

Trace Minerals in Cattle

Frank Martin DVM

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What Are Trace Minerals

- Minerals that are essential for cattle to live or function at levels less than 100 parts per million
- Have effects in development, bone strength, immune function, and reproduction.

Essential Trace Minerals

- Beef cattle have basically four limiting essential trace minerals
- Copper
- Selenium
- Zinc
- Manganese

Copper

- Copper is essential for young developing animals
- Essential for iron utilization and bone development
- Deficiency will lead to weak bones, slow growth, ill thrift, depigmented hair, diarrhea, decreased immune function and potentially anemia.
- Reproductive performance can be severely limited by copper deficiency. Causes failure to ovulate in females and decreased semen quality in males.

Copper

- Copper must exist in the diet at a level of 4-10 parts per million (ppm)
- Presence of antagonistic minerals in the diet may limit copper absorption
- Molybdenum, Sulfer, Calcium (limestone), Zinc and excessive Iron can all limit copper and lead to copper deficiency.
- Overgrazing and increased soil intake can lead to poor copper uptake.

Selenium

- Essential for growth and fertility in ruminants.
- Works in conjunction with vitamin E to protect cell membranes and helps create an enzyme that protects cells from damage.
- Deficient animals will have poor fertility, decreased milk production, retained placenta, premature weak calves, ill thrift in developing calves, chronic diarrhea, weakness and unable to stand, and white muscle disease.

Selenium

- Beef cattle need 0.1 ppm of selenium in their daily diet which equates to 1mg per day for an adult cow.
- High sulfates in the diet can be antagonistic and prevent uptake of Selenium.
- Legal limit of supplementation of Selenium is 3mg per head per day

Zinc and Manganese

- Zinc and Manganese have similarly important roles to beef cattle health and performance.
- Manganese is likely deficient in non supplemented herds in California and studies are being done to develop strategies to supplement.
- I have no personal experience with deficiency of these two minerals so will focus the rest of the lecture to Copper and Selenium management

So Am I Deficient Doc?

- You may be if.....
- You have cattle in poor body condition on good feed
- Hair coats are long and curly and light colored
- Your veterinarian is complaining about getting covered in loose watery diarrhea from your cows even if they are on dry feed
- Pregnancy checks just aren't as good as they should be

Does This Look Familiar?



Supplemented Color



Now What Do I Do?

- Diagnostics can be performed by your veterinarian.
- Blood samples can be taken from some representative animals and sent to the diagnostic lab. (5-10 animals)
- Blood samples are not perfect but are a good screening tool, especially in non-supplemented herds. They are good at finding deficient herds but not good at evaluating supplementation levels.
- Liver samples can be harvested from slaughtered animals and kept frozen indefinitely or liver biopsy

Developing A Plan

- Work with your veterinarian to determine which plan makes the most sense for your herd.
- If you have a smaller acreage closer confined herd mineral mixes may be your best choice
- If you are in a range setting bolus supplements may work best
- There is no one size fits all solution!

Salt Mixes

- Salt mixes are usually fed free choice
- Labor intensive, require checking salt tubs
- Labels can be confusing
- Intakes are assumed but vary animal to animal
- Despite negatives oral supplementation when done right can yield some of the best results.

Salt Mixes

- A good salt mix will have the following profile and can be adjusted for intakes with traditional loose salt.
- 1000ppm copper
- 3000ppm zinc
- 4000ppm manganese
- 10ppm selenium

Sweet Lick Supplements

- Protein Tubs
- Loomix products
- Sweet lick Blocks
- Advantages of these include increased consumption of product, addition of protein or other nutrition, the opportunity to work with knowledgeable people who may know about your areas deficiency problems
- Disadvantage \$\$

Supplement Bolus

- Copasure Bolus
- Provides 10-12 months of copper supplementation
- Requires skilled people (or at least tough) to administer the bolus
- The bolus is a gel capsule filled with copper wires that imbed in the wall of the rumen.
- The best option for range cattle

Copasure Bolus

Bolus available in cow and calf sizes

The gel capsule is water soluble so take care



Copasure

- The bolus gun should be dipped into vegetable oil between cows
- Both a copper bolus and selenium bolus can be administered at the same time
- Caution should be used to not damage the back of the animals throat with the bolus gun



Se 365 Bolus

- California Cattlemens association has a relationship with Pacific Minerals to distribute this product
- One bolus will supplement Se for at least one year at the legal level
- One bolus per year will keep Se blood levels above 40ppb

Selenium Bolus



- Available on the California Cattlemen's website
- Releases Selenium into the cows reticulum at a rate under the legal limit of 3mg of Selenium per day.
- Package of 60 bolus cost 240 dollars, so it is a good value for the duration of supplementation.

Injectable Copper

- No prepared copper on the market at this time
- Injectable copper must be made at a compounding pharmacy
- Severe injection site lesions have been reported
- On rare occasions sudden death can occur
- Little data on effectiveness or duration of supplementation as there is no current research on the product.

Multimin/Mineral Maxx

- Easy to give
- Readily available at veterinary supply sources
- Short duration of supplementation
- No evidence of increased liver copper levels
- requires multiple injections per year to be effective
- Good as part of a strategy of supplementation, such as pre breeding, branding, weaning etc.

What About Salt Blocks?

- Trace mineral salt blocks will not supply adequate supplementation alone.
- Entire block of salt has a total of 300ppm of copper, 3500ppm of zinc, 2000ppm of manganese, selenium is not even listed.
- The above listed amounts are at or below one animal's needs for one day!



Don't Over Do It!!

- The only thing worse than deficiency of trace minerals is excessive trace minerals
- Copper can be extremely toxic in high doses, and as it is stored in the liver, once it is in the animal it is hard to get it out of the animal.
- Copper toxicity leads to severe gastro intestinal problems, diarrhea, dehydration and shock, followed by hemolysis, and anemia.
- Sudden death can occur

Lets Review

- Trace minerals are essential for developing young animals and healthy adults that can reproduce successfully.
- The big four trace minerals that affect beef cattle are copper, selenium, zinc and manganese
- Kern county cattlemen have had diagnosis of copper and selenium deficiency in their herds.

Review Continued

- Your veterinarian can help you to design a testing and supplementation strategy for your herd
- There is no one size fits all solution
- The best results I have seen personally are through Loomix or minerals fed to cattle
- My favorite choice for range cattle that are spread out away from feeders is the bolus supplementation

Review Continued

- Although Multimin and Mineralmaxx are limited in the duration of supplementation, their ease of use and ready availability make them a useful tool around strategic periods such as the breeding season or weaning/processing.
- Salt blocks or loose trace mineral salt simply doesn't have enough trace minerals to adequately supplement your cattle.

Here is what we don't want



Thank You, Any Questions?

