

Indexes as Decision Tools

Experts explain the creation of indexes and how they can work for you.

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Success in the beef industry would be a lot easier if we could accurately predict the future. Beef producers aren't greedy; they just want to know what the market will want five years from now. Is that too much to ask?

The truth is, beef producers need vision because seedstock selection is an information-driven process of choosing animals to become parents of future calf crops, explains Bob Weaber, associate professor and extension specialist in animal sciences and industry at Kansas State University (K-State). Market trends are determined by factors that affect income and expense at some point in the future.

Michael MacNeil, owner of the quantitative genetics, statistics and systems company Delta G and adjunct faculty member at K-State, says there are many factors to consider for income and expenses. For instance, income can include the number and weight of calves, body composition, product quality, and even the number and weight of cull cows. Expenses can include the nutrients required, the number of replacements required, the cost of sick calves, prophylactics and more.

In an ideal world, MacNeil says, when put on a "teeter-totter," the incomes should outweigh the expenses. However, as most beef producers know, it doesn't always turn out that way.

"The average enterprise breaks even over the long term. You don't want to be heavy on the expense side," he says.

Indexes as selection tools

MacNeil likens this balancing act to juggling 10 balls in the air at the same time. Luckily, there is a way to concentrate on the most important of those traits, the economically relevant ones, through the use of indexes.

Weaber notes that a breeding objective is a useful selection tool, though using a bit of math helps establish this objective. This breeding objective helps breeders focus their selection decisions on economic well-being and aids in accuracy and consistency, says Weaber. Additionally, it simplifies evaluation in your cattle selection process. Selection indexes are simply the weighting of EPDs by the economic contribution to profit at some end point.

"There are a lot of EPDs (expected progeny differences) to consider at one time for genetic improvement. It would



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be faster if you only had to consider a few traits, right?" Weaber asks. "Individual traits change more quickly when you select for them one at a time. However, profit improves more quickly when you select on it via an index that weights a number of traits that are relevant to a given end point."

He adds that breed associations provide indexes of their specific EPDs, and they typically explain only slightly less variation in genetic potential for profit than would be explained by a customized (herd-specific) breeding objective.

Angus indexes

The indexes created and used by the American Angus Association are known as dollar value indexes (\$Values). They are bridges in information gaps, says Sally Northcutt, director of genetic research at the Association. While difficult to develop, they are easy to use, convenient and assist a producer in selecting for directional change in multiple traits at once. Ultimately, they translate EPDs into their combined value in the market.

The indexes take into account the outputs considered on the revenue side of the profit equation, but they also consider the input, or expense, side associated with the production area of interest, she says. They conveniently incorporate both EPDs (see Table 1 for a description of the EPDs that go into each \$Value) and market factors in terms of feedlot performance, carcass merit and cow-calf production.

Northcutt explains that the hardest part of designing the indexes is deciding the traits with the most economic value.

Table 1: EPDs included in \$Values

\$W	\$B
BW	YW-WW
WW	MARB
Milk	CWT
MW	RE
YW	FAT

Table 2: Economic assumptions used to calculate American Angus Association \$Values

Weaned calf assumptions

Base calf price	\$145
Cow/Heifer mix	80%/20%
Cow weight	1,300 lb.
Feed energy cost, per MCal NE _m	\$0.090

Feedlot assumptions

Days on feed	160
Ration cost, \$ per dry ton	\$305
Fed market, \$ per cwt. live	\$115

Quality grade assumptions

Prime, \$ above Choice	\$14
CAB®, \$ above Choice	\$4
Choice-Select spread	\$10
Standard discount	-\$22

Yield grade assumptions

YG 1 premium	\$4.50
YG 2 premium	\$2.25
YG 3 (base)	0
YG 4 & 5 discount	-\$18
Average carcass weight, lb.	816
Heavy weight discount	-\$20

The computations are complicated, but interpretation of the \$Values is not. The higher \$Values are more favorable.

Weaned calf value (\$W) looks at preweaning performance and maternal traits of the herd, and includes EPDs concerning birth weight, weaning weight, milk, mature cow size and yearling weight.

The beef value (\$B) is one of the most popular indexes. It is the terminal index used to improve performance and carcass trait merit. \$B is made up of feedlot value (\$F) and grid value (\$G). \$F is influenced by weaning weight and yearling weight EPDs.

To add to this, \$G can be broken into quality grade value (\$QG) and yield grade value (\$YG). \$QG includes marbling EPDs; and \$YG has contributions from carcass ribeye and fat EPDs, carcass weight EPDs, and yearling weight EPDs.

Keep in mind that \$B is not just the sum of \$F and \$G; it includes additional adjustments.

Additionally, there is a cow energy value (\$EN), which represents the dollar savings per cow per year to meet feed energy requirements. Milk, mature cow size, and yearling weight and height EPDs factor into \$EN.

It is evident that there are quite a few factors and assumptions that go into calculating \$Value indexes, and it is important to stay relevant with these factors. However, the indexes can't react to every small change, explains Tom Brink, beef industry consultant.

This means that \$Value economic assumptions work off of a three-year rolling average. For instance, rations at the feedyard cost \$150 in the spring of 2004.

In January 2013, they cost \$315 per dry ton, and they have since fallen. Based on an average of the last three years, he says the assumptions used in calculating \$Value indexes today are conservative; the current market is probably higher right now.

Indexes as marketing tools

Weaber suggests using a terminal index that is aligned with your marketing end point to produce calves for market and use a maternal index to select the sires of replacement females. He says it is rare to find a bull that excels in both the terminal and maternal categories. Separating your selection system into a terminal and maternal focus allows you to focus on the most profitable traits for your breeding system.

Weaber warns that many breeders often focus too much on \$B, so don't get stuck on just one value. Emphasis should be placed on the index that is best aligned with your marketing system. If you sell calves at weaning use \$W rather than \$B, you'll achieve better results. Be careful not to use terminal indexes to select sires of replacement females. Terminal indexes place no emphasis on maternal traits and often are antagonistic with maternal performance. Phenotypes also play a role in selection and marketing strategies.

Coming from the feeder sector, Brink agrees.

"Don't forget that \$Values are extremely relevant to the entire industry. I know \$B gets a lot of publicity, but it's not just about \$B. Now in the cattle-feeding world, \$B is everything, but in your world and your customers' world, it's more complicated than that," says Brink.

"I fully believe that what [the American Angus Association is] doing with these different components, just like [it] did with birth to growth, you can do the same thing," he says. "You can create cows that work in pretty much any environment — with a lot of \$B — with a lot of value as those cattle get fed."

The best-kept secret about the American Angus Association's \$Values is that you can customize the economic assumptions to create tailored within-herd \$Values for your given scenario, Northcutt adds. The Custom \$Values in AAA Login (www.angusonline.org) are designed to use within a seedstock producer's herd as a tool to help their commercial bull buyers.

Custom \$Values are designated with the letter 'C' preceding the results and are for individual use only. It is important to remember that Custom \$Values are not intended for use in advertising, sale books or other promotional materials, and they will not be included in any materials produced by the *Angus Journal*.

As with all \$Values, remember that Custom \$Values are a combination of multiple traits, and it's good to have an understanding of \$Values before changing the assumptions. Also, Northcutt explains that variation

in \$Values, as with EPDs, between animals indicates the average expected differences in the value of future progeny (in dollars per head) while raised in the same environment and if random mating is assumed. Thus, a \$Value has meaning only when compared with the \$Value of another animal within the American Angus Association's database. Nevertheless, being able to customize a

\$Value can still help with your decision-making process.

Through the use of \$Values as selection tools, now Brink sees cattle with yearling weight EPDs of more than 100 but with a frame size of 5, instead of the much bigger-framed cattle many years ago. Using the tools over a period of time, he says breeders are able to resize and reshape the growth the industry needs on the

feeder end, but also keep the mature size reasonable to work for the breeders and their customers. These tools allow you to satisfy the ranch side of the equation, but also the feedlot and packing side.

What better aspects to market are there than those that satisfy many sectors of the industry?

