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Critical Growth Stages of Corn

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This newsletter will discuss the most critical stages of development of corn plants. The development of corn plants may be divided into vegetative (V) and reproductive (R) stages. Table 1 lists these stages for the full season. Each vegetative leaf stage is defined according to the uppermost leaf whose leaf collar is visible.

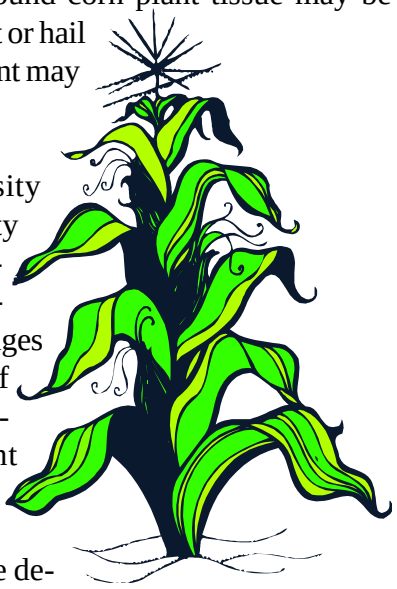
Table 1. Vegetative and reproductive stages of a corn plant

Vegetative Stages	Reproductive Stages
VE emergence	R1 silking
V1 first leaf	R2 blister
V2 second leaf	R3 milk
V3 third leaf	R4 dough
	R5 dent
	R6 physiological maturity
V (n) nth leaf	
VT tasseling	

This staging system, developed by researchers at Iowa State University, is often useful in understanding the plant growth stages of corn referenced on pesticide labels. A knowledge of these stages may also be quite helpful in understanding how the corn plants respond to weather conditions throughout the growing season.

The first critical stage in growing corn is stand emergence. Soil temperature should be ≥50ºF. at the 2-inch soil depth in the early morning hours. Soil moisture should be sufficient to support a rapid and continuous germination process. Corn seed should be placed in the soil at about 2-inches deep, and then the soil pressed around the seed securely.

Once corn plants emerge, adverse weather such as hail or frost may be experienced. Under these circumstances crop producers will often be faced with decisions regarding the need to replant. After the adverse weather event one should examine the corn plants to assess the condition of the "growing point". At the **V3 stage** of development the growing point is well below the soil surface. The above-ground corn plant tissue may be destroyed by either frost or hail at this stage, and the plant may still survive.



Obviously, plant density and spacing uniformity are important for optimum grain yield potential. Anything that damages the growing point of corn plants after emergence, and thus, plant density and/or spacing uniformity will reduce yield potentials to some de-

gree. Assessing the degree of damage after adverse weather events may be quite difficult in some cases. Another factor that must also be taken into account is the affect of the **date** of **replanting** upon the prospective yield potential for the future crop.

A second critical stage in corn is the **V6 stage**. At this stage the growing point is above the soil surface, and the stalk is beginning a period of rapid elongation. Under dryland conditions, **all fertilizer nutrients should have been applied** by this time; as the uptake of these essential nutrients will become very rapid. This is also the stage at which time the application of **certain herbicides may be damaging** to the corn plants. Field cultivation at this stage and later will result in disturbing and pruning important roots; and thus, reduce water absorption capabilities by the crop plants.

By the **V12 stage**, the number of rows of kernels per ear has been determined, and the number of kernels per row are in the process of being determined. The **most critical stage** of development for corn plants is the **V15 (10-12 days pre-tassel) through R2 (blister) stages**. This is because the corn plants are utilizing considerable amounts of water each day for "cooling" itself and for sugar production, to support the large plants and the grain-filling processes. Also during this period of growth and development, the number of kernels per row on the ears is finally determined. Adverse growing conditions at this time may reduce the grain yield potentials significantly. High temperatures (95+ºF.) may reduce the pollen viability, and thus, the number of kernels fertilized. The effects of high temperature on "kernel set" is accentuated by moisture shortage in the soil.

If soil moisture is adequate during the pollination and kernel fertilization stages, as well as through much of the grain-fill period; grain yield potential may be maintained. However, if soil moisture becomes depleted during the "milk" and "dough" stages of grain-fill, then grain abortion may occur; thus, resulting in shrunken and light bushel-weight grain. Maximum grain yields are obtained when soil moisture is available through **"physiological maturity"**, or black layer formation.

Summary

There is little dryland producers can do to help alleviate the impacts of "Mother Nature". However, one needs to follow practices which minimize other contributing problems which might reduce grain yield potentials. These would include: 1) judicious applications of herbicides relative to crop growth stages and at times when the crop is not under stress conditions; 2) making applications of side-dressing fertilizer well enough in advance of crop needs to avoid nutrient deficiencies; and 3) avoiding field tillage operations which may lead to unnecessary soil moisture losses.

For additional information, see our website at:
http://soil-testing.tamu.edu