

Managing Flood Damaged Corn

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The large amounts of rain over the past week caused flooding or ponding in poorly drained areas of corn fields. Many other fields that were not flooded or ponded were saturated with water. Many growers have asked what impact these wet conditions will have on the corn crop. Flooded and saturated soil conditions can impact the corn development, cause nutrient deficiencies as well as increase the risk of herbicide injury and disease incidence. These flooding repercussions all have the potential to reduce yields.

Impact on Corn Growth and Development

- Actively growing corn is impacted by wet conditions because they become deprived of oxygen and are unable to breathe (respire). Soil oxygen becomes depleted after 48 hours of soil saturation. Without oxygen, the plant cannot perform critical life functions such as nutrient and water absorption.
- Plants younger than the 6th leaf stage (6 leaf collars exposed) are more susceptible to wet conditions than older plants for the following reasons. First, the growing point is at or below the soil and therefore is directly impacted by oxygen deprived soil conditions. Second these young plants are in the process of developing and establishing a vigorous root system. Stunting or death of roots from oxygen depletion can be a major set back for a young plant. Young corn (emergence to sixth leaf stage) can survive only two to four days under flooded or ponded conditions. If temperatures are warm (77° F or higher) young plants may only survive 24 hours. Cooler temperatures will actually prolong plant survival. Crop injury will be lessened if flooding lasts less than 48 hours.
- Extended periods of saturated soils plus warm temperatures will take its toll on the overall vigor of the crop and can result in yield loss. Flooding causes the greatest yield losses when it occurs early during the growing season. Six inch corn flooded for 24, 48, and 72 hours resulted in yields reduced by 18, 22, and 32 %, respectively. Root death will occur and new root growth will be stunted until the soil dries. This will predispose the plant to greater injury if we have a dry summer because of restricted and poorly developed root systems.
- It is wise to evaluate your stand to determine loss from the wet conditions. The first step to evaluating the stand is to confirm plant survival by checking the color of the growing point. The growing point should be white to cream colored, while a dark or soft growing point usually precedes plant death. Also look for new leaf growth 3 to 5 days after wet drains from the field.

Impact on Nitrogen

- When soils are wet and cool the plants are often a pale yellow color. This is symptomatic of low photosynthetic activity and general nutrient stress experienced by the plant. These conditions limit corn seedling root growth by limiting nutrient uptake. Furthermore, the release and plant availability of some nitrogen is slowed down due to slower microbial activity in cool wet soils. In order for nitrogen to be released from soil organic matter the microorganisms need oxygen and warm temperatures. Since oxygen is very low in flooded and saturated soils, very little microbial activity occurs. This decreases the amount of ammonium and nitrate supplied to the plant often resulting in nitrogen deficiency in water logged soils.
- In addition, heavy rains can cause nitrogen losses from corn fields. The major losses associated with flooded and saturated soils are nitrogen leaching below the root zone and gaseous losses of available nitrogen through denitrification. Denitrification is a microbial process that converts nitrate to gaseous nitrogen compounds under oxygen limiting conditions. The form of nitrogen lost from leaching or denitrification is nitrate. Therefore the potential for significant loss is determined by the amount of the crop N supply that was in the nitrate form when the excess rainfall occurred.
- A key decision that needs to be made by farmers is whether additional nitrogen should be applied to compensate for nitrogen losses that may have occurred. The pre-sidedress soil nitrate test (PSNT) is the best way to determine if supplemental nitrogen is needed. The PSNT offers a diagnostic method for evaluating the nitrogen supply for the crop. For assistance in collecting samples for PSNT testing contact your local extension specialist.

Impact on Weed Control

Untimely rainfall can also have a major impact on weed control in corn fields. Rainfall has the potential to leach pre-emergence herbicides out of the weed zone, reducing the efficacy on germinating weeds. The extent of leaching will vary across farms and fields and is dependent upon the amount of rainfall, the particular herbicide applied and the soil type. Injury symptoms might include stunting of shoots, leaves unfurling underground, and buggy whipping (leaves not unfurling properly). However, the good news is that most corn can outgrow the symptoms once the soil dries, and warmer weather prevails. If you have to rely on post-emergence herbicides for any rescue treatments, be sure to check the label for maximum weed and crop size and for any crop rotation restrictions before selecting products.

Questions?

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