



Common Grass-Livestock Disorders

Perennial grasses can contain a variety of antiquality factors that can negatively affect animal performance. Some of these are species-specific, while others are seasonal or a function of the soil composition. Many of these antiquality factors evolved as defenses to minimize animal predation. Most large ruminants do not have the nutritional sense to be able to consistently avoid harmful plants.

Categories of Animal Disorders

Some plants contain poisons toxic to ruminants. Poisonous plants are never seeded, they invade seeded stands. There are seasonal disorders that result from an interaction of environment, management, and animal. There are also livestock disorders that are unique to a particular species.



Figure 1. For most grass-based animal disorders, there is no visible sign of the anti-quality component. For example, high-alkaloid reed canarygrass is visually identical to its low-alkaloid counterpart.

Mineral Disorders

Mineral concentrations can be low enough to cause deficiencies or high enough to cause toxicities. Elements can also interact, such that a high concentration of one element reduces the availability of another element, causing a deficiency.

Grass Tetany

Grass tetany or hypomagnesemia is a complex disorder for grazing animals, typically occurring in the spring. Animals with early symptoms exhibit nervous twitching, which can quickly lead to convulsions and death. While it is a magnesium deficiency, a principal cause is high soil potassium which reduces both Mg uptake by plants and Mg availability to animals.

A forage K/ (Ca + Mg) ratio (milliequivalent basis) greater than 2.2 carries a risk of grass tetany. Magnesium injections are an effective treatment in all but the later stages of the disease. Some grass cultivars (e.g. in tall fescue) have been developed to contain high levels of Mg, reducing the risk of tetany. Grass tetany is rare in New York State.

Nitrate Poisoning

Nitrate can accumulate in any grass species given the combination of high available soil N and cool temperatures, drought, or other stress that slows plant growth. Using urea or other ammonium forms of N as fertilizer will not solve the problem, as they are quickly converted to nitrate in the soil. With moderate to high levels of N fertilization, nitrate levels peak in grass forage about 2 to 3.5 weeks following N application. Under normal weather conditions, nitrate levels decline rapidly after peaking, but plant stress conditions result in nitrates persisting indefinitely.

A forage nitrate concentration up to 0.44% (1000 ppm nitrate-N) is safe to feed. Pregnant animals are much more susceptible to nitrate poisoning than non-pregnant animals. Excess nitrate in the animal is absorbed into the bloodstream. Rapid breathing, muscle tremors and death are potential symptoms of nitrate toxicity.

Prussic Acid Poisoning

Prussic acid or hydrocyanic acid poisoning occurs when animals consume plants

containing cyanogenic glycosides. These result in the production of toxic hydrogen cyanide. Rapid breathing, muscle spasms, and death may occur as quickly as 15 minutes after onset. Some sorghum, sudangrass, and sorghum-sudangrass hybrids contain sufficient cyanogenic glycosides to cause the disease.

Prussic acid poisoning is most common when livestock graze sorghum species less than 15 to 18 inches tall, or from grazing shortly after freezing temperatures. Any new tillers following a freeze will be preferentially grazed, and also will contain high levels of the poison. High rates of N fertilizer increase the problem. Sorghum silage and hay are generally safe from prussic acid poisoning.

Phalaris Poisoning

Tryptamine alkaloids present in reed canarygrass can either result in phalaris staggers, a neurological disorder, or sudden death syndrome. These are considered two separate diseases, although both show neurological signs due to brain damage. Lower levels of alkaloids in the diet result in diarrhea and loss of weight. Essentially all reed canarygrass seed currently on the market consists of low alkaloid varieties that avoid this problem.

Tall Fescue Toxicosis

Old varieties of tall fescue all contained an endophytic fungus that benefits the plant by increased stress tolerance, but the ergot alkaloids produced are toxic to animals. Three syndromes are associated with the toxin: fescue foot, fat necrosis, and summer syndrome. High respiration, intolerance to heat, poor animal production, and low conception rates are all associated with the disease.

The fungus travels with fescue seed, but prolonged seed storage can eliminate it. Almost all tall fescue forage varieties are now low endophyte or endophyte-free. One problem with these plants is that their reduced stress tolerance makes them less likely to survive under drought or insect stress. A novel endophyte was developed which provides stress tolerance, but lacks the toxic ergot alkaloids. While these varieties are essential for stressful environments, novel endophyte varieties do not appear to have any advantage

over low endophyte varieties in NY.

Ryegrass Toxicity

Perennial ryegrass can contain a fungal endophyte that produces lolitrem alkaloids. The disease is often called ryegrass staggers, as the symptoms include staggering, trembling and collapse. The disease is not fatal, but does affect animal gains. In some parts of the world annual ryegrass is infected with a nematode and a bacteria, which produce annual ryegrass toxicity. Although caused by completely different organisms, symptoms are similar to perennial ryegrass toxicity. Neurological damage can be permanent and death is a possible outcome of annual ryegrass toxicity.

Summary

For essentially all forage grass anti-quality components it is possible to greatly reduce the danger simply by diluting the suspect forage with another feed source. Low levels of any of the antiquality components mentioned here will not result in adverse animal affects.

Additional Resources

- Binder, E.M., D.J. Blodgett, J.F. Currin, D.L. Caudell, J.H. Cherney, T. LeRoith. 2010. Phalaris arundinacea (Reed canarygrass) grass staggers in beef cattle. J. Vet. Diagn. Invest. 22 (5):802-805.
- Cheeke, P.R. 1998. Natural toxicants in feeds, forages, and poisonous plants. 2nd Ed. 479 p. Interstate Publishers, Danville, IL.

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This information sheet reflects the current (and past) authors' best effort to interpret a complex body of scientific research, and to translate this into practical management options. Following the guidance provided in this information sheet does not assure compliance with any applicable law, rule, regulation or standard, or the achievement of particular discharge levels from agricultural land.

For more information



Cornell University
Cooperative Extension

Grass Management Manual
<http://forages.org>

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