Digging Into the Value of Tillage Depth Control to Improve Planting

Emerging tillage technology is proving to be a strategic step toward more consistent crop emergence, better seedbed preparation and increased equipment efficiency.

When correlating the value of tillage depth control technology with more consistent crop emergence, growth and yield, a shallow understanding can limit on-farm production and profitability.

The ability to precisely and actively reduce variability in the field every time a tillage tool penetrates the soil surface is emerging as a key component to a comprehensive planting strategy, especially in cropping systems and geographic regions where seasonal tillage is a necessity to raising a profitable crop.

SOIL PREPARATION

Digging Into the Value of Tillage Depth Control to Improve Planting

Emerging tillage technology is proving to be a strategic step toward more consistent crop emergence, better seedbed preparation and increased equipment efficiency.

Depth Perception

The impact that proper seedbed preparation and consistent planting depth can have on crop growth and yield is well documented.

A recent 4-year study conducted by Oklahoma State University and the Oklahoma Panhandle Research and Extension Center (OPREC), (***Optimum Planting Depth for Uniform Germination and Emergence of Corn, Sharma, 2019***) analyzed the rooting depth and yield impact of planting strip-tilled corn at 1½- and 2-½-inch depths.

From 2015-18, corn was planted at 32,000 populations during the second week of May each year with uniform nutrient and irrigation management. The results revealed, on average, more than an 8-bushel-per-acre yield increase for corn planted at 2½ inches. While germination was about 85% for both planting depths, those seeded at 1½ inches were more prone to stunting and poor root development, according to the study.

Given the proven economic consequences that inconsistent planting depth alone can have on crop yield, there's practical emphasis on equipping planters with advanced technology to increase the odds of raising a consistently profitable crop. But the value of precision depth control extends beyond seed placement, especially for farmers who rely on tillage as a critical step in seedbed preparation.

> We learned that it didn't matter how much money we invested in our planter if we didn't make that same commitment to properly getting our tillage done…
>
> **Conley Dugalech,** farmer, Oakley, Mich.

"We learned that it didn't matter how much money we invested in our planter if we didn't make that same commitment to properly getting our tillage done," says Oakley, Mich., farmer Conley Dugalech.

Typically, Dugalech makes a fall pass with a Sunflower 6631 vertical tillage tool across 70% of his 600-acre corn and soybean operation to size residue, and then a spring pass to create a seedbed ahead of his 6-row White 6100 planter. But an inability to effectively

Digging Into the Value of Tillage Depth Control to Improve Planting

Emerging tillage technology is proving to be a strategic step toward more consistent crop emergence, better seedbed preparation and increased equipment efficiency.

adjust tillage depth to compensate for changing soil conditions contributed to delayed crop emergence - sometimes 5-6 days behind - variable stand counts and measurable yield drag.

"We're always trying to keep the same soil profile and maintain a consistent tillage depth across our fields, ideally 2-2½ inches," he says. "But we've got such variable soils - sandy loam, blue clay, yellow and black sand - that in some areas, we'd only be going 1½ inches deep and then in the lighter ground, we might be at 4 inches and the soil would dry out under the seed."

Dugalech found the solution he needed in 2018, when he added Topcon Tillage Depth Control (TDC), an active, accurate tillage management system. The ISO-technology utilizes Norac ultrasonic non-contact sensors to maintain uniform depth throughout his vertical tillage pass, automatically compensating for changing soil types and conditions in the field.

"A grower has one or two chances in the spring to really get a good seed bed — this solution gets it right the first time regardless of conditions," says Brady Bjornson, senior product manager at Topcon Agriculture. "The ultrasonic system uses an echo that continuously bounces between the sensor and the soil, adjusting depth and control based on real-time conditions. Because of that, an accurate depiction of the area being dug is evident."

Dugalech runs TDC through the Topcon X25 console in his Massey Ferguson 7620 tractor, but the system is compatible with any in-cab ISO-UT display.

"I like that I can pre-set uniform depth at 2 inches, but easily adjust it on-the-go if I'm getting into a part of the field where I need more down pressure to get through heavier residue," he says. "And since it's an active system, I can trust that the depth is accurate and adapting to changes in the field."

Cutting Costs

Since adding the system, Dugalech has seen more uniform plant emergence and crop stands - visual benefits he attributes to being able to create a more consistent growing environment.

But he's also been able to extend the life of the blades on his vertical tillage machine and estimates at least a 10% savings in annual fuel costs. "Since we're not running as deep as we used to in some areas of the field, we've been able to run 12-14 hours on a tank of fuel, vs. only about 10 in the past," Dugalech says.

Digging Into the Value of Tillage Depth Control to Improve Planting

Emerging tillage technology is proving to be a strategic step toward more consistent crop emergence, better seedbed preparation and increased equipment efficiency.

Recent Clemson University research (Real-Time, Variable-Depth Tillage for Managing Soil Compaction in Cotton Production, Fox, 2018), supports the economic benefit that variable-depth tillage can have on fuel consumption. The study analyzed whether real-time, sensor-based and site-specific tillage could be more efficient and effective than uniform deep-tillage, traditionally used in cotton production to manage soil compaction in the Southeastern coastal plains region.

Results revealed that site-specific tillage operations reduced fuel consumption by 45% compared to conventional, constant-depth tillage. The study further revealed that only 20% of the trials required the commonly recommended tillage depth of 15 inches to alleviate soil compaction in the region.

Hard clay soils in the southern part of the country often require some form of tillage to create a plantable seedbed, says Ray Asebedo, Ph.D. global agronomy lead with Topcon Agriculture. But he sees the potential for significant fuel savings in the region with TDC because farmers tilling 4-5 inches deep in some areas might really only need to go 1-2 inches to create the optimal seedbed.

As the economic advantages of pairing tillage depth control technology with proper seedbed preparation continue to develop, so too will the agronomic benefits, according to Asebedo.

“As an agronomist, I was trained to disturb the soil as little as possible,” he says. “So being more consistent with incorporating residue at a prescribed depth and not tilling deeper than you need to in certain areas is going to preserve that organic matter.”

In the future, Asebedo says the ability to create tillage prescription maps through the TDC platform will allow farmers to analyze soil texture changes and how tillage depth changed depending on factors like compaction and soil density.

> “The next step is comparing tillage data sets with yield maps and planting maps…”
>
> **Ray Asebedo,** Ph.D global agronomy lead, Topcon Agriculture

Digging Into the Value of Tillage Depth Control to Improve Planting

Emerging tillage technology is proving to be a strategic step toward more consistent crop emergence, better seedbed preparation and increased equipment efficiency.

"The next step is then comparing those tillage data sets with yield maps and planting maps," he says. "Then we're getting a fuller profile to determine where there are discrepancies in tillage depth and how those correlated to yield. We'll be able to quantify the effects of consistent vs. variable tillage depth and what it means to the overall profitability on the farm."

Hear more from Oakley, Mich., farmer Conley Dugalech and his experience with Topcon Tillage Depth Control in this **recent podcast episode** of "Topcon Talks." Find out how HBS Research Farms in Baltic, S.D., is applying Topcon Tillage Depth Control on its 3,000-acre corn and soybean operation to **create more consistent field conditions** by managing residue and improving overall farm productivity.

A **full-length version** of this story is on the Topcon website.

Check out the **Topcon Agriculture YouTube channel**

www.topconagriculture.com