

COMPARING ACROSS BREEDS

USMARC releases 2020 adjustment factors for calculating across-breed EPDs.

by Larry Kuehn & Mark Thallman, U.S. Meat Animal Research Center

National cattle evaluation (NCE), and the resulting expected progeny differences (EPDs), have resulted in substantial genetic change since their inception in the 1970s. However, EPDs are generally only comparable within a breed because of differences in the genetic base.

Since 1993, the U.S. Meat Animal Research Center (USMARC) has produced a table of factors to adjust the EPDs of cattle so the merit of individuals can be compared across breeds.

Adjustment factors for carcass traits have been calculated since 2009, and carcass weight was added in 2015. To be included, breeds must have carcass data in the USMARC database and report carcass EPDs on an actual carcass basis using an age-adjusted end point.

Normally, the EPDs of animals from different breeds cannot be compared because many breed associations compute their EPDs in separate analyses, and each breed has a different base point.

Bulls of different breeds can be compared on the same EPD scale by adding the appropriate adjustment factor from Table 1 to the within-breed EPDs produced in the most recent genetic evaluations for each of the 18 breeds, creating across-breed EPDs (AB-EPDs). The across-breed adjustment factors reflect both the current breed difference and differences in the breed base point and adjust the EPDs to an Angus base.

The traits for which factors are estimated are birth weight (BW), weaning weight (WW), yearling weight (YW), maternal milk (Milk), marbling score (Marb), ribeye area (REA), backfat depth (Fat) and carcass weight (CW).

The AB-EPDs are most useful to commercial producers purchasing bulls of more than one breed to use

in crossbreeding programs. As an example, suppose an Angus bull has a YW EPD of +90.0 pounds (lb.) and a Hereford bull has a yearling weight EPD of +92.0 lb. The across-breed adjustment factors for yearling weight are 0.0 for Angus and -41.3 for Hereford. The AB-EPD is $90.0 - 0.0 = 90.0$ for the Angus bull and $92.0 - 41.3 = 50.7$ for the Hereford bull. Thus, the expected weaning weight difference of offspring when both are mated to cows of another breed would be $90.0 \text{ lb.} - 50.7 \text{ lb.} = 39.3 \text{ lb.}$

Brahman EPDs for marbling score are reported on a different scale than the other breeds with marbling score EPDs. For Brahman $400 = SI^{00}$ and $500 = Sm^{00}$; whereas, for the other breeds, $4.00 = SI^{00}$ and $5.00 = Sm^{00}$. As a result, EPDs from other breeds need to be multiplied by 100 after being adjusted to Brahman, and Brahman EPDs need to be divided by 100 prior to applying the adjustment factors.

The adjustment factors in Table 1 were updated using EPDs from the most recent NCEs conducted by each of the 18 breed associations (current as of December 2020). The breed differences used to calculate the factors are based on comparisons of progeny of sires from each of these breeds in the Germplasm Evaluation Program at USMARC

at Clay Center, Neb. These analyses were conducted by USMARC geneticists Larry Kuehn and Mark Thallman.

Following a Beef Improvement Federation (BIF) working group recommendation, these factors are released near the beginning of each year to facilitate the use of these tools during spring bull buying. Additional updates may be released throughout the year, particularly if breeds are aware of significant changes to their evaluations, such as base adjustments.

The most current version of the factors is reported on the BIF website, www.beefimprovement.org.

Editor's note: Article adapted from a release provided by USMARC.

Table 1: January 2021 adjustment factors to add to EPDs of 18 breeds to estimate across-breed EPDs

Breed	BW ^a	WW	YW	Milk	Marb ^b	REA	Fat	CW
Angus	0.0	0.0	0.0	0.0	0.00	0.00	0.000	0.0
Hereford	0.9	-16.6	-41.3	-11.1	-0.35	0.06	-0.076	-69.7
Red Angus	2.3	-21.3	-28.9	1.6	-0.11	0.29	-0.035	-7.2
Shorthorn	3.5	-23.1	-37.6	-4.9	-0.15	0.32	-0.039	-3.0
South Devon	3.1	-30.9	-57.9	2.6	-0.37	0.39	-0.042	2.2
Beefmaster	3.8	24.1	2.5	4.2				
Brahman	9.4	55.8	19.9	13.6	-0.69	0.11	-0.154	-33.9
Brangus	2.8	16.5	10.2	14.1				
Santa Gertrudis	4.9	39.7	35.1	17.5	-0.47	0.21	-0.074	-2.1
Braunvieh	2.1	-14.2	-40.6	-1.2	-0.63	1.17	-0.117	-38.9
Charolais	6.0	28.5	20.3	8.4	-0.33	0.80	-0.198	6.6
Chiangus	2.4	-23.6	-42.9	4.3	-0.40	0.53	-0.122	-26.1
Gelbvieh	3.2	-9.7	-17.2	7.1	-0.56	0.77	-0.112	-12.3
Limousin	1.7	-10.9	-35.4	-4.8	-0.39	0.61	-0.082	-4.5
Maine-Anjou	1.8	-28.5	-57.9	-7.6	-0.53	1.06	-0.169	-26.5
Salers	2.1	-17.7	-31.5	8.3	-0.78	0.53	-0.063	0.5
Simmental	1.7	-16.2	-25.5	-2.8	-0.19	0.50	-0.066	-4.5
Tarentaise	2.2	26.9	-8.1	11.1				

^aBW = birth wt., lb.; WW = weaning wt., lb.; YW = yearling wt., lb.; Milk = maternal milk, lb.; Marb = marbling score, units; REA = ribeye area, sq. in.; BF = backfat, in.; CW = carcass wt., lb.

^bMarbling score units: $4.00 = SI^{00}$; $5.00 = Sm^{00}$. Note that Brahman EPDs for marbling are reported on a scale where $400 = SI^{00}$ and $500 = Sm^{00}$. When converting sires from other breeds to a Brahman basis, the adjusted EPD should be multiplied by 100. Likewise, when Brahman EPDs are adjusted to other breeds, the EPD should be divided by 100 before adding the adjustment factor.

SOURCE: U.S. Meat Animal Research Center, January 2021.