Beef Logic

► by **R.A. "Bob" Long**

Expected progeny differences

Certified Angus Beef LLC (CAB) sponsors a chat group on the Internet designed to facilitate discussions about profitable production of high-quality beef. Participants discuss the pros and cons of almost every phase of breeding, feeding, management and marketing of beef cattle. This group refers to itself as "the list," and the list includes purebred breeders, commercial breeders and cattle feeders of all shapes, sizes and backgrounds — even a few academic types. Any cattleman should find it interesting to participate, and you might even learn something. (If you are interested, contact Steve Suther by e-mail at cabsteve@aol.com.)

EPD discussion

Opinions and ideas are offered by individual posters. In view of the variation in experience and environment, the discussions may get a bit wild. For example, I was surprised and concerned by the opinions presented recently during a discussion of the accuracy of ultrasound expected progeny differences (EPDs) and their use. The subject was initiated by a group member's request for information on how to increase marbling in carcasses of steers from his herd. Responses covered genetics, nutrition and management and finally centered on a discussion of the accuracy of ultrasound EPDs.

One group member questioned the use of ultrasound EPDs by referring to research data from a major university, which he thought proved that a sire's EPDs for marbling did not predict the marbling of his steer progeny. This prompted the remark from another member, "If EPDs for marbling do not predict marbling in a sire's steer progeny, then what is their commercial and economical value?"

Whoa!

An animal's EPD for a trait does not predict its performance and was not designed to do so. EPDs estimate the expected difference in performance of two animals when used as parents; hence the name expected progeny differences.

Some basics

A bull's EPD for marbling cannot by itself predict the marbling in steer progeny because the mother cow provides 50% of the genetics. Furthermore, nutrition, age at slaughter, management and the environment affect marbling.

Similarly, an EPD for any trait does not predict performance of progeny — only the difference in performance of animals when used as parents.

For years, population geneticists have urged the use of performance records as a tool for the evaluation of breeding stock. Initially, simple computations such as average adjusted weaning and yearling weights and the ratios of these weights among contemporaries were used. These data did a reasonably good job of ranking individuals within herds and seasons, but yielded no information as to where individuals ranked as compared to breed averages or for comparing individuals from different herds.

As the more progressive breed associations accumulated extensive performance data banks and promoted the use of "check sires," much more sophisticated procedures were possible and geneticists used the "reduced animal model" to analyze the data. This mathematically complex procedure is so massive that it can be handled only by a so-called "super computer" which is only available to the individual breeder through a breed association or university.

The reduced animal model is designed to analyze performance data from all herds and contemporary groups (groups treated alike and in the same season) within a breed and to separate the genetic effects from the environmental components of that data. That portion of an animal's performance for a trait due to genetics is said to be that animal's genetic value or breeding value. It is calculated from that individual's own performance data, that of its progeny and all close relatives. The EPD is an estimate of one-half of the breeding value since the animal can transmit only half of its genes to an offspring.

Example for using EPDs

The EPD estimates only the expected difference in performance of two animals when used as parents. For example, assume that Bull A has an EPD for yearling weight of +70 and Bull B an EPD of +10. This means that if these two bulls are mated to similar cows, and the cows and the resulting calves are treated alike, the average yearling weight of the calves sired by Bull A will be 60 pounds (lb.) (70 - 10 = 60) heavier than those sired by Bull B.

Each EPD is also accompanied by an accuracy value. The accuracy value is determined by two factors:

Table 1: Accuracy and associated possible change

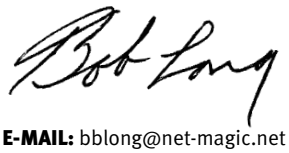
Accuracy	Birth weight (BW) EPD	Weaning weight (WW) EPD	Yearling weight (YW) EPD
0.10	2.55	11.9	16.0
0.20	2.45	11.3	15.2
0.30	2.35	10.7	14.5
0.40	2.20	10.1	13.6
0.50	2.00	9.4	12.7
0.60	1.80	8.6	11.7
0.70	1.60	7.7	10.5
0.80	1.40	6.7	9.1
0.90	1.20	5.3	7.3

1. The amount of information available on an individual — the more progeny, the more herds and the more relatives involved in the performance data, the higher the accuracy value.
2. The heritability of the trait — yearling weight is highly heritable and therefore requires less information than does a trait of low heritability, such as calving ease.

However, if enough data to compute an EPD is available, the probability of the EPD's changing is not as great as people might believe. Table 1 shows the possible change for different accuracy values and different traits in the Angus breed.

Therefore, if two young bulls, each with a low accuracy value for yearling weight, are being considered for purchase, the low accuracy is of little importance if there is a large difference in EPDs. For example, if the difference in EPDs for yearling weight is +50 lb. the possible change for a 0.10 accuracy value is only ±16 lb.; therefore the bulls will maintain their rank and the high EPD can be selected with confidence.

Remember, EPDs do not predict an individual's actual performance; they only estimate differences in breeding ability and are designed to move herds or breeds in a certain direction for a particular trait — and they *do* work.



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