%	Medium-high accuracy. Some progeny information included.
More than 90%	High accuracy estimate of the animal's true breeding value. It is unlikely that EBVs will change much with addition of more progeny data.

EBVs with less than 20% accuracy will not be reported.

It is important to keep accuracy in perspective. Accuracy and genetic merit are not the same things. It is possible for animals to have very low EBVs, but for these EBVs to be highly accurate. Conversely, animals may have high EBVs with low accuracy.

Animals should be compared on EBVs regardless of accuracy. However, where two animals have the same EBV, the animal with the higher accuracy would normally be used more heavily than the animal with the lower accuracy because the results are more predictable.

More [information on accuracy](#) is available from the BREEDPLAN website.

4. BREEDPLAN LINKAGE

Fundamental to the concept of BREEDPLAN analyses is the ability to compare the performance of animals in different herds. This is what is described as linkage (or connectivity) between herds. To compare the performance of animals in different herds there must be genetic linkage between the herds. That is, the herds must have some performance recorded progeny which are genetically related.

It is extremely important that herds have adequate linkage if they are to get the full benefit of being included in a BREEDPLAN analysis. It is also important to note that the EBVs of animals from herds with low genetic linkage may change as the linkage improves in the future.

5. REPORTABILITY OF EBVs

The BREEDPLAN genetic evaluation is a multi-trait analysis. That is, all animals that are included in the analysis have all traits analysed and all EBVs calculated. However, EBVs must meet certain criteria before they are released to breeders and the commercial industry.

In general, EBVs are reportable if the accuracy level is above a single minimum value. The minimum accuracy requirement is the same for all traits and for all animals. In general, traits will be reported if the animals have performance analysed for that particular trait.

The reportability criteria are in place to ensure the integrity of the EBVs that are available. The reportability criteria ensures that the EBVs are only available if a sufficient amount of information has been recorded on the animal or its relatives.

One trait that causes concern relating to the EBV not reporting is 200-Day Milk. Until a sire has daughters in production (i.e. with performance-recorded calves), his Milk EBV is determined from the EBVs of his parents. The accuracy of a Milk EBV that is based strictly upon pedigree information is low and therefore some young sires will not have Milk EBV reporting until their daughters are brought into production.

6. VISUAL APPRAISAL

Although EBVs provide an estimate of an animal's genetic merit for a range of production traits, they do not provide information for all of the traits that must be considered during selection of **functional** animals. In all situations, EBVs should be used in conjunction with visual assessment for other traits of importance (structural soundness, temperament, fertility etc).

The recommended practice is to firstly select a shortlist of replacement breeding stock based on EBVs and then select from this group via a visual appraisal to ensure that the final selections are physically fit for purpose.

7. REPORT LAYOUT

Each Herd Report is made up of several sections. The first is the **Sire Report**, next is the **Dam Report** and finally the **Calf Reports** (heifers, steers and bulls). Calves (i.e. non-parents) are usually included in the report if they are active and born in the last 2 years. The sires and dams of these calves are also reported. The reports are usually sorted in Calving Year, Herd and Drop number order.

In the Sire and Dam reports there are several additional statistics reported for each animal. The counts of progeny analysed are calculated from all herds in the respective BREEDPLAN analysis (and so may include progeny recorded in other herds).

In the Calf reports, there is a listing of the traits that have been analysed for each calf in the BREEDPLAN analysis (labelled as Trait Indicators see example). If the calf has one observation for a trait then the relevant letter or number will be printed. A blank indicates that the calf was not analysed for this trait.

The codes to the right are used in the Trait Indicators table.

Sorted by: Calving Year, Herd & Drop No.

Animal Ident	Sire Ident	Dam Ident	Date of Birth	Trait Indicators
ABC Q123	ABC G456	ABC N789	01/01/2019	GB246TSU C D
EXAMPLE BREEDPLAN CALF Q123				GB246..U . .

TRAIT INDICATOR DESCRIPTIONS

G	-	Gestation length
B	-	Birth weight
2	-	200 day weight
4	-	400 day weight
6	-	600 day weight
T	-	Temperament
S	-	Scrotal circumference
U	-	Ultrasound scan
C	-	Abattoir carcass
D	-	DNA

The **current breed average EBVs** are presented at the bottom of each page in the animal reports and are a very useful benchmark that approximates the current genetic level for the herds represented in the analysis. The average EBVs can be used to help assess the relative ranking of animals for the various traits.

There are a number of **Trend Reports** included at the back of the Herd Report. First the Trend reports for the relevant herd are reported and then the Genetic Trend reports for the breed overall. **The Trend reports can be used to see how the herd has performed over the years compared to the breed average.**

The **Genetic Trend** reports for the herd show the average EBVs for each trait for animals born in the herd in the nominated year. The **Phenotypic Trend** reports show the average adjusted performance for each trait of all calves (by sex) born in the herd in the nominated year.

The **Genetic Trend** reports for the breed show the average EBVs for each trait for animals born in the nominated year. Also included are graphs of the Genetic Trends for the herd relative to Genetic Trends for the breed overall.

The last page of the Herd Report is the **Percentile Table** listing the percentile bands (for all animals born 2 years prior to the BREEDPLAN run). The Percentile Report provides an indication of the distribution of the EBVs within the two-year-old calves and can be used as

a guide for the ranking of animals on BREEDPLAN EBVs across herds. By referring to this report it is possible to determine where animals rank compared to other animals analysed in the BREEDPLAN analysis.

8. MARKETING WITH BREEDPLAN EBVs

BREEDPLAN EBVs can be used to compare animals from different herds if they are calculated in the same analysis. This means BREEDPLAN EBVs are by far the most logical choice for use in the marketing of stock.

Information regarding the display of BREEDPLAN information in advertisements, sale catalogues or brochures is provided on the [Help Centre](#) on the BREEDPLAN website or by contacting staff at BREEDPLAN.

9. CONTACTS FOR BREEDPLAN

If you have any questions regarding the BREEDPLAN Herd Report, publishing EBVs or interpretation of BREEDPLAN in general, please do not hesitate to contact staff by using the details listed below.

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Acknowledgements and Disclaimer

BREEDPLAN results are calculated using beef cattle genetic evaluation analytical software developed by the Animal Genetics and Breeding Unit (AGBU) and Meat & Livestock Australia Limited (MLA).

Information analysed in BREEDPLAN evaluations, including but not limited to pedigree, performance and DNA information, is based on data supplied by clients and/or third parties. The Agricultural Business Research Institute (ABRI) does not oversee or audit the collection of the data. Whilst every effort is made to ensure the accuracy of the information, the ABRI, AGBU and MLA (and their officers and employees) assume no responsibility for its content, use or interpretation.

Estimated Breeding Values can only be directly compared to other EBVs calculated in the same analysis.

