By the Numbers

► by **Performance Programs Department staff,** *American Angus Association*

$W and $EN: Any questions?

The $Value Indexes were developed with the commercial bull buyer in mind. Indexes are useful in that they are multi-trait selection tools, with simplicity as the focus. And for commercial cattlemen trying to make steady improvements across the board rather than design a marketable expected progeny difference (EPD) package, why study through a long list of EPDs when real-world values expressed in dollars are at your fingertips?

Take a look

Selection tools are not just of interest to seedstock breeders anymore. Commercial bull buyers are becoming increasingly more interested in the dynamics of EPDs, and now $Values. In some cases, a simple definition of $Values is just not enough. In an effort to "train the trainer" of genetic tools, the American Angus Association staff has answered questions about Weaned Calf Value ($W) and Cow Energy Value ($EN).

? How are the individual EPDs that influence $W weighted?

There is no explicit weighting percentage attached to each of the four traits used to calculate $W (birth weight, weaning weight direct, daughter's milk and daughter's mature size). Rather, the formulation evaluates each trait independently as to its economic effect in a typical cow-calf operation, accounting for both cost and revenue influences. The individual effects of the four traits are then combined to form $W. In other words, $W is constructed so that each trait affects the final index value proportionate to its bioeconomic merit in a real-world industry context.

? If the components of $EN are already included in $W, why was $EN published as a separate value?

$W includes the effects of both revenue and cost differences associated with daughter's milk and mature size, and it assumes that adequate feed is available to meet energy requirements for lactation and maintenance, regardless of genetic profile. $EN expresses only the cost side of milk and mature size, and is calculated as the relative savings in cow lactation and maintenance costs that are attributable to genetic differences (annual savings in cow feed expenses).

Low $EN values are found in cattle with higher milk and larger mature size genetics — those requiring more feed energy. Conversely, animals with less milk and smaller mature sizes will exhibit a higher $EN, because they need less feed for lactation and maintenance.

Thus, $EN is a genetic-alignment tool created specifically to help producers match their cows to their unique farm or ranch environments and available feed resources. Higher input genetics (those with relatively low $EN values) may be undesirable in operations characterized by restricted and/or highly variable feed supplies. However, it is equally true that lower input genetics (those with a high $EN) could prove inefficient where feed resources are more abundant. $EN enables producers to match the appropriate Angus genetics with virtually any environment where beef cattle are raised.

? Do milk EPDs have more effect than mature weight on $EN values?

Both milk and mature size influence $EN according to the lactation and maintenance energy requirements for various levels of each trait, based on nutritional research conducted by the National Research Council (NRC). It is difficult to directly compare these two traits, because they do not have a common unit of measurement.

However, it is generally true that lactation requires large amounts of feed energy. NRC data suggests that a beef cow producing a peak production level of 25 pounds (lb.) of milk per day will require 10% more feed energy on an annual basis, compared to a cow whose lactation curve peaks at 15 lb. per day. This difference in required feed energy is equivalent to an additional 200 lb. of mature weight.

? Isn't the database for mature size measurements fairly small? How can the bioeconomic effect of mature weight in $W and $EN be calculated?

The Association's database for mature weight and mature height in Angus females is larger now than it has ever been (83,432 records and 212,661 EPDs). Furthermore, new statistical techniques have been developed to better utilize these records, which has enabled a higher percentage of available data to be employed in the calculation of mature size EPDs. Additionally, the application of known pedigree relationships allows the Association to leverage available data over a larger portion of the Angus population (the same can be said for other traits as well).

Additionally, research has shown that a parent's yearling weight EPD is strongly correlated with daughter's mature size. The Association has developed mathematical equations capable of incorporating yearling weight EPDs with mature weight and mature height EPDs to more accurately predict mature weight phenotypic relationships over a large portion of registered Angus cattle. These calculations are sensitive to EPD accuracy levels. As an animal's mature weight EPD increases in accuracy, that EPD becomes the dominant measurement affecting the mature size component of $W and $EN, while the yearling weight EPD plays a declining role.

? If a commercial producer has heifers to breed, should he place any emphasis on $W, while still selecting for low birth weight EPDs?

Yes. Selecting bulls with appropriate birth weight and calving ease direct EPDs should be the primary criteria used when breeding heifers. Producers can then use $W as a secondary selection tool, knowing that, generally, bulls with higher $W values will create more profit potential in the calves they sire.

? Are there accuracies for $W and $EN?

Accuracies are not calculated for $Values. The calculations that are used for accuracies associated with the EPDs do not apply. Both

$W and $EN incorporate multiple EPDs, in addition to utilizing industry-based assumptions for prices and costs found in a typical U.S. cow herd. Such complexity does not lend itself to the development of meaningful accuracies.

That said, it should be recognized that animals with low-accuracy EPDs for the traits used in $W and $EN will tend to experience larger fluctuations in their EPDs and resulting $Values from one National Cattle Evaluation (NCE) to the next, as compared to animals with higher EPD accuracies. If the EPDs change, then the $Values will also change.

? Should commercial producers be concerned about using low-accuracy yearling bulls because their $W and $EN values might change significantly from the original estimates?

Producers should evaluate $Values on yearling bulls just as they currently do the low-accuracy EPDs. EPDs on young animals are the best available prediction of that animal's genetic merit at the time they are calculated (using both pedigree and individual performance information). These EPDs are used to calculate $W and $EN, so these $Values are the best available predictions for bioeconomic merit that can be constructed without a progeny proof. Low-accuracy EPDs and the $Values built upon them are subject to change, especially from one individual animal to the next. However, producers can be very confident that groups of bulls will, on average, breed according to their EPDs and $Values. AJ

Editor's Note: *"By the Numbers" is a new* Angus Journal *column authored by Association staff in the Performance Programs Department to share insights with Angus members about data collection and interpretation, NCE, genetic selection, and relevant technology and industry issues. If you have questions or would like to suggest a topic for a future column, you may contact Sally Northcutt, director of genetic research, or Bill Bowman, director of performance programs, at (816) 383-5100. They can be reached by e-mail at snorthcutt@angus.org or bbowman@angus.org.*