Let's talk marbling

by JOHN CROUCH,
director of performance programs,
American Angus Association

The Certified Angus Beef (CAB) Program, in the opinion of this author, has done more than any one factor to focus the attention of the beef industry on the quality and consistency of the end product. Around 1986 the Angus breed experienced a resurgence of interest in evaluating sires for carcass merit.

From a historical standpoint, carcass evaluation began in 1972 when the first Angus structured sire evaluation concept was adopted by the American Angus Association Board of Directors. During the late '70s the program flourished, then almost died in the mid-'80s. In 1985 only three sires were added to the carcass database, and I wondered about the future of carcass testing.

Through the efforts of the Board and staff and due to the influence of the CAB Program, interest in carcass evaluation was rekindled. Evidence of the success of the program can be observed from the fact that 149 new sires were added to the Angus carcass database during the past six months. Along with this tremendous interest comes a constant quest for carcass quality through sire selection.

What determines quality

Quality (Prime, Choice, Select, etc.) in beef carcasses is determined by several factors; namely, the age of the animal, the color and texture of the lean and the amount of intramuscular fat or marbling. Of these factors, the one affected most by genetics is marbling.

Marbling by definition is the amount of fat intermingled with lean in muscle tissue. Marbling is measured in the ribeye muscle between the 12th and 13th ribs after the carcass has been chilled in the cooler for 24-48 hours. Marbling accounts for a large portion of taste, juiciness, palatability and tenderness of beef according to research at the Meat Animal Research Center, Clay Center, Neb. What's more, it is a well-known and documented fact that Angus cattle possess excellent genetics for marbling. It is also documented that marbling is moderately high in heritability.

Table 1: Relationship of marbling score to USDA Quality Grade

Marbling Score	Numerical Expression	USDA Grade
Slightly abundant	8.00	low Prime
Moderate	7.00	high Choice
Modest	6.00	average Choice
Small	5.00	low Choice
Slight	4.00	Select

What the numbers mean

Even though the average marbling level in the Angus breed is very high, still half of the breed is above average and half of the breed is below average, and breeders sometimes get upset at negative values. For the purpose of argument and discussion, let's examine the meaning of the numbers.

It takes a marbling score of small, numerically expressed by 5.0, for an A-maturity carcass (coming from an animal that is 30 months of age or less) to grade low Choice. An A-maturity with modest marbling, numerically expressed by 6.0, will grade average

Choice and qualify for the CAB Program.

Table 1 illustrates the relationship of marbling to USDA Quality Grade.

Yogi Berra supposedly said, "If you don't know where you're going, you might wind up somewhere else." By the same token, if we don't know where we are, it's hard to figure out where we are going. So before we try to decide on a breeding program, let's examine where we are.

The Angus carcass database is broken into heifers and steers younger than and older than 480 days of age. The big portion (more than 25,000 animals) consists of steers younger than 480 days of age when slaughtered. It is interesting to note the average age of this group was 437 days. Their average marbling score was 5.87 or small 87. This places them 87 points into low Choice, in fact almost to average Choice.

From this, let's make some assumptions:

• Assume we have a herd of 1,000 cows that are exactly breed average for marbling.

• Assume zero (0.00) expected progeny difference (EPD) for marbling relates to a marbling score for small 87, or low Choice 87 (numerically 5.87).
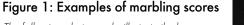
• Assume we use two bulls at random on the cows:
  ◆ Henry has a marbling EPD of +0.00.
  ◆ Richard has a marbling EPD of -0.50

• Assume the calves by Henry (marbling EPD of +0.00) have a marbling score of small 87 (5.87). The average grade of the group will be low Choice 87.
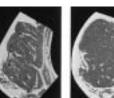
In contrast, assuming 5.87 is breed average, Richard's calves would have a marbling score of 5.37 and have an average grade of low Choice 37 (5.87 – 0.50 = 5.37).

The average grade is still low Choice and, while the marbling level is slightly less, it is still no reason to be greatly alarmed. We must remember that in most grid pricing systems the major economic effect from a quality standpoint stems from the price differential between Select and Choice.

My point is simply that before we eliminate seedstock on the basis of minor fluctuations in genetic values, we need to scrutinize the situation very soundly and determine the results. We certainly do not want to throw the baby out with the bathwater.

Figure 1: Examples of marbling scores

The following photographs illustrate the lower limits of six marbling degrees. It should be noted there are nine degrees of marbling referred to in the official U.S. Standards for Grades of Carcass Beef. These photographs have been developed to assist government, industry and academia in the proper application of official grade standards. (SOURCE: NATIONAL LIVE STOCK & MEAT BOARD/USDA)

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