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# Dairy Nutrition Fact Sheet

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## Drought-Stressed Corn Silage

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The growing season in New York has been somewhat variable this year. In some areas, corn for silage looks pretty normal. However, there are other areas where the dry weather has affected growth. A number of Extension agents have asked about drought-stressed corn silage. The following information should assist in responding to inquiries.

1. What are the impacts of drought on corn silage?

The effects of inadequate moisture during the growth cycle can affect yield, plant composition and nitrate levels. The period when corn plants are most susceptible to lower moisture levels is around silking and pollination. The primary effect at this stage will be a reduction in yield. Inadequate moisture after this stage can lead to poor ear fill and low test weight corn. The potential for high nitrate levels also exists in drought-stressed corn silage.

2. What types of nutrient composition changes are expected?

If the plants have poor ear fill, the crude protein content may be increased to 9-11% on a dry matter basis. There should also be a higher level of sugars in the plant since there is less conversion to starch in the grain. Fiber values may also be increased.

3. What about the energy value?

This will depend on the degree of ear fill. NRC lists a  $NE_1$  of 0.73 Mcal/lb for well eared silage. The corresponding value for silage with few ears is 0.64. The relative energy value in drought-stressed corn silages has ranged from 65 to 100% when compared with normal silage.

4. What about silage fermentation?

The sugars in the plant should provide a readily available carbohydrate source to initiate fermentation. Depending upon type of storage structure used, moisture should be 60-70% at time of cutting. I would suggest allowing at least a 3 week fermentation period before feeding.

5. What about silage additives or preservatives?

The addition of NPN sources is not suggested for drought-stressed corn silage if elevated nitrate levels are suspected. The addition of a bacterial inoculant may assist in providing an adequate number of microorganisms for a rapid and efficient fermentation.

6. What about nitrates?

The risk of higher nitrate levels is greater in drought-stressed corn silage. Nitrates accumulate in the plant when something interferes with normal plant growth. The nitrates accumulate primarily in the stalks, stems and leaves. It appears that the majority of the accumulation will be in the lower 1/3 of the stalk. If there is a concern with nitrates, the cutter bar could be raised to leave 8 to 12 inches of stalk in the field. Rainfall can also help to reduce nitrate concentration by

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stimulating plant growth. It may be advisable to wait 5-7 days after a heavy rainfall before chopping.

7. What happens to nitrates during fermentation?

Nitrates are reduced by 40-60% during fermentation. If fermentation is altered, there may be less nitrate reduction.

8. Any other concerns regarding fermentation?

There is an increased risk of silo gases being produced. These gases include nitrogen dioxide, nitrogen tetroxide, nitric oxide. These gases are heavier than air and can be lethal to humans and animals. Some of these are odorless and colorless. Don't enter silos before aerating them. It is suggested to run the silo blower for at least 15-30 minutes before entering the silo. If there are any signs of irritation to the throat or lungs, leave the area immediately.

9. When should nitrate tests be done?

The best time is after fermentation has been completed. These values will indicate the nitrate content of the silage being fed. It is also possible to take samples as the silo is being filled to get an index of nitrate content. However, you would still probably need to take additional samples once fermentation has been completed.

10. What are the guidelines for nitrates in feeds?

More detailed information on nitrates is in a Fact Sheet titled "Nitrates in Dairy Rations" by C. J. Sniffen and L. E. Chase. The following guidelines summarize this information:

The overall goal is to keep total ration nitrate level less than 0.44% NO<sub>3</sub> or < 0.10% NO<sub>3</sub>-N. A sample calculation including nitrates from water is in the Fact Sheet.

11. What about greenchop corn?

Nitrate levels will be higher since no fermentation has occurred. Do not use this feed for pregnant animals. Make sure carbohydrate energy supplements are fed. A nitrate test should be done before feeding any of this material. If it is necessary to greenchop the corn, it would be advisable to raise the cutter bar 8 to 12 inches.

Nitrate ion, % of DM	Nitrate-N, % of DM	Comment
< .44	< .10	Considered safe in most situations
.44-.66	.10-.15	Safe for nonpregnant animals. Limit to 50% of forage for pregnant animals.
.66-.88	.15-.20	Limit to 50% of total ration dry matter
.88-1.54	.20-.35	Don't feed to pregnant animals. Limit to 35-40% of total ration dry matter.
> 1.54	> .35	Possible toxicity, don't feed

12. Any other feeding guidelines?

- Balance rations using normal procedures based on forage testing.
- Make sure adequate levels of nonstructural carbohydrates (NSC) are fed. Guideline is about 35-40% of total ration dry matter. You may be able to go up to 42 or 43% NSC as long as rations contain at least 20% NDF from forage.
- A portion of this NSC from rapidly available sources such as corn meal, barley or molasses may help to improve ruminal nitrogen utilization.
- Adding yeast may help.
- Make sure that a minimum of 100,000 IU/cow/day of Vitamin A are fed.
- Feed the forage more frequently or as part of a TMR.
- For heifers and dry cows, feed at least 3-5 lbs of a grain supplement to provide a carbohydrate source.