Steps to avoid soil compaction

Fortunately, most of the corn and soybean fields were harvested before the strong winds and heavy showers came through the area about a week ago. However, it is estimated that 5 percent of the cornfields and 20 percent of the soybean fields still need to be harvested.

Some cornfields experienced wind damage, which will slow down the harvest. However, field conditions may be the biggest factor in slowing down the harvest. Any significant rain may prevent equipment on the field and the colder temperatures will delay field drying.

In some instances, farmers may have to wait until the ground freezes to harvest. During the wait, yield losses may occur from plant lodging, dropped ears, and pod shattering.

Besides harvest, field conditions may affect tillage activity, fertilizer application, and herbicide spraying.

Farmers can put off some fall activities, such as fertilizer application and herbicide spraying, until next spring. However, they need to get the harvest done, which may cause work on marginal conditions. Farmers will have to consider the consequence of working on too wet of fields, which may lead to soil compaction.

Compaction changes the physical structure of the soil. It occurs when soil particles are compressed together, reducing pore space. As pore space shrinks, the ability of water to move down through the soil is reduced, which may cause more surface runoff.

Compaction will also reduce the ability of soil to store water, which may become evident during dry years. In addition, the reduction of pore space will affect root development at critical growth stages by decreasing the amount of oxygen and available water and nutrients in the rhizosphere, which may result in yield losses.

Ruts in a field are evidence of soil compaction. Machinery and vehicles with heavy loads that cause deep rutting will often cause subsurface compaction. Axle load is a determining factor in the overall depth of soil compaction. The risk and severity of compaction increases when field activities occur on wet soils.

The best way to avoid compaction is to minimize field activities when soil conditions are marginal. The Ohio State University Extension agricultural engineers recommend the following steps to reduce compaction under marginal soil conditions:

- Use a controlled traffic strategy to minimize the amount of field traversed by combines and grain carts. Most damage occurs with the first pass of the machine.
- Make sure tire pressure is properly adjusted for the axle load. Larger tires with lower air pressure allow for better flotation and reduce pressure on the soil surface. Larger tires that are properly inflated increase the “footprint” on the soil (pressures for road travel should not be the same as field travel).
- High inflation pressures lead to more serious compaction events.
- Minimize filling grain carts to maximum capacity, thereby reducing overall axle load.
- Hold off on soil tillage operations until soil conditions are drier. Tilling too wet soil can cause issues as well and not accomplish the intended results of tillage, leaving large and hard clods.
- Collect machine data to evaluate trafficked areas after harvest. This data can identify where multiple passes of equipment occurred and where areas need to be deep-ripped in the future.
- Where funds allow, consider making the switch to tracks from wheeled tractors and carts. Tracked machinery and equipment distribute weight more evenly and cause less damage than wheeled vehicles.

If possible, farmers need to avoid soil compaction during field activities. Compaction, especially subsoil compaction, may reduce crop yields many years after the initial damage. Oftentimes, it is difficult to restore a soil to its original structure and form after compaction.

Fortunately, farmers generally do not cause severe compaction. All of us have seen the effects of severe compaction, such as abandoned rail beds and roads, and installation of pipelines. In fact, Ohio State University has a current research study investigating the long-term effects of compaction on crop production from pipeline installations across fields.

Additional information may be found on soil compaction at https://acerops.osu.edu/special-ization-areas/soil-compaction and https://extension.psu.edu/effects-of-soil-compaction

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