AGRONOMIC DESIGN

AGRONOMIC DESIGN INSIGHTS

Brought to you by Case IH

AGRONOMICALLY OPTIMIZE YOUR SEEDBED

Seedbed conditions — a core principle of Case IH Agronomic Design™ — affect germination, plant development and, ultimately, yield potential. When you pull your planter into a field, you expect a soil surface that looks ready to plant — a field with a smooth consistency as far as the eye can see. But an ideal seedbed reaches much deeper.
The agronomic qualities you can't see are as important as the ones you can see.

On the surface, the perfect seedbed is level, adequately firm and covered with small clods or a light mulch of crop residue to protect against soil erosion. Below ground, the subsurface floor where your planter places the seed should be even more level, smooth and consistent than the field surface. In between, look for moisture throughout the seedbed depth. You also need soil that is well-mixed, providing the right soil-air-water balance and reliable incorporation.

Success starts with a great foundation — a smooth, level, firm and consistent seedbed floor where your planter can do its job. From there, your crop has the best chance possible of the fast, uniform emergence that's so critical in reaching its full yield potential. The following information details the important role the seedbed floor plays in the success of your crop and, ultimately, your farming operation. This information is brought to you by Case IH staff agronomists. As industry-leading soil management experts, these agronomists manage test plots, evaluate seedbeds, planting performance and crop growth, and provide agronomic advice to help producers reach new levels of efficiency.

WHAT'S INSIDE

CASE IH

AGRONOMIC DESIGN

Every individual plant counts towards your bottom line. That's why at Case IH, we engineer our equipment based on agronomic design – to maximize yield potential by making the most of season, soil, and seed.

HARVEST QUALITY

Minimize the amount of grain left in the field with equipment that can help overcome harvesting challenges.

CROP RESIDUE MANAGEMENT

The right amount and type of crop residue builds up soil organic matter, which is essential for good soil tilth.

CROP PROTECTION

Protecting a crop's yield potential requires getting the right amount of product applied at the right time.

PLANT FOOD AVAILABILITY

Efficient plant food application requires equipment that allows the nutrients to get down into the soil to be captured, not left on the surface.

SOIL TILTH

Good soil tilth affects every aspect of the soil matrix – the most important being the movement of oxygen and water needed for plant growth.

SEED PLACEMENT ACCURACY

The first three agronomic design principles affect in-row spacing and plant population accuracy when planting – impacting the ability to produce photocopy plants.

SEEDBED CONDITIONS

The consistency of a seedbed surface and floor determines seed placement accuracy, which affects seed germination and plant growth.

PART 1

INTRODUCING THE SEEDBED FLOOR

The Seedbed Floor Defined

By Dr. Alison Bryan • Case IH Tillage Research Agronomist

If the seedbed is the home you've built to foster your crop's early development, think of the seedbed floor as the foundation. It is the base on which that agronomic environment is formed. And just as the foundation is critical to any structure, optimizing the agronomic quality of the seedbed floor sets the stage for your crop to reach its full yield potential.

The seedbed floor is the narrow layer between worked and unworked soil. Commonly at the depth the seed is placed. When created with the right tillage tool that's properly adjusted, the seedbed floor is smooth, level and consistent across the full width of your tillage equipment. Variations across the implement can result in inconsistencies in temperature, moisture and soil structure — all factors that conspire against fast, uniform emergence.

How to find the seedbed floor. Perform a "kill stall" during normal operation and wipe away the top layer of loose soil to find the seedbed floor behind the tillage tool. Check for any inconsistencies in soil temperature, moisture and seed-to-soil contact.

Firm, but not hard. Because the seedbed floor is where your planter row unit rides, it needs to be firm to support the row unit and provide a smooth ride. But this firmness is important for other reasons, too.

First, providing a smooth seedbed floor where your planter row unit places each seed helps deliver the consistent seed spacing and depth necessary for fast, uniform germination and emergence. Keep in mind, the ideal floor is smooth, but not so firm that it inhibits root development or a good mix of moisture, air and nutrients.

Second, a flat and consistent floor allows for consistent seminal root development when the plant is young. Because the roots are the life blood of the plant and consistency of stand establishment from plant to plant is important for maximizing yield potential, the ability of a young root to take up moisture and nutrients to elongate without issue becomes critical.[1] Variability in the floor flatness and firmness can cause roots to grow sideways, instead of at a slight angle towards more moisture and nutrients which could delay plant development.

WHAT THE SEEDBED FLOOR IS NOT

When defining the seedbed floor as a firm layer of soil between worked and unworked ground, thoughts instantly turn to compaction. But is the seedbed floor a compaction layer?

Properly created, the seedbed floor is a narrow layer where there is a change in density, but not to the point of compaction. Creating a compaction layer requires 250 to 300 psi. When correctly adjusted and operated under the right conditions — soil that is moist, but not wet — sweeps on a field cultivator will not exert sufficient psi to create a compaction layer.

Moisture matters. When facing the challenges of a late spring, it can be tempting to work fields under conditions that are less than perfect.

An ideal seedbed has moisture throughout its depth. But moist soil produces vastly different results than wet soil. To create a high-efficiency seedbed with a level and smooth seedbed floor, avoid working fields that are too wet.

BUILDING AN AGRONOMIC SEEDBED FLOOR

Every seed must thrive to achieve a successful crop. Achieving maximum yield potential depends on seed-by-seed precision. When your tillage regimen and planter work in harmony, you create a high-efficiency system. The Case IH Tiger-Mate® 255 field cultivator and 2000 series Early Riser® planter complement each other — first creating a high-efficiency seedbed and then delivering the ultimate in seed placement accuracy.

Add in the latest technology — AFS Soil Command™ from Case IH — and you have the tools you need to measure and optimize the agronomic quality of your seedbed, right from the tractor cab.

Ultimately, this advanced technology delivers real-time feedback so you can make on-the-go adjustments that result in the ideal seedbed floor.

THE PAYOFF

A smooth, level seedbed floor puts your crop in the best position possible to achieve its maximum yield potential. Fast, uniform emergence from an optimal seedbed floor leads to row after row of photocopy plants at the same growth stage.

An uneven, inconsistent seedbed floor can cause planter row unit bounce, which leads to poor seed placement from a depth and spacing perspective. Both factors impact yield potential, with uniform depth being the greater yield determinant.[2]

University Extension research from across the Midwest shows fields that get off to a fast, uniform start yield better. In its analysis, Iowa State University researchers found that when factors such as seeding depth and crop residue distribution slowed germination and emergence for just 17 percent of corn plants, yields dropped by 4 percent to 8 percent — or 8 to 16 bushels per acre on 200-bushel-per acre corn.[3]

[1]Purdue University Department of Agronomy. Stand Establishment Variability in Corn. https://www.agry.purdue.edu/ext/pubs/AGRY-91-01_v5.pdf. Accessed June 1, 2018.

[2]Yield effect of uneven corn heights. Iowa State University Agronomy Extension website. Accessed March 31, 2016.

[3]Lauer J. Effect of Corn Spacing and Emergence Variation on Grain Yield. University of Wisconsin, 1575 Linden Drive – Agronomy, Madison, WI 53706

PART 2

HOW DIFFERENT TILLAGE TOOLS IMPACT THE SEEDBED FLOOR

Finish Fields Right for a Fast Start

By Dr. Alison Bryan • Case IH Tillage Research Agronomist

When you pull into a field with your planter and look across the piece of ground —maybe while the planter unfolds — it's important to feel good about what you see. The surface looks smooth. Clods and residue are consistently sized and evenly distributed. But it's how the field got to that point that matters most.

To be sure, regardless of implement, each tillage pass contributes to final seedbed conditions. But the implement used just before planting creates the final seedbed you're planting into. Most important: That tillage tool sets the seedbed floor where your planter's row units ride and where they will place the seed. Have you created a high-efficiency seedbed?

In a perfect world, the planter rides on a consistent, level seedbed floor. This leads to a smooth planter ride, even seed placement and uniform emergence. And, because the seedbed sets your planter's speed limit, a high-efficiency seedbed is what allows for high-speed planting.

In many fields, however, the seedbed floor is not perfectly even. A gouged, rough, inconsistent seedbed floor can be a result of several factors:

- Soil too wet
- Misadjusted tillage equipment

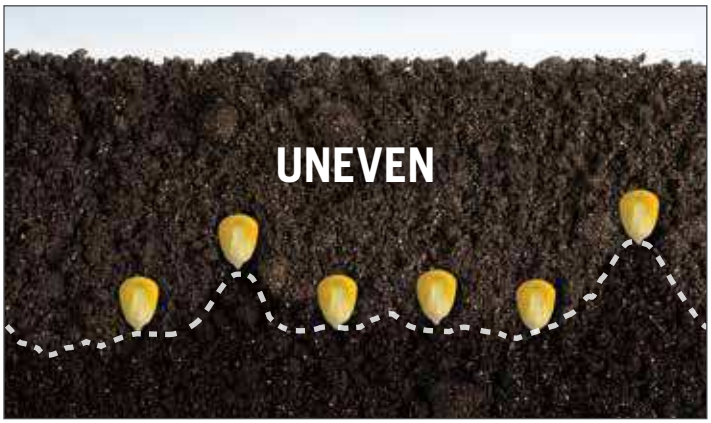
- Incorrect operating speed
- Tillage implements ill-suited for final seedbed prep

A rough seedbed floor can make the planter row unit bounce, causing uneven seed placement or skips. Misadjusted tillage equipment — improper leveling across the width of the tool, for example — or properly adjusted equipment operated at the wrong speed[1] can lead to variations in soil moisture and temperature. Changes in soil density can result in poor seed-to-soil contact and hinder root development.

Alone or in combination, any of these factors can lead to nonuniform emergence and poor crop development that limits yield potential. Understanding how different tillage tools impact the seedbed floor and, ultimately, yield can help you more consistently achieve a high-efficiency seedbed. This insight also helps reveal how Case IH Advanced Farming Systems (AFS) and the technology behind AFS Soil Command™ seedbed sensing can allow for real-time, yield-enhancing adjustments during final seedbed preparation.

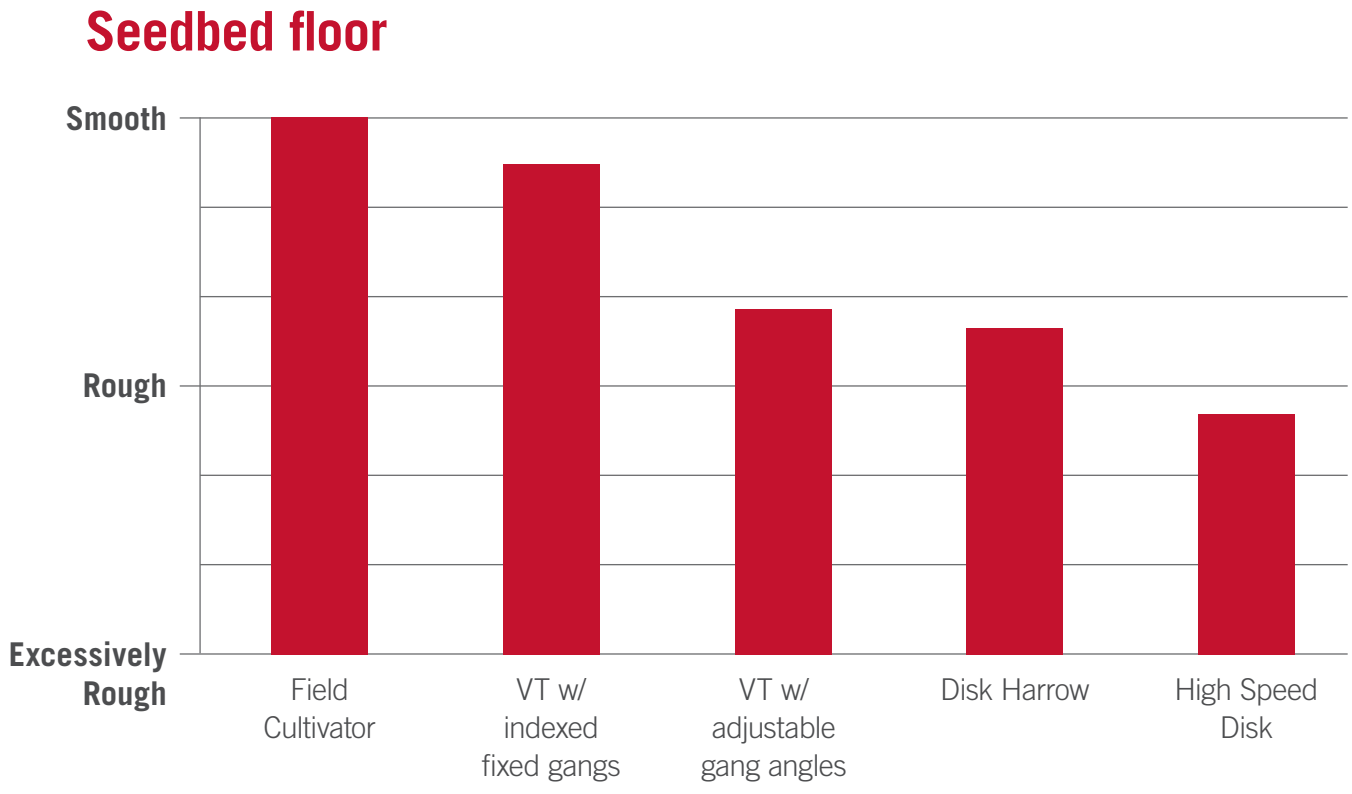
IDENTIFYING A HIGH-EFFICIENCY SEEDBED

On the surface, the perfect seedbed is level, adequately firm and covered with small clods or a light mulch of crop residue to protect against soil erosion. Below ground, the seedbed floor is the narrow layer between worked and unworked soil where your planter row units ride and place the seed. When created with the right tillage tool that's properly adjusted, the seedbed floor should be even more level, smooth and consistent than the field surface. Look for moisture throughout the seedbed depth and a soil profile that is well-mixed, providing the right soil-air-water balance for optimal seedling development.



EQUIPMENT TO CREATE A AGRONOMIC SEEDBED.

Different tillage tools can adequately achieve certain components of a high-efficiency seedbed. But Case IH agronomist field tests prove a field cultivator does the best job of bringing together all the elements and is the most commonly used implement for the final tillage pass before planting. However, a field cultivator is not a fit for every farming operation. It is helpful to understand how different tools can impact seedbed preparation, particularly the creation of a smooth, consistent seedbed floor:



Seedbed floor quality for varying tillage tools

IN-LINE AND DISK RIPPER, CHISEL PLOW

Primary tillage tool; excellent for managing crop residue, breaking up compaction (rippers only) and advancing fields toward a high-efficiency seedbed.

- Ideally followed by a secondary tillage tool, such as a field cultivator, for final seedbed preparation
- Ensure proper settings and adjustments when using to create final seedbed ahead of planting
- Properly sizes clods (less than 6 inches in diameter) and residue (shorter than 18 inches) to set the stage for a more effective and efficient spring tillage pass

DISK HARROW

A disk harrow is an excellent soil and residue management tool. They effectively slice through residue, uproots root balls and helps level the soil surface. Often used as a fall tool but can also be an effective spring seedbed preparation tool.

Seedbed floor created with Disk Harrow

Individual disk blades can leave behind underground ridges

- Improperly matching gang angle to blade concavity can result in back-side disk blade pressure that can create soil density and firmness variances across the width of the tool
- Proper disk design, setting and adjustments are critical to creating a smooth and consistent seedbed floor
- Blade spacing wider than 9 inches makes creating a perfectly flat seedbed floor more difficult
- Planting at a slower speed in the same direction as — instead of at an angle or perpendicular to — can help improve planter row unit ride

VERTICAL TILLAGE TOOL.

Vertical Tillage is shallow and fast tillage pass that promotes residue management. They effectively slice through residue, in some cases mix soil with the residue and level the soil surface. Is used in both fall or spring.

Seedbed floor created with fixed gang angle vertical tillage tool

Seedbed floor created with fixed 18-degree gang angle vertical tillage tool

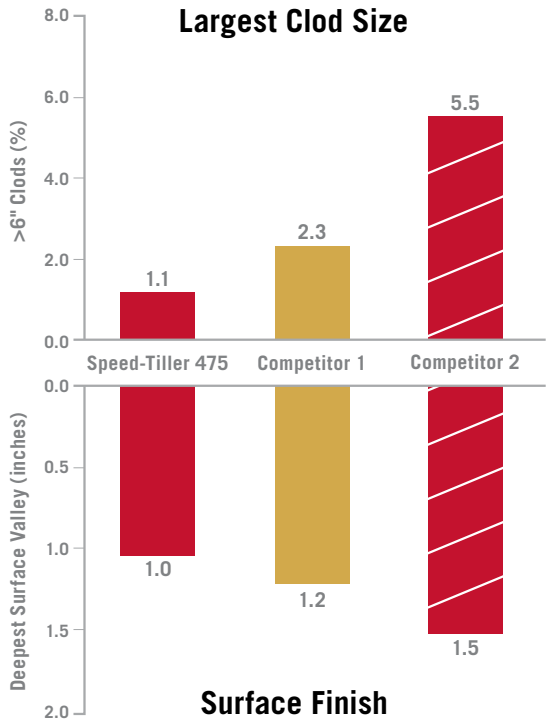
- Individual disk blades can leave behind underground ridges
- Improperly matching gang angle to blade concavity can result in back-side disk blade pressure that can create soil density and firmness variances across the width of the tool
- Proper disk design, settings and adjustments are critical to creating a smooth and consistent seedbed floor
    - Fixed gang angle (tools with adjustable gang angles not likely to create a flat seedbed floor)
    - Front and rear gangs indexed to each other so they work together to shear a flat seedbed floor
    - Higher speeds often required
    - Must have walking tandems and stabilizer wheels to maintain a smooth operating frame
    - Fore/aft leveling required
    - Must maintain wing-to-main-frame levelness

EMERGING TREND: HIGH-SPEED DISK

High-speed disks have received considerable attention in recent years, with a variety of different manufacturers to choose from. While they manage residue, cover a lot of acres quickly and create a seedbed that looks good — on the surface not all high-speed disks are created equal when it comes to agronomic performance - because what you can't see is a seedbed floor that is rough and inconsistent.

Working the entire soil profile is critical for planter ready seedbed floors in order to provide a smooth row unit ride. According to Case IH's agronomy team's multi-season, side-by-side field trials, the competition's disks proved to only work portions of the soil, while the Speed-Tiller high-speed disk worked the entire soil profile resulting in a smoother floor and finish and is more effective at weed removal.[1]

The attractiveness of a high-speed disk is it's dual-season use and it can run fast. The Case IH Speed-Tiller high-speed disk is ideal if you're looking for a dual-season tillage solution in the high-speed disk category. In our testing, it created a smoother subsurface finish than the competitors we assessed. It also created more clods of ideal size, those that were less than 6 inches in diameter, compared to the other high-speed disk options we tested. Clod sizing is critical to a level seedbed in the spring and minimizing the larger clod sizes is important for an ideal field finish.



FIELD CULTIVATOR

A field cultivator is widely recognized as the best choice for final seedbed preparation.[2]

Seedbed floor created with a field cultivator

- Shanks are able to work independently, yet provide 100% coverage so every square inch of the seedbed floor is conditioned and made flat
- Proper settings and adjustments are critical for successful creation of a flat seedbed floor:
  - Fore/aft leveling
  - Leveling of wings to main frame
  - Must have walking tandems and stabilizer wheels for a smooth operating frame
  - Optimal shank holding force allows for higher speeds while still creating a flat seedbed floor

This environment allows for consistent seed placement and optimal seed-to-soil contact for fast, uniform germination and emergence.

TECHNOLOGY CAN HELP

In conjunction with the Tiger-Mate™ 255, Case IH AFS Soil Command™ provides the first seedbed monitoring technology that allows you to measure and optimize the agronomic quality of your seedbed — right from the tractor cab. This advanced technology monitors the quality of the seedbed with sensors strategically mounted to shank assemblies throughout the machine. Each time the shank begins to trip or float, the sensors deliver real-time feedback to the operator in the cab, allowing the operator to fine-tune adjustments to match field conditions.

[1] 2018 field tests conducted by Case IH agronomists evaluated residue coverage, residue sizing, levelness, clod sizing and seedbed floor. Conditions in your area may differ.

[2] DeJong-Hughes J, Daigh A. Tillage implements, purpose and ideal use. University of Minnesota Extension website. http://www.extension.umn.edu/agriculture/soils/tillage/tillage-guide-implements/#shallow. Published 2017. Accessed May 21, 2018.

PART 3

THE TILLAGE-PLANTER RELATIONSHIP

Take a Systems Approach to Planter-ready Fields

By Lily Cobo, M.S. • Case IH Planter Research Agronomist

New planter technology allows for high-speed planting. But it's your seedbed that sets the speed limit for your planter. So, rather than approaching your final tillage pass as a way to get your fields ready to plant, think of this step as getting your fields ready for your planter.

That's the goal in creating a high-efficiency seedbed, one with a level and smooth seedbed floor: To provide an environment suited to high-speed planting where the planter can consistently and reliably place seeds at the right depth and spacing. Ultimately, this leads to uniform germination and emergence and gives plants the best opportunity to achieve their full yield potential.

Despite all the advancements in planter technology — from residue managers to hydraulic downforce — it remains a reactive system; the planter row unit must constantly react to ever-changing field conditions.

- Residue managers can help clear the way for gauge wheels, yet the ride of the unit's disk openers on the seedbed floor plays an even bigger role in seed placement and depth.
- Hydraulic downforce can help maintain engagement with the seedbed floor, but it cannot perfectly smooth a rough ride. Additional downforce is the result of sensing a rough ride, which with conventional style row units can create side-wall compaction and hinder fast, healthy root development.
- High-speed planting makes the bumps bigger. No matter how quickly planter row units can react, the faster you travel, the more row feet you cover before they settle back to the seedbed floor, and, thus, the more seeds improperly placed.
- Oftentimes the planter reacts to agronomic inconsistencies it shouldn't have to encounter in the first place. Fixing seedbed problems before your planter pass can significantly improve seed placement accuracy.

Reducing the number and degree of reactions you ask your planter to make starts with a more proactive approach to the seedbed floor.The smoother and more consistent it is across the entire field, even as soil conditions change, the less reaction is required by the planter. And that allows for higher-speed planting, fewer adjustments and increased efficiency without sacrificing yield.

IS HIGH-SPEED THE RIGHT SPEED?

High-Efficiency Farming is most accurately measured by bushels in the bin at the end of the season rather than in miles per hour or acres covered on planting day. But that doesn't mean you can't achieve High-Efficiency Farming and higher speeds.

The right tillage tool, properly adjusted and operated, can create a high-efficiency seedbed with an ideal seedbed floor. In fact, research shows that operating the Tiger-Mate™ 255 field cultivator at higher speeds — even up to 10 mph — can help optimize agronomic quality of the seedbed.[1]

A higher operating speed, combined with a firm, yet flexible shank design that maintains a level sweep, can increase soil movement and mixing. The swept-back, high-concavity shank design helps soil ramp up and explode higher for better clod sizing and a more level surface finish. Maintaining a level sweep prevents gouging for a smooth seedbed floor that allows for high-speed planting.

ANGLE IN ON A SMOOTHER RIDE

Conducting each field pass at an angle to the previous one long has been standard practice in crop production. When it comes to making the final tillage pass before planting, consider making a change.

Operating your planter at an angle to that last tillage pass forces the row unit to ride over any imperfections in the seedbed floor. For example, if you use a tandem disk to create your final seedbed, planting in the same direction will help disk openers ride more smoothly.

In contrast, planting at an angle creates opportunity for row-unit bounce each time the disk opener rides over any potential imperfections created by other tillage tools. Higher-speed planting only amplifies this bounce. Making both passes in the same direction also helps manage wheel traffic.

However, even with similar direction a rough seedbed floor may influence the depth that the seed is placed at. If we introduce inconsistencies in planting seed on top of the ridges (firmer soil) vs. in trenches (on top of loose soil) differences in soil density, moisture, temperature can lead to inconsistent germination and inconsistent stands.

ALIGN IMPLEMENT WIDTHS, CONTROL TRAFFIC

One of the most often-overlooked opportunities to keep tillage and planting equipment working toward the same goal is to match their operating widths. Yet, for various reasons — different tractor sizes, equipment availability, operational changes — tillage tools and planting equipment can fall out of sync.

Equal widths between these two implements, and running them in the same direction, helps maintain seedbed floor consistency, soil moisture and temperature uniformity across the width of the planter for more even germination and emergence.

Another advantage to aligning the widths of your final tillage implement and your planter is wheel traffic. Case IH designed the Tiger-Mate field cultivator and Early Riser® planters for controlled wheel traffic. Pairing implements of equal widths aligns wheel paths to help minimize compaction across the field.

SET YOURSELF UP FOR AN EFFICIENT AND AGRONOMIC PLANTING SEASON.

While it's easy to understand the importance of a properly set tillage tool for high-quality seedbed, it's often overlooked, especially as a planting season wears on. The last day of seedbed preparation should be examined as intently as the first. Field conditions change, and intended settings of the tillage tool can become misadjusted.

That's why a high quality seedbed surface and floor depend on a well-set seedbed preparation tool.

While fore/aft levelness and mainframe-to-wing levelness typically stay put, they should not be ignored throughout the spring season. The seedbed floor should be examined regularly to evaluate if the front of the tool is operating at the same depth as the rear and the left wing is running the same depth as the right wing. To check, perform a "kill stall" during normal operation and wipe away the top layer of loose soil to find the seedbed floor behind the tillage tool. Check for any inconsistencies in depths between the front and rear of the machine along with inconsistencies in the sections of the tillage tool.

Other settings like tire pressure and depth along with general conditions of shanks, sweeps and shank mounts should be checked on a daily basis. A well-tuned and well-set tillage tool leads to an even more productive, efficient and agronomic system.

[1] Parli, B. (2016). Soil Management Plots.

PART 4

HOW VARIABILITY IN SEED PLACEMENT IMPACTS YIELD

Uniform Depth and Spacing Grows More Grain

By Lily Cobo, M.S. • Case IH Planter Research Agronomist

In farming, few visuals are more pleasing than cornfields with picket fence stands of photocopy plants. This level of consistency is about much more than aesthetics — it's about achieving maximum yield potential.

Consistent stands of photocopy plants are the direct result of fast, uniform germination and emergence. Study after study shows that uniformity from planting through harvest puts more grain in the bin.

Iowa State University Extension specialists have compiled and analyzed research trials from across the Midwest. They found that an uneven corn stand with just 17 percent of the plants emerging late yielded 4 percent to 8 percent less grain than a stand with even emergence.[1] On 200-bushel-per-acre corn, that's 8 to 16 fewer bushels per acre. When lagging plants accounted for half the field, yield dropped by 20 percent. This Iowa State research attributes late-emerging plants to several factors, including:

- Soil temperature
- Seeding depth

- Crop residue distribution
- Soil crusting
- Soil moisture

Many of these factors tie directly back to seedbed quality and creating a high-efficiency seedbed with a consistent, level and smooth seedbed floor.

SMOOTH SEEDBED FLOOR = UNIFORM EMERGENCE

A rough seedbed floor can make the planter row unit bounce, causing uneven seed placement (spacing, skips and depth). But University of Wisconsin Extension analysis shows that seeding depth and its impact on uniform emergence are a greater yield determinant than plant spacing.[2] High-speed planting or using a planter that isn't designed for high-speed planting only amplifies these challenges.

Varying seed depth leads to poor uniformity in germination and emergence. This can be due to several factors, such as inconsistent soil and moisture levels delaying germination, or newly germinated plants simply needing more or less time to reach the soil surface.

Research shows that uneven emergence can lead to less leaf area, dry matter accumulations and early emerging plants outcompeting the later emerging plants for sunlight.[3] The result is reduced yields at harvest.

AT 10 MPH, SMALL BUMPS MAKE A BIG DIFFERENCE

During planting season, the hours fly by, and so do the acres. But you might be surprised by just how quickly you are covering ground. Consider the math:

- At 10 mph, your planter travels 14.667 feet per second.
- At a population of 36,000 seeds per acre in 30-inch rows, each planter row places one seed every 5.81 inches.
- That's about two seeds per linear foot per row and 28 to 30 seeds per second, per row.

Now consider how many seeds end up above the intended planting depth each time a row unit bounces or rides over an imperfection in the seedbed floor. Even the latest hydraulic downforce technology can't eliminate the bump that caused their reaction in the first place. It takes time for the row unit to settle down to the seedbed floor. In just a quarter-second, your planter travels more than 3½ feet and places seven to eight seeds — each potentially inconsistent with its intended position. And, when it comes to optimal seed placement, time is bushels.

ELIMINATE THE UNEVEN SEEDBED FLOOR

If your fields are suited for high-speed planting, make sure to go one step further to measure and optimize the agronomic quality of the seedbed floor prior to planting. It's an often-overlooked issue that many try to compensate for by adjusting planter settings. Creating an even seedbed floor during the final tillage pass, ensures the planter can place seed without having to react to the seedbed.

That's where AFS Soil Command™ from Case IH, paired with the Tiger-Mate® 255 field cultivator, can help. This advanced seedbed sensing technology delivers real-time feedback so you know what's happening 2 to 4 inches below the surface.

Once you have an even seedbed floor, you are in the perfect position to focus on high-efficiency, high-speed planting. Here are final tips as you hit the field:

- Plant at your speed, aligning with your tillage practices, soil types and field conditions.
- Adjust planter settings, such as hydraulic downforce and closing system down pressure to reduce row unit bounce. If excessive row unit bounce is still being experienced, make any needed adjustments to the tillage tool to get a smooth seedbed floor or, if that isn't possible, evaluate your tillage tool and practices.

(See "***HOW DIFFERENT TILLAGE TOOLS IMPACT THE SEEDBED FLOOR***" white paper)

- Run your planter in the same direction of travel as the final tillage pass for a more consistent, smoother row unit ride.

[1] Yield effect of uneven corn heights. Iowa State University Agronomy Extension website. http://www.agronext.iastate.edu/corn/production/management/early/heights.html. Accessed May 29, 2018.

[2] Lauer J. Effect of Corn Spacing and Emergence Variation on Grain Yield. University of Wisconsin, 1575 Linden Drive – Agronomy, Madison, WI 53706

[3] Liu W, Tollenaar M, Stewart G, Deen W. Reponse of Corn Grain Yield to Spatial and Temporal Variability in Emergence. Crop Science. Published May, 2004. Accessed May 31, 2018.

DAY OF EMERGENCE	NO. OF PLANTS EMERGED	AVERAGE WEIGHT OF EARS AT HARVEST (OZ.)	PERCENT OF EARS	YIELD (BU./A)
Day 1	59	10.79	84.3	217
Day 2	6	7.65	8.6	154
Day 3	3	8.2	4.3	165
After Day 3	2	3.05	2.9	61
Average	70	10.19	100	205

25,400 ears per acre; hand-harvested from 40-foot length of row

Source: *Keith Balderson and Wade Thomason, 2016, Corn Emergence Evaluation, Virginia Cooperative Extension, Virginia Tech-Virginia State University, CSES-157NP*

A lot of thought goes into a seed bag. But at Case IH, we put a lot of thought into your seedbed. We use Agronomic Design™ principles to develop a system of soil management tools that help optimize everything from nutrient access to water infiltration. These higher-quality seedbeds, when paired with Case IH planting solutions, will give your plants a better start. Which is more than can be said for a paper bag. Get to know why your seedbed drives productivity at **caseih.com/soilmanagement**.