

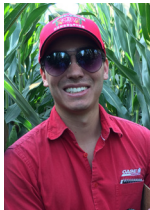
INSIGHTS

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PART 4 OF 4

HOW VARIABILITY IN SEED PLACEMENT IMPACTS YIELD

Uniform Depth and Spacing Grows More Grain



By Nicholas Andrejuk, Case IH Agronomist and Soil Management Specialist

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 straggler 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.

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

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.