Optimum Planting Conditions and Seed Placement for Corn—Alabama and Georgia

After a long winter and the arrival of spring, many growers want to get into the field. However, planting corn too early, under poor conditions, can have a negative impact on yield. Planting date is one of the few factors a grower has control over during the life of the crop and trying to get the best start possible is critical. It is important to plant according to soil temperature and conditions as opposed to the calendar. When conditions are fit, proper seed depth and planting density are critical to maximize yield potential.

Optimum Temperatures

The optimum soil temperature for corn germination is 55° F. Temperatures below the optimum can cause seeds to remain dormant and become more vulnerable to diseases, insects, and animal predators. Crops should be planted when soil temperatures are optimal and within the target dates for the region. Keep in mind these dates are based on the average year and the use of short or long relative maturity corn products will affect these target dates. In addition, planting into cold and/or wet soils can lead to numerous problems.

Saturated and Flooded Soils

Along with soil temperature, adequate soil moisture and high soil oxygen concentration are favorable for germination and plant growth. In this region, planting is often driven by soil moisture content. Saturated soils, which may include flooded or ponded soils, can have a negative impact on emergence, even with high quality seed lots. The main side effects include plant growth restriction and decreased oxygen availability to the plant. For instance, saturated soils can inhibit root growth, leaf area expansion, and the photosynthetic process. Young plants may develop yellow leaves due to slowing of photosynthesis and plant growth. A prolonged period of saturated soil can reduce germination and emergence due to lack of oxygen. In addition, portions of roots may die as a result of no oxygen. However, there is still a chance for survival unless the growing point is damaged.

The longer an area remains saturated, the higher the risk of plant death. Experts believe that young corn can survive approximately 4 days of flooding if temperatures are relatively cool (mid-60°’s F or cooler). If temperatures are warm (mid-70°’s F or warmer) survival will be less than 4 days. Warmer weather may shorten these durations.

Soil Compaction

Soil compaction takes place when soil particles are pressed together resulting in decreased pore space and increased soil density. Compaction can result in yield reductions due to decreases in seedling germination, root and plant growth, and nutrient uptake. It is important to realize the majority of soil compaction can take place from equipment passes over a field. Research indicates approximately 80% of soil compaction happens on the first pass, while subsequent passes cause additional, but progressively less, compaction. The best form of management is prevention. That means staying out of the field until conditions for field work have improved. If mud sticks to the tires and ruts are deeper than an inch, it is too wet to be in the field.

Soil Crusting

Soil crusting can occur when a crust layer forms on the soil surface as wet soils dry. The crust layer can delay or prevent seedling emergence. Crusting may be more common in fields with fine textured soils, low organic matter, and little surface residue, especially where excessive tillage has taken place. A rotary hoe can break up the crust and aid seedling emergence. Timing is essential and breaking the crust as soon as possible is most beneficial. If seeds are not infected with disease, cooler soils will allow seedlings to survive longer when trying to break through the crust.

Corn Planting

“The optimum time for planting corn is when the soil temperature is 55° F or higher in the seed zone for 3 days in a row and the air temperature will allow that same trend or warmer to continue,” says Dewey Lee, extension agronomist, University of Georgia. “That’s usually the first of March in South Georgia and Alabama, but it could occur earlier. History suggests that optimum conditions generally occur about 2 to 3 weeks later for middle Georgia and two weeks after that for north Georgia.”
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Corn smaller than the V6 (six leaf) growth stage can tolerate a light frost if the temperature does not drop below 30°F. A moderate frost to corn at the V6 growth stage or smaller will injure the existing corn leaves. However, new leaf growth can occur in four to five days, which allows the plant to fully recover. As a corn plant’s growing point reaches the soil surface, the chance for permanent injury increases, as well as the chance for uneven emergence.

Decreases in corn yield due to uneven emergence arise when larger, earlier emerging plants compete with the smaller, later emerging plants. There are many different reasons why uneven emergence in corn can occur. A few examples are: soil moisture variability in the seed zone, soil temperature variability in the seed zone, soil crusting, improper planting depth, and insect or disease damage. Poor seed-to-soil contact can also cause uneven emergence due to cloddy soils and corn can occur. A few examples are: soil moisture variability in the seed zone, soil temperature variability in the seed zone, soil crusting, improper planting depth, and insect or disease damage. Poor seed-to-soil contact can also cause uneven emergence due to cloddy soils and worm or misadjusted coulters or disc openers. Many of the factors that cause uneven emergence can be avoided by waiting to plant until conditions are fit for planting.

Corn seed placement is critical to help maximize yield potential. Extension agronomist Dewey Lee recommends planting 1.5 to 2 inches deep. *Planting too shallow can result in poor nodal root development. Shallow planting can also increase the risk of injury from some soil-applied herbicides. Planting when the soil is too wet can cause sidewall compaction and poor root development. Growers without irrigation should wait for soil moisture before planting. I’d rather wait 4 or 5 days for moisture than risk an uneven stand by planting into dry soils,” he says.*

Generally, corn yield potential will become greater with increasing populations. However, the optimum plant population density can vary depending on product genetics. Factors such as plant structure and ear placement can influence weather and insect-induced lodging. Consequently, many Southern producers plant corn at lower than optimal plant populations, which may decrease yield potential and profit. To help reach optimum yield potential, the recommended planting populations for the latest DEKALB® brand corn products are shown in Figure 1.

**Average Yield by Population**

<table>
<thead>
<tr>
<th>Population</th>
<th>Yield (bu/ac)</th>
</tr>
</thead>
<tbody>
<tr>
<td>33000</td>
<td>220</td>
</tr>
<tr>
<td>36000</td>
<td>210</td>
</tr>
<tr>
<td>39000</td>
<td>200</td>
</tr>
</tbody>
</table>

*Figure 2. Average yield of different DEKALB® Brand corn products at three different plant populations. Source: 2012 Scott Learning Center Demo Trial.*

**Summary**

Planting when soil temperature and conditions are favorable is very important to give the crop the best chance of emerging properly and getting off to a good start. Waiting for good soil temperatures and planting conditions may help avoid disease, lack of oxygen to the seeds, and restricted plant growth which can all lead to poor emergence. However in some instances, such as a late spring frost, injury may be unavoidable. Rushing to plant in cold, wet conditions can lead to problems that can reduce yield potential.

When conditions are fit for planting, proper seed depth and planting density are critical to maximize yield potential. Lodging is one issue associated with planting too shallow and at higher than optimum planting densities. Emergence problems associated with planting deeper than necessary and planting at lower than optimum populations can also decrease yield potential.

For additional agronomic information, please contact your Asgrow®, DEKALB® and Deltapine® Brands Seed Representative.

**Sources:**