Yetter FARM EQUIPMENT

Leading Edge

SEPTEMBER 2014

Handling Harvest Challenges

Manage both compaction and residue for a smoother spring

With harvest in full swing, it's easy to lose focus of how your combining and fall tillage practices may impact you in the spring. Consider taking the time to revisit two practices—soil compaction and residue management—that can make a significant difference in how successful your planting season is.

Compaction and your crops

Compaction in the fall due to harvest equipment is always a concern, but even more so this year as some areas of the country received heavy rainfall in recent weeks. The first key to preventing compaction is to avoid entering fields with heavy equipment until the soil is dry enough to handle it.

There are two types of compaction: subsoil and surface. Surface compaction occurs in the top foot of soil and is caused by high-contact pressure, like that from road tires inflated to 100 psi or iron wheels.[1] According to Sjoerd Duiker, an associate professor of soil management and applied soil physics at Penn State, you can reduce surface compaction by using flotation tires, duals, or tracks. Aim to use the lowest allowable inflation pressure (<35 psi) in flotation tires or duals.

If you are already seeing signs of surface compaction[2] [3], it's manageable. In a no-till environment, soil can recover from surface compaction within a year without any tillage due to high biological activity in the soil. If you don't have the luxury of waiting, consider planting a cover crop like tillage radish. (Be sure to do your homework on cover crops to ensure they have the intended result. For more on cover crop usage, read the August 2014 *Leading Edge*.)

Signs of compaction include:

- Slow crop emergence or growth
- Uneven crop growth
- Abnormal rooting patterns
- Crusting after it rains
- Standing water in the field
- Excessive erosion or runoff after a mild rain
- Slow decomposition of residue
- Unexpected early nitrogen deficiency in corn
- Soybeans demonstrating a light green color later in the season

Subsurface compaction occurs below the top foot of soil and is caused by heavy axle loads, not high-contact pressure.[4] "If you traffic soil that is really too wet with axle loads of 10 tons or higher, you're likely causing subsoil compaction below 20 inches," said Duiker. Subsurface compaction is extremely difficult to alleviate, so avoiding it should be one of your key objectives. As farm equipment gets larger, subsurface compaction becomes a greater concern.

The University of Minnesota Extension and author Jodi DeJong Hughes have compiled an article titled "Tires, traction and compaction" that offers informative tables listing axle loads for equipment that commonly enters your fields as well as recommended tire PSI for the axle load for radial tires. For example, for a tractor with single tires and an axle weight of 5,840 pounds, the proper tire inflation is 24 psi. When duals are placed on the tractor the proper inflation is reduced to 10 psi.[5]

Compaction cannot be completely eliminated, but since healthy soil is your most valuable resource and greatest contributor to profitability, managing it is crucial. Mapping out a controlled traffic pattern is one of the best ways to head off excessive compaction. According the United States Department of Agriculture Natural Resources Conservation Service, "Controlled traffic systems must limit wheel/track traffic to no more than 50 percent of the rows or a maximum of 50 percent of the trafficked area. Rows or area affected by wheel/track traffic is the same for all passes and years. There should be no tracks over rows that are 20 inches or wider."[6] While switching to a controlled traffic pattern may be a goal that takes several years to reach, the end results will be worth the effort.

Residue management while harvesting

Keeping residue on the field is another practice that can help reduce compaction, and making sure it's handled properly during harvest can make achieving high yields in a no-till system more likely. Steps can be taken to size and incorporate residue, for example, which ensure better planter operation in the spring.

The wider the header, the more likely it is you need to make sure you are spreading your residue the entire width of the combine. Consider the impact of not spreading valuable soybean residue, which contains high levels of nitrogen: "If you're throwing out 4,000 pounds of residue, that's 35 pounds of nitrogen per acre. If residue is only spread across 15 feet of a 30-foot header, there will be a band of ground with 70 pounds of nitrogen and a band with none."[7] The result is uneven nutrition and zones of cooler soils in no-till operations.

On headers up to 25 feet, adjusting deflectors can help spread the residue effectively. If your header is larger than that, after-market choppers may be a good investment.

Further steps may be needed to handle corn residue, especially in corn-on-corn acres. Marion Calmer, no-tiller and owner of Calmer Ag Research, has four goals he aims for during harvest:[8]

1. A 45-degree angle for corn stalk stubble, which opens up the root ball, letting water in and allowing the freeze and thaw cycle to help decomposition.
2. A root ball that remains attached to the stalk, holding residue in place on the field.
3. Horizontal crimping and vertical laceration and splintering of the stalk.
4. Residue in close contact with the soil and the microbes that speed decomposition.

Adding a stalk roller like the Yetter 5000 Stalk Devastator helps with this type of residue management. The solid steel rollers crush and push the corn stocks down, closer to the ground, so that they can begin the process of breaking down. As an added bonus, this type of reside management also helps prevent costly tire damage from intact, tough stubble.

Vertical tillage

While the term is often used to refer to a tool, vertical tillage is more accurately a tillage system. Vertical tillage tools that preform primary tillage, as well as vertical tillage harrows that no-tillers and strip-tillers sometimes add to their equipment lineup are available.

Primary vertical tillage can be a solution for soil compaction. To achieve compaction alleviation with an inline ripper, chisel plow, disc chisel, or disc ripper, you must achieve fracturing across the width of the tool, which can be inconsistent if the operator does not check results and make needed adjustments. "When you dig behind your primary tillage tool, you'll want to make sure the soil is fractured from shank to shank," explains *Farm Journal* Associate Field Agronomist Missy Bauer. "If there are columns of undisturbed soil between the shanks, you did not achieve full shatter. Ideally, you want full shatter 4" to 6" from the surface."[9]

Shallow vertical tillage has the potential to serve two purposes for no-tillers and strip-tillers. It can combat surface compaction, and it can also be the perfect solution for sizing and incorporating residue after harvest. (To make VT a triple threat, it can be used in the spring to warm soil.) Vertical tillage attachments are available to retrofit unused equipment to create this versatile tool.

Fall vertical tillage can help with soil compaction.

Keep your eyes on the future

Your soil is your most valuable asset—take the time to make decisions that protect it this harvest season, and set the foundation for a better seedbed when planting season rolls around. Controlling compaction with set traffic patterns and proper tire inflation, as well as managing residue with proper spreading, crushed and rolled stalks, and shallow vertical tillage, are all things you can do to set the stage for next year. Have a safe harvest!

Endnotes

1. Sjoerd Duiker, "Soil Compaction Dangers in Harvest Season," September 2, 2014, http://extension.psu.edu/plants/crops/news/2014/09/soil-compaction-dangers-in-harvest-season, accessed September 24, 2014.
2. Laura Allen, "Keep Compaction Under Control This Harvest," September 17, 2014, http://www.no-tillfarmer.com/pages/Spre/From-the-Desk-of-Laura-Allen-Keep-Compaction-Under-Control-This-Harvest-9-17-14.php, accessed September 25, 2014.

3. Ron Dodds, "Visual soil compaction symptoms," December 18, 2009, http://articles.aberdeennews.com/2009-12-18/news/26360080_1_compaction-corn-deficiency, accessed September 25, 2014.

4. Duiker.

5. Jodi DeJong Hughes, "Tires, traction and compaction," 2009, http://www.extension.umn.edu/agriculture/tillage/tires-traction-and-compaction/, accessed September 25, 2014.

6. "Soil Quality Enhancement Activity - Compaction Avoidance through Controlled Traffic," United States Department of Agriculture Natural Resources Conservation Service, April 15, 2008, http://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs144p2_041778.pdf, accessed September 25, 2014.

7. Martha Ostendorf, "Harvest-Time Residue Management Hurdles," July 18, 2012, http://www.no-tillfarmer.com/pages/Spre/Harvest-Time-Residue-Management-Hurdles-And-Solutions.php#sthash.mdbWqp6d.dpuf, accessed September 25. 2014.

8. Ibid.

9. Margy Eckelkamp, "Straight Talk on Tillage," October 28, 2011, http://www.agweb.com/article/straight_talk_on_tillage/, accessed September 25, 2014.

Visit www.yetterco.com to review past issues of the *Leading Edge* and to find Yetter products that maximize your yield potential.

Yetter Manufacturing Co., Inc. | 109 S. McDonough | Colchester, Illinois 62326
Phone: 800-447-5777 | FAX: 309-776-3222 | www.yetterco.com | E-mail: info@yetterco.com