

# Beef Logic

by R.A. (Bob) Long



## Carcass composition is genetically controlled

Value-based marketing emphasizes beef carcass composition and rightly so. Carcass composition is extremely important since it determines both the percent yield of edible beef and its tenderness, juiciness and flavor.

The beef industry must be concerned with composition because of the wide variation in carcass characteristics. Differences in real value of as much as \$100-\$150 between carcasses of the same weight from the same slaughter group are quite common. This variation can be due to cutability, quality, maturity or any combination thereof.

Unfortunately there is some confusion as to how carcass composition can be controlled. Many cattlemen believe that nutrition controls

carcass composition. Nutrition does affect composition, but changing feeding programs can't solve the composition problem the beef industry faces.

The most recent beef carcass audit underscores the fact that, on average, beef carcasses are too fat, deficient in marbling and deficient in muscling. The effects of nutrition on these three traits warrant discussion.

**In addition to producing**, cattle must live, breathe, eat, drink, move, maintain their bodies and keep a constant body temperature, all requiring energy and certain nutrients, the total of which is termed the "maintenance requirement."



Therefore, before cattle can grow (produce a carcass), their maintenance requirements must be met. After maintenance has been satisfied, the remaining nutrients are available for growth and development of a carcass.

The major tissues of a carcass are bone, muscle and fat. Of these, bone and muscle have priority for nutrients, so fat deposition takes place last. This explains why early in life cattle grow rapidly but fatten slowly. As physiological maturity approaches, skeletal growth and muscle development slows or stops, and nutrients above maintenance all go to fat deposition.

The important fact to remember is that the percentage of bone, muscle and fat in a carcass depends on the genetic potential of the animal producing it. For example, muscle is high in protein, but increasing the level of protein in the diet above the normal requirement will not result in a heavily muscled carcass. The degree of muscling is determined by the genetic code, and excess protein in the diet is broken down and used for fattening.

**The same is true of fat** deposition. Of course, starved cattle will not get too fat. However, if the plane of nutrition is adequate for rapid and efficient gain, the percentage of fat in the carcass is determined by genetic potential. Further, the distribution of that fat in the carcass is controlled genetically. Fat occurs as seam fat (between the muscles), subcutaneous fat (under the skin), marbling (within the

muscles) and internal fat (deposits around the kidneys, on the intestines and the mesenteries that support them, around the heart, and in the pelvic canal).

Likewise, the percent of total fat in each of these locations is dictated by genetics. Among cattle treated alike, great variation in fat deposition patterns occurs. Some cattle develop sufficient marbling to grade USDA Choice with 0.25 inches (in.) of fat at the 12th rib, while others fail to grade with a full inch of outside fat simply because of different genetic potential.

The subcutaneous fat can also vary in deposition pattern. Among cattle with identical fat thickness at the 12th rib, some can be trim and uniformly covered while others can have tremendous deposits around the tail, along the loin edge and in the brisket and flanks. Still another example is seen in the great variation between breeds and strains of cattle in the amount of kidney, pelvic and heart fat— all dictated by genetics and all highly heritable.

**One can only conclude** that the solution of the beef industry's problem with carcasses carrying too much fat and too little marbling and muscle lies in changing the genetics of the nation's herd. Obviously this requires greater emphasis on carcass characteristics in seedstock selection programs. Performance data must be collected under conditions similar to those employed by commercial feedyards, and herd sires not exhibiting adequate cutability and marbling should be culled.

### We Welcome Your Input!

Our Beef Improvement section has been expanded to include more information for today's performance-minded breeder. Both "Beef Logic" by Bob Long and the "What's Your Beef?" columns serve as a forum for Angus breeders and industry experts to express their opinions on current issues and topics of breed improvement and performance programs.

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 Angus Journal, Editor  
 3201 Frederick Blvd.  
 St. Joseph, MO 64506  
 fax: (816) 233-6575  
 e-mail: shermel@angus.org