

News Column
by Greg McClure, KSU-Riley County Extension Agriculture Agent
110 Courthouse Plaza
Manhattan, KS 66502

For Release 11/27/17
Phone: 785/537-6350
Fax: 785/537-6353

NITRATES AND PRUSSIC ACID

Livestock producers who don't get a little nervous when they turn cattle or sheep out to graze stalks or cover crops just haven't been in the business long enough. Losses from nitrate poisoning and prussic acid toxicity happen every year. However, careful management can minimize those losses.

Nitrates and prussic acid are the two main concerns when grazing crop residues. The end result for both is the same. Death. But the cause of death is a little different for each type of poisoning.

Nitrate poisoning occurs when high nitrate levels in feed converts to nitrites and accumulates in the rumen. From the rumen, nitrites are rapidly absorbed into the bloodstream where they convert hemoglobin to methemoglobin. Red blood cells containing methemoglobin cannot transport oxygen and the animal dies from asphyxiation.

With prussic acid poisoning, the end result is the same – death by asphyxiation – but the process is different. Prussic acid poisoning is caused by cyanide production in plants, primarily sorghum type plants, under certain growing conditions.

Once eaten, cyanide is absorbed directly into the bloodstream. Cyanide in the bloodstream prevents hemoglobin from carrying oxygen and the animal dies from asphyxiation.

They sound alike, don't they?

The first sign of a problem with nitrates or prussic acid is often a dead animal, but there

are differences. Prussic acid acts rapidly, often killing an animal within minutes. Nitrate toxicity symptoms might not occur for a few hours, or even a few days after consumption of high nitrate feeds.

Signs of nitrate toxicity include reduced appetite, weight loss, diarrhea, and runny eyes. More serious symptoms of nitrate toxicity are labored breathing, muscle tremors, and eventual collapse. Coma and death usually follow within a few hours.

To determine the cause of death post-mortem, your veterinarian will look at the color of the blood. An animal that died from nitrate toxicity will have chocolate colored blood. However, the color will change to dark red within a few hours after death.

Animals that have died from prussic acid poisoning will have bright red blood that clots slowly. The smell of bitter almonds is often detected in animals poisoned by cyanide (prussic acid).

Treatment isn't a good option for either prussic acid poisoning or nitrate toxicity. Prevention is the key.

To prevent prussic acid poisoning, avoid grazing sorghums – grain sorghum, forage sorghum, sudan – that are less than 18 inches tall. Regrowth can be especially dangerous, so never graze grain sorghum stalks in the fall sooner than a week after a killing freeze. The night it frosts can be the worst. Some producers who cheat and graze early will find dead animals the morning after a frost.

Feed testing for nitrate levels is advised for harvested forages. Some will test standing forages too. While testing standing forages is a good practice, I'm not as concerned grazing a standing forage because nitrates accumulate toward the base of the plant and animals will start eating at the top.

Cattle and sheep can gradually adapt to high nitrate feeds, but a big dose on an empty stomach can be fatal. Therefore it is always wise to have animals full before turning out onto a new forage. Feeding grain along with the forage is also an option for dealing with feeds with slightly elevated nitrate levels. The grain will dilute the nitrate level in the total ration.

If you have questions, you can reach me at the Riley County Extension Office at 785/537-6350. Or, you can send e-mail to gmcclure@ksu.edu.

K-State Research and Extension is an equal opportunity provider and employer.