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# AGRONOMY NEWSLETTER

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April 2, 2019

## Planting in Cold/ Wet Soils

Spring marks the start of a new crop year, filled with excitement, optimism and a sense of urgency. Growers know the importance of early and timely planting to maximize corn yield potential. If the calendar says “go” but soil conditions and the weather forecast say “wait”, think twice before pulling the planter out of the shed. The disadvantages of planting into cold/saturated soils may out weight the advantages of planting early. Consider the following best management practices before planting season starts to help you decide when to start planting.



**In early spring it is best to wait until soil conditions are good to excellent. Try to avoid planting when wide temperature fluctuations can create challenges with germination and seedling uniformity.**



Corn will germinate and begin growth at a 50° soil temperature. It is best if the soil has warmed to 55° or above within a week after planting. If the temperature stays near 50°, corn will germinate but progress will be slow, taking longer for plants to emerge. Slow early season growth and development caused by fluctuating soil temperatures can disrupt germination, causing reduced and uneven stands. Further, slow growth increases the risk of seedling disease and can negatively impact plant health and performance throughout the entire growing season. Cold/ moist soils also increase the potential for herbicide damage in young seedlings. Slower seedling development reduces the plant’s ability to metabolize herbicides, increasing the risk of serious injury.

**Keep an eye on the forecast and manage risk accordingly.**

In the first 24-36 hours after planting, the corn seed will absorb or imbibe approximately 30% of its weight in moisture. Through this process the cell tissues in the kernel will swell and expand.

If cold temperatures persist and cold water is absorbed by the seed, imbibitional chilling may occur, causing cell tissues to become less pliable and rupture while swelling. This often stops germination. If the seed goes ahead and sprouts, growth of the radicle root and/or coleoptile may stop, preventing seedling emergence. Another tell-tale sign of imbibitional chilling is the “corkscrew effect” noted by the deformed elongation of the mesocotyl, which almost always leads to the seedling leafing out underground.



“Corkscrew” mesocotyl from cold injury to developing corn plant.  
Source – Svnaenta

### **Watch for seed placement and compaction issues when planting into moist soils.**

Planting into moist fine textured soils may smear the sidewall of the seeding slot, causing poor slot closure which leads to uneven seedling germination and emergence. Planting into wet soils may also encourage side wall compaction. Adjust the down pressure on the closing wheels or press wheels to help minimize this issue. Watch for soil buildup on the gauge wheels to prevent planting at shallower depths. Also, if mud builds up on the disk openers and closing wheels, they may stop turning and plow a trench, leaving seed uncovered.

### **Plant corn at least 1.75 – 2.25” deep.**

Planting at proper depths encourages good seed to soil contact, adequate soil moisture, and better development of the nodal roots. This maximizes water and nutrient uptake and helps to reduce late season root lodging. Planting shallower than recommended will not ensure warmer soil temperatures and faster emergence. Wide swings in soil temperature often occur for shallow planted seed and cause coleoptile corkscrewing or leafing out underground to occur. Even if the weather is favorable and faster emergence occurs, shallow planted corn is likely to have a smaller root mass, causing lodging issues throughout the season.

Shallow planted corn in cool soils is also at a greater risk of soil-applied herbicide injury because the seed and roots are closer to the concentrated herbicide zone.



### **Monitor seed and seedling health in corn fields planted into cold/wet soils.**

In order to assess seedling health, dig up seeds 7-10 days after planting. This will aid in predicting stand establishment or the potential for replant if conditions have been wet and cool during this period. It will also help you anticipate future crop health issues and guide you in making important management decisions later in the season.

While examining seedlings, check for rot diseases, such as Pythium and Fusarium, especially in fields with continuous corn, minimum tillage, or poorly drained soils. For corn that has not emerged, dig up the seed and look for any soft/mushy seeds, discolored seeds and seeds that have a rotten smell. Healthy seeds will be firm and will have a white or light color when the seeds are split open. For emerged plants, dig up the roots and look for any damage or discoloration, and split the plants to look at the growing point. A healthy growing point will be a whitish or cream color, and the tissue will be firm. Diseased tissue will be brown, soft and water soaked.

Early season fungal pathogens attack seedlings, but don't necessarily go away when the soil warms and the plants begin to grow. Disease damage to seedling roots often leads to delayed and stunted plants in June. There can be a 6 to 12- inch difference in height between diseased and unaffected corn plants. The shorter, diseased plants will act like weeds for the remainder of the growing season, stealing water and nutrients and not contributing to yield.

**Make sure planters are in good shape and properly calibrated.**

Uneven plant spacing and emergence (skips and doubles) caused by an improperly adjusted planter issue may reduce final corn yield potential. If fields are planted in wet conditions, factors within growers' control, such as proper planter maintenance and calibration, become more important.

**Slow down when planting, especially in cold/ moist soils.**

For most non high-speed planters, as planting speed increases over 4 mph, seed placement and accuracy is reduced. This adds to stand establishment and uniformity problems resulting from planting into cold and wet soils. It's always important to double check both planting depth and spacing as soil conditions change or when moving to a new field.

When challenged by cold and wet planting conditions, be sure to visit with your NK representative to develop a hybrid placement strategy for cool soil conditions. Positioning hybrids to match greater emergence, seedling vigor, and disease tolerance with soils that will be slow to warm (due to high residue, heavy soils, etc.) may be critical to getting your crops off to a better start.

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April 8, 2019

## Anhydrous Ammonia Injury In Corn

As we look back at the past fall and winter there was limited opportunity to apply fertilizer in preparation for our 2019 cropping season. In many areas the weather conditions prevented application of anhydrous ammonia. As we approach planting season and figure out the best method to apply fertilizer in a limited time it is important to work to prevent anhydrous ammonia injury in your corn. This fertilizer can cause harm to corn seeds, roots and plants.

### Background

Most of the anhydrous ammonia is dispersed through the soil with-in 24 hours after application. Unfortunately, it takes very little ammonia  $\text{NH}_3$  to cause injury to the corn seed, root or plant. The highest chances of encountering anhydrous ammonia injury is:

- During spring application
- When it is applied shallow and near the seed
- When the soil texture is dry and/or course

Highest chances for anhydrous ammonia corn injury is with spring applications that are applied shallow and near the seed. The potential for fall-applied anhydrous ammonia injury is low mainly because the anhydrous has time to go through the nitrification process; however, again it can still occur if applications are applied shallow and near the seed.

### Injury Identification

There are certain signs that point to anhydrous ammonia injury. First, the root tips of injured plants will appear blunted and brown or black. Second, plants will often be stunted and may have leaves that are a purple or reddish tint.



## Management Tips

According to [Iowa State Extension](#), the highest concentration of ammonia is within the first 1 to 2 inches from the injection point. The overall zone is 3 to 4 inches in radius from the injection point.

The best way to avoid injury, according to [University of Nebraska Extension](#), is to get enough soil separation between the highest concentration injection point and the seed. For example, if the injection point is 6 to 8 inches in depth, the outer edge of the ammonia retention zone is about 3 to 4 inches from the point of injection. A seed that is planted at a 2-inch depth would be outside or at the edge of the applied ammonia

If the injection point is not deep enough to place the seed out of the highest concentration zone, try to offset the planter so that the row is not directly above the injection point. If injury has already occurred, the only management option is to irrigate or hope for at least 1 inch of rainfall to reduce the concentration of ammonia salts out of the root zone.

Overall, the best way to protect your corn from anhydrous ammonia injury is proper soil application placement and seed placement.

## Topic Resources:

[Iowa State: Corn Injury From Anhydrous Ammonia](#)

[UNL: Ammonia Root Burn on Corn](#)

[Brandt®: Ammonia Injury in Corn](#)

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