Crop Production

Dry weather: Worried about high nitrates in forages?

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During periods of dry growing conditions, forage producers begin to ask about the increased risk of nitrate accumulation in forages and how best to manage them.

Plants take up nitrogen from available soil sources during normal plant growth. Soil-source nitrates are used by the plant to form protein. Since photosynthesis-formed sugars are also components of protein, anything that influences normal plant growth (such as drought) will reduce protein synthesis, and nitrate (NO_3) can accumulate in the plant in higher than normal amounts.

The most common causes of high NO_3 content in forage tissue are the following:

- High applications of nitrogen fertilizers or manure, or high soil fertility.
- Drought conditions.
- Conditions that stop or reduce photosynthetic activity, such as drought, extended periods of low light intensity, hail, and sometimes herbicide applications.
- Plant species vary in their likelihood to accumulate nitrates. Corn, sorghum, cereal grains, and some weeds tend to accumulate more nitrates than other forage species.

Accumulated NO_3 only becomes a concern when the plants are fed to livestock. NO_3 poisoning occurs when animals eat forage material or a daily diet with high nitrate content. The NO_3 from all diet sources contribute, including high NO_3 in the water source. In the animal digestive system, NO_3 is converted to nitrite. The nitrite is absorbed into the blood, and interferes with the normal transport of oxygen in the body. At low diet levels, nitrate poisoning produces sub-clinical conditions, which result in poor animal performance and a general lack of condition.

Sampling-Analysis

Forage laboratories can easily test for NO_3 concentration, so if there is concern that there may be high NO_3 in the forage, sample and test for it before making grazing, harvest, storage, and feeding decisions.

Corn. Cut 6 to 10 stalks at the same height as chopper. Send samples to an analytical laboratory for quantitative results. See your local extension office for laboratory information.

Silage. Sample several days after ensiling but before feeding. Send samples to a laboratory for analysis. Because ensiling reduces NO_3 concentration, it is more important to test before feeding than before ensiling.

Hay. Take a core sample from 15 to 20 bales prior to feeding. Send samples to a laboratory. The NO_3 levels may decrease some during curing, so waiting several days after baling to sample the hay might give better information.

There are some "quick test" kits available that can detect NO_3 in plant tissue; however, they only detect the presence of nitrate, not the concentration. A laboratory test provides the most useful information.

General Guidelines for Handling Nitrates

Be concerned, but don't panic. It is manageable.

Ensiling reduces NO_3 content by 30 to 70 percent. This usually makes feed that is high in NO_3 safe to feed. Ensiling high-NO_3 forage also produces large amounts of silo gas. Be especially careful around silos during the first week after ensiling. Use forage test information and consult with a veterinarian or livestock nutritionist before feeding suspected high-NO_3 feeds. Producers have often successfully blended high-NO_3 forages with low-NO_3 feeds, such as alfalfa, grain, and other low-NO_3 hay. Adapting animals to increasing levels of NO_3 slowly over several days or weeks increases the amount of NO_3 livestock can consume safely.

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