

Prussic Acid and Nitrate Toxicity in Cattle

Prussic acid and nitrate toxicity can be potential problems with some forages for grazing cattle or hay being baled this time of year. Therefore, I would like to discuss the various environments that cause these problems, symptoms associated with toxicity, how to prevent against these problems and treatment if prevention does not work.

Usually nitrate toxicity is a problem when cattle are grazing or eating hay that was baled from specific summer annual grasses and weeds during hot, dry conditions. The specific summer annual grasses are pearl millet, sorghum x sudangrass hybrids, and johnsongrass, as well as summer annual weeds such as pigweed and lambs quarter. Symptoms can also present if cattle are grazing these specific forages during long periods of cloudy or cool weather, or following herbicide application. These conditions will stress the plant leading to sudden reduction in growth and accumulation of nitrate in the plant.

When cattle consume forages that are high in nitrate, methemoglobin increases in the blood. This decreases the oxygen carrying capacity of blood, reduces oxygen transportation, and leads to animal death. Early toxicity symptoms present within 6 to 8 hours after consumption and include labored breathing, frothing at the mouth, frequent urination, diarrhea, staggering, and a brown coloration of the mucous membranes. Collapse, convulsion, and death follows if treatment is not provided within 30 minutes after symptom onset. Other less noticeable symptoms of nitrate toxicity are poor breeding rate due to abortions, and reduced calf gain.

If nitrate toxicity symptoms are noticed prior to cattle dying, here are some treatment protocols. First, if you notice symptoms remove the cattle from these specific forages immediately. Consult a veterinarian for treatment instructions. Proper dosage of methylene blue has shown to be a therapy for nitrate toxicity.

Prevention of nitrate toxicity is the best option, since the first symptom people usually notice is dead animals. The first prevention step is to test susceptible forages, and if level of nitrate is excessive, do not graze or harvest for hay until nitrates drop to an acceptable level. Visit with a local MU Extension agriculture specialist to determine if the level is safe. Another way to reduce nitrate is to ensile the forage. Higher levels of nitrate will accumulate in the lower 6 inches of the stalk, so if the cutter bar is raised above this level during mowing or if cattle are not forced to graze the lower portion of the stalk, they are less likely to consume excessive nitrate. Finally do not turn hungry cattle on these susceptible fields because it is likely they will consume excessive nitrate and lead to toxicity symptoms.

Prussic acid toxicity is a problem when cattle consume feedstuffs in plant families of sorghum, prunus and flax. Symptoms usually present when cattle are consuming immature forages of the sorghum family such as sorghum, sorghum x sudangrass hybrids, and johnsongrass. Symptoms can also present with the consumption of wilted leaves of wild cherry, chockcherry and pin cherry trees. These feedstuffs contain hydrocyanic acid or prussic acid, which leads to toxicity symptoms in cattle.

Prussic acid inhibits cellular utilization of oxygen, and the animal can die very quickly of asphyxiation. Prussic acid toxicity symptoms begin with accelerated, deep respirations. Then the nose and mouth fill with foam and the animal has involuntary urination. The animal experiences depression, is unable to stand, has severe difficulty breathing, and without treatment, dies.



Consult a veterinarian for proper treatment if you see toxicity symptoms. Prevention is also the best option with prussic acid poisoning because usually animal death is the first symptom noticed. One management strategy to prevent prussic acid poisoning is to defer grazing forages in the sorghum family until they reach a height of 24 inches. In addition, do not graze these forages after a frost until all the plants in the field are cured. If you want to utilize these forages and think they might be a problem, baling for hay is an alternative because once the forage is cut, wilted, and baled there is no prussic acid problem.

This is the time of year when nitrate toxicity and or prussic acid toxicity can be a problem resulting in lost performance or livestock death, which affect profit potential of cattle operations. I hope these tips will help reduce the chances of toxicity problems and provide information on treatment options if toxicity problems occur. If you have further questions please contact your local MU Extension Agriculture Specialist.

Source: *Patrick Davis, Livestock Specialist*