By the Numbers

▶ by **Tonya Amen,** *American Angus Association*

GE-EPDs: past, present and future

Genomic-enhanced expected progeny differences (GE-EPDs) are the best estimate of an animal's genetic worth as a parent. These values make use of known pedigree, performance and genomic information about an animal, its progeny and other relatives.

Why use?

Angus breeders and commercial users of Angus genetics have benefited from genomic trait tests because they

- enhance the predictability of our current selection tools;
- increase EPD accuracy on young animals;
- help characterize genetics for traits for which it is difficult to measure the animal's own performance (carcass traits in breeding stock or maternal traits in bulls, for instance); and
- allow EPDs to be calculated for animals that may have had blank boxes previously (single-animal contemporary groups, for example, or those without an EPD for a specific trait).

We've come a long way

Use of genomic profile results in Angus EPDs traces back to 2010, when EPDs for

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carcass traits were first genomically enhanced using a limited-marker panel called the Igenity® Profile for Angus. Since that time, the tests used in our weekly national cattle evaluation (NCE) have grown in the number of traits represented, marker size and genetic variation explained for the various traits of interest.

We've also learned a lot about the importance of maintenance and recalibration of these tests so they remain relevant and informative as selection tools. To date, Angus breeders have purchased more than 100,000 high-density (HD) tests, and we've been through four calibrations of the mathematics behind these tests, which allow them to go into Angus EPDs.

Your choice

As always, breeders continue to have a choice regarding which company they would like to provide the genotype for use in GE-EPDs. Current genotype providers are GeneSeek and Zoetis.

One of the most frequent questions we receive at AGI is which test provider to use. The answer? For our intents and purposes, they are equivalent. Genotypes from both companies cost the same amount, impact the EPD by the same magnitude, include parent verification and allow for addition of certain genetic conditions at a reduced cost.

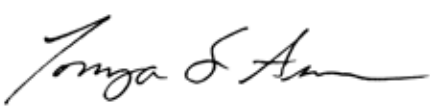
It appears most of the confusion arises because the chip used to obtain the genotypes has a different number of markers depending on the company (145,000 for GeneSeek and a bit more than 70,000 for Zoetis). For the purposes of calculating GE-EPDs, don't assume that more markers must be better. Both chips — the Zoetis HD50K chip, which was designed specifically for Angus cattle, and the GeneSeek GGP-HD chip, which was designed for use across multiple breeds — have content that is not actually used in the evaluation (parentage markers, genetic condition markers, markers that will help with imputation in the future, etc.). For the Angus evaluation, the same markers are used from both companies.

So, while the company may have use of the additional markers in its research, not all of the content on the chips is informative for the American Angus Association, and they are equivalent in their contributions to calculating GE-EPDs.

Also, research has shown that chips containing more than 50,000 markers show minimal increase in genetic variation explained above traditional 50K when used in a single breed (like Angus). To take that a step further, VanRaden et al. (2012) showed only a 0.4% increase in reliability of the proofs of dairy bulls when using an 800,000 marker chip vs. a 54,000 marker chip (to translate this to beef language, insert "accuracy" for "reliability" and "EPD" for "proof").

What's coming?

Research is currently ongoing with both companies for lower-cost, lower-density tests that — through the process of imputation — will be nearly as powerful as today's HD tests (HD50K and GGP-HD for Angus). We anticipate that this offering will be available for purchase in June, with results delivered by mid-summer.



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Download foot-scoring spreadsheet

American Angus Association members can now download a spreadsheet to submit foot scores via their AAA Login account. To download the spreadsheets in AAA Login, click the "Spreadsheet Entry" tab. From that menu select the "Foot Score Spreadsheet." Click the "Instructions" link for step-by-step procedures explaining how to select a group of animals, download the Excel spreadsheet, fill it out and return it to the Association for processing. The instructions also provide a description of phenotypes warranting each score, links to *Angus Journal* stories explaining the process of foot-scoring and links to other pertinent information.

For more information, contact Dan Moser, AGI president, at dmoser@angus.org or Tonya Amen, AGI genetic service director, at tamen@angus.org.

Watch for DMI information

Association members should notice another EPD on their registration papers and various reports provided by the American Angus Association. We've noted how the Association has enhanced its dollar value indexes ($Values) by including an EPD for feed intake in calculations for feed value ($F) and beef value ($B).

The feed intake EPD, reported in pounds of dry matter per day, had been calculated behind the scenes as a component of the residual average daily gain (RADG) EPD. It is supported by both feed-intake data and genomic profile information.

Producers requested that a DMI EPD be reported so they could dig deeper into what factors affect the broader index values. The Association is responding to that request, making the EPD available on performance documents.

For more information, contact Moser or Amen.