

Corn dissection

Focus questions	What can the corn plant tell us? How can we tell what stage of growth the corn plant is in?
Vocabulary	Vegetative (V) stages, reproductive (R) stages, node

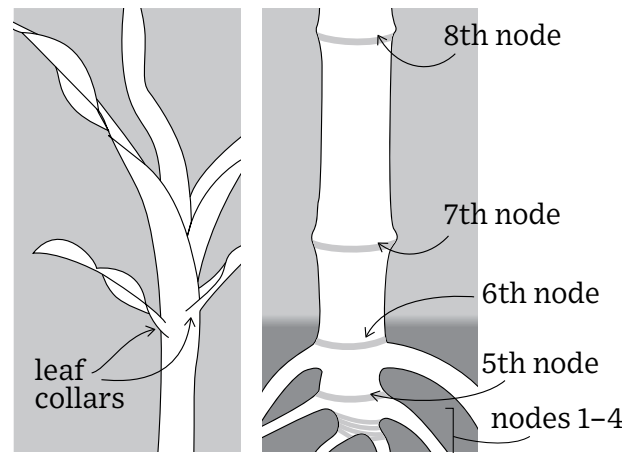
Background

Corn is an integral component to the success of agriculture. The development of the corn plant is determined by different Vegetative (V) and Reproductive (R) stages. Please see the corn growth and development poster (bookstore.ksre.ksu.edu/pubs/MF3305.pdf) for details on the Vegetative and Reproductive Stages a corn plant undergoes throughout its development. V stages are determined by the total number of leaves with visible collars (e.g., a plant with 3 visible leaf collars is at V3). A collar is the offwhite band at the base of the leaf blade where it extends away from the stalk.

A new leaf appears every 3 to 4 days during good growing conditions until tasseling. As the plant grows, lower leaves are lost. These leaves must be counted; otherwise, the development stage will be misidentified.

Split stalks to accurately determine the leaf stage. Each leaf is attached to a single node, and nodes are visible as lines across the split stalk. The first 4 nodes are usually indistinguishable within the crown, just above the root. The 5th node is about 1/2 inch above the area that contains the first nodes. The node corresponding with the uppermost leaf with a visible collar defines the vegetative stage. This knowledge is important because it helps the farmer or agronomist determine any inputs that might be necessary to add to the crop, as well as the crop’s potential yield. Corn needs little fertilizer boost until V5, but requires a large nitrogen intake to increase yield from V8 until VT (tasseling). It is important to sidedress (inject between corn rows) nitrogen before the V8 stage. This allows the plant to maximize its photosynthetic potential. Ear length is determined between the V12 and VT vegetative stages. Tassel emergence occurs from V17 to V22 depending upon the corn variety.

The growth rate of a corn plant is slow at the beginning of the season, but increases with the presence of each new leaf. Under non-stressful conditions, the time between new leaves will decrease as the season progresses. The plant is most vulnerable to stress during silking, when important pollination events are occurring. As the reproductive stages progress, the effect of stress on seed weight will decrease, while the effect on seed number will be minimal after R2. Highest yields will be achieved in areas where environmental conditions are favorable for these growth stages, especially R1. Unfavorable conditions early in the season will limit leaf size, which will decrease photosynthesis, while stress later in the season can affect pollination in the form of kernel size and number.



Procedure

1. Observe the corn plant's exterior.
 - a. Is it in the Vegetative or Reproductive Stage?
 - b. What stage of growth do you think the corn plant is in?
 - c. How did you determine this?
2. Use a pair of heavy scissors (or utility knife if it is a mature plant) to carefully split the stalk of the corn plant in half on a cutting board from the tip of the roots up to the tassel if it has emerged.
3. Lay open the plant and study its interior.
 - a. Count the number of visible nodes that cross the stalk from side to side (remember that the first 5 nodes are merged together due to rapid development).
 - b. Locate the last complete leaf collar (there is a whitish line where the leaf blade breaks away from the stalk). Follow the leaf blade down to the node that produced it. This node will determine the growth stage.
 - c. Dissect all of the undeveloped structures within the corn plant. Trace them all back to their point of growth, the node. How many nodes will you see as the plant grows taller and more leaves emerge?

Constructing explanations

4. Why is it necessary to dissect the stalk to accurately determine the growth stage of the corn plant? What does the growth stage tell us?

Design a management plan

5. Create a management plan to maximize your crop growth as it reaches maturity. Research corn growth and describe the remaining growth stages that your corn plant will go through as it develops. What does the plant still need to remain healthy and grow? What inputs are necessary as it develops to create a healthy ear of corn? Be sure to correlate the necessary inputs with the proper developmental stage.

Rubric for self-assessment

Skill	Yes	No	Unsure
I can identify the developmental stage of the corn plant.			
I can describe the remaining stages of growth the corn plant must undergo to reach maturity.			
I can outline the necessary inputs needed for corn to reach maximum yield.			