

Prussic Acid Poisoning in Livestock

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Prussic acid poisoning can occur when livestock are pastured on sorghum-type plants, including grain sorghum, forage sorghum, sudangrass, sorghum-sudangrass crosses, Johnsongrass, sweet sorghums, and other sorghum-type plants. Prussic acid poisoning (also known as cyanogenesis) is caused by hydrocyanic acid, one of the most toxic and rapidly acting poisons. Although many plants contain hydrocyanic acid, sorghum-type plants contain amounts that can cause severe poisoning. Cattle, sheep, and goats are most susceptible, while horses and swine are generally not susceptible.

MECHANISM OF PRUSSIC ACID POISONING

Prussic acid can form in young sorghum-type plants or in the leaves of stressed sorghum-type plants. The poison can also form in an animal's rumen after eating sorghum-type plants. Prussic acid causes asphyxiation by inhibiting the action of the enzyme that links oxygen with red blood cells.

POISON SYMPTOMS AND TREATMENT

Prussic acid poisoning can occur within a few minutes after an animal consumes forage high in prussic acid potential. If poisoning occurs from within the rumen, symptoms may take slightly longer to appear depending upon the animal's condition, feed sources, and type and volume of forage consumed.

The first symptoms of prussic acid poisoning are accelerated and deep respiration. The nose and mouth may become filled with foam, and in some cases, involuntary urination may occur. These symptoms are followed by depression, inability to stand, severe difficulty in breathing, and finally death.

Because prussic acid is one of the fastest acting poisons known, prompt diagnosis and treatment are required. Extremely low levels of prussic acid are toxic: only 2 mg per pound of body weight per hour

will kill an animal. Plants with more than 20 mg per 100 g (0.02%) are considered dangerous.

Two antidotes are used to treat prussic acid-poisoned animals: sodium nitrate and sodium thiosulfate. Recommended treatment is an intravenous injection of 1.2% sodium nitrate and 7.4% sodium thiosulfate in a 125–250 cc dose. If the injection is given before the heart stops, the animal may be saved.

Take care that the animal is suffering from prussic acid poisoning rather than nitrate poisoning: If a nitrate-poisoned animal is treated with sodium nitrate and sodium thiosulfate, it will die. The symptoms of prussic acid and nitrate poisoning are similar. However, nitrate poisoning usually occurs several hours after the animal has eaten high nitrate forage, and the animal's blood is dark chocolate brown in contrast to the red venous blood of the prussic acid-poisoned animal. Some veterinarians use methylene blue solution to treat both nitrate and prussic acid poisoning.

SAFE USE OF SORGHUM FORAGES

Prussic acid poisoning is most likely to occur under the following conditions:

- Grazing young sorghum plants.
- Grazing sorghum plants stressed by drought or freeze.
- Grazing sorghum plants following a period of stress. (For example, plants may be stressed shortly after a rain following drought or if regrowth occurs following a light freeze.)
- Grazing plants that have regrown following tissue damage from livestock traffic, haying, or mowing.

If any of these conditions occur, use a sacrifice animal to determine the potential for prussic acid

poisoning. Turn an animal of little value into the field and observe it for 2–3 hours. If the animal shows no signs of poisoning, the remainder of the stock may be allowed to graze the crop. Remove the livestock if the crop is subsequently stressed. Also, provide livestock a source of starchy feed such as grain concentrate to reduce the potential for poisoning.

Follow these tips to help reduce the potential for prussic acid poisoning:

- Use sorghum or other forage that has been thoroughly cured as hay or dry fodder.
- Silage that has been stored for several months is generally safe.
- Grazing dry forage after a hard freeze is also generally safe.
- Sudangrass has much less potential for prussic acid poisoning than the sorghums and is therefore much safer to use for grazing pasture.
- After heading, most sorghums are safe to graze until frost.