Angus Beef is Superior – Keep it That Way

BY R.A LONG

"In 1993 and 1994 the theme of every national and state industry meeting was devoted to the NCA Beef Quality Audit — and rightly so. "
-Bob Long

Beef from Angus cattle has a well deserved reputation for excellent eating quality and USDA Choice and Prime marbling. Thus, feedyard managers and packer buyers look for black hides and breeders of the exotics introduce the black gene and tout those individuals which are homozygous black. Supporting this marbling image is the unparalleled success of the Certified Angus Beef (CAB) Program.

Angus beef is superior to that of most breeds and this internationally held image of superiority is of immense value to Angus breeders. However, carcass characteristics of both quality and cutability are highly heritable and so failure to include these traits in selection programs can result in failure of the Angus breed to retain this valuable reputation for carcass excellence.

Carcass Evaluation

A breeder who wishes to maintain and improve carcass excellence in his herd must first understand how carcasses are evaluated and be able to recognize an ideal carcass.

The USDA currently evaluates beef carcasses by a dual grading system which assigns both a quality grade and a yield grade.

The quality grade is concerned only with tenderness, juiciness and flavor of the meat (eating quality). Unfortunately, many beef producers have confused the issue by using the word "quality" with reference to any desirable carcass characteristic. It should only be used in connection with the quality grade.

The USDA quality grades for steer and heifer carcasses are in order of value: Prime, Choice, Select, Standard and Utility. These grades are determined by marbling, maturity, color and texture.

Marbling is the major factor which determines the quality grade. Marbling is the term applied to the visible specks and streaks of fat in a cross section of the ribeye muscle. The chilled carcass is "ribbed" by dividing the carcass side into quarters by cutting between the 12th and 13th ribs. The USDA grader looks at the cut surface of the ribeye and declares a marbling score.

The 10 marbling scores are: 1. Devoid 2. Practically devoid 3. Traces 4. Slight 5. Small 6. Modest 7. Moderate 8. Slightly Abundant 9. Moderately Abundant 10. Abundant.

Carcasses with sufficient marbling scores to be eligible for Prime are scores 8, 9, and 10; Choice are 5,6 and 7; Select is score 4 and Standard is 2 and 3. Program standards require a score of 6 (modest) or better.

Maturity is a measure of age. It is a better measure of physiological age than calendar age because some animals mature in a shorter time than others. Maturity is determined by observing the color of the cut surface of the bone and the degree of ossification of the cartilage.

The maturity scores are A B, C, D and E with "A" being youngest and "E" oldest. "A" maturity ranges from about 10 to 30 months of age. Since almost all steers and heifers are slaughtered within that age group, maturity is not usually important in determining quality grade. Even so, the younger the animal the better, as long as adequate marbling is present. Color and texture are also considered in quality grading but are rarely of importance.

The yield grade is concerned only with the percent yield of boneless, closely trimmed, retail cuts from the round, loin, rib and chuck. As such, it's a good measure of saleable meat and is a major basis for value-based marketing. The yield grades are: 1,2, 3, 4 and 5 with 1 being the most desirable. Yield grade is determined by fat thickness at the 12th rib, the area of the ribeye at the 12th rib, the hot carcass weight, and percentage kidney, pelvic and heart fat.

Fat thickness has the greatest influence on yield grade and because fat deposition patterns can vary widely the USDA grader must often adjust the fat thickness First the USDA grader establishes a preliminary yield grade (PYG) on the basis of fat thickness. Then for each square inch of ribeye above 11 square inches the grader subtracts .3 of a Yield Grade or adds .3 for each square inch under 11 square inches. Next, for each 25 pounds of hot carcass weight over 600 pounds the grader adds .1 Yield Grade or subtracts .1 for each 25 pounds less than 600 pounds. Finally, .1 Yield Grade is added for each .5% kidney, heart and pelvic fat above 3.5 percent or .1 Yield Grade is subtracted for each .5 percent below 3.5 percent.

The yield grade is calculat-

ed in tenths, for example 2.4 or 3.6. However, the carcass is stamped only with whole numbers and herein lies a problem. A Yield Grade 2.0 carcass will contain approximately 2 percent more trimmed, boneless retail cuts than a carcass grading 2.9, yet both carcasses are stamped 2 and sell for the same amount per unit of weight. A Yield Grade 2.0 carcass will yield 52.3 percent boneless retail cuts and a 2.9 will yield only 50.3 percent. In a 700-pound carcass this amounts to 14 pounds of boneless product that sells for $3 to $4 per pound, for a difference in real value of $40 to $50 between the two carcasses. Therefore, yield grades should always be expressed in tenths instead of round numbers.

The National Cattlemen's Association recommended that this inequity be partially corrected by dividing the most frequently assigned yield grades in half. Yield Grade 2 would become 2A and 2B and Yield Grade 3 would be 3A and 3B. This recommendation is quite logical and is an effort to support value-based marketing. It's rumored that a major packer will soon initiate this method of yield grading.

The Ideal Carcass

The ideal carcass should weigh approximately 700 pounds, carry .25 inches adjusted fat thickness, have a ribeye area of 15.0 square inches, exhibit moderate marbling and be 12 to 14 months of age. Such a carcass would be assigned a USDA Choice + quality grade; USDA Yield Grade 1.5; would please feeders, packers, retailers, restaurateurs and consumers; and cost no more to produce than today's average carcass.

Carcass Evaluation

Unfortunately, the beef industry has shown little improvement in carcasses during the past 20 years as evidenced by the recent NCA Beef Quality Audit. In 1993 and 1994 the theme of every national and state industry meeting was devoted to the Beef Quality Audit — and rightly so. Not surprisingly, this in-depth study revealed that beef carcasses averaged too fat, thinly muscled, deficient in marbling and lacking in uniformity. These findings were particularly discouraging in that the very same problems were observed 20 years ago.

Why has there been no progress? Simply, few breeders have emphasized carcass traits in selection because they have not been financially rewarded to do so. Fortunately, the trend is toward value-based marketing and breeders are showing increased interest in carcass improvement.

Expected Progeny Differences

The development of expected progeny differences (EPDs) is one of the most important advancements in animal breeding technology. The American Angus Association has compiled by far the largest performance database of any breed and must be commended. Included in this data set are the measurements from thousands of Angus carcasses which made available EPDs for carcass traits. No other breed has this kind of support for carcass improvement and it's encouraging to observe the increase in use of carcass EPDs by Angus breeders.

Still, a major concern of the author with the use of current EPDs as a tool for carcass improvement is the ribeye area.

This measure is taken in square inches from the carcass and adjusted for age (see Fall 1995 Sire Evaluation Report). However, the size of the ribeye of a carcass offers little information unless it's unadjusted and associated with ac-

tual carcass weight. Many breeders incorrectly assume that using a bull with a positive EPD for ribeye area will result in heavier muscling and improved cutability. Since the size of ribeye alone tells little about the composition of a carcass it is logical to conclude that ribeye EPD should be based on area per unit of weight not size of ribeye alone.

Carcass Improvement

Progeny tests for carcass traits are expensive and time consuming. However, carcass characteristics can be identified in live animals. These traits are highly heritable so improvement can be made faster and cheaper by live animal evaluation provided the management and technology are adequate. Here's how to do it:

The ideal time to evaluate carcass characteristics is when the cattle are weighed off post weaning gain test at 12 to 14 months of age. As in all performance testing, the cattle must be compared at the same age and under the same environment. Also, since the goal is to measure differences in genetic potential for carcass composition and degree of marbling, the plane of nutrition must be sufficient to allow that potential to be expressed.

The latest and most sophisticated tool for measuring the composition of live animals is Magnetic Resonance Imagery (MRI) which is widely used in human medicine. Unfortunately, no MRI instrument has been constructed large enough to scan a yearling bull and the cost of manufacturing such an instrument would be excessive. Currently, the only tools available to the industry for estimating the composition of live cattle are ultrasound and visual appraisal.

Ultrasound Era

In 1960, first Stouffer at Cornell University and then animal scientists at the University of Georgia, used high frequency sound (ultrasound) to measure fat thickness and ribeye area in live cattle. This was found to be fairly accurate in measuring fat thickness but somewhat erratic on ribeye area.

Technological advances in ultrasound equipment have improved accuracy, portability of the equipment and made it more user friendly today. More importantly, the latest in ultrasound equipment has been married to sophisticated computer techniques, making it possible to measure marbling in the live animal. These advances dictate the use of ultrasound as a selection tool in progressive breeding programs.

Positive results from the use of ultrasound depend on the following:

1. Modern, realtime ultrasound equipment must be used.

2. Measurements and interpretation must be handled by certified personnel.

3. The cattle compared must be of the same age and sex, and have been exposed to the same environment.

4. The plane of nutrition must have been adequate to allow genetic differences to be expressed.

5. Ribeye area must be associated with live weight in order to measure degree of muscling.

6. The data must be used in selection and culling.

Visual Appraisal

The human eye is capable of distinguishing minute differences in color, shape, depth and peripheral acuity. However, accurate interpretation of these differences depends upon the knowledge, experience and objectivity of the observer.

Informed visual appraisal of live cattle has several advantages over ultrasound.

1. Cattle vary greatly in fat deposition patterns. Therefore, a single fat measurement at the 12th rib (by ultrasound) is not an accurate measure of total fatness. Visual evaluation can identify excess fat deposits in the brisket, around the tailhead, at the loin edge, and in the flanks and twist.

2. An experienced observer can evaluate cattle faster, with less stress on the animals, and without need for a headgate and chute.

3. Visual appraisal can simultaneously consider several traits in addition to fat and muscling, such as soundness of feet and legs, frame size and disposition.

The two disadvantages of visual evaluation are:

1. The human eye cannot see marbling in the live animal.

2. There are too few people with the experience and objectivity to do the job.

In Summary

In order to maintain and enhance the current reputation of the Angus breed for carcass excellence there is a need for emphasis on carcass traits in Angus selection programs. Therefore, some measure of composition should be a part of the performance records maintained by every Angus breeder. Further, the EPDs computed from these records should express muscling as ribeye area per unit of weight or some measure of muscle to bone ratio.

Currently, the most practical method for measuring genetic potential for differences in composition is ultrasound. However, the top cut of yearling bulls destined for use in seedstock herds should be farther evaluated by informed visual appraisal.

A Word of Caution

Not only is the Angus breed noted for carcass desirability but Angus cows are considered superior in maternal traits. For example, most crossbreeding programs require the mother cows to carry a minimum of 50 percent Angus blood. This ability to function efficiently under range conditions is in part due to the fact that Angus cows store some fat in the good times which allows them to handle the droughts and blizzards and still produce.

Therefore, as breeders strive to improve carcass cutability by reducing fat cover a goal might well be a happy medium rather than extreme leanness.

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