

# Angus Moves to Single Step

American Angus Association unveils enhancements to its weekly national cattle evaluation.

by Jena McReil, American Angus Association

**D**riven by advancements in genomic technology and uptake by the nation's Angus breeders, the American Angus Association and Angus Genetics Inc. (AGI) announce historic changes to the breed's weekly genetic evaluation.

Beginning Friday, July 7, the organization became the first major U.S. beef breed to incorporate single-step methodology to calculate, on a weekly basis, all of its expected progeny differences (EPDs) and dollar-value indexes (\$Values). The move is the result of years of dedicated research and development to equip Angus breeders with the industry's most sophisticated, accurate and reliable performance data and genetic selection tools.

"This is a new era for genetic evaluations," says Stephen Miller, AGI director of genetic research. "Angus breeders have been anticipating single step, and we believe they will greatly benefit from the methodology's increased precision.

"We've also incorporated several major enhancements to the evaluation," he continues. "It's new and improved in a number of ways."

As the name implies, single-step methodology incorporates all genotype, pedigree, performance and progeny data simultaneously in one step to derive genomic-enhanced EPDs (GE-EPDs) within the weekly national cattle evaluation (NCE). The change to single step has allowed AGI to simplify the calculation models used.

"In a genetic evaluation, the more traits you put in, the more complicated it is to solve," he says (see "By the Numbers" on page 47 of the July 2017 *Angus Journal*). "Now, with single step, we don't have to fit in all the molecular breeding values (MBVs), so we can incorporate more focused traits within the models, and weaning weight is one of them."

The need for routine calibration, a necessary function with the multi-step process as the number of Angus genotyped



► Stephen Miller, AGI director of genetic research, explains the breed's new and improved genetic evaluation, which includes single-step methodology, that was released Friday, July 7, in this segment from *The Angus Report* (available at <http://bit.ly/TAR-SS>). A webinar featuring recent enhancements to the Angus breed's genetic evaluation is available at <http://bit.ly/Webinar-SS>.

cattle continues to grow, will be eliminated through the use of single step.

## New and improved

Enhancements to the carcass model are among the most immediate benefits of single step, Miller says. They've streamlined the process to analyze the most important traits of interest, including carcass weight, marbling and ribeye area, and will also begin including weaning weight (to offset selection bias) and yearling fat (an indicator of maturity) into the carcass model.

One of the things producers will see is a stronger relationship between growth and carcass weight, Miller says.

Additional July 7 updates to the NCE include updated genetic parameters.

Heritabilities and genetic correlations have been re-estimated to best reflect the American Angus Association's current data. It's a routine practice for any genetic evaluation, Miller says, that occurs every five to 10 years. As a result, breeders may see slight changes in heritability estimates for some traits.

Each year in July, the Association releases updates to its economic assumptions, which are assigned to EPD components to calculate \$Values that represent both costs and revenues affecting the production system. The economic assumptions are based on a three-year rolling average and reflect the current beef industry price cycle.

"When we look at the genetic trends for weaned calf value (\$W) and beef value (\$B), they are pretty much the same for the last number of years," Miller says. "Even with the new economic assumptions and improved overall evaluation, the \$B trend will be similar to what we've seen prior to July 7."

Another major factor within the improved Angus evaluation is simply the volume of genotypes being added to the database. Since AGI began calculating GE-EPDs in 2010, the wealth of genomic information has increased sharply with each passing year.

Currently, about one-third of the cattle registered through the American Angus Association are being genotyped. In fiscal year 2016, AGI added 110,000 genomic profiles — and that number will continue to rise.

On July 7, the genomic predictions were based on more than 350,000 animals with genotypes now in the NCE. The last calibration released in April 2016 was based on 108,000 genotypes.

With single step, genomic information will have a much more immediate effect on animal data. The weekly NCE release will better reflect all available information, including all genomic, performance and progeny data.

"We're basically tripling the size of the genotypic database that's behind the evaluation on July 7," Miller says. "As we receive more and more data, we'll be able to do more with it, making even more accurate tools and GE-EPDs for Angus breeders."

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### What to expect

When Angus breeders accessed their performance data Friday, July 7, there were, as expected, noticeable changes. An animal's EPDs had the potential to adjust following the evaluation's enhancements.

Think of this as one last calibration that will affect animals across the entire population, Miller says.

When studying the data, he suggests breeders consider that although traits are the same, the scale is slightly different. If there's change in a certain animal's numbers, he recommends looking at the EPD percentile ranks. That should add clarity to where animals fall within the scale of the new evaluation.

"If you compare the standard deviation in the previous *Sire Evaluation Report* to what goes out July 7, you can see some changes, such as a reduction for marbling," Miller says. "That's going to give us a little less spread,

from top to bottom, than we're used to."

Because of adjustments in the carcass model, breeders will likely notice the most change within carcass trait EPDs. The dry-matter intake (DMI) and heifer pregnancy (HP) EPDs will also experience some change, as well as milk EPDs.

Models for growth, including correlations between birth weight and growth traits, were also enhanced as part of the new genetic evaluation. Breeders can expect to see minimal changes in re-ranking of sires that recorded the most progeny registrations in the last fiscal year (Top 200 Sires).

However, young animals that do not have birth weights recorded in the evaluation, but do have weaning and yearling weights reported — especially those with high growth — may experience greater change, on average, for birth weight EPDs across the board.

Again, when dissecting these EPD changes from the old vs. the new evaluation,

producers are encouraged to pay attention to the changes in EPD percentile ranks.

Angus breeders should also note that the single-step evaluation requires a change in the cut-off date for data to be included in the weekly NCE. Historically, information received on Tuesday would be incorporated into the week's Friday release.

Due to an extended processing time associated with single step, data cut-off will be moved to the Friday before. Information received by the Association by close of business on Friday will be reported in the next week's NCE, the following Friday.

The July 7 release will be published in the *Fall 2017 Sire Evaluation Report*, and breeders should submit data by June 30 to be included in that print publication and to receive the most current information from the improved genetic evaluation.

New overall genetic trend charts for the Angus breed will be released in the next edition of the *Sire Evaluation Report*.

### Common questions

At the National Junior Angus Show (NJAS) in Des Moines, Iowa, Angus Genetics Inc. (AGI) President Dan Moser answered some questions that have arisen since release of the new Angus genetic evaluation. Here is a condensed version.

#### How did the time that transpired since the last calibration impact changes?

While there has been a substantial increase in the number of genotypes included in the analysis, the biggest change is found not in the amount of data, but in the new approach.

Had we had a more recent calibration since the one released 14 months ago, it wouldn't have changed the outcome on a lot of the cattle. By far, the changes in single-step approach, the changes in the carcass model and the changes in the parameters had the biggest impact.

#### With single step, is there more emphasis placed on genomics, or less?

That depends on the animal. Some animals will see more emphasis on genomics relative to pedigree and their own performance data because those animals have a large number of ancestors and relatives that have lots of measurements for the traits that we are interested in. For those animals there is a higher degree of accuracy and confidence in the genomic predictions, and so those animals will see relatively more weight on genomics.

Other animals that don't have DNA similarities to animals with a lot of recording, particularly for some traits, will actually see less change.

One of the things we like about this system is the ability for it to weight genomics more or less depending on how well the data and the genomics describe those animals.

#### Why did my animal's \$B change so much?

Another change that occurred this July, just like every July, is new \$B (beef dollar value index) calculations. Specifically, we put new economic values to give Angus breeders and their commercial customers the most current economic information — things like prices for fed cattle, feed costs, those sort of things — into the evaluation. Some of the changes in \$B were a result of that.

The biggest changes were more likely changes in the component EPDs. For \$B, the EPDs that drive that terminal sire index are carcass weight, marbling, feed intake and, to a lesser extent, ribeye area and fat thickness. As the new single-step evaluation did a more accurate job across the population of describing differences in carcass weight, marbling and feed intake, that will be reflected in \$B values.

To find more information about the Angus genetic evaluation, go to [www.angus.org/AGI](http://www.angus.org/AGI).

### Tested and proven

The single-step method has been running in tandem with the Association's current genetic evaluation for the past eight months to evaluate its speed and stability. Several internal checks and third-party verifications have shown the single-step-generated data to be superior to existing methods, Miller says, and Angus breeders can rest assured in the accuracy of the information.

The computer software driving single step is the result of collaboration among the University of Georgia—Athens, AGI and the American Angus Association. The U.S. Meat Animal Research Center (USMARC) also provided validation to the single-step EPDs and their analysis has proven the strength of the new method over prior evaluation models.

"Research done within our own database, coupled with that from USMARC, shows us that the move to single step, coupled with our improved models, is a significant improvement," Miller says. "It's our mission and top priority to ensure that Angus members receive the most accurate, weekly EPD updates that they've come to expect and trust."

Additional resources on the single-step evaluation are available on the AGI website. Visit [www.angus.org](http://www.angus.org) to learn more or contact AGI at 816-383-5100 with any questions.



**Editor's Note:** Jena McReil is digital editor for the American Angus Association.