A **GENOMICS** Bull Buying Guide

Use this "owner's manual" to select bulls based on genetic merit.

by Jamie T. Courter

As a rocky 2020 ends and we enter spring bull sale season, it is imperative producers arm themselves with information to make educated purchasing decisions. As you flip through various catalogs, selecting bulls as you have so many times before, I would like to take this opportunity to provide what I believe are fundamental pieces of information to better assist producers in their bull buying decisions.

In addition to overall soundness and conformation of a bull, it is always important to select a sire backed by data. You wouldn't necessarily go out and buy a new pickup truck without researching its horsepower, torque and overall tow-rating. Instead, you would ensure the overall mechanics of the engine match your daily needs. The same is true about purchasing a new herd bull or AI (artificial insemination) sire. Instead of an owner's manual, you have expected progeny differences (EPDs).

What is an EPD and how is it calculated?
In addition to photographs, most catalogs include a multitude of information and numbers for a given sire. While they can be overwhelming, those numbers summarize what is currently known about the genetic potential of an animal. These values are referred to as EPDs and represent an estimate of the genetic merit an animal will pass on to its offspring.

Seedstock producers invest heavily into reporting key information used to calculate EPDs. For traditional EPDs, these include individual pedigrees, phenotypes for key traits of interest and progeny information (Figure 1). When an EPD is reported back to the seedstock producer, the estimate of genetic merit is summarized in three different ways:

1) **EPD**: The first number listed following the trait abbreviation, an EPD is an estimate of the genetic merit an animal will pass on to its progeny, on average. An EPD ranks animals according to their potential to make genetic change within a herd, or when making bull buying decisions. For example, if you compare a bull whose weaning weight EPD is +53 to another whose EPD is +63, one would expect the second bull's progeny to weigh 10 pounds more than the first bull's, on average. Therefore, if the second bull sires 30 progeny in a season, an extra 300 pounds of weaning weight is expected from the second animal as compared to the first.

Figure 1: Sources of information used to calculate an EPD

Progeny information — Pedigree — Phenotype — EPD

2) **Accuracy**: Ranging from 0 to 1, accuracy is an estimate of confidence that the EPD provided represents the "true" value of the EPD of the animal. After all, an EPD is a best estimate of an animal's genetic potential based on the information provided to the evaluation at that time. As more progeny records and phenotypes on an animal are reported, its EPDs will fluctuate up and down based on new data.

3) **Percentile rank**: Normally the last, or bottom value, a percentile rank reports where the specific EPD for that animal ranks across the entire breed. Ranging from 1 to 100, if an animal is in the top 1%, it is one of the best animals in the database for that trait of interest. While percentile rank is useful to gain bearings as to what a "good" or "bad" EPD looks like, it is recommended producers use EPDs when making selection and bull buying decisions.

Not all of this information is printed in catalogs. Often the EPD and percentile rank are published while accuracies can be found online. Regardless, aligning a bull's EPDs with your operation's breeding objectives goes a long way toward increasing the genetic potential and profitability of a commercial herd.

On top of aligning an animal's EPDs with your breeding objectives, look for bulls with the AHA GE-EPD logo to ensure the utmost confidence in the bulls you purchase.

What is an AHA GE-EPD and why is it important?
In addition to pedigree, phenotype and progeny records, EPDs can be enhanced with a genomic test. Signified by the American Hereford Association (AHA) GE-EPD logo, where "GE" stands for genomic-enhanced, incorporating genomic information to an existing pedigree-based evaluation will immediately increase the accuracy of the prediction.
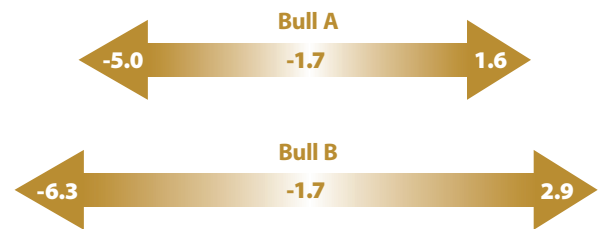
Accuracy is the second-most important number to consider when selecting a bull for purchase. As previously mentioned, an EPD is an estimate based on the information available to the genetic evaluation at the time. As more information is reported, be it in the form of phenotype records or DNA, that estimate can move up or down as the accuracy of the prediction increases. However, the amount of potential movement decreases as the accuracy increases.

To help visualize this difference, Figure 2 includes birth weight (BW) EPD information for two different yearling bulls, where Bull A was genotyped. While they have the same EPD for BW (-1.7 pounds), thus the same percentile rank in the breed (3%), the accuracy is higher for Bull A than

Figure 2: The impact of accuracy on the 95% confidence interval of an EPD.

	Birthweight	
	Bull A	**Bull B**
EPD	-1.7	-1.7
ACC	0.39	0.15
Percentile rank	3%	3%

Figure 3: The possible range of "true" EPDs

Bull A
-5.0   -1.7   1.6

Bull B
-6.3   -1.7   2.9

for Bull B because it was genotyped.

Looking at their respective EPDs, both animals are considered "calving ease" bulls and can be purchased as such. However, Figure 3 represents the possible range (95% confidence interval) of "true" EPDs for both Bull A and Bull B, given their respective accuracies. Notice how much smaller the range is for Bull A compared to Bull B. Genomic testing helps reduce the risk to buyers and allows them to confidently purchase a heifer bull knowing the seedstock producer has done everything possible to ensure he is indeed a heifer bull.

What does this mean for a seedstock breeder?
The strength of an evaluation and the benefit of genomic testing are a direct result of genomic technology and seedstock breeders investing into recording pedigrees and collecting phenotypes. Dedication to advancing the Hereford breed has resulted in vast amounts of genetic change and will only grow through reporting more data.

While much of this article is geared toward purchasing bulls with GE-EPDs, the concepts and reasons provided also support why seedstock providers should genomically test their bulls. In addition to powering the genetic evaluation, selling bulls with GE-EPDs is a standard practice to ensure that when a young bull is sold to a commercial rancher, he will perform as expected. Genomic testing increases the confidence seedstock producers have in the bulls they sell, as well as the confidence commercial customers have in their purchase. The increased accuracy leads to improved selection of animals that meet an operation's breeding objectives. This ultimately leads to an improved, overall quality of your bull offering and alignment with the needs of your customer base. **H**W