

Compaction Issues When Planting Into Wet Soils



DR. EDWIN RITCHEY AND DR. LLOYD MURDOCK

PRINCETON, KY.

This spring many farmers are facing wetter than desirable planting conditions. This may lead to trafficking the fields when the soil conditions are too wet leading to soil compaction based on the need for timely planting. Compaction results when the soil is compressed into a smaller volume. There are three main causes of compaction. These causes of compaction result from tillage, traffic, and planting. In most soils, the greatest amount of compaction occurs when soil is near field capacity. If a soil is wetter than field capacity, ruts and rearrangement of soil pores can occur. This is not desirable, but it is not considered compaction.

Compaction can be caused by a tillage implement exerting downward pressure on the soil. This is most commonly associated with intensive tillage, such as moldboard plowing and/or multiple discings. Hopefully at this point in the season, most of the intended tillage has been accomplished and should not be an issue. Traffic compaction is influenced by axial load, tire pressure, and the number of passes. With many producers utilizing large tillage implements and planters, the potential field area compacted is relatively small compared to the total field size. The compaction that would occur due to planting traffic would also be between the planted rows and would have relatively little affect on overall plant growth.

The main compaction issue that producers may be facing at this point will be sidewall compaction, especially with the wetter than normal

conditions and more precipitation likely to come. Producers maybe feeling the pressure to finish corn planting and start planting soybeans and might “push” planting operations. Sidewall compaction results from planting when the soil is a little too wet and is due to the planter’s opening discs smearing the sidewall of the planter furrow. The trailing press wheel can also increase compaction with its downward pressure. If the soil stays moist during germination then the roots can penetrate the compacted soil at the furrow wall and establish a root system. However, if the soil dries and hardens after planting the roots are not able to penetrate the sidewall since there are no pores or cracks present for roots to utilize. When this situation occurs, plant roots grow predominately within the planting furrow along the direction of the row. Although plants may look normal at emergence, they will begin to show problems associated with nutrient and drought stress after the corn is several inches tall. This problem can be more common in no-tillage as these soils have better structure and are easier to traffic in a wetter condition.

Sidewall compaction can be prevented by delaying planting until soils are sufficiently dry. If you can mold the soil into a ball in your hand and the soil ball will not easily crumble, then it is too wet to plant. Some implement manufacturers offer spiked closing wheels that are designed to disrupt the sidewall as it closes the soil around the seed, giving plant roots a “channel” to penetrate the sidewall. These types of spiked closing wheels have not been tested by the University of Kentucky, but the idea of disrupting the smeared sidewall is sensible. Unfortunately, there are no good options to alleviate sidewall compaction if present. When conditions are unfavorable for roots to penetrate the sidewall after emergence, they will likely continue to grow in the plant furrow. The best option to deal with sidewall compaction, and all other forms of compaction is prevention. △

DR. EDWIN RITCHEY AND DR. LLOYD MURDOCK: Extension Soils Specialists, University of Kentucky