

# Cattle Producer's Handbook

Nutrition Section

317

## Fundamentals of Supplementing Low-Quality Forage

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One of the distinct advantages of ruminants over other livestock species is their ability to effectively utilize forages as a source of nutrients for maintenance and production (growth, lactation, and reproduction). As a result, most cattle will spend their entire lives, except for the final 4 to 6 months in the feedlot, grazing standing forages and/or consuming hay.

Forage quality is usually sufficient to support normal levels of production early in the growing season. However, as forages mature they increase in fiber content and decrease in protein and digestibility. Consequently, low-quality forages often require some form of supplementation to maintain desired levels of production.

A reoccurring problem faced by beef producers is when, and with what, to supplement low-quality forage. The answer depends on many variables including (1) physiological state of cattle, (2) nutrients required for a desired level of production, (3) nutrient content of the forage, and (4) quantity of forage available.

The nutrient requirements of beef cattle are well documented and readily available to producers. Thus, a supplementation program can be defined as a program that provides the difference between the nutrients required by the cattle and the nutrients provided by the low-quality forage.

### Protein Supplementation

Protein is normally the first limiting nutrient in low-quality forage diets and, therefore, is usually the most beneficial nutrient to supplement when an adequate quantity of forage is available. Fig. 1 compares the approximate digestible protein requirements of beef cows with digestible protein derived from range forage.

Because protein is required by both the animal (for normal growth and production) and ruminal microorganisms (for microbial growth and ruminal digestion), a protein deficiency can severely depress animal performance and productivity. Most responses to protein supplementation are observed when the crude protein (CP; percentage nitrogen x 6.25) content of the forage is less than 6 to 8 percent.

### Type of Protein Supplement

Protein supplements can be classified as natural (animal or plant origin) or non-protein nitrogen (NPN; such as urea and biuret). In addition, CP is divided into degradable intake protein (DIP) and undegradable intake protein (UIP).

Degradable intake protein is broken down within the rumen by ruminal microorganisms to yield ammonia and amino acids that they use to stimulate ruminal fermentation and synthesize microbial protein (the main source of protein for grazing ruminants). Undegradable intake

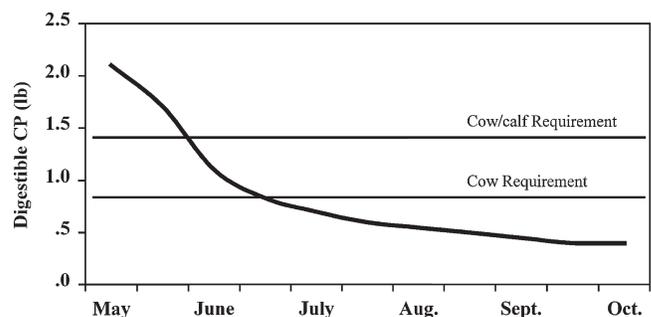


Fig. 1. Approximate digestible crude protein required by spring calving cows with calves and dry cows and the amount obtained from range forage.

*Portions of this article were obtained from data compiled by the Western Region Coordinating Committee on improvement of forage utilization by ruminants in sustainable production systems in the western region.*