By the Numbers

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EPD basics: Why use the EPDs?

Expected progeny differences (EPDs) are a beef-cattle selection tool for cow-calf and seedstock producers to rank or compare the relative genetic merit of animals. These tools are used to select sires for economically important traits that will leave future progeny meeting the desired characteristics for the producer's breeding program.

Compare economic relevance

The EPDs are reported in the units of measure for the trait, such as pounds of birth, weaning, yearling or carcass weight, or square inches of carcass ribeye area. Unlike individual animal measures such as weights and ratios, EPDs can be compared across animals of different ages, herds, management groups and areas of the country within the Angus breed. EPDs are the common language of the beef industry to allow comparisons of relative rankings of Angus seedstock for economically relevant traits.

EPDs provide a benchmark of genetic performance that is comparable across the American Angus Association database. Where weights and measures vary by season and animal age, as well as breeder and management routines, EPDs are genetic values with the environmental differences adjusted out. This allows comparison of EPDs breed-wide.

EPDs incorporate varying sources of information on an individual animal and relatives, such as pedigree and the Association's weights or measures database for the trait of interest. These values allow breeders to compare animals directly against the breed population and chart their course for making genetic improvement.

Why include DNA results in EPDs?

The Beef Improvement Federation (BIF) guidelines state that DNA test results should be reported to the beef industry in a consistent, understandable format. Further, the format should be in the form of an EPD, in the units of the trait, on a continuous scale, and with a corresponding BIF accuracy.

DNA tests have value in genetic selection when incorporated with all other available forms of performance information for economically important traits in national cattle evaluation (NCE), and when communicated in the form of an EPD with a corresponding BIF accuracy.

If some form of an EPD is available for the trait through the Association, then the EPDs should be considered the selection tool of choice. The Igenity Profile for Angus scores are a simple categorical ranking on a 1-to-10 scale, until EPDs are available for a trait. Profile scores do not predict actual phenotypes. The scores reflect the animal's genetic potential for that particular trait based on the combination of the DNA markers analyzed. The higher scores do not necessarily indicate that it is the most desirable.

For the Pfizer Angus HD50K percentile rankings, a lower value indicates a more favorable ranking for the trait. Percentile ranking format, ranging from 1% to 100% in integer increments, is similar to that used in EPD percentile rankings. For example, a smaller numeric percentile ranking for a Pfizer result in birth weight and carcass fat indicates lighter calves and leaner carcasses as the expectation.

Again, if an EPD is available for the trait through the Association, then the EPDs should be considered the selection tool of choice. The EPD and accuracy account for all sources of information available on the animal of interest (e.g., pedigree, own record, weights/measures, genomic results).

The continued evolution of selection tools available for producers utilizing Angus genetics relies on a consistent and simplified method to characterize these genetics. Using the language of EPDs and the associated accuracies allows us to use the established "language" of the industry.

Why weekly NCEs?

Weekly genetic evaluations provide Angus enthusiasts the most up-to-date EPDs available to further characterize Angus genetics in a timely fashion. For example, the weekly genetic predictions for carcass merit will encompass carcass, ultrasound and genomic databases. Ultrasound, carcass, genomic and pedigree databases are boiled down into one seamless set of genomic-enhanced carcass EPDs for Angus breeding programs.

Table 1: DNA scores, establishing direction

	Igenity Score 'Favorable'	Pfizer Percentile 'Favorable'
Calving ease direct (more unassisted)	10	1%
Calving ease maternal	10	1%
Birth weight (lighter)	1	1%
Weaning weight	10	1%
Yearling weight	10	1%
ADG postweaning	10	1%
Milk (more maternal milk in daughter calves)	10	1%
Carcass marbling	10	1%
Carcass rib (larger)	10	1%
Carcass fat (leaner)	1	1%
Carcass weight (heavier)	10	1%
Dry-matter intake (eat less)	1	1%
RFI (lower feed intake than predicted)	1	1%
Tenderness (more tender)	10	1%
Docility (more docile)	10	
Yearling height (more hip ht.)	10	
Scrotal (larger size)	10	
Mature weight (larger cow wt.)	10	
Mature height (more cow ht.)	10	
Heifer pregnancy	10	

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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.*