AUSTRALIAN WAGYU ASSOCIATION™

WAGYU TECHNICAL UPDATE

www.wagyu.org.au

UNDERSTANDING EBV ACCURACY

AN IMPORTANT STEP WHEN MAKING BREEDING SELECTION DECISIONS

An important step when making selection decisions using BREEDPLAN Estimated Breeding Values (EBVs) is the consideration of EBV accuracy. The following information provides a guide to understanding and utilising EBV accuracy and the EBV Accuracy Graph.

WHAT IS EBV ACCURACY AND HOW IS IT REPORTED?

An EBV is an estimate of the animal's genetic merit for a trait based on all the information currently available. The "accuracy" figure in an animal's EBV table gives a confidence assessment of how close the estimate is to the true breeding value for a trait. Accuracy figures are reported as a percentage (%) between 0 – 99. In most cases where an EBV is presented, the accuracy of the EBV will be reported in either the column immediately following or the row beneath the EBV.

The accuracy figure of each EBV is a reflection of the amount and quality of information used in the calculation of that EBV. As more data gets analysed for the animal, its progeny or its relatives, the accuracy will increase and the EBV will change, moving up or down as the estimate approaches the true breeding value.

As the accuracy increases, the likelihood and amount of possible change in the animal's EBV decreases. This means you can have greater confidence that EBVs with high accuracy figures will be a closer estimate of the animal's true breeding value than EBVs with lower accuracy figures.

WAGYU EBV ACCURACY GRAPH

Estimated Breeding Values for traits change as new information, such as genomics or performance data, is added to Wagyu BREEDPLAN by AWA members. More information submitted to BREEDPLAN enables better estimation of the genetic merit of animals. Understanding EBV accuracy allows you to know the maximum likely change that may occur to an animal's EBVs. Within Wagyu BREEDPLAN, this is provided within the EBV Accuracy Graph for every animal.

The EBV Accuracy Graph shows the change (confidence range) that could be expected in an animal's EBVs for each trait at the current accuracy. In statistical terms, the horizontal coloured bar for each trait displays one standard deviation either side of the current EBV value. Based on this statistical definition, there is a 68% likelihood that the true breeding value for this trait will be within the range displayed.

FIGURE 1

The relatively high accuracies of a Sire.

July 2019 Wagyu GROUP BREEDPLAN														
	Gestation Length (days)	Birth Wt (kg)	200 Day Wt (kg)	400 Day Wt (kg)	600 Day Wt (kg)	Mat Cow Wt (kg)	Milk (kg)	Scrotal Size (cm)	Carcase Wt (kg)	Eye Muscle Area (sq cm)	Rump Fat (mm)	Retail Beef Yield (%)	Marble Score	Marble Fineness (%)
EBV	+0.2	+1.5	+11	+16	+9	+13	-2	-0.4	+10	+3.2	+1.6	+0.0	+0.6	+0.17
ACCURACIES	**85%**	**86%**	**93%**	**95%**	**95%**	**79%**	**73%**	**65%**	**96%**	**93%**	**94%**	**76%**	**95%**	**82%**
Breed Avg. EBVs for 2017 Born Calves Click for Percentiles														

INTERPRETING EBV ACCURACY

The following guide is recommended when interpreting accuracy

LESS THAN 50% ACCURACY

EBVs ARE PRELIMINARY

In this accuracy range the EBVs could change substantially as more direct performance information becomes available on the animal

50 - 74% ACCURACY

EBVS ARE MEDIUM ACCURACY

EBVs will usually have been calculated based on the animal's genomic data and/or own performance and some pedigree information

75 - 90% ACCURACY

EBVS ARE MEDIUM-HIGH ACCURACY

EBVs will have usually been calculated based on the animal's genomic data and/or own performance coupled with the performance for a small number of the animal's progeny

MORE THAN 90% ACCURACY

EBVS ARE HIGH ACCURACY

EBVs are an estimate of the animal's true breeding value. It's unlikely that EBVs with this accuracy will change much with addition of more progeny data

Figure 2 shows the possible change a Proven Sire with substantial performance records and higher EBV accuracies compared to the Young Animal with fewer performance records and lower EBV accuracies. The width of the horizontal coloured bars for the Proven Sire is narrower than that of the Young Animal reflecting the higher accuracy of the EBV for the proven sire.

The middle point on the graph is the breed average for each trait and is the number given in light grey text above each horizontal bar. The location of the horizontal coloured bar therefore gives a visual indication of where the expected true breeding value of the animal sits relative to the breed average. The animal's current EBV is the value in the middle of the horizontal coloured bar. The accuracy for each trait is displayed in the far-right column of the graph.

The Proven Sire and Young Animal examples given in Figure 2 both have a Marble Score EBV of +0.6. It is clear the possible change in the Proven Sire's EBV is significantly less that that of the Young Animal. The true breeding value of the Proven Sire is expected to be between +0.3 and +0.9 compared to -0.5 and +1.5 for the Young Animal.

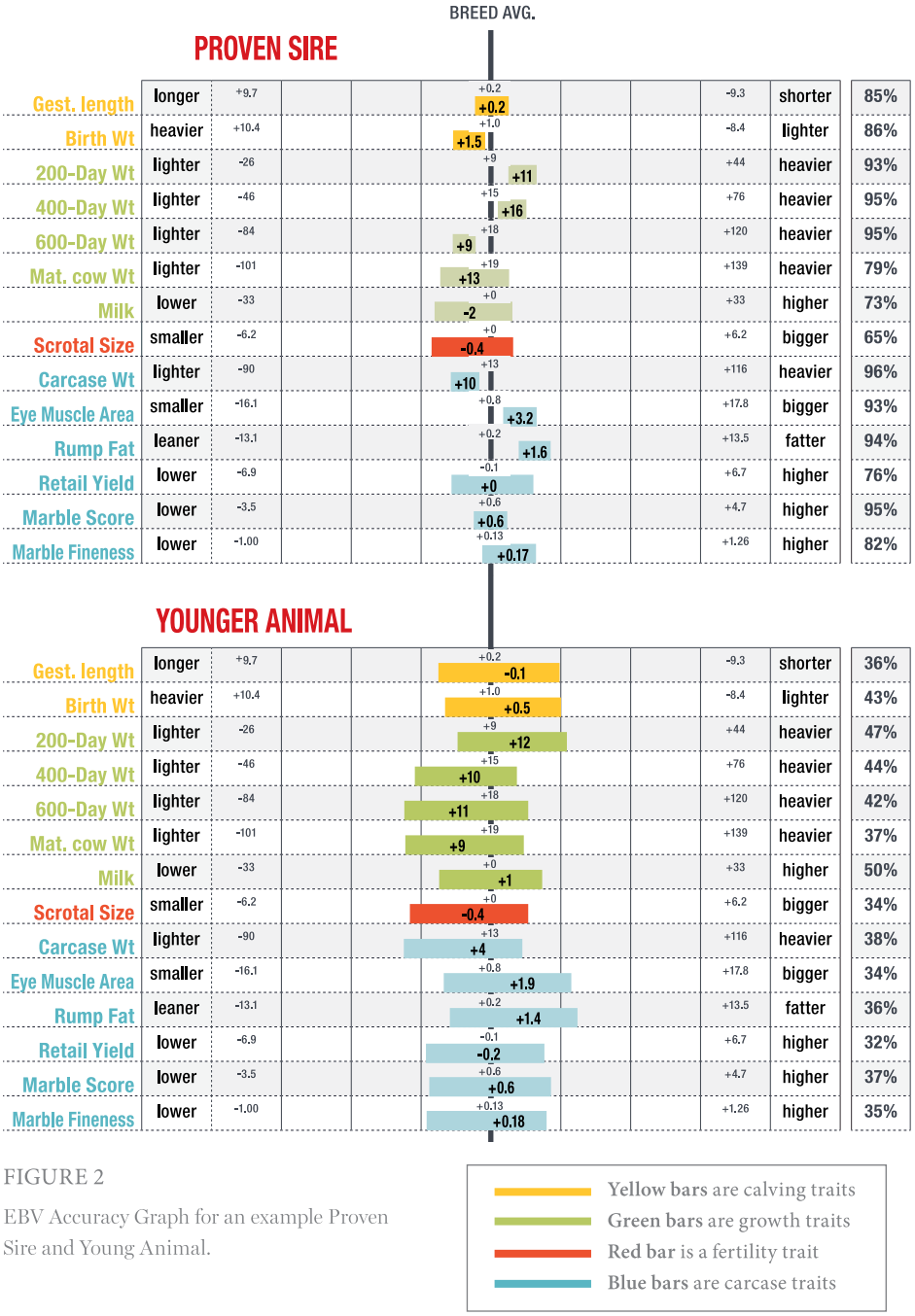

FIGURE 2

EBV Accuracy Graph for an example Proven Sire and Young Animal.

FIGURE 3A

How to find the EBV Accuracy Graph from a BREEDPLAN animal search

FINDING THE EBV ACCURACY GRAPH

Every animal in Wagyu BREEDPLAN where EBVs are given, will have an EBV Accuracy Graph. To find this graph conduct a Wagyu Animal Search and open the Animal Details page. At the bottom of the information field click the "View" Button next to the "EBV Graph" title – as shown in Figure 3a.

The next page that is presented is the EBV Percentile Graph for the animal, which shows how the animal's EBVs compare to the breed average. The link to the EBV Accuracy Graph is below the EBV Percentile Graph – click on 'Switch Graph" – see below example.

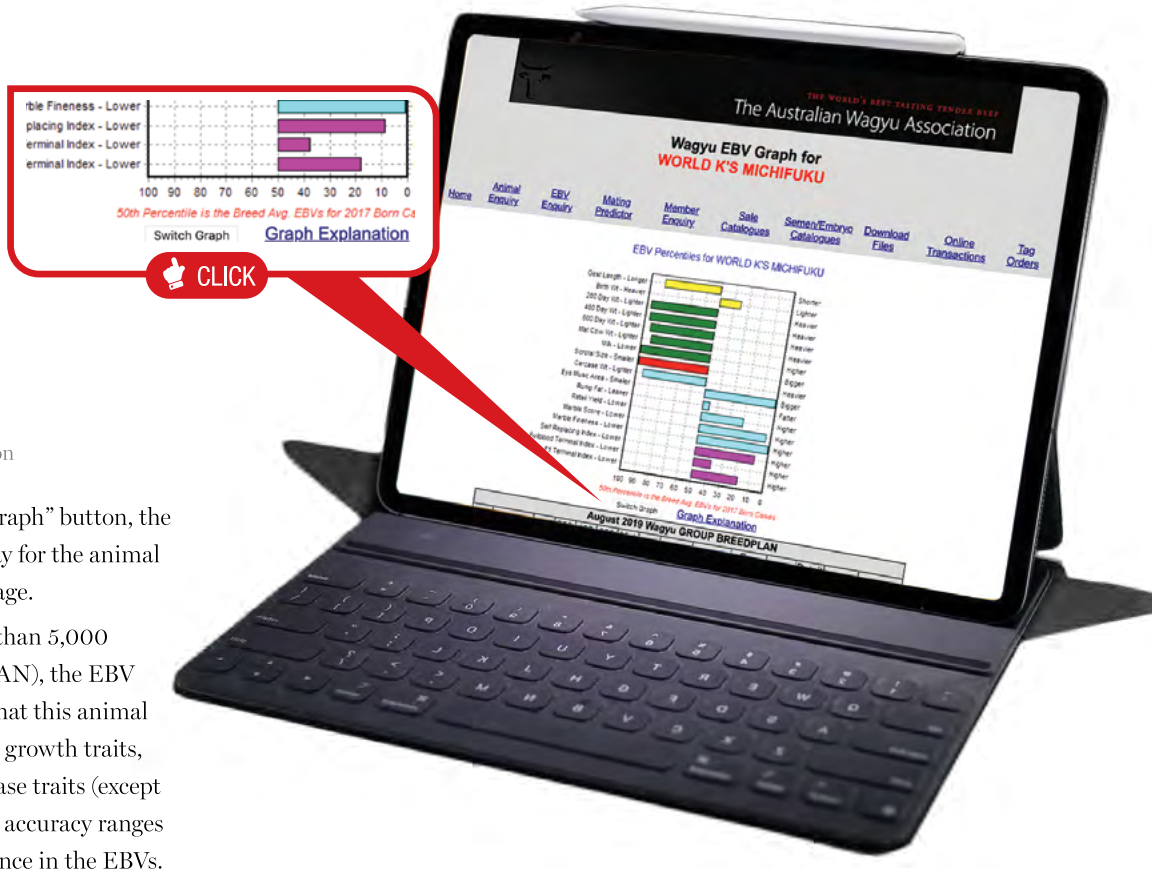

FIGURE 3B

How to find the Switch Graph button

Once you click on the "Switch Graph" button, the EBV Accuracy Graph will display for the animal of interest – see figure 3C overpage.

For this well-known Sire (more than 5,000 progeny recorded in BREEDPLAN), the EBV Accuracy Graph demonstrates that this animal has lower than average EBVs for growth traits, but higher than average for carcase traits (except for carcase weight), with narrow accuracy ranges for all traits, giving high confidence in the EBVs.

FIGURE 3C

Displaying the EBV Accuracy Graph

ACCURACY AND SELECTION DECISIONS

Although the accuracy of an EBV should be considered, animals should generally be compared on EBVs regardless of accuracy as the EBVs are still the best estimate of an animal's breeding value. In the case where animals have similar EBVs, the animal with the higher accuracy might be preferable because the results can be predicted with more confidence and less risk. However, the animal with the lower accuracy may in future – with more data - end up with a higher (or lower) EBV than the high accuracy animal.

If producers prefer to minimise risk, consideration should also be given to:

- Undertaking a higher level of performance recording across a range of traits and managing their seedstock herd to maximise contemporary group size.
- A genomic test (50K SNPs) on breeding animals.
- Sourcing bulls, females and genetics (e.g. semen, embryos) from herds with a history of performance recording.
- Using high accuracy proven sires (e.g. AI sires) or dams.
- Spreading the risk of using younger, lower accuracy animals by utilising a team of young bulls rather than just one bull.

WHAT INFLUENCES THE ACCURACY OF AN EBV?

A range of factors can influence the accuracy of an EBV

THE ACCURACY OF THE PARENTS

An animal with high accuracy sire and/or dam will generally have higher accuracy EBVs compared to an animal with parents with lower accuracy.

THE AMOUNT OF PERFORMANCE INFORMATION AVAILABLE

EBV accuracies will increase as more performance data is supplied by breeders and is analysed for a specific trait. This includes performance data on the animal itself (eg, its 200-day weight record). Submitting the performance data of an animal's progeny will also impact the EBV and its accuracy.

EFFECTIVENESS OF PERFORMANCE INFORMATION

Animals whose performance data is collected in large contemporary groups will generally have higher EBV accuracy compared to those in small or single animal contemporary groups.

GENETIC CORRELATION WITH OTHER MEASURED TRAITS

BREEDPLAN analyses many traits and their relationship to each other allowing for calculations of EBVs and its accuracy. For example, recording weaning weight will also add information to the 400 Day Weight EBV. Therefore, herds that are recording a range of traits (e.g. calving ease, several weights, fertility, carcase) will have higher EBV accuracies than a herd that has limited recordings (e.g. weaning weights only).

THE HERITABILITY OF A TRAIT

The higher the heritability of a trait, the bigger the impact that performance data has on the EBV accuracy. This is simply because the performance record is likely to be more reflective of the genetic potential of the animal. Growth and carcase traits tend to have higher heritability, whereas maternal traits tend to have lower heritability.

AVAILABILITY OF GENOMIC DATA

Genomic data is used in the Wagyu Breedplan analysis. Animals with 50K tests done will have higher EBV accuracy figures when compared to those animals without a 50K test.

MORE INFORMATION

Contact the Australian Wagyu Association for further information or if you wish to republish any part of this article

Communications@wagyu.org.au or +61 2 8880 7700

FIRST PUBLISHED *Australian Wagyu Update Magazine, Vol 72*