Grass Tetany – Start Preventative Measures Now

Dr. Michelle Arnold – University of Kentucky, Veterinary Diagnostic Laboratory, USYAKS Science and Herd Health Committee

A special thanks to Dr. Jeff Lehmkuhler, Extension Beef Cattle Specialist, University of Kentucky and Dr. Cynthia Gaskill, Veterinary Toxicologist, University of Kentucky Veterinary Diagnostic Laboratory for their significant contributions to this article.

What is "Grass Tetany" and when are cattle most likely to have it?

Grass tetany, also known as spring tetany, grass staggers, wheat pasture poisoning, winter tetany or lactation tetany, is a condition due to a low level of magnesium (Mg) in the blood. The disorder in adult cattle begins with muscle spasms and quickly progresses to convulsions, respiratory difficulty, and death. The amount of magnesium in the blood is completely dependent on the amount obtained from the daily diet. Deficiencies occur most often in beef cows when they are nursing a calf and grazing young, green grass in early spring. Fast-growing spring pastures are high in potassium (K+) and nitrogen (N+) and low in magnesium (Mg++) and sodium (Na+). Affected cattle often have low blood calcium concurrently. Fall calving cows may also experience grass tetany during the winter months.

Will Feeding Plain White Salt to Cows Prevent Grass Tetany?

This claim is shared every spring and, indeed, there are producers who do not have grass tetany that only feed salt. How can that be? Simply put, for those few lucky producers, the minerals available in their soils and forages are enough to meet the needs of their cows. A number of complex factors contribute to the ability of magnesium to be absorbed through the rumen (stomach) wall. Primarily there is a "pump" mechanism that actively transports the dissolved form ofMg across the rumen wall to the bloodstream. This pump does not work when potassium in the rumen is high and sodium is low because this changes the electrical potential necessary to drive it. Adding salt to the ration will improve magnesium transport to the bloodstream only when sodium is low in the overall diet. Too much salt will increase urination and cause magnesium to be lost in urine. Salt, as with any substance, can be dangerous and even fatal at high levels.

Research has shown that the negative effects of high potassium in early spring grass cannot be overcome by simply adding large quantities of salt. However, a second, passive transport system for Mg exists which is not influenced by potassium. This transport system only works when Mg in solution in the rumen fluid is high. High magnesium mineral mixes prevent grass tetany by allowing magnesium to passively flow into the bloodstream of the cow without the need for the active transport pump.

Has Limited Amounts of Salt in Trace Mineral Mixes led to an Overconsumption of Minerals?

Regional soil types, soil fertility and diverse forage species result in different mineral needs for grazing livestock on every farm. A blanket statement disregarding these factors is oversimplifying a very complex situation. Trace minerals such as copper, selenium, and zinc are all essential nutrients vital for proper growth, production, and immune system function. Trace mineral deficiencies are common and can predispose animals to\ serious and sometimes fatal disease conditions. Interactions occur between all of the various metals, minerals, and

other elements in the diet, and optimal amounts of all elements are essential for proper nutrition. Trace mineral mixes are formulated to meet the needs of cattle, including the need for salt. The keys to using a free-choice product are to ensure cattle have access to mineral 100% of the time, use a palatable, quality product and make sure they are consuming it at the expected level. Remember a 50-pound bag of hi-mag mineral to be fed at 4 ounces per head per day will only last 4 days in a 50 cow herd. If the cows have calves that also eat mineral, a bag may only last 3 days.

Does Grass Tetany Only Occur in tbeSpring?

No! "Winter tetany" in beef cattle is caused by consumption of a diet low in energy and an insufficient intake ofalso be observed when feeding wheat or rye baleage during the winter since these forages are often high in potassium and nitrogen but low in magnesium. Affected cattle have borderline low blood magnesium concentration then clinical signs of grass tetany are triggered by a stressor such as a severe cold snap.

How Can Grass Tetany Be Prevented?

Prevention is based on providing magnesium in the diet during times when conditions are right for grass tetany. As long as the active transport pump for magnesium is working well and driving magnesium across the rumen wall, grass tetany problems should not develop. However, when factors prevent this pump from working (such as when potassium is high in lush spring grass), the second or "backup" pathway depends on increasing levels of magnesium in the diet with a high magnesium mineral mix. A high rumen magnesium level will allow magnesium to passively flow into the bloodstream of the cow without the need for the active transport pump. Supplementation with high magnesium mineral should begin at least 30 days prior to calving. Cows require 20 grams of magnesium daily or 4 ounces per day of a 15% magnesium mineral mix, especially during the late winter and early spring if pregnant or lactating. Mineral feeders should not be allowed to be empty because consistent intake is important for clinical disease prevention. Do not offer additional loose salt or salt blocks at the same time! High magnesium mineral may be discontinued in late spring once the grass is more mature, the water content of the forage is decreased, and daily temperatures reach at or above 60°F.

Does the form of magnesium used in the mineral matter? Absolutely. The feed industry utilizes magnesium oxide (MgO) to supply magnesium but there is tremendous variation in quality and bioavailability. UK Beef Integrated Resource Management (IRM) mineral recommendations for free choice supplements for grazing beef cattle include 15% salt and 14% magnesium in the complete mineral mix and all magnesium from magnesium oxide (no dolomitic limestone or magnesium mica). Current recommendations also include a minimum 50% of the MgO should be of the Martin Marietta AniMag prilled form.

"Prilling" is a method of processing ruminant animal feed that decreases degradation by ruminal microorganisms and allows absorption further down the digestive tract. These complete mineral mixtures also supply the necessary sodium in the form of salt to aid in combating high potassium intakes. Consumption should be monitored because cattle will not eat enough trace mineral if using poor quality products.

In addition, feeding an ionophore (such as monenssin or lasalocid) has been shown to improve magnesium absorption efficiency.

Are there management changes that reduce the risk of grass tetany?

Yes. These include: 1) Soil test and apply fertilizer based on soil test results and use no more potassium than recommended since grasses are luxury consumers of potassium; 2) Legumes are high in magnesium and will help offset the problem although their growth is often limited in late winter; 3) Feeding hay to cattle on lush pasture during susceptible periods or limit grazing to 2-3 hours per day will slow the rate of passage through the digestive tract and allow more time for absorption; 4) Graze the less susceptible or non-lactating animals (heifers, dry cows, stocker cattle) on the highest risk pastures.

In summary, increasing magnesium intake by supplementing with magnesium oxide, offering adequate salt to prevent sodium deficiency, and increasing total energy intake with good quality forage or supplemental feed are all effective tools in preventing grass tetany. These are exceptionally important when moving from winter rations to young spring grass pasture, especially in lactating cows.

Grass tetany is considered a true veterinary emergency requiring prompt treatment with magnesium to prevent death. Response to therapy is not always good and depends largely on the length of time between onset of symptoms and treatment. Cattle that do recover take at least an hour which is the time it takes for magnesium levels to return to normal. Many of these cows will relapse and require more treatment within 12 hours. Administering oral magnesium gel once the animal has regained good swallowing reflexes or drenching with magnesium oxide or magnesium sulfate will reduce the rate of relapse. If grass tetany has occurred within a herd, an effort should be made to Immediately increase the intake of magnesium to other members of the herd to prevent further losses.