

Don't Overlook Compaction As A Yield Robber

NORCROSS, Ga. — The Symptoms of soil compaction often go unnoticed until harvest. Without close inspection of the root system, or soil probing to evaluate resistance to penetration, it is difficult to determine if compaction has been a silent yield robber. There are some secondary symptoms that can help provide clues to this hidden problem. Early wilting in field is a tell-tale sign when other fields, or areas in the same field, fail to show indications of drought stress. Slow water infiltration and percolation after rainfall, in areas where surface drainage is not a limiting factor, can also be a clue that compaction exists.

Compaction is often caused by heavy equipment and tillage, when the soil is trafficked at improper soil moisture levels. In some soils, compaction occurs where the sandier

surface soil meets the subsurface soil layer having a higher silt and clay content. It can range from slight to severe and usually is encountered at the bottom of the normal tillage depth. If a disc is the tillage tool, compaction often begins 4 to 6 inches deep and may extend to 8 or 9 inches. In plowed and chisel plowed fields, the compaction usually begins at 8 or 9 inches deep and can extend to the 12 to 15-inch depth.

Root penetration and aeration are decreased in compacted soils. Compaction reduces root access to potassium, nitrogen, phosphorus, and other nutrients. It slows soil warming in the spring, can increase denitrification losses of nitrogen, and indirectly contributes to increased erosion potential by causing greater runoff. Increases in fertilizer rates can partially compen-

sate for reduced nutrient utilization efficiency, but are really only a temporary solution where opportunities exist to disrupt compacted soil layers with appropriate tillage. Banding or row-applying fertilizer can also help offset reductions in root access to nutrients in compacted soils.

Subsoiling to disrupt compacted soil layers can increase corn yields as much as 20 to 30 bushels per acre for some soils. Wheat response can parallel corn response. While soybeans are often considered less responsive, yield increases can exceed 10 bushels per acre. Recent work in the Mississippi Delta on certain silty clay and clay soils showed soybean yields increasing from 18 bushels per acre without subsoiling to 41 bushels per acre with fall subsoiling, followed by a dry growing season. since the effectiveness of

subsoiling varies, local research results should be reviewed before this practice is implemented.

A diversity of subsoiling equipment is available and being used where compaction has been recognized. Offset shanks, sometimes preceded by rolling coulters, can be used where reduced tillage and no-till systems are in place, to avoid heaving large clods on the surface and to minimize disturbances of crop residues. Subsoiling in a dry fall and avoiding further tillage before planting, especially with a disc, shatters compacted soil layers and may provide the greatest potential responses. If reduced-tillage or no-tillage is practiced for many years, earthworm activity and increased organic matter levels can improve soil aeration and help minimize compaction effects. However, compaction can still occur and may need to be disrupted. Use of controlled traffic patterns minimizes the damaging effects, whether in a no-till or tilled system.

Soils should be probed to see if compaction is present, roots and rooting depths should be examined and subsoiling or deep chiseling should be considered. Growers should contact their crop advisers, Extension specialists, or Natural Resources Conservation Service offices for more information on the elimination of soil compaction. Plan now for improved crop performance in 1999.

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

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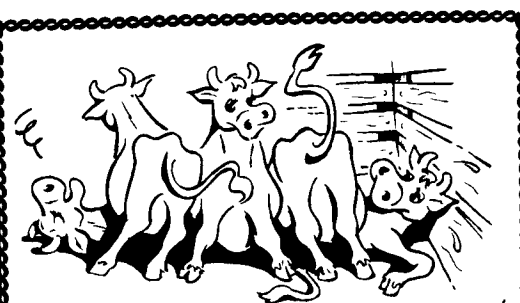
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