

How to Sample

- Pull a representative sample. Do not sample end rows or next to gravel roads.
- Send at least a softball size amount of plant tissue for analysis.
- Ship as soon as possible in paper bags. NEVER use plastic bags.
- Ensure samples arrive within one shipping day. Never ship samples on a Friday.

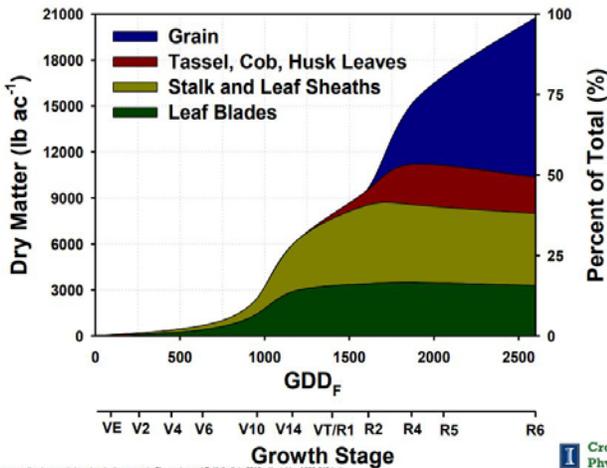
When to Sample

A corn tissue sampling program should correspond to important developmental growth stages or times of peak nutrient uptake.

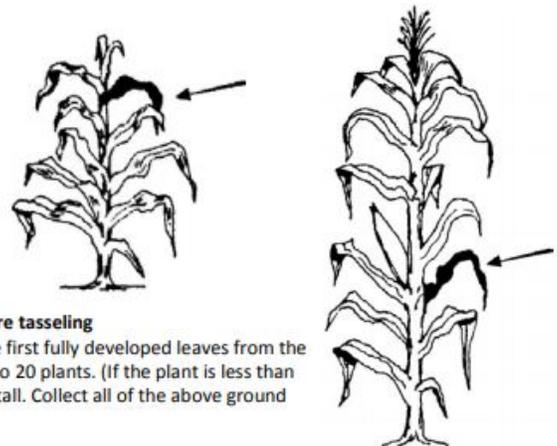
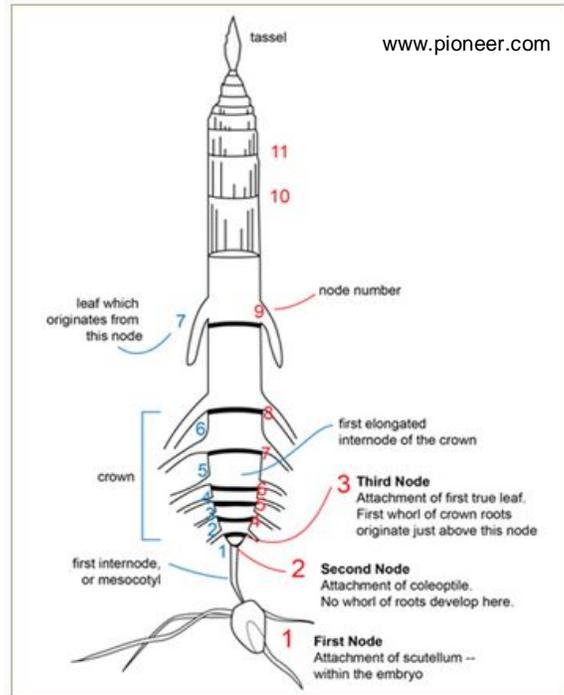
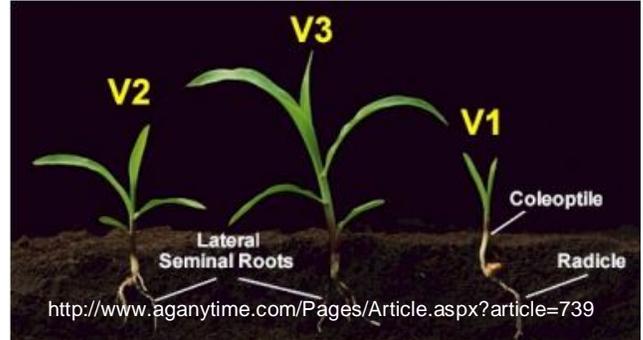
Corn Tissue Sampling Program:
V4-V6: Above ground level portion of 25 plants.
V9-V11: First fully developed leaf with a collar from 15 to 20 plants.
VT-R2: Leaf below and opposite from the ear of 15 to 20 plants.

Critical Field Corn Growth Stages

Growth Stage	Days after Emergence	Growth Event	Importance
V3	9-12	Seminal root system and ear shoots initiated	Seedling vigor seen, ears established
V4 to V5	14-21	Ear shoot initiation complete	Number of kernel rows determined
V6	21-25	Nodal root system established	Plant's ability to take up nutrients and water is established
V12 to V14	42-49	Number of ovules determined	Number of kernels per row determined
R1 (silking)	63-68	Pollen shed begins, brace roots establish, near maximum root mass	Kernel fertilization, support ear weight, kernel fill



Staging Corn



Corn before tasseling
 Collect the first fully developed leaves from the top of 15 to 20 plants. (If the plant is less than 12 inches tall. Collect all of the above ground portion).

Corn from tasseling to silking
 Collect the leaves below and opposite from the ear of 15 to 20 plants.



Corn Tissue Sampling

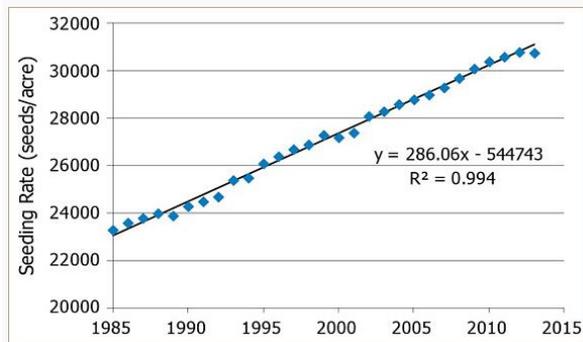
Corn Growth and Development

- Growing Degree Days (GDD) ((High Temp + Low Temp)/2)-50
- Soil temp must be at least 50 degrees F and the seed must absorb approximately 30% of its dry weight in moisture before germination occurs.
- Emergence (VE) occurs at approximately 125-160 soil temp GDD.
- New leaves emerge at the rate of approximately 1 for every 65-80 GDD

VE	Emergence	125-160 soil temp GDD
V1	3"	65-75 GDD/ 3-7 DAE
V2	5"	140 GDD/ 7-14 DAE
V3	6"	210 GDD/10-21 DAE
V4	9"	280 GDD/ 13-26 DAE
V5	12"	350 GDD/15-30 DAE
V6	14"-24"	420 GDD/20-33 DAE
V7	22"-30"	490 GDD/ 23-37 DAE
V8	32"	560GDD/26-41 DAE

Crop Notes

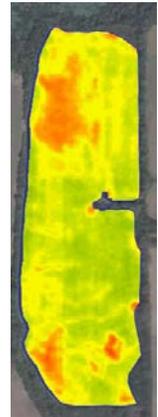
- Plant tissue nutrient levels should be maintained between the upper half of the sufficiency range for maximum yield. This helps prevent "hidden hunger" due to sampling and in-field variation.
- As planting population increases, more nutrients must be applied to raise per-plant nutrient levels.



Crop Insights by Tom Doerge, Mark Jeschke and Paul Carter

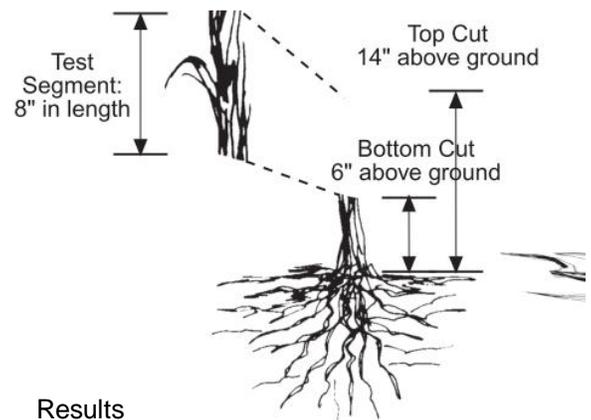
- Note that crop stress can impact nutrient levels in the plant. For example, too much or too little soil moisture will impact the crop's uptake of soil nutrients.
- University of Arkansas research recommends an additional 45 lbs of N if the tassel stage ear leaf plant tissue is less than 3%.

- Nematodes, pH and fertility problems can be identified with NDVI imagery. For a diagnostic sample, take a soil and plant tissue sample from a "good" area and a "bad" area. Indicate on the submittal form that the additional soil tests accompany the tissue. If a plant-mobile deficiency is suspected, sample the lower leaves in both samples.



- The N:S ratio may be a better indicator of the S status of corn than the S concentration. This ratio should not exceed 18:1 if S deficiency is to be avoided. Stewart and Porter (1969) suggested that a N:S ratio above 16:1 indicates a lack of S may be limiting protein formation. A ratio of 20:1 or greater indicates that S is severely deficient. For optimum corn grain yields, the N:S ratio should be maintained between 10:1 to 15:1.

Stalk Nitrate Test



Results

- Low = Less than 450 ppm nitrate-N = High probability that N is deficient. Visual signs of N deficiency usually are apparent.
- Optimal = 450-2000 ppm nitrate-N = High probability that yields are not limited by N availability.
- Excess = More than 2,000 = High probability that N is greater than needed for maximum yields.

End-of-Season Corn Stalk Nitrate Test, Nielsen, 2003