



By the Numbers

► by **Sally Northcutt**, director of genetic research, American Angus Ass'n

New-generation carcass EPDs

Fall 2009 welcomed in a new generation of carcass EPDs that combine all that we know on an Angus animal's end-product potential at the American Angus Association. Carcass genetic predictions are better than ever before in characterizing Angus cattle for carcass marbling, as well as ribeye, fat and carcass weight. With the advent of genomic profile information, expected progeny differences (EPDs) can be generated on animals at any time during their lifetime in concert with all available pedigree and performance information for the traits.

What's new?

A recent "By the Numbers" article (see October 2009 *Angus Journal*, pp. 184-185) described the process of utilizing the Igenity® profile for Angus cattle to enhance genetic predictions on your cattle. Now the mechanics are in place to calculate national cattle evaluation (NCE) EPDs on a weekly basis. In the past, NCE EPDs were released as biannual updates in July and December. Since early October 2008, breeders and producers using Angus genetics have the best carcass predictions available on any Angus breeding stock through the Association every week. This bypasses the retention of interim EPDs on carcass traits in many cases for animals that would wait the six-month stretch for an NCE EPD.

The weekly genetic predictions for carcass merit will encompass carcass, ultrasound and genomic databases. These EPDs come from the combined analysis — or integrated evaluation — resulting in a single EPD for carcass weight, marbling score, ribeye area and fat thickness. The units of measure remain in carcass trait format. Ultrasound, carcass, genomic and pedigree databases are boiled down into one seamless set of genomic-enhanced carcass EPDs for Angus breeding programs. Every Friday morning, the genomic-enhanced NCE EPDs are available at www.angus.org.

Benefits

- What are the benefits of weekly carcass evaluations?
 - NCE EPDs are the best genetic predictions for carcass traits — surpassing ratios and interims as selection tools.
 - NCE EPDs are available on Angus cattle in a rapid time frame.
 - Ultrasound, carcass and genomic databases with a four-generation pedigree are used simultaneously each week.
 - Genomic profile results are incorporated into EPDs without a six-month wait for biannual evaluations.
 - Ultrasound-scanned animals receive an NCE EPD within a week of the scan results being processed by the Association, for a comprehensive prediction beyond interims.
 - Calves with genomic profile results have calculated NCE EPDs using all data contributing to the comprehensive EPD system.
 - The carcass dollar values (\$Values) are updated with the change of associated carcass trait EPDs.
 - Pedigree-estimated interim EPDs for young nonparent animals are short-lived or bypassed to provide the more informative NCE EPDs each week.

- On calves with ultrasound or genomic profiles, dams that had no carcass EPDs in the past now receive weekly NCE EPDs without the time lag of a biannual evaluation.

What stays the same?

The beauty of the comprehensive carcass EPD that includes phenotypic and genomic data is that the use of EPDs and their associated Beef Improvement Federation (BIF) accuracy stays the same. The challenge and opportunity is still in the hands of the breeder to apply the technology to long-term breeding programs. Each breeder must reconcile the emphasis in their program to balance traits of economic importance. For example, programs may vary on strengths and selection for calving ease, maternal milk, growth, marbling and red meat yield.

The refresher on carcass marbling and ribeye EPDs that follows is not to take away from other economically important traits, but to emphasize that EPDs from the new carcass weekly runs are used the same and retain their long-standing application to characterize and establish relative genetic differences among Angus animals of interest.

As a review, a marbling EPD is a prediction of differences in future progeny performance relative to carcass marbling score. In most cases, we are comparing future offspring performance of sires in order to make directional change in carcass marbling. Marbling EPDs allow a relative ranking of sire genetics to be assessed and then sires to be chosen that best fit the producer's marketing objectives and breeding program. The important application of these tools is to compare differences between sires to determine their effect on future progeny, rather than focus on the absolute numerical value of the EPD.

The unit of measure for the marbling EPD is marbling score. Marbling score is the primary component of the USDA beef quality grading system. Traditionally, it has been subjectively assessed by the USDA grader when the USDA Quality Grade is being assigned.

As a review, the degree of marbling and numerical score are presented in Table 1 (see page 94). The degrees of marbling help describe quality grade. Selection pressure to improve the average marbling score would be expected to improve quality grade. Thus, marbling EPDs can be used to make genetic progress in cattle for more desirable quality product.

EPD example

The following two bulls have new carcass EPD profiles. Assume that both sires have similar accuracies and are mated to comparable females, and that calves are fed out, managed and harvested under the same conditions:

	Expected progeny differences (EPDs)			
	Cwt., lb.	Marb	REA, sq. in.	Fat, in.
Sire A	6	0.23	0.20	0.010
Sire B	8	-0.10	0.50	0.010
Difference (Sire A - Sire B)	-2	0.33	-0.30	0.000

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On the average we would expect the carcasses from Sire A's calves to have one-third higher marbling score than the carcasses from Sire B's progeny.

What could this potentially mean on the rail at grading time? If we collected the data from both sire groups and Sire B's average marbling score was 5.80 (or Small⁸⁰, low-Choice; see Table 1), we would expect under the assumptions of how the sires were mated and the progeny were managed and harvested that Sire A's progeny carcasses would have an average marbling score of about 6.10 (or Modest¹⁰). This improvement in marbling score qualifies these carcasses for acceptance into the *Certified Angus Beef*[®] (CAB[®]) brand provided other CAB specifications are met.

The expected result of using the EPDs is that the average marbling score of future progeny carcasses will improve by selecting the higher-marbling-EPD sire. This simplified, single-trait example illustrates the ability to select for carcass merit through the available genetic tools.


What about ribeye?

It is important to note that the seedstock

Table 1: USDA quality grading system and marbling score

<u>Quality grade</u>	<u>Degree of marbling</u>	<u>Numerical score</u>
Prime +	Abundant	10.0-10.9
Prime	Moderately abundant	9.0-9.9
Prime -	Slightly abundant	8.0-8.9
High Choice	Moderate	7.0-7.9
Avg. Choice	Modest	6.0-6.9
Low Choice	Small	5.0-5.9
Select	Slight	4.0-4.9
Standard	Traces	3.0-3.9
Standard	Practically devoid	2.0-2.9
Utility	Devoid	1.0-1.9

breeder and commercial bull buyer must consider a variety of economically important traits for their particular operation. Even in this example, we have not yet given consideration for the difference in ribeye genetics, favoring Sire B over Sire A. On the average, the carcasses out of Sire B would be expected to have nearly a 1/3-square (sq.)-inch (in.) ribeye area advantage over the carcasses of Sire A progeny.



E-MAIL: snorthcutt@angus.org
www.angus.org

Editor's Note: "By the Numbers" is a column by Association performance programs staff to share insights about data collection and interpretation, the NCE, genetic selection, and relevant technology and industry issues.