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## Silage Harvest of Drought-Stressed and Severely Lodged Corn

Brian J. Lang

*Iowa State University*, [bjlang@iastate.edu](mailto:bjlang@iastate.edu)

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## Silage Harvest of Drought-Stressed and Severely Lodged Corn

### Abstract

The decision to chop corn for silage should be made when there is no further potential to increase grain dry matter and whole plant moisture is in the proper range for the storage structure. The proper harvest moisture content is the same for drought stressed and normal corn. Recommended whole plant moisture contents are 65-70% in horizontal silos (trenches and bunkers), 60-70% for bags, 60-65% for upright stave silos, and 50-60% for upright oxygen limiting silos.

### Disciplines

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Integrated Crop Management

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August 18, 2020

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Randomly sample stalks from the field and test for whole-plant moisture of chopped corn to assure that proper fermentation will occur. Using a chipper-shredder and forced air dryer is the preferred method of determining moisture (Koster, Best Harvest). Other methods include an oven, microwave, electronic forage tester or NIR.

The whole plant yield of severely lodged or broken corn at milk, dough or initial dent stages are about 65%, 75% and 85%, respectively, compared to fully dented ½ milk-line corn. The energy value of late-milk to dough stage corn is about 80-90% of normal corn silage. Feed value of drought stressed corn with ears (+40 bu/A) has about the same pound for pound value as normal corn silage. It has increased sugar content, higher crude protein, higher crude fiber and more digestible fiber than normal corn silage. Drought reduces yield and grain content resulting in increased fiber content, but this is often accompanied by lower lignin production that increases fiber digestibility.

Depending upon farm forage needs, raising the cutter-bar on the silage chopper reduces yield but increases quality. For example, raising cutting height reduced yield by 15%, but improved quality so that milk per acre of corn silage was only reduced 3-4% (Lauer,

Wisconsin). In addition the plant parts with highest nitrate concentrations remain in the field (Table 1).

With lodged corn, raising the cutter-bar may not be an option. The lower part of the plant is highest in nitrate concentration. The only way to know the actual composition of drought-stressed corn silage is to have it tested by a commercial feed testing laboratory to estimate nitrate concentration and nutritive value for livestock. During silage fermentation the nitrate concentration usually decreases by one-third to one-half, therefore sample the forage after the ensiling process is complete. Table 2 provides interpretation of laboratory results for nitrate tests. Silage with high nitrate levels can be managed by dilution with other feeds.

During the ensiling process, if the plants contain nitrates, a brown cloud may develop around your silo. This cloud contains highly toxic gases and people and livestock should stay out of the area.

Some of the drought area was hot (>86°F) and dry during pollination which is favorable for *Aspergillus* infection. This was followed by >80°F daytime along with >70°F nighttime and drought during grain fill which is favorable for *Aspergillus* development. The *Aspergillus* fungus may produce the aflatoxin mycotoxin as kernel moisture decreases, with the highest production occurring at 18-20% kernel moisture. Most corn silage is harvested at 40-50% kernel moisture, so there is less chance of problems with aflatoxin, but the silage should be tested before feeding.

**Table 1. Nitrate concentration of various corn plant parts.** From Hicks, University of Minnesota.

Plant part:	ppm NO <sub>3</sub> -N
• Leaves	64
• Ears	17
• Upper 1/3 of stalk	153
• Middle 1/3 of stalk	803
• Lower 1/3 of stalk	5524
• Whole plant	978

**Table 2. Interpretation of Laboratory Results.**

Form of Nitrate reported by the lab			
KNO <sub>3</sub>	NO <sub>3</sub> -N	NO <sub>3</sub>	Recommendations for feeding
0-1% 0-10,000 ppm	0-0.15% 0-1,500 ppm	0-0.65% 0-6,500 ppm	Generally considered safe for livestock.
1-1.6% 10,400-16,000 ppm	0.15-0.23% 1,495-2,300 ppm	0.65-1% 6,500-10,000	Caution: Potentially toxic at this level. Mix, dilute, limit feed forages at this level.
> 1.6% > 16,000 ppm	> 0.23% > 2,300 ppm	> 1% > 10,000 ppm	Danger. Do not feed. Potential for toxicity high.

## Resources

[Corn Silage Harvesting and Storage](#), University of Wisconsin

[Use of Inoculants in Corn Silage](#), Kevin Panke-Buisse, University of Wisconsin

[Managing Immature Crops for Grain or Silage -- Disaster Recovery](#), Mark Licht, Steve Barnhart, Roger Elmore, Mark Hanna and Lori Abendroth

[Nitrate Toxicity](#), Steve Ensley and Steve Barnhart, Iowa State University

[Strategies if Milk is High in Aflatoxin](#), Mike Hutjens, University of Illinois

[Aflatoxin M1 in Milk](#), Jodie Pennington, University of Arkansas

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**Crop:**

[Corn](#)

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**Author:**



Brian Lang *Field Agronomist in NE Iowa*

Brian Lang conducts Iowa State University Extension and Outreach programs in crop production and protection in northeast Iowa. Frequent clients include farmers, ag chemical and fertilizer dealers, seed dealers, crop consultants, and farm managers. Provide timely in-season crop management inform...