



BY RACHEL ENDECOTT, BEEF CATTLE SPECIALIST

# **COW SENSE CHRONICLE**

## **SEPTEMBER 2014**

Greetings from Bozeman! Classes have begun and campus is buzzing. Last month, I was pleased to introduce Dr. Megan Van Emon as the new MSU Extension Beef Cattle Specialist located in Miles City. This month, Megan writes about trace minerals in a guest post. Enjoy!

### **TRACE MINERALS**

**BY MEGAN VAN EMON, BEEF CATTLE SPECIALIST**

I can't believe it's September already, the heat of the day is starting to dissipate and weaning is rapidly approaching. September is also a great time of year to think about trace mineral supplementation. Weaning is one of the most stressful times in a calf's life, and can compromise the immune system, which can increase illness susceptibility and ultimately decrease performance. No matter your plan for your cows and calves, ensuring all cattle are receiving adequate trace mineral concentrations is essential to maintaining production. Trace mineral requirements are summarized in the table on page 3.

#### *Selenium*

In Central and Eastern Montana, selenium concentrations in forages and grains are likely adequate to meet the requirements of the cow and calf. However, in Western Montana, the majority of forages and grains do not contain adequate selenium to meet requirements. Selenium is required for decreasing oxidative stress and the production of thyroid hormones via the required enzymes. Oxidative stress can occur during weaning and if selenium requirements are not met, tissue damage can occur.

#### *Copper*

Most forages in Montana do not meet the copper requirements of cattle and needs to be supplemented. Copper is required for a number of enzymes that impact reproduction, bone development, hair growth, and iron transport. One of the tell tale signs of copper deficiency is depigmentation of

the hair coat, such as graying of black hair, and is especially seen around the eyes. When determining copper concentrations in supplement, antagonists must also be considered. Molybdenum and sulfur are both copper antagonists and can form thiomolybdates within the rumen, which renders copper insoluble. Forages in Montana are relatively high in molybdenum and water can contain high concentrations of sulfate.

### *Zinc*

In Montana, most forages are not adequate in zinc to meet requirements. Zinc is required for numerous processes, such as gene expression, fat absorption, antioxidant defense, and the control of appetite. Zinc is critical for DNA synthesis and plays a major role in fetal development. Zinc is also integral in the development of the immune system and its functioning. Adequate zinc concentrations will help maintain a healthy immune system during stressful situations, such as weaning, gestation, and calving.

### *Manganese*

Manganese is required for reproduction enzymatic activity to reduce oxidative stress and for energy metabolism. Manganese requirements vary based on production, either growth or reproduction. Cows have a much higher requirement for reproduction than growing and finishing cattle. Heifers have a large demand for manganese due to the combination of growth and pregnancy. Therefore, production goals must be considered when supplementing manganese.

### *Iodine*

Iodine has one major function as a part of thyroid hormones. Thyroid hormones are essential for immune function, thermoregulation, muscle function, and circulation. Each of these functions is important for growth and reproduction.

### *Cobalt*

The main function of cobalt is B vitamin synthesis, which is formed in the rumen. Cobalt is also involved in energy metabolism. Regeneration of methionine, an essential amino acid, is also one of the main functions of cobalt.

### *Iron*

Iron is a main structural component of hemoglobin, which transports oxygen in the blood to the tissues and carbon dioxide from the tissues back to the lungs. Iron requirements are most likely met by the forages and grains fed to cattle and do not need to be supplemented.

Providing trace minerals can be done in a number of ways, like free-choice loose mineral, injectable minerals, trace mineral-fortified salt blocks, and trace mineral fortified feed supplements. There are advantages and disadvantages to each of these trace mineral supplementation strategies. No matter how trace minerals are supplemented, ensure concentrations provided are adequate for cattle.

Having forages analyzed for trace mineral concentrations can help when determining which trace minerals are needed in a supplementation program. Analyzing forages for trace minerals can provide information to limit possible issues with trace mineral deficiencies.

Table 1. Trace mineral requirements of beef cattle.

Mineral, ppm	Growing & Finishing	Cows
Cobalt	0.1	0.1
Copper	10	10
Iodine	0.5	0.5
Iron	50	50
Manganese	20	40
Selenium	0.1	0.1
Zinc	30	30

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Heifers at Fort Keogh in Miles City, one of whom is fitted with a heart rate monitor to learn about energy expenditure and requirements.