

Interpreting Performance Information of IBEP Bulls

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Ear Tag	Bull Name	DOB:	Reg. #:	Tattoo/Brand:	Breed	
Pen #	Owner	Phone #				
				Act BW	64	
	Paternal Grandsire			Adj WW/Ratio	659/103	
Sire		\$M	+80	WW Contemp.	16	
	Paternal Granddam	\$W	+77	% Retail/Ratio	64.78/98	
		\$F	+91	Adj % IMF/Ratio	3.6/106	
	Maternal Grandsire	\$G	+47	Adj RE/Ratio	11.8/103	
Dam		\$B	+138	Adj RE/CWT	0.97	
	Maternal Granddam	\$C	+259	Adj Rib Fat/Ratio	0.32/171	
Sale Index	Perf. Index	Weight	ADG/Ratio	WDA/Ratio	Act. Frame	Act. CLW/ANG
78.25	106.59	1207	3.2/106	3.2/108	5.0	4/6
CED	BW	WW	YW	RADG	DMI	YH
+10/6%	-.3/20%	+79/15%	+141/10%	+25/55%	+2.27/95%	+7/30%
MILK	CEM	HP	CW	MARB	RE	FAT
+29/35%	+7/65%	+18.0/4%	+60/25%	+45/75%	+80/30%	-.013/20%
DOC	SC	Act SC/Adj SC	Carc Merit		Dam Age	Prog/NR
+18/55%	+38/80%	33/33	101.93		2	1/103

ID Information

Ear Tag: Bull's visual identification ear tag at IBEP Test Station.

DOB: Bull's actual date of birth.

Reg. #: Bull's official registration number with the breed association (American Angus Association, American Hereford Association, American Simmental Association, etc.). This number can be searched on the breed association's website.

Tattoo/Brand: Permanent form of identification, registered with the breed association.

Breed Composition: Purebred or percentage of breeds represented in the bull's pedigree. This example is for a Purebred Angus bull.

Pen #: Pen at the IBEP Test Station in which that bull is housed.

Farm Name and Location: Bull's owner with town and state of residency.

Farm Phone Number: Contact number for the bull owner.

Data Recorded On-Farm

Act BW: The bull's actual recorded birthweight.

Adj WW/Ratio: The 205-day weight adjusted for the age of the dam. The ratio is the weight expressed as a percent of the average; this was determined within herd and not within breed at the IBEP.

WW Contemp.: The number of calves of the same sex born within 90 days of each other which have been managed the exact same way, making them weaning contemporaries.

Dam Age: The dam's age at calving.

Prog/NR: "Prog." refers to the number of progeny born out of dam and "NR" is their average weaning ratio. In this example, the dam has had 1 calf that had a weaning weight that was 3% above the average of its contemporary group.

Data Measured at IBEP

Perf. Index: This is the IBEP Performance Index = $.60(\text{ADG Ratio}) + .40(\text{WPDA Ratio})$. In this example, the index is $.60(106) + .40(108) = 106.59$, indicating that his combined performance was 6.59% above the breed average. Bulls with higher indexes should add more growth potential to calves than bulls of the same breed with lower indexes. Calves with more genetic potential for growth should be heavier at weaning, gain faster in the feedlot, reach an acceptable harvest weight at a younger age, and be more profitable.

A note on Ratios: Ratios for traits compare the bull to others of his breed in this test. If there are fewer than 6 bulls of that breed, the ratio is based on the trait average for all bulls in the test.

Weight: The bull's most recent weight recorded or the official off-test weight of the bull.

ADG/Ratio: The Average Daily Gain of the bull during the 125-day test. The ratio compares the ADG to the breed average. A ratio of 106 indicates the bull gained 6% faster than the average of his breed in this test.

WDA/Ratio: The Weight Per Day of Age at the time of off-test. The ratio compares the WPDA to the breed average. A ratio of 108 indicates the bull was 8% heavier per day of age than the average of his breed on test.

Act Frame: The frame score at the time of off-test. The formula used by IBEP is that reported by the Beef Improvement Federation (BIF) for 5 to 21-month-old bulls. $\text{Frame Score} = -11.548 + (0.4878 \times \text{Hip Ht.}) - (0.0289 \times \text{Age}) + (0.00001947 \times \text{Age}^2) + (0.0000334 \times \text{Hip Ht.} \times \text{Age})$, where Age = days of age. As noted by BIF, this calculation was based on recorded measurements of beef cattle in the 1970s. Based on genetic progression since this time, this formula may no longer be accurate. See <https://beefimprovement.org/> for more information.

Act CLW/ANG: Actual claw and foot angle scores assigned to the worst hoof by the IBEP structural soundness committee, utilizing the *Foot Score Guidelines* published by the American Angus Association. Scores range from 1 to 9, with 5 being ideal. See "Soundness and Foot Score Evaluations" below for more details.

Act SC/Adj SC: The actual (Act) and adjusted (Adj) scrotal circumference, in cm, at the end of the test. The adjustment is to 365 days of age.

% Retail/Ratio: This is the % Retail Product, which is estimated as $65.59 - 9.931 * (\text{Rib Fat}) + 1.2259 * (\text{Rib Eye Area}) - 0.013166 * (\text{Carcass Weight}) - 1.29 * (\text{KPH})$. Rib Fat and Rib Eye Area are adjusted to 365 days of age. Carcass Weight was estimated as $.60 * (365\text{-day Weight})$; if the breed association does not adjust ultrasound information to 365 days of age, the weight at scanning is used instead of 365-day weight. A KPH (kidney, pelvic and heart fat) value of 2.0% was used for all bulls. The ratio compares the % retail product to the breed average. A ratio of 98 indicates the bull is estimated to have 2% less % retail product than the average for his breed in this test. The % retail product is heavily influenced by rib fat thickness and rib eye area, and highly related to carcass Yield Grade. Lower rib fat thickness and larger rib eye area result in greater % retail product. Comparing within a breed, bulls with higher % retail product values should sire calves with carcasses having more desirable Yield Grades than bulls with lower % retail product values.

Adj % IMF/Ratio: The % intramuscular fat (IMF) is a measure of marbling, which is one of the major factors influencing carcass Quality Grade. It is measured by ultrasound and adjusted to 365 days of age. Comparing within a breed, bulls with higher % IMF should sire calves with a higher % IMF, and therefore a higher carcass Quality Grade, than calves sired by bulls with lower % IMF. The ratio compares the % IMF to the breed average. A ratio of 106 indicates the bull had 6% more % IMF than the average of his breed in this test.

Adj RE/Ratio: Rib Eye Area is measured by ultrasound at the 12th rib, and adjusted to 365 days of age. Breed-specific adjustments are used. A ratio of 103 indicates the bull had a 3% larger RE than the average of his breed on test.

Adj RE/cwt: The adjusted Rib Eye Area expressed per hundred pounds of live weight. The 365-day weight is used as the live weight measurement; if RE is not adjusted to 365 days, the weight at scanning is used.

Adj. Rib Fat/Ratio: Rib fat, also referred to as backfat, is measured at the 12th rib, and adjusted to 365 days of age. A ratio of 171 indicates the bull had 71% more rib fat than the average of his breed on test.

Note: ^ Denotes that the breed association does not adjust this ultrasound information (IMF, RE, Rib Fat) to 365 days of age, so this is the actual record (unless otherwise specified)

Carcass Merit: This is calculated as (% Retail Product Ratio + % Intramuscular Fat Ratio)/2. In this example, the carcass merit is (106+98)/2 = 101.93, indicating that his carcass merit is 1.93% above the breed average (ratios were rounded to integers for display in the catalog). Carcass merit is an attempt to provide an indicator of both carcass Quality Grade and carcass Yield Grade. Ideally, we would prefer bulls that were above average in both % retail product and in % IM fat. However, this is not always possible. Producers whose calves tend to have less than desirable Quality Grades need to place greater emphasis on % IM fat, while those with calves that tend to have poor Yield Grade (i.e., few Yield Grade 1 and 2 with some Yield Grade 4) need to place greater emphasis on % retail product.

Sale Index: This is a weighted sum of the number of stars for six traits. Traits included are: 30% ADG, 20% WPDA, 7.5% IMF, 7.5% REA/cwt, 20% Calving Ease Direct EPD, and 15% Weaning Weight EPD. The maximum Sale Index for a bull is 100.0.

Number of stars is related to the decile ranking of the bull for that measured trait or EPD. A bull in the top 10% received 10 stars, the top 20% received 9 stars, and so on. For EPDs, this uses the breed association's percentiles for non-parent bulls (see the "EPD" description below). For traits measured during the test, the bull is compared to others of the same breed; if there are fewer than 6 bulls of that breed, the bull is compared to all bulls in the test.

EPDs and \$ Indexes

EPD: EPDs (Expected Progeny Difference) are given for several traits. Production traits: Direct Calving Ease (CED,CE), Birth Weight (BW), Weaning Weight (WW), Yearling Weight (YW), Docility (DOC), Scrotal Circumference (SC), Yearling Height (YH), Dry Matter Intake (DMI), Residual Average Daily Gain (RADG), and Average Daily Gain (ADG). Maternal traits: Milk (MILK,MM,MK), Maternal Calving Ease (CEM,MCE), Heifer Pregnancy (HP,HPG), Udder Suspension (UDDER,UDDR), Teat size (TEAT), Sustained Cow Fertility (SCF), and Stayability (STAY,STY,ST). Carcass traits: Carcass Weight (CW,CWT), Marbling (MARB,MRB,MB), Rib Eye Area (RE,REA), Backfat (FAT,FT,BF), Yield Grade (YG), and % Retail Cuts (RET). Exact traits, and abbreviations for trait names, will be different for each breed.

All bulls in this catalog have genomic-enhanced EPDs, meaning their pedigree and performance information has been refined by DNA data, which increases the accuracy of the EPD. For some EPDs, DNA can increase EPD accuracy as much as phenotypic data would on a first calf crop. It is only valid to compare EPDs of bulls within the same breed. Do not compare EPDs of bulls in different breeds unless the EPD has an "Across-Breed EPD Adjustment Factor". These are published by the U.S. Meat Animal Research Center (USMARC) and are available at <https://beefimprovement.org/>

EPDs are reported with a %, which comes from the breed association. This is a percentile ranking which compares the bull to other non-parent bulls in their entire breed, not just the bulls in this test. An EPD with a percentile ranking of 50% would be considered breed-average. In this example, the bull's CED EPD of +10 has a percentile ranking of 20%, so the bull is in the top 20% of non-parent bulls in the Angus breed for Direct Calving Ease. His MARB EPD of +.45 has a percentile ranking of 75%, so the bull is in the top 75%, or bottom 25%, of non-parent Angus bulls for Marbling. "Non-parent" means young bulls that have not sired a calf crop with progeny data submitted to the breed association.

\$ Indexes: These are multi-trait selection indexes calculated by many breed associations. These combine EPDs for several traits into a single economic value, which can be used to make selection decisions. Typical beef production and economic values are used in calculating the indexes. Indexes are expressed in dollars per head, and higher indexes mean a higher dollar value per head. The index values are interpreted like EPDs; the difference in index value between two bulls is the expected difference in average dollar value per head of their progeny, when the bulls are bred to similar cows. An index value only has meaning when it is compared to the index value of another animal of the same breed. Currently, indexes are calculated for Angus, Gelbvieh, Gelbvieh Balancer, Hereford, Limousin, Red Angus, Shorthorn, Simmental, and SimAngus bulls.

Angus indexes are Maternal Weaned Calf Value (\$M), Weaned Calf Value (\$W), Feedlot Value (\$F), Grid Value (\$G), Beef Value (\$B), and Combined Value (\$C).

Charolais index is Terminal Sire Index (TSI).

Gelbvieh indexes are Total Maternal (TM), \$Cow, Efficiency Profit Index (EPI), and Feeder Profit Index (FPI).

Hereford indexes are Baldy Maternal Index (BMI\$), Brahman Influence Index (BII\$), and Certified Hereford Beef Index (CHB\$).

Limousin index is Mainstream Terminal Index (\$MTI).

Red Angus indexes are Profitability and Sustainability Index (ProS), HerdBuilder Index (HB) and GridMaster Index (GM).

Shorthorn indexes are Calving Ease Direct (\$CEZ), British Maternal Index (\$BMI), and Feedlot (\$F).

Simmental and **SimAngus** indexes are All-Purpose Index (API) and Terminal Index (TI).

See the article "EPDs and \$ Indexes" on the IBEP website for more information about EPDs, \$ Indexes, and their interpretation: https://ag.purdue.edu/departments/ansc/ibep/_docs/w23-epd-index.pdf.

Comparing EPDs for Different Bulls:

Bull A	Bull B	
CED	CED	Name of EPD
+7/45%	+12/40%	EPD / Percentile ranking for the EPD
<p>The difference between their CED EPDs is $12 - 7 = 5$, or 5%.</p> <p>If Bull A and Bull B were bred to the same group of heifers, we would anticipate calves sired by Bull B to require assistance at birth 5% of the time less than those sired by Bull A.</p> <p>The actual number of calves requiring assistance at birth between bull A and B based on this percentage difference is dependent upon the number of heifers bred.</p> <p>$10 \text{ heifers} \times 5\% = 0.5 \text{ calf}$, so we would anticipate that there would essentially be no difference in number of assisted births between these two bulls given the number of heifers being bred.</p> <p>$20 \text{ heifers} \times 5\% = 1 \text{ calf}$. Between Bull A and Bull B if mated to the same 20 heifers we would anticipate having to assist with one more birth from Bull A compared to Bull B.</p>		

Soundness and Foot Score Evaluations

The IBEP board of directors accepted the motion in December of 2019 to utilize the *Foot Score Guidelines* published by the American Angus Association to score hoof angle and claw set on every bull on test. A diagram of the guidelines is shown below. Scores of 1 and 9 are considered “unsound”, and scores of 2 and 8 are considered “marginally unsound”. A score of 5 is considered an ideal score. The structural soundness committee consists of three to five individuals that do not own a bull currently on test. As a committee, they discuss each bull and come to an agreement on the foot angle, claw set score, and whether or not each bull is eligible for sale based on structural soundness and disposition.

