Each year one of the first and most important decisions a corn grower must make is when to plant. Research proves there are advantages to planting early. But some current and future conditions can stack the odds against your success. Understanding the risks before making your planting decision gives you the best chance at maximizing profit.

**Ideal Conditions for Planting**

A few conditions must be met for corn to germinate and emerge. It’s almost impossible to always plant into ideal conditions, but it’s good to be aware of all of these factors so you can make the best decision given the size of the planting window environmental conditions give you.

- **Sufficient soil moisture.** To trigger germination, a corn seed must imbibe over 30% of its weight in water. If the area around the seed is too dry, or dries too quickly, germination is delayed until enough moisture is available. Some factors affecting soil moisture in the seed zone are soil type, tillage practices, uneven seeding depth, and unusual weather conditions.

  If you still have time in your planting window, it’s better to wait until there is sufficient soil moisture for the seed to imbibe to germinate in a timely fashion. Planting early is no benefit if the seed simply sits in the ground exposed to disease and pests longer than necessary. If you choose to plant into dry conditions, adjust your planting depth deeper to a depth with consistent moisture.

- **Adequate soil temperature.** Corn will emerge slowly and unevenly at soil temperatures below 50⁰ F. Once soils warm into the mid-50s or warmer, emergence will improve. It takes approximately 115-120 Growing Degree Days (GDDs) from planting to emergence. As the soil warms, emergence occurs faster which lessens the chance of issues that could stop emergence.

Uneven or fluctuating soil temperature in the seed zone can lead to uneven emergence and a poor stand. Soil type, soil drainage, residue coverage and seeding depth can all affect soil temperature. And uneven stands are most pronounced when soil temperature is right around the 50⁰F threshold. When the temperature fluctuates it can lead to corkscrewed or twisted seedlings which are less likely to emerge successfully. If soil temperature is around 50⁰ F, and cooler temperatures are forecasted, the best decision is to delay planting until temperatures warm.

- **Seed-to-soil contact.** For the seed to imbibe the required amount of water it must have good seed-to-soil contact. Poor seed-to-soil contact is common when planting into residue, in soil that has a lot of clods or rocks, or when the seed is exposed to air due to poor furrow closure. Wet soils further complicate the situation by increasing the risk of sidewall compaction and poor furrow closure. In all these situations there’s a greater chance the seed will not take in enough water to germinate, or germination will be more weather dependent than normal leading to uneven emergence.

  When soils are too wet leading to sidewall compaction and poor furrow closure you should stop planting until soils have time to dry. Row cleaning attachments should be used on the planter to help clear the seed furrow when planting into a seedbed with a lot of residue, clods or rocks.

- **Soil compaction.** Anything restricting the coleoptile from breaking the surface, or the mesocotyl from elongating, will restrict emergence. Crusting at the surface or sidewall compaction in the furrow can hinder emergence and cause leafing out underground, or seedling death. Sidewall compaction can also inhibit root growth, limiting the young plant’s ability to take in vital nutrients and water.

  Excessive tillage followed by a hard rain can lead to surface compaction. Another leading cause of compaction is tillage or other field work done while the soil is wet. Not only does the wheel traffic cause compaction, but tillage equipment can also cause compaction layers below the surface which restrict root growth. Be mindful of the forecast and soil conditions before doing any field work. If the conditions aren’t right, it’s best to wait.
Planting In Cold Soils

The first recommendation for planting into soils at or below 50°F is this: Don't do it.

The most vulnerable time for corn plant is before emergence and the early V stages. Fluctuations in soil temperature and cold rains work against corn emergence, and the highest likelihood for those conditions are in the early spring, before soil has warmed above 50°C.

Today's seed treatments are effective at protecting against pests and diseases when used properly, but even the most effective technologies lose effectiveness in conditions that cause germination and emergence to be delayed.

**If you must plant into soils at 50°F or below, it's very important to look at the forecast.** Planting immediately ahead of conditions that are predicted to be cool and wet can affect uniformity of emergence. Imbibition of cold water can lower germination rates, and cool soil temperatures can delay emergence allowing more time for diseases to attack the seedling. If you must plant into cold soils, make sure temperatures are continuing to warm and that there is no chance of rain in the near future.

If a chance of a cold rain is forecasted during planting, it's best to stop at least 24 hours before the rain. The seed will imbibe its needed water in the first 24-36 hours if the conditions are right, so corn planted more than 24 hours before the rain has a much lower chance of imbibing the cold water.

The biggest takeaway is to be patient and wait for the right soil conditions. Make sure the soil temperature is at least 50 degrees, and is predicted to stay above 50°C.

**Considerations for High Residue**

Planting into corn-on-corn fields, or fields with a high amount of residue, presents additional challenges. Hairpinning, sidewall compaction, lack of consistent seeding depth and failure of the furrow to close can reduce critical seed-to-soil contact. Coulters, clearing discs, sweeps, brushes, and rolling fingers can all help to cut and clear residue in the row area in front of planting units.

Fields with a lot of residue will not dry quickly, and are much slower to warm in the spring. Even if there are fields in the area with soil temperatures above 50°C, that doesn't mean it's the same for all fields. Within a field there could also be variability due to uneven distribution of residue. Extra patience is needed for corn-on-corn and no-till fields. These fields already present more stress to corn plants, so it's important to reduce additional stress whenever possible, especially at planting.

If you have the option, it's best to wait until later in the spring to plant high residue fields. Allowing the extra time for the soil to warm up and dry out will be beneficial in the long run. Also, consider using row cleaning attachments to clear the seed furrow of as much debris as possible. Take time when adjusting the row cleaning attachments to make sure they're set low enough to clear the residue, but not so deep that a trench forms.

**Conclusion**

Maximizing the genetic potential of a hybrid starts at planting. Many factors affecting germination and emergence are environmental, but there are decisions and actions completely under our control that can improve our chances of a successful start to the corn growing season.

Choosing when to plant is one of the most important decisions a corn grower can make. And balancing yield potential with potential stand establishment is paramount to that decision. As with most decisions, this one is not black and white. You raise your chances of success if you're simply mindful of the risks and rewards of planting early, and make well informed decisions on a field by field basis.

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Coleoptile injury due to lethal, cold temperature.

High residue fields require different management considerations.

**From the desk of**

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