



Summer Brings Danger Of Nitrate, Prussic Acid Poisoning In Cattle

FAYETTEVILLE, ARK.

Drought can turn ordinary forages into sources of nitrate and prussic acid poisoning in cattle and producers should keep a close eye on pasture conditions, said Dirk Philipp, assistant professor for the University of Arkansas System Division of Agriculture.

Summer annual forages such as sorghum or sorghum-sudan hybrids and pearl millet can accumulate toxic levels of nitrates.

"Nitrate is taken up from the soil by plants for protein synthesis," said Philipp. "When drought-like conditions occur, they restrict the growth of cells and the nitrate accumulates in the cells."

He said this most commonly occurs when heavy fertilization of a pasture is followed by drought.

"When forage is grazed, nitrates at high levels affect health of cattle and can result in death," Philipp said. Nitrate is converted to nitrite in the cattle's digestive system, then is absorbed in the bloodstream.

"Nitrite interferes with the blood's ability to carry oxygen and the animals die of asphyxiation," he said. Death can occur within one to two hours following onset of symptoms such as trembling, staggering rapid pulse and breathing.

Prussic acid poisoning

Prussic acid, or hydrogen cyanide, is another danger.

Where forages are concerned, Johnsongrass, sorghum and sorghum-sudan varieties have the greatest potential for prussic acid accumulation.

"It's thought that hydrogen cyanide in plants developed as a defense mechanism against grazing or browsing animals," he said. Hydrogen cyanide also works on oxygen in the blood stream, but instead of interfering with the hemoglobin's ability to take up oxygen hydrogen cyanide keeps oxygen from being released to where it's needed.

Prussic acid can kill within minutes, Philipp said. If the symptoms are spotted quickly, and levels of prussic acid are relatively low, the cattle can be saved by veterinary intervention.

Avoiding poisoning

There are management techniques ranches can use to reduce the changes for poisoning.

Watch out for conditions that favor nitrate accumulation, including drought or reduced sunlight. Be sure the soil is not deficient in essential nutrients such as phosphorus, sulfur and molybdenum.

Since nitrate accumulates in stems rather than leaves, Philipp recommends no grazing lower than 6 inches, and deferring grazing on young, stressed plants.

Testing forage is also important. "Levels below 700 parts per million of nitrate-N are safe. Levels above 700 parts per million should be considered hazardous to pregnant and young animals, while levels above 2,100 parts per million are considered potentially lethal," he said.

As with nitrate, problems with prussic acid can be minimized with proper management.

- Test forages when in doubt before animals start grazing or being fed
- Sorghums heavily fertilized with N are a potential problem if coupled with drought, and or cool, cloudy weather
- Apply nitrogen in splits
- Don't graze sorghums until plants are 18-24 inches high, since young plants have higher amounts of HCN than older ones.
- Don't graze sorghums after a killing frost; grazing can commence after plants have thawed and wilted for a few days.
- Graze pastures to a uniform height and prevent them from grazing lush regrowth
- Haying or silage making reduces the amount of prussic acid in the forage
- More than 200 parts per million of hydrogen cyanide in forage, on an as-fed basis, are considered dangerous. Δ