Forage Ability to Meet Nutrient Requirements of Cows

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Developing feeding strategies for the cowherd is simplified by having a basic understanding of the production cycle and changing nutrient requirements. By knowing and anticipating nutritional needs, producers can plan feeding programs and lower feed costs. Nutrients are used in the following order: 1) maintenance — keeping cows alive and moving, 2) lactation — providing milk for calves, 3) growth — including weight gain, and 4) reproduction. For most nutritional and management purposes, the annual production cycle for beef cows can be divided into phases: Postpartum, Lactating and Pregnant, Gestation, and Pre-calving. Each is physiologically unique and has its own set of nutritional requirements. We will base our discussion on a March-calving cow.

Postpartum (Mar-May) is the most demanding nutritional period, 80-90 days beginning at calving. Cows must lactate, repair reproductive tracts, resume heat cycles, breed, increase activity and, if young, grow, causing considerable strain. The amount of feed she will eat is highest during this period. If not meeting nutritional demands, she will lose weight and fail or be delayed in rebreeding.

Lactating and Pregnant (May-Sep) is a period of 120-130 days where nutritional requirements are still high. However, energy requirements decrease ~13% and protein needs ~8% compared to postpartum. In this period, cows reach peak lactation and then decrease milk production. Limited fetal growth does not add much to requirements. Cows usually lose some weight during this period.

Gestation (Sep-Dec) is the 100-110 day period immediately after weaning. Nutritional requirements are the lowest since lactation ceased. Energy needs are 23% less than the previous period and protein requirements drop 36% (Figures 1 & 2). This is the best time to put on weight. Developing calf growth is slow and activity decreases. Cow's voluntary feed intake is lowest during this period.

Pre-calving (Jan-Feb) is the most critical period, 50-60 days immediately before calving. Cows must reach or preferably maintain a body condition score of 5 or 6. Energy and protein needs increase 20+% compared to gestation. The calf may gain 60 lbs during pre-calving, and the placenta is also growing. Cows need to gain 1-1.25 lbs/day; heifers and young cows need to gain 2-2.5 lbs/day. Cows are preparing for lactation. Late in this period feed intake may decrease because the fetus and associated structures take space normally occupied by the rumen, making nutrient deficits even worse.

Figure 1. Net energy (Mcal/day) requirement of 1,200 lb cow by month.

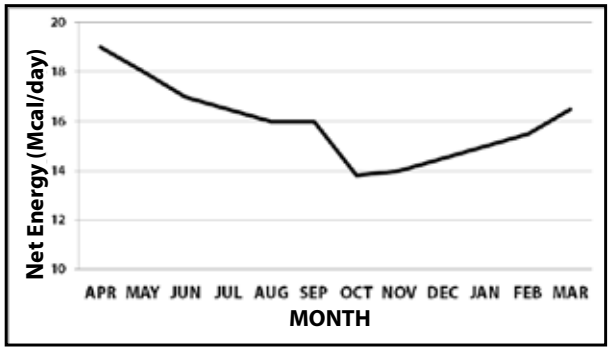
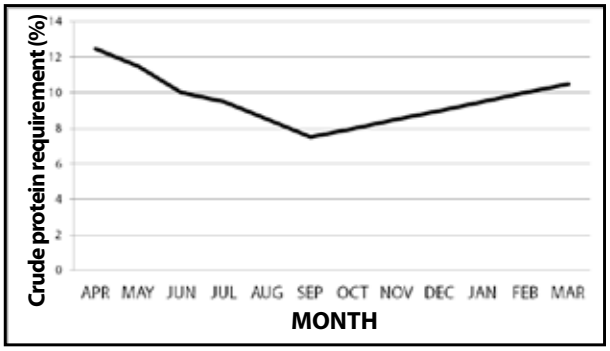


Figure 2. Crude protein (%) requirement of a 1,200 lb. cow by month.



Nutrient composition of forages

Nutrient composition of forages vary greatly depending on:

- **Forage type and species.** Forage quality can vary. Legumes generally produce a smaller, less fibrous stem than most grass species. Lower fiber and higher nutrient content of legumes make them an attractive forage type for grazing and haying. There also is considerable difference between cool-season and warm-season grasses. Cool-season grasses tend to produce less fiber and have higher protein concentrations than warm-season grasses. Plant height also makes a big difference in the nutrient composition of grasses. Taller species (e.g., smooth bromegrass, tall fescue) are genetically predisposed to produce more fiber. Shorter species (e.g., orchardgrass, Kentucky bluegrass) produce less fiber since they do not grow as tall.

- **Stage of maturity.** This is the most important factor in managing the nutrient composition of harvested forage. In general, forage quality declines as plants grow and mature because fiber is produced to improve structural integrity. For beef cows, it is often more economical to harvest additional yield than to harvest early for quality.

Figure 3. Net energy (mcal/day) requirement of 1,200 lb cow and net energy provided by composite sample of grass hay.

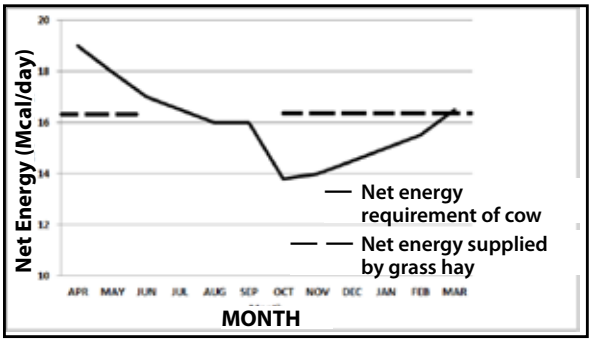
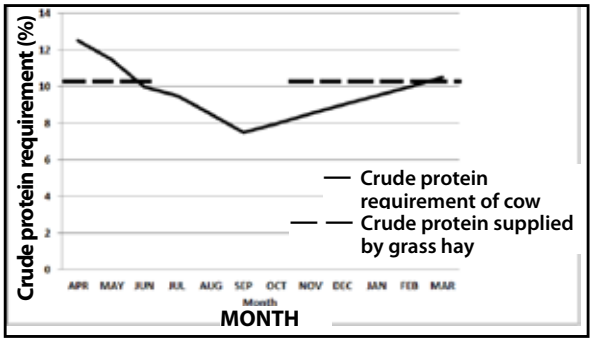


Figure 4. Crude protein (%) requirement of 1,200 lb cow and crude protein provided by composite sample of grass hay.



period just before summer grass. However, if cows enter peak lactation in average condition or less, this period of energy deficiency can be problematic as a loss of one-half of a body condition score can result in poor reproductive performance during the breeding season.

Protein deficiencies are much more common for cows wintering on primarily grass hay or other medium to low quality roughage. The time of the year protein deficiencies show up will largely depend on the quality of winter roughage. Garden variety grass hay generally provides ample protein well into the third trimester of gestation and supplemental protein will likely only be needed through the lactation phase up to summer grass. Poorer quality roughage, however, may require protein supplementation as early as late-fall and continue through winter until summer grass.

What should cows be supplemented with?

Sources of supplemental feeds will likely be dependent on which nutrients need to be supplemented and the depth of nutrient deficiency. After that, it becomes an issue of cost. Energy supplements generally are feed grains or commercial supplements while protein supplements tend to be grain byproducts or commercial supplements. Table 1 illustrates a few common energy and protein supplements. The amount of supplement delivered will depend on supplement source and depth of nutritional deficiency. Thus, recommendations need to be made on a case-by-case basis. Consult with Extension personnel or a qualified nutritionist.

Where do we need to supplement nutrient deficiencies?

In a typical northern Great Plains cow wintering system, grass hay is the primary source of winter nutrition. However, as nutrient requirements change with each physiological stage, the ability of hay to meet requirements can fall short, primarily during late winter and early spring (Figures 3 & 4). These are critical times for the cow. Typical nutrient deficiencies for cows fed only grass hay begin at the third trimester before calving and continue through peak lactation, when she can least afford to be restricted nutritionally. The result will likely be poor rebreeding performance as nutrient reserves have been spent growing her calf and milking. When breeding time comes, there often is not enough time to replenish nutrient stores and, thus, body condition in time for successful June rebreeding — even though nutrition has likely improved dramatically by now. Early winter through late spring is when producers should consider supplemental feeds to make up nutrient deficiencies supplied through the primary roughage source.

Energy supplementation need is confined to a very short time period around peak lactation. Often, the need for supplementation is overlooked because the window of actual need is very short (<60 d) and cost of supplementation of energy can be relatively high. When cows enter peak lactation in exceptional condition, nutritional deficiency may not even be noticed; even though the cows may lose one-half of a body condition score in that

Table 1. Common sources of energy and protein supplementation for beef cows.

Energy	Protein
Corn grain	Corn distillers grains
Oat grain	Soybean meal
Corn distillers grains	Canola meal
Commercial liquid	Commercial protein cake
	Commercial lick tubs
	Commercial liquid