



# Texas Agricultural Extension Service

*People Helping People*

## GRASS TETANY

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Grass tetany is a nutritional disease or metabolic disorder characterized by a low level of magnesium in the blood serum. The disease has been known to exist for over a hundred years and is a world-wide problem. Occurrence of the disease has become more prevalent in recent years, particularly where cattle and forage production have been intensified.

Grass tetany is common during cool, cloudy, rainy weather and most often occurs when this weather is followed by a warm period, during which grasses grow very rapidly. The disease usually affects beef cows, but may also affect stocker cattle, ewes and dairy cattle. It is most common in older animals, particularly during early lactation of beef cows that have had at least two calves.

Although death losses in beef cows from clinical grass tetany may appear more dramatic, economic losses due to chronic, subclinical low blood magnesium may be equally important to producers. Magnesium is necessary for growth, bone development and many enzyme systems to function properly; plays a key role in energy metabolism reactions. Animal performance is always limited by the availability of the most deficient nutrient. Because there is a daily requirement for magnesium, symptoms may appear suddenly, but the deficiency developed over a period of time. Cattle on a magnesium deficient diet may look normal, but they starve to death due to a lack of available energy at the tissue level.

Approximately 70 percent of the body's magnesium is contained in the bones and the other 30 percent is distributed among the various soft tissues and fluids. Of the magnesium contained in the bones, approximately one-third is subject to mobilization for soft tissue use when intake is inadequate.

The low serum magnesium levels associated with grass tetany indicate that the disturbance is associated with a metabolic or physiological deficiency of magnesium. The metabolic deficiency may be due to a simple dietary deficiency resulting from low levels of magnesium in the forage, inadequate forage intake or from an impairment of magnesium absorption and utilization.

The beef cow requires 7 to 9 grams of magnesium daily during gestation and 20 to 22 grams of magnesium per head per day during lactation.

Magnesium requirements may be increased by high intake levels of aluminum, potassium, phosphorus or calcium, as these minerals decrease the efficiency of magnesium absorption and/or utilization. Beef cows with the genetic capability for high milk production also have a higher magnesium requirement.

### Occurrence

Grass tetany is most likely to occur on pastures grown on soils which are low in available magnesium and high in available potassium. The incidence of grass tetany has increased in recent years because of the emphasis on increased forage utilization in beef production. Heavy fertilization, particularly with nitrogen and potassium, enhances forage production; however, it also intensifies the incidence of grass tetany because high levels of potassium and nitrogen reduce magnesium absorption and utilization. Heavy applications of broilerhouse litter or other high-nitrogen and potassium manures may also increase the hazard.

### Symptoms

Magnesium deficient cattle have a reduced appetite and ability to digest dry matter. Initial symptoms of magnesium deficiency include undue nervousness, ears carried backward, excessive salivation, staring eyes and a stiff, irregular gait. As the disease advances, labored breathing, increased heart rate and tetanic muscular spasms can be observed. Affected animals sometime have the instinct to charge or fight people in the immediate area. In the most severe stage, the animal collapses to the ground with continued muscular spasms and their legs will thrash the ground around them. Convulsions, coma and death will occur rapidly if treatment is not administered. The only symptom that remains constant is a lowered blood serum magnesium.

### Prevention

Programs to prevent grass tetany in beef cattle should emphasize that established dietary requirements must be considered in relation to the various factors known to influence an animal's magnesium utilization. Because the cow has limited capacity to store magnesium, a continuous dietary supply of magnesium is necessary.

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Warm season perennials are normally high in calcium, low in phosphorus and marginal in magnesium. Cows grazing warm season perennial grasses in the summer, fall and winter, or fed hay from warm season perennial grasses, should have a mineral mix that is 6 to 12 percent calcium, 12 percent phosphorus and 4 percent magnesium. This will provide the phosphorus and magnesium necessary for normal body functions and production.

Beef cows will consume 1 to 3 ounces of this mineral per head daily or 20 to 60 pounds per cow annually. Low levels of magnesium, 3 to 4 percent, in the perennial grass mineral supplement will increase efficiency of production, help maintain body stores and aid in preventing the "downer-cow" syndrome. Consumption is lowest when grass is lush and highest during a drought or when grass is mature. If the salt content of a mineral is below 20 percent, trace mineralized loose salt should be provided separately, particularly during periods when lush spring perennial pastures are available.

The use of dolomitic limestone or magnesium fertilizers has been suggested as a solution to the grass tetany problem. Fertilizers have been somewhat effective, but they have not provided adequate protection nor have they been cost effective. Nutritional requirements for efficient plant growth do not necessarily meet the nutritional requirements for livestock.

### High-Risk Situations

Cattle grazing winter pastures, such as wheat, oats, rye or ryegrass, should have a mineral mix that is high in calcium and magnesium, but relatively low in phosphorus. These pastures are normally high in potassium and phosphorus and low in calcium and magnesium. Mature cows with young calves grazing heavily-fertilized, winter pastures are very susceptible to grass tetany.

Forced or hand-feeding of one ounce or more of magnesium oxide daily has normally prevented or stopped outbreaks of grass tetany. Many commercially prepared mineral mixes are available for this purpose. A good mix will contain 12 to 14 percent calcium, 10 to 14 percent magnesium and 4 to 6 percent phosphorus. Consumption levels of 4 to 6 ounces per head daily are recommended.

The following homemade mineral mixes have been fed with good results:

#1	#2
25 lbs. ground corn	15 lbs. dehydrated molasses
25 lbs. defluorinated rock phosphate	25 lbs. defluorinated rock phosphate
25 lbs. magnesium oxide	25 lbs. magnesium oxide
25 lbs. trace mineralized salt	25 lbs. trace mineralized salt

Magnesium oxide is very unpalatable, but cows must consume 4 to 6 ounces of high magnesium mineral per head daily to be effective. Consumption of commercial or home-mixed mineral supplements can be regulated or adjusted by adding 5 percent salt when consumption is too high. When consumption is too low, the addition of 5 percent ground corn or dried molasses will increase intake.

Magnesium supplements should be available at the beginning of the winter grazing season because blood levels of magnesium are easier to maintain than to restore. Other magnesium salts can be used, but magnesium oxide is utilized more readily by the animal and requires a smaller daily intake. For example, magnesium sulfate (epsom salt) must be fed at the rate of 8 to 12 ounces daily, plus it has an undesirable laxative effect.

Another prevention method is to limit-graze winter pastures and provide cattle plenty of hay while they are off of winter pasture. Increasing dry matter reduces the rate of passage and increases absorption. Remember that grass tetany is a sporadic disease and the success of various management procedures is difficult to interpret. A single solution for all cattlemen is not available. The control program must be tailored to the individual operation.

### Treatment

The best treatment for grass tetany is prevention. Cattle afflicted with grass tetany need immediate treatment. The common treatment is an intravenous injection of 500 cc of a dextrose solution containing both magnesium and calcium. Consult a veterinarian regarding recommended preparations and dosage rates. Injecting 200 cc of a saturated solution of magnesium sulfate (50 percent) under the skin will give a relatively high level of magnesium in the blood within 15 minutes. This may be used as a temporary treatment when a veterinarian is not immediately available. **Caution:** Afflicted animals may show a surprisingly quick response to treatment, enough that they might get up and charge or fight those in the vicinity.

### Summary

Grass tetany is the result of a dietary deficiency of magnesium or factors interfering with magnesium absorption or metabolism. Improved fertilization practices tend to increase the incidence of the disease, particularly when high levels of potassium and/or nitrogen are applied. Cattle productivity can usually be increased on warm season perennial pastures by providing a mineral mix high in phosphorus and containing 4 percent magnesium. In high-risk situations where lactating cows are grazing lush winter pastures, tetany is usually controlled if cattle consume 1 to 2 ounces of magnesium oxide daily.

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