



Grass Tetany: Complex & Complicated

Multiple factors can contribute to the animal's deficiency of magnesium.

Story by

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The good ol' *Merck Veterinary Manual* describes it as "a complex metabolic disturbance characterized by hypomagnesemia." We're talking about a condition of cattle known as grass tetany, or grass staggers, resulting from abnormally low levels of magnesium in the blood. The subsequent frenzied behavior, muscle spasms and convulsions aren't pretty. Grass tetany has been called a condition of short clinical course and high mortality. In cowboy lingo, it means a cow brute can go downhill and die mighty quick.

Grass tetany definitely is complex, meaning multiple factors can contribute to the animal's deficiency of magnesium. Soil, plant, animal and weather interaction is involved. The interaction of various factors is complicated, too, and not completely understood. To make matters worse, grass tetany doesn't always play by the rules.

Contributing factors

For example, mature, heavy-milking females appear to be most susceptible to grass tetany. Young animals are seldom affected, but it's possible. It can affect non-lactating cows, too, particularly when nutritionally stressed animals are introduced to succulent green forage. What's hard to explain is why some animals seem to be more susceptible than others of similar kind, age and stage of production that are consuming the same diet.

The problem is considered most likely to occur when cattle are grazing lush grass in the spring. However, it may occur during the fall and even in winter. Grass tetany is often associated with cool, cloudy and rainy conditions, but it may show up during a subsequent period of warm, sunny weather. Cool-season perennial grasses and cereal-grain pastures undergoing rapid growth typically are considered most likely to be low in magnesium, and therefore more dangerous. Grass tetany has been reported among cattle whose diets consisted of grass hay, silage or corn stover when those feedstuffs were low in magnesium.

"We see increased incidence of grass

tetany in cows offered baleage from cereal-grain forages, as well as cows grazing cereal-grain pastures. This can be due to high nitrogen fertility and, often, high potassium fertility of soils," says University of Kentucky Extension Beef Cattle Specialist Jeff Lehmkuhler. "We know high nitrogen and potassium fertility greatly increase the risk of magnesium deficiency. [University of Missouri] work also showed that phosphorus fertilization of pastures increases forage magnesium concentrations."

While low magnesium in the soil and the forage grown on that soil is blamed for grass tetany, other minerals influence magnesium availability. Fertilizing pastures without determining site-appropriate rates per a soil test could promote soil nutrient levels conducive to tetany. Nitrogen has been recommended for stimulating grass production in spring, but the resulting rapid-growth forage is high in moisture and low in magnesium. Excessive potassium in the soil hinders plants' ability to absorb available magnesium. Phosphorus enhances magnesium absorption, so low phosphorus usually means forage will be magnesium-deficient.

Legumes are an exception to the rule. Tetany rarely occurs when legumes comprise a significant portion of cattle diets. Grown on the same soil as magnesium-deficient grasses, legumes may contain up to twice as much magnesium.

Emergency situation

From the animal's point of view, grass tetany results from reduced intake or absorption of magnesium, or both. According to Kansas State University Extension Veterinarian Larry Hollis, it's the ratio of potassium to calcium and magnesium that gets out of balance. It qualifies as an emergency, because the time lapse between the onset of symptoms and death may be only a few hours. Symptoms may start with excessive nervousness, wide-eyed staring, muscle twitches, incoordination and a staggering gait. Affected animals eventually collapse and thrash their limbs with head thrown back, before falling into a coma and dying.

As a treatment, veterinarians typically recommend intravenous administration

of a commercial preparation of calcium and magnesium in a dextrose base. When affected animals are found early, response to treatment and recovery can occur quite rapidly. In many cases of grass tetany, however, the only sign is a dead animal. Hollis says prevention is the best management strategy.

Increasing magnesium intake

"Traditionally, producers have supplemented cattle with a high-magnesium mineral," explains Hollis, noting the need for daily ingestion of magnesium because the body does not store a ready reserve.

"The most convenient form of supplementation is in the form of 'hi-mag' blocks. However, physical intake from blocks is often inadequate to meet animal need during peak grass-tetany conditions," Hollis adds. "I routinely tell producers to use a loose mineral mix containing salt and high-magnesium mineral."

Blending mineral with salt is a method of regulating intake. Salt helps assure a minimum level of consumption of less palatable minerals, like magnesium, but it can help control overconsumption as well.

Hollis says there is limited evidence that salt, or the sodium part of it, also may play a role in the grass-tetany syndrome. It's been suggested that a deficiency of sodium in the animal's blood is a major predisposing factor, and increased intake of salt may help prevent many, if not most, cases of grass tetany. Hollis says there is little research to support that notion.

Lehmkuhler agrees, calling supplementation with a high-magnesium mineral the most reliable method for preventing grass tetany. Lehmkuhler says producers should be diligent in managing magnesium supplementation, because daily consumption is necessary during periods of peak tetany risk.

"Managing the mineral feeder is often overlooked," laments Lehmkuhler. We encourage folks to write down on the calendar when mineral is put out and how much. Write down the number of cattle and calves that have access to the feeder each time it is filled. This allows easy calculation of intake, per head, for comparison to the targeted consumption listed on the mineral-bag label.

"There can be quite a large amount of variation in intake, so producers should consider what is changing. Heat stress may cause cattle to spend more time in the shade or at the water tank. Where is the mineral feeder in relation to those areas? If mineral feeders are close by, mineral consumption might be higher," says Lehmkuhler.

When managing any mineral supplementation program, producers should not overlook the amount of mineral a suckling calf can consume, especially if it weighs 300 to 400 pounds. If the targeted rate is four ounces (oz.) per head daily, a cow-calf pair can be expected to consume more than 4 oz.

"We see calves consume 3-4 ounces of mineral postweaning, and expect they consumed nearly that amount (for some period of time) prior to weaning," adds Lehmkuhler.

Producers who are making changes to their operations as a result of drought might want to keep grass tetany in mind. Some of them may be planting cereal-grain forage crops, such as rye, oats or triticale. Particularly with fertilization and irrigation, rapid growth could present a grass-tetany risk. Risk should also be evaluated when relocating cattle from drought areas to regions where rain has afforded greener pastures. Remember, too, that stress resulting from transport and fasting can be factors influencing the occurrence of grass tetany.

Hollis says it could be a big problem in drought-stressed areas as rain returns, especially if rains are preceded by a period of warm temperatures. Allowing rapidly growing grass to achieve some height is wise pasture management, and it could also help prevent tetany problems.

"The perfect storm this year on drought-stressed pastures might be having enough moisture to get grass started slowly, followed by turnout, and then a really good general soaking rain over several days — and that followed by several bright, warm, sunny days," opines Hollis. "The faster the grass grows, the bigger the potential problem."

Editor's Note: Troy Smith is a freelancer and cattleman located near Sargent, Neb.