



Managing & Feeding Crops with Severe Drought Stress

Drought Corn Management

4 Methods of Harvesting and Feeding Livestock Whole Corn Plant:

1. Green Chop
2. Silage
3. Baling
4. Grazing

1. Green Chop Method: (Highest Risk of Nitrate Poisoning!)

Advantage

- Provides an immediate source of feed for dry lot or supplement on pasture.

Disadvantage

- In fresh forage you could experience potentially high levels of nitrates under crop stress.
***ABSOLUTELY have tested for levels of nitrates before feeding.**
- **Corn does not ferment when green chopped.**

Chart 1: Content of Nitrate Nitrogen (Dry Matter Basis) Percentage

Content of Nitrate Nitrogen Percentage	PPM	Comments
0.0-0.10	0-1,000	Safe to feed.
0.1-0.15	1,000-1,500	Limit to 50% of ration for pregnant animals.
0.15-0.20	1,500-2,000	Limit to 50% ration for all animals.
0.20-0.35	2,000-3,500	Limit to 35-40% of ration. Do not feed to pregnant animals!
0.35-0.40	3,500-4,000	Limit to 25% of ration. Do not feed to pregnant animals!
0.40<	4,000>	DO NOT FEED!

2. Silage

Advantage

- Can be stored and fed for longer periods of time than “green chop.”
- Fermentation process can reduce nitrate nitrogen content by 50% or more.
- Excellent method of harvesting plant material for feed under severe drought.

Disadvantage

- Drought damaged corn can be difficult to judge moisture content for the type of silo structure.
 - o Bunker or Trench Silo: 65-70% moisture
 - o Upright Silo: 60-65% moisture

Indicating Silage Moisture Content

1. Use a Koster moisture tester, microwave oven to dry 100 grams of silage and dry it and reweigh it and this will be your moisture content.
 - a. Otherwise send it to a laboratory for analysis
2. Milk Line Method (**Warning, silage may be drier than what milk line indicates under extreme drought!**)
 - a. Milk line 1/3 of the way down from the kernel crown
 - o 68-72% moisture content
 - b. Milk line ½ way down the kernel from crown
 - o 63-68% moisture content
3. Grab Test (**NOT Recommended**)
 - a. Grab handful of silage and squeeze tightly for 90 seconds. Release the grip and observe the plant ball in hand.
 - o If juice runs freely or shows between fingers, the crop contains 75-85% moisture.
 - o If ball holds shape and hand feels moist, silage is 70-75% moisture.
 - o If ball expands slowly and hand does not feel moist, silage is 60-70% moisture.
 - o If ball springs out in the open hand, silage is 60% or less moisture.

Silage Management Recommendations under Drought:

1. Have corn plants checked for nitrate nitrogen content. (Use nitrate values from Chart 1)

Sampling Method:

- Collect three to five handfuls of silage from the first load of the day in a plastic bag and refrigerate IMMEDIATELY!
- Follow the same method of sampling for several loads throughout the day.
- Once field is complete mix together thoroughly and send off to be tested. (**Repeat the same procedure for each field**)

2. Use of Silage inoculants and preservatives under stress is HIGHLY recommended.

- Ensures proper populations of “lactic acid bacteria.”
- Lactic acid bacteria- convert sugar to lactic acid. Drops pH of silage enhancing the fermentation process and reduces spoilage.
- Lactic acid bacteria, converts NO₃, nitrogen to gas. (Denitrifies)
- Recommend a silage inoculant that can provide 100,000 colonizing lactic acid bacteria’s per gram of silage.

3. Haying

Advantage

- Less immediate, long term feed source.

Disadvantage

- Higher risk of nitrate poisoning. (MUST TEST FOR NITRATES!)
*Use nitrate nitrogen values from Chart 1.

Testing Method

- Recommend using a hay probe only!
- Test each field separately.
- Take 25-30 samples from each field and mix together thoroughly!
- Send in to lab for testing.

Haying Management Recommendations:

-If droughty corn is taken for hay before physiological maturity (black layer), allow it to cure (dry) out for a fairly significant amount of time.

- Approximately double the amount of time it takes to cure (dry) alfalfa hay.

-Droughty corn that is taken for hay following grain harvest is significantly safer than corn taken for hay prior to physiological maturity, but still has risk for nitrate poisoning.

- Much of the Nitrate Nitrogen is converted to safer formulations.

4. Grazing

It is recommended that grazing of drought stressed corn stalks be done only after grain harvest. NOT PRIOR!

Advantage

- Provides excellent fall pasture
- Great feed source

Disadvantage

- Corn that experienced significant drought stress could have higher levels of nitrate in lower stalks.

Grazing Management of Drought Stressed Corn:

- Safer than haying due to the majority of nitrates are in lower stalks and livestock generally avoid the standing stalks (selective feeders), **BUT DON'T PUSH LIVESTOCK!**
- Livestock are select feeders and generally eat the leaf material and other loose plant material that is lying on the soil, but if pushed will be forced to eat standing stalks. MUST rotate cattle more periodically on drought stressed stalks, than a low to non-drought environment.

Drought Soybean Management

It is recommended that soybeans that will be harvested for forage be harvested between R6 (pod fill) - R7 (yellow pod).

- Plant has achieved maximum dry matter yield.
- Harvesting prior to R6-R7 produces higher quality forage, but significantly less dry matter.

** If harvested for soybean silage, allow to dry to 55-65% moisture before ensiling.*

Drought Management with Sorghum-Sudan

Grazing: Have livestock “filled up” before turning cattle into and DO NOT turn cattle into sorghum-sudan till it reaches 24” in plant height. If crop is less than 24” in height, grazing can result in “prussic acid” poisoning.

Hay: Recommend not to hay till sorghum-sudan is 36-48” to ensure ideal tonnage.

Green chop or Haylage: Recommend sorghum-sudan is 3 ft-early boot and only green chop what you can feed in a single day.

Other Important Notes:

- **WARNING!** Severe drought can suppress growth significantly. If plant freezes before reaching 24” in plant height, delay grazing for 2 weeks and if plant reaches 24” prior to killing frost, delay grazing for 7 days.
- Haying Sorghum-Sudan after a killing frost will be safe of prussic acid as long as hay is allowed to cure (dry) for a minimum of 7 days. Prussic acid will evaporate off.
- Pastures that are exposed to significant drought and are fairly weedy pose a threat. Pastures that experience extreme drought will experience dried up less palatable grasses. Weeds may be the only vegetation that is green and succulent. Livestock are selective feeders! Certain species of weeds can have toxic nitrate level: Pigweed, Canada Thistle, Lambsquarter, Nightshade, Kochia, Field Bindweed, Russian Thistle, Curly Dock.

References:

Corn Newsletter, Ohio State University, August 5, 2002

Stress-Damaged Crops, NDSU Extension, June 2004

Harvest of Drought-damaged Corn, Iowa State University, 9/15/2003

Dan Matzek | Director of Product & Portfolio Development | Ellsworth, Wisconsin