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What Does the Value-Based Market Value?

BY RON BOLZE

Cow-calf producers are challenged with a continuous balancing act in trait selection to maximize profitability. Traditionally we have thought that, in relative economic terms, reproductive efficiency was roughly twice as important as growth performance, which was approximately five times as important as carcass merit. However, a few years ago, in a reanalysis of the economic importance of these three trait groups under value-based marketing, the former reproduction-to-growth-to-product ratio of 10-to-5-to-1 was adjusted to 2-to-1-to-1.

Multiply these numbers by 5, and you can see that the emphasis on reproduction remains the same; but the importance of growth vs. product has changed greatly, with growth becoming relatively much less important.

Economic challenges and opportunities will likely fall within the other two areas, recognizing that reproductive efficiency has been difficult to genetically change due to low heritability. However, carcass traits are highly heritable and lend themselves to relatively rapid genetic directional change.

Genetic selection for carcass characteristics, or for any other trait, is a little like taking a trip. Step 1 is we must know where we are. Step 2 is we must know where we want to go. And Step 3 is we must have a plan that includes the right vehicle to get there.

Step 1

Step 1 is to know the genetic capabilities of your cow herd for carcass merit. Carcass data must be collected on at least a portion of the calf crop. The time-tested means of retrieving carcass data, of course, is through retained ownership from conception to slaughter with cooperating feedlots and packers. This can prove challenging, particularly for smaller-scale cow-calf producers who have traditionally sold calves off the cow at weaning time.

However, there are opportunities to get data on at least a portion of the calf crop through steer futurities organized by associations, the Extension service or private individuals. Some producers have pooled resources and cattle in order to efficiently retain ownership and to recover carcass data on a portion of their calves.

Table 1: Quality grades and corresponding marbling scores

Degree of marbling	Numerical score	USDA Quality Grade
Slightly Abundant	8.0	low-Prime
Moderate	7.0	high-Choice
Modest	6.0	average-Choice
Small	5.0	low-Choice
Slight	4.0	Select
Traces	3.0	Standard
Practically Devoid	2.0	Standard

Ideally, data should be collected on the entire calf crop of steer progeny, which should be managed the same way in the same feedyard at least two years in a row to remove individual feedyard management effects on carcass characteristics.

Likewise, the same sires need to be used on the same cows more than one year with the entire steer calf crop evaluated to remove sire effect and to truly benchmark the herd for carcass merit.

However, even less-than-ideal data can prove significant over time.

Some understanding of carcass characteristics is necessary to interpret the data collected. Many are the cow-calf producers who went to the effort and expense to collect carcass data, then did not utilize the information.

In measuring carcass merit, we are concerned with those traits that affect carcass value. These include quality grade, yield grade and outliers.

Quality grade is determined by age and marbling. Age or youthfulness is determined by the color of the bone and the hardness or degree of ossification of the split dorsal processes of the vertebrae.

Certified Angus Beef ™ (CAB®) carcass specifications require the youngest classification, "A" maturity, which is approximately 30 months old or less. This is seldom a problem. Most feedlot cattle are harvested at 15-20 months of age.

Marbling scores are determined by the flecks of fat within the cut surface of the ribeye muscle between the 12th and 13th ribs. Quality grades and corresponding marbling scores are listed in Table 1.

CAB carcass specifications require a Modest degree of marbling (average-Choice) or higher. Within the full range (low, average and high) of Choice carcasses, approximately 75% fall within low-Choice and do not meet CAB specifications.

Approximately 44% of harvest-condition cattle meet CAB live specifications with a black hide. Of these, approximately 19%-20% (with seasonal variation) have sufficient marbling to meet CAB carcass specifications. Therefore, only about 8%-9% of all fed cattle meet final CAB specifications.

USDA yield grades (YG) attempt to classify carcasses as to cutability or red-meat yield of closely trimmed retail cuts from the round, loin, rib and chuck. Four factors determine yield grade: external fat thickness over the 12th rib; area of the ribeye muscle at the 12th rib in relation to carcass size; hot carcass weight; and percent kidney, pelvic and heart (KPH) fat.

YG 1 carcasses tend to have minimal external fat cover and large ribeye area per unit of carcass size. In contrast, YG 5 carcasses have excessive external fat cover and small ribeye area per unit of carcass size.

CAB carcass specifications require a YG 3.9 or better. With some seasonal variation, approximately 12%-14% of harvest-condition cattle meeting CAB live (black hide) and minimum-marbling (Modest) requirements fall within the YG 4 category and, thus, fail to meet CAB requirements.

Outliers are those cattle that do not conform to the packer's basic requirements. Most value-based marketing grids severely discount cattle that produce carcasses unacceptably low in quality grade (Standard marbling), unacceptably poor in yield grade (too fat or too light-muscled for a given carcass size), too heavy (>950 lb.), too light (<550 lb.) or dark cutters.

Discounts for these carcass defects typically cost the producer as much as $25/hundredweight (cwt.) of carcass.

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Attempts to capture carcass premiums should start with the avoidance of discounts as these can easily negate any premiums for superior quality or yield.

Step 2

Step 2 is to know where we want to go or, in other words, to have a "target" in mind. Numerous value-based marketing "targets" exist today that pay premiums for specific carcass characteristics, and more will emerge over time. One might speculate as to how long some of these targets might survive.

The Certified Angus Beef (CAB) Program has been in existence for more than 21 years. The Program does not directly pay premiums for carcasses that meet CAB specifications. The Program does not own the cattle or the product. But many alliance grids today do pay excellent premiums for carcasses that meet these carcass specifications.

As an example, let's assume that we want to target CAB premiums. We are managing a 200-head crossbred cow herd with the following carcass characteristics based on two or three years of carcass data collection on the entire steer calf crop.

Avg. carcass wt., lb.	700
Avg. marbling score	4.8
or	Slight[80]
Avg. quality grade	Select
CAB® acceptance rate, %	10
% Choice	30
% Select	70
Avg. ribeye area, sq. in.	12.0

How do we get from here to our target?

Step 3

Step 3 is using the right vehicle to get to our destination or target. Enter expected progeny differences (EPDs). How are EPDs defined, and what do they mean?

Carcass weight EPD is the difference in hot carcass weight from breed average of a sire's progeny at 480 days of age expressed in pounds. As with any EPD, an individual sire's absolute value for carcass weight EPD is not as important as the difference between sires.

In other words, use EPDs to rank sires for directional change in a trait and not to predict progeny performance. Carcass weight is obviously a major contributor to total carcass value, assuming discounts can be avoided for excessive carcass size (>950-975 lb., depending on the packer).

The average carcass weight for steers in the Angus carcass database is 740 lb.

Ribeye area (REA) EPD is the difference from breed average of REA of a sire's progeny at 480 days of age, measured at the 12th rib and expressed in square inches. There is a high genetic correlation between REA and both percent retail product (0.58) and total retail product (0.72). Selection for increased REA can improve yield grade. However, ribeyes larger than 15 sq. in. can create portion-control challenges, particularly for the foodservice trade.

Selecting for increased REA per unit of carcass weight can result in reduction in mature cattle size over time — which in itself may have value in some production scenarios.

Average REA for steers in the Angus carcass database is 12.3 sq. in.

Marbling EPD is the difference from breed average of the marbling score of a sire's progeny at 480 days of age. Marbling EPD is expressed as a percent of one-third of a marbling score.

The average marbling score of the steers in the database is 5.7 or Small[70], which corresponds to low-Choice[70] or about two-thirds of the way between low-Choice and average-Choice. In other words, an average Angus steer does not have sufficient marbling to achieve CAB carcass specifications (Modest[0]).

Fat thickness EPD is the difference from breed average of the average external fat thickness of a sire's progeny at 480 days of age. It is measured over the 12th rib and is expressed in inches. Fat thickness has a negative genetic relationship to percent retail product.

Many Angus producers are concerned that selection for negative fat thickness EPD can result in harder-fleshing daughters over time. No genetic relationship appears to exist, as some of the easiest-fleshing lines of Angus cattle are sired by negative fat-thickness EPD sires.

Percent retail product EPD is a predictor of the difference in pounds of salable retail product of a given sire's progeny compared to the average sire in the Angus breed. Factors included in this calculation are hot carcass weight, REA, fat thickness, and percent KPH fat.

In that percent retail product EPD includes all the factors in yield grade, selection emphasis can be simplified by selection for percent retail product EPD instead of the individual factors separately.

So how do we apply EPDs to make directional change in a cow herd?

Applying this information

Assuming the cow herd genetic potential for carcass merit has not changed from our previous example, the sires of the steer progeny would be the only other source of genetic contribution. A study of the performance pedigrees of the current sires reveals the following average EPDs:

Carcass weight	+10
Marbling	+ 0.0
Ribeye area	+ 0.0

The following year, in an attempt to improve quality, yield grade and CAB acceptance rate, a group of bulls with the following average EPDs were mated to the same cows.

Carcass weight	+20
Marbling	+ 0.30
Ribeye area	+ 0.30

With nutrition (ration, days on feed) and environment (feedlot management, health, implantation strategy, etc.) the same, the next calf crop averages could be expected as follows, based on sire EPD differences:

Avg. carcass wt., lb.	710
Avg. marbling score	5.10
or	Small[10]
Avg. quality grade	low-Choice
CAB acceptance rate, %	22
% Choice	70
% Select	30
Avg. ribeye area, sq. in.	12.3

If yield grades of both groups of steer progeny were the same, assuming a Choice-Select price spread of $8/cwt., the second set of steer progeny, with a 40% improvement in Choice, is worth $22.72/head more than the first set (7.1 × 8 × 0.4) of steers. The 12% improvement in CAB acceptance rate, valued at $4/cwt., increases the average value of each steer by $3.41 (7.1 × 4 × 0.12). A combined value of $26.13 multiplied by 100 steer progeny from the 200-head cow herd yields an increased value of $2,613 for the lot of cattle.

These are average figures. Historically, the Choice-Select price spread can approach $15-$18/cwt. and did so a few months ago. Also, no premiums were included for potential improvement in yield grade.

Note that this example represents single-generation improvement as a result of only direct-sire effects. Further improvement in CAB acceptance rates and entry into the Prime grade premium market can be achieved by retaining replacement heifers

from these matings and, in turn, mating them to sires with similar or even superior carcass EPDs.

CAB acceptance rates for black-hided cattle of unknown genetic origin run about 19%-20%. Commercial Angus cows mated to known Angus sires can yield 32%-34% CAB acceptance rates or better. In fact, acceptance rates can be as high as 60%-85% when sires with high-accuracy marbling EPDs are mated to Angus cows with "stacked pedigrees" for carcass marbling. But for sustainable production, be sure to aim for parallel progress in other traits of economic importance.

If you, as a commercial cow-calf producer, put equal selection pressure on factors that affect maternal efficiency, your cow herd can be characterized by reproductive soundness, rapid early growth and excellent maternal qualities — as well as superior carcass characteristics. AJ

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