Don't Overlook The Possibility Of Prussic Acid Poisoning

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Fall harvest is in full swing and the weather has been beautiful except for the dry conditions. At the same time daylength is decreasing with an increasing likelihood of a killing frost. Thus the extremely dry conditions and the threat of a killing frost means that several common plant species are/can become extremely toxic to your herd due to prussic acid; also known as cyanide or hydrocyanic acid.

Prussic acid poisoning is most often associated with forage sorghums and sorghum-sudangrass crosses (all in the genus Sorghum). However, a number of other plants can be cyanogenic. These include: Johnsongrass, Shattercane, Birdsfoot trefoil, Elderberry, Cherry, White Clover, and Indiangrass.

A number of common plants may accumulate large quantities of prussic acid (cyanogenic compounds). These cyanogenic compounds are located in epidermal cells (outer tissue) of the plant, while the enzymes which enable prussic acid production are located in the mesophyll cells (leaf tissue).

Any event that causes the plant cell to rupture allowing the cyanogenic compound and the enzyme to combine will produce prussic acid. Plant cells can be ruptured by cutting, wilting, freezing, drought, crushing, trampling, chewing, or chopping.

Once plants containing prussic acid have been consumed, the toxin rapidly enters the blood stream and is transported throughout the body of the animal. Prussic acid inhibits oxygen utilization by the cells in the animal's body. In essence, the animal suffocates. Prussic acid is extremely poisonous. A concentration greater than 0.1 percent of dry tissue is considered highly dangerous.

Ruminant animals (cattle and sheep) are more susceptible to prussic acid poisoning than non-ruminant animals because the ruminal microorganisms have enzymes which will release prussic acid in the animal's digestive tract.

There are several factors affect the amount of prussic acid in plants – drought, freezing, maturity, herbicides, fertilizers, plant parts and species.

• Drought - Drought-stricken plants are hazardous to feed because they are mostly leaves.

• Freezing - Cold weather may kill only the tops of sorghum plants, leaving the lower portion alive. The unbound prussic acid in this forage does not decline until wilting begins. The forage is usually considered safe to pasture or feed as green chop a week after a killing frost. New shoots emerging from unkilled portions of the plant are apt to be high in prussic acid. Therefore, this forage should not be used until that new growth reaches a height of 2 feet.

• Maturity - Highest prussic acid levels are reached before the boot stage. As plants mature, the stalks make up a greater proportion of the plant, causing prussic acid content in the total forage to decrease. However, the hazards associated with poisoning may decrease only slightly with age if animals selectively graze those plant parts that are high in prussic acid.

• Herbicides - 2,4-D may cause prussic acid content to increase in forages. The effect may last several weeks.

• Fertilizer - Fields planted with sudangrass, sorghum-sudangrass crosses and forage sorghums are deficient in phosphorus and potassium and high N rates are applied, then prussic acid levels usually increase.

• Plant Parts - In the sorghums, leaf blades normally contain higher prussic acid levels than leaf sheaths or stems, the heads are low in prussic acid, and the seeds contain none. Upper leaves have more prussic acid than older leaves. Tillers and branches have the highest levels, because they are mostly leaves and not stalk material.

• Species – The vegetative portion of all sorghums contains prussic acid. As a group, the sorghum-sudangrass hybrids have more prussic acid than sudangrass (about 40 percent less).

So how can you prevent prussic acid poisoning? First, know what forage plants have the potential for prussic acid toxicity. Do not graze cattle on these plants when they have been severely drought-stressed or subjected to a killing frost. To be safe you should remove cattle from pastures of sorghums or Johnsongrass when there is a risk for a heavy frost. After they are frosted, avoid grazing ruminants for at least one week. If you are unsure about the safety of the forage plants in the pasture, expose test animals for brief periods. Δ

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