Cattletrails
The Southern States Cattle Management Newsletter

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Addressing Concerns for Beef Cattle Producers During Drought Conditions

Primary concerns for producers are:

1. Do I have adequate pasture and hay to get through until it rains enough to depend on pasture?
2. How will this affect my next calf crop or stocker calf gains?
3. How much will it cost me to get through?
4. Is it short term, or long term?

No one can know how long a drought condition will last. Therefore it is wise to develop a plan to conserve as much of your forage as possible. If one has pasture available, but it is just not growing, a supplement feed can be used to "stretch" available supply. Cattle can be supplemented from 1-2% of their bodyweight to displace intake of pasture forage. This will allow the same amount of pasture to last twice as long as it normally would. If hay feeding is already necessary, the same program can be used to extend the amount of hay on hand.

Often we become concerned about protein intake and over feed protein. Remember, when feeding higher levels of supplement, the total protein intake is increasing due to volume being fed. A 12%-16% ration will provide adequate protein in most all cases. If hay or pasture is of very low protein value, intake of the forage is going to be quite low and supplement intake will be higher. Extra protein without a balance of energy and minerals is very costly and highly inefficient.

At the present time, the Southern States 14% JumpStart product line, the new Southern States 16% & 20% PowerStroke line and the Beef Commodity Blend/Beef Extender provide an economical means of supplementing fair to poor quality forage or hay. 1%-2% of the animal body weight can be fed without creating digestive problems. It is far more economical to maintain body condition than to replace it later.

Liquid Feed Supplements will fit the program if the producer has adequate volume of dry grass/hay, but needs added protein to stimulate intake and utilization for the forage. Intake of these products should not be more than .2-.6% of animal body weight.

Calves can be weaned early with our 13% Commercial Cattle Starter and will do quite well. This takes pressure off the cow, resulting in less nutrients required. Milking is very poor, therefore calves gain poorly. We sell pounds of calf for income, invest in the calf for weight gain. Putting feeds into the cow to get gain on a calf is a very expensive program. It requires 4# of high quality feed to produce one pound of milk and 10 pounds of milk to create 1 pound of calf gain. A 40 – 1 conversion. Once weaned, put the calves on one of the SSC pasture supplements or creep feeds to continue growth.

Drought condition corn fields make very good forage for beef cattle and a means of salvage if necessary. Monitor dry matter content to assure it can ensile properly and check for nitrate levels for safety. Once cut, turn cattle on the field and salvage more. Corn stalks will require supplemental protein and minerals, such as a liquid supplement.

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Nitrate and Prussic Acid Toxicity Risk to Cattle Health

Dr. Mark L. Wahlberg

Nitrate and Prussic Acid are 2 substances which normally are not a concern. However, under drought conditions (actually as we come out of drought), they can emerge with a vengeance. Let's take each one separately and outline the issues and strategies.

Prussic acid is formally known as hydrocyanic acid, and as the name implies, is a cyanide-containing compound. It is only produced by certain plants, but under conditions of plant stress, those plants can produce the problem. Cattle ingest the plant, and during the process of digestion the cyanide compound is released.

The cyanide, once it is absorbed, enters the cells of the animal and interferes with normal respiration at that level. Basically, the animal's blood carries oxygen, but the cell doesn't take in the oxygen because the cyanide is already there. Thus, the animal experiences what is known as hypoxia, or is oxygen starved. When large amounts are consumed, the animal experiences muscle tremors and dies within a few minutes. When smaller amounts are eaten over a longer period of time, the animal salivates, has increased breathing rate, then experiences muscle tremors, and finally staggers, struggles, and collapses. The mucous membranes of the animal are bright red, since the blood is fully oxygenated.

In Virginia, there are 2 families of plants which produce this problem. One is the Sorghum family, including both forage sorghum and grain sorghum, Sudan grass, and Johnsongrass. The other is the Prunus family, with wild black cherry, choke cherry, and pin cherry. Finally, flax is another problem plant.

Key factors which increase the concentration of the cyanide toxin:

- New, young, rapidly growing plants
- Mature plants that are stressed due to such factors as:
- Drought
- Frost
- Wilting and Trampling
- Herbicide damage
- Heavy nitrogen fertilization
- Plant disease conditions

Prussic Acid is reduced in the susceptible plants by:

- Making hay rather than grazing (Ensiling has less effect on prussic acid content)
- Allow plants a week or more to return to normal growth after rain

- Allow plants to attain at least a height of 18 inches before use
- Allow a week or more after frost before using

To recap the Prussic acid situation, it is only certain plants which produce the toxin when stressed, or in new, young growth. Under normal growing conditions the susceptible plants do not contain dangerous levels. Signs in the cattle are related to oxygen-starvation and muscle control problems.

Nitrate Toxicity is another problem which occurs under many of the same environmental conditions. However, it is not restricted to certain plant families. Almost any plant can accumulate nitrate. The problem comes from plants taking up nitrate from the soil (this occurs naturally under normal growing conditions), but the plant's growth is impaired, thus the nitrate accumulates rather than being converted to plant protein. When the ruminant animal consumes large amounts of nitrate, it is converted to nitrite in the rumen, and absorbed. It ultimately interferes with the ability of the hemoglobin molecule to take up oxygen, thus the animal is oxygen starved. Consequently, the animal symptoms of nitrate toxicity and of prussic acid poisoning are almost the same. In addition to these symptoms animals can also experience reduced growth, increased susceptibility to infection, and abortions.

Conditions contributing to nitrate toxicity are those associated with plants that grow fast, often with high levels of nitrogen fertilizer, and abnormal growth conditions or plant stress.
Specifically, these factors increase the chances of nitrate toxicity:

- High nitrogen fertilization
- Cool, cloudy growing conditions
- Plant stress, such as:
- Drought
- Herbicide damage
- Frost
- Plant Disease
- High nitrate levels in water

Plants which are especially prone to generate nitrate toxicity under these conditions include corn, other annual grasses such as oats, sorghum, millet, rye, various weeds such as lambsquarter, pigweed, kochia, dock, and Johnsongrass. Perennial grasses, including fescue, orchardgrass, and matua brome have been known to accumulate nitrate to toxic levels.

The likelihood of nitrate toxicity occurring is reduced when plants are growing under normal conditions. Once rain freshens up plants following a drought, there is a short period of heightened nitrate level. Allow a week or more of normal growth following rain to enable the plant to metabolize the nitrate that is taken up. Ensiling reduces the nitrate level by around 50%. Hay-making has little effect on the nitrate level in a plant.

Cattle can consume certain levels of nitrate safely. Due to the risk of abortions, pregnant animals cannot be fed levels which may be safe for the non pregnant female. High nitrate feeds can be

diluted with feeds which are low in nitrate to make a total diet that is safe. See table 1 for guideline values for nitrate content in the diet.

Table 1. Guidelines for Use of Nitrate-Containing Feeds

Nitrate Ion, %	Nitrate Nitrogen, ppm	Feeding Recommendation
0-0.44	<1000	Safe under all conditions
0.44-0.66	1000-1500	Safe for Non Pregnant. Max 50% of DM for Pregnant Animals
0.66-0.88	1500-2000	Max 50% of DM
0.88-1.54	2000-3500	Max 40% of DM. Not for Pregnant Animals
1.54-1.76	3500-4000	Max 25% of DM. Not for Pregnant Animals
Over 1.76	>4000	Do Not Feed

Feed laboratories conduct nitrate analyses routinely.

Corn silage is a special concern, due to the fact that so much material is harvested and stored in a short time period. Corn should not be harvested until relatively safe conditions have occurred. Then, a producer should submit a sample of fresh chopped corn for nitrate analysis before the material goes into the silo. Based on that analysis, the post-fermentation silage should also be analyzed before feeding. Remember, a portion of the nitrate will be converted to safe substances during the fermentation process.

Several good fact sheets and references are available on this topic. Below is an abbreviated list of these publications.

References

- The Merck Veterinary Manual.2006; Merck & Co., Inc. Whitehouse Station NJ, USA. Available on-line at http://www.merckvetmanual.com/mvm/index.jsp

- Nitrate and Prussic Acid Toxicity in Forage. MF 1018. Cooperative Extension Service, Kansas State University, Manhattan. Available on-line at http://www.oznet.ksu.edu/library/crpsl2/MF1018.PDF

- Precautions When Utilizing Sorghum / Sudan Crops as Cattle Feed . 2006. University of Missouri Extension. Available on-line at http://agebb.missouri.edu/drought/sudan.htm