

# Beef Logic

by Bob Long



## The rumen assures beef industry future

Cattle are ruminants and as such have the ability to utilize fiber (cellulose) from pasture, hay and crop residue for life and body processes. Simple-stomached animals (humans, pigs, chickens) cannot handle fibrous material for food. This fact guarantees the future of the beef production industry.

Approximately 70 percent of the feed required to develop a steer or heifer to slaughter weight comes from the roughages mentioned above. This includes feed for the cow herd, for the calf from birth to weaning and for the stocker cattle before entering the feedyard. Additional roughage is included in the finishing diet, further reducing the amount of grain required for beef production.

Note that poultry, pork and fish farming depend almost entirely on grain.

Humans cannot handle roughage and prefer not to consume the feed grain diet utilized by cattle during the finishing period. Fortunately, cattle convert this roughage to tender, juicy, flavorful beef — one of the worlds most healthful, satisfying and prestigious cuisines.

Roughage is the major product of the great prairies and savannahs of the world; and without its conversion to nutritious human food there would be famine in the land.

**The complexity of the ruminant digestive tract makes the transformation of roughage to beef possible.** The digestive tract of humans and other

simple-stomached animals is composed of a small stomach, a small intestine and a large intestine and is not capable of digesting the fiber of roughages. Digestion is almost entirely enzymatic (effected by digestive juices).

Cattle and other ruminants possess a very complex, four compartment stomach. The rumen the largest compartment, serves as a fermentation vat where literally billions of microorganisms per milliliter are constantly growing and reproducing as they break down fiber and other nutrients.

Whereas simple-stomached animals break down starch to simple sugars, which are absorbed into the bloodstream from the intestine, cattle convert fiber, starch and sugar to volatile fatty acids which are absorbed directly through the rumen wall into the bloodstream and provide energy for maintenance, growth and fat deposition.

**Protein is an important nutrient for all animals.** The protein molecule is composed of amino acids and when protein is digested the amino acids enter body metabolism. Eleven of these amino acids are necessary for life in all animals. These essential amino acids must be included in the diet of simple-stomached animals. Proteins that contain them are termed "high-quality proteins" and are an expensive food item.

Fortunately, cattle and other ruminants have the ability to utilize "low-quality proteins." The rumen microorganisms

convert the nonessential amino acids in low-quality protein to essential ones and incorporate them into their own bodies.

These organisms then pass on into the small intestine where they are digested releasing the essential amino acids, thereby eliminating the need for high-quality protein in the diet and reducing feed costs.

Rumen organisms also have the ability to synthesize high-quality protein from nonprotein nitrogen compounds such as urea, further reducing feed cost of some diets.

**Still another advantage** of rumen fermentation is the synthesis of vitamins. The rumen microorganisms synthesize each of the B vitamins as well as the C and K vitamins. The quantity of each vitamin produced is more than sufficient to meet the body requirements of cattle so these nutrients need not be included in the feed — still another saving in cost of beef production.

**In summary,** ruminants have the ability to convert low-quality roughage into meat and milk which are excellent sources of high-quality protein, minerals and vitamins so necessary for human health and welfare. Utilization of this plant material by wild ruminants offers an almost insurmountable management problem.

Sheep and goats require a great deal of attention in the form of hand labor, housing and protection from predators.

Dairy cattle require the higher quality roughages and supplemental feeds in order to produce efficiently.

This leaves beef cattle as the best converter of low-quality roughage to nutritious, healthful, satisfying human food and guarantees the future of the beef production industry.

### 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 opinion on current issues and topics of breed improvement and performance programs.*

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