

## Another Look at Why Dealing with Soil Compaction is Important Across the Eastern and Western Corn Belt – First in Series of “*What Strip-Till Can Do For You*”

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Any way you look at it, compaction is a trouble maker for crop production and getting anywhere for solid top yields that make you a decent economic return. For some who put subsoil ripping into their seedbed preparation practices they feel as though they have taken care of the problem. That can be a yes or a big not quite. It is inevitable that getting the crop planted and that it works hard at growing in compacted soils will suffer (as seen in the very stunted picture of corn roots). A root system like shown in Figure 1 is going to take water badly, be susceptible to heat stress, crust badly, be liable to fall over or lodge in the fall, have dramatic kernel set drop-off and potential soil erosion problems.



**Fig. 1** Stunting of roots due to soil compaction

Right now, springtime 2009, growers are eager to get into the field if spring soil preparation is looming in growers faces and



**Fig. 2** Ponding of water at edge of alfalfa due to compacted soils

soils or clayey textured soils, compaction even from one event will slow downward water movement 15-20X that of a well structured, porous and ameliorated soil.

What can occur with excess rain over and above the soils total water holding capacity to the depth of the tillage pan/compacted layer – runoff or ponding. Runoff starts when all the pores in the soil are filled with water. In the course of a high intensity rain event, runoff will start after rain has thoroughly soaked the soil, it will increase until it stabilizes at a level corresponding to the absorption capacity of the soil. This simply means that the tilled horizon has reached saturation, so that the macropore storage capacity of this horizon or layer is filled to overflowing. If the underlying horizon is near impervious due to a compaction, the amount of runoff will correspond precisely to that of the rainfall; there may, however, be a certain residual absorption capacity corresponding to that of the plough pan. When the surface soil layer is totally

get that field ready to pull the planter in and plant. But it has been wet off and on, just about to become nail biting time and last fall you struggled to get the corn or beans out – compaction could be a problem in some areas.

So why might you be concerned? First, as seen in the root picture, compaction will cause problems with root penetration and growth. Next for those of you applying water via irrigation, water intake, water percolation and downward movement is dramatically restricted. How does that work? Whether you are farming sandy

saturated, any drop of rain will run off unless all surrounding portions of the field are higher in elevation, we will then have ponding. The compacted layer will not allow water from the saturated zone above until a hydraulic head potential is met, finally forcing water through much finer sized pores to finally soak below the compacted zone. During heavy rain or irrigation events with soils compacted at 6 inches below the soil surface, the saturated soil above the compacted depth will become fluid then flow towards a point of less resistance, downhill, into a gully, down a crack created by a shank or chisel or plow, taking silt and clay particles with it – the ugly ‘E’ word - erosion. The gully or massive sheet erosion will go as deep as the compacted layer and move thousands of tons of material.

We can dig under the compacted zone no more than 3 inches two days after the rain event and find that soil below the compacted layer just moist and then dry below that. Adequate soil porosity, remnant or native vertical soil structure is vital to the subsurface and subsoil to absorb or take water. When a man-induced compacted layer is not managed with proper tillage methods at the right time and soil moisture and set of tools or tool, compaction is a bear to contend with.

We at Orthman Manufacturing realize that soil compaction has been and continues to be the farmer’s nemesis to raise better crops all across the Eastern & Central to the Western Corn Belt. Orthman has implements such as the Soil Shark the In-Line ripper and the 1tRIPr to give the grower options in dealing with soil compaction. These tools are designed for two different main purposes. They both can offset the negative effects of soil compaction. The 1tRIPr is not a ripping tool to go deeper than 11.5 inches, it is not a tool to shatter a pan from the left side of the toolbar to the extreme right side of the toolbar. It is our strip-till bar for creating a compaction free zone in a strip or band of 8 to 10 inches wide on specific row spacings of 22”, 30”, 36”, 38” or 40”. The Soil Shark is designed to shatter larger bands or widths to greater depths up to 18 inches deep depending upon spacings between shanks. Closer the spacing, the more shatter across the entire width of the toolbar. For more complete details of how subsoil rippers work we suggest you go to your states Cooperative Extension bulletins on Soil Compaction and it’s alleviation.

Water is like the master key to soils being productive, managing your soils in all your fields to absorb as much water as possible, as quick as possible to fill the profile from top to rooting depth and deeper is a grower’s sincere challenge. Using better tillage management like strip-till or direct seeding do is a secret worth learning and knowing more about. Those of you in dry country and see those big thunderclouds each late spring and throughout the summer want that cloud to drop a shower and leave the hail somewhere else. But as per normal, there is a dump of rain, 3 inches in 45 minutes and poof, gone! Can your soils take it? With strip-till and good residue management, managing soil compaction well – it can be all yours to soak up.

Talk to your local Orthman dealer, they have a good understanding of what the 1tRIPr will do for your soil management program and those rains a-coming.