What You See —
The Importance of Phenotypes

Phenotypes are an important aspect of cattle selection, but often do not tell the whole story without performance data such as EPDs.

by Leoma Wells

"I don't need all these numbers. I can pick out the best bull with my own two eyes and by knowing his actual birth weight." How many times have you been at a bull sale and heard a similar statement?

While a producer may get it right six out of 10 times (with a little luck), what often is not acknowledged is the level of risk the buyer accepts in this situation. A phenotype is an individual's observable traits, according to *genome.gov*. Selecting animals using only phenotypes does not provide producers with the larger picture though.

For example, imagine a pro football coach who needs to select between two wide receivers. Visually, both players are 6 feet, 5 inches tall and 245 pounds. If the coach assumed both players would perform the same on the field based upon outward appearance, he could choose either as a sufficient addition to his team.
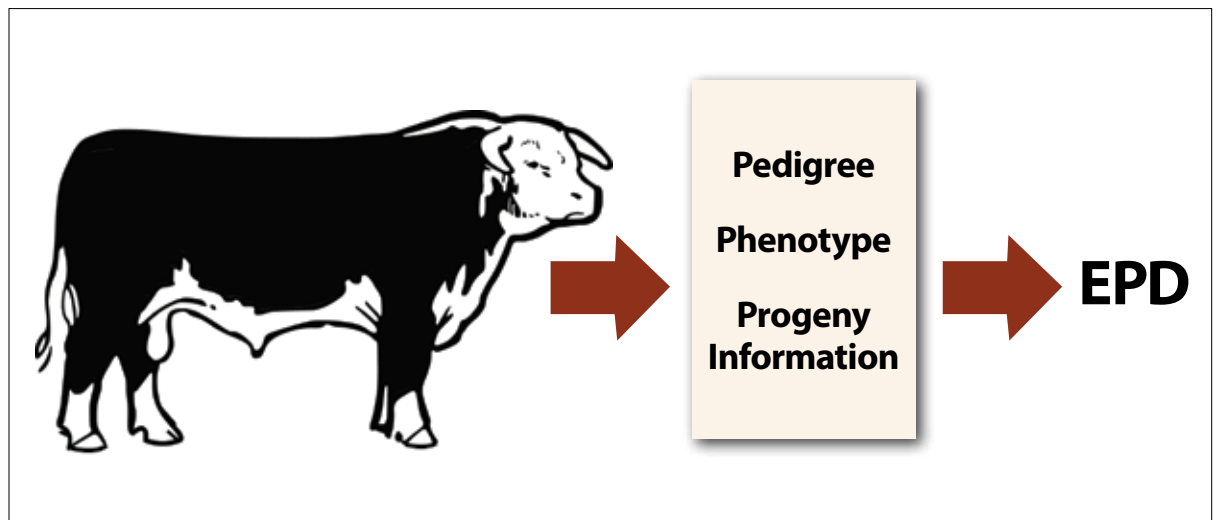
Instead, he wants the best one for the position, so he asks them to sprint 40 yards. One finishes in 4.5 seconds and the other in 4.8 seconds. The coach reviews the data from other players within the same conference to accurately evaluate each athlete's performance and finds the average player runs 40 yards in 4.6 seconds.

Without the performance, the coach may have inadvertently selected the slower receiver. Like athletes, animals may appear equally appealing based upon their weight, height, color, etc., but it is important to consider additional data from the individual against the group to establish and determine overall value.

EPDs provide cattlemen and women with more insight into the genetic merit of an individual animal than phenotype, or appearance, alone. EPDs are calculated using an animal's pedigree, individual phenotype and their progeny's performance. As producers collect more phenotypic data on individual animals and their offspring, the EPDs become more robust and reliable.

Phases of Selection Decisions

Seedstock breeders should establish a selection process that is systematically carried out each year and employs multiple tools to continuously improve each generation to meet and/or exceed the operation's goals. By instituting a consistent method of selection, an animal can be accurately measured, analyzed and confidently assigned an unbiased value in comparison to contemporaries.

Just like a professional coach drafting players, the responsibility falls on producers to utilize the available information to make the best investment associated with the least amount of risk. Here is an example of a selection decision process which allows cattlemen and women to use all the tools at their disposal to select the best cattle for their operation.

- First, breeders select for cattle to be environmentally functional, structurally sound and eye appealing. It does not matter if a bull blows you away on paper, if he cannot stride across the pen, more than likely he is not an ideal selection.
- Certain phenotypes, such as weights, become a powerful and more robust selection tool once they have been incorporated into the EPDs and combined with other data points. Given the importance of the initial culling decisions, it is imperative to ensure individuals are being fairly compared against their peers. Submit complete sets of data from calving through yearling on all individuals, desirable or not, which allows the genetic evaluation to analyze the group from an unbiased position and assign accurate percentile rankings and ratios.
- Sort cattle based upon appearance, ratios and EPDs.
- Collect DNA samples on all retained animals, both bulls and heifers. Submit for genomic testing.
- Review DNA testing results, sort cattle via genomic-enhanced expected progeny differences (GE-EPDs) and place in appropriate groups based upon goals and objectives. **H**W

Predicting performance

With the many tools available within the beef industry, it is imperative for producers to manage risk as much as possible, especially before making a genetic investment. There is much more to an animal and how it will perform than what meets the eye.

Regardless of where you are on the technology adoption curve, expected progeny differences (EPDs) are a great tool to use in the second phase of selection decisions. If you are still using actual data, I would encourage you to consider using the EPD calculation for the trait instead. This is especially helpful when selecting for growth traits since the actual measurement is incorporated into the EPD calculation.

Initially, EPDs are calculated by taking the average of the sire and dam and adding any phenotype information on the individual. It is important to remember that progeny, even if they are full siblings, will not receive the exact same sets of genes from their parents. This variation can lead to phenotypic differences but is not accounted for within EPDs until genomics or years of progeny information have been added.

Remember, if producers consistently collect and submit quality phenotype data, EPDs can be very useful to review and assess an animal's or a group of animals' merit. As the entire set of herd data flows into the evaluation, year after year, the EPDs will become even more robust, and they can confidently be embraced as part of your selection process, especially when combined with genotype information.

A great resource for more information on phenotype collection and EPD calculations can be found on the Beef Improvement Federation's website at *http://guidelines. beefimprovement.org/*. **H**W

Editor's Note: Leoma Wells is the strategic account manager for Neogen Genomics.