

# MEASURE AND MANAGE

## Drought Stressed Corn Silage 2007

By Ron Piett  
[rpiett@agtest.com](mailto:rpiett@agtest.com)  
Agri-Food Laboratories

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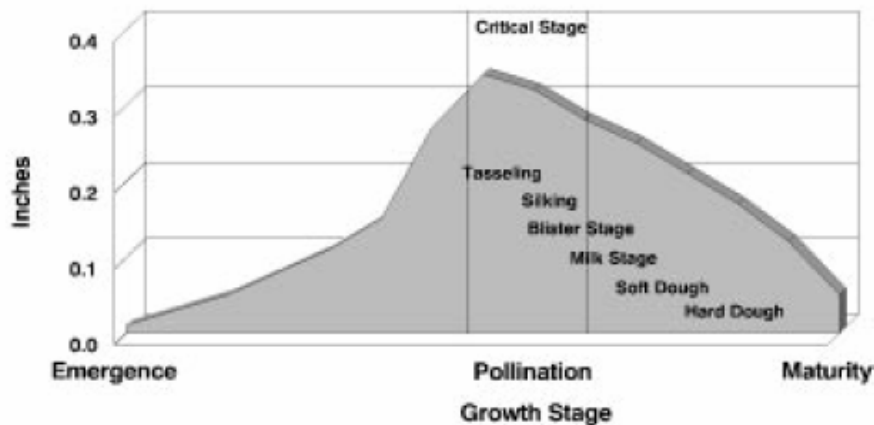
The corn silage crop this year, will be variable both in quantity and quality, due to the amount of precipitation received in different areas throughout the province.

Certain areas have not received any appreciable amount of rain during most of June and July. Comparing recorded rainfall in 2003 with that recorded in 2001 (another dry year), the lack of precipitation during July is noticeable.

	2001	2003
	June - July	June - July
London (Woodstock) mm	75.2	46.2
	2001	2003
	July - Aug.	July - Aug.
London (Woodstock) mm	14.6	29.2

Tasseling is one of the most critical stages in the corn plant development and requires a minimum of 7.6 mm per day during this period.

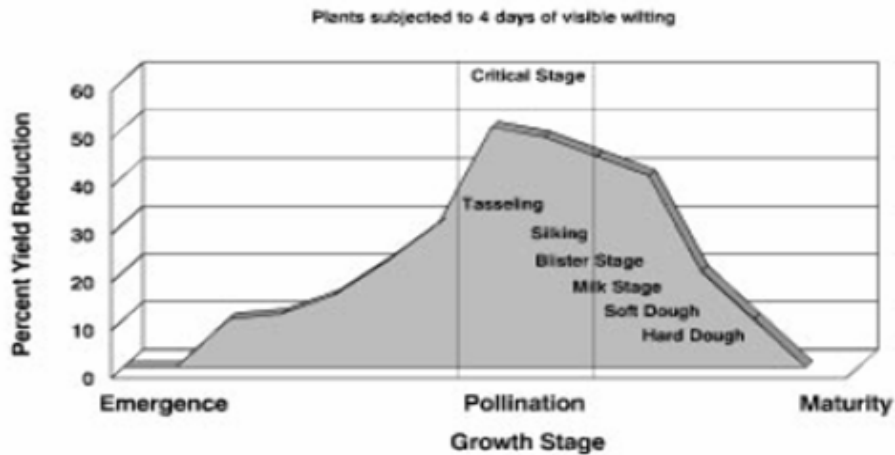
**Figure 3. Daily water use by corn.**



Adapted from Fowler, 1983

Typically, this occurs during mid July throughout most of our area, and as a result occurs during one of the driest periods of the year.

**Figure 4. Corn yield reduction due to moisture stress.**



Adapted from Fowler, 1983

Yield is most adversely affected by dry conditions that occur during the pollination stage. Only a few days of severe drought can reduce yields by as much as 50%.

The decision of when to harvest drought stressed corn silage may be difficult to make. If it is apparent that fertilization has not occurred or that kernel development will be limited, the most critical control point for successful harvest, storage and feed out, is whole plant moisture content.

Determination of the proper ensiling moisture seems to be more of a challenge during dry years. Silage harvested at moisture levels that are too low, make packing into bunkers very difficult and inefficient in upright silos.

This results in huge dry matter losses during fermentation, heat damage (bound fibre /protein), and may result in mold and/or yeast proliferation. These problems are not reversible, and will plague the producer throughout the entire feed out period.

If kernel development is going to be limited, it is more advantageous to harvest the crop at the proper moisture than to suffer losses on both grain content and ensiling quality. Approximately 75% of the energy of corn silage comes from the starch in the grain. The energy associated with drought stressed corn silage will be less than “normal” corn silage. The starch content of this forage will give a reasonable indication of the energy value.

Corn that has experienced drought-like conditions through a large part of the growing season will have higher fibre digestibility than corn grown under ideal conditions, or even than corn that experiences drought at the later stages of its development. Some of the energy lost due to low starch content will be offset by higher NDF digestibility. Other differences will be higher protein and higher NDF values.

High nitrate levels in corn silage can be a concern during dry periods. Nitrates are absorbed from the soil and converted into amino acids and protein mainly in the leaves. When the rate of conversion of nitrogen to other metabolites, is reduced in the corn plant, nitrates accumulate in the lower portion of the stalk.

#### Nitrate Concentration of Various Corn Plant Parts

Plant Part	ppm NO <sub>3</sub> N
Leaves	64
Ears	17
Upper 1/3 stalk	153
Middle 1/3 stalk	803
Lower 1/3 stalk	5524
Whole Plant	978

\*derived from Hicks, Minnesota

The concentration of nitrates in the lower stalk can be almost seven times greater than in the mid stalk portion and 30 – 40 times greater than in the upper portion of the stalk. Nitrate levels in corn silage can be increased by a significant rainfall after a prolonged dry period as the roots take up more nutrients from the soil.

When this occurs, harvesting should be delayed for a few days as more normal metabolic rates return to the plants and nitrate levels are reduced.

Corn silage that has been ensiled at the proper moisture and undergoes good fermentation will reduce the concentration of nitrates by 30 – 50%.

Leaving longer stubble will also reduce nitrate levels, as the portion of highest concentration is left in the field.

If the crop is harvested for green chop, greater care and consideration should be given before feeding. In cases where the corn silage is being direct fed, a nitrate test should be done.

Below are some guidelines for nitrates in forages being fed to cattle.

Nitrate-Nitrogen (ppm)	Recommendation
<1000	Safe to feed under all conditions
1000-1500	Safe to feed non-pregnant animals
1500-2000	Safe to feed at <50% of total DMI
2000-3000	Limit feed to 30-40% DMI, do not feed over 2000 ppm to pregnant cattle
3500-4000	Limit feed to 25% DMI
>4000	Potentially toxic, do not feed

From Pioneer Forage Manual, A Nutritional Guide