

Livestock Producers Beware: Frost-Damaged Forages Can Be Deadly
Bobby Smith, Morgan County Extension Agent

With the first frost of the year, my phone has been ringing steadily. The questions go something like this: Are you the County Agent? Can I graze my sorghum-sudan grass? Is my millet safe to cut for baleage? Is my fescue safe to cut? These questions come about because most producers know that some forages that are frost damaged are toxic to cattle.

When plants freeze, changes occur rapidly in their metabolism and composition that can be toxic to livestock. Some summer-annual grasses contain cyanogenic glucosides, which are converted to prussic acid (hydrogen cyanide) when the plants are damaged by frost. The concentrations of cyanogenic glucosides vary among plant species: sorghum contains the highest concentrations, followed by sorghum-sudangrass crosses, and sudangrass contains the lowest concentrations. Pearl millet is virtually free of cyanogenic glucosides. The concentrations of these compounds are highest in immature plants and decrease as plants mature. Leaves also contain much higher concentrations than do stems. Plants growing under high nitrogen levels or in phosphorus or potassium deficient soils will be more likely to have high cyanide potential. After frost damage, cyanide levels will likely be higher in fresh forage as compared with hay or silage, because cyanide is volatile and dissipates as the forage cures and dries or is ensiled.

Light frosts that stress the plant, but do not kill it entirely, are often associated with prussic acid poisonings. Removing livestock from pastures for several days after a frost is the best preventative management strategy to reduce prussic acid poisoning in sudangrass and sorghum-sudangrass pastures. Livestock can be returned to frost-injured sudangrass that are 18" tall or taller and sorghum-sudangrass that's at least 30" tall after about three or four days. If the grass is shorter than those heights when frost damage occurs, the recommendation is to stay off the pasture for 10 days to two weeks. Producers need to watch for new shoot regrowth (tillers or suckers) on partially frost-killed plants. Direct grazing of these fresh new shoots can be toxic. Where new shoots appear following frost, avoid grazing for two weeks after the freeze that kills the new shoots.

When animals consume forage with high levels of cyanide-producing compounds, prussic acid is absorbed into the bloodstream, where it binds hemoglobin and interferes with oxygen transfer. Prussic acid acts rapidly, frequently killing animals by asphyxiation within minutes. Symptoms include excess salivation, difficult breathing, staggering, convulsions, and collapse. Ruminants are more susceptible than other species because cud chewing and rumen bacteria increase the release of cyanide. Precautions when grazing or green chopping sorghum species this fall:

- Grazing should be avoided on nights when frost is likely. High levels of prussic acid are produced within hours after a frost on susceptible species.
- Following a killing frost, avoid grazing suspect forages until the plants are dry. Wait at least 5 to 7 days to allow the released cyanide to dissipate.

- Following a non-killing frost, grazing should not resume until 5 to 7 days after a killing frost.
- Following a frost, do not graze wilted plants or plants with young tillers.
- Green-chopping frost-damaged plants lowers the risk compared with grazing directly, because animals have less ability to selectively graze damaged tissue. However, the forage can still be toxic after green chopping, so proceed with great caution.
- Frost-damaged annual sorghum grasses can be made into hay with little or no risk of cyanide toxicity. Plants that are dry enough to make hay will have dissipated most of the volatile cyanide gas.
- Normal silage making allows a majority of the cyanide to dissipate from frost damaged annual sorghum grasses. Delay feeding suspect silage for 6 to 8 weeks after ensiling. Be careful when working in the feed room, around silos and inside silos. Cyanide is heavier than air and will migrate downward as it is released from silage. Make sure ventilation is adequate.
- Suspect silages should be sent to a lab and analyzed for cyanide content before feeding.
- Cattle that must be grazed on sorghum pastures that have not been totally killed should have access to another type of hay, have full rumens before turning in on the field, and should be watched closely for the first few hours after turn in. If signs of labored breathing, such as would be found in asphyxiation, are noted, remove the cattle immediately. Call your local veterinarian for immediate help for those animals that are affected

For information on this and other forage related information, contact your local UGA Cooperative Extension office by calling 1-800-ASK-UGA-1, or 1-800-275-8421.