



Vitamin/Mineral Problems in Cattle Herds of Montana

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Vitamin/Mineral Deficiencies

- *Copper Deficiency (72%)*
- *Selenium Deficiency (56%)*
- *Vitamin E Deficiency*
- *Vitamin A Deficiency*
- *Rarer*
 - *Manganese (1%)*
 - *Zinc (9%)*
 - *Cobalt (<1%)*

Vitamin/Mineral Deficiencies

- *2008 saw half as many deficiency cases as was seen 10 yrs previous with slightly increased numbers of tests*
- *2009 the number significantly increased*
- *2010 numbers doubled from 2009*
- *2011-14 slight increase from 2010*
- *2015 – similar to 2011-2014*

Vitamin/Mineral Deficiencies

- *Why do we see more now than 30 yrs. ago???*
 - *Fall of 2008 – Cost cutting*
 - *More common testing*
 - *Increased production output*
 - *Altered nature – calving dates*
 - *Drought effects*

Copper Deficiency

- *Deficiency in calves can cause*
 - *Poor Growth Rate*
 - *Poor Immune Function*
 - *Susceptible to various causes of diarrhea and pneumonia*
- *Calves should be born with higher body reserves than an adult*
- *Cows move copper to fetus during gestation*

Copper Deficiency (cont.)

- *Deficiency in a calf is caused by maternal deficiency*
- *Deficiency due to inadequate intake or precipitated by high sulfur, iron, selenium, or molybdenum in the diet*
- *Feeder and Adult deficiencies associated with repeat breeders, poor conception rates, prolonged calving dates, non-breeders, poor immune function, and poor growth*
- *Sample of choice for testing is liver*
 - *Deficient Serum is accurate*
 - *Adequate serum is questionable*

Copper Excess

- *Over-Supplementation*
- *Causes interference with iron, selenium, and zinc*
- *Can cause mild to severe functional liver changes*

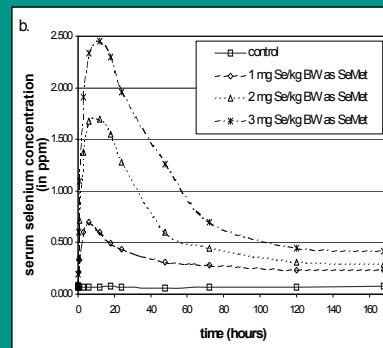
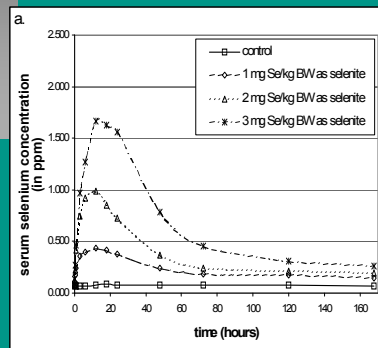
Selenium Deficiency

- *Deficiency in calves can cause:*
 - *Poor Growth Rate*
 - *Weak calves*
 - *Poor Immune Function*
 - *White Muscle Disease*
 - *Sudden Death*

Selenium Deficiency (cont.)

- Calves should be born with higher body reserves than an adult
- Cows move selenium to fetus during gestation
- Feeder and adult deficiencies associated with repeat breeders, poor conception rates, prolonged calving dates, non-breeders, poor immune function, poor weight gain, and sudden deaths
- Deficiency due to inadequate intake or precipitated by high sulfur, zinc, or iron
- Sample of choice is liver, serum, or whole blood
 - Serum is a good monitor of recent intake
 - Whole blood is a monitor of long term status

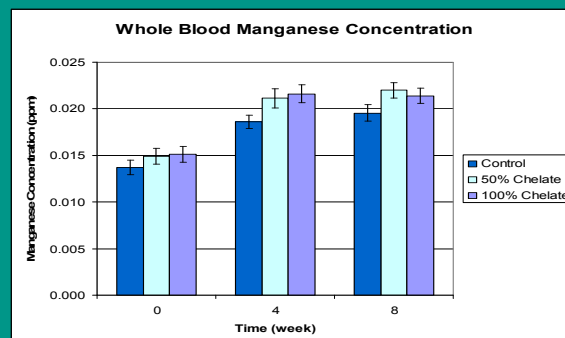
Chemical Form of Supplements



Manganese Deficiency

- *Manganese necessary for bone and joint development and reproductive functions*
- *Deficiency associated with cystic ovaries, repeat breeding, and weak calves*

Supplement Type can make Differences



Vitamin E Deficiency

- *Deficiency in calves can cause:*
 - *Poor Growth Rate*
 - *Weak calves*
 - *Poor Immune Function*
 - *White Muscle Disease*
 - *Sudden Death*

Vitamin E Deficiency (cont.)

- *Vitamin E is a fat soluble vitamin that requires intake of green vegetation*
- *Drought conditions result in less accumulation of Vitamin E to sustain the cow through the winter and gestation*
- *Liver or serum are adequate for testing*

Vitamin A Deficiency

- *Deficiency in calves can cause:*
 - *Poor Growth Rate*
 - *Weak calves*
 - *Poor Immune Function*
 - *Poor digestive tract integrity*
 - *High susceptibility to diarrhea*
 - *Deaths*

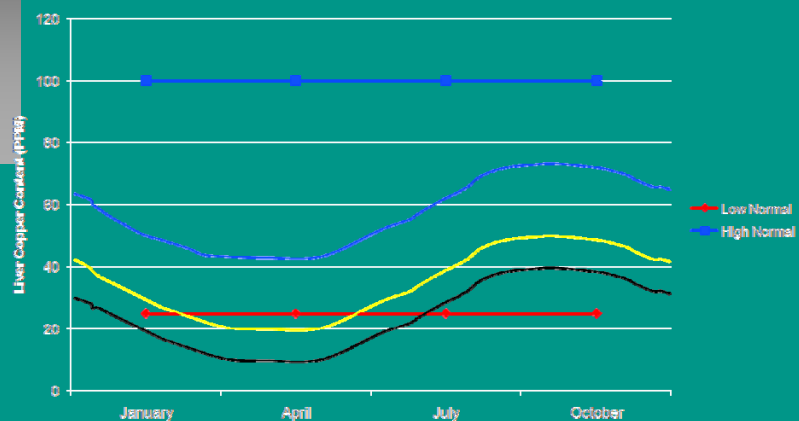
Vitamin A Deficiency (cont.)

- *Vitamin A is a fat soluble vitamin that requires intake of green vegetation*
- *Drought conditions result in less accumulation of Vitamin A to sustain the cow through the winter and gestation*
- *Liver or serum are adequate for testing*

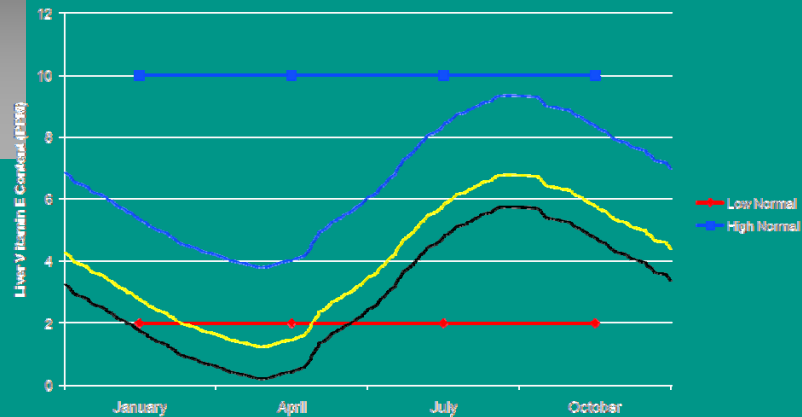
Effects on Immunity

- *Copper, Selenium, Zinc, Vitamin A and Vitamin E are required for normal immunity*
- *With deficiencies*
 - *Direct immune compromise*
 - *Indirect immune compromise*
 - *Poor response to vaccinations (cow)*
 - *Poor colostrum*

Copper Cycle of Body Reserves



Vitamin A and E Cycle of Reserves



Drought Effects

- Vitamin-Mineral supplement intake limited by salt and phosphorous content
- Intake is based on a relative percent of total dietary intake
- As dry matter intake decreases so does supplements
- Lab is already seeing more nitrate cases this year

Timing Supplementation

- *Vaccine Timing*
 - *Not wise to vaccinate when animals are in poor condition for vitamin/mineral balance*
- *Optimization of Health – Calves, feeders, etc.*
- *Optimization of Reproductive Efficiency*

Herd Testing

- *Serum*
 - *Groups of samples required*
 - *5-10 samples per group of similarly treated animals (dependent on group size)*
 - *Copper – questionable*
- *Liver*
 - *Saved samples from “normal animals”*
 - *Liver Biopsies*



■ *Questions*