

Texas Dairy Matters

Higher Education Supporting the Industry

WHAT TO DO WITH DROUGHT-STRESSED CORN SILAGE

Kevin Lager, Ralph Bruno, Ellen Jordan, and Todd Bilby
Extension Dairy Team
Department of Animal Science
Texas A&M AgriLife Extension Service
The Texas A&M University System

Drought-stressed corn is highly variable, which means its dry matter content within the pile, and when fed, also fluctuates. If your silage corn was drought-stressed, frequently test for moisture content, starch content, NDF digestibility, and nitrates. This allows you to better formulate rations for high-producing dairy cows.

It's important to test corn silage moisture frequently and adjust as-fed feeding rates to maintain the correct dry matter amounts and proportions of silage in the diet. The starch content of the silage, which normally accounts for 65-70 % of the energy content of corn silage, most likely will be inconsistent. Testing starch content of corn silage frequently and adjusting the grain feeding rates helps attain optimal production.

The energy content of corn silage may not be dramatically lower. During drought-stress, the plant concentrates more sugars and organic acids in the stalk. Another parameter to measure will



be the neutral detergent fiber (NDF), which increases in drought-stressed corn silage compared to normal corn silage. However, if corn is too dry (< 60 % moisture) at harvest, the silage's NDF could be lower than normal; therefore testing NDF on a more frequent basis will also be important.

Finally, test severely drought-stressed corn silage for mycotoxins and nitrates. If corn is stressed during pollination and ear development, the silk ends of the corn ears may have been open during kernel-fill, making them more susceptible to mold growth and mycotoxin development. If the corn silage has significant levels of mycotoxins, you may not be able to feed it to dairy cows. Depending

upon the level of contamination, dilute affected silage with other forages or consider a mycotoxin binding agent that may protect the health of your cows and avoid contamination of milk.

Guidelines for feeding forages with high nitrate levels to dairy cattle.

Level in forage on a dry matter (DM) basis		
Nitrate-Nitrogen (NO ₃ -N)	Nitrate (NO ₃)	Feeding Recommendation
< 1,000 ppm	< 4,400 ppm or < 0.44%	Safe to feed under most situations
1,000 – 1,700	4,400 – 7,500 ppm or 0.44 – 0.75%	Gradually introduce to ration. Feed some concentrate. Test all feeds and water. Dilute to 0.40% NO ₃ or 900 ppm NO ₃ -N in total ration dry matter. Restrict single meal size in component feeding systems.
1,700 – 2,300	7,500 – 10,000 ppm or 0.75 – 1.0%	Possible acute toxicity. Feed in a balanced ration with concentrate included. Dilute to 0.40% NO ₃ or 900 ppm NO ₃ -N in total ration dry matter. Restrict single meal size in component feeding systems.
> 2,300	> 10,000 ppm or > 1.0%	Avoid feeding.

Adapted from: Jones, C.M., A.J. Heinrich, G.W. Roth, and V.A. Ishler. 2004. From Harvest to Feed: Understanding Silage Management. Cooperative Extension Fact Sheet, UD016. The Pennsylvania State University, Penn State Cooperative Extension Service.

Nitrate accumulation in drought-stressed corn is often highest the first two weeks after a drought ends. Significant rainfall that saturates the soil stimulates microbes and causes a release of nitrate-nitrogen. Corn plants recovering from drought then take up large amounts of nitrate, but are unable to fully distribute them throughout the plant. Consequently, nitrates accumulate mainly in the lower part of the plant's stalk and it takes several weeks for them to be fully assimilated.

Ensiling drought-stressed corn cuts nitrate levels in corn silage up to 50-60 %, but it is difficult to predict how much of the nitrate breaks down during fermentation and storage. Therefore, test drought-stressed corn silage for nitrate content. If it has significant nitrate levels, dilute it with other low-nitrate feeds or don't feed it at all. In the table are some guidelines for feeding forages based on nitrate-nitrogen and nitrate concentrations.

With drought comes reduced forage production and variability in nutrient content. Don't guess as to the composition of your forage, test it. Your herds health depends on it.

<http://texasdairymatters.org>

September, 2011

The Texas A&M AgriLife Extension Service provides equal opportunities in its programs and employment to all persons, regardless of race, color, sex, religion, national origin, disability, age, genetic information, veteran status, sexual orientation, or gender identity.

The Texas A&M University System, U.S. Department of Agriculture, and the County Commissioners Courts of Texas Cooperating