BY THE NUMBERS

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Focusing on Maternal Function

Maternal weaned calf value aims to predict profitability differences in progeny due to genetics from conception to weaning.

If you tore a page out of the Spring 2005 *Sire Evaluation Report*, you would notice a couple of things. The report dawned the first-ever index to predict preweaning profitability, known as weaned calf value ($W), and the first calving ease direct and maternal expected progeny differences (EPDs), both of which have been utilized extensively for mating and selection decisions.

Since this time, the number of calving ease records collected on first-calf heifers has risen to more than 1.6 million and several other EPDs including docility and heifer pregnancy have been added as selection tools. Again this summer, the American Angus Association will make available two new foot structure EPDs which aim to improve foot angle and claw set.

While $W included the information available at the time to predict profitability in the cow-calf sector, access to other traits for inclusion in a maternally focused index warranted discussion. A resounding message voiced from 70% of the participants who took part in the dollar value index ($Value) survey last year was the need for an index more keenly focused on fertility and functional traits.

In addition, there are obvious economic benefits to the commercial cow-calf producer when females get bred and are not culled early from the herd because of structure, temperament or dystocia issues.

A new index

Maternal weaned calf value ($M) aims to predict profitability differences in progeny due to genetics from conception to weaning. Expressed in dollars per head, $M is built off of a self-replacing herd model where commercial cattlemen replace 25% of their breeding females in the first generation and 20% in subsequent generations. The remaining cull females and all male progeny are sold as feeder calves. In addition, the index is finding cattle who are most profitable when the producer receives no economic benefit for traits affecting postweaning performance.

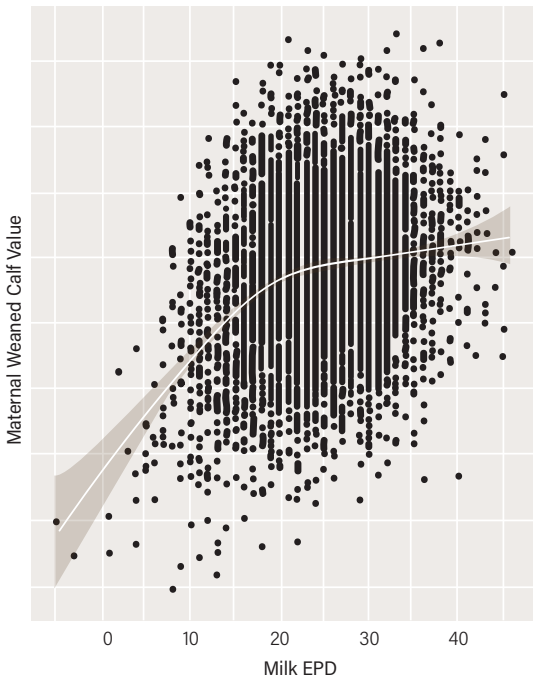
Even though similarities in the shared breeding objectives of both $M and $W are seen, several glaring differences between the two $Values readily appear. In fact, the correlation between the new $M and what is known as $W is only 0.43, which means the two indexes rank animals differently when lined up side by side.

Why does $M rank animals so differently? The following two features induce the largest changes in $M:

Inclusion of more traits. The $M model includes additional traits to better define profitability from conception to weaning. While $W consists of only four traits including birth weight, weaning weight, milk and mature cow size — the new $M takes advantage of nine different EPDs. Traits included in the $M are calving ease direct and maternal, weaning weight, milk, heifer pregnancy, docility, foot score (both foot angle and claw set) and mature cow weight. Birth weight is replaced by calving ease in $M as calving ease is the economically relevant trait when considering dystocia, and all birth weight records are utilized in the prediction of calving ease EPDs, therefore direct inclusion of BW EPD is not necessary.

Use of non-linear components. The new $M model takes advantage of fitting traits including milk and calving ease as non-linear traits. For example, when the index considers milk, the benefit of having more Milk EPD starts to diminish once

Figure 1: ***Non-linear component of milk expressed among approximately 6,600 females across the population. Milk EPD is on the horizontal axis and Maternal Weaned Calf Value ($M) is on the vertical axis.***



the optimum is met. In Figure 1, it is shown increasing from a +10 to a +20 Milk EPD increases the value of $M significantly. However, increasing from a +20 to a +30 Milk EPD does not increase $M by the same magnitude. When looking at the graph, one can see how the line starts to level out as Milk EPD continues to rise. This does not mean high Milk EPD cattle will be discounted; rather, cattle will not be able to rise to the top of $M solely based on high Milk EPDs alone.

Looking ahead

A useful tool when trying to understand how $M places different emphasis on traits is to analyze their expected response to selection. Response to selection is a useful tool as it takes into account the intercorrelations between all the traits.

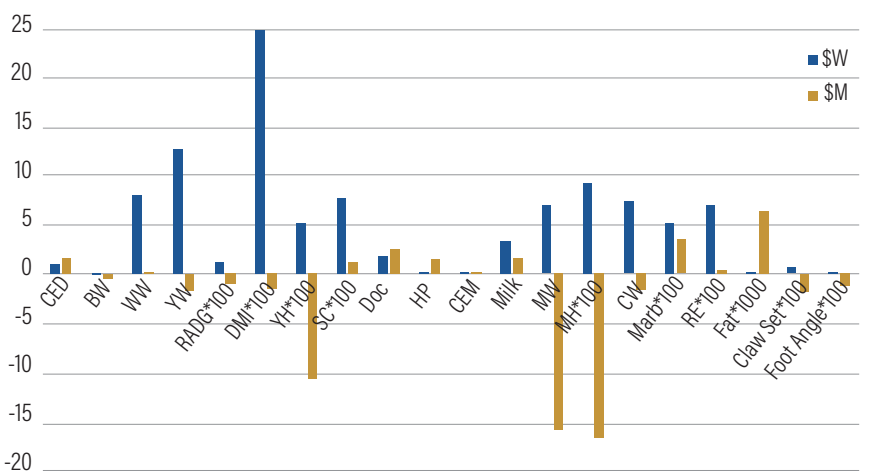
Figure 2 illustrates the expected response in the EPD traits to approximately 10 years of selection, if animals were selected strictly on $M versus $W. It is important to note only the nine traits listed previously are used directly in the formulation of $M; however, some traits (i.e. carcass weight) show a small response to selection of $M because of the correlations present among growth traits.

$W heavily emphasizes calf weight and allows cow size to continually increase over the next decade. On the contrary, $M places greater emphasis on the cost side of commercial cow-calf production decreasing overall mature cow size by 16 pounds and maintaining weaning weights consistent with today's production. $M also places less emphasis on Milk EPD, while heifer pregnancy and docility increase under $M selection. In addition, foot traits start to improve.

Including $M as a tool for making selection decisions should allow for a stronger selection response to traits not as readily included in individual breeding objectives, but remain important to the overall profitability of the cow-calf operation. AJ

Editor's note: The example for comparing the claw set EPD in bulls in the May Angus Journal *By the Numbers column was incorrect. Printed here is the correct example: Currently, breed average for both of these traits (claw set and foot angle) is 0.5. This means animals with EPDs less than 0.5 can be considered a "breed improver" for that trait. When using these two new EPDs, these tools should be used to compare bulls to each other. For example, Bull A has a +0.5 claw set EPD and Bull B has a 0.0 claw set EPD. Bull B's progeny, on average, would be predicted to score half a score better on the 5-9 scale for claw set compared to Bull A's progeny.*

Figure 2: ***Trait Responses to 1 SD of Selection (approximately 10 years)***



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