By the Numbers

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What's in a $Value?

With the release of the latest American Angus Association National Cattle Evaluation (NCE), the use of the $Value selection index tools continues to grow. Even though these $Values were designed primarily with the commercial bull buyer in mind, it never hurts to review the components behind each $Value and the assumptions involved.

Selection index concepts

The theory behind the Association's $Values is not a new concept, as $Values are selection indexes (or indices, as some say) 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, as well as some international beef breed reports.

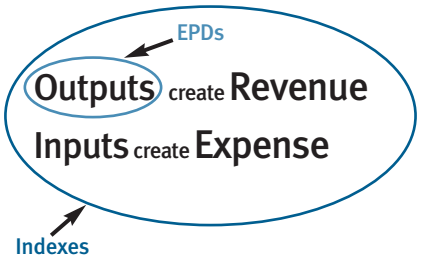
In the U.S., indexes are made available by other beef breeds. Although the traits included and their scopes may vary, the underlying principle of providing cattle producers with an economic merit value for multiple traits holds constant.

Indexes are challenging to develop, which probably slowed their initial release, as the first emphasis by breed association performance programs was to fine-tune the use of expected progeny differences (EPDs). Indexes are the next logical step in our evolution of performance, particularly with the detailed list of EPDs available today. Selection index concepts and customized indexes will continue to evolve, since they are easy to use and multi-trait by design.

The Association's $Values are producer "net return" measures for the ranch, feedlot and grid. The $Value initiative stemmed from the need to develop economically relevant values for the commercial producer. As seedstock producers, you probably are comfortable with 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 equate only to the revenue side of the profit equation (see Fig. 1). 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 effects of genetic decisions.

Fig. 1: EPDs vs. $Value indexes



Weaned calf value ($W)

Weaned calf value ($W) is directed toward the cow-calf unit and preweaning production. As a bioeconomic value, $W 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 for the production segment of a cow-calf operation.

EPDs for birth weight, weaning weight direct, maternal milk and mature cow weight and height are called upon to generate the $W. In cases where mature cow size EPDs are absent or low in accuracy, their association with 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 contributes expenses, too. The calf has costs associated with its own maintenance and gain. As an additional adjustment to give $W dimension, mature cow size is handled strictly as an expense.

The assumptions used in $W are given in Fig. 2. The base calf price is calculated from a three-year rolling average. The average cow weight is representative of the 1,300-pound (lb.) average mature cow weight from the Association's database. Compare a sire with a $W of $14.89 (see Fig. 2) to another sire whose $W is 0.00. If these bulls were mated to comparable females and the calves were exposed to the same environment through weaning, on the average, the future progeny difference between the two sets of calves would be nearly $15 per head at weaning.

Just as with EPDs, these $Values have meaning when comparing relative merit or ranking of two or more animals. To look at the absolute $Value alone means nothing, unless in comparison with another individual or average of animals.

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

Fig. 2: Assumptions used to calculate $W, $EN

A A R New Trend - 9958634 — **Wean Value ($W) : +14.89**

ASSUMPTIONS		
Base Calf Price	$105.00	per cwt
Cow/Heifer Mix	80%/ 20%	
Cow weight	1300	lb
Feed Energy Cost	$0.055	per MCal NEm

Cow Energy ($EN), Savings, $/cow/year	+3.11

Cow energy value

A commonly asked question is whether $EN is already included in $W. The $EN numerical value cannot be subtracted from $W, but instead it is better to view $EN as being based on some of the expense pieces from $W. These costs are converted into "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 (CEM), milk and mature size. $EN uses National Research Council (NRC) nutrient requirements of beef cattle to reference the necessary maintenance and lactation adjustments. For simplicity, the $EN is reported in an economic merit format, dollar savings per cow per year, rather than megacalories (Mcal.).

If mature size and milk genetics have never been a challenge for the cow herd and the production environment has had no negative effect on the herd's economic performance, then $EN is probably not of interest. In this case, feed resources are abundant and are available to handle the maternal genetic choices for future daughters of sires 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. For example, the $W choices could be made within a reasonable range of $EN values for a specific operation.

For more information about using $W and $EN in your herd, visit the following Web sites:

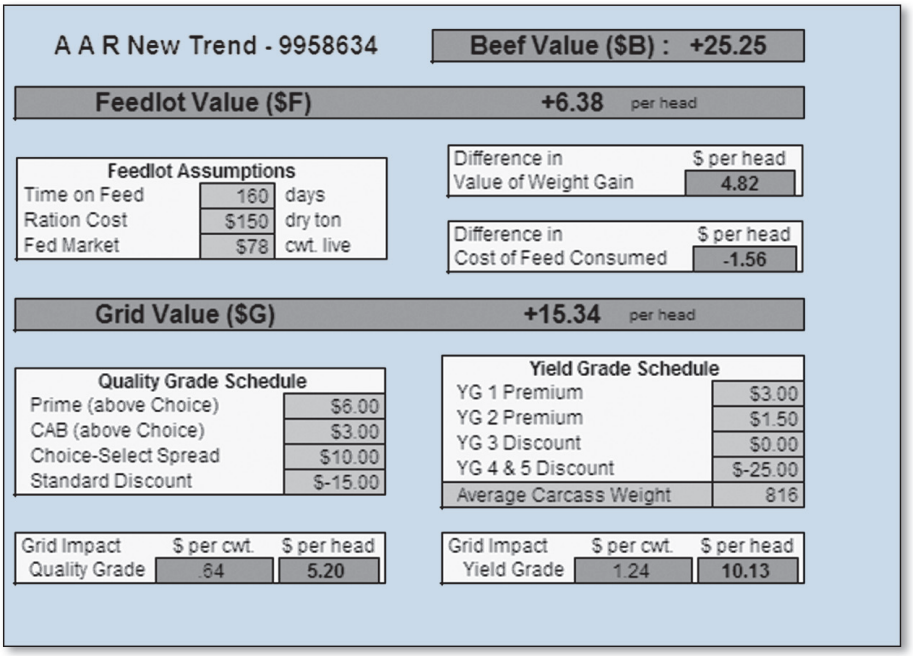
- *www.angus.org/sireeval/bythenumbers.pdf*
- *www.angus.org/sireeval/dollarWandENforWeb.pdf*
- *www.angus.org/sireeval/valueindex.html*

$F, $G and $B

In contrast to $W, the Feedlot ($F), Grid ($G) and Beef ($B) $Values are terminal indexes; no maternal components are included. Think of using these in situations where all calves are going to market and no replacement females are being 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.

Also, $F and $G include revenue and expense components in their calculation, and are pulled together to form $B. Fig. 3 illustrates the pieces for these $Values. This breakdown is available on any registered Angus animal at *www.angus.org*.

Fig. 3: Assumptions used to calculate $F, $G and $B



$F is strictly postweaning feedlot merit, where yearling weight (YW) EPD, along with its relationship to weaning weight (WW) EPD, are key genetic components. The future calves out of the sire in Fig. 3 are expected to have more than a $6-per-head difference in feedlot performance compared with a sire whose $F is 0. Genetics for gain generate revenue, then the indexes include adjustments for feed and consumption expenses. The assumptions stay relatively stable, and in the recent fall 2005 NCE, the fed-market price was changed slightly from $76 to $78 per hundredweight (cwt.) live.

$G has quality grade and yield grade components expressed in dollars per head. Fig. 3 illustrates the breakdown of quality and yield impact areas to arrive at $G. 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 that are 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, $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 (either NCE EPDs or interim EPDs) are available. EPDs used in $G include marbling; ribeye and fat from the carcass EPDs; and intramuscular fat (IMF), 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. $B is not simply the sum of $F and $G. Adjustments are made to prevent double-counting weight between feedlot and carcass segments. To make the index viable, both the value of weight and the costs associated with producing that weight must be assessed. Additionally, $B considers discounts for heavyweight carcasses.

$Values have a great deal to offer the commercial bull buyer in terms of providing multi-trait selection tools based on economic merit. It is important to remind Angus bull buyers that these are only a few of a variety of tools they can 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.

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Editor's Note: *"By the Numbers" is a column authored by Association performance programs staff 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.*