BY THE NUMBERS

by Stephen Miller, Angus Genetics Inc.

$C — A Way to Balance Traits

Combined value index provides a way to balance emphasis on maternal and terminal traits.

The Angus genetic evaluation and dollar value indexes ($Values) saw a number of changes rolled out May 31, 2019. As described in previous columns, these changes have included a revised model for beef value ($B) and the introduction of a new maternal index, maternal weaned calf value ($M).

With that, breeders also gained the ability to preview a new $Value for Angus cattle that will become official in June 2020 — combined value index or $C.

$C combines both maternal and terminal segments of the value chain. This is literally a combination of $B (terminal) and $M (maternal) where $C = $M + (1.297 x $B). Maternal weaned calf value ($M) is based on the profitability of a cow-calf herd that selects and raises their own replacement heifers and sells all calves at weaning. $B looks at the profitability of calves postweaning, considering selling them on a value-based grid. $C is just the $M index, but instead of selling the calves at weaning, they are retained and sold on the same value-based grid as $B.

The official release of $C is slated for next summer. In the meantime, breeders can download $C on their owned and active animals through their AAA Login. However, $C is not included on registration certificates, Sire Evaluation Report searches, or EPD Pedigree lookups for current sire and dams, or non-parent bulls and cows. For this reason, individual rankings for current sire and dams or non-parent animals cannot be established with 100% certainty.

The reason $C is not a simple summation of $M and $B and is instead $M + (1.297 x $B), is because $M and $B are on slightly different scales. $M is based on profit differences between animals on a per-cow-calving-in-the-herd basis; where $B is, and always has been, based on a per-steer-in-the-feedlot basis. In order to combine them, so $C, like $M can also be based on a per-cow-calving basis, $B needed to be multiplied by the 1.297 factor.

Why $C?

The new $C really provides a way to balance emphasis on maternal and terminal traits systematically. This challenge is apparent when one looks at expected response to selection when selecting on either $M or $B alone. Expected change in each of the traits in Angus's genetic evaluation is presented in Figure 1 and is presented in units of the trait, such as pounds of yearling weight or percent of docile animals.

For some traits, like marbling, where the units are small, these have been multiplied by 100 to get them on a comparable scale, so they can be compared on the same graph with other traits. The response represents what might be expected after about 10 years of selection.

When selecting on $B alone, with no regard for maternal traits, the response in growth is obvious; but some other traits also change. An increase in growth and carcass weight will also result in an increase in cow weight, because cow weight and earlier growth traits are positively correlated. Angus's genetic progress for yearling weight, carcass weight and mature weight are well documented in the genetic trends (available at *www.angus.org*).

Not only has Angus improved growth rate considerably, which improves profitability in the feedlot, but the breed has also increased cow size. Recent results from the across-breed studies at the USDA Meat Animal Research Center (USMARC) have identified Angus to now have the largest cows in addition to having the largest carcasses.

Selecting on $M with no regard for postweaning profitability of the calves can also be problematic. The

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emphasis on cow weight in the $M model is negative and over time, with no selection pressure for growth, postweaning, yearling weight will start to reverse. These smaller cows weaning the same size calves will be more efficient and thus more profitable. However, these same calves when arriving in the feedlot will have reduced growth during this phase, which will not be desirable for the purchasers of these calves.

However, when using the new combination index, $C, the selection on growth and cow weight is more balanced. With $C, yearling weight expected progeny difference (EPD) is increasing at almost the same rate as it was with selection on $B alone, but the cow weight is increasing at only half the rate as it was under strict $B selection. $M can be considered a counterbalance to $B. $B increases growth and as a result, the correlated trait of cow weight; but $M places a negative weight on cow size. When $M is combined with $B in the $C index, it helps slow this rise in mature cow weight.

Although new $C combines both $B and $M, the $B index is having a larger impact in $C for a couple of reasons. First of all, the $B includes the major revenue traits in the production system (cattle marketed on a quality grid). Although both cost and revenue are important, it is not possible to build a profitable business by only cutting costs, revenue is important.

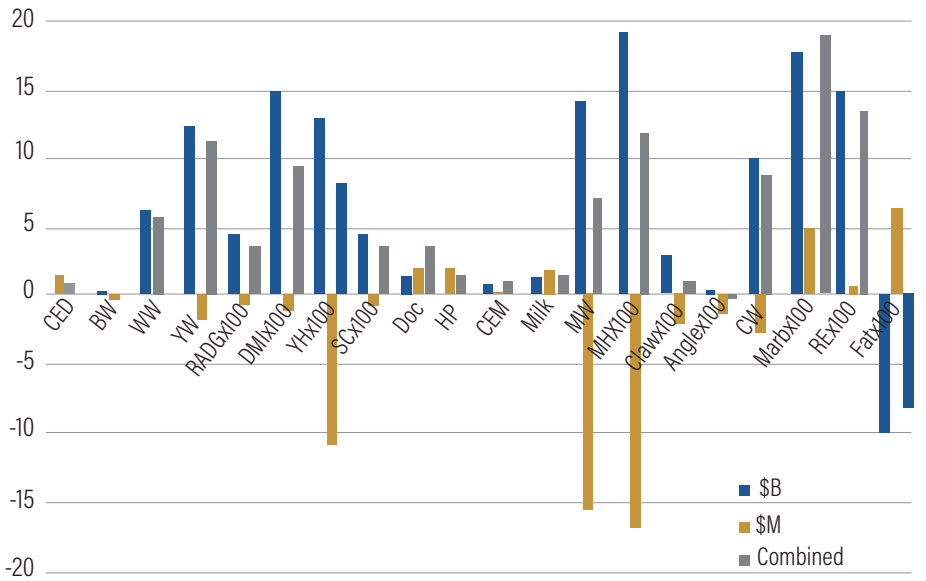
Secondly, these important revenue traits, such as carcass weight and marbling are well-characterized with EPDs influenced by large amounts of data and as a result have quite a bit of spread from top to bottom.

Therefore the EPDs for the terminal traits spread the cattle out more on $C. In general the maternal traits have less data behind them, as many of these EPDs are newer, and have less associated spread.

Overall, the correlation between $B and $C is 0.95, which is very high. On the contrary, $M and $C only share a correlation of 0.21, and the correlation between $M and $B is even lower at 0.10. (Remember a correlation of 1.0 would mean animals rank exactly the same for each trait being compared.) The relationship between $B and $C within a herd that has been turning in maternal data on mature cow weight, docility, heifer pregnancy and foot score is less highly related (0.88). These herds collecting more maternal data have more spread in their maternal EPDs, and as a result spread their cows out more on $M, which in turn has a bigger impact in $C. So to some extent, breeders can influence how much emphasis traits have on the $Values. If a herd is more diligent in recording a trait, the EPDs on those animals will be more accurate, spread more, and in the end have a bigger impact on the $Value.

The new $Values have been well-received by breeders and the opportunity to get acquainted with the new $C index ahead of the June 2020 release has created a lot of interest as well. With $M playing a role in $C, breeders will want to have their cattle characterized for the EPDs that underpin $M as accurately as possible. The solution for this is recording. Breeders should be approaching maternal-trait recording with renewed vigor including cow weight, heifer pregnancy, docility as well as foot score. AJ

Figure 1: ***Expected response in Angus EPD to selection on three $value indexes over ~10 years***



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Editor's note: If you have questions on these new EPDs, please contact the Performance Programs department at 816-383-5100.