



# THE VETERINARY LINK

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## Factors that affect carcass quality, yield grade

Because the percentage of finished cattle being sold on a carcass-value formula is increasing compared to the historical methods of selling on a live-weight or carcass-weight basis, understanding quality and yield grades is becoming essential for all beef producers.

While the U.S. government requires inspection of all packing plants for sanitation and safety, quality grading is not mandatory. Quality grades, which are recognized worldwide, are used to segregate and to describe carcasses based on their expected palatability.

Packers who want to sell beef that has been given a USDA (U.S. Department of Agriculture) grade pay the government to have a grader working in the plant. Quality grades attempt to predict how a carcass will taste with respect to tenderness, juiciness and flavor. To determine the quality grade of the carcass, the USDA grader considers the marbling of the ribeye muscle, the maturity of skeletal bone, and the color and texture of the lean. The quality grades of beef are USDA Prime, Choice, Select, Standard, Commercial and Utility.

Marbling (intramuscular fat) is the intermingling of fat within the lean. Graders evaluate the amount and distribution of marbling in the ribeye muscle at the cut surface between the 12th and 13th ribs. Degree of marbling is the primary determination of quality grade.

Maturity of the carcass is primarily determined by the amount of ossification of cartilage (cartilage changing into bone) in the backbone. As animals age, more of the cartilage in the vertebrae is changed to bone. This change first occurs near the pelvis and over time moves forward to the chest area.

Other bones also are used to indicate age. The ribs are round and red in young animals' carcasses, whereas carcasses from more-mature animals have wide, flat ribs.

The color and texture of the ribeye muscle is evaluated as an aid in determining maturity.

Young animals' carcasses have a light-cherry-red color and a fine texture to their lean. A dark-red color and a coarse texture indicate mature animals.

After maturity and marbling have been determined, the two factors are combined to arrive at the final quality grade. Desirable ribeyes will exhibit an adequate amount of finely dispersed marbling in a firm, fine-textured lean.

### Yield

When beef is graded and stamped for quality grade, it also must be evaluated and stamped for yield grade. In beef, yield grades estimate the amount of boneless, closely trimmed retail cuts from the high-value parts of the carcass (round, loin, rib and chuck).

Beef yield grades are 1, 2, 3, 4 and 5. Yield Grade (YG) 1 is the leanest and highest in yield, or cutability. YG 5 is the fattest and lowest in yield.

Beef yield grades are determined on the basis of ribeye area; fat thickness over the ribeye; percent of kidney, pelvic and heart (KPH) fat; and carcass weight. The USDA grader uses the four factors in a formula to determine yield grade.

### Pneumonia

Many factors affect carcass quality and yield grades, including genetic potential for marbling and muscling, length of the feeding period, and age and weight at feedlot placement. Because of space constraints, I am going to write about only two variables that affect quality and yield grade: pneumonia and growth-promoting implants.

Evidence from the Texas Ranch to Rail program and other research has shown that animals having pneumonia at some time in their life to the extent that lung lesions can be seen at slaughter are less likely to grade Choice and tend to have lower yield grades than cattle that do not experience pneumonia.

A recent trial from Oklahoma State University showed that feedlot steers treated for respiratory disease while in the feedlot or that had lung lesions at slaughter had lower final live weights, poorer average daily gains (ADGs) during the feeding period, lighter hot-carcass weights, and less external and internal fat. With increased selling of cattle on carcass-merit grids, this additional cost of pneumonia adds importance to preventing respiratory disease at any time in the animal's life.

### Implants

Use of growth-promoting implants is a proven strategy to increase ADG, carcass weight and economic return in growing cattle. However, with the exception of androgen alone, all implants administered during the final feeding phase reduce marbling score and the percentage of cattle grading Choice compared to nonimplanted control groups. Implanting enlarges ribeye area with no increase in intramuscular-fat deposition, which results in the reduced marbling score.

Among animals that receive implants, dressing percentage, fat thickness, marbling score and shear force (a measure of tenderness) are not significantly different, regardless of implant type. However, use of androgen-plus-estrogen combination implants results in heavier carcasses and a reduced percentage of cattle grading Choice than either not implanting or using estrogen-plus-progesterone combinations.

Most research has shown that androgen-containing implants tend to be more detrimental to marbling score than estradiol implants without androgen. This is particularly true if androgen-containing implants are administered more than once or if they are administered late in the finishing period. Correspondingly, when quality grade is a concern, suppliers of androgen-containing implants have recommended using them once, not less than 70 days before slaughter.

Evidence indicates that implanting suckling calves and stocker cattle does not decrease carcass performance compared to nonimplanted control groups. Therefore, even when concerned about carcass quality, producers can implant suckling calves and stockers destined for carcass-merit grids.



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