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### **Nitrate Poisoning in Livestock**

July rain has been a welcomed gift for agriculture producers, but one issue that might pop up because of them, is something livestock producers need to be aware of. Livestock nitrate poisoning can be an issue in some forage crops, especially after extended dry periods. Folks have asked if grazing or haying of some of our summer annuals is safe now, so this feels like a topic to address this week.

The potential for high nitrate concentrations in crops such as corn, sorghum, brassicas, cereal grains, and some grasses, in addition to non-cultivated plants like pigweeds and Johnsongrass, occurs after exposure to drought, hail, frost, cloudy weather, or soil fertility imbalance. Nitrates accumulate in the lower portion of these plants when stresses reduce yields to less than those expected, based on the supplied nitrogen fertility level. Feeding harvested forages or grazing plants that are high in nitrates can be toxic to livestock because the metabolism products from nitrates interfere with the ability of blood to carry oxygen, causing asphyxiation. Lack of oxygen in the tissues can cause abortions and death.

Nitrates are usually highest in young plants and nitrates decrease as plants mature, unless growth stress is encountered. Nitrate is not necessarily toxic, at normal levels. When high nitrate forages are consumed the nitrate is converted in the rumen into ammonia and used by ruminal microbes as a protein source. An intermediate product in this process is nitrite, when too much nitrite is produced it is absorbed into the blood. Nitrates may cause death within 30 minutes to 4 hours after symptoms appear.

It is important to use caution in your feeding programs when known nitrate accumulators are undergoing stress before harvest or grazing. Forage suspected to contain high nitrate levels should be tested by a laboratory before feeding to livestock. Please note that not every lab reports levels on the same scale, but all test can be converted to determine if it is safe to feed. Generally speaking, ppm Nitrate (NO<sub>3</sub>) levels of 3000 are safe and over 9000 are dangerous, with some ability to manage in between that range.

Preventative measures should be taken to help prevent loss in your herd. This includes things such as; gradually adapting to high-nitrate feeds, dilute with other feeds, feed a balanced ration, don't feed higher nitrate feeds to stressed livestock, don't feed to hungry livestock and keep plenty of clean fresh drinking water at all times. If you suspect that you have an animal with nitrate poisoning, quick intervention from a veterinarian can help to reverse symptoms and possibly save the animal's life.

In summary, here are some of the main points to remember about nitrates and livestock. Pay close attention to potentially troublesome plants, such as sorghum, sudangrass, other summer annuals, and brassica species. Avoid excessive application of manure or nitrogen fertilizer. When harvesting high-nitrate forages, raise the cutter bar. Harvest plants containing high levels of nitrate as silage rather than as hay. Finally, have representative samples of suspect forage analyzed before feeding.

If you need help with sampling and testing forages for nitrates, please reach out to your local Extension office. The K-State publication [MF-3029 Nitrate Toxicity](#) is available for more in depth information.