Multi-Trait Selection Tools: Angus $Values

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The use of selection index tools in the beef industry continues to grow. The American Angus Association's (AAA) $Value indexes were designed primarily with the commercial bull buyer in mind, and it never hurts to review the components behind each $Value and the assumptions involved.

Selection Index Concepts
The theory behind the AAA's $Values is not a new concept, as $Values are selection indexes that take into account genetic and economic components. The swine industry has a long history of using selection indexes. Also, indexes appear in dairy cattle genetic evaluations and some international beef breed reports. In the United States indexes are made available by various beef breeds, and although the traits and scope may vary, the underlying principles of providing cattle producers with an economic merit value for multiple traits holds true. Indexes are challenging to develop, which probably slowed their initial release. The first emphasis by breed association performance programs was to fine-tune the use of EPDs by breeders. Indexes were the next logical step in the evolution of performance measurements, particularly with the detailed list of EPDs available today. Selection index concepts and customized indexes will continue to evolve, as they are easy to use and multi-trait focused.

The AAA's $Values are producer ‘net return' measures for the ranch, feedlot and grid. The $Values stemmed from the need to develop economically relevant values for the commercial producer. You are probably comfortable using an array of EPDs to target a breeding objective. However, your customers may not have the same comfort level and some may prefer multiple traits boiled down into economic index values. Keep in mind that EPDs have traditionally been a measure of "outputs" which equates only to the revenue side of the profit equation. Indexes take a much broader approach by also considering the "input" or expense side of the equation, presenting a much clearer picture of the economic impact of genetic decisions.

Weaned Calf Value ($W)
Weaned Calf Value ($W) is directed toward the cow-calf segment for preweaning production. $W, a bioeconomic value, represents a relationship between the revenue generated from genetically derived outputs and associated costs (expenses) from required inputs. The inclusion of calf weight and calf crop percentage to generate revenue along with cow maintenance and lactation expenses creates a "net revenue" value in the production segment of a cow-calf operation.

EPDs for birth weight, weaning weight direct, maternal milk and mature cow weight/height are utilized to generate the $W. In cases where mature cow size EPDs are absent or low accuracy, the association between yearling weight and height EPDs is used.

Lower birth weight EPDs are associated with revenue back to the cow-calf operation. Weaning direct growth and maternal milk generate revenue in pounds of calf, but each also contributes expenses. The calf has costs associated with his own maintenance and gain. As an additional adjustment to give $W dimension, mature cow size is handled strictly as an expense.

Compare a sire with $W=$14.17 to a sire whose $W=0.00 and mate these bulls to comparable females. Then if you expose the calves to the same environment through weaning, the average future progeny difference between the two sets of calves would be about $14 per head at weaning. As with EPDs, these $Values have meaning when comparing relative merit or ranking of two or more animals. Just looking at the absolute $Value alone means nothing, unless in comparison with another individual or average of animals.

The choice of $W assumes the resources are available and the environment is appropriate for the level of production (weaning direct, maternal milk) and cow size. If extremes in milking ability of replacement females and mature cow size are issues for a particular herd, then the cow energy value ($EN) can provide an additional tool to tailor the selection decision.

Cow Energy Value ($EN)
A commonly asked question is whether $EN is already included in the $W. The $EN numerical value cannot be subtracted from $W, therefore, it is better to view $EN as being based on some of the expense pieces from $W. These costs are converted into dollar savings and reported as such. This $Value is a specialized tool, which is why it appears in the maternal trait section, along with EPDs for calving ease maternal, milk and mature size. $EN includes necessary maintenance and lactation energy adjustments. The $EN is reported in dollar savings per cow per year, rather than in megacalories (Mcal) of feed energy.

If mature size and milk genetics have never been a challenge for the cowherd in a given production environment and have had no negative impact on economic herd performance, then using $EN is probably not of interest. In this case, feed resources are abundant and are available to handle the maternal genetic choices for future females entering the herd. However, some production environments test producers to match the cow to the resources available. Extremely variable environments warrant special consideration of milk and cow size when feed resources are uncertain from one year to the next. $EN can be a risk management tool in this area.

Feedlot Value ($F), Grid Value ($G) and Beef Value ($B)
In contrast to $W, the Feedlot ($F), Grid ($G) and Beef ($B) $Values are terminal indexes, in that no maternal components are included. These indexes assume all calves go to market and no replacement females are retained. All of these indexes are reported in dollars per head and can be used to compare animals on how future progeny are expected to perform for postweaning feedlot and carcass merit.

The $F and $G include revenue and expense components in their derivation and are pulled together to form $B.

$F is strictly postweaning feedlot merit where yearling weight EPD along with it's relationship to weaning weight EPD are key genetic components. Genetics for gain generates revenue. Then the indexes include adjustments for feed and consumption expenses, because faster gaining cattle are typically more feed efficient.

$G has quality grade and yield grade components expressed in dollars per head. Three-year rolling averages for these premiums and discounts are comparable to many industry grids to date. Although some of these premiums may seem conservative with changes seen in the Choice/Select spread, the use of a rolling average provides continuity in the $Values from one genetic evaluation to the next.

With the Association's ultrasound and carcass databases, the $G pulls together both sets of EPDs with weightings appropriate to the accuracy of each. If an animal has no $G, then no ultrasound or carcass EPDs are available. The EPDs used in $G are marbling, ribeye and fat from the carcass EPDs, and intramuscular fat, ribeye and fat from the ultrasound EPDs.

$B is an overall $Value for postweaning feedlot and carcass value. It combines $F and $G as a selection tool for quality, red meat yield and pounds produced. The $B is not simply the sum of $F and $G.

$Values are business-minded and in the language of economics. They have a great deal to offer the commercial bull buyer in terms of providing a multi-trait selection tool. It is important to remind Angus bull buyers these are one of various tools they use to make their operations successful. Selection indexes will continue to become more widely accepted across the seedstock industry as a means to identify genetics for use in commercial programs.