



technical brief

“Breedplan Accuracy”

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The **true** breeding value of an animal is only known after the animal has had numerous progeny and grand progeny performance recorded – at this time you have all the information you need to evaluate the animal’s breeding value across a range of production traits with almost absolute accuracy – but too late for making decisions about whether or not to use the animal to breed from in the first place.

An EBV is an **estimate** of the animal’s breeding value based on information available at the time you make a selection decision – whilst it is the **best estimate** that can be calculated from the **available information**, its reliability as an estimate depends on how much (and how well recorded) was the information used to calculate it.

The **Accuracy** of an EBV gives an indication of its reliability as an estimate of the animal’s true breeding value, and the likely extent of its possible change as more information about the animal becomes available.

*EBV Accuracy reflects how much of the total amount of information needed to be 100% sure of the animal’s **true** breeding value was available to **estimate** the animal’s breeding value at the time the EBV was calculated – expressed as a percentage..*

Group Breedplan accuracies are reported as a percentage ranging between 0 and 99%. The higher the percentage accuracy of an EBV, the greater the chance it reflects the animals true breeding value, and the less likelihood that it will change as more information becomes available.

How accuracy is influenced by available information

The following table shows how the accuracy of an EBV is influenced by the amount of information that is available for calculating the EBV.- eg, 400 day Wt EBV.

<u>Information available on..</u>	<u>Accuracy %</u>
individual animal	55
individual + sire + dam	60
individual + 12 half sibs	64
10 progeny	67
individual + 10 progeny	74
55 progeny	90
individual + 55 progeny	95

Possible changes in EBVs at different levels of accuracy for Shorthorns

The theory -The degree of possible change to EBVs as more performance information becomes available is indicated by the **standard error** associated with each trait at different levels of accuracy. The size of the standard error decreases as the accuracy level increases.

Statistically, there is a 66% chance that an animal's true breeding value will be within 1 standard error of its EBV, and a 99% chance that it will be within 2 standard errors of its EBV. The change has an equal chance of being reflected in the EBV increasing or decreasing.

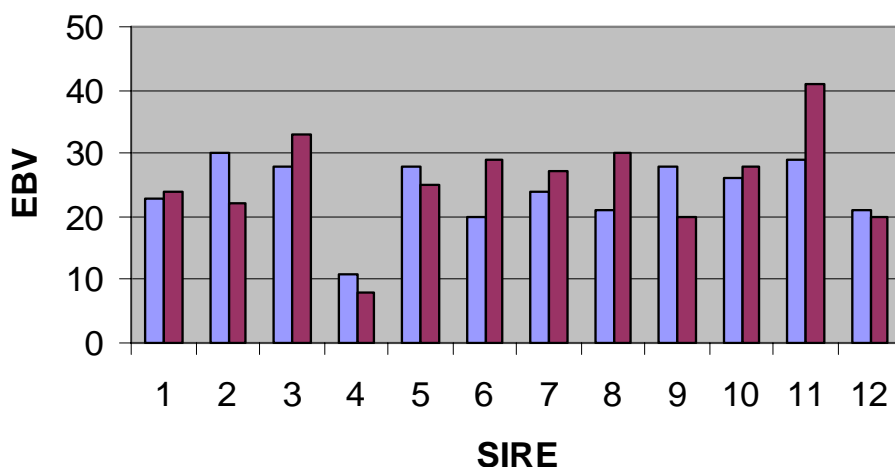
Table 1 shows the statistical standard error of different accuracy levels for various traits.

The practice - The following graph shows the actual EBV change, before/after progeny, for 12 bulls used in the Durham project. The left column shows the EBV (200 day Wt) of each of 12 bulls as yearlings (no progeny). The right column shows the EBVs of the same bulls after 2 years of progeny information had been included in the calculation of their EBVs.

With the addition of progeny information, the **average accuracy** of the EBVs increased from 60% to 85% whilst the **average EBV** of the 12 bulls remained fairly constant, however the **EBVs of the individual bulls did change** – half up, half down as you would expect from the theory, and well within theoretical limits.

Even though the EBVs of individual bulls did change, their group ranking didn't. The top bulls were still the top bulls and the bottom bulls were still the bottom bulls. **The non-parent EBVs was a good estimate of the progeny-proven EBVs**, and were within the range of possible change that could be expected.

Occasionally one hears of a drastic change to an animal's EBV. This is most often the result of a data/management grouping error, not a function of standard error.



Interpreting accuracy.

The EBVs of **sires with recorded progeny** are more accurate and more stable than the EBVs of “non-parent” bulls - progeny information is a better estimate of a bull's breeding value than is his own performance. EBVs of progeny proven sires will range in accuracy from **75% to 99%**, the higher accuracy EBVs reflecting progeny and/or daughters progeny information being used to calculate the animal's EBV.

EBVs for **yearling bulls** (without progeny recorded) are calculated from information recorded about the animal itself, and/or its relatives - the accuracy of these “non-parent” EBVs will be in the range of **40 to 75%**, with the higher accuracy EBVs reflecting a greater depth of information from relatives and/or a stronger herd recording history.

An accuracy of **less than 35%** indicates that limited information is available for the animal – and has most likely been sourced from relatives rather than direct measurement, or may be from a correlated trait, and/or the trait has a low heritability. This EBV should be considered a preliminary estimate only and could change considerably as more substantial information becomes available.

Table 1 - Standard errors for EBVs at different levels of accuracy

Trait	Accuracy %							
	30	40	50	60	70	80	90	99
Birth wt - kg	2	1.9	1.8	1.7	1.5	1.3	0.9	0.3
200 day wt	11.6	11.2	10.6	9.7	8.7	7.3	5.3	1.7
400 day wt.	15.1	14.5	13.7	12.7	11.3	9.5	6.9	2.2
600 day wt	19.2	18.4	17.4	16.1	14.4	12.1	8.8	2.8
Milk	8	7.7	7.2	6.7	5.5	5	3.6	1.2
Scrotal size	1.2	1.2	1.1	1	0.9	0.8	0.5	0.2
Rib fat	1.4	1.3	1.3	1.2	1	0.9	0.6	0.2
IMF%	0.9	0.9	0.8	0.8	0.7	0.6	0.4	0.1
EMA	2.3	2.2	2.1	2	1.7	1.5	1.1	0.3

For example, an EBV for 400 day wt., with an accuracy of 70% will have a standard error of +/-11.3 kg. At an accuracy of 90% the std error is +/- 6.9 kg

If an animal’s EBV is +40 with an accuracy of 70%, there is a 67% chance the EBV will be within the range of +28.7 kg to + 51.3 kg, and a 99% chance that it will be within the range of +17.4 kg to + 62.2 kg, as more performance information becomes available.