

Many beef producers are utilizing cereal greenfeed and/or straw as the main forage source for their cattle. During the past couple of years an increasing number of cattle herds have exhibited tetany-like problems. It is becoming apparent that high levels of potassium & low levels of calcium may be present in many of the cereal forages used as the main roughage source for cattle. High levels of potassium and low levels of calcium in the diet can limit the absorption of magnesium, resulting in tetany problems.

Tetany and milk fever are two metabolic diseases that produce tetany-like symptoms. Symptoms include depressed appetite, reduced weight gain, nervousness, staggering, stiff gait, convulsions and paralysis usually in mature cattle. Grass tetany refers to animals that exhibit tetany-like symptoms after being turned out on lush pasture, while winter tetany refers to animals fed on winter rations that exhibit similar symptoms. Tetany is caused by hypomagnesemia, or low blood magnesium (Mg) and milk fever is caused by hypocalcemia or low blood calcium (Ca). Symptoms of both conditions are often seen in mature cows in late pregnancy (about 6 weeks before calving) or soon after calving.

Often the first signs of a problem in the beef herd is a dead cow. It is often difficult to tell whether the cow died from milk fever or tetany. Check around the cow's body for signs of struggling (marks on the ground) or paddling on the ground around her head and legs. If these signs are present the cow likely died from tetany. Animals that have died from milk fever show no signs of struggling or convulsions. Cows that have not died that are suffering from hypomagnesemia or tetany are often excitable, or "flighty", appear uncoordinated, have a stiff gait, trembling, staggering or may be down. Farmers sometimes call these cows "downer cows". **Producers should contact their veterinarian immediately** if their cattle show any of these symptoms.

If the cow is down, draw a blood sample before treatment is given. Treat the downed cow and

have the blood sample checked for Ca and Mg levels in order to determine if the cow that was down was due to hypomagnesemia (tetany) or hypocalcemia (milk fever). The results of the blood test can help your livestock nutritionist develop a preventative mineral mix for the rest of the herd. Cows suffering from tetany usually have low blood magnesium (Mg) and adequate blood calcium (Ca) levels. Cows suffering from milk fever will usually have low blood Mg and Ca levels. Treatment includes intravenous or subcutaneous administration of solutions containing magnesium and/or calcium salts.

Absorption of magnesium from the diet is dependent on the magnesium status of the animal with absorption efficiency varying from 25 to 75% of dietary intake. Absorption of magnesium is influenced by the amount of calcium, phosphorus and potassium (K) in the diet. High dietary levels of potassium, sulphate, or phosphorous reduces absorption of magnesium. Cows depend on a continuous supply of magnesium from the digestive tract to maintain normal blood magnesium concentrations.

Normally, levels of potassium in forages ranges from 1.5% to 1.9% (100% dry basis). **Drought or dry growing conditions** and regions where acidic soils exist (low pH) contribute to the accumulation of potassium in plants, especially cereal crops. Alfalfa can also accumulate high levels of potassium. High levels of potassium in the feeds can reduce the amount of magnesium that is absorbed from the ration. High levels of potassium in feeds can also be caused by fertilizing crops with high levels of nitrogen and potassium, and by repeated or high levels of manure application to soils.

Winter tetany can also occur when cattle are fed poor quality hay, cereal greenfeed or straw, which contain low levels of magnesium. Winter tetany in Alberta is often associated with feeding grain and straw or greenfeed based rations. Cereal forages are typically low or borderline in magnesium compared to the cow's requirements.

**Prevention** of this disease is possible through supplementation of the ration with magnesium oxide and limestone. Limestone is a source of calcium, which is often deficient in cereal-based rations. It is important to ensure that the cows are receiving adequate and balanced levels of calcium and magnesium. A feed analysis will indicate the levels of available nutrients and minerals in the greenfeed or silage. Based on the results of the feed & blood tests, proper mineral/vitamin supplementation can then be formulated.

Supplementation programs should be designed to provide approximately 40 grams of magnesium oxide and 80 grams of limestone per cow per day. Greater amounts may be required if the potassium level in the ration is extremely high. Magnesium oxide is very unpalatable and should be mixed with grain or screenings based supplements, or with silage, to achieve this level of intake.

Producers should work with a nutritionist from their feed company to design a program that fits with their management system. The goal should be to reduce the K/(Ca + Mg) ratio to less than 2.2 and to get the Ca to P ratio to greater than 2 in the total ration. Cereal based rations also require

supplementation of salt, trace minerals and vitamins and, if a lot of straw is used, protein and energy. The Dietary Cation-Anion Balance (DCAB) calculation can be used as a guideline as well. The appropriate DCAB ratio is defined for dairy cows but further research work is required to adequately define it for beef cows. Cereal based rations also require supplementation of salt, trace minerals and vitamins and, if a lot of straw is used, protein and energy.

Table 1 provides a general guideline for creating mixes that provide supplemental magnesium and calcium for 590 kg (1300 lb) beef cows on a greenfeed-based ration that contains 2.0% to 2.5% potassium. For higher amounts of potassium in the ration the amount of minerals may have to be adjusted.

Tennis Marx,  
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If you have questions or require further assistance on this topic, please call the AgInfo-Center at 1-866-882-7677

<b>Table 1: Supplemental Mix for Calcium &amp; Magnesium for 590 Kg (1300 Lb) beef cow.</b>						
<b>Feeding rate of Grain Based mix (per cow /Day)</b>						
	<u>Kg</u>	<b>Lbs</b>	<u>Kg</u>	<b>Lbs</b>	<u>Kg</u>	<b>Lbs</b>
	1	<b>2</b>	2	<b>4</b>	4	<b>9</b>
<b>Kg (Lbs) of Mineral supplement to add to 1,000 kg (2205 Lbs) of Grain Mix</b>						
Limestone	70	<b>155</b>	50	<b>110</b>	29	<b>62</b>
Magnesium Oxide	36	<b>80</b>	19	<b>42</b>	12	<b>26</b>