



ADVANCED AG SYSTEMS'

Crop Soil News

<http://www.advancedagsys.com/>

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"It is the crops that feed the cows that make the milk which creates the money."

Getting Out of Rut-ville.

The wide spread soggy conditions that started in mid-July have continued through harvest across most of the New England, Mid Atlantic, and upper Midwest dairy region. The corn silage was too dry to harvest and fields were too wet to drive. Dump wagons off loading at the edge of the field, tractors pulling trucks as the chopper fills them, broken chains and cables were common sights as they tried to get the harvest. The end result is tremendous amount of soil compaction across all soil types. It happened, now how can we correct it. Sort of like the bumper sticker that was around when the movie Titanic was out: The boat sank, get over it. We need to go from here forward. You have a yield limiting problem in your fields. Work in Canada found some damage is permanent – compaction greater than 20 inches. The ruts may not be that deep but the **damage starts at the bottom of the rut and goes down from there** (see picture at lower right). Before you start ripping and tearing, you need to understand what is going on in the soil. Just ripping, **you can start to correct the damage or make it much, much worse.**

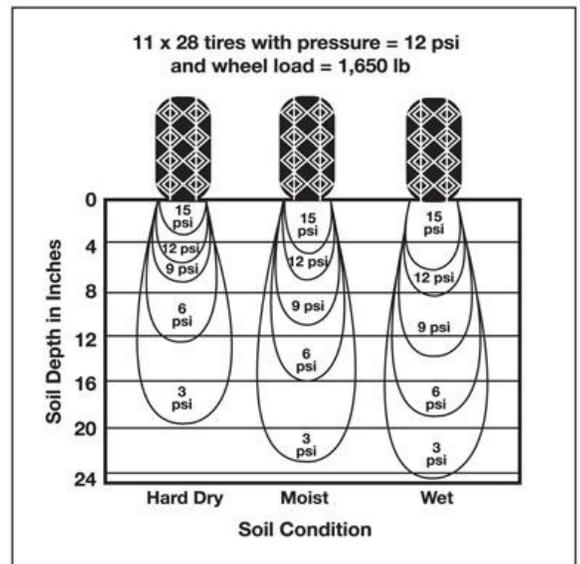


As farmers struggled to chop to dry corn on to wet fields, the results were clear to see. To undo the damage and reduce the yield reduction on future crops takes planning and strategic cropping.

Advanced Ag Systems
Research, Education, Consulting

The best educational meeting I have ever attended in my 44 years of agronomic research and working with farmers, was the Innovative Farmers Soil Compaction meeting in Ontario two years ago. Fortunately, they recorded it all. Go to <https://www.ifao.com/> website and scroll down to the soil compaction tests. Look at all the video, especially Matthias Stettler discussion of the impact of compaction, before you touch your field.

Hooking up to a deep ripper and blowing a lot of black smoke is not removing compaction. In New Zealand researchers state, *"Deep tillage without a change in the rest of the tillage/planting system is a waste of time."* If



If your tire sunk 12 inches into the soil then the above tire graphic starts there and the compaction goes 24 inches deeper. The deeper compaction may never be removed. Duiker (2004).

you do not have the deeper layers dry and friable, **deep tillage will make the damage many times worse**. Not only will you have vertical compaction, but the tillage unit working wetter sub soil will then put in lateral compaction (photo at right). You will basically be turning the lower soil structure to the consistency of cement blocks. Continuing to plant corn and simply running a deep ripper through will leave your soil permanently crippled and yield limiting.

Dig a hole before you rip, and see where the compaction starts and finishes. The deep tillage needs to be 1 – 2 inches deeper than the compaction in order to lift and shatter the profile. In my field tests, anything less will just cut a compacted groove in a compacted layer (see photo at right), and nothing is accomplished for your time and investment although it looks great from the tractor seat. Check around the field as wetter areas may be deeper and drier are shallower.

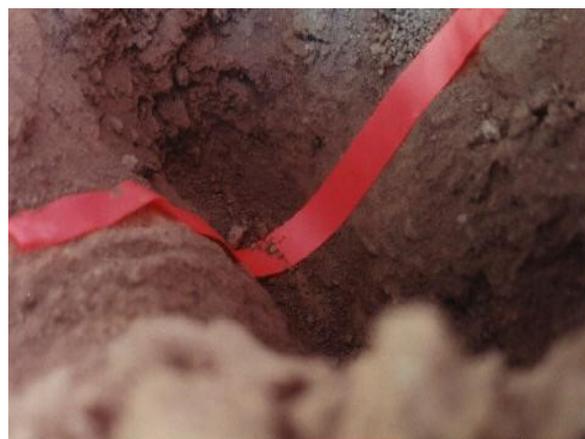
Research has found **frost will NOT remove compaction**. What is lifted by the frost settles to the same density after thaw. A more effective system is a holistic approach with a **mix of pre-prescription tillage and fibrous deep-rooted crops**. The latter is critical. If you loosen the soil and plant corn, there is nothing to stabilize it, and structure will collapse again worse than before. Just like if you pick up a stone and let it go, it falls to the ground; lifting the soil to reduce compaction will simply collapse, especially with the next pass, unless you are doing something to hold it open. It needs to be a process over multiple steps, integrated with deep and fibrous rooted crops that will sustain the tillage effort. The stabilizing crop (not corn or soybean) bridges the gaps like miniature structure I beams, and helps to hold open the voids you created.

Unless your area has a very dry spring (not much snow to melt and rainfall deficit after) you will **not** be able to remove any compaction early next spring. As soon as the ground is friable simply work the top 6-7 inches with a chisel and plant. **Resist the temptation to run the chisel as deep as it can go**. First, the lower layers are wet and you will assure the lower layers laterally compact to the consistency of a paved interstate even if the top looks nice. Second, when you operate deeper than the vertical portion of the curve of a chisel, you are now pushing down and out, not lifting up. This compacts the soil further and I have seen it make **compacted curled bricks** of the field. I would **NOT use a disk to finish** behind the chisel as this will leave a root limiting disk pan at 4 inches. Most of farmers I work with have switched to levelers attached to the chisel for one pass preparation.

You will not remove the compaction in one swoop. It will take a repeated treatment over time. Rotation will be a huge help as perennial crops' roots will grow in times when the soil is softer and they could help penetrate. **Do not think that simply planting a few months of tillage radish is going to magically cure all your issues**. With the damage I have seen over multi-states, this will hardly scratch the surface of the problem. On the flip side, rotations do not mean taking your corn



If the lower soil profile is too wet, not only will you NOT remove vertical compaction, you will add lateral compaction to assure a poor crop



Not looking before you rip will just cut a groove in the compaction. It looks great from the tractor seat but you accomplished nothing.



Willy-nilly deep ripping can turn your soil into a collection of bricks and cement blocks with little life, restricted air and water, and poor yields for a long time.

ground out for 10 years of hay. You need to maintain your diversified forage system. Short term rotations can allow you to target compaction amelioration to damaged fields while simultaneously maintaining the quality and quantity of forage needed.

Cropping rotations

The most critical part is to PLAN a system for opportunities to remove compaction. **Sod type crops alone will NOT remove compaction.** We dug in an alfalfa timothy stand that had been in for 15 years. We could still see the plow marks and there was NO roots below the 7 inches (photo at right). You still need to grow corn for energy. Swap out sod fields to corn as they hopefully were not compacted and rutted during harvest. They will also give 15-20% higher yield than corn follow corn.

One system for very damaged fields is to leave them until after first cutting haylage. Usually the soil is much drier then. Deep tillage and then plant BMR brachytic dwarf type sorghum (brachytic has better standability) in narrow (15 inch or drilled at 8 – 10 lbs. seed/acre) rows. Sorghum has a very different root system than corn. They are very fine, and excel at penetrating deep into the profile to give stability to the recently loosened soil. As this crop can come off earlier than corn, you can deep till again at a slight angle to the first, and plant a winter forage. Where we have done this, it doubled the winter forage yield. Digging in the profile, the **triticale went as a tremendous root mass 14 – 16 inches into the profile**, holding the ripped voids you made open. The following spring you can either go back to corn or no-till a haylage crop.

If sorghum is not your choice, and you were only able to do the top 6-7 inches with a chisel then plant a shorter season corn so it is harvested early. You can then **deep till** in normally dry, late August or beginning of September, and **immediately plant winter forage** 10 days to two weeks before wheat planting date. This will produce **tremendous fall root mass** (see photo at right) that will follow the newly created voids deep in the soil. Winter forage is one of the best crops to rapidly improve soil structure. Work in the Carolina's coast plains found that the roots penetrating the ripped voids leave a coating of organic matter that keeps it from reconsolidating in a compacted mass. In the spring after the winter forage is harvested, no till alfalfa or red clover for 2 – 3 years of perennial forage. Not only do they stabilize the deep tilled soil in a less dense condition, the perennial roots grow when the ground is soft and can continue to penetrate any small cracks.

As said earlier, plan the system. The most damaged fields are fixed first, and then work to the less damaged until you have completed the cycle. Covering your problem with a chisel plow and hoping the compaction goes away, will guarantee low yields vulnerable to adverse weather.



15 years of alfalfa grass did not remove the compaction. The crop was grown on 7 inches. There was no roots below that.



Deep tillage followed immediately by early/on time planted winter forage will produce a mass of roots that go to the bottom of the tillage and hold the shattered soil open for the next crop.

Sincerely,

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