Planting early can contribute to maximizing yield potential; however, planting into wet and cold field conditions may lead to poor emergence and less than ideal final plant populations. When planting corn and soybean, farmers should focus on examining existing field conditions, soil temperature and moisture, with less emphasis on calendar date. Another factor to consider is the near term weather forecast, which may influence your chosen planting depth and the potential for soil surface crusting to occur after planting.

**Planting Dates**

Corn and soybean planting dates vary considerably across the country, from early March corn planting in southern regions to mid-July soybean planting in the northeast.¹ For a range of planting dates for your state, farmers may want to refer to the United States Department of Agriculture Field Crop Usual Planting and Harvest Dates, (Handbook 628) at:

http://usda01.library.cornell.edu.

Soil moisture conditions are usually suitable for field work if soil from the top three to four inches breaks apart between your fingers instead of forming a ribbon or ball. Excessive soil moisture at planting should be avoided as sidewall compaction in the seed furrow may develop from disk openers slicing wet soil. Also, wet soils that dry after planting could possibly split open and expose seed. Down pressure on planter coulters should be periodically checked as adequate down pressure is influenced by soil moisture and soil type, which will change throughout the planting season.

**Planting Depth**

**Corn.** Corn seed needs to absorb soil water, equivalent to about 30% of its weight, and be exposed to soil temperatures of about 50°F in order to germinate.² Ideal planting depth varies with soil moisture and soil type; however, for most conditions, planting depth should be 1.75 to 2.0 inches.³ A key to corn plant standability is the plant’s nodal root establishment between the seed and soil surface. Seeding deeper than 1.75 inches helps support the development of this permanent root system. Planting less than 1.75 inches deep can result in poor crown development, rootless corn or root lodging.³ Also, shallow planting can increase the risk of injury from some soil applied herbicides.

Planting in dry soil conditions can result in poor seed-to-soil moisture contact within the seed furrow. If soil is dry, it is generally less risky to plant up to 3 inches deep to reach moisture, compared to planting shallow in anticipation of rain. Also, dry soil conditions can increase the potential for uneven emergence between seedlings, which may cause yield loss.⁴ However, planting deeper has risks as well due to the increasing length of time from germination to emergence. Longer time periods until emergence increases the chances for seedling coleoptile and/or mesocotyl damage, seedlings leafing out underground, secondary insect damage, and seedling disease. Corn seedlings will generally emerge after about 90 to 120 growing degree days (GDD).⁵

**Soybean.** Soybean seed requires different planting conditions than corn because at emergence, the growing point is immediately exposed above ground, where the growing point for corn seedlings is below ground until the V6 (six leaf collars) growth stage. Planting soybean seed is generally not recommended until soil temperatures at planting depth are at least 55°F.⁶
Optimal Planting Conditions & Seed Placement for Corn and Soybean

Soybean should be planted at a depth of 1.25 to 1.75 inches, which generally results in a quicker, more uniform emergence. Planting deeper can result in slower emergence, which increases the risk of insect damage and seedling diseases such as Pythium, Phytophthora, Fusarium, and Rhizoctonia.

### Soil Compaction

Minimizing compaction can be achieved by avoiding field work when soil moisture is at or near field capacity. Even one pass over a field under poor field conditions can cause significant damage. Compaction occurs when soil particles are pressed together resulting in decreased pore space and increased soil density. Consider using larger wheels and tires, which allow better floatation, and reduce your tire pressure, which can help reduce the load on the soil. A study at Iowa State University showed that using equipment with 6 pounds per square inch (psi) of surface pressure yielded 9 bu/A more compared to using equipment with 16 psi of surface pressure. Yield reductions from compaction are due to decreases in germination, root and plant growth, and nutrient uptake. Potential compaction can easily be prevented by staying out of the field until soil conditions improve. If mud sticks to the tires and ruts are deeper than an inch, it is probably too wet to be in the field.

### Chilling Injury

Early planted corn and soybean seed can be at risk to chilling injury, also known as imbibitional chilling injury, due to cold soil temperatures at planting. Chilling injury may occur if seed has adequate seed-to-soil moisture contact and absorbs (imbide) cold water or experiences cold temperatures, 24 to 36 hours after planting.

Some common symptoms of chilling injury may include a swollen seed that has not germinated, a fragile or absent primary root, and delayed seedling growth. A specific example of chilling injury in corn can include corkscrewed mesocotyls and/or leafing out below the soil surface (Figure 1). Similar symptoms to chilling injury can also be caused by other stresses during germination such as herbicide injury, disease, or soil crusting.

Waiting for optimum soil conditions and warmer temperatures at planting can contribute to establishing a healthy corn and soybean crop.

![Figure 1. Chilling injury in corn can cause abnormal growth, which results in seedlings leafing out below the soil surface.](image)

Sources:

Web sources verified 12/23/14.

Individual results may vary, and performance may vary from location to location and from year to year. This result may not be an indicator of results you may obtain as local growing, soil and weather conditions may vary. Growers should evaluate data from multiple locations and years whenever possible.

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