

What really
causes
Grass Tetany?

Historically, grass tetany has been attributed to a magnesium deficiency brought about by cattle grazing spring pastures when there is a superabundance of young, rank, quick-growing grasses rich in proteins. Environmental stresses such as frost or freezing increases the risk.

However, we now know that there are other factors involved that have a great impact on grass tetany and other metabolic disorders.

Factors involved in the Grass Tetany Syndrome

- Low Blood Magnesium
- Nitrate Toxicity / Excess Dietary Protein
- Sodium Deficiency
- Low Blood Calcium
- High Blood Potassium

Low Blood Magnesium

Most mineral supplements currently recommended to prevent grass tetany are deficient in sodium and excessive in magnesium.

Low blood magnesium may occur in animals foraging on diets low in magnesium, but it may also occur when diets contain adequate magnesium.

This suggests that something is either tying up the magnesium, making it unavailable through chelation, or causing excessive loss from the through the urine, feces or milk, thus causing an acute low blood magnesium.

Nitrate Toxicity

Nitrate toxicity occurs in ruminants when *nitrate* is converted to *nitrite* by the gut bacteria, and then the nitrite induces a methemoglobinemia (which renders the red blood cell incapable of carrying oxygen to the tissues) and anoxia, or difficult breathing.

Common factors associated with this form are excessive nitrogen fertilization of pastures and feeding rations excessive in protein and non-protein nitrogenous compounds.

Nitrate Toxicity

Another form of nitrate toxicity may occur as the body begins to remove excess nitrates. The majority of excess nitrates are bonded to cations - Sodium, Calcium or Magnesium - and are then excreted in the urine, feces or milk. If there is a deficiency of sodium, and most forages and rations are deficient in sodium, and excessive in potassium, and when there is a spike in nitrate, or excessive nitrate in the body, anionic nitrate is eliminated from the body as an ionic complex associated with magnesium and calcium.

Nitrate Toxicity

If sufficient sodium is not available the body depletes itself of calcium and “washes out” some of the essential cations, calcium, magnesium and sodium in the urine, feces and milk.

This depletion of essential cations causes a severe electrolyte and mineral imbalance which may initiate a host of metabolic diseases in ruminants, and secondary immune suppression associated with these disorders.

NH_4^+ may also interfere with the absorption of magnesium from the gut.

Sodium Deficiency

A dietary sodium deficiency causes an electrolyte and mineral imbalance which contributes to a multitude of syndromes, including hypomagnesemia, hypocalcemia, grass tetany, downer cow syndrome, acute bloat, vaginal and rectal prolapses as well as a host of opportunistic diseases and immune suppression and other conditions believed to be associated with excessive potassium and nitrate in the diet.

Sodium Deficiency

Adequate dietary sodium protects against nitrate toxicity, grass tetany syndrome in herbivores, and other metabolic and reproductive disorders induced by nitrate or other excess protein sources in the ration.

It has been observed that if cattle have access to adequate loose salt, they rarely die from grass tetany or acute bloat.

Low Blood Calcium

High nitrates and low sodium in the ration can cause low blood calcium and thus contribute to the occurrence of milk fever and the 'downer cow' syndrome.

The clinical signs of grass tetany or hypomagnesemia are unlikely to occur unless there is also a hypocalcemia.

High Blood Potassium

The same conditions that are involved in grass tetany - lush growth of pastures in early spring, along with cool, cloudy and wet weather and possible freezes or frosts, will cause acute spikes in potassium as well as nitrate in affected growing pastures.

The acute spike in potassium and nitrate is causing an electrolyte and mineral imbalance in affected herbivores. These imbalances in pastures and forages include an increased ratio of K/ Ca+Mg, and a deficiency in sodium.

Prevention

Build the soil and avoid over application of nitrogenous fertilizers including manure.

Supply white salt free choice.

Over feeding of protein can be somewhat alleviated by feeding adequate calcium, magnesium and sodium preferably in complete rations, but also a variety of minerals should be available free choice.