BEWARE OF NITRATES IN SUMMER GRASSES

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Most of the hay produced for beef cows in Tennessee comes from tall fescue fields. There are, however, a significant number of producers that use summer grasses such as bermudagrass or sorghum x sudangrass hybrids for hay. These plants can be used successfully for hay production. But there is the potential for a buildup of nitrates in these plants, especially during a drought. It is important for producers to understand what nitrate toxicity is and how to prevent it.

What is nitrate poisoning?

Nitrate poisoning occurs when animals consume hay containing high levels of free nitrates. Under drought conditions, both warm-season grasses have the potential to accumulate high levels of nitrates, especially if they have been fertilized with nitrogen. Feeding hay that was cut during or just after a drought should be avoided. Nitrate accumulation occurs because the plant continues to take up nitrogen through the roots, but drought conditions cause an inadequate water supply for rapid plant growth. Nitrates are accumulated in the plant for use in protein formation when adequate water becomes available.

When the animal consumes a plant with high nitrate levels, the nitrogen is converted from nitrate to a form called nitrite. These nitrites get into the blood stream and interfere with the ability of red blood cells to carry oxygen. Animals suffering from nitrate poisoning exhibit labored breathing, muscle tremors and staggering. Membranes of the eyes and mouth are bluish because of the lack of oxygen. Death can occur relatively quickly.

Preventing nitrate accumulation in plants

Nitrate toxicity is the most common toxicity during a drought. The chances for high nitrates are increased if the crop has been fertilized with nitrogen. Do not fertilize summer grasses with nitrogen if adequate moisture for growth is not available. If a period of drought occurs, do not cut or graze the crop until it starts to grow after a rain. If you have any suspicions that nitrate levels may be high, contact your local Extension office for information about getting forage tested for nitrate levels.

Detecting high nitrate hays

Prevention is the best way to deal with nitrate toxicity. However, if a hay cutting is suspected of having high nitrates, it can be analyzed to determine the nitrate content. Since the nitrate level in hay will not decrease during storage, it is important to have the hay analyzed prior to feeding. The UT Soil, Plant and Pest Center can determine forage nitrate content. Contact your local Extension office for more information. Table 1 lists a scale of the toxicity of increasing nitrate levels in hay.

Table 1. Guide to determine the potential for nitrate toxicity in hay.

Nitrate level (ppm, DM basis)		Comments
0 - 2,500	**SAFE**	Generally considered safe to feed.
2,500 - 5,000	**CAUTION**	Generally safe when fed with a balanced ration. For pregnant animals limit to one-half of total dry ration. Do not feed with liquid feed or other non-protein nitrogen supplements. Be cautious with pregnant or young animals.
5,000 - 15,000	**DANGER**	Limit to one-fourth of ration. Should be well fortified with energy, minerals and Vitamin A. May experience milk production loss in 4 -5 days, possible occurrence of reproduction problems.
Over 15,000	**TOXIC**	Toxic. Do not use in free-choice feeding program. Feed with such high levels should be ground and limited to 15% of total ration.