Dealing with wet soils

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Dealing with wet soils

Abstract
Wet spring--good or bad? Above average snowfall and spring rains have replenished both topsoil and subsoil moisture across Iowa. This spring, Iowa's overall topsoil moisture is rated 4 percent short, 73 percent adequate, and 23 percent surplus. Subsoil moisture rated 5 percent very short, 22 percent short, 63 percent adequate, and 10 percent surplus, representing a substantial improvement over last fall's ratings, when nearly 90 percent was cited as short or very short. However, the amount of moisture received this season is a mixed blessing: it is needed but it also is delaying fieldwork.

Keywords
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**Assess field moisture conditions**

Use the information in Table 1 to estimate soil moisture levels. When dry enough to be tilled, a ribbon of soil pushed out between the thumb and index finger will break before it reaches 5 inches in length. Likewise, soil made into a ball will break apart when thrown into the air. If the soil is too wet, it is more "plastic" and fails these tests.

Note that soils with different textures respond differently to moisture conditions. Under wet conditions, clay loam and silty clay loam textured soils create more tillage challenges than soils with less clay such as silt loams, loams, and fine sandy loams, because coarser textured soils increase the potential for infiltration if the soil is not saturated.

**Watch for problems associated with wet soils**

Wet soils make fieldwork difficult by restricting the mobility of equipment and by damaging soil structure, thereby reducing crop production. Excess soil moisture also can impact water quality by leaching soluble chemicals such as nitrates.

Under wet soil conditions, heavy tractors can facilitate soil compaction. Once the soil is compacted, tilling the soil leads to the formation of nonuniform, large-sized soil clods that can have a negative impact on seedbed preparation due to lack of soil uniformity, which prevents consistent coverage of seeds.

Compaction near the surface (within 3 to 6 inches) is generally associated with the amount of surface pressure. Compaction at deeper depths is primarily associated with axle (tractor or heavy implement) weight. If soil a foot below the surface is at field capacity and the tractor's axle load is 7 to 8 tons or greater, compaction can occur at this depth despite lower surface pressures.
Because compaction reduces pore size in the soil (by "crushing" soil particles closer together), surface water penetration down into the soil profile is reduced compared with noncompacted soils. As a result, surface water runs off, causing soil erosion, and this runoff carries sediment, nitrates, phosphorus, and other nutrients to water bodies.

**Modify planting and tillage plans**

Try waiting it out, but watch the calendar. Generally, crops planted within 8 days of May 5 are influenced by conditions other than planting date.

Some possible solutions to the problems associated with wet soils include minimizing or eliminating tillage. To switch to a minimum tillage plan, perform only those tillage operations that are absolutely necessary, for example, for field leveling, weed control, or fertilizer incorporation. If seedbed preparation times become too compressed, producers can establish a crop with little (field cultivate then plant) or no tillage (no-till planting).

Wet conditions also may cause delays for those who have not applied nitrogen. Nitrogen application by itself should not compact soil; however, the tractor pulling the applicator may compact the soil. Because of the risk of compaction and a high likelihood of ammonia loss (due to poor soil coverage after application), the best strategy for nitrogen application is to wait until conditions are workable to avoid soil damage and significant nitrogen loss.

Wet springs happen. But a careful evaluation on a field-by-field basis and some modifications of tillage and planting strategies can help in dealing with wet soil conditions and in protecting water quality. For updated soil moisture levels across Iowa, or for a specific region, contact Iowa Agricultural Statistics at 800-772-0825 or e-mail nass-ia@nass.usda.gov

**Table 1. Guide for judging how much moisture is available for crops according to soil texture.**

<table>
<thead>
<tr>
<th>Soil Moisture Available</th>
<th>Medium (Coarse) Texture</th>
<th>Medium (Fine) Texture</th>
<th>Fine and Very Fine Texture</th>
</tr>
</thead>
<tbody>
<tr>
<td>100 percent soil moisture</td>
<td>Upon squeezing, no free water appears on soil but wet outline of ball is left on hand</td>
<td>Upon squeezing, no free water appears on soil but wet outline of ball is left on hand</td>
<td>Upon squeezing, no free water appears on soil but wet outline of ball is left on hand</td>
</tr>
<tr>
<td></td>
<td>1.8 in./ft</td>
<td>2.2 in./ft</td>
<td>2.0 in./ft</td>
</tr>
<tr>
<td>75 percent available soil moisture remaining</td>
<td>Forms a ball, is pliable</td>
<td>Forms a ball, is pliable, sticks readily</td>
<td>Easily ribbons out between fingers, slick</td>
</tr>
<tr>
<td></td>
<td>1.35 in./ft (0.5 in./ft)</td>
<td>1.65 in./ft (0.55 in./ft)</td>
<td>1.50 in./ft (0.5 in./ft)</td>
</tr>
<tr>
<td>50 percent available soil moisture remaining</td>
<td>Forms a ball, somewhat plastic</td>
<td>Forms a ball, somewhat plastic, will stick slightly with pressure</td>
<td>Forms a ball, ribbons out between thumb and forefinger</td>
</tr>
<tr>
<td>--------------------------------------------</td>
<td>-------------------------------</td>
<td>-------------------------------------------------</td>
<td>--------------------------------------------------</td>
</tr>
<tr>
<td></td>
<td>0.9 in./ft (0.9 in./ft)</td>
<td>1.1 in./ft (1.1 in./ft)</td>
<td>1 in./ft (1 in./ft)</td>
</tr>
</tbody>
</table>

Numbers in parentheses represent the amount of moisture depleted or "lost" from the soil.

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