Sifting Genetics

AHA's robust genetic evaluation provides powerful selection tools.

Eyes of experience are unbeatable for evaluating cattle conformation and structural soundness. However, no one can visually appraise an individual animal and predict its genetic merit for specific traits more reliably than expected progeny differences (EPDs). Genomic-enhanced expected progeny differences (GE-EPDs) offer the same power with increased accuracy of genetic prediction earlier in an animal's life.

Individual beef breed associations coordinate the genetic evaluations resulting in unique EPDs and GE-EPDs for each breed. Although there are similarities between common traits evaluated in various breeds, there can be subtle differences in the definition, not to mention entirely different traits measured among breeds.

The American Hereford Association (AHA) provides EPDs for 17 traits along with three economic selection indexes. AHA's genetic evaluation uses what's termed a Marker Effects Model, which calculates EPDs by incorporating the pedigree, phenotypic and genomic profile of an animal. Animals with a genomic profile receive GE-EPDs, denoted with a GE-EPD logo.

Calving Ease — Direct (CE)

CE EPD is based on calving ease scores and birth weights. This trait is measured as a percentage. CE EPD indicates the influence of the sire on calving ease in females calving at 2 years of age. For example, if sire A has a CE EPD of 6 and sire B has a CE EPD of -2, then you would expect on average, if comparably mated, sire A's calves would be 8 percent more likely to calve unassisted than those by sire B.

Birth Weight (BW)

BW EPD is an indicator trait for calving ease and is measured in pounds. For example, if sire A has a BW EPD of 3.6 and sire B has a BW EPD of 0.6, then you would expect on average, if comparably mated, sire A's calves would be 3 pounds heavier at birth when compared to sire B's calves. Larger BW EPDs usually, but not always, indicate more calving difficulty. The figure in parentheses found after each EPD is an accuracy value, which estimates the reliability of the EPD.

Weaning Weight (WW)

WW EPD is an estimate of pre-weaning growth measured in pounds. For example, if sire A has a WW EPD of 60 and sire B has a WW EPD of 40, then you would expect on average, if comparably mated, sire A's calves would weigh 20 pounds heavier at weaning when compared to sire B's calves.

Yearling Weight (YW)

YW EPD is an estimate of post-weaning growth measured in pounds. For example, if sire A has a YW EPD of 100 and sire B has a YW EPD of 70, then you would expect on average, if comparably mated, sire A's calves would weigh 30 pounds more at 1 year of age when compared to sire B's calves.

Dry Matter Intake (DMI)

The DMI EPD predicts the daily consumption of pounds of feed. For example, if sire A has a DMI EPD of 1.1 and sire B has a DMI EPD of 0.1, you would expect sire B's progeny, if comparably mated, to consume on average 1 pound less of feed per day.

Scrotal Circumference (SC)

Measured in centimeters and adjusted to 365 days of age, SC EPD is a fertility

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estimate. It is related to the bull's own semen quantity and quality, and it is also associated with age at puberty of sons and daughters. Larger SC EPDs suggest younger age at puberty. Yearling sons of a sire with a 0.7 SC EPD should have yearling scrotal circumference measurements that average 0.7 centimeters larger than progeny by a bull with an EPD of 0.0 centimeters.

Sustained Cow Fertility (SCF)
The AHA's SCF EPD is a prediction of a cow's ability to continue to calve from 3 years of age through 12 years of age, given she calved as a 2-year-old. The EPD is a deviation in the proportion of the 10 possible calvings to 12 years old expressed as a probability. For example, the daughters of a bull with a 30 SCF EPD would have the genetic potential to have one more calf by age 12 than the daughters from a bull with a 20 SCF EPD. In other words, the daughters from the 30 SCF EPD bull would have a 10% greater probability of having one more calf than the bull with a 20 SCF EPD. This is equivalent to saying that the daughters are 10% more likely to remain in the herd to age 12.

Maternal Milk (MM)
The MM EPD of a sire's daughters is expressed in pounds of calf weaned. It predicts the difference in average weaning weights of sires' daughters' progeny due to milking ability. Daughters of a sire with a +14 MM EPD should produce progeny with 205-day weights averaging 24 pounds more (as a result of greater milk production) than daughters of a bull with a MM EPD of -10 pounds (14 minus -10 = 24 pounds). This difference in weaning weight is due to total milk production during the entire lactation.

Maternal Milk & Growth (M&G)
The M&G EPD reflects what the sire is expected to transmit to his daughters for a combination of growth genetics through weaning and genetics for milking ability. It is an estimate of the daughter's progeny weaning weight. A bull with a M&G EPD of 29 pounds is expected to sire daughters with progeny weaning weights averaging 19 pounds heavier than progeny of a bull's daughters with a M&G EPD of 10 pounds (29 minus 10 = 19 pounds). It is equal to one-half the sire's WW EPD, plus all of his MM EPD. No accuracy is associated with this since it is a mathematical combination of two other EPDs. It is sometimes referred to as "total maternal" or "combined maternal."

Maternal Calving Ease (MCE)
MCE EPD predicts how easily a sire's daughters will calve at 2 years of age and is measured as a percentage. For example, if sire A has a MCE EPD of 7 and sire B has a CE EPD of -3, then you would expect on average, if comparably mated, sire A's daughters would calve with a 10% more likely chance of being unassisted when compared to sire B's daughters.

Mature Cow Weight (MCW)
The MCW EPD was designed to help breeders select sires that will either increase or decrease mature cow size in the herd. The trait was developed after years of cow weight data collection and the EPD relates directly to the maintenance requirements of a cow herd. For example, if sire A has a MCW EPD of 100 and sire B has an EPD of 85, then you would expect the females of sire A, if comparably mated, to be 15 pounds heavier at mature size.

Udder suspension (UDDR)
UDDR EPDs are reported on a 9 (very tight) to 1 (very pendulous) scoring scale. Differences in sire EPDs predict the difference expected in the sires' daughters' udder characteristics when managed in the same environment.

For example, if sire A has a UDDR EPD of 0.4, and sire B has a UDDR EPD of -0.1, the difference in the values is 0.5, or one-half of a score. If daughters of sires A and B are raised and managed in the same environment, you would expect half a score better udder suspension in daughters of sire A, compared to sire B.

Teat size (TEAT)
TEAT EPDs are reported on a 9 (very small) to 1 (very large, balloon shaped) scoring scale. Differences in sire EPDs predict the difference expected in the sires' daughters' udder characteristics when managed in the same environment.

For example, if sire A has a teat size EPD of 0.4, and sire B has a teat size EPD of -0.1, the difference in the values is 0.5, or one-half of a score. If daughters of sires A and B are raised and managed in the same environment, you would expect half a score smaller teat size in daughters of sire A, compared to sire B.

Carcass Weight (CW)
CW EPD is a beneficial trait when considering the impact that pounds have relative to end product value. At the same age-constant endpoint, sires with higher values for carcass weight will add more pounds of hot carcass weight compared to sires with lower values for carcass weight. For example, if sire A has a CW EPD of 84 and sire B has a CW EPD 64, then you would expect the progeny of sire A, if harvested at the same age-constant endpoint, to have a 20-pound advantage in terms of hot carcass weight.

Rib Fat (FAT)
The FAT EPD reflects differences in adjusted 365-day, 12th-rib fat thickness based on carcass measurements of harvested cattle. Sires with low, or negative FAT EPDs, are expected to produce leaner progeny than sires with higher EPDs. Ultrasound measures are also incorporated into this trait and have been shown to be highly correlated with the performance of slaughter progeny. All data is expressed on a carcass scale.

Ribeye Area (REA)
REA EPDs reflect differences in an adjusted 365-day ribeye area measurement based on carcass measurements of harvested cattle. Sires with relatively higher REA EPDs are expected to produce heavier muscled and higher percentage yielding slaughter progeny than sires with lower REA EPDs. Ultrasound measurements are also incorporated into this trait and have been shown to be highly correlated with the performance of slaughter progeny. All data is expressed on a carcass scale.

Marbling (MARB)
MARB EPDs reflect differences in an adjusted 365-day marbling score (intramuscular fat, [IMF]) based on carcass measurements of harvested cattle. Breeding cattle with higher MARB EPDs are expected to produce slaughter progeny with a higher degree of IMF and therefore higher quality grades. Ultrasound measurements are also incorporated into this trait and have been shown to be highly correlated with the performance of slaughter progeny. All data is expressed on a carcass scale.

Baldy Maternal Index (BMI$)
The BMI$ is a maternally focused index that is based on a production system that uses Hereford-Angus cross cows. Progeny of these cows are directed towards Certified Hereford Beef® (CHB). This index has significant weight on SCF, which predicts fertility and longevity of females. There is a slightly positive weight on WW, MCW and MM, which accounts for enough growth but ensures females do not increase inputs. There is some negative emphasis on DMI, but a positive weighting on CW, which is anticipated to provide profitability from finishing of non-replacement females and castrated males. MARB and REA are also positively weighted to keep the harvested progeny successful for CHB. This index is geared to identify Hereford bulls that will be profitable when used in a rotational cross with mature commercial Angus cows.

Brahman Influence Index (BII$)
The BII$ is a maternally focused index based on a production system that uses Brahman-Hereford cross cows. Progeny of these cows are directed toward a commodity beef market since *Certified Hereford Beef* does not accept Brahman-influenced cattle. This index has significant weight on SCF, which predicts fertility and longevity of females. There is a slightly positive weight on WW, MCW and MM, which accounts for enough growth but ensures females do not increase inputs. There is some negative emphasis on DMI, but a positive weighting on CW, which is anticipated to provide profitability in finishing non-replacement females and castrated males. MARB and REA are also positively weighted to keep harvested progeny successful for a variety of commodity based programs. This index targets producers who use Hereford bulls on Brahman-influenced cows.

Certified Hereford Beef Index (CHB$)
CHB$ is a terminal sire index built on a production system where Hereford bulls are mated to mature commercial Angus cows, and all progeny will be targeted for *Certified Hereford Beef* after the finishing phase. This index has significant weight on CW and MARB to ensure profit on the rail. Gain is weighted positively, while DMI is weighted negatively to ensure efficient pounds of growth in the finishing phase. In addition, there is a positive weighting for REA and the FAT is weighted negatively to maintain desirable yield grades. This is the only AHA index that places no emphasis on fertility. It assumes that no replacement heifers will be retained. **H**W