



Planting into Dry Soil

Planting crops into dry soil is a difficult decision because seeds require adequate moisture to support germination and seedling establishment. If soils are adversely dry, the “should I” questions arise:

- Should I plant regardless of soil moisture?
- Should I wait until it rains?
- Should I do a tillage pass to rid the field of growing weeds?
- Should I plant deeper into moisture or plant at my normal planting depth?
- Should I cut seeding rates?
- Should I apply weed control herbicides that depend on moisture for activation?
- Should I change seed products?

The answer to these “should I’s” is the vague agronomic answer of “it depends”.

Deciding to plant into dry soil is greatly dependent on many factors including field soil type(s), soil water holding capacity, compaction, tillage and planting practices (conventional vs. conservation), availability of irrigation, near and extended weather forecasts, planting equipment, and seed product(s).

When the calendar indicates it is time to plant and conditions are adequate, putting the seed in the soil becomes a priority. Keep in mind that the ideal planting window is roughly two weeks in most areas, and not a single day on the calendar. In some cases, it might be wise to keep the seed in the shed until seeding conditions improve or rainfall is in the forecast. On the other hand, waiting for adequate rainfall may be non-productive, particularly if several hundred acres need to be planted. Therefore, the likely best approach is to manage any pre-planting factors that are manageable and plant accordingly. Conserving soil moisture after a lengthy dry period should be a consideration. Tillage should be limited as each trip results in surface moisture being lost. An herbicide burndown may be a better option for weed control compared to a tillage operation. If equipment is available, consider switching to no-till or strip-till planting as these methods can help reduce the loss of available soil moisture.

Weather Forecasts

Weather forecasts, regardless of soil moisture content, can be used to help determine a planting date. A forecast for continued dry weather for a week or more is likely a sign to plant before additional soil moisture is lost. A forecast for rain could be a sign to plant or wait dependent on the forecasted amount. Light rain could be a go for planting, while forecasted heavy rainfall could be a sign to wait because of potential crusting after planting.

Planting Depth

Each soil has its own drying properties and water holding capacity. Under the same conditions, the soil surface to several inches deep in sandy soils can be quite dry while clay and loam soils may be adequate for germination.

Ideal planting depth for corn is about 1.5 to 2 inches deep. When planting into dry soil, our agronomists recommend going deeper, roughly 3 inches. Research from Iowa state has suggested planting 3 to 3.5-inches deep in clay soils, 4 to 5-inches deep in loam soils, and 5 to 6-inches deep in sandy soils can be considered.⁶ Planting deeper can add additional stress and prolong the time for emergence because of cooler soil temperatures at the deeper

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depths, particularly if air temperatures are cool. Therefore, fungicidal, and insecticidal seed treatments and/or soil insecticides should be considered to help reduce potential disease and insect stress. Planting deeper usually brings concern about crusting should a heavy rain occur; however, if the soil is prone to crusting, it likely doesn't matter if the seed was planted 1.5 inches deep or 3 inches deep.¹ Corn seeds need to absorb about 30% of their weight in soil water for germination to begin and be sustained through emergence.² Seeding depth should be routinely observed to help ensure seeds are uniformly placed into available moisture as 8 to 10% yield loss can occur.³

For soybean, planting depth under favorable conditions is around 1 to 1.5 inches deep. Planting soybean seed deeper is more challenging because the hypocotyl pushing the cotyledons to the soil surface can snap if hard crusts develop. However, moisture is critical because the seed must imbibe 50% of its weight in moisture for germination to begin and remain above 20% through seed coat splitting.⁴ If deeper planting is necessary, consider planting the largest seeded products on hand as they have more stored energy and may have a greater potential for emerging from the greater depth. However, bigger seeds have larger cotyledons that must be pushed or pulled through any crust. If the soil is prone to crusting, this should be considered.⁴ Selecting soybean products with characteristically high emergence and vigor scores can be an added advantage for deeper planting.

Sources:

¹ Nielsen, R.L. 2021. Soil moisture and corn seed depth. ENTM Extension Newsletters. Pest & Crop Newsletter. Purdue University. <https://extension.entm.purdue.edu/>.

² Hoefft, R.G., Aldrich, S.R., Nafziger, E.D., and Johnson, R.R. 2000. Modern corn and soybean production. MCSP publications, Champaign, Illinois.

³ Luce, G.A. 2016. Optimum Corn Planting Depth - "Don't Plant Your Corn Too Shallow." Integrated Pest Management. University of Missouri Cooperative Extension. <https://ipm.missouri.edu/IPCMI/>.

Seeding Rates

Seeding rates for corn should remain close to normal in the Corn Belt where rainfall is usually expected. Reducing the seeding rate during a dry planting season has the potential to reduce yield should normal to near-normal rainfall occur during the growing season. In non-irrigated dryland areas, particularly on coarse textured soils that are prone to late summer drought, seeding rates may need to be reduced, possibly to around 15,000 seeds/acre to help provide each plant with as much soil moisture as possible.⁵

Soybean seeding rates may need to be increased if planting deeper into dry soils because of the risk of hypocotyl breakage and loss of cotyledon energy before reaching the surface. How much depends on the soybean product, seed size, planting equipment (drill vs. planter), and planting depth needed to reach uniform moisture. Additionally, soybean plants can compensate for lower populations by adding branches and pods. Your seed supplier can provide guidance regarding planting rates under adverse conditions.

Seed Products

The ability to switch products at planting time is greatly dependent on seed supply. Yield goals are established by selecting adapted products with the agronomic traits generally required for each field. Switching to a more drought tolerant or "defensive" product at planting time because of dry soils could be counterproductive. Generally, keeping the original adapted seed is the best recommendation.

⁴ Staton, M. 2016. Soybean planting depth matters. MSU Extension. Michigan State University. <https://www.canr.msu.edu/>.

⁵ Bean, B. 2010. Dryland corn in the Texas Panhandle. Texas Cooperative Extension. Texas Agricultural Experiment Station. The Texas A&M University System. <http://agrilife.org/>.

⁶ Elmore, R. 2013. Corn planting FAQs. Iowa State University. <https://crops.extension.iastate.edu/>.

Web sources verified 4/28/21.

Legal Statement

ALWAYS READ AND FOLLOW PESTICIDE LABEL DIRECTIONS. Performance may vary, from location to location and from year to year, as local growing, soil and weather conditions may vary. Growers should evaluate data from multiple locations and years whenever possible and should consider the impacts of these conditions on the grower's fields.

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