Mineral Nutrition for the Cow Herd – Calving through Breeding

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Minerals and vitamins account for a very small portion of daily intake in cow diets. They are often overlooked due to misunderstanding of their importance and the cost of supplementation. Beef cattle require at least 17 different minerals. Required minerals are classified as either macrominerals or microminerals based on the quantity required. Macrominerals include calcium, magnesium, phosphorous, potassium, sodium, chlorine, and sulfur. Microminerals include chromium, cobalt, copper, iodine, iron, manganese, molybdenum, nickel, selenium, and zinc. Mineral requirements vary depending on animal age, weight, production stage, breed, and stress level. For the purposes of this article, we will be discussing minerals in terms of female beef animals and their needs just prior to calving through the breeding season. In general, when beef cows are grazing green forage during summer months, unless a specific problem has been identified, a basic mineral supplementation strategy is more than adequate to meet mineral needs. However, once cows are moved off of pastures to winter feed, adequate mineral nutrition becomes much more important. The importance of mineral nutrition during the critical stages of calving and breeding are due to the fact that cows go through body composition changes during calf development, lactation, and preparation to return to estrus – they do all of this while generally being fed harvested forages of variable quality.

The biggest nutritional issue for beef cows is mineral interactions. Minerals interact with each other in the body which can result in tying up or making other mineral elements unavailable. The interaction between calcium and phosphorous is a classic example of mineral interaction.

MACROMINERALS

Calcium is the most abundant mineral in the body. Although calcium is rarely limited in cow diets, maintaining an optimal 1.6:1 ratio of calcium to phosphorous may necessitate the need for supplemental calcium in some situations. The lactation phase will increase calcium requirements significantly, dictating the need for calcium supplementation if roughages do not supply enough.

Phosphorous needs are often presented in terms of the calcium to phosphorous ratio described earlier. Roughages are typically pretty low in phosphorous, although they generally supply enough for most beef cow classes. Drought conditions and very mature forages may have very low phosphorous concentrations suggesting the need for supplemental phosphorous in these situations.

Magnesium toxicity is generally not a problem in beef cows as they have a high tolerance for it. Magnesium deficiencies are much more common and results can be fatal, as with grass tetany. Heavy lactating cows on green, lush grass in the spring are most susceptible to magnesium deficiencies. Forage magnesium concentrations depend on species, soil, growth stage, season, and temperature. Legumes usually contain higher concentrations than grasses. Generally speaking, magnesium deficiencies in beef cows are not common, although many farmers still make a high-magnesium mineral available early in the grazing season; presumably as insurance against tetany.

Potassium is a critical mineral to the beef cow. Forages are a good source of potassium, often ranging from 1-4%. Potassium content can be very high in lush pasture, potentially contributing to grass tetany. Mature and stockpiled forage contain lower concentrations. In general, potassium supplementation is not necessary beyond the basic oral mineral supplement.

Sodium and Chlorine (salt) are critical for beef cows year-round. Cows crave sodium and will consume more salt than needed when offered. Some excess salt intake is not a problem as long as adequate water is available. Salt content of a preformulated mineral supplement is usually 10-25% of the supplement and many farmers will provide additional loose salt.

Sulfur in feedstuffs is found largely as a component of protein. In diets containing high levels of sorghum forage, mature forage, forages produced in sulfur-deficient soils, corn silage, rumen-bypass proteins, or if urea is used as a replacement for plant proteins, dietary sulfur supplementation may be increased.

MICROMINERALS

Copper deficiency is best known for its effects on reproduction, particularly estrous cycle disruption. Copper deficiency is a widespread problem in beef herds. Copper is very susceptible to being tied up with a number of other elements in the body, namely molybdenum, sulfur, iron, and zinc, rendering copper unavailable for use by the body. The status of these elements in the body may affect copper requirements of the beef cow. Breed composition also affects copper requirements; Simmental and Charolais require more copper in the diet than Angus. Copper supplementation may need to be increased 25-50% in these breeds. Forages vary widely in copper concentrations as well as concentrations of molybdenum, sulfur, iron, and zinc. Legumes typically contain higher copper concentrations than grasses. Copper is generally supplemented at 1,250 ppm on a 4 oz/day oral mineral.

Iron is a critical component of the mineral strata in beef cows. Iron generally is not lacking in diets, however, excessive iron can present problems. Iron depletes copper and can contribute to copper deficiency if supplementation levels are not adjusted to compensate for losses to iron.

Manganese is generally not limited, as most forages contain adequate concentrations. However, corn silage tends to be relatively low in manganese; cows consuming corn silage as a high percentage of the diet, on a dry matter basis, may need to be supplemented. Manganese is generally supplemented at 2,000 ppm on a 4 oz/day oral mineral.

Zinc plays an important role in immune system development and function. Zinc toxicities are not common but deficiencies may impact reproductive performance and susceptibility to foot rot. Zinc concentrations in forages are variable; supplementation is often recommended to maintain immune function. Zinc is generally supplemented at 4,000 ppm on a 4 oz/day oral mineral.

Nothing is more important than having roughages tested at regular intervals throughout the winter to determine mineral availability in the diet and to ensure your mineral package is meeting the cows' needs for optimum production during this critical time. A good mineral and vitamin supplementation program costs $30-$55/head/year; with the average cost of running a cow nearing $900/cow/year, the mineral program is a relatively small investment. Additionally, strategic supplementation of the oral mineral program with an injectable mineral supplement may be advantageous for some at these very critical stages of production. Testing roughages regularly throughout the winter and consulting with a nutritionist to ensure you have the right mineral program for the cow herd will pay big dividends.