

News Column

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Facts about prussic acid in sorghums

When plants freeze, changes occur in their metabolism and composition that can poison livestock. But you can prevent problems.

Sorghum-related plants, like cane, sudangrass, shattercane and grain sorghum can be highly toxic for a few days after frost. Freezing breaks plant cell membranes. This breakage allows the chemicals that form prussic acid to mix together and release this poisonous compound rapidly. Livestock eating recently frozen sorghums can get a sudden, high dose of prussic acid and potentially die. Fortunately, prussic acid soon turns into a gas and disappears into the air. So wait 5 to 7 days after a freeze before grazing sorghums; the chance of poisoning then becomes much, much lower.

One other word of caution is that prussic acid is more concentrated in the growing point and young leaves than in older leaves or stems. If a few light frosts do not kill the sorghum plants and new sorghum growth, especially “suckers” or tillers occurs following a frost, these plants can be dangerously high in prussic acid. In this case waiting at least 5 days after a killing frost has occurred or until the frozen leaf tissue has completely dried out before grazing to allow the release of the prussic acid to dissipate. New growth from frosted or drought-stressed plants is palatable but can be dangerously high in prussic acid.

Freezing also slows down metabolism in all plants. This stress sometimes permits nitrates to accumulate in plants that are still growing, especially grasses like oats, millet, and sudangrass. This build-up usually isn't hazardous to grazing animals, but green chop or hay cut right after a freeze can be more dangerous.

Alfalfa reacts two ways to a hard freeze, down close to twenty degrees, cold enough to cause plants to wilt. Nitrate levels can increase, but rarely to hazardous levels. Freezing also makes alfalfa more likely to cause bloat for a few days after the frost. Then, several days later, after plants begin to wilt or grow again, alfalfa becomes less likely to cause bloat. So waiting to graze alfalfa until well after a hard freeze is a good, safe management practice.

Frost causes important changes in forages so manage them carefully for safe feed.

While prussic acid leaves the plant in a few days after a frost, nitrates on the other hand do not. If hay has been drought stressed high levels of nitrates are possible. Sampling this hay and sending it in for a nitrate test is good insurance to prevent any potential nitrate poisoning of cattle. Often time's forages that do test high in nitrates can be managed and fed safely to pregnant cows by taking some precautions.

Some quick summary guidelines would be to grind your hay and blend high-nitrate hay with low-nitrate hay so that the overall diet contains less than 3,000 ppm nitrate on a dry matter basis for breeding cattle; growing cattle can tolerate higher-nitrate levels. If grinding and blending hay is not a feasible option, then feeding at least 4 pounds or more of grain or by-product dilutes the amount of nitrate in the total ration and provides the energy necessary for bacteria to quickly convert nitrite to ammonia. Molasses also can provide needed energy for nitrite reduction but may be cost prohibitive.

Frequent intake of clean drinking water is important for optimal rumen fermentation, and water dilutes nitrate concentrations in the rumen. Analyze the livestock water supply to determine whether it is contributing to the nitrate burden of cattle.

Keep in mind that cattle can gradually adapt to high-nitrate feeds, and that nitrate toxicity can occur more often in animals without prior exposure to nitrates. Another note of caution is that sick, stressed and thin, and hungry cattle have a lower tolerance for nitrates than healthy animals.

For further information on prussic acid or nitrate toxicity contact your local County Extension Office.