**Vegetative**

**V1 – First-Leaf**
One leaf with collar visible (structure found at the base of the leaf). The first leaf in corn has a rounded tip. From this point until flowering (VT stage), leaf stages are defined by the uppermost leaf visible. The growing point is located below the surface until the late V6 stage.

**Management**
Scout for proper emergence (e.g., 30 plants in 17½ feet of row distance is the recommended corn seedling, unless it is extremely cold or the corn was shallowly planted).

**V2 – Second-Leaf**
Nodal roots begin to emerge below ground. Seminal roots begin to senesce. Root xylem is still active until the end of the V5 stage, and heat and drought stress will affect pollination and final grain number. Potential kernels per row is set, final potential grain number (number of rows x number of kernels) is determined. Last branch of the tassel is visible at the top of the plant. Silks may or may not have emerged. The plant is almost at its maximum height.

**Management**
Nutrient (K > N > P) and water (0.10 inch per day) demands for the crop are at the peak. Heat and drought stress will affect potential number of kernels per row. Scout for insects (e.g., corn leaf aphid, western corn rootworm, corn rootworm larvae), and diseases (e.g., gray leaf spot, southern rust, northern leaf blight). Total leaf defoliation severely affects final yields.

**V4 – Fourth-Leaf**
Six leaves with collar visible. The first leaf with the leaf tip nearest the shoot apex is senescent, consider this point when counting leaves. The growing point emerges above the soil surface. All plants are initiated. Between V4 and V10, the potential number of rows (near germination) is established. Potential row number is affected by genetics and environmental factors, and reduced by stress conditions. The plant increases in height due to stem elongation, nodal roots are developed. First leaf canopy and plant emergence are observed. The leaf canopy separate due to drought or any biotic or abiotic stress does not impact yields after this development stage. Lodging from disease, insect damage, or heat can result in physical loss of yield. Frost can be prevented, but recommended moisture for long-term storage is 14%. The economic leaf drop due to things such as European corn borer damage is about 10%.

**Management**
Scout for weeds, insects, and diseases. Rapid nutrient uptake begins at this stage. Timing nutrient applications to match this uptake will enhance the potential for greater nutrient use efficiency for future yields, especially for mobile nutrients such as nitrogen.

**V10 – Tenth-Leaf**
Minimum leaf number in the lower above-ground nodes of the plants. Until this stage, rate of leaf development is approximately 2 to 3 days per leaf.

**Nutrient**
Potassium (K) > Phosphorous (P) > Nitrogen (N) > Sulfur (S) > Calcium (Ca) > Magnesium (Mg) > Iron (Fe) > Zinc (Zn) > Copper (Cu) > Manganese (Mn) > Boron (B). scout for root lodging issues and diseases (e.g., corn smut, root, brown spot). Winter wheat control is critical since com does not tolerate early-vase competition.停滞 complies, nutrients, and radiation well.

**Reproductive**

**V14 – Fourteen-Leaf**
Rapid growth. This stage occurs approximately two weeks before flowering and is insensitive to heat and drought stress. Four to six extra leaves will expand from this stage until VT.

**Management**
Scout for root lodging issues (greenup - likely to occur from V10 to VT) and disease (e.g., common rust, brown spot). Abnormal corn ears can result and be obvious from this time until flowering.

**VT – Tassel**
Potential kernels per row is set, final potential grain number (number of rows x number of kernels), and potential ear size are being determined. Last branch of the tassel is visible at the top of the plant. Silks may or may not have emerged. The plant is almost at its maximum height.

**Management**
Nutrient (K > N > P > Ca > Mg > Zn > Mn > Cu > Fe) and water (0.10 inch per day) demands for the crop are at the peak. Heat and drought stress will affect potential number of kernels per row. Stalks begin to develop in the ground below the ear, enclosing the plumule leaves that open as the tassel approaches the soil surface. Growth stages, moisture content, and total dry matter progression for corn during the reproductive stage.

**R1 – Silking**
Fertilization begins when a silk is visible outside the husks. The first silks to emerge from the husk leaves are those attached to potential kernels near the base of the ear. Silks remain active until pollinated. Pollen falls from the tassel to the silks, fertilizing the ovule to produce an embryo. Potential kernel number is determined. Maximum plant height is achieved. Following fertilization, silk division is occurring within the ear.

**Management**
Nutrient (N and P accumulation is still progressing, K is almost complete) and water (0.33 inch per day) demands are at the peak. Heat and drought stress will affect pollination and final grain number. Dehydration by heat or other factors such as insects will produce a large yield loss.

**R2 – Blister**
Silks darken and begin to dry out (approximately 12 days after R1). Kernels are white and blister-like in shape and contain a clear fluid. Kernels are approximately 85% moisture, embryos develop within each kernel. Cell division is complete. Grain filling commences.

**Management**
Stress can reduce yield potential by reducing final grain number (abortion).

**R3 – Milk**
Silks dry out (approximately 20 days after R1). Kernels are yellow, and a milk-like fluid can be squeezed out of the kernel when crushed between fingers. This fluid is the result of the starch accumulation process.

**Management**
Stress will still cause kernel abortion, initially from the top ear.

**R4 – Dough**
Starchy material within the kernels has dough-like consistency (approximately 26 to 30 days after R1). Rapid accumulation of starch and nutrients occurs, kernels have 70% moisture, and begin to dent on the top. Material squeezed out of the kernel has dough-like consistency.

**Management**
Stress can produce unfilled or shallow kernels and ‘Shorth’ yield. Impact of frost on grain quality can be severe when it occurs at this stage (23 to 40% yield loss from light to killing frost, respectively).

**R5 – Dent**
Most of the kernels are dented. Kernel moisture declines to approximately 55% (38 to 42 days after R1) as the starch content increases.

**Management**
Stress can reduce kernel weight. Stair hardening is approaching (at around 50% kernel moisture).

**R6 – Maturity**
A black layer forms at the base of the kernel, blocking movement of dry matter and nutrients, from the plant to the kernel (50 to 60 days after R1). Kernels reach final moisture (30 to 35% moisture) and are physiologically mature.

**Management**
Grain is not ready for safe storage. Frost or any biotic or abiotic stress does not impact yields after this development stage. Lodging from disease, insect damage, or heat can result in physical loss of yield. Frost can be prevented, but recommended moisture for long-term storage is 14%. The economic leaf drop due to things such as European corn borer damage is about 10%.

**Yield components and critical growth stages for their definition in corn production.**