

Laura Sharpe, Agronomy Information Consultant

KEY POINTS

- Evaluate every field for soil moisture conditions before starting any field work. Use the simple “ribbon” test to determine soil conditions and fitness.
- Determining when the soil is fit to work or plant in the spring is a key skill to growing high yielding crops.
- Tillage and planting operations are best done when soils are dry enough in the top 3-4” of soil that they do not form a ribbon with normal compression forces from your hand.

HOW TO DETERMINE IF SOIL IS FIT FOR FIELD WORK

- The following soil test is a quick method to accurately gauge if soil is ready for spring tillage and seedbed preparation.
- Take your trowel and dig down 3 to 4 inches into the seed bed.
- Grasp a handful of soil from the trowel and squeeze it together with your hands; be firm, the action of a cultivator or disk is not gentle.
- Try to break apart the ball and assess how friable the soil is.
- If the ball is easily broken down to its original crumb structure, the ground is fit to work.
- If any of the following are true, the soil is too wet:
 - The soil smears together
 - The ball of soil sticks together
 - Soil feels tacky
 - A ribbon forms when squeezed between your thumb and forefinger (as shown in Figure 1)
- If water comes out of the ball when you squeeze it, the soil is much too wet to be worked or planted.



Figure 1. (Left) Soil that is too wet to plant, as it forms a ribbon when squeezed between your thumb and forefinger. **(Right)** Soil that is fit for field work when it crumbles when pressed.

WHAT HAPPENS WHEN SOILS ARE WORKED OR SEEDING WHEN THEY ARE TOO WET?

- Planting into wet soils or working soils too wet can cause smearing of the seed furrow sidewall, sidewall compaction from the disk openers, and a seed trench that does not close (see Figures 2-4). This can cause uneven crop emergence.
- Compacted soil restricts corn and soybean root systems and causes uneven emergence. Restricted nodal root systems will reduce the plant's ability to uptake water and nutrients, lowering yield potential (see Figure 5).



Figure 2. A soil that was too wet to plant, leaving the seed trench open and the seed exposed.



Figure 3. Wet soils at planting can lead to sidewall smearing that restricts optimum nodal root growth and yield potential. Note that the roots of this corn plant are running horizontally along the seed trench.



Figure 4. Planting into wet soils caused an open seed trench resulting in uneven emergence and poor stands. Arrows indicate emerged corn plants. *Photo from Paul Hermans, Agronomist.*



Figure 5. The roots on the left are from a plant that experienced sidewall smearing – notice how the roots are concentrated directly underneath the stalk and do not branch out horizontally. The roots on the right show what normal roots look like – notice the greater root mass and more even distribution across the area.

WHAT ABOUT A DRY SPRING?

- Dry soil in the spring is less susceptible to impacts of equipment traffic, such as compaction and ruts in the field.
- However, soil disturbance increases the potential for soil erosion after any rain events and the loss of soil organic matter, topsoil, and nutrients.
- Inspect the top 6 inches for soil moisture status and plan to minimize tillage unless it is absolutely necessary.
- Minimizing tillage passes can save as much as a quarter of an inch of water per pass (Al-Kaisi, 2020).

HOW TO TELL WHEN SOIL IS READY FOR FIELD WORK

- Soil should be dry enough in the top 3-4 inches that it does not form a ribbon with normal compression in your hand.
- Soils in proper condition for seedbed preparation should crumble between your fingers and have favorable tilth. These properties will optimize early growth and minimize soil compaction.
- Soil moisture conditions can change between the time the seedbed is prepared and planting begins in the field.
- If soils become wet, be patient and allow them to dry out. Try to work fields as close to planting operations as possible.

HOW TO TELL WHEN SOIL IS READY FOR PLANTING

- When you walk on a field prior to planting, your boots should not sink into the soil more than an inch.
- The goal of spring tillage is to prepare a seed bed. Ideal seed beds are firm. A very loose seedbed will result in uneven emergence, poor nodal root establishment, potential for root lodging in summer storms, less root mass for periods of drought, and lower yields.

REFERENCES

- Al-Kaisi, M., M. Hanna, and M. Tidman. 2002. Field Observations are Key When Planning Spring Work. Integrated Crop Management. Iowa State University Extension and Outreach. <https://crops.extension.iastate.edu/encyclopedia/field-observations-are-key-when-planning-spring-work>
- Al-Kaisi, M. 2020. Consideration for Tillage Decision this Fall After Drought. Integrated Crop Management. Iowa State University Extension and Outreach. <https://crops.extension.iastate.edu/cropnews/2020/10/consideration-tillage-decision-fall-after-drought>

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