



By the Numbers

► by **Sally Northcutt**, director of genetic research, American Angus Association

EPDs and what they tell us

Sometimes, in our attempt to always access and use the most current information or understand the latest in decision-making tools, we take for granted that all who read this column on a monthly basis have been exposed to the basics of animal breeding tools. It may seem redundant to say that an expected progeny difference (EPD) predicts “differences” in how future progeny are expected to perform. Yet a commonly asked question received in the Performance Programs Department at the Association regarding EPDs is “what will the calves weigh?”

By definition

By definition, an EPD is the expected difference in future progeny performance between one animal relative to future progeny performance of another individual(s). The EPDs are to be used in comparison with each other. As an example for two sires, EPDs are a prediction of how future offspring of one sire will compare with progeny from another sire. Specifically, if Bull A has a weaning weight (WW) EPD, reported in pounds (lb.), of +40 and Bull B has a WW EPD of +20, then on the average one would expect the future calves sired by Bull A to be 20 lb. heavier at weaning than the calves sired by Bull B.

Example 1

| | WW EPD |
|------------|---------|
| Bull A | +40 lb. |
| Bull B | +20 lb. |
| Difference | 20 lb. |

Keep in mind that we use EPDs to identify the genetics that will positively change populations. It was stated above that “on average” the difference between progeny of the two sires would be 20 lb. There will be individual animals by these sires that will not reflect the expected differences; but, with enough volume of data, the 20-lb. difference will be exhibited.

Another point to make is that with the EPDs we have not predicted the weight of

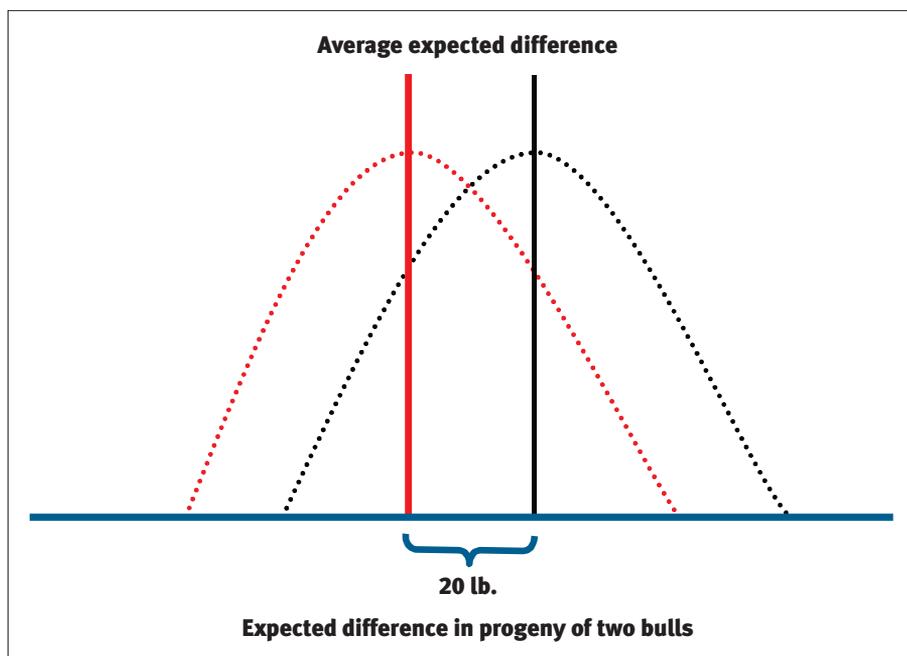
any one calf or the weights of a group of calves. EPDs predict progeny performance differences and not actual performance.

Performance differences

Fig. 1 depicts the hypothetical distributions of calf birth weights for Bull A and Bull B described in Example 1. Weaning weight is a continuous trait with a normal distribution of the data in what is commonly called a “bell-shaped” curve. A variety of calf weaning weights are produced from the progeny of these two bulls, so think of each dot on the curve as an individual calf’s weaning weight. Fig. 1 illustrates that not all calves will weigh the same, but the differing genetics of the two bulls (as described by their EPD predictions) produce an average 20-lb. difference in future progeny performance.

Another important take-home message can be found in the bell-shaped curve. Note that we have the averages of the two sires’ progeny that depict the expected 20-lb. difference. But also notice that some of the calves sired by the lower-weaning-EPD sire actually weighed a good deal more than the average of the heavier sire. Likewise, the calves by the higher-weaning-EPD sire are not all going to weigh more than the calves sired by Bull B. This demonstrates that EPDs do a great job of describing genetic differences, but we are always going to find individual examples that may defy the expected performance.

Fig. 1: Weight distribution of progeny and the average EPD between Bull A and Bull B



What EPDs don't tell us

The answer to one of the common questions on what calves will weigh out of a bull with a certain EPD is easy: We don't know!

EPDs predict the differences in expected performance. The genetics and age of the females mated to the bull, the season of year, the herd management, nutrition levels and other factors all have an effect on the actual weaning weight of the calves.

Knowing what EPDs can do and what they can't is an important concept to understand as one uses the various selection tools to make genetic improvement in an Angus operation. As always, if you have

questions, please contact the Performance Programs Department for additional information.

EPD basics to remember

- ▶ EPDs do not predict actual performance. The numbers describe genetic differences between animals within the Angus breed.
- ▶ EPDs are expressed in units of measure for the trait.
- ▶ Each trait has a breed average EPD for various classes of animals (e.g., current sires, non-parent bulls)
- ▶ Breed average EPD for a trait is not necessarily zero. Be aware of breed averages for Angus EPDs, as they are not directly comparable to EPDs printed for other cattle breeds.



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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 National Cattle Evaluation (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.

References:

EPD and \$Value definitions:
www.angus.org/sireeval/howto.html

Breed averages:
www.angus.org/sireeval/breed_avg_epd.html

EPD accuracy and possible change:
www.angus.org/sireeval/accuracy.htm