

Louisiana Corn Fields Flooded

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During the past week, corn fields have received in excess of 10-12 inches in the northern corn growing areas of Louisiana. Many of these corn fields range from having seed that has just started the germination process through the 2-3 leaf stage. Corn is extremely vulnerable to flooding prior to the 6-leaf stage or when the growing point is near or below the soil surface. Completely submerged plants are at a higher risk for damage than those partially submerged. Two to four days of flooded conditions is the most that corn can survive when it is less than the 6-leaf stage. After about 48 hours of flooding, the oxygen supply in the soil is depleted. With oxygen being depleted, the corn plants cannot perform or sustain important functions such as nutrient and water uptake, which is being impaired and inhibiting of root growth.

Air temperature is an important factor for the survival of corn under flooded conditions. When warm temperatures greater than 77° are experienced, corn may not survive even 24 hours. Cooler temperatures prolong the survival and once the growing point is above the water level the likelihood for survival improves greatly.

Also, just because the corn plants survive a flood in their early stages of development there still might be a long term negative impact on crop development and ultimately yield at the end of the season. An overabundance of soil moisture during the early vegetative stages retards corn root development. The implications occur later on during the growing season when it becomes dry and the root systems are not adequately developed to access available subsoil water. Also, be aware that flooding can result in losses of nitrogen through denitrification and leaching.

Overall, crop injury to flooding of less than 48 hours should be limited. To check plants for survival, the color of the growing point should be white and cream colored. A growing point that is darkening or is softening usually precedes plant death (Figure 1). Be sure to look for new growth 3-5 days after water drains from the field.

For fields that have just been planted, corn should typically emerge in 90 to 120 growing degree days (GDDs). Temperatures are used to calculate growing degree days (GDDs) or some people call them heat units (HU). Several formulas exist to calculate these GDD, but the one used most often is the "Modified 86/50 Cutoff Method" (MGDD).

MGDD for any given day are calculated by subtracting 50 from the average daily temperature. The average daily temperature is calculated by adding the daily high and the daily low temperatures and then dividing by two.

$$\text{GDD} = \frac{\text{Max. Temp} + \text{Min. Temp.}}{2} - 50\text{F}$$

Two criteria or rules exist when calculating MGDD. First, if the daily high was greater than 86F, then 86F is used to calculate the average. Second, if the daily low was less than 50F, then 50F is used to calculate

the average. These upper and lower temperature thresholds or limits define the boundaries beyond which corn develops very slowly, if at all. Keep in mind as the soil dries, a crust may form and hinder the corn plants from emerging. Count the number of emerged plants and determine if struggling seedlings will reach the soil surface. Assess replant options based on surviving stands, corn yields begin to decline when final plant stands fall below 27,000 plants per acre. An option to consider is rotary hoeing for breaking the soil crust in some situations, although hoeing may reduce stands possibly by 5-10 percent.

Another issue related to flooding is disease problems such as crazy top. This disease develops when soils have been flooded shortly after planting or before plants are in the 4-5 true leaf stage. Saturation for 24-48 hours is sufficient for infection to occur.

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Figure 1. Corn plant in the V2, early V3 stage of growth and the location of the growing point in relation to the soil surface.