



# Cattle Producer's Handbook

Animal Health Section

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## Copper: An Essential Micronutrient for Beef Cattle

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Throughout the world and especially within the western United States and western Canada, copper deficiency limits cattle production by reducing growth, reproductive performance, and immune response to infectious diseases. Insufficient copper in the diet is the major cause of this deficiency.

In many geographical areas copper deficiency is caused by an excess of certain other minerals that interfere with copper absorption, function, or both. In these areas copper consumption may be adequate to meet an animal's normal essential needs for copper, but a toxic mineral like molybdenum renders copper unavailable.

Molybdenum or a combination of molybdenum and sulfur are the minerals of greatest concern in interference with copper metabolism. Major relationships between various minerals and organic content in the soil affect the uptake of copper by the plant and the ability of the animal to use its copper. Because of these interrelationships, it is more difficult to manage proper nutritional levels for the beef herd.

### Clinical Signs of Copper Deficiency

A variety of conditions can affect the clinical symptoms of copper deficiency. An acute deficiency will cause different clinical symptoms than a long term chronic deficiency. Grazing cattle are more likely to develop a copper deficiency than feedlot cattle. Because of the low copper availability in forages, forage-consuming animals are more likely to become copper deficient. The extent of copper release from forages depends upon for-

age type and stage of vegetative growth. Cattle grazing mature, low-quality forages during fall and winter or grazing late-harvested hays are more likely to develop a copper deficiency than those grazing in spring and summer.

Clinical signs of copper deficiency include ill thrift and poor growth in the young or loss of body condition in the cow. The haircoat will be rough and faded. The change in hair color is a result of loss of pigment in hair follicles. The hair coat will appear more yellow on a red colored cow or gray on a black colored cow. Some deficient cattle show little change in hair coat color, or change is less evident because of "breed" or breed color.

Another symptom is the immune system becomes compromised, resulting in diarrhea and susceptibility to certain infectious diseases. Lameness, incoordination of movement (ataxia) in newborn calves, spontaneous fractures of bones in mature cattle, and rickets-like condition are frequently observed. Major blood vessels may rupture and hemorrhage.

Muscle tissue of the heart can degenerate because fibrous tissue replaces it. This causes sudden heart failure called "falling disease." Usually less than 5 percent of the cattle herd will die of this sudden heart failure. This condition may become fatal without any prior copper deficiency symptoms.

Cow infertility may be a major problem with copper deficiency. Delayed or depressed estrus or fetal deaths because of fetal hemorrhages and anemia are commonly observed fertility symptoms of a copper deficiency.