



Winter 2005-2006, No. 5

### WET SPOTS IN YOUR FIELD—COULD IT BE SOIL COMPACTION?

**Have you observed wet spots in your fields after normal rainfall, particularly in areas that are not low-lying or depressions in the landscape?** Do your plants seem to have retarded or slowed growth in certain areas in your field, and are the patterns associated with tillage, tractor wheel traffic, or harvesting patterns made by combines, grain carts, or pickers? If you have seen these signs, you may be witnessing the symptoms of soil compaction.

**Poor crop root growth impairs the ability of plants to acquire nutrients and moisture for rapid development and high yields.** Nutrient levels can build in such spots and complicate soil sampling and testing results. A number of factors can contribute to reduced root growth: strong soil acidity, low soil phosphorus levels, nematodes, insects, diseases, and cold, wet, or dry conditions...or combinations of these factors. Probably the most overlooked factor impairing root growth is soil compaction.

**Soil compaction can occur throughout the surface layers into the subsoil under severe conditions of heavy trafficking, especially when equipment is used during overly moist soil conditions.** Tillage compaction...most often from disks...tends to occur within the surface foot, often within the top 4 to 8 in. Tillage compaction can result in a compacted layer a few to several inches thick, but usually extending less than a foot into the soil. Sometimes where there is a sharp increase in clay content (especially in soils with a sandy surface texture) soil strength or bulk density can be high, resulting in reduced downward root growth and an abrupt horizontal root orientation.

**Diagnosis of soil compaction problems by skilled agronomists often involves use of soil penetrometers to measure the degree of resistance to soil penetration.** Or sharpened steel rods with cross-handles can be used to detect resistance to penetration pressure. A sharpshooter or shovel may also be effective to excavate roots during the active growing season, or before the root systems decompose at the end of the season. Such diagnoses are best accomplished under field-moist soil conditions. Proper identification of the degree of compaction, and the soil depth at which it begins and ends, can guide appropriate tillage to improve rooting volume. In no-till, strip-till, and ridge-till systems, it is usually desirable to avoid surface disturbance, to protect the crop residues and organic matter that have accumulated on the soil surface. Minimizing surface disturbance can help reduce erosion and maintain desirable soil quality.

**One of the best tell-tale signs of compaction is extended puddling of water on the soil surface after a rain shower.** If this is recognized, farmers and crop advisers will want to explore the causes by probing. If observations during the growing season do not expose such spots because of limited rainfall, you may want to consider some probing or digging during the fall and winter, to be sure that soil compaction does not limit your crop growth in the next season. With increased fuel prices and fertilizer costs, it is important to minimize or eliminate all factors that could limit crop root growth. Correcting soil compaction can encourage better rainfall and irrigation water infiltration, improved soil moisture storage, and greater plant water availability. Elimination of soil compaction in the fall is also a great way to make your fertilizer investment stretch farther. Probe, dig, and disrupt root growth limitations this fall for good results next season. Benefits will be seen in higher yields and a more efficient production system.

—CSS—

For more information, contact Dr. Cliff S. Snyder, Southeast Director, PPI, P.O. Drawer 2440, Conway, AR 72033-2440. Phone: (501) 336-8110. E-mail: [csnyder@ppi-far.org](mailto:csnyder@ppi-far.org).