

CORN GROWTH STAGES AND DEVELOPMENT

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Vegetative Stages

The vegetative stages are described using the leaf collar method, which is defined by the number of collars on the plant. Leaves are counted from the lowermost first (rounded-tip) leaf to the uppermost leaf with a leaf collar, which is the connection between the leaf blade and the leaf sheath. The leaves in the whorl that are not fully expanded are not counted.

Emergence(VE)

- Coleoptile leaf (1st leaf) visible. This leaf will be shorter than later emerging leaves and has a rounded tip.
- Growing point of the plant should be 1 to 1.75 inches below the soil surface. Seminal roots begin growing from the seed. Permanent (nodal) root system will begin developing at this point. If seed is planted too shallow the root system will have a difficult time becoming established.

2-Leaf (V2)

- Collar of the 1st true leaf (not the coleoptile leaf) is visible. Plant is still relying primarily on seed reserves for survival.

3-Leaf (V3)

- Collar of third leaf visible. Occurs approximately 10 to 14 days after emergence.
- Growing point below the soil surface. The plants total leaf number and ear shoot are developing in the stalk.
- Photosynthesis now very active and supporting the plant.
- May apply 2,4-D or dicamba from emergence through the 5th leaf stage without drop nozzles.
- Begin checking roots for Western corn rootworm larvae (white). Watch corn that is next to wheat or grass for Banks grass mites infesting lower surface of leaves.

4-Leaf (V4)

- Collar of 4th leaf visible.
- Growing point below the soil surface.
- Roots are elongating. The roots system is now primarily nodal roots.
- Weed competition will begin to significantly reduce yield potential.

5-Leaf (V5)

- Collar of 5th leaf visible. May have lost the coleoptile leaf by this time.
- Leaf number and ear shoot formation is now complete.
- Plant is approximately 8 inches tall. Growing point is just below the ground surface. A hail or light freeze will cause little long-term damage to the plant. However, flooding while the growing point is below ground can kill the plant, especially if temperatures are high.
- The first internode to elongate is about 13 mm long and is located just below the node to which leaf 5 is connected. This is an important reference for crop growth staging.
- Tassel formation has been initiated.
- Ideal growth stage to side dress nitrogen (N). N uptake begins to increase at V5. This is a good time to supplement N so that it is in an available form to meet the requirements for development.

6-Leaf (V6)

- Collar of 6th leaf visible. Occurs approximately 3-weeks after emergence.
- Growing point and tassel above soil surface making the plant more vulnerable to a hail or freeze.
- Permanent root system rather than the seminal roots is now the primary root system supporting the plant. Root system extends approximately 18 inches.
- Tillers may begin developing at this stage.
- Internode elongation is starting.
- Continue to check roots for Western corn rootworm larvae. Continue to check for small colonies of Banks grass mite.

7-Leaf (V7)

- Collar of 7th leaf visible. Plant beginning to grow rapidly.
- The number of kernel rows being determined from V7 to V8. Maximum row set by V8.

8-Leaf (V8)

- Collar of 8th leaf visible. Occurs approximately 45 days after emergence May have lost lower two leaves.
- Don't side dress after this point or root damage may occur.
- Check upper and lower surfaces of leaves for Southwestern and European corn borer eggs or small larvae.
- No longer advisable to apply insecticide for Western corn rootworm control.

9-Leaf (V9)

- Collar of 9th leaf visible. Ear shoots are visible in the leaf collar regions. May have up to 8 ear shoots.
- Tassel is rapidly developing.
- Corn borer feeding damage should be evident on leaves and in whorl of infested plants.

10-Leaf (V10)

- Collar of 10th leaf visible. New leaf stage occurring every 3 to 4 days.
- Water and nutrient demands are high.
- Continue to check for Banks grass mite infestations on lower leaves.

11-Leaf (V11)

- Collar of 11th leaf visible. May have lost lower three leaves.
- A few corn borers will have entered stalk by this time. No longer feasible to apply insecticides for corn borer control.

12-Leaf (V12)

- Approximately 6 weeks after planting.
- Collar of 12th leaf visible. Potential number of kernels on each ear and size of ear being determined, this continues until about 1 week prior to silking. Number of kernels strongly influenced by environment.
- Number of kernel rows already determined. Top ear is still smaller than lower ear shoots.
- Brace roots just beginning to develop from the 5th node.
- Adequate moisture and nutrients are critical during this time.

13-17 Leaves (V13-V17)

- Leaf stages 13 to 17 will develop very rapidly. At some point the tip of the tassel will be visible. At which leaf stage this occurs will vary between hybrids. Silks will begin to grow as tassel is emerging. Brace roots are now growing.
- Early maturing hybrids progress from the 13-leaf stage through the 17-leaf stage faster than later maturing hybrids and have smaller ears. This can be compensated by higher seeding rate.
- Attempts should be made to have the soil profile full of water prior to tassel emergence.
- Brace roots developing from the 6th node.
- V17 is approximately 8 weeks after emergence.

Tassel (VT)

- Tassel is fully emerged 2 to 3 days prior to silking.
- Plant is at full height and all leaves have emerged.
- Hail damage is most significant at tasseling and can result in 100% yield loss if the tassel is lost.
- Beginning of a 4-week period that is very critical. Silking will generally begin in 2 to 3 days. Stress occurring a few days prior to tasseling can cause ear development to slow resulting in a lag between pollen shed and silking. This can lead to barren ears.
- Begin to check for 2nd generation corn borer egg lay on leaves.

Reproductive Stages and Kernel Development noted as “R” Stages

Silking (R1)

- Silks emerge with pollen shed at a rate of 1- to 1.5- inches per day.
- Silks visible outside the husks. Most critical stage in the development of the corn plant.
- Largest yield reduction occurs from water and nutrient stress at R1
- Takes 24 hours for pollen grain to grow down the silk and fertilize the ovule. Once fertilized, the ovule becomes the kernel. Generally, 2 to 3 days required for all silks to be fertilized on a single ear.
- Corn earworm moths may be laying eggs on silk.
- Banks grass mite population may begin to rapidly increase.

Blister (R2)

- Blister stage occurs 10 to 14 days after silking. Kernels are small and watery.
- Silks are browning and dry; silks will be darker under heat and water stress
- Irrigation and/or good soil moisture still critical for grain fill
- Starch begins to accumulate in the kernel
- Continue to check for Banks grass mite.

Milk (R3)

- Milk stage occurs 18 to 22 days after silking. The kernel is a yellow color on the outside with a milky fluid inside.
- Stress at this stage will still affect yield although not as severe as R1.
- Kernel growth is now due to cell expansion and starch accumulation
- Corn borer and mites may reach economic thresholds.

Dough (R4)

- Dough stage occurs 24 to 28 days after silking. The inside of kernels have a pasty consistency.
- Kernels have accumulated 50% of their dry weight. Under stress, kernels will have poor grainfill.

Dent (R5)

- Dent stage generally occurs 35 to 42 days after silking.
- Cob is a dark red color on the majority of hybrids.
- Stress will reduce kernel weight but not number. Early frost will stop grain fill. Frost damaged corn is slow to dry, thus delaying harvest.

Mid-Dent (R5.5)

- Mid-Dent often referred to as ½ Milk Line
- As the kernels are drying down a white layer of starch will begin to form beginning at the top of the kernel and progressing to the cob.
- When this hard layer reaches half way down the kernel, it is considered to be at the ½ Milk Line stage.
- If the soil profile is full of water at this point no more additional irrigation may be required. Continued irrigation may slow dry down in wet fields.

Physiological Maturity (R6)

- Physiological maturity also referred to as Black Layer
- Black layer stage occurs when the starch line has progressed to the base of the kernel. This can be identified by slicing the kernel and observing the black line that occurs at the kernel base. Maximum dry matter has now accumulated in the kernel.
- Moisture content is approximately 30 to 35 percent at black layer formation.

