Breed Association $Value Indexes Fact Sheet

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Multi-trait selection indexes combine EPDs for several traits into a single economic value aimed at simplifying selection decisions. The index values are interpreted like EPDs; the difference in $Value between two bulls is the expected difference in average dollar value of their progeny, when the bulls are bred to similar cows. Economic assumptions from "typical" beef production methods are used in calculating the indexes. All indexes are expressed in dollars per head.

✓ More $$$ is always better; higher index values are more desired, but only if your environment and management can handle the potential increase in inputs. Proceed with caution!

✓ $ Indexes are NOT comparable between breeds, even if both breeds participate in the same multi-breed genetic evaluation (i.e. both breed's EPDs have the same base). However, some breed indexes have the same general production goal in mind even though the indexes are calculated independently.

✓ Indexes are calculated from EPD values, so they are only updated and change when EPDs change. Also, if an EPD required in the index is not available (N/A) for lack of data submitted (Example: Carcass/Ultrasound data or Calving Ease records on young bull calves), the $ Index will also be N/A.

✓ Phenotype is still extremely important to include in your selection program. Bulls with identical $ Values can have drastically different composition, structure, frame size, etc.

$ Values can be sorted into a few distinct categories based on the main goal of the index: Calving Ease, Maternal Strength, Growth and/or Carcass Performance, etc. Some $Values have utility in a number of different management schemes.

Angus

Weaned Calf Value ($W) is the expected average difference in future progeny performance for pre-weaning merit. $W includes both revenue and cost adjustments associated with differences in birth weight, weaning direct growth, maternal milk and mature cow size. For producers that develop their own replacement heifers and sell all male progeny at weaning, $W may be the most useful tool for their operation, especially when used in conjunction with $EN.

Cow Energy Value ($EN) is essentially the cost component of $W, yet measures of feed efficiency like Dry Matter Intake (DMI) and Residual Average Daily Gain (RADG) are NOT included in the index. For producers selling calves at weaning, $W is an index to maximize profit, but $EN may be a useful tool to keep cow size and milk production in line with the production environment. $EN is not a measure of maternal efficiency, only a measure of cow cost. There is no revenue expressed in $EN. The highest $EN bulls in the breed sire the lowest milking daughters with the smallest mature size, accordingly having the lowest feed cost.

$EN is the estimated difference in the potential energy requirements of future daughters of sires. A larger value is more favorable when comparing two animals (more dollars saved on feed energy expenses). Components for computing the cow $EN savings difference include lactation energy requirements and maintenance energy costs associated with differences in mature cow size.

Cow Energy ($EN), Savings, $/cow/year	+15.75		Cow Energy ($EN), Savings, $/cow/year	+4.68

In the above example, the expected difference in cow energy savings per cow per year for future daughters of the two animals is $11.07 (15.75 - 4.68 = +11.07).

$Feedlot, **$Grid**, and **$Beef** Values incorporate available carcass EPDs, converted into economic terms, incorporating industry-relevant components for feedlot performance and carcass merit. Since 2014, these indexes include Feed Intake EPD, the first measure of feed efficiency included in an index calculation. $Feedlot, $Grid, $Beef, $Quality Grade, and $Yield Grade are all terminal indexes and should be considered as such in selection programs.

Feedlot Value ($F) is the expected average difference in future progeny performance for post-weaning merit compared to progeny of other sires. $F incorporates weaning weight (WW) and yearling weight (YW) EPD along with trait interrelationships. Typical feedlot gain value, feed consumption and cost differences are accounted for in the final calculations, along with a standard set of industry values for days on feed, ration costs and cash cattle price. In 2014, $ F and subsequently $B, began to include feed intake (DMI) in the index calculation. At the most basic level, $F is a terminal index that may work best for producers that retain ownership and sell them on a live weight basis.

Grid Value ($G) is the expected average difference in future progeny performance for carcass grid merit compared to progeny of other sires. The $G combines quality grade and yield grade attributes, and is calculated for animals with carcass EPDs. A three-year rolling average is used to establish typical industry economic values for quality grade and yield grade schedules. Quality grade premiums are specified for Prime, CAB and Choice carcasses, as well as Select and Standard discounts. Yield grade premiums are incorporated for YG 1 and YG 2 (high-yielding carcasses) with discounts for YG 4 and YG 5 (low red meat yields). Grid impact in dollars per hundredweight (cwt.) and dollars per head is calculated from the yield and quality grade components, and then combined to arrive at the $G.

- **Quality Grade ($QG)** represents the quality grade segment of the economic advantage found in $G. $QG is intended for the specialized user wanting to place more emphasis on improving quality grade. The carcass marbling (Marb) EPD contributes heavily to $QG.
- **Yield Grade ($YG)** represents the yield grade segment of the economic advantage found in $G. $YG is intended for the specialized user wanting to place more emphasis on red meat yield. It provides a multi-trait approach to encompass ribeye, fat thickness and weight into an economic value for red meat yield.
  $G combines both $QG and $YG, and may be the best carcass decision tool for focusing on quality and red meat yield simultaneously.

Beef Value ($B) facilitates what almost every beef breeder is already seeking - simultaneous multi-trait genetic selection for feedlot and carcass merit, based on dollars and cents. $B represents the expected average dollar-per-head difference in the progeny post-weaning performance and carcass value compared to progeny of other sires. The $B value is comprised of two pieces: $F and $G. However, $B

is not simply the sum of $F and $G. Projected carcass weight and its value are calculated, along with production cost differences like feed intake (DMI). $B takes into consideration any discount for heavyweight carcasses. Final adjustments are made to prevent double-counting weight between feedlot and carcass segments. The resulting $B value is not designed to be driven by one factor, such as quality, red meat yield or weight. Instead, it is a dynamic result of the application of commercial market values to Angus genetics for both feedlot and carcass merit.

Hereford

Baldy Maternal Index ($BMI) is the expected average performance of progeny of Hereford bulls used in rotational crossbreeding programs on Angus-based cows and heifers, with the progeny marketed on a Certified Hereford Beef LLC pricing grid. As the name implies use this index for British F-1 heifer retention programs.

Calving Ease Index ($CEZ) is actually similar to $BMI, except that the bulls are mated only to yearling heifers. It has increased emphasis on calving ease. However, many other economically relevant traits are still included in its calculation.

Brahman Influence Index ($BII) is also similar to BMI$, except that the bulls are mated to Brahman-based cows. It puts more emphasis on fertility and age at puberty, and less on growth and calving ease. For hot, dry climates with limited feed resources, $BII may also be a useful tool for bull selection, even if the mating may not include Brahman-influenced cows.

Certified Hereford Beef Index ($CHB) is the expected average performance of progeny of Hereford bulls mated to British-cross cows, with all progeny sold as fed cattle on a Certified Hereford Beef LLC pricing grid. It is a terminal sire index, including growth and carcass information only, since all progeny are marketed and no females are retained in the herd.

Shorthorn

Calving Ease Index ($CEZ) assumes a bull will only be mated to heifers, not cows. The potential profitability of the sire is measured by the incidence of live calves at birth. Moderate mature size is also emphasized in the index, but performance is not a priority. This index is also a good measure of Shorthorn females' ability to produce calving ease sires. Overemphasis of $CEZ may cause unwanted depression of weaning and yearling performance.

Feedlot Value ($F), similar to a Terminal Sire scenario, $Feedlot places strong emphasis on growth and carcass traits. This multi-trait index assumes the sire will be mated to a mix of heifers and cows and attempts to measure profitability when progeny are sold on the fed market. On the female side, mature size should be monitored closely when selecting for $F. Over-selection may cause detrimental harm to longevity, reproductive efficiency, and fleshing ability.

British Maternal Index ($BMI), as the name implies, this multi-trait selection index attempts to measure a bull's potential profitability when complimenting the British cow base (Angus, Red Angus, Hereford, etc.). Shorthorn females can likewise be gauged at adding value to British or British-composite bulls of other breeds. A balance of growth and carcass traits is desired with a strong maternal component aimed at optimum reproductive efficiency and cow longevity.

Fescue Tolerance Index ($Fescue) is the first of its kind, an index that attempts to gauge environmental fit by using a genomic test result that measures tolerance to toxic tall fescue grass. This index somewhat mirrors $BMI, but it assumes the animal is in a toxic fescue environment.

Red Angus

Herd Builder (HB) was developed for producers selecting bulls to develop more profitable replacement females and to maximize the value of non-replacement marketed progeny. It assumes Red Angus bulls will be mated to cows and heifers with replacement heifers retained within the herd and all remaining progeny sold on a quality-based carcass grid. Given that heifers are retained, significant influence is placed on maternal ERTs (Stayability, Heifer Pregnancy, and Calving Ease). Marbling, Yield Grade and growth EPDs still impact the Herd Builder index.

Grid Master (GM), index was designed to solely focus on feedlot and carcass traits to maximize profitability in the feedyard and on the rail. In this scenario, Red Angus bulls are mated to cows only with all progeny being sold on a quality-based grid. Marbling, Yield Grade, and growth traits are of primary importance to the Grid Master index.

Simmental & SimAngus

All-Purpose Index ($API) is the expected average performance of progeny of Simmental, SimAngus, Red Angus, and Gelbvieh bulls used on the entire Angus cowherd, with a portion of the daughters being retained for breeding and the remaining progeny being put on feed and sold grade and yield. The goals of this index would similar to those of $B in Angus cattle, only this index is calculated differently and uses a separate set of assumptions.

Terminal Index ($TI) is the expected average performance of progeny of Simmental, SimAngus, Red Angus, and Gelbvieh bulls mated to mature Angus cows (not heifers), with all offspring placed in the feedlot and sold grade and yield. It includes growth and carcass information only, since all progeny are marketed. As the name implies, $TI should be avoided if moderation of growth and female retention are desired.

Gelbvieh

$Cow: Represents the genetic value in dollars of profit of an animal when retained as a replacement female relative to other animals in the herd. A higher number represents more profitable genetics for maternal productivity. $Cow will serve producers in selecting bulls that will sire daughters with stayability and reproductive efficiency as well as other traits that lead to profitability in a production system, such as milk, calving ease, moderate mature weight and the ability of calves to gain. A female's genetics also influence the performance of her calves in the feedlot and at slaughter, so traits such as feed efficiency and carcass value are also included in $Cow.

Efficiency profit index (EPI): An economic selection index developed to aid producers in selecting for more feed efficient cattle that still have acceptable amounts of gain. The EPI provides slight negative pressure on intake, while keeping gain at a constant value. By selecting on this index, producers will be able to find those animals that gain the same amount as their contemporaries while eating less.

Feedlot Profit Index (FPI): An economic selection index designed to aid producers in selecting sires whose progeny will perform in the feedlot and are sold on a grade and yield standpoint. Well ranking sires for FPI have higher marbling and carcass weight than their contemporaries. As a terminal index, little emphasis is put on maternal traits such as stayability and calving ease.

Charolais

Terminal Sire Profitability Index utilizes economic and management descriptions of your ranching operation, along with EPD on available Charolais bulls to assist in identifying the most profitable sires for your unique operation. Using economic selection index theory, this tool will generate dollar indexes per terminal progeny produced on bulls in the AICA database, ranking them for profit potential <u>given the inputs you provide</u>. The dollar indexes are to be interpreted much like single trait EPD. For example, if sire A's index is $110.50 and sire B's index is $115.00, then we would expect Sire B's offspring to average $4.50 more net return ($115.00 - $110.50) than sire A's offspring.

Limousin

Mainstream Terminal Index ($MTI) is the expected average profit per carcass of progeny of Limousin bulls mated to British-cross cows, with all calves placed in the feedlot and sold on a "mainstream" grid that mainly targets red meat yield. It is a terminal sire index, including growth and carcass information only, since all calves are marketed and no females remain in the herd.

<u>Resources</u>

www.angus.org	www.simmental.org	www.shorthorn.org
www.hereford.org	www.nalf.org	www.charolaisusa.com
www.gelbvieh.org	www.redangus.org	