



Beef Roundup

January 2001

University of California Mineral Website

Most of us know that mineral deficiencies in California cattle are far too common. Because our cattle have been bred for better performance—higher reproductive rates, increased weaning weights, growth, carcass characteristics, etc.—the nutritional requirements of our cattle have also increased. At the same time, we have become better farmers and forage production has increased. Plants do not need trace minerals in the same amounts as cattle. For example, plants do not require selenium at all for their growth. So, at the same time, our cattle need increased mineral nutrition, our plants probably contain less. Therefore, mineral deficiencies in our cattle are increasing—not decreasing!

The University of California at Davis has developed a Website that contains a tremendous amount of practical, science-based information on the common mineral deficiencies affecting California cattle. This Website address is <http://animalscience.ucdavis.edu/extension/mineralproject/>. It is quick to get to and easy to use.

Note: The Animal Science mineral Website can be easily reached through a link in our Website at <http://cetulare.ucdavis.edu>.

Mineral Information. The four minerals that we have the most problems with in California are copper (Cu), selenium (Se), phosphorus (P), and zinc (Zn). Information on these minerals is contained in this Website. For each mineral,

various categories of information are available. This includes biologic function, signs of deficiency, requirements, how to diagnose or determine status in cattle, and methods of supplementation.

Local Information. Each county in the state is listed on the Website and, for each county, all the available information for each of the minerals (Cu, Se, P, and Zn) is listed. For some counties, there is a tremendous amount of information on the individual minerals, and for other counties there is less or, in some cases, no information. As new information becomes known, it is added to the Website. Additionally, the livestock advisor's e-mail address for each county is listed, as well as the addresses for other folks who have expertise in this area.

Methods to Determine Mineral Status. Also contained on the Website is information on methods available to determine the mineral status of your cattle. Whether it is forage samples, blood samples, or other methods, there is a wealth of information on how you can get answers for your cattle and your ranch. The diagnostic methods, advantages and disadvantages of each are discussed. After you get the sample values, the Website provides information on how to interpret those levels.

Conversion Calculator. Many of the minerals are discussed in terms of parts per million (ppm), parts per billion (ppb), or percentages (%). These are units many of us do not use every day. So included in the Website is a calculator that you can use to convert numbers from one unit to another. It is especially useful when evaluating supplements as

contents are often reported in different units for different products. This is a very handy feature of the Website.

Source: John Maas, DVM, MS, Diplomate, ACVN & ACVIM, Extension Veterinarian, School of Veterinary Medicine, University of California, Davis

Urolithiasis (Urinary Calculi) in Ruminants

Urinary calculi form in all ruminants; however, it presents a serious problem in steers between 5 to 18 months of age. The stones form in feedlot animals being fed high grain and pastured animals grazing grasses high in silicates or oxalates. Males are predisposed because their urethral diameter is smaller than that of females and the penis is a yard long with an S-shaped flexure. Stone formation does occur in intact bulls; however, males castrated at a young age are at increased risk because the urethral diameter is smaller as a result of their decreased exposure to male hormones.

Urinary calculi is considered primarily a nutritional disease. The number of cases is highest in calves castrated at an early age and fed high grain diets with a 1:1 calcium to phosphorous ratio or a diet high in magnesium. Calves grazing on silica rich soil are predisposed to form silica uroliths.

Urinary calculi form most often during winter in steers on full feed, or on range during severe weather conditions when water intake is limited and especially when the water has a high mineral content. Urine pH is a major factor determining calculi composition. If the urine pH exceeds 8.5, calcium carbonate and phosphate crystals precipitate as urine colloids and lose their ability to serve as protective gel. Dehydration can promote stone formation due to urine concentration and is related to water deprivation caused by frozen water sources or any management practice that limits water intake. Vitamin A deficiency has also been implicated as a predisposing factor to stone formation.

Measures to Prevent Urinary Calculi:

- ! Provide a calcium to phosphorus ratio of 2:1 in the complete ration.
- ! Add salt up to 4% of the ration to stimulate water consumption.
- ! Water must be available continuously. Water heaters may be needed for newly weaned calves or stocker cattle during cold weather.
- ! Supply water with a low mineral content.
- ! Assure adequate vitamin A intake daily.
- ! Acidify the urine by addition of ammonium chloride (56-80 gram per head for a 550-pound steer).
- ! Prevention of silicone stones in grazing bull or steer calves is difficult.
- ! Current implants do not predispose to stone formation.

Source: Dr. Bill Kvastnicka, Veterinary Specialist, University of Nevada, Reno

Oak Toxicity

Recently, Dr. Maas had a number of questions regarding the toxicity of oak trees (leaves and buds) or acorns for cattle. Most of our cattle in California spend at least part of the year in areas where oak trees abound. Health problems due to ingestion of oak leaves or acorns are certainly not an everyday problem; however, when problems do occur they can be catastrophic. Several years ago, in a few northern California counties, about 2,700 cattle died due to oak toxicity.

Do all oak trees contain the toxins? There are more than 50 common species of oak trees in California and all contain some level of the chemicals that can cause problems in cattle. **The buds, young leaves and fresh acorns have the highest level of toxins.** There is considerable variation in the concentration of toxins in the plant tissues and is dependent on (1) the species of oak trees, (2) the season of the year, (3) the year in question, depending on climatic conditions. The chemical toxins in question are tannins and phenols, which are naturally contained in the plant material, but vary in

concentration based on the variables listed above.

How do the toxins affect cattle? The oak toxins (tannins and phenols) attack the proteins they contact. Thus, the gastrointestinal tract (mouth, esophagus, rumen, and intestines) is damaged by direct contact. This results in ulcers, bleeding, and perforation in some cases. So if the cattle survive long enough, bloody diarrhea or dark diarrhea is seen. Also, in the rumen, some of the tannins are converted to other chemicals (gallic acid and pyrogallols) that are absorbed into the blood stream, travel to the kidneys where they cause severe damage to the kidneys. This damage to the kidneys results in renal failure, which can cause death in many cases. Younger cattle (less than 400 pounds) are usually more severely affected than older cattle.

What do the affected cattle look like? Symptoms usually appear shortly after cattle eat 50% or more of their diet as oak (leaves, buds, acorns). Some animals may simply be found dead. Others may appear weak and listless, without an appetite. A day or two after eating the oak leaves or buds, bloody or dark diarrhea may be noticed. As kidney failure progresses, fluid may accumulate around the anus or vulva. Throughout, the cattle appear weak, listless, and have no appetite.

What are the most important risk factors that can lead to oak toxicity? The presence of large numbers of acorns when forage is scarce is one of the main risks. Wind, hail, or snowstorms can cause large number of acorns or limbs from oak trees to drop so that cattle can gain easy access. California outbreaks have been worse in the late winter and early spring when oak buds and small leaves are present in large numbers and a wet snowstorm occurs. The wet snow breaks branches and limbs and the snow also covers the available grass and leaves the cattle very hungry. This leads to consumption of these very toxic buds and leaves because it is the only feed available.

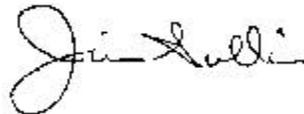
What is the acorn calf syndrome? The *acorn calf syndrome* is completely different from the typical oak toxicity problems seen in cattle. *Acorn calves* are congenitally malformed calves born to cows that have ingested large numbers of acorns under very poor forage conditions during the second trimester of pregnancy (3-7 months of pregnancy). The cause appears to be a combination of poor nutrition and exposure to acorns. The calves have very short legs, abnormal hooves, and misshapen heads (either short noses or long narrow heads). These calves look like dwarves in most instances. Occasionally, more than 10% of the calves in a herd will be acorn calves.

How can these problems be prevented? Oak toxicity can be prevented by supplementing the cattle with hay when forage conditions are poor and acorns are abundant. Likewise, when late snowstorms cover the forage and knock down oak limbs with large amounts of buds and young leaves, be sure to start hay supplementation immediately. A delay of only a day or two could result in many deaths. Prevention of acorn calves is also a matter of being sure adequate forage is available or supplementing with hay or other forage when running the cattle in oak areas.

Source: John Maas, DVM, MS, Diplomate, ACVN & ACVIM, Extension Veterinarian, School of Veterinary Medicine, University of California, Davis



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In Focus, an update on the University of California Cooperative Extension (UCCE) efforts and results in Tulare County, can be accessed on the Web at <http://cetulare.ucdavis.edu/update/infocus.htm>. This report is designed to introduce you to UCCE and some of the important, interesting, and varied projects being conducted by Tulare County's office of Cooperative Extension.