the Measurements *Of* Value

*There are many yardsticks that help determine a beef producer's profitability,
but in the end, yield grade and quality grade are the rulers.*

BY MAGGIE MARTIN

John Unruh, meats specialist at Kansas State University, points to the ribeye of a carcass, where the ribeye area (REA) and fat thickness are measured. A standardized grid is used to estimate REA in square inches, while the fat thickness is measured down the ribeye and perpendicular to the outer skin. These measurements are key to determining yield grade.

Understanding beef carcass quality and yield grades enables producers to recognize for what characteristics consumers look when selecting a product at the meat counter and what helps determine the profit from that product.

Cattlemen should know for what a grader looks in a carcass, as well as what the end consumer will request, says John Unruh, associate professor of animal sciences and industry at Kansas State University.

"Quality and yield grades are used as a marketing tool," the meats specialist says. "They are used to differentiate between carcasses."

Unruh says each individual processing plant decides if it will grade for quality, yield or both. Quality grades predict palatability-related traits, while yield grades predict carcass cutability. Cutability is the indicated yield of closely trimmed, boneless retail cuts derived from the primal wholesale cuts (round, sirloin, short loin, rib and square-cut chuck).

Quality

The two components of quality grades are maturity and marbling. Quality grades applied to carcasses are Prime, Choice, Select, Standard, Commercial, Utility, Cutter and Canner.

To determine the maturity of a carcass, graders evaluate the size, shape and ossification of the bones and cartilage. They look at the cartilage caps and buttons in the sacral, lumber and thoracic vertebrae, ribs, and split chine bones to determine age by the conditioning of those bones. Ossification of cartilage buttons signifies an older animal.

The color and texture of the lean or ribeye also determines lean maturity. High-quality carcasses have meat that is bright red in color. Discolored or darkened meat indicates an older animal, Unruh says. Most animals 9-36 months of age are considered A maturity. Maturity scores are listed in degrees from A to E.

"The ribeye area is used to look at maturity because it is in the middle," Unruh says. "Animals develop from the extremities to the middle."

Producers also should be aware of bullock and dark-cutter carcasses, which may cause lower quality or yield grades. Bullock carcasses are A-maturity carcasses of male animals that exhibit masculine characteristics, such as a noticeable crest over thick shoulders and a prominent "jump muscle" before the hip bone. They often display a slightly darker red lean color and more coarsely textured lean. Bullock carcasses can be assigned quality or yield grades, but they must be identified as bullocks if either grade is applied. Bull carcasses (B, C, D and E maturity) are assigned only a yield grade.

Dark cutters are carcasses that produce a lean that is dark red to almost black in color and that has a sticky or gummy texture. This condition often results from cattle that have been stressed for a relatively long period of time. Dark cutters are safe to eat, and the palatability normally is not affected, but consumer acceptability and carcass value are reduced. Dark-cutter carcasses that would qualify for the Prime, Choice or Select grades otherwise may be reduced as much as a full quality grade.

Marbling, the amount and dispersion of intramuscular fat within the ribeye, is also a factor in quality grading. Marbling ranges from Moderately Abundant to Practically Devoid. For example, a carcass with an A maturity and a Slightly Abundant amount of marbling would be considered Prime, but a carcass with A maturity and Modest marbling would be graded Choice.

Steve Whisenant of Amarillo, Texas, works for the USDA and supervises meat graders in packing plants in Kansas, Oklahoma and Texas. In his experience, Whisenant feels the most important traits to consumers are color and fat thickness, which help determine quality and yield grades.

"They want the bright pink or red color," he says. "The other characteristic is exterior trim. They want something that has very limited fat around the outside of it. Some people also understand the importance of intramuscular marbling and look for that when buying a product."

Yield

Yield grades are determined by three components: muscle, fat and bone. Preliminary yield grades are predicted by the carcass factors of adjusted fat thickness (FT), hot carcass weight, ribeye area (REA), and percentage of kidney, pelvic and heart (KPH) fat. Yield grades are numbers ranging from 1 to 5. Carcasses graded 1 and 2 are trim and well-muscled, while those graded 4 and 5 are fat and poorly muscled.
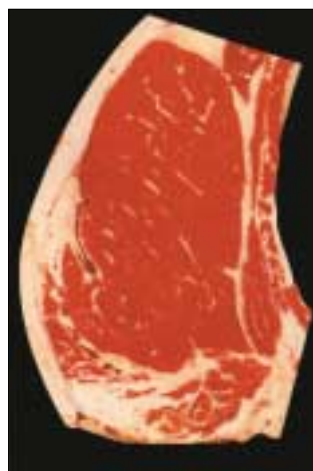
Because bone remains relatively constant to each carcass, graders only predict the percentage of lean content. Fat thickness is measured between the 12th and 13th ribs, up the ribeye from the
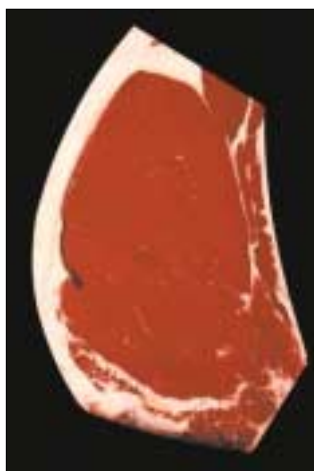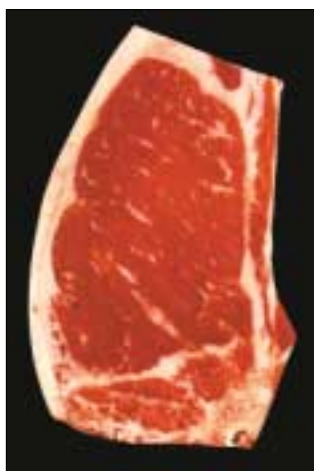

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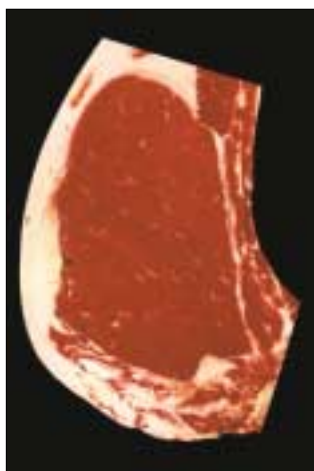
Small

Modest

Moderate

Slightly Abundant

Moderately Abundant

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split chine bones and perpendicular to the outer skin. Graders may have to adjust it for unusual fat distribution. The percentage of retail cuts decreases as external fat increases, Unruh says.

Ribeye area in relation to hot carcass weight is used to evaluate muscling. Generally, as carcass weight increases, the percentage of retail cuts decreases slightly due to increased fat deposition.

"The ribeye is the last place for development," Unruh explains. The longissimus dorsi muscle is measured at the 12th rib by using a grid. The measurement is expressed in square inches. REA is an indicator of carcass muscling. As it increases, retail-cut yield increases.

KPH fat represents an estimated percentage of carcass weight, which includes the kidney knob, the lumbar and pelvic fat, and heart fat in the chuck and brisket areas. As the percentage of KPH fat increases, the percentage of retail cuts decreases.

These estimated percentages and measurements are used to establish the yield grade of a carcass.

Know your product

"It is important for producers to understand quality and yield grades," Unruh says. "They play a large part in determining the price of the product."

Whisenant agrees in the importance of understanding the USDA grading system.

"Payment is a big reason [to understand quality and yield grades]," he says. "If producers are selling their slaughter cattle based on these factors, the industry will pay premiums for Yield Grades 1 and 2. They will give discounts for Yield Grades 4 and 5. It would be in the producer's best interest to use whatever management practice to enable his cattle to grade 1 or 2."

"I see more producers trying to get carcass data back on their cattle, so they can make some management decisions," he says. "Meat grading offers a carcass data service that producers can receive for a fee. Producers can obtain quality and yield grade information about their cattle that were slaughtered.

"From that data, a producer can go back and make decisions about which bulls or cows to keep or [to] what feedlot to sell his calves in order to create a bigger profit."

The reference chart compares the marbling and maturity of a carcass to determine a quality grade. The flip side helps graders evaluate the maturity, color and texture of the carcass.
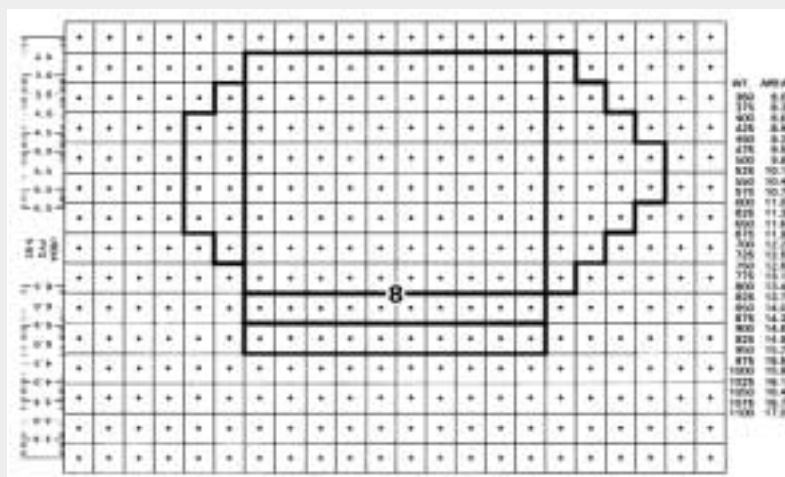
A transparent grid is placed on the ribeye to determine its size. Each square covers 0.1 square inch.

Yield grades are calculated by using the following formula: Yield Grade = 2.50 + (2.50 + adjusted fat thickness, in.) + (0.0038 x hot carcass weight, lb.) + (0.2 x percentage kidney, pelvic and heart fat) – (0.32 x ribeye area, sq. in.)

For example, a carcass has 0.40 inch (in.) of fat, 2.5% kidney, pelvic and heart (KPH) fat, 12.8 square inches (sq. in.) of ribeye area (REA), and a hot carcass weight of 750 pounds (lb.). Substitute these variables into the yield-grade equation to calculate a final Yield Grade of 2.75: 2.50 + (2.50 x 0.4) + (0.2 x 2.5) + (0.0038 x 750) – (0.32 x 12.8) = 2.75.