Strategies for Reducing Losses to Forage Related Disorders

Dr. Jeff Lehmkuhler
Extension Beef Cattle Specialist
University of Kentucky

Forage induced disorders are not uncommon. These may be the result of poor harvesting and storage, symbiotic relationships with other organism such as endophtye-infected tall fescue, or environmentally induced. Poisonous plants can also be problematic when they are present in areas where cattle actively graze or forage is harvested. Yet, in many instances, problems are rare and often limited not affecting the entire herd. A primary management strategy is to ensure forage availability is not limiting forcing cattle to consume poisonous plants. Additionally, farming involves a given amount of management in all daily activities and one cannot simply ignore the fact that forages need to be managed.

Bloat

During the spring of 2010, it appeared as if all the moons and stars aligned perfectly resulting in above average clover concentrations in many pastures across the state. News of cattle losses due to bloat were increasing in frequency coincidently during the spring grazing school that was being held in Princeton. Unfortunately, cattle losses to legume bloat are not predictable. If they were, one could identify susceptible animals and apply selective preventative management. Preventative management strategies that can reduce the severity of bloat exist and are presented below.

A.) The simplest and first line of defense is as simple as looking down your nose. Monitoring grazed pastures provides one the opportunity to establish the level of risk. Visually estimating the amount of legumes in the pasture sward can help determine if cattle may be at high or low risk. As the percentage of legumes increase above 50% in the stand, the risk to bloat increases as selective grazing can result in cattle grazing predominately legumes. This pasture monitoring provides you the opportunity to implement proactive prevention management strategies.

B.) Promoting grass growth by nitrogen fertility in the spring will promote grass growth. In most pasture situations, nitrogen fertility will stimulate

grass growth. This will increase the competitiveness of the grass reducing legume growth.

C.) Allowing forages to mature can decrease the incidence of bloat. This is especially true for alfalfa as the leaf:stem ratio will decrease with maturity. As the plant matures, the plant will also have a greater degree of lignification lowering the digestibility. Waiting to graze clover pastures until the maturity plants have flowered has been suggested as a method to reduce the risk of bloat.

D.) Avoid grazing legumes while plants are wet. If possible, avoid moving cattle to fresh legume pastures during the rain or while dew is still on the plants. Move cattle in the afternoons.

E.) Avoid moving cattle to pastures high in legumes when hungry. Under rotational grazing scenarios, move cattle earlier in the rotation rather than forcing cattle to graze paddocks close. Also, moving cattle in mid-day allows for cattle to finish their early morning grazing bout. If needed, provide hay before moving ensuring cattle are not hungry when moved to legume pastures.

F.) Feeding hay has been shown to reduce the incidence of bloat for cattle consuming alfalfa as well as cattle grazing winter wheat. This is a practical management strategy and hay should not be high in crude protein. High protein hay will provide additional soluble protein. Palatable, high quality grass hay is ideal. Cattle will consume hay even when grazing.

G.) The use of feed additives can also be implemented as a preventative strategy. Poloxalene is the most common, FDA approved bloat prevention feed additive. Research has shown that it works by reducing both foam formation and disrupts foam stability. Most will opt for using the 33 1/3 lb blocks containing this product. It is important to note that using feed additives as a method to prevent legume-induced bloat requires daily consumption at the target levels. Since these blocks are of a size that allows for only 1-2 animals to be actively consuming the product at the same time, it is important that ample blocks be placed out for groups of grazing cattle. Manufacturer tags indicate the number of blocks placed in the field should be at least one per 5 animals. Though no label claim has been approved for preventing or reducing the severity of bloat, monensin has been demonstrated to reduce the incidence and severity of bloat in grazing cattle by several researchers. One limitation is that the use of monensin has not been approved for use in free-choice feeds or

minerals for beef cows and must be mixed in at least one pound of grain or supplemental feed.

H.) Wilting legumes rather than feeding green chop also has been shown to reduce the incidence of bloat. Though this may not be practical, in situations where bloat cannot be kept under control, it is one more option.

I.) Monitor cattle closely, especially late morning as cattle have a large grazing bout near sunrise. A large amount of fermentation will occur following consuming this forage and 4-6 hours following sunrise one might expect to see mild cases of bloat. Some bloat is not a bad thing, but cattle showing signs of bloat should be noted and closely monitored. Below is a bloat scoring table that can be utilized to help in recording the severity of bloat (Table 1).

Table 1. Bloat scoring system.

Score	Description
0	No bloat – No distension in left paralumbar fossa
1	Slight – Slight distension in left paralumbar fossa; “puffy”
2	Mild – Marked distension in left paralumbar fossa; well rounded out between hip and rib on left side; little to no distension on right side
3	Moderate – Well rounded out on left side, drumlike; full on right side; restless
4	Severe – Both sides badly distended; left hip nearly hidden; skin tight; defecation; urination; incoordination; protruding anus; mild respiratory distress
5	Terminal – Extreme abdominal distention; severe respiratory distress; cyanosis; prostration; death unless treated

Adapted from Johnson et al., 1958.

Nitrates

There are a variety of forages that can accumulate nitrates. Often nitrate issues occur with cultivated crops during drought situations. Nitrogen fertilization of corn, oats, barley, wheat, rye, sorghum, sudangrass and hybrids followed by drought conditions results in accumulation of nitrates in the base of the plant.

Other plants typically classified as weeds can also pose a risk to nitrate toxicity. Johnsongrass is likely the most typical one and others include dock, nightshade, Jimson, pigweed, thistle, lambsquarter and others. This can be of concern during the periods of drought as low forage availability may result in cattle consuming plants they normally would avoid.

Low to moderate concentrations of nitrates are not toxic to cattle. It is actually the conversion of nitrates to nitrites in the rumen that results in a problem. Nitrites inhibit the hemoglobin's ability to bind and transport oxygen. Cattle have the ability to utilize and detoxify moderate levels of nitrates, especially if allowed to adapt over time. However, sudden exposure to forage high in nitrates overwhelm the animal's ability to detoxify these levels resulting in complications. Pregnant females exposed to high nitrates often abort a few weeks later as a result of a lack of oxygen delivered to the fetus.

During dry years and periods of drought, suspect forages should be sampled and tested for nitrate/nitrite concentrations. This is especially true of forages chopped such as corn silage and sorghum, sudangrass and hybrids. Following precipitation, nitrates are mobilized from the base of the plant and the risk is greater immediately following a rain. Laboratory results are often expressed as parts per million (ppm) of nitrates. Guidelines for using forages are presented in Table 2.

Table 2. Concentrations of forage nitrate levels and recommendations.

Levels of Nitrates	Comments
0 to 4,400 ppm	Safe to growing cattle, non-pregnant females. Caution is warranted for pregnant females and young animals at the upper levels.
4,400 to 8,800 ppm	Generally safe when fed in a balanced diet for growing cattle and non-pregnant females. For pregnant females limit to not more than half the daily ration. Be sure water does not contain excessive levels of nitrates and do not utilize non-protein nitrogen as a source of protein in the diet. Be cautious when feeding to pregnant and young stock.
8,800 to 15,000 ppm	Limit to 1/4th of the diet. Diet should be balanced and provide enough fermentable carbohydrates to make use of the nitrates and ammonia. May impact milk production and fertility.
15,000 ppm or more	Considered TOXIC and should not be fed.

Prussic Acid

Hydrocyanic acid (HCN) or prussic acid is poisonous to cattle and is another forage related disorder that is often associated with hot, dry conditions. During normal growing conditions that allow for actively growing forages, cyanogentic glucosides are compartmentalized and isolated from enzymes (emulsion). However, during stress from drought or following frost, these molecules come into contact yielding prussic acid (dhurrin). Also, the action of mastication or chewing and breakdown of the plant cell structures releases the dhurrin and the bacteria begin to act on it releasing cyanide. The cyanide is then absorbed into the bloodstream. The cyanide does not hinder the ability to transport blood, but it prevents the uptake of oxygen. Hence, the oxygen of affected animals will be bright red.

Plants that are most likely be problematic include sorghums, johnsongrass, sorghum-sudan hybrids and sudangrass. One challenge with this disorder is that the younger plants and newer or younger leaves of plants are higher in HCN. Cattle are typically drawn to younger, more succulent plants as they are often more palatable. Downed cherry trees following a storm can also produce HCN and result in cattle losses if cattle are not excluded from areas with downed cherry trees. Fortunately, the HCN is metabolized and inactivated with time. The typical recommendation is to avoid grazing these areas for 10-14 days after which time the leaves are likely to be safe.

Because young plants pose a greater risk, avoid grazing the above mentioned plants until they are at least 18-24 inches tall. As with nitrates, one should avoid grazing or harvesting forages known to pose a risk for at least four days following precipitation. Avoid grazing following a frost for at least 7-10 days. Just as with bloat, if grazing areas that were of risk, cattle should not be turned in hungry and should be fed hay prior to entry. Because these forages may tiller and regrow during the active growing season, it is recommended that sorghums and the like be rotationally or strip grazed to prevent grazing of the new young shoots which are higher in HCN.

Pasture management is essential for a successful forage-based beef enterprise. Environmental conditions can increase the need for management to reduce the risk of livestock disorders. Proactive management strategies can reduce the impact of many forage related issues, but it is important to realize that it likely will not completely eliminate the risks. Contact your local county Extension office for additional resources and have a great conference.