By the Numbers

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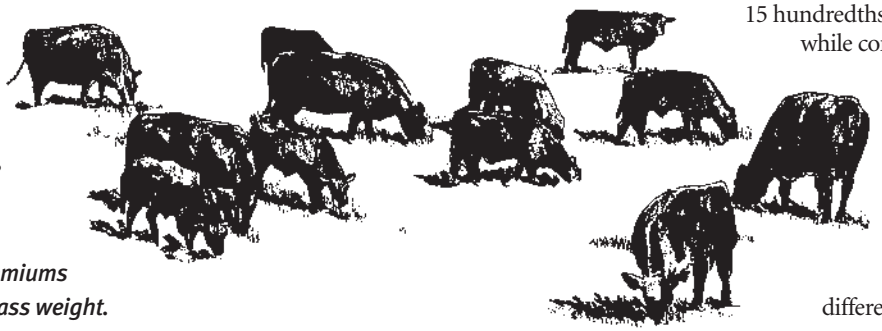
Selection on $B improves feed efficiency

Angus dollar values ($Values) are designed to help breeders balance selection emphasis among a variety of traits to improve profitability. Such multitrait selection becomes difficult when the traits are unfavorably related. An example of a group of traits with an unfavorable correlation includes growth, marbling and feed intake.

In general, cattle that excel for yearling weight and carcass weight, and produce high-quality carcasses with higher marbling scores, tend to have higher levels of feed intake. Depending on market conditions, this increased feed cost in the feedlot can negate some of the additional revenue achieved through carcass-quality premiums and increased carcass weight.



Gauging efficiency

Two different genetic values describe feed intake and efficiency in Angus cattle. Residual average daily gain (RADG) estimates gain differences among animals at a constant level of feed intake. If one sire has an RADG expected progeny difference (EPD) of 0.28, compared to another with an RADG EPD of 0.13, the 0.15 difference indicates the first sire's progeny should gain 15 hundredths of a pound more per day while consuming an equal amount of feed. Over a 160-day feeding period, that would equate to 24 additional pounds (lb.) of live weight with no increase in feed cost, due to greater feed efficiency.

The EPD for dry-matter intake (DMI) describes differences in cattle for daily feed

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intake. Cattle with higher DMI EPDs consume more feed each day in the feedlot, but lower DMI EPD alone does not indicate efficiency. Some high-DMI EPD cattle are still very efficient, because of their high level of gain, and some low-DMI EPD cattle gain at a slower rate, and thus may be less efficient.

The RADG EPD is the best indicator of feed efficiency, not DMI EPD. Angus began providing EPDs for RADG in 2011, but despite this, the genetic trend for feed intake has been increasing for many years.

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As you can see in Fig. 1, the genetic trend for the beef value index ($B) has been increasing in the Angus breed since the values were first provided more than 10 years ago. The trend, simply the average value by birth year, is calculated using today's economic assumptions, so the change in $B illustrated is a direct result in the changing average values of the traits included, especially marbling and carcass weight.

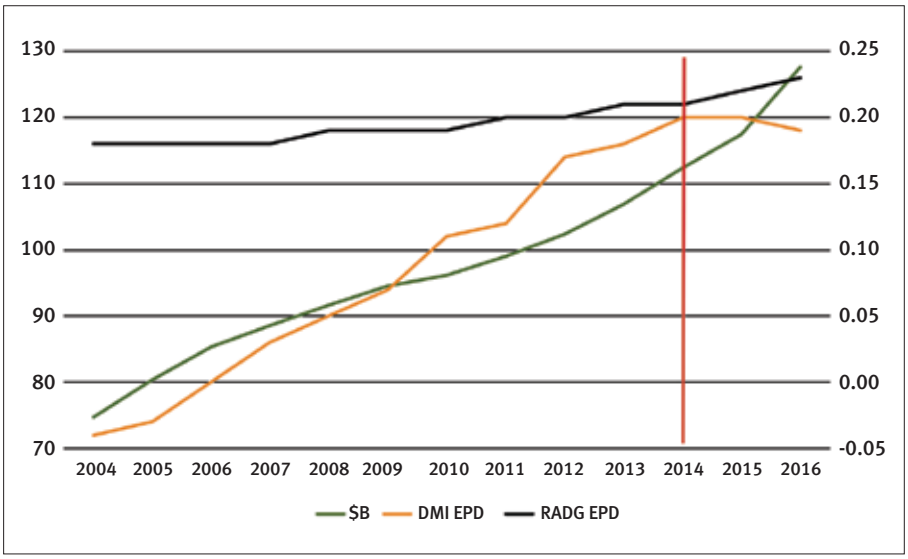
Up to this point, feed-intake information was not directly included in $B. Through 2014, the trend for DMI EPD increased at a similar rate to $B, so even though Angus cattle were improving for marbling score and carcass weight, some of the benefit was offset by increased feed costs. In 2014, the equation for $B was changed, adding DMI EPD as a direct factor. Since that change was made, the genetic trend for DMI has moderated, and actually decreased in 2016-born calves.

The EPD for RADG, which had been gradually increasing, shows a more dramatic and consistent improvement in feed efficiency for the breed since the change in the index equation was made.

Even with the addition of feed intake into the $B equation, other traits in the index, such as marbling and carcass weight, continued to improve, as shown in Fig. 2. This illustrates the benefit of index selection, weighting unfavorably related traits by their economic value. The current $B formulation identifies sires with the most favorable combination of all traits to improve profitability during the feedlot phase of production. The sires that best combine genetics for carcass quality, carcass weight and feed efficiency achieve the highest values for $B.

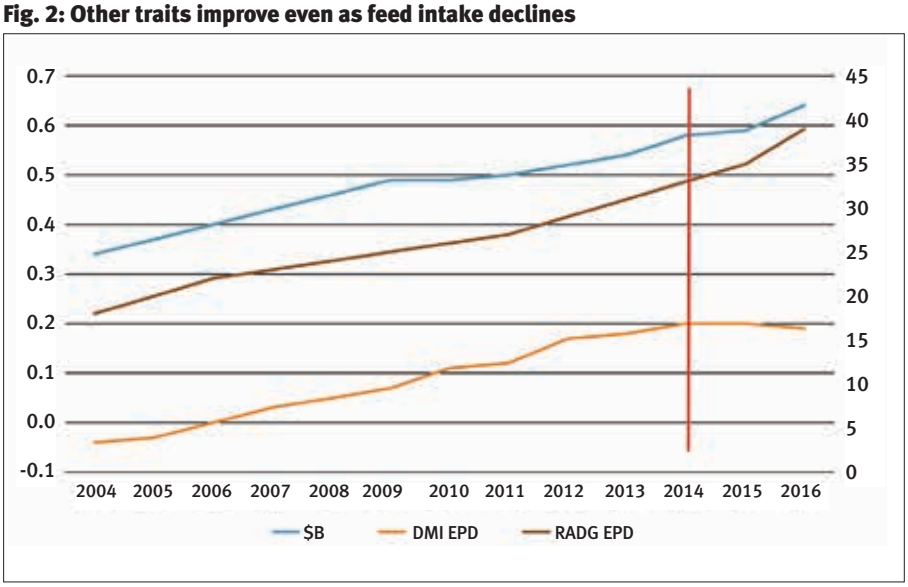
As new traits are added to the Angus genetic evaluation, both $B and $W will be updated to better reflect the true profitability differences among animals, including as many economically relevant traits as possible. The bottom line is today's Angus cattle have a more favorable combination of traits influencing profitability in all phases of beef production.

Fig. 1: Selection on $B improves feed efficiency



Avg. values for $B (green line, left axis), DMI EPD (yellow line, right axis) and RADG EPD (black line, right axis), by birth year. The vertical line at 2014 represents the point when the $B formula was changed to include feed intake. Prior to 2014, DMI was not directly included in $B calculation, and the genetic level of intake increased each year. After DMI was included in $B calculation in 2014, the genetic trend for intake leveled out in 2015, and decreased in 2016.

Fig. 2: Other traits improve even as feed intake declines



Avg. values for marbling EPD (blue line, left axis), DMI EPD (yellow line, left axis) and carcass weight EPD (brown line, right axis), by birth year. The vertical line at 2014 represents the point when the $B formula was changed to include feed intake. Even as genetic level of feed intake remained constant in 2015 and declined in 2016, the genetic levels of marbling and carcass weight continued to increase.

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