



By the Numbers

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Basic points on ultrasound EPDs

Ultrasound expected progeny differences (EPDs) are not difficult to use, and they work like any other EPD as a tool for genetic improvement. These genetic predictions give breeders and commercial bull buyers a head start in making directional genetic change in future progeny for carcass merit.

Ultrasound traits

Ultrasound measures are available for ribeye area, fat thickness and percentage intramuscular fat (%IMF). The first two traits are straightforward in units of measure, such as square inches of ribeye and inches of rib fat. The third trait, %IMF, is a noninvasive measurement used to indicate genetic potential for marbling.

Ultrasound traits for beef cattle were designed to be indicators of carcass merit of future progeny, such as market animals of sires. Heritability for these traits is moderate to high, indicating genetic selection can be effective.

Literature reports from previous research document the genetic correlations between ultrasound data and carcass data. In research summarized from four studies from multiple breeds (Bertrand et al., 2004), the correlations between ultrasound and carcass traits were large and favorable — ribeye: 0.75; 12th-rib fat: 0.62; IMF/marbling: 0.76.

These estimates between 365-day seedstock ultrasound measures and carcass traits on harvested progeny indicate progress can be made by selecting for carcass merit using ultrasound EPDs.

EPD example

An example of two yearling Angus bulls with interim ultrasound EPDs is given in

Table 1. Both bulls have their individual scan data included in their interim EPD calculation, with similar accuracies equal to 0.28 for all traits.

In assessing the genetic difference in how future progeny of these two bulls are expected to perform, the difference between each EPD is what is important.

Bull A's future progeny are expected, on the average, to have greater %IMF, with only a slightly larger ribeye area and more 12th-rib fat thickness than the progeny sired by Bull B.

The %IMF difference is a quarter percent difference in intramuscular fat. It is not one-

fourth of a marbling score. A higher %IMF EPD is the favorable direction to make genetic improvement in marbling, the correlated trait of interest. The EPDs for each bull could also be compared with the breed average ultrasound EPDs for nonparent bulls.

At no point in this example was there discussion of comparing the bull's specific %IMF phenotypic measurement. Instead, each bull's own scan data collected by a field technician and interpreted by the ultrasound lab was used to calculate the EPDs, comparing the bull's own performance to that of his contemporary group.

Occasionally a breeder will ask what the highest %IMF scan or the largest Angus ribeye area scan reported on Angus Herd Improvement Records (AHIR®) has been. The actual %IMF and ribeye area measurements have no value as absolute numbers to compare sires across management groups and environments. They are valuable only when used in National Cattle Evaluation (NCE) EPD calculations utilizing the contemporary group data.

Age range and contemporary group

American Angus Association members have amassed the largest seedstock ultrasound database for genetic improvement — with more than 660,000 phenotypic measurements used in the Spring 2007 NCE — to generate more than 1 million ultrasound EPDs. The specific breeder protocol for capturing ultrasound data for genetic improvement through AHIR is available online at www.angus.org/performance/breeder_protocol.html. It was also published beginning on page 377 of the February 2007 *Angus Journal*.

Common questions from breeders include age ranges and contemporary grouping issues. More often than not, the grouping question arises when a yearling animal shows up with no EPDs. Acceptable scanning age ranges are 320-440 days of age for bulls and 320-460 days for heifers. Steers within 320-460 days of age with scan data may also be submitted. This data is included in the carcass EPD analysis.

The contemporary group definition starts with weaning. This makes the submission of weaning weights and barnsheets a necessary

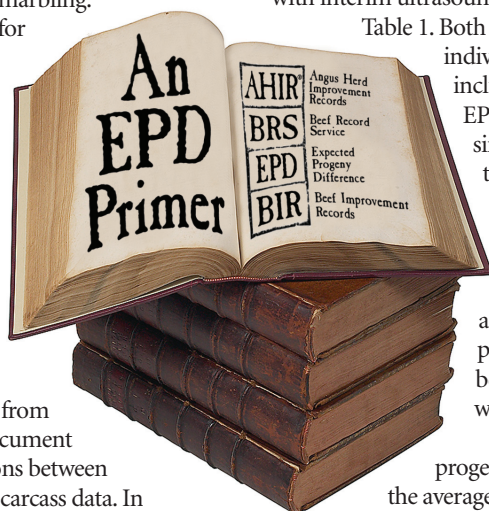


Table 1: Comparing ultrasound EPDs of two bulls

	EPDs and accuracies					
	%IMF	Acc	URE, sq. in.	Acc	UFat, in.	Acc
Bull A	0.42	0.28	0.31	0.28	0.015	0.28
Bull B	0.17	0.28	0.21	0.28	-0.003	0.28
Difference	0.25		0.10		0.018	
Breed average EPD						
Nonparent bulls	+0.13		+0.22		+0.005	

%IMF is percentage intramuscular fat as measured by ultrasound in %; URE is ultrasound ribeye area as measured by ultrasound in square inches (sq. in.); UFat is fat measurement at the 12th rib as measured by ultrasound in inches (in.).

Source: American Angus Association.

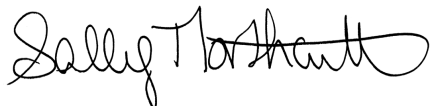
Breeder protocol for submitting ultrasound data

1. Submit weaning weights to obtain barnsheet.
2. Steps for image collection:
 - a. Determine age at scanning.
 - b. Select a field technician.
 - c. Prepare for scanning.
 - d. Collect scan weights.
 - e. Assign contemporary groups.
 - f. Determine test type.
 - g. Determine diet.
3. Field technician submits ultrasound images to authorized lab.
4. Authorized lab reports interpretive data to the American Angus Association.
5. American Angus Association returns ultrasound reports/summaries to breeder.

Source: American Angus Association, www.angus.org/performance/breeder_protocol.html.

part of the AHIR ultrasound process. Contemporaries are from the same weaning group, and there must be at least two calves of the same sex to form a usable contemporary group for ultrasound EPD calculations.

Scan weights are required and should be taken within seven days of the technician's capturing the ultrasound data. For the animals within the contemporary group, they should be scanned on the same day or over no more than two consecutive days. Many breeders will schedule the scanning date to coincide with data collection for other yearling traits.



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Editor's Note: "By the Numbers" is a column by Association performance programs staff to share insights with Angus members about data collection and interpretation, the NCE, genetic selection, and relevant technology and industry issues. If you have questions or would like to suggest a topic for a future column, contact Sally Northcutt, director of genetic research, or Bill Bowman, director of performance programs, at (816) 383-5100.