2025 RESEARCH SUMMARY

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2025 PTI Farm Research Summary

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MORE WAYS TO GET DATA

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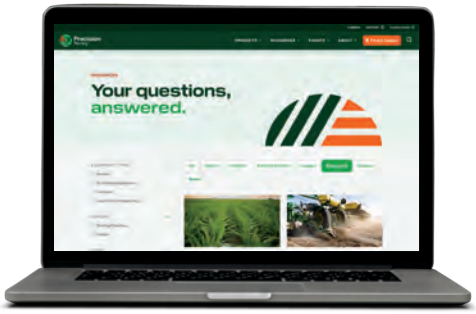

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2025 PTI Results

Introduction and Guide to Summary Report

Precision Planting is excited to share our 8th year of PTI research farm results and findings. We hope they provide useful insights that help drive thoughtful consideration around future crop management decisions. This publication is intended to summarize and explain the many agronomic trials that were implemented in 2025. This year we added new and interesting agronomy trials to our testing program, and we are excited to release our findings in this report.

During the summer of 2025, the PTI Farm hosted thousands of growers from throughout the United States as well as international countries including Australia, Germany, Canada, Argentina, Brazil, South Africa and the Ukraine. Farmers visited the PTI research farm to dive into agronomy field trials, see and understand real world agronomic problems, and were even able to experience some of the latest and greatest state-of-the-art technology in our ride and drive "Sandbox" area. Field days started in June and lasted until the 3rd week of September.

For the 2025 PTI Yield Summary Data, net returns are calculated with corn prices of $4.13/Bu. and soybeans at $9.93/Bu. These prices represent average **cash** prices for new crop 2025 corn and soybeans from October 1st, 2024, through October 1st, 2025. This simulates how growers could sell new crop throughout the year.

At the bottom of each trial summary page, a brief explanation is listed to show the planting date, hybrid or variety, population, row width, crop rotation, commodity price/bu. and cost information that pertains to the products being evaluated. Most starter fertilizer trials at the PTI Farm have a $30 to $40 re-allocation credit applied to each product in testing. This approach allows us to use the total intended fertility needed for soil test build-up and yield maintenance but allows the planned use of both dry fertilizer in the fall and liquid product on the planter without over-spending or over-applying more nutrients than needed. To accomplish this, we reduce our dry fertilizer rates by $30 to $40/A. to account for the reallocation. All control tests in each study get additional fertilizer to achieve a typical 100% program without starter fertilizer on the planter.

Fall Dry Fertilizer: $40 Reduction + At-Plant Liquid Starter

2025 PTI Results

Top and Bottom 10 Return on Investment Performers

Top 10	ROI $/A.
1. Strip Cropping/Livestock Sustainability	$325.70/A.
2. NETAFIM™ Drip Irrigation	$246.50/A.
3. Non-GMO/Organic Corn	$114.95/A.
4. On-Farm Drying vs Commercial Corn Drying	$97.73/A.
5. Smart Hydrogel Soil Moisture Retainer	$69.51/A.
6. Weight Management & Tire Inflation	$65.07/A.
7. Corn Fungicide	$58.55/A.
8. Livestock Manure	$52.69/A.
9. Marco NutriStart 21-4-4-3.5S-.25Zn	$48.97/A.
10. Reveal Row Cleaners	$41.71/A.

Bottom 10	
1. Late Planted Corn	-$281.51/A.
2. Late Planted Soybeans	-$210.52/A.
3. Narrow Row Corn High Seeding Rates	-$208.00/A.
4. Shallow Corn Planting Depth	-$160.66/A.
5. Sunlight Amplification	-$154.25/A.
6. Soybean Narrow Row Low Populations	-$124.68/A.
7. Plasma Activated Water 100% Nitrogen Replacement	-$109.30A.
8. Shallow Soybean Planting Depth	-$82.42/A.
9. Corn Planter All Wrong	-$78.44/A.
10. Corn Cover Crop	-$74.65/A.

2025 PTI Results

Corn Planting Date Study

Objective: To evaluate various corn planting dates throughout the spring to determine the optimum planting date. Once the optimum planting date is discovered, economics can then be analyzed to determine yield loss and cost per acre when planting dates were not implemented within the optimum planting window.

Results: May 12th achieved this year's optimum plant date at 279.9 Bu/A. (Table 1). Early planting dates of April 15th and April 25th suffered yield losses of **-5.2 Bu/A.** to **-9.5 Bu/A.** Pushing planting date later to May 19th offered losses of only **-3.5 Bu/A.**, June 1st losses of **-39.7 Bu/A.** while the latest plant date of June 11th was **-68.2 Bu/A.** off the pace from optimum plant date.

Table 2. illustrates losses of **-$39.09/A.** to **-$21.52/A.** when planting earlier in April. May 19th proved the smallest loss of **-$14.51/A.** Later planting dates of June 1st and June 11th proved largest losses of **-$163.87/A.** and **-$281.51/A.**

Table 1.

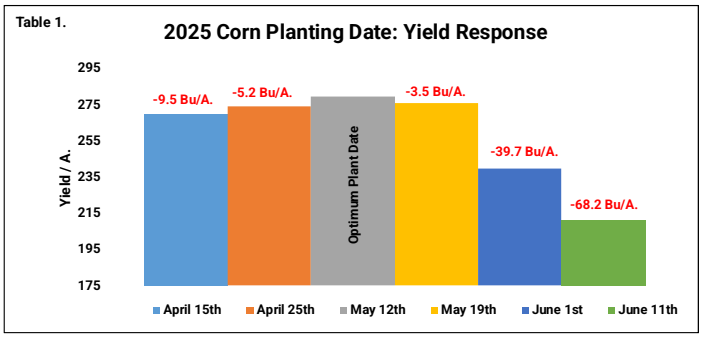
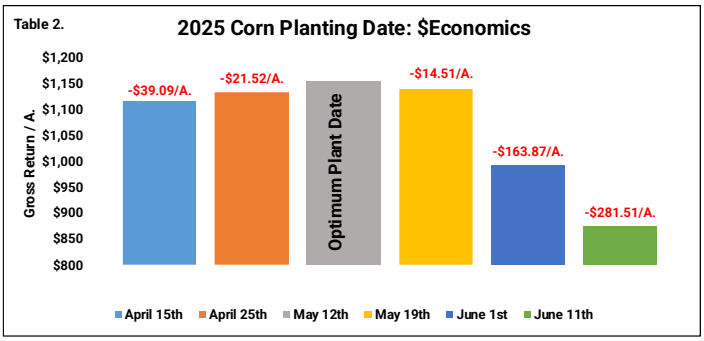
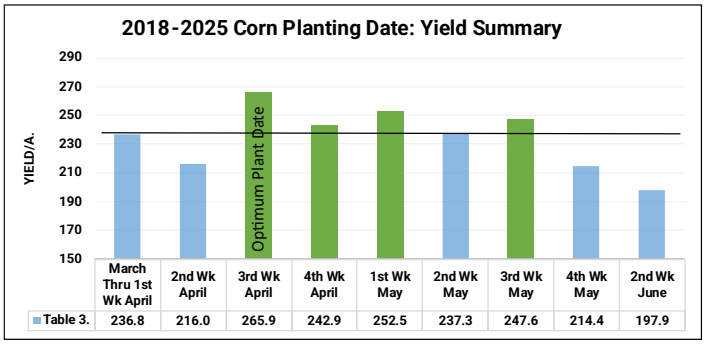


Table 2.





	March Thru 1st Wk April	2nd Wk April	3rd Wk April	4th Wk April	1st Wk May	2nd Wk May	3rd Wk May	4th Wk May	2nd Wk June
Table 3.	236.8	216.0	265.9	242.9	252.5	237.3	247.6	214.4	197.9

Table 3. summarizes the average yield from week-to-week plantings over an eight-year period from 2018-2025. Over this timeframe, the ideal planting date for corn has been the 3rd week of April. Highest yield losses have been late June plantings with losses of **-68 Bu/A.**

In general, the planting window of the 3rd week of April through 1st week of May plantings have all proven above average yields. However, it is interesting to note that 2nd week of May plantings have fallen short of average yield, due to the commonality of "Mother's Day Massacre" storm events.

Planting Date: Varied *Hybrid: DKC 114-99* *Population: 36K* *Row Width: 30"* *Rotation: CAB* *Corn Price: $4.13*

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Corn Starter Fertilizer Response by Planting Date Study

Objective: To monitor the performance of starter fertilizer at various planting dates. When does starter fertilizer give the highest returns? Does starter fertilizer respond differently at earlier planted dates versus later? In this study we evaluate five planting dates consisting of April 15th, April 25th, May 12th, and May 19th with and without a starter fertilizer, monitoring its performance throughout the planting season.

The starter fertilizer program used for this study consists of the following:

Product	Fertilizer Analysis	Placement of Fertilizer
6 Gal/A. Nachurs® Triple Option®	Figure 1. FurrowJet® Placement 4-13-17-1S	FurrowJet® Wings

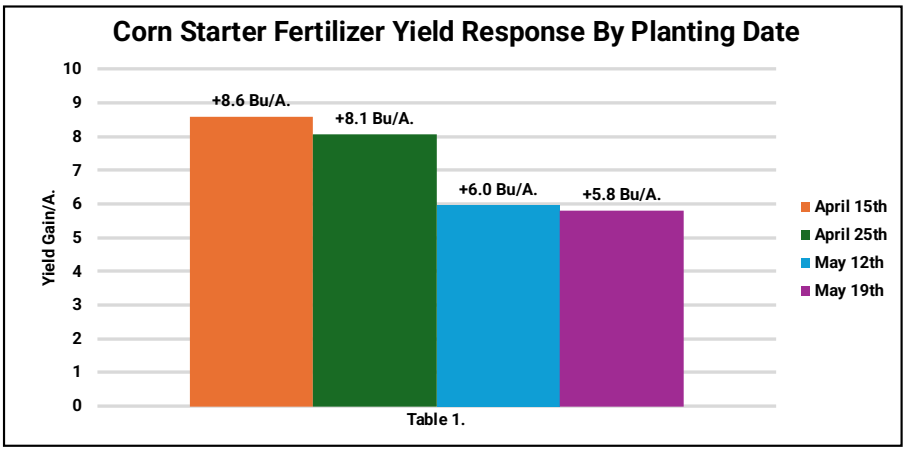
Figure 2. Conceal® Placement

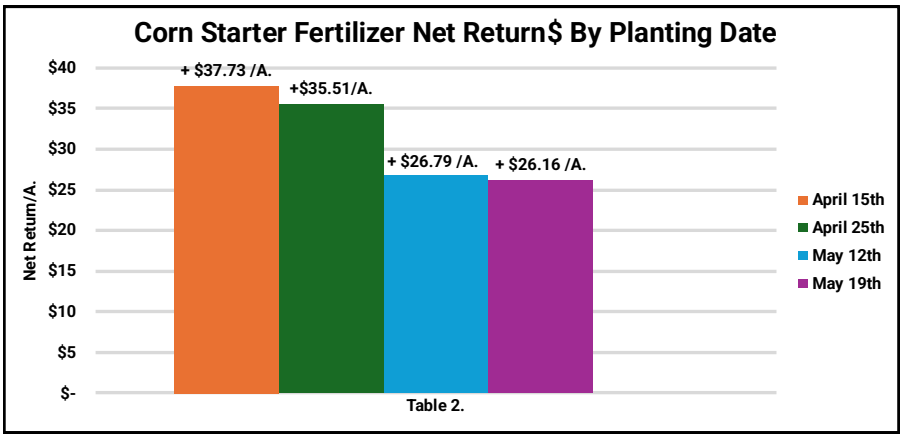
2025 PTI Results

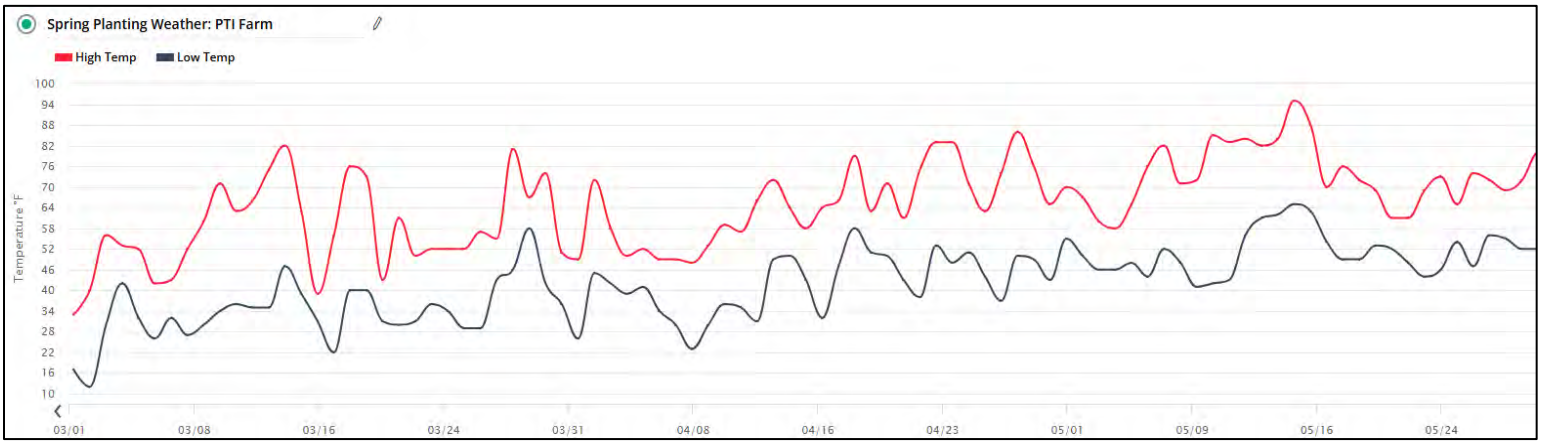
Corn Starter Fertilizer Response by Planting Date Study

Results: Table 1. illustrates that all planting dates in April and May achieved yield gains from starter fertilizer. These planting dates resulted in yield gains of +5.8 Bu/A. to +8.6 Bu/A.

Table 2. illustrates positive economic net returns of +$26.16/A. to +$37.73/A. from starter fertilizer applications on all planting dates. In 2025 the starter fertilizer program was reduced to a single in- furrow product resulting in a much leaner cost. Along with our standard fertilizer reallocation program, positive net returns were easier to achieve.







Planting Date: Varied *Hybrid: DKC 114-99* *Population: 36K* *Row Width: 30”* *Rotation: CAB* *Corn Price: $4.13*

Starter Program Cost: $37.80 *$40 Fertilizer Reallocation*

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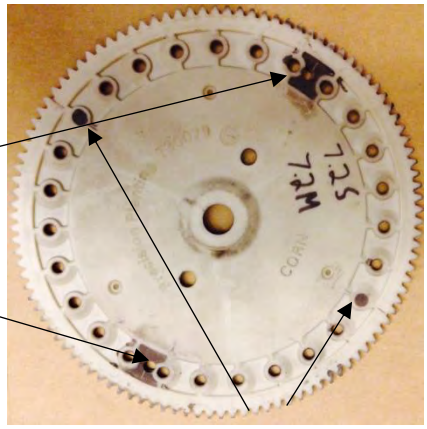
2025 PTI Results

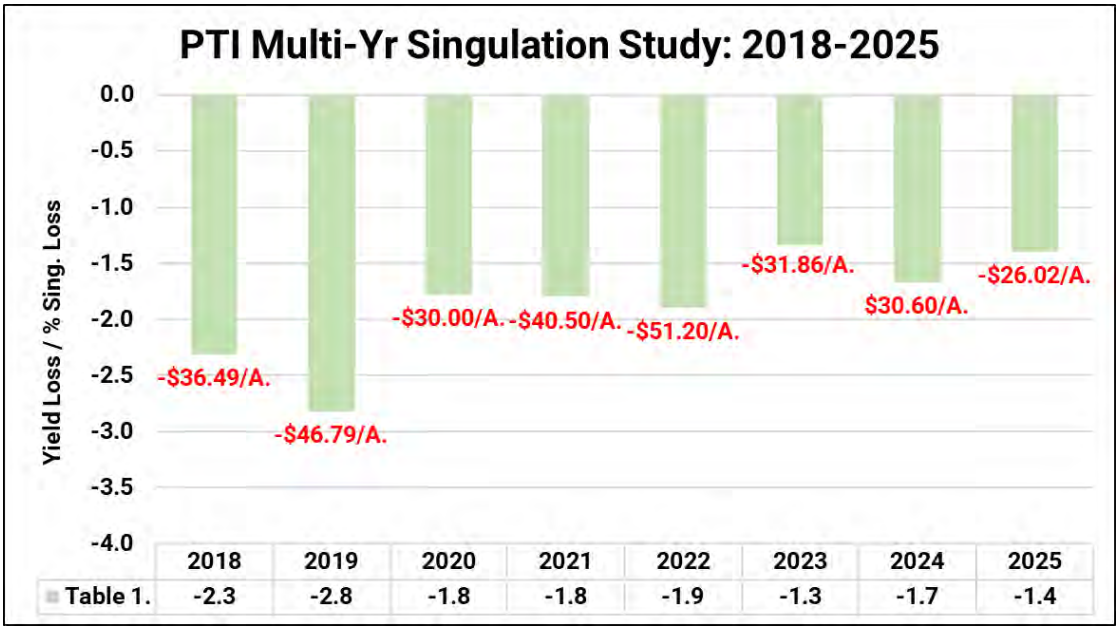
vSet® Planter Singulation Study

Objective: To evaluate how improper seed singulation affects corn yield. Modified vSet® seed plates with plugged and extra holes were used to create skips and doubles. These "goof" plates created an average of 95% spacing accuracy vs. the control at 99.5%.



Results: The table below illustrates 95% seed singulation resulted in an average economic loss of **-$36.68/A.** over an 8-yr period of 2018-2025.

Over this same time period, for each percentage of singulation loss, yield was decreased by an average of **-1.9 Bu/A.**



Planting Date: May 19th Hybrid: Channel 214-78 Tillage: Strip-Till Population: 36K Row Width: 30" Rotation: CAB Corn Price: $4.13

SmartDepth® Corn Planting Depth Study

Objective: To evaluate yield and economic performance of various manual corn planting depths consisting of 1.25” to 3” in ¼” increments, compared to automated variable depth planting using SmartDepth® control.

Digging seeds is a time consuming yet important task at planting time (Figure 1). Getting your eyes on the furrow where the seeds are placed will allow you to understand if those seeds are in an environment to thrive. Is the seed being planted into adequate moisture? Until now, we did not know this for every seed, and we were unfortunately simply guessing.

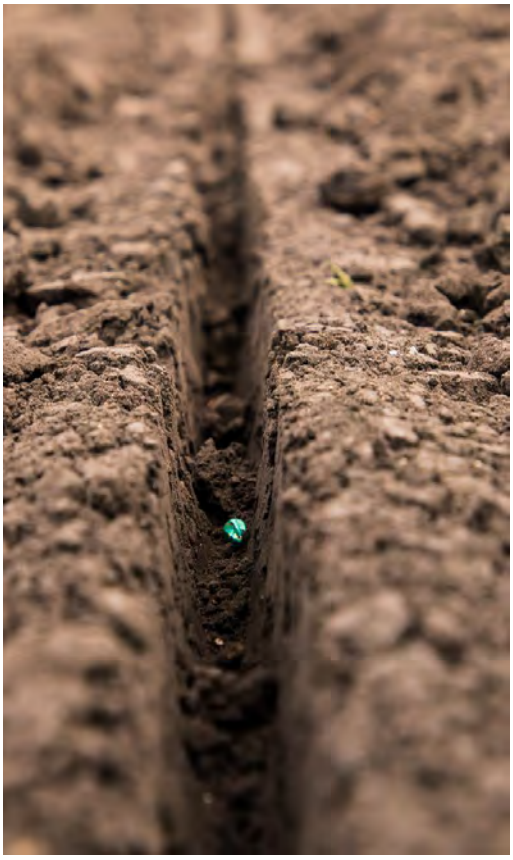


Figure 1. Seed Furrow

With a SmartFirmer® sensor (Figure 2.) you can now have virtual eyes in the furrow. Soil moisture is a critical component for seed germination, uniform plant emergence, and ultimately crop yield. SmartFirmer® sensors gives row-by-row visibility to soil moisture in the seed furrow, allowing farmers to choose the right planting depth as soil conditions change. Currently, the recommendation for ideal furrow moisture levels to achieve adequate corn emergence, is near 32%. Using the 20|20® monitor (Figure 3.) in tandem with SmartFirmer® sensors, we now have the ability to evaluate furrow moisture in real-time. Based on this real-time information, growers can make decisions based on live sensing data.

Figure 2. SmartFirmer® Sensor

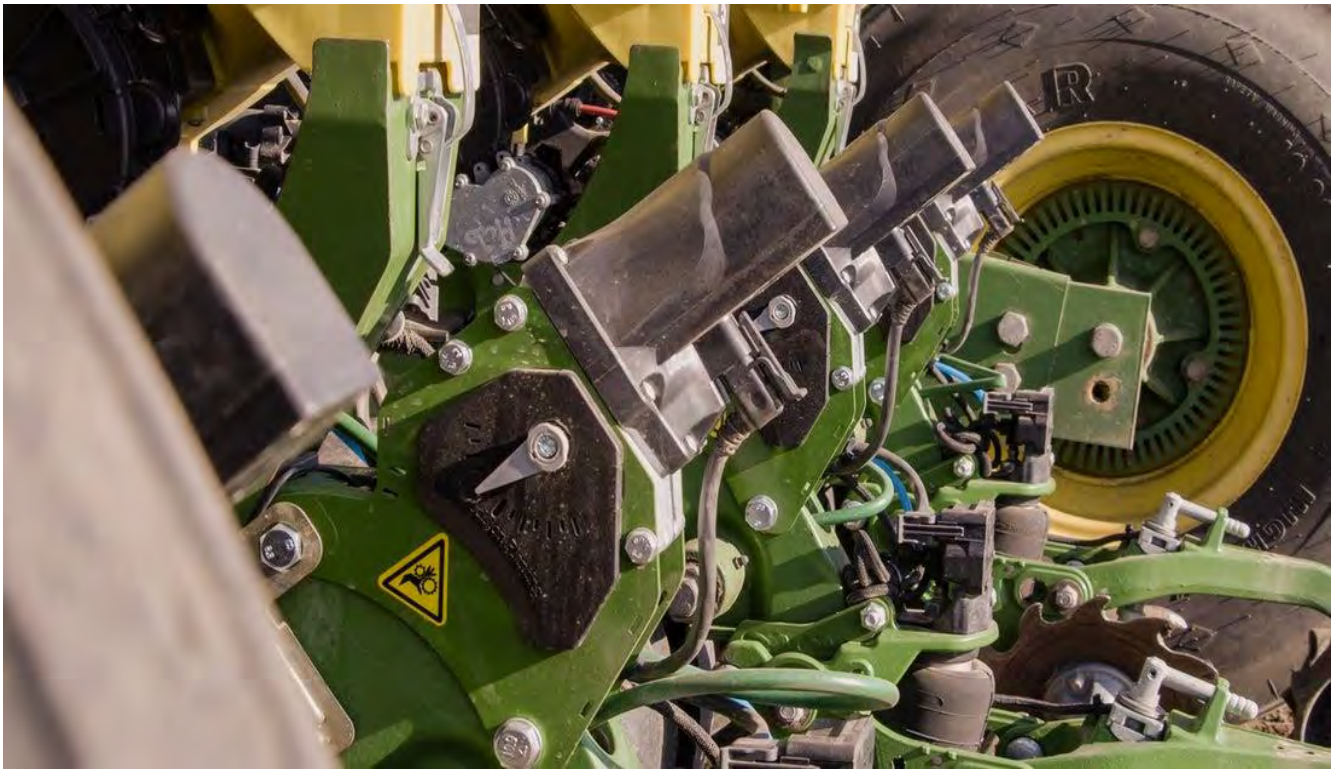
Figure 3. 20|20® Monitor System

SmartDepth® Corn Planting Depth Study

Figure 4. illustrates SmartDepth®, a unique product that takes the technology one additional step further, allowing planting depth to be changed on a planter, by section or individual row basis. This can be done manually from the tractor cab and 20|20® console or automatically using furrow moisture values from SmartFirmer® sensors. Growers can customize their own settings to optimize both furrow moisture and planting depth values (Figure 5). This control allows growers to measure, react, and take control of planting depth to optimize emergence timing.

Figure 5. SmartDepth® Customization Screen

Figure 4. SmartDepth® Control System



2025 PTI Results

SmartDepth® Corn Planting Depth Study

Results: Table 1. reveals a planting depth of 2.25" achieved the agronomic and economic optimum in 2025. SmartDepth® fell **-9.8 Bu/A.** compared to the agronomic optimum.

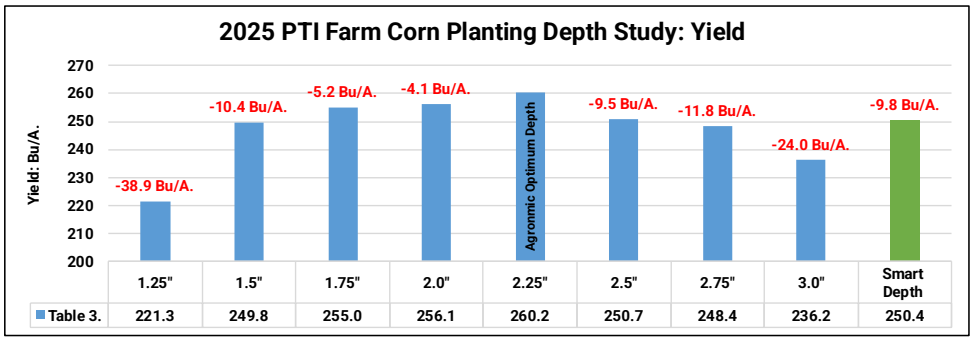
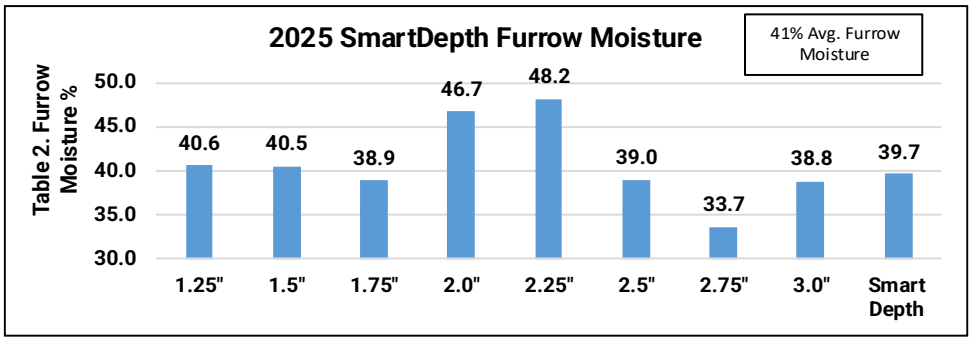


Table 2. illustrates average furrow moisture of 41% which would indicate ample moisture for seed to soil contact. These higher moisture levels helped prove that deeper planting depths were not needed in 2025.



Currently, the recommendation for ideal furrow moisture levels to achieve adequate corn emergence is near 32%.

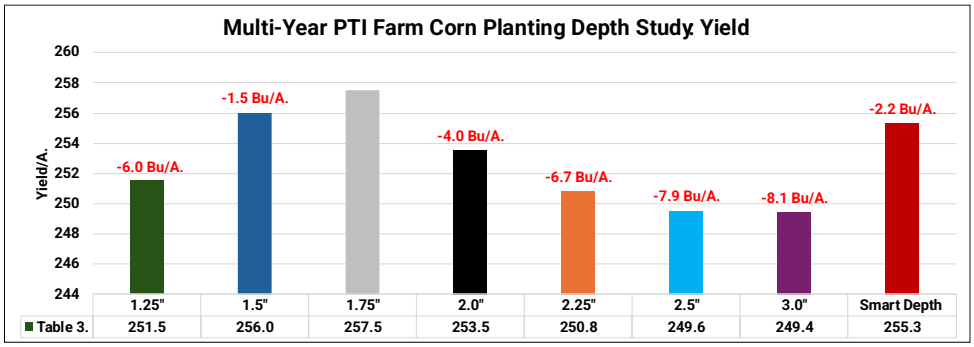


Table 3. illustrates automatic SmartDepth® achieved corn yield within 2.2 Bu/A. of the optimum manual planting depth of 1.75" with economic variance of only $11.47/A. over a 3-yr period of 2023-2025.

By using SmartDepth®, SmartFirmer® and a 20|20® monitor system, growers can obtain perfect planting depths just below the furrow moisture line.

Planting Date: May 18th *Hybrid: Channel 214-78* *Population: 36K* *Row Width: 30"* *Rotation: CAB* *Corn Price: $4.13*

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Reveal® Residue Management Study

Figure 1. Reveal® System

Objective: This study evaluates the yield and economic benefit of Reveal®, a frame mounted row cleaner system in a corn after corn strip-till environment.

Residue management is a necessary part of today's operation to maximize profitability. Tougher stalks and more corn-on-corn acres mean a heavier load of residue that needs to be controlled. Residue in the seed trench competes with seedlings for moisture and can harbor diseases.

Reveal® (Figure 1-2.) is frame mounted, so unlike other row cleaners, it gets rid of that row unit chatter. It has an internal gauge wheel that precisely controls the depth of the cleaning tines. It also has an airbag that makes sure the depth that it's set at, stays consistent. The pressure of the airbag can be controlled on the 20|20® monitor or utilizing a manual controller in the cab.

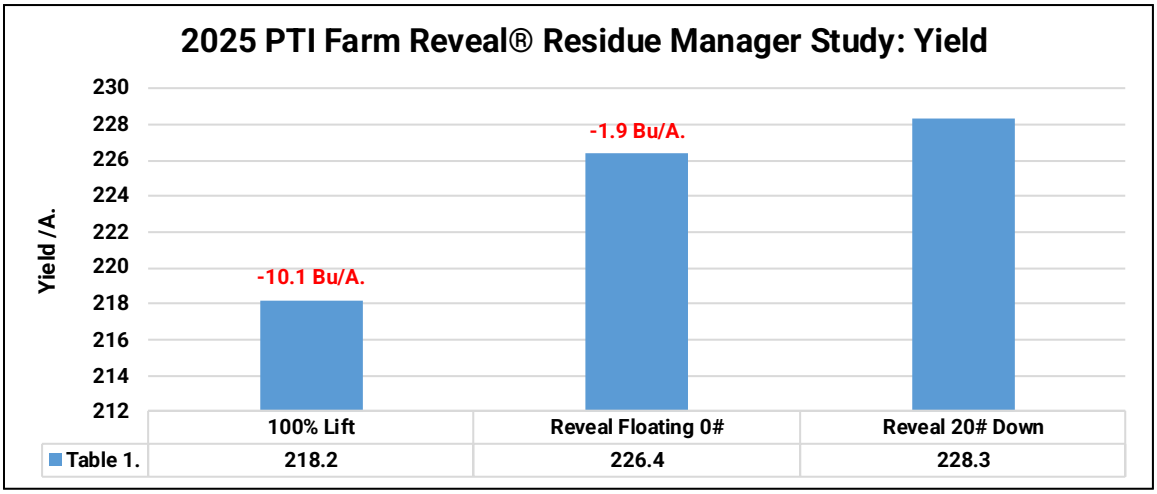
In this agronomic study, we compared the absence of row cleaners, and floating row cleaners to that of Reveal® at notch 1 and 20 PSI setting.

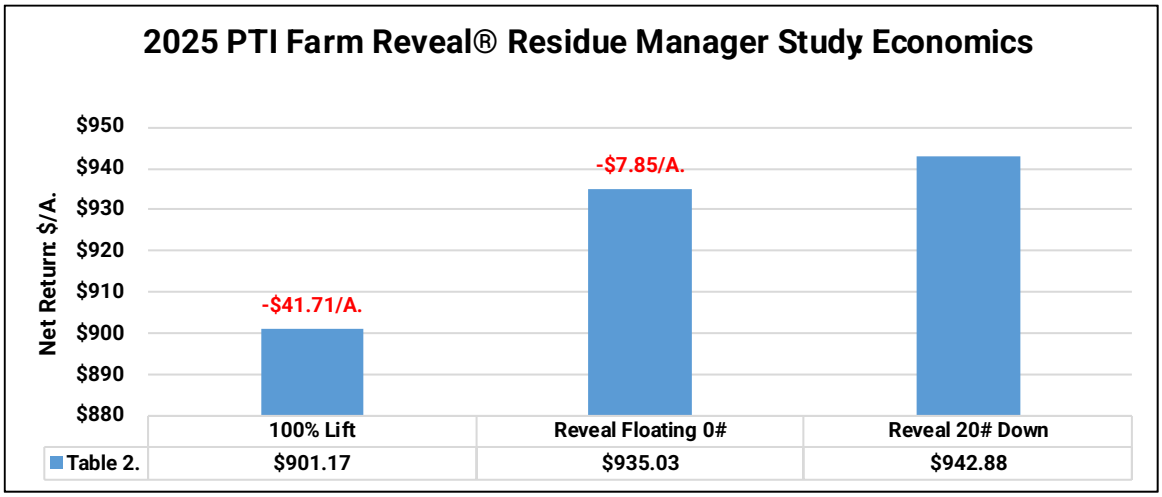
Figure 2. 20|20® System

2025 PTI Results

Reveal® Residue Management Study

Results: Table 1. illustrates the summary of all residue manager systems. Compared to the control of 100% lift, the Reveal® residue management system at 20# PSI down in notch 1, wheel settings, provided the highest yield gains in the study, with gains of +10.1 Bu/A, and corresponding return on investment of +$41.71/A. Floating row cleaners realized +1.9 Bu/A. gain to that of the control.





Planting Date: May 16th Hybrid: Channel 214-78 Tillage: Strip-Till Population: 36K Row Width: 30" Rotation: CAB Corn Price: $4.13

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Multi-Year Day of Emergence Study

Objective: This multi-year study illustrates the impact of yield loss when corn plants emerge from the soil surface on an inconsistent basis. Flag testing implementation (Figure 1.) was used to monitor the emergence timing of young plants each year. As corn first started to emerge from the soil surface, flags were placed at five different timings to identify the emergence of all plants within the study.

Figure 1. 12-Hr Flag Testing

Protocol:

12 hours = 1st initial plants to emerge

24 hours = Plants that emerged 24 hours later

36 hours = Plants that emerged 36 hours later

48 hours = Plants that emerged 48 hours later

48+hours= Plants that emerged >48 hours later

Results: Manual ear checks were completed to calculate potential yield loss from late emerging plants. Table 1. below summarizes yield loss as emergence varied over the 8-year study. Plants that emerge in the first 12 hours are considered the best achievable performance and therefore used as the baseline control with 100% yield potential. As plants emerged 24 hours later, **-11%** yield losses were realized compared to the first emergers. As emergence continued to 36-hour delays, yield fell to **-28%** losses. 48-hour delay in emergence resulted in yield deficits of **-59%** and finally, the latest emergers that came up >48-hours proved devastating losses of **-75%.**

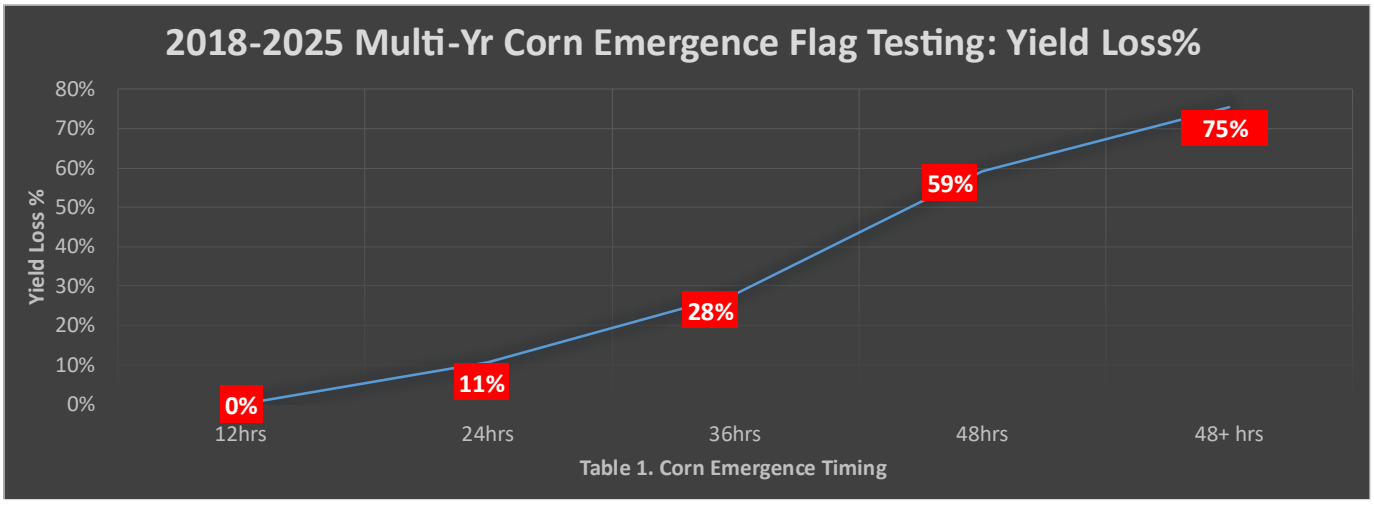


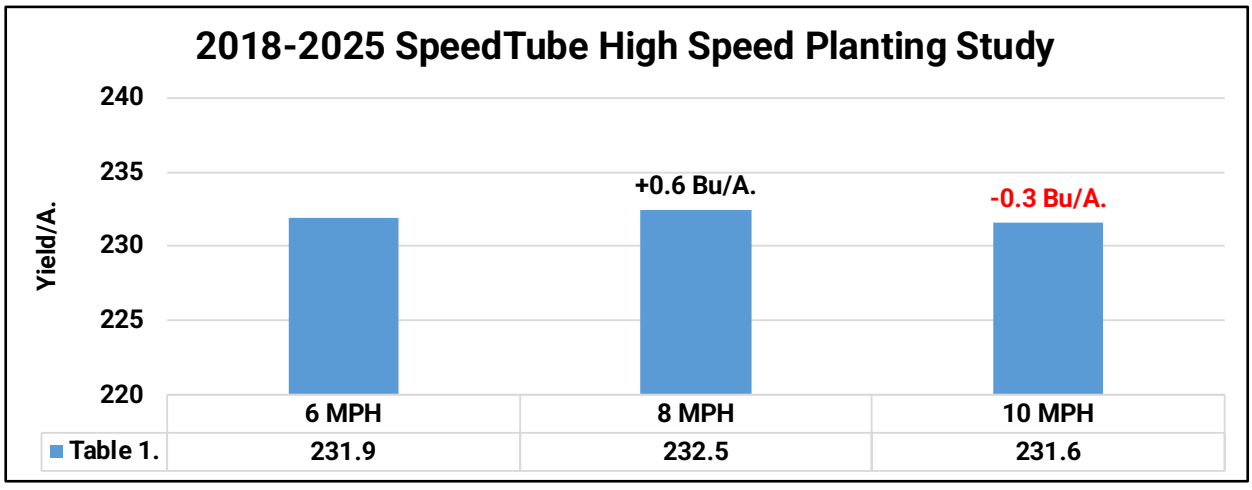
Table 1. Corn Emergence Timing

SpeedTube® Corn High Speed Planting Study

Objective: To evaluate yield response of planting speeds at 6, 8, and 10 MPH with a SpeedTube® system. This high-speed planting technology takes the place of conventional seed tubes and consists of a flighted belt. By transporting each seed to the furrow, there is no opportunity for seeds to ricochet into the trench. Even at twice normal planting speeds, seed arrives safely at the bottom of the trench, spaced evenly, every time.

Results: Table 1. summarizes multi-year data from 2018-2025, with planting at speeds of 6, 8, and 10 MPH, indicating yields varied less than 1 bushel per acre across all speeds.

With traditional planting speeds typically near 6 mph, this data would suggest that growers could plant faster without sacrificing planter performance, as long as true high speed technology is implemented. Faster planting would allow farmers to wait until planting conditions are perfect to plant.



Planting Date: May 5th *Hybrid: DKC 65-95RIB* *Population: 36K* *Row Width: 30"* *Rotation: CAB* *Corn Price: $4.13*

2025 PTI Results

High Speed Planting Without High Speed Technology Study

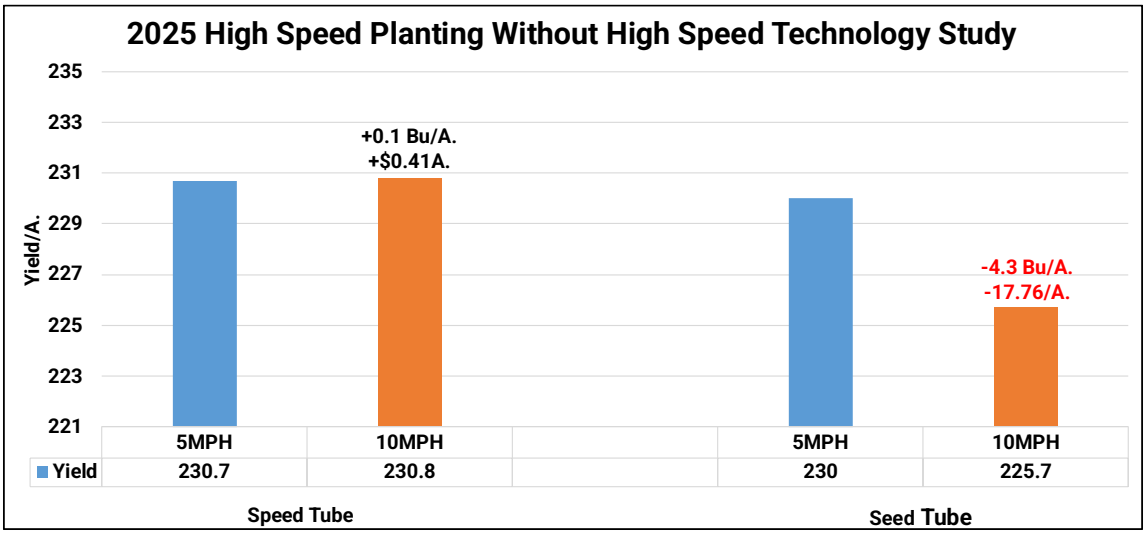
Objective: To evaluate yield response of planting speeds of 5 and 10 MPH with a WaveVision® Seed tube system and a SpeedTube® system. Seed tubes are designed for typical planting speeds of 4 to 6 MPH and is not high speed technology.

Figure 1. WaveVision® SeedTube

WaveVision® is a seed sensor within the seed tube that counts only seeds and not dust, giving you confidence that the population you see on your monitor is the population that you're planting. WaveVision® does not incorporate an optical sensor in the housing, meaning there is no opportunity for seeds to ricochet into the trench. Instead, high-frequency radio waves measure mass instead of shape.

SpeedTube® is high-speed planting technology that takes the place of conventional seed tubes and consists of a flighted belt. By transporting each seed to the furrow, there is no opportunity for seeds to ricochet into the trench. Even at twice normal planting speeds, seed arrives safely at the bottom of the trench, spaced evenly, every time.

Results: The table below illustrates how seed tube performance fell by **-4.3 Bu/A.** when increasing planting speed from 5MPH to 10MPH, resulting in economic losses of **-$17.76/A.** However, high speed planting technology resulted in actual yield gain of +0.1 Bu/A. and economic gains of +$0.41/A.



Planting Date: May 5th *Hybrid: Channel 214-78* *Tillage: Strip-till* *Population: 36K* *Row Width: 30"* *Rotation: CAB* *Corn Price: $4.13*

FurrowForce® Closing System Study

Objective: To evaluate the yield response of FurrowForce® closing system at 3 different system pressures. This study evaluates the benefits of planter retrofitted with a FurrowForce® system. Setting your closing system correctly is tough. FurrowForce® is a two-stage closing system that adapts to your planting conditions to remove air pockets and firm soil to keep moisture, giving you confidence that your crops will germinate the best that they can.

Figure 1. FurrowForce®

In the first stage, notched wheels work to close the seed furrow from the bottom up, fracturing to eliminate air pockets, even in extreme no-till conditions where traditional closing systems struggle. In the second stage, stitch wheels carry weight on them to firm the soil. This consistent firming is especially beneficial behind spring tillage where the seed environment is at risk of drying out.

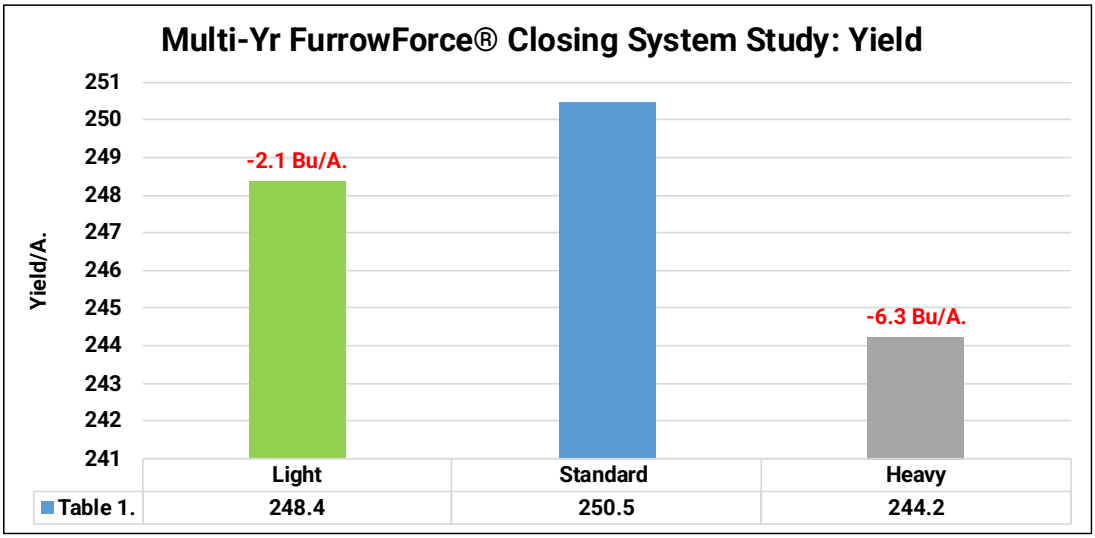
In this study, we use air pressure to push down or release air on our closing system to change and evaluate the aggressiveness of closing the furrow.

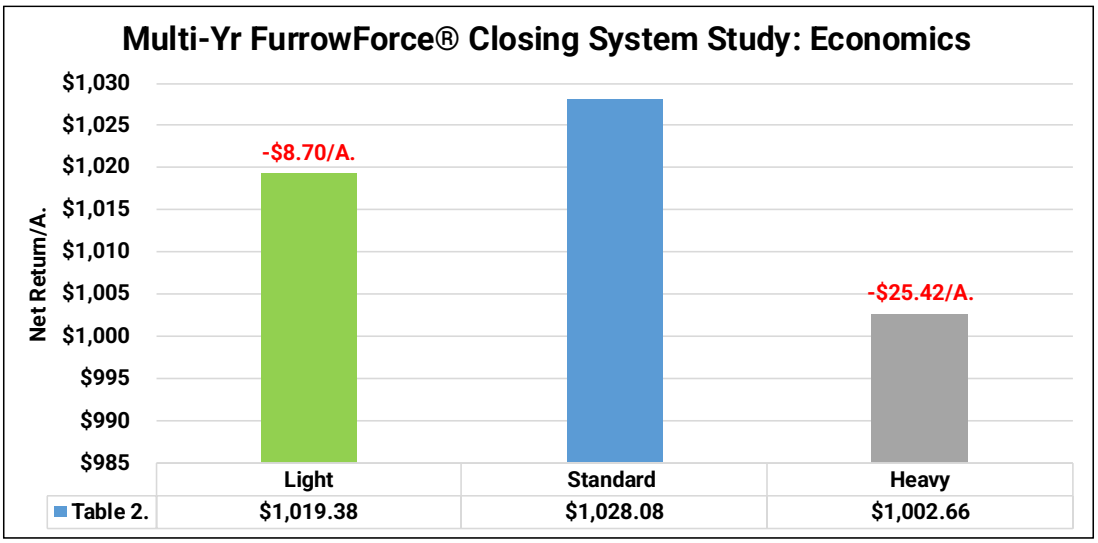
These agronomic settings consisted of:

- Light – 15 PSI down
- Standard – 35 PSI down
- Heavy – 55 PSI down

FurrowForce® Closing System Study

Results: Tables 1. illustrates multi-year FurrowForce® yield results from the PTI Farm. A light pressure setting proved a yield loss of **-2.1 Bu/A.** against the standard setting resulting in an economic loss of **-$8.70/A.** Using a heavy pressure setting resulted in a yield loss of **-6.3 Bu/A.** equating to an economic loss of **-$25.42/A.**





Planting Date: May5th Hybrid: Golden Harvest 12U11 Tillage: Strip-Till Population: 36K Row Width: 30" Rotation: CAB Corn Price: $4.13

Corn Tillage/Closing Wheel Study

Objective: To evaluate the performance of non-sensing single-stage and two-stage automatic sensing closing systems in four different tillage practices including conventional, strip, vertical, and no-till.

Closing systems are designed to close the seed trench, eliminate sidewall smear, compaction and to remove air pockets, all while achieving good seed-to-soil contact.

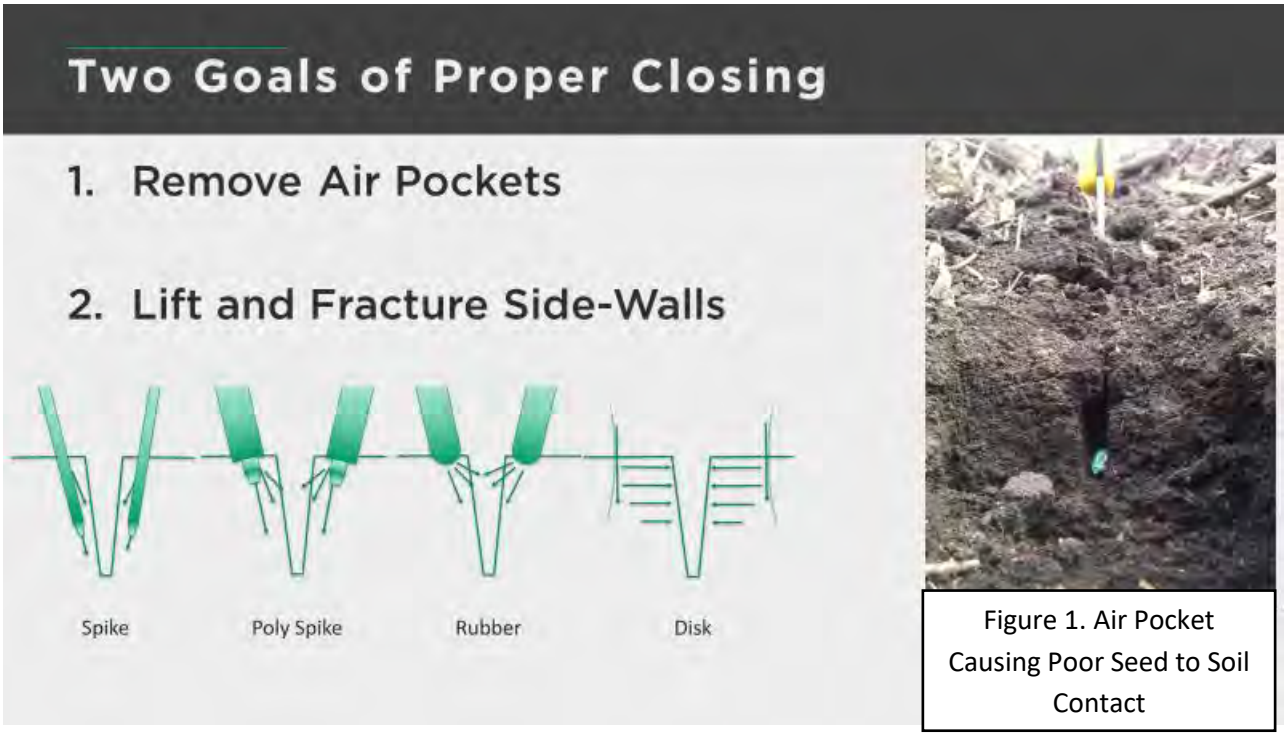


Figure 1. Air Pocket Causing Poor Seed to Soil Contact

Figure 2. Good Seed to Soil Contact

Corn Tillage/Closing Wheel Study

This tillage/closing study evaluates yield and economics of six distinctly different types of closing wheel systems, in four different tillage systems including the following:

FurrowForce® Automated Control Closing System:

Advantages:	Lifts and fractures sidewall compaction/smear
	2nd stage stitching and removal of air pocket
	Ability for automatic sensing/control of soil variability
Disadvantages:	Rocks can be problematic, increased cost

Non-Sensing Traditional Dual Rubber Closing System:

Advantages:	Sealing or “Pinching” in dry conditions
Disadvantages:	Difficult to lift/fracture sidewalls, struggles to close furrow

Non-Sensing Dual Yetter Poly Twister® Closing System:

Advantages:	Lifts and fractures sidewall compaction/smear
	Center ring acts as depth maintainer
Disadvantages:	Lightweight wheels require increased tension

Non-Sensing Martin-Till® fCrusher Closing System:

Advantages:	Tapered tooth design – Lightweight Cast
	Allows firming and crumbling.
Disadvantages:	Single Stage, Potential to Overpack

Non-Sensing Case Manual Two Stage with Cupped Razor Closing Disc System:

Advantages:	Lifts and fractures sidewall compaction/smear
	2nd stage removal of air pocket
	Multiple Manual Settings for easy adjustment
Disadvantages:	Manual control – no sensing

Corn Tillage/Closing Wheel Study

Non-Sensing Case Manual Two Stage System:

Advantages:	Lifts and fractures sidewall compaction/smear
	2nd stage removal of air pocket
	Multiple Manual Settings for easy adjustment
Disadvantages:	Manual control – no sensing

Figure 1.Kuhn® EXCELERATOR® XT 8010 Vertical Tillage

Four tillage systems were evaluated in the study to evaluate the difference in closing performance.

Vertical-Till (Figure 1.) In the fall after harvest, vertical tillage was used to mix, cut, and level residue in a 3" depth tillage pass. Herbicide was used as a burndown to control early season weeds in the absence of spring tillage.

No-Till: (Figure 2.) Planting directly into last year's soybean stubble with no tillage activity performed. Herbicide was used as a burndown to control early season weeds in the absence of tillage.

Figure 2. No-Till Planter

Conventional-Till (Figure 3.) In the fall after harvest, deep 13" ripping with aggressive cutting and mixing of residue. A spring soil finisher leveled before planting.

Figure 3. Kuhn® Dominator® 4857

Strip-Till (Figure 4.) In the fall after harvest, 10" deep strips were created with a strip-till unit. Herbicide was used as a burndown to control early season weeds in the absence of spring tillage.

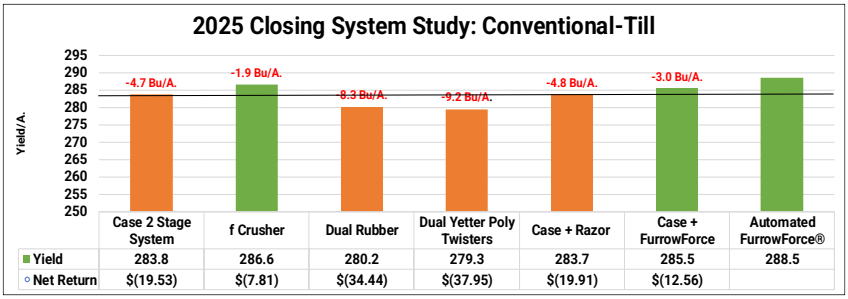
Figure 4. Kuhn® 1200 Gladiator® w/ Montag® Fertilizer Cart

2025 PTI Results

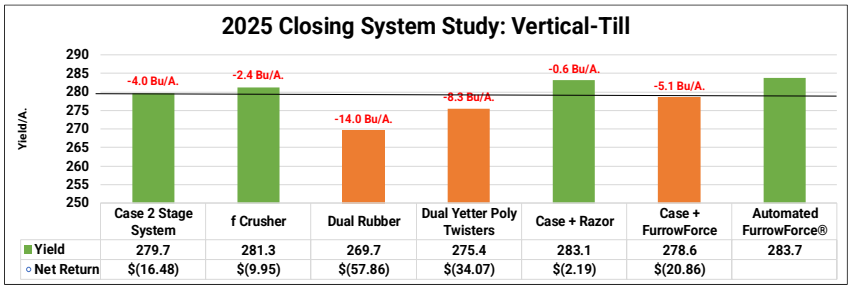
Corn Tillage/Closing Wheel Study

Results:

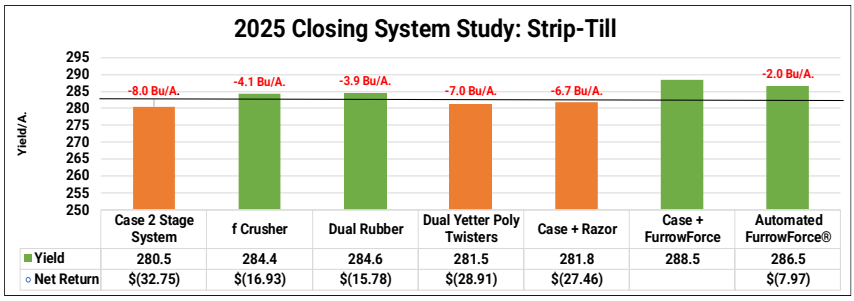
Conventional Till: Automated FurrowForce® outperformed all other closing systems in conventional tillage, with yield advantages ranging from +1.9 Bu/A. to +9.2 Bu/A. Martin fCrusher and Case + Automated FurrowForce® offered above average yields compared to other closing systems in this tillage program



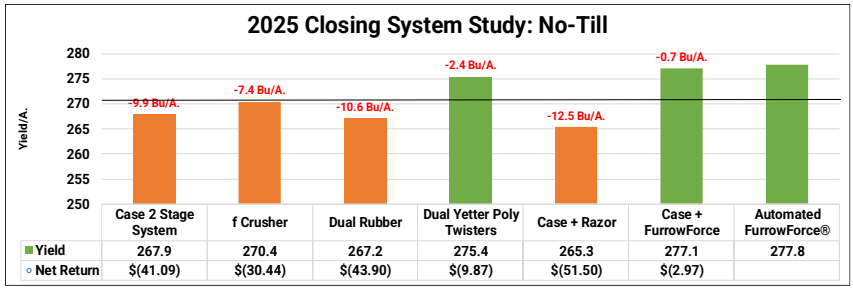
Vertical-Till: Automated FurrowForce® proved positive yield gains compared to all other closing systems by +0.5 Bu/A. to +14.0 Bu/A. As planting conditions became more challenging, Dual Rubber proved the highest yield losses of **-14.0 Bu/A.** with associated revenue losses of **-$57.86/A.** Top performers in this tillage program included Case 2 Stage, Case + Martin Spike, and Martin fCrusher.



Strip-Till: Case with Automated FurrowForce® proved positive yield gains compared to all other closing systems by +0.3 Bu/A. to +4.1 Bu/A. Top performers in this tillage program included Standard Automated FurrowForce, Dual Rubber and Martin fCrusher.



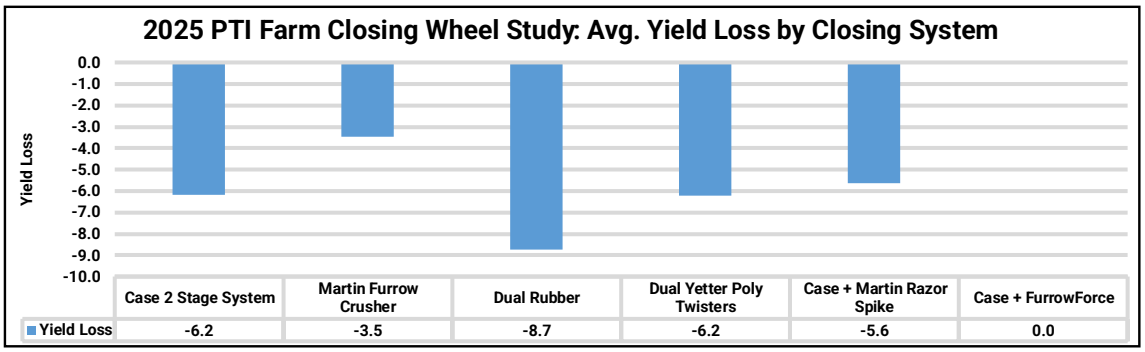
No-Till: Both Automated FurrowForce® systems outperformed all other closing systems with yield gains of +0.7/A. to +12.5 Bu/A. In this tougher to close environment the only other closing system that preformed above average was Dual Yetter Poly Twisters.

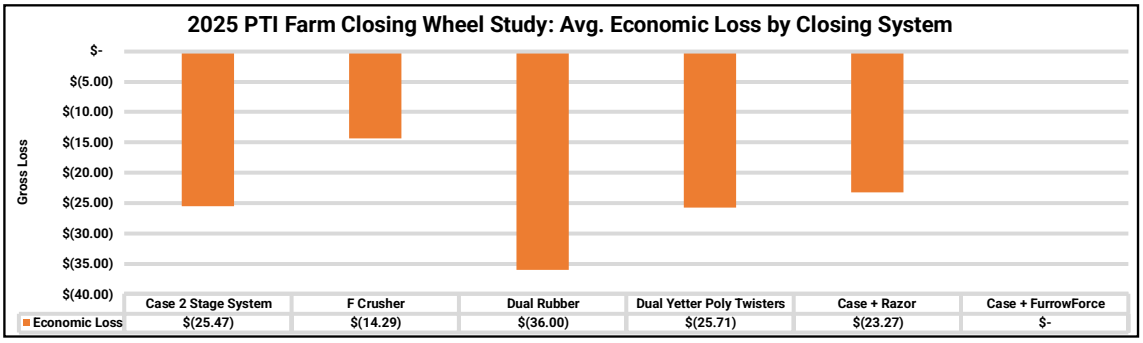


Corn Tillage/Closing Wheel Study

Overall, FurrowForce® two-stage automated closing system resulted in average yield gains of +5.0 Bu/A. and additional revenue of +$20.79/A. across all tillage environments.

However, the clear advantage for FurrowForce® occurred in reduced tillage environments such as no-till and vertical tillage. In these programs, average yield gains of up to +5.6 Bu/A. to +7.3 Bu/A. with increased revenue of +$23.60/A. to +$30.00/A. indicate that in tougher closing situations, a more robust system is needed to effectively close the furrow.





In summary, for years planters have struggled with closing systems with manual settings that offered the inability to account and change for varying soil conditions. Today, we are excited that technology finally exists where farmers can use sensing technology on the planter row unit to determine how much force is needed on closing systems to address soil variability. By using a robust 2-stage closing system, load pin, and sensing architecture, partnered with a 20|20® monitor, farmers can be confident of closing the seed trench, eliminating sidewall compaction/smearing, and removing air pockets all while planting through various seedbed conditions on a pass-pass basis.

Planting Date: May 8th *Hybrid: DKC 114-99* *Population: 36K* *Row Width: 30"* *Rotation: CAB* *Corn Price: $4.13*

ExactEmerge® FurrowForce® Closing System Study

Objective: The PTI Farm Team conducted seven off-site testing locations across east central Illinois to compare the closing performance of FurrowForce®, an automatic 2-stage closing system compared to a manual single stage non-sensing Yetter Poly Twister® system installed on a John Deere 1775 ExactEmerge® planter.

Figure 1. FurrowForce®

FurrowForce® Automated Control Closing System:

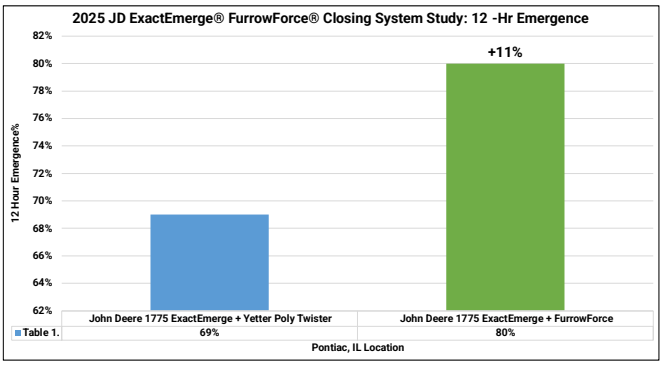
Advantages:	Lifts and fractures sidewall compaction/smear
	2nd stage stitching and removal of air pocket
	Ability for automatic sensing/control of soil variability
Disadvantages:	Rocks can be problematic, increased cost

Figure 2. Yetter Poly Twisters®

Non-Sensing Manual Yetter Poly Twister® Closing System:

Advantages:	Lifts and fractures sidewall compaction/smear
	Center ring acts as depth maintainer
Disadvantages:	Lightweight wheels require increased tension

ExactEmerge® FurrowForce® Closing System Study

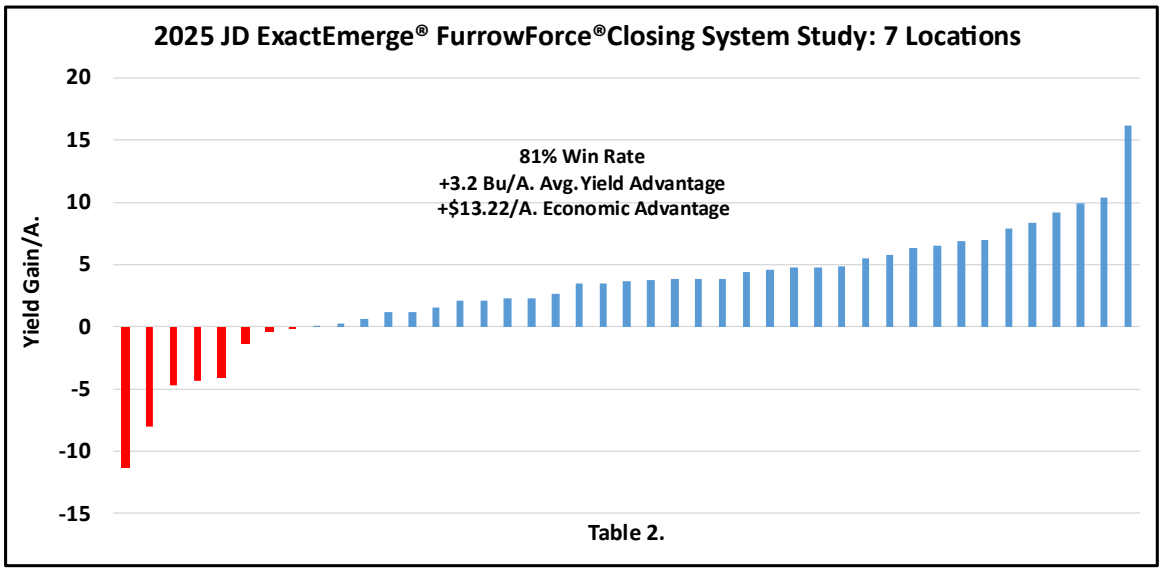


FurrowForce® is a two-stage closing system that adapts to your planting conditions to remove air pockets and firm soil to keep moisture, giving confidence of good seed to soil contact.

In the first stage, notched wheels work to close the seed furrow from the bottom up, fracturing to eliminate air pockets, even in extreme no-till conditions where traditional closing systems struggle. In the second stage, stitch wheels carry weight on them to firm the soil. This consistent firming is especially beneficial behind spring tillage where the seed environment is at risk of drying out.

Results: Table 1. illustrates 12-hr emergence timing for both closing systems from the Pontiac, IL site location, with FurrowForce® resulting in 80%, in other words 80% of all corn plants emerged within the first 12-hr timeframe, +11% higher than the Yetter Poly Twister.

Table 2. summarizes the yield advantages of FurrowForce® over 43 replications, using 7 corn hybrids, on 7 different east central Illinois farms. With a win rate of 81%, FurrowForce® tallied average yield gains of +3.2 Bu/A. with economic gains of +$13.22/A.



Planting Date: May 10th Hybrid: DKC 66-06, 65-95, Pioneer 1742Q, 14830, 09312V Pop: 36K Row Width: 30" Rotation: CAB Corn Price: $4.13

DownForce Management Study

Figure 1. DeltaForce® Cylinder

Objective: Planter row unit downforce is a common agronomic issue that often goes unaddressed. This study evaluates yield impact of implementing proper downforce, compared to too light or too heavy row unit settings. When downforce matches field conditions, the depth of planting is consistent and correct. Too light of row unit downforce causes planting depth to shallow up, potentially placing seed in dry soil, thus creating poorly rooted plants that struggle for water and nutrients. Conversely, too much downforce can lead to furrow side-wall compaction, also creating an environment that can cause limited plant access to water and nutrients.

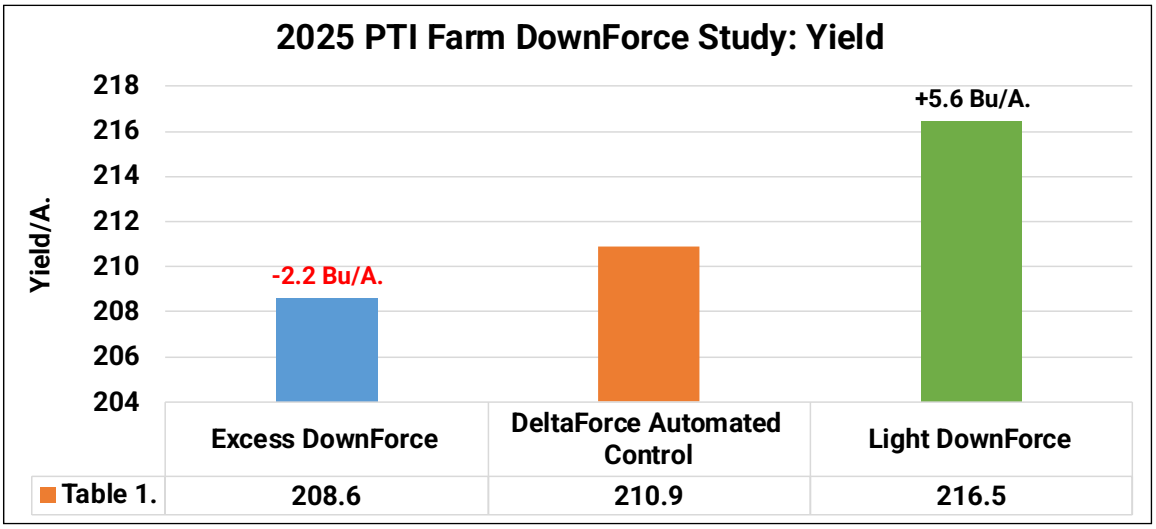
DeltaForce® system replaces the springs or air bags on your planter with hydraulic cylinders (Figure 1.) It automatically increases or decreases weight with military precision, on each row individually. When one row encounters conditions different than another (wheel tracks, old roadbeds, clay knobs, headlands, etc.), each will adjust independently (Figure 2). Row by row, foot by foot, and seed by seed, you produce an environment that fosters uniform germination, optimum growth, and maximum yield.

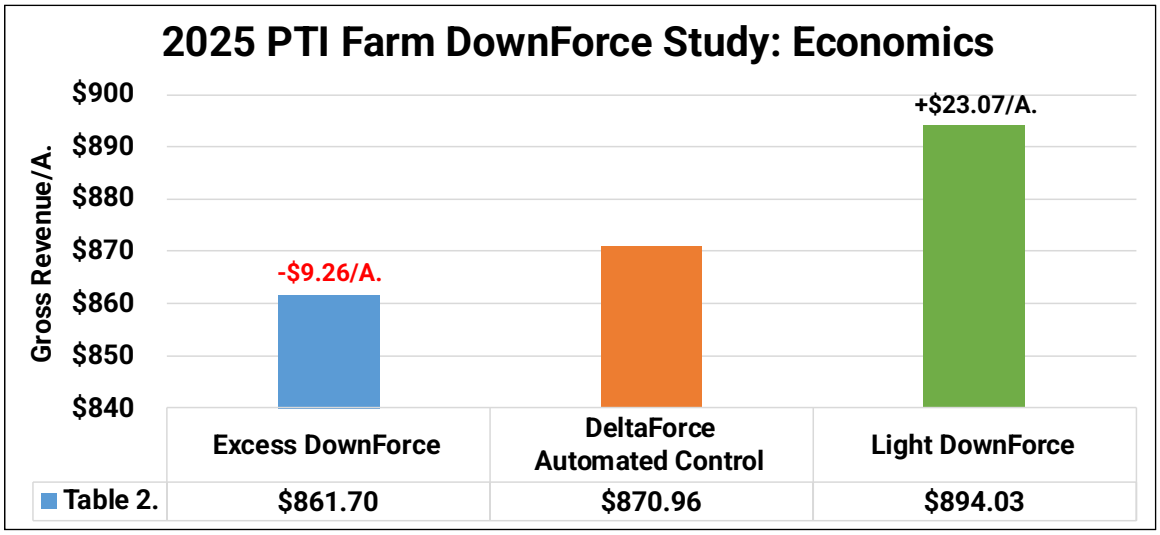
Figure 2.

DownForce Management Study

Results: Table 1. illustrates the yield response of DeltaForce® automated control (Custom 120#) compared to excessive and light downforce settings. Too light of downforce (175# lift, 100# down) resulted in yield increases of +5.6 Bu/A., while excess downforce (550# down, 100# up) resulted in a yield decrease of **-2.2 Bu/A.**

Table 2. reveals the economics of the automated downforce system. Light downforce had the largest overall gains of +$23.07/A., while excess downforce resulted in a small loss of **-$9.26/A.**





2025 PTI Results

DownForce Management Study

Table 3. illustrates multi-year downforce yield results over the time-period of 2018 to 2025 at the Precision Planting PTI Farm. During these growing seasons, light downforce resulted in yield losses of **-10.4 Bu/A.** compared to automated control with a DeltaForce® system. Excess downforce resulted in losses as well, however at only **-4.5 Bu/A.**

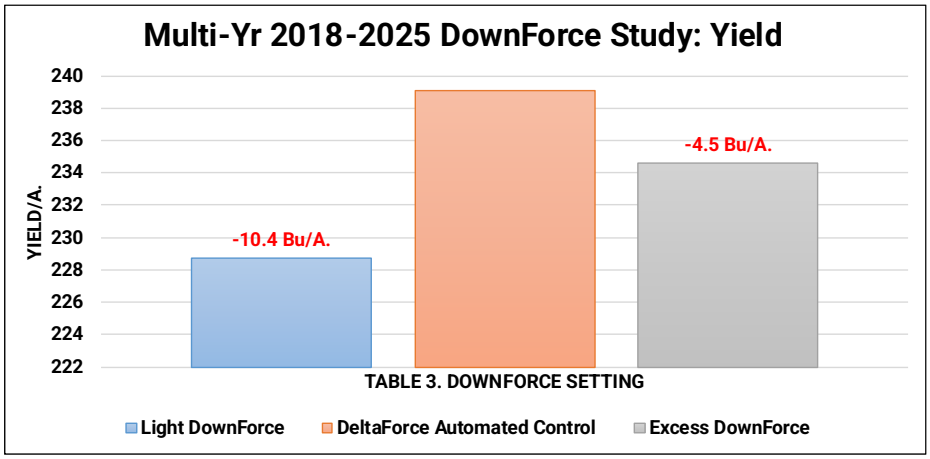
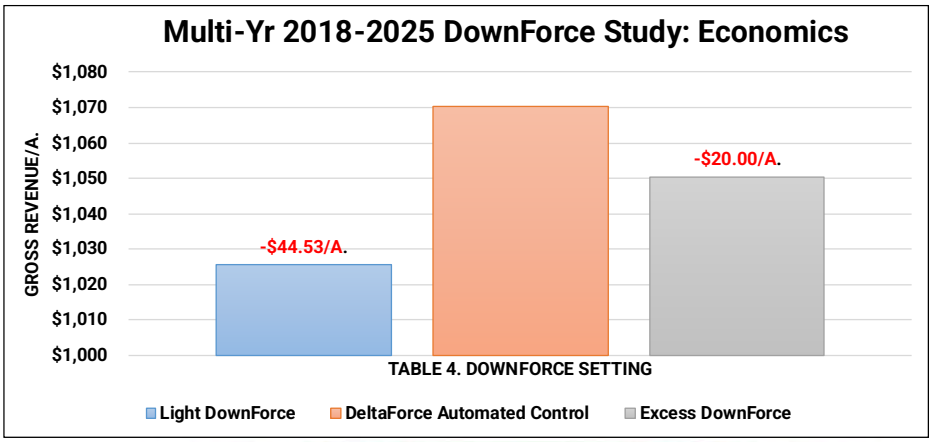


Table 4. depicts the same multi-year time-period, but economics rather than yield. Over 2018-2025, light downforce resulted in economic losses of **-$44.53/A.** and excess downforce of **-$20.00/A**.



In summary, when downforce matches field conditions, the depth of planting is consistent and correct. By measuring with the DeltaForce® system, farmers can react and take control to ensure proper downforce and eliminate yield and economic losses.

Planting Date: May 12th *Hybrid: Channel 214-78* *Population: 36K* *Row Width: 30"* *Rotation: CAB* *Corn Price: $4.13*

PTI ILLINOIS

Keeton® Seed Firmer Study

Objective: This study evaluates the benefits of Keeton® Seed Firmers (Figure 1). Seeds don't always land right at the bottom of the trench where they belong. With its unique, in-the-trench design, the Keeton® Seed Firmer gently firms those seeds to the bottom of the V-trench (Figure 1). The end result is even depth, correct seed-to-soil contact, and most importantly uniform germination.

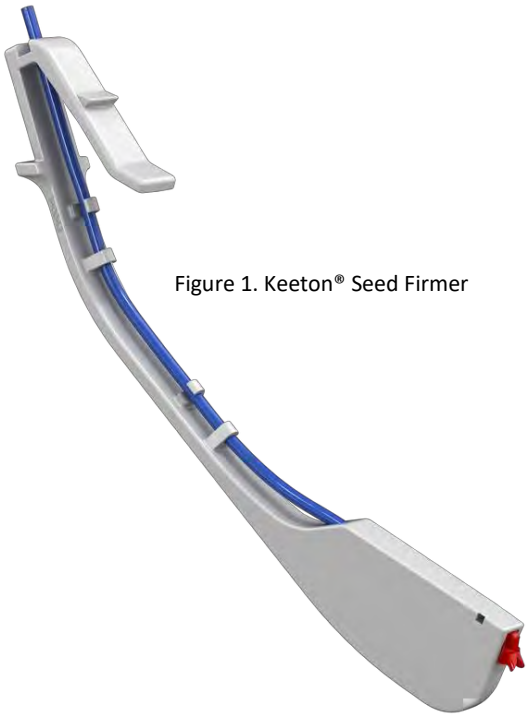
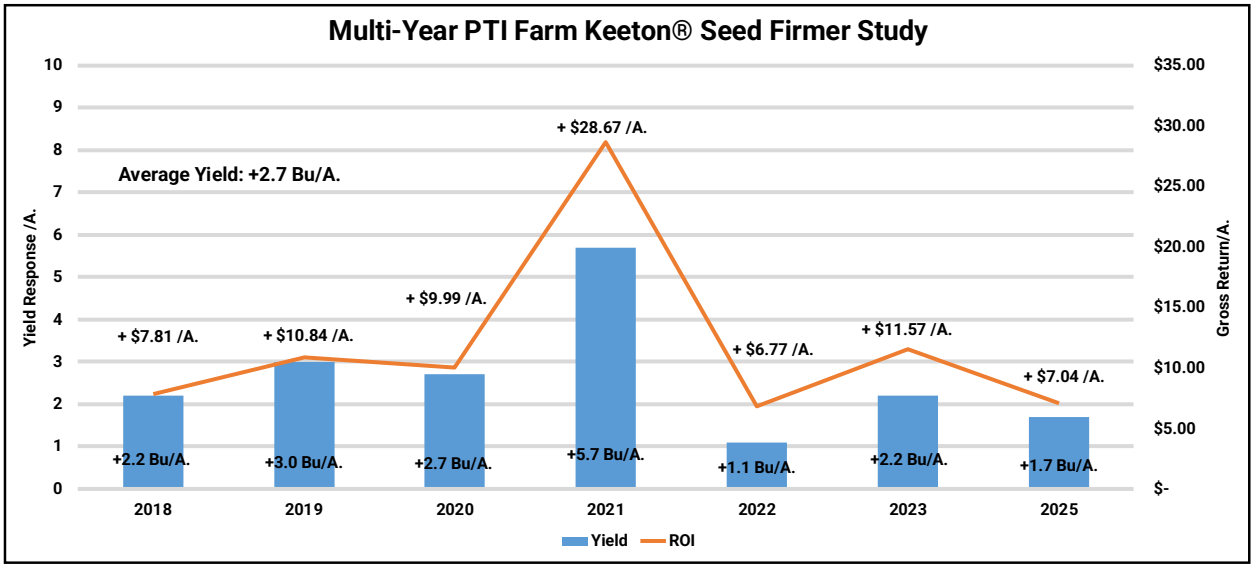


Figure 1. Keeton® Seed Firmer

Results: In 2025, Keeton® Seed Firmers resulted in yield gains of +1.7 Bu/A. with a return on investment of +$7.04/A.

The table below illustrates multi-year data over the period of 2020-2025 where Keeton® Seed Firmers have resulted in an average yield gain of +2.7 Bu/A, with a net return of +$11.81/A.

At a cost of $40/row for Keeton® Seed Firmers and quick attach brackets for a 16-row planter, using the +$11.81/A. increase in revenue, break-even occurs at only 55 acres.



Planting Date: May 12th *Hybrid: Channel 214-78* *Population: 36K* *Row Width: 30"* *Rotation: CAB* *Corn Price: $4.13*

2025 PTI Results

Planter "All Wrong Study"

Objective: This planter trial is designed to simulate yield and economic effects when a grower gets downforce, residue manager settings, and singulation incorrect on the planter, all at the same time. For this study we implemented light downforce, "goof" plates to achieve 95% singulation, and removed the use of residue managers.

Results: Table 1. reveals "All Wrong" planter settings caused average yield losses of **-15.6 Bu/A.** over the past five years. Table 2. calculates average economic losses of **-$78.44/A.** when all three planter settings were incorrect. For more information on individual performance of these attributes, please see multiyear summary results for downforce management, residue management trials, and singulation studies.

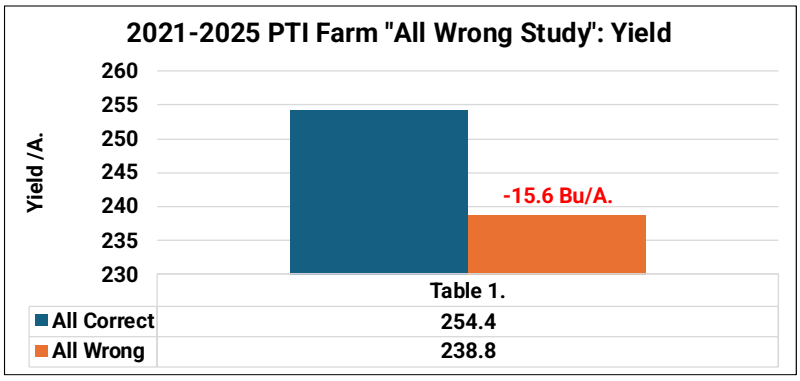


	Table 1.
All Correct	254.4
All Wrong	238.8

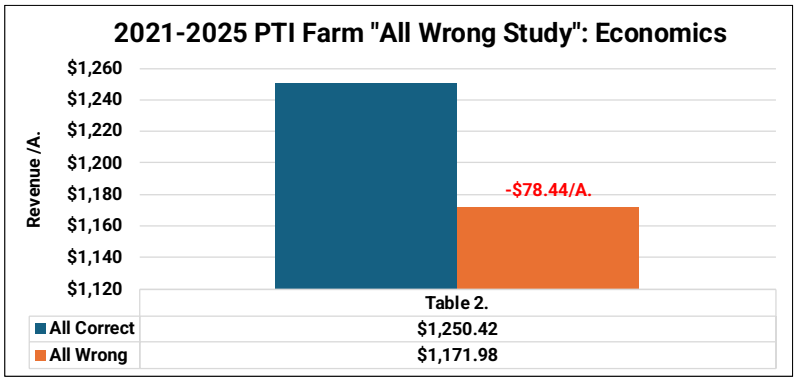


	Table 2.
All Correct	$1,250.42
All Wrong	$1,171.98

Planting Date: May 12th *Hybrid: Channel 214-78* *Tillage: Strip-Till* *Population: 36K* *Row Width: 30"* *Rotation: CAB* *Corn Price: $4.13*

Fendt® Momentum™ Load Logic Weight Mgt and Tire Inflation Study

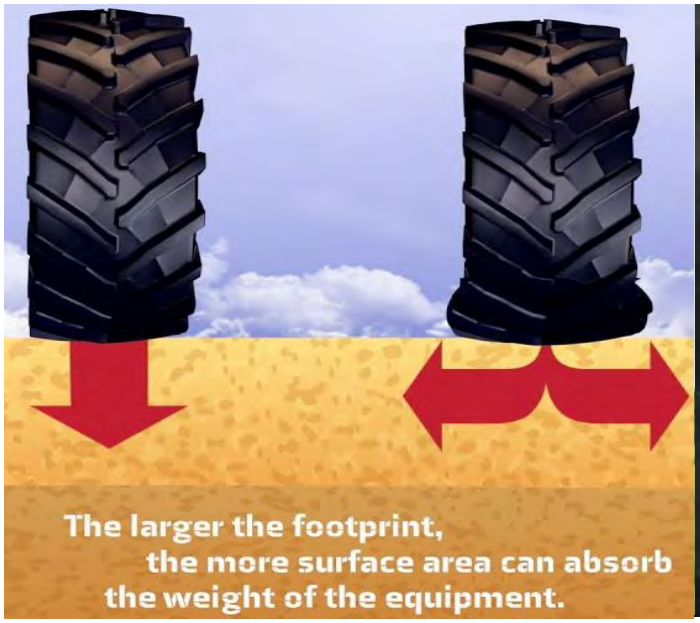
Objective: To evaluate the yield benefit of AGCO's Fendt® Momentum™ planter, equipped with a Load Logic System (Figure 1). In 2020, AGCO released the all-new Fendt® Momentum™ planter equipped with key agronomic features to help alleviate pinch row compaction. One of those key features is the Load Logic system that includes hydraulic weight distribution and a tire pressure control system. Load Logic uses load cells to determine the available weight per tire, adjusting to weight distribution hydraulically across the entire planter and tractor.

Figure 1. Fendt® Vario® Grip Load Logic Weight Mgt

In this study, we compare four different modes on the planter and tractor.

1. Automatic Weight Management + Automatic Low Tire Pressure
2. Automatic Weight Management + High Tire Pressure
3. Weight Management OFF + Automatic Low Tire Pressure
4. Weight Management OFF + High Tire Pressure

Figure 2. Fendt® Vario® Grip Load Logic Tire



Fendt® Momentum™ Load Logic Weight Mgt and Tire Inflation Study

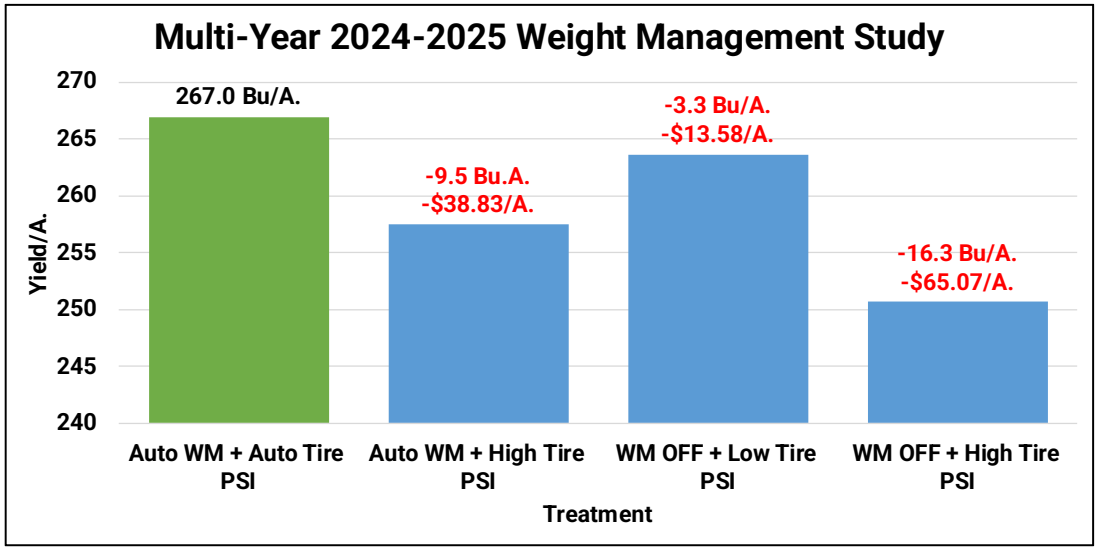
Results: Table 1. illustrates multi-year 2024-2025 data indicating that highest yield of 267 Bu/A. has been derived from the combination of using both the automatic planter weight management system, in addition to the automatic low tractor tire air pressure. Using this as the best-case scenario (control), we can determine the following:

- ✓ Lowest yield of 250.7 Bu/A. occurred by turning both the automatic planter weight management system in additional to using high tractor and planter tire pressure, resulting in **-16.3 Bu/A.** yield and **-$65.07/A.** economic losses.

- ✓ Turning the automatic planter weight management system off and utilizing only the automatic low tractor and planter tire pressures, minimized losses to only **-3.3 Bu/A.** and **-$13.58/A.**

- ✓ Turning the automatic planter weight management system on and using high tractor and planter tire pressures, resulting in losses of **-9.5 Bu/A.** and **-$38.83/A.**

- ✓ 2-year data might suggest that tire pressure management could offer the highest agronomic advantage in this study. As automatic tire inflation systems are NOT widely adopted by growers, this early data stands to reason that more attention needs to be paid to the agronomic benefits of this technology.



Planting Date: May 5th Hybrid: DKC 65-95 Tillage: Strip-Till Population: 36K Row Width: 30" Rotation: CAB Corn Price: $4.13

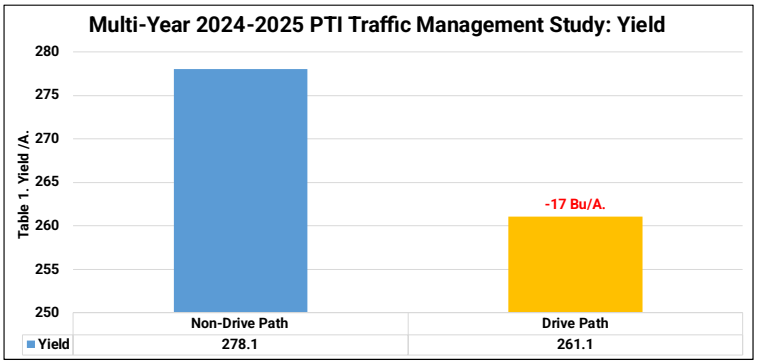
Traffic Management Study

Objective: To evaluate the yield and economics of wheel traffic patterns. With every equipment pass made, growers have the opportunity to create compaction, soil density issues, and potentially lower yields. Compounded with the problem of harvesting equipment not having the ability to measure row-by-row yield, this studies goal is to identify the wheel traffic and measure the yield loss in those individual rows.

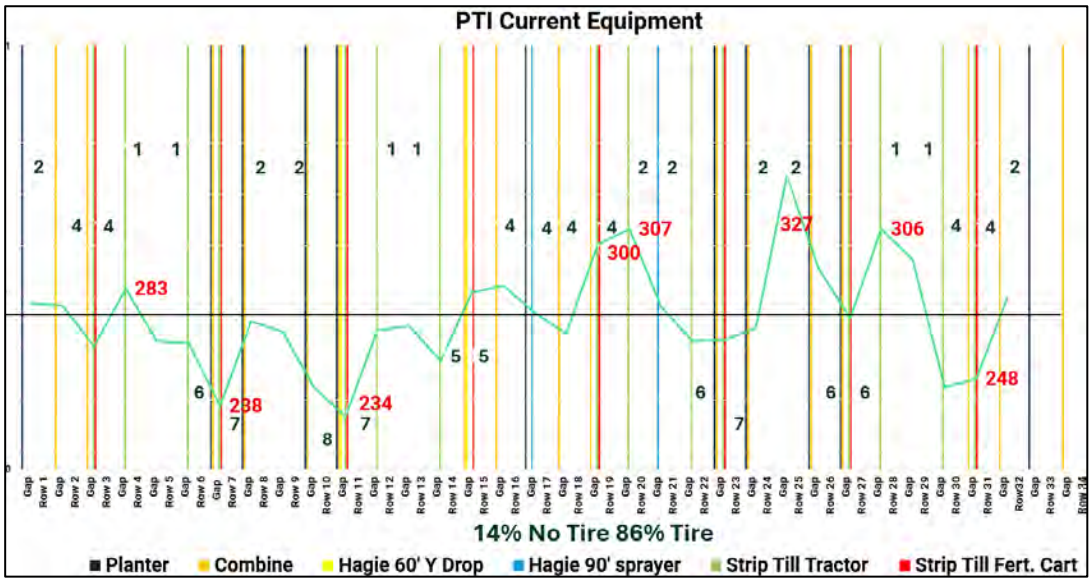
2025 PTI Results

Traffic Management Study

Results: With the current equipment at the PTI Farm, wheel traffic has occurred at some degree on 86% of all rows, meaning that only 14% of the field has no wheel traffic. Table 1. illustrates that combined wheel traffic rows have resulted in average yield losses of **-17.0 Bu/A.** over the first two years of this study in 2024 and 2025.



The table below layers the traffic passes over 32 rows of corn, indicates how many tire tracks are made/row, and even more importantly reveals yield losses/row because of the traffic pass. Over the 32 rows, yield varied by 93 Bu/A., ranging from 234 to 327 Bu/A. Row by row corn yield was revealed by hand collecting and shelling each row, highlighting the yield variance over each set of 32 corn rows. The black line across the map indicates the average corn yield of all 32 rolls being 272 Bu/A. Typically, a grower may think this is acceptable yield, however if current yield monitor equipment could measure and identify the wide variance of yield row by row, a grower might be able to measure and identify areas of improvement such as traffic management.



As this is the second of a ten-year study, we look forward to evaluating this in the future to better understand measuring wheel traffic and how we can potentially manipulate equipment width to minimize the amount of wheel traffic.

Planting Date: May 10th Hybrid: DKC 65-95 Tillage: Strip-Till Population: 36K Row Width: 30" Rotation: CAB Corn Price: $4.13

PTI ILLINOIS

mSet® Multi-Genetic Planting Study

Objective: To analyze the yield and economic benefit of implementing mSet® single meter multi-genetic technology to place specific corn hybrids for individual spatial management zones.

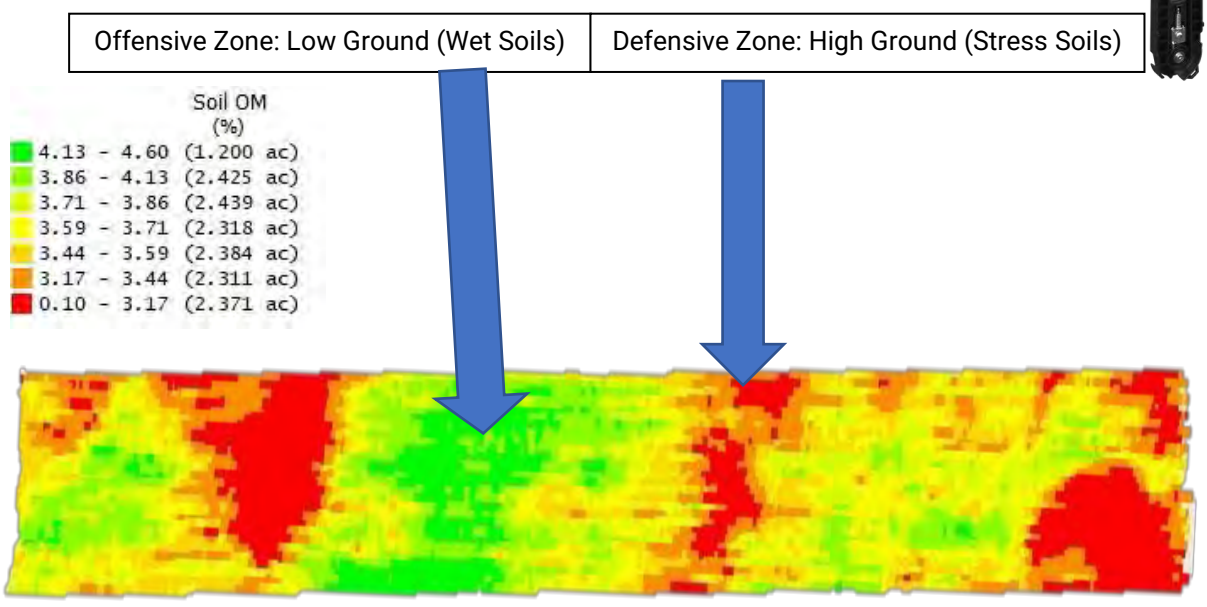
mSet® is an upgradeable product to vSet® meters and vDrive® controller, which couples a seed selector added to the hopper to switch hybrids, and a seed pool level sensor in the meter (Figure 1.) The level sensor tells the seed selector when the meter needs more seed, and it drops a dose of seed into the meter. This continually happens until it is time to switch hybrids. At hybrid change, the level sensor will let the seed pool run low, then call for a dose of the other hybrid to enter the meter just in time for the change, leading to a short transition between hybrids. The seed pool is controlled by the mSet® selector (Figure 2.), providing the correct hybrid in the meter, and allowing the vSet® meter to accurately singulate those seeds. The ultimate result is the hybrid you select, planted in the area of the field you select, planted with highest accuracy of singulation. Additionally, for those who want to both plant fast, and place hybrids by spatial zone variability, SpeedTube® system can be used in tandem with multi-genetic technology (Figure 3).

Figure 1. mSet® Box

Figure 3. Speedtube®

Figure 2. mSet®

Figure 4. Offensive and Defensive Spatial Zones



mSet® Multi-Genetic Planting Study

Results: For this spatial study, DeKalb 66-06 Trecepta was used as our offensive corn hybrid in the lower elevation, higher OM, but potentially saturated soils. Conversely, Pioneer 12065Q was used as the defensive hybrid planted into the higher ground, lower OM, and potentially droughty soils. Each genetic package was placed into the appropriate matching spatial management zone (Figure 4). Test blocks were planted to evaluate the yield performance when hybrids were placed correctly, as well as incorrectly.

Figure 5. illustrates the results of multi-hybrid planting in 2025 and this year ended up being the year of the "dog". Multi-hybrid placement in the defensive zones resulted in yield losses of **-28.7 Bu/A.** and corresponded to economic losses of **-$118.53/A.** This hybrid selection was the worst performance in our multi-hybrid trials since inception at the PTI Farm. Alternatively, multi-hybrid placement in the offensive zones proved yield gains of +27.3 Bu/A. with increased revenue of +$112.75/A.

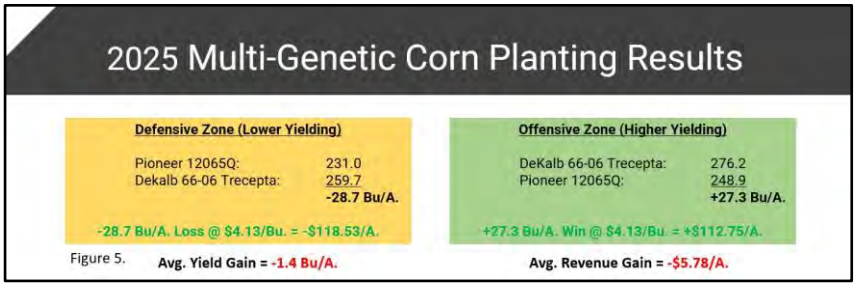


Figure 5.

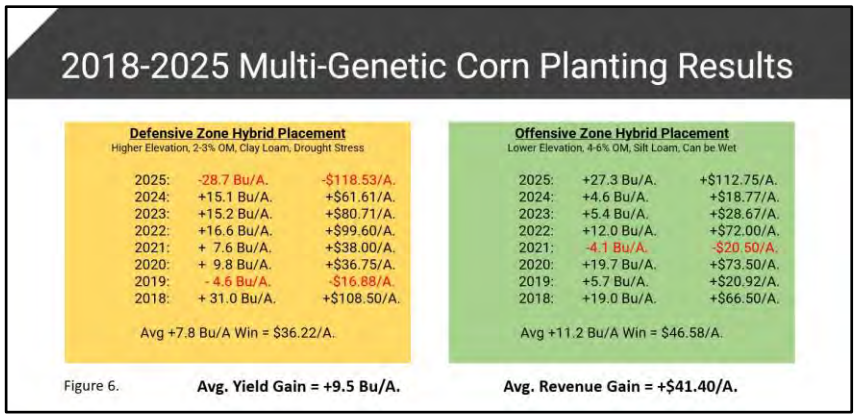


Figure 6.

Figure 6. summarizes multi-genetic corn planting performance over the eight-year time period of 2018-2025. During this timeframe, multi-genetic corn has offered increased yield gains of +9.5 Bu/A. with additional farm revenue of +$41.40/A. in increased revenue. In each zone placement over the last 8 years, two have been incorrect in the defensive zones and only one incorrect in the offensive zones. This track record would suggest an average of 80% (75% defense, 85% offense) success rate for choosing the optimum hybrid placement over 2018-2025 for each high/low yield zone. Based on this multi-year data, if a grower invested $1000/row on a 16-row planter for multi-hybrid technology, these types of yield and economic gains could result in return on investment at only 387 acres. These yield results confirm that a multi-genetic system can offer yield advantages and potentially large economic gains if used properly. For this system to work, growers and seedsman need to work together to place the appropriate genetics on the correct acre and planted at suitable seeding rates.

Planting Date: April 26th Hybrids: Pioneer 12065Q, DKC 66-06 Trecepta Population: 36-38K Row Width: 30" Rotation: CAC Corn Price:$4.13

ArrowTube™ Seed Orientation Study

Objective: To study the yield and economics of planting corn “tip down” in the furrow with ArrowTube™.

Figure 1. illustrates how a corn kernel embryo imbibes water and starts germination. Each corn kernel has an embryo on one side of the corn kernel. When planted “tip down”, the seed embryo imbibes water and the coleoptile will begin its path upward to the soil surface for emergence, while the radicle root shoots downward into the soil profile. This would be the fastest route to emergence.

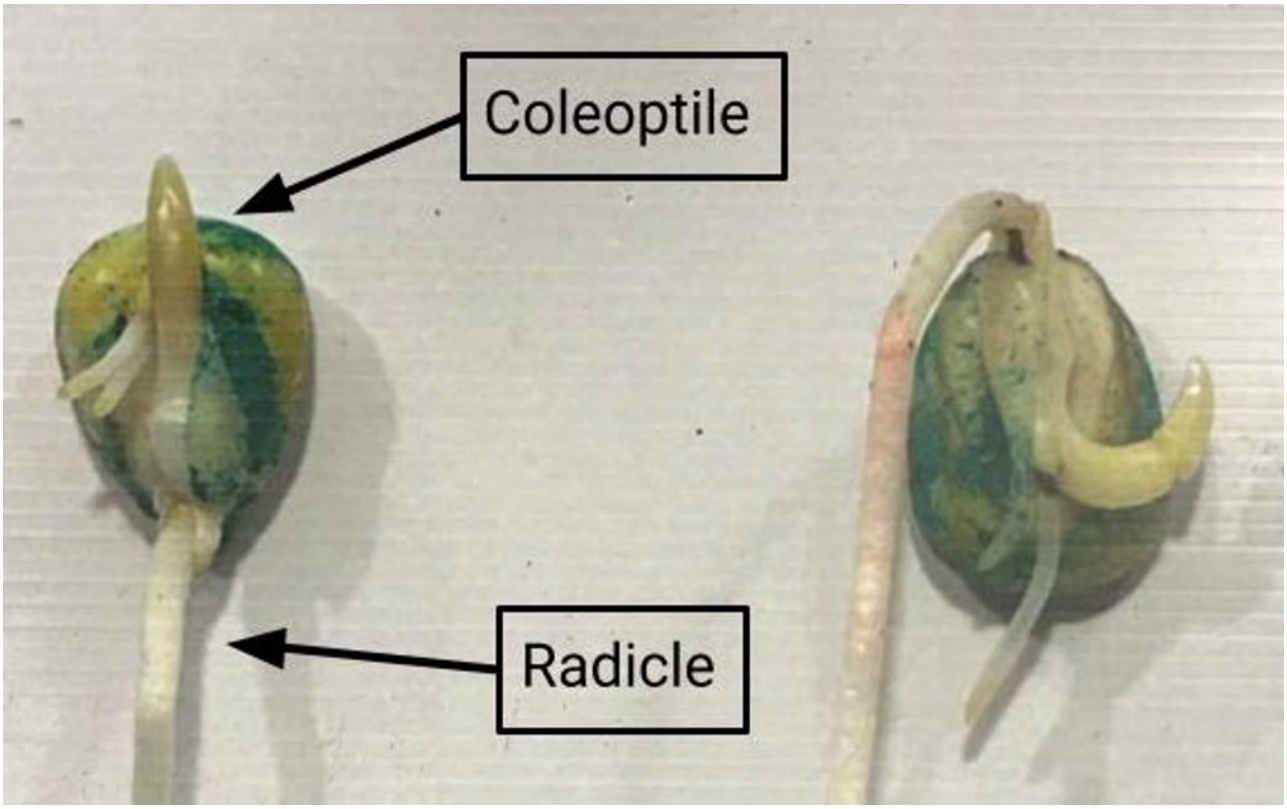


Figure 1. Seed Orientation

However, if the corn kernel is planted “tip up” just the opposite occurs. The coleoptile grows downward and the radicle upward. At some point the kernel will figure out that it’s growing upside down and will trigger a “U-turn” and then continue growing in the correct direction. The problem with this scenario is time and vigor, especially in cold, wet growing conditions.

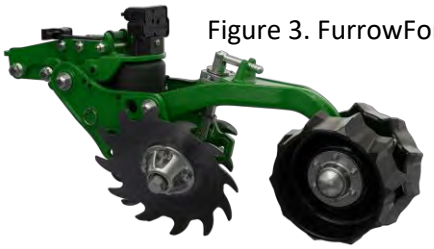
ArrowTube™ Seed Orientation Study

This study evaluates emergence timing differences of planting corn kernels in the furrow with Precision Planting's new ArrowTube™ (Figure 2.), a high-speed planting seed delivery mechanism that directs seed "tip down" in the furrow. For this study, a 16-row John Deere 1775 ExactEmerge® planter was retrofitted to include ArrowTube™ on rows 9-16, while rows 1-8 remained stock John Deere ExactEmerge® units.

Figure 2. ArrowTube™

Both planting systems were installed with FurrowForce®, Precision Planting's 2 stage automatic closing system.

Figure 3. FurrowForce®



The PTI Farm Team conducted seven off-site testing locations across east central Illinois to compare the seed orientation performance of ArrowTube™, compared to traditional "non-oriented" seed drop that planters have accomplished for decades.

Figure 4. ArrowTube™ Equipped ExactEmerge® Planter

ArrowTube™ Seed Orientation Study

Results: Table 1. reveals multi-year corn emergence flag testing data over 2018-2025 that indicates corn plants emerging just 12-Hrs late (24hrs), suffer yield losses of **-11%**, while **-28%** at the 36-Hr timeframe. Faster, more uniform emergence can eliminate these losses to maximize yield and to limit losses. Understanding this multi-year data helped us analyze seed orientation with this in mind, hoping to help eliminate early 12-Hr to 24-Hr late emergers by planting the correct seed orientation to speed emergence.

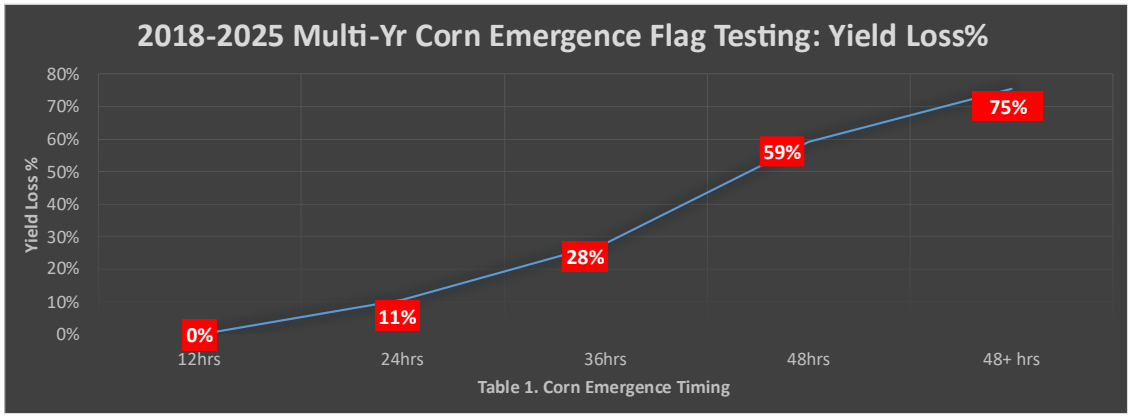


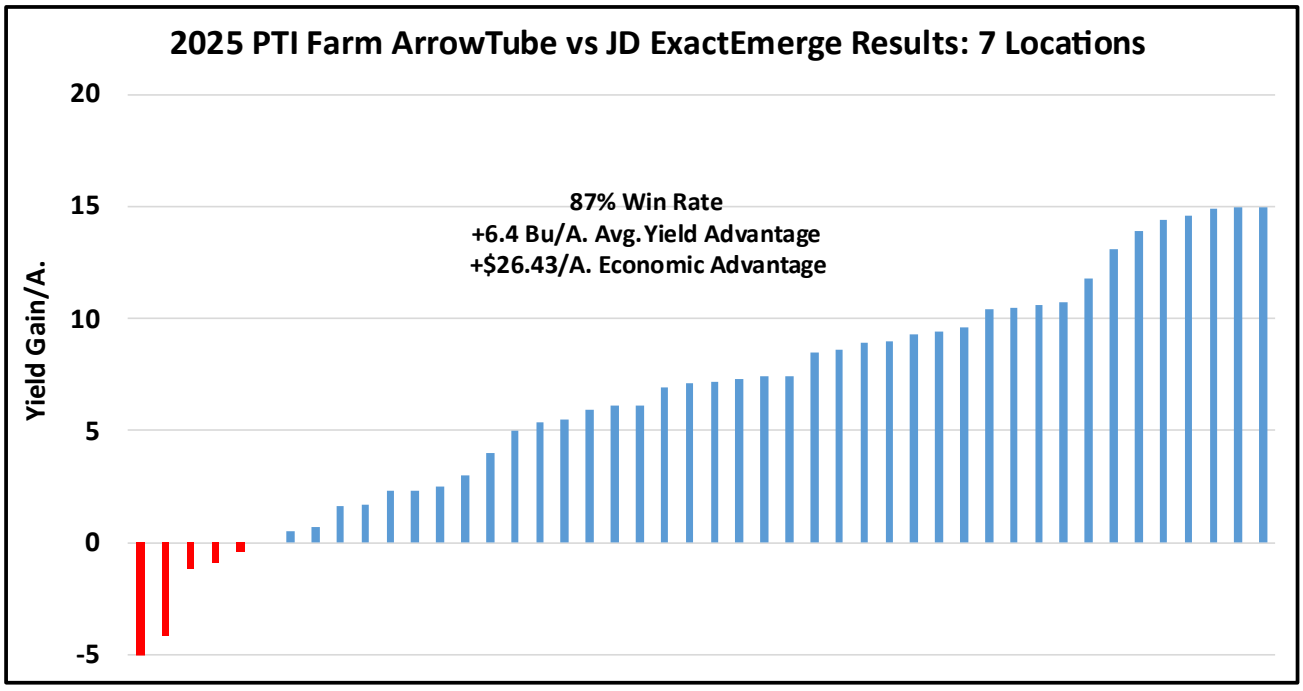
Table 1. Corn Emergence Timing

2025 PTI Results

ArrowTube™ Seed Orientation Study

The table below illustrates 46 side by side comparisons of ArrowTube™ accurately orienting seed correctly in the furrow, compared to “randomized” orientation of the John Deere1775 ExactEmerge® planter system.

Proper seed orientation resulted in yield gains of +6.4 Bu/A. with corresponding net returns of +$26.43/A. Of the 46 comparisons, 87% proved yield gain.



ArrowTube™

Planting Date: May 10th Hybrid: DKC 66-06, 65-95VT2P, GH 12U11, Pioneer 1742Q, 14830, 09312V Population: 36K Row Width: 30” Rotation: CAB Corn Price: $4.13

Planter Performance Study

Objective: To study the yield and economic performance of seven different planter systems with various seed delivery and closing systems.

The following planters were used to evaluate overall performance:

Planter	Seed Delivery System	Closing System
1. John Deere 1775	ArrowTube™	FurrowForce®
2. John Deere 1775	ExactEmerge®	FurrowForce®
3. John Deere 1775	ExactEmerge®	Yetter Poly Twisters
4. Fendt® Momentum	SpeedTube®	FurrowForce®
5. Massey Fergusen	SpeedTube®	FurrowForce®
6. CaseIH 2150S Early Riser®	SpeedTube®	FurrowForce®
7. CaseIH 2150S Early Riser®	SpeedTube®	CaseIH 2-Stage

FENDT

CASE IH AGRICULTURE

JOHN DEERE

Precision Planting®

MASSEY FERGUSON

2025 PTI Results

Planter Performance Study

This first of its kind, unique study will compare three distinct seed delivery systems with John Deere's ExactEmerge®, Precision Planting's SpeedTube®, and Precision Planting's new ArrowTube™, a high-speed delivery system designed to correctly orient the seed in the trench for optimum emergence timing.

Figure 1. ArrowTube™

Figure 2. SpeedTube®

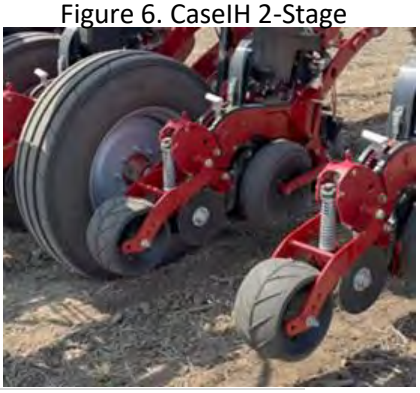
Figure 3. ExactEmerge®

Another unique feature of this study also includes three different closing systems, including Yetter Poly Twisters®, CaseIH 2-Stage, and Precision Planting's two-stage automatic closing system FurrowForce®.

Figure 4. Yetter Poly Twister®

Figure 5. FurrowForce®

Figure 6. CaseIH 2-Stage



Planter Performance Study

Figure 7. Fendt® Momentum

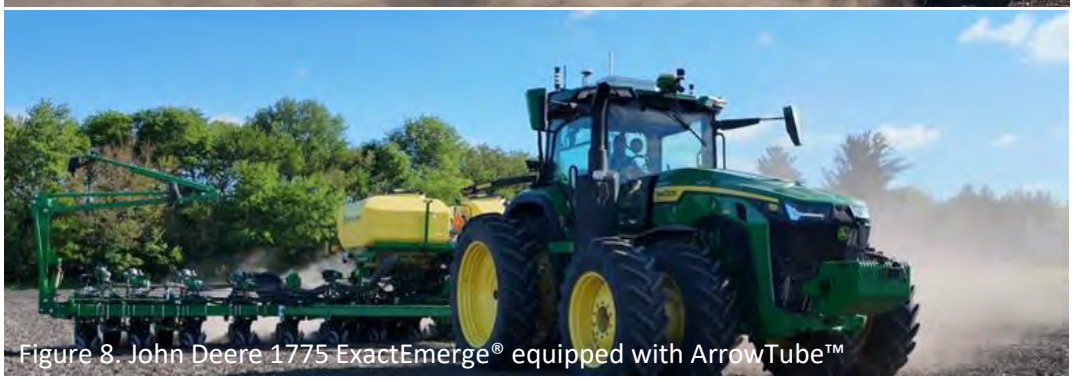


Figure 8. John Deere 1775 ExactEmerge® equipped with ArrowTube™

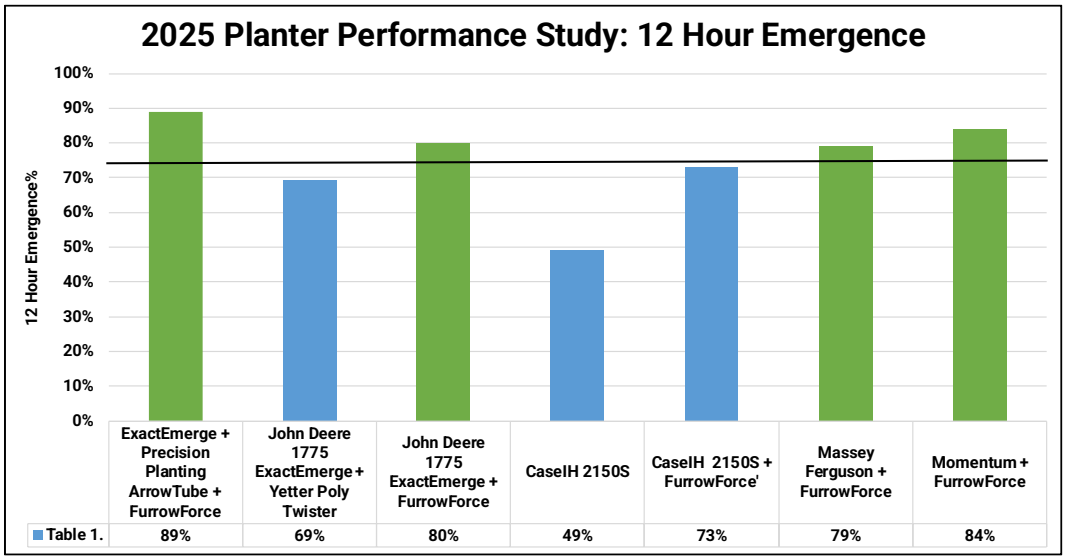
Figure 9. Massey Ferguson

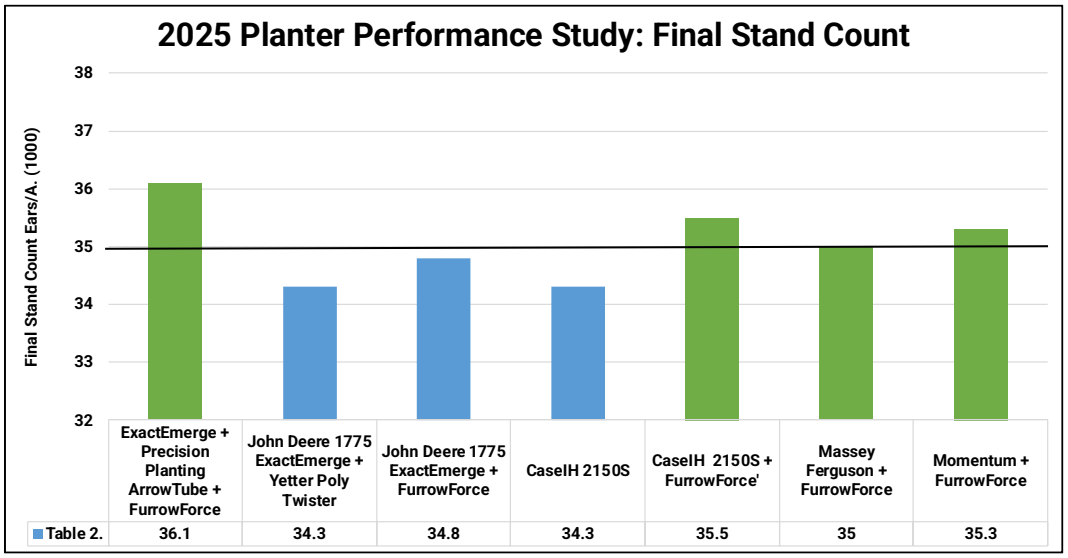
Figure 10. CaseIH 2150S Early Riser®

Planter Performance Study

Table 1. summarizes all planter performance in regard to average 12-Hr emergence scores. Flag testing is conducted in 12-hr increments to establish emergence variance. ArrowTube™ achieved highest scores at 89%, while FurrowForce® on the Momentum, Massey Ferguson, and ExactEmerge® also scored above average (75%).

Table 2. illustrates overall final stands for all planter entries. 35K was trial average, with ArrowTube™, and FurrowForce® on CaseIH, Massey Ferguson, and Momentum all scoring above average.





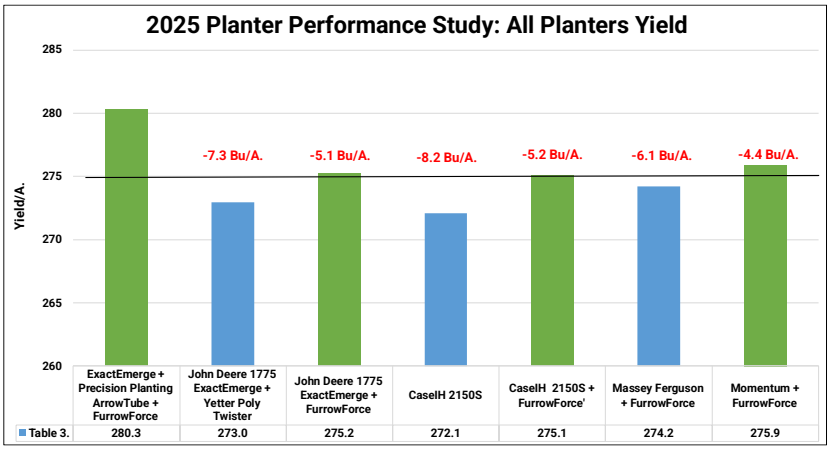
Planter Performance Study

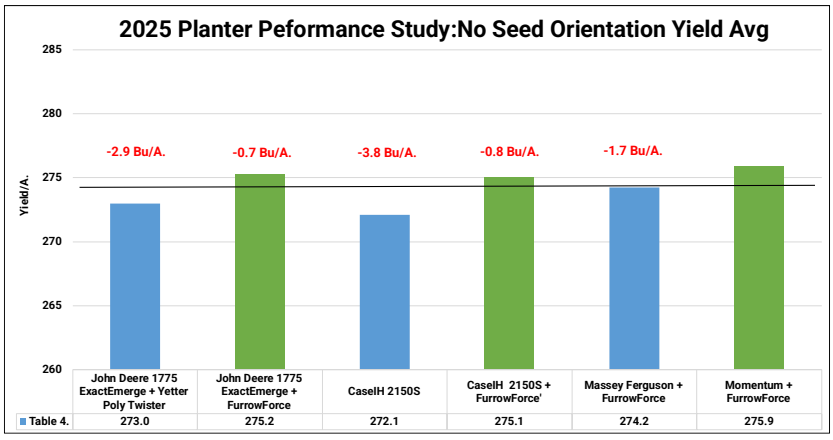
Table 3. summarizes overall yield of all planter systems with ArrowTube™ leading the way at 280.3 Bu/A., averaging +6.1 Bu/A. over all other planter systems. Other planter systems that performed above field average of 275.5 Bu/A. included the FurrowForce® systems on CaseIH, Momentum, and ExactEmerge®.

Table 4. removes ArrowTube™ from the dataset and just compares all other planter systems. Incredibly, the variance of all planter systems averaged less than **-3.8 Bu/A.**, with Momentum + FurrowForce® proving highest yields at 275.9 Bu/A.

Correct seed orientation resulted in yield gains of +6.1 Bu/A., which equates to additional gross returns of +$25.19/A. with a commodity price of $4.13/Bu.

We have always known that kernel orientation in the seed trench has dictated how the coleoptile and radicle begin to travel upon imbibition, however until now we have not had the means to implement it successfully.





Planting Date: May 8th *Hybrid: GH 12U11* *Population: 36.5K* *Row Width: 30"* *Rotation: CAB* *Corn Price: $4.13*

2025 PTI Results

15” Narrow Row Corn After Corn Seeding Rate Study

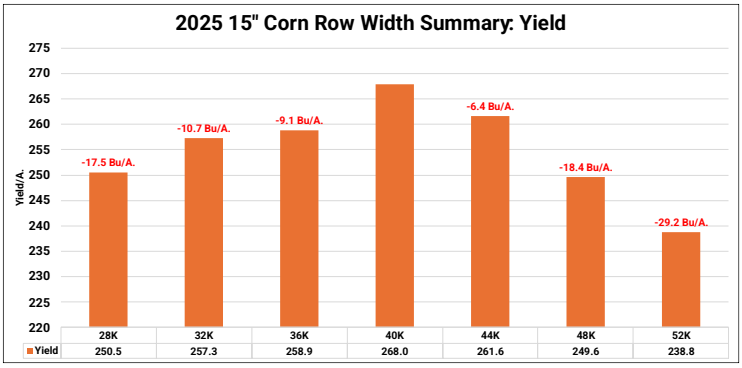
Objective: This trial evaluates a narrow system of 15” rows with seven seeding rates of 28K, 32K, 36K, 40K, 44K, 48K, and 52K.

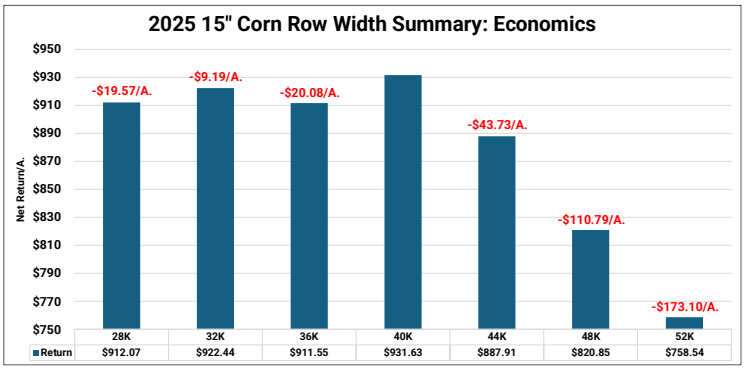
Results:

Yields were excellent in this 15” corn dryland experiment with yields averaging 254.9 Bu/A. Agronomic optimum yield occurred at the 40K seeding rate at 268 Bu/A., yields varied up to **-29.2 Bu/A.** overall entries. Lower seeding rates at 36K, 32K, and 28K proved yield losses ranging from **-9.1 Bu/A.** to **-17.5 Bu/A.** Seeding rates higher than 40K resulted yield losses of **-6.4 Bu/A.**, **-18.4 Bu/A.** and **-29.2 Bu/A.**

The real story in this study resides in economics. The economic optimum seeding rate occurred at 40K. After accounting for seed cost of $350/bag, each 4K seeding rate needed a +4.3 Bu/A. yield increase to break-even. Seeding rates of 28K to 36K proved losses ranging from **-$9.19/A.** to **-$20.08/A.**, higher 44K seeding rates offered a loss of **-$43.73/A.** and the highest seeding rates of 48k and 52K proved the largest losses of **-$110.79/A.** to **-$173.10/A.**

In conclusion, 2025 data performed similar to most recent studies. 40K seeding rates seem to be ideal for 15” row corn at the PTI Farm. Higher seeding rates have not proved profitable due to lack of yield response along with higher seed cost per acre.





Planting Date: May 15th *Hybrid: DKC 66-18VT2RO* *Population: Varied* *Row Width: 15”* *Rotation: CAC* *Corn Price: $4.13* *Seed: $350/Bag*

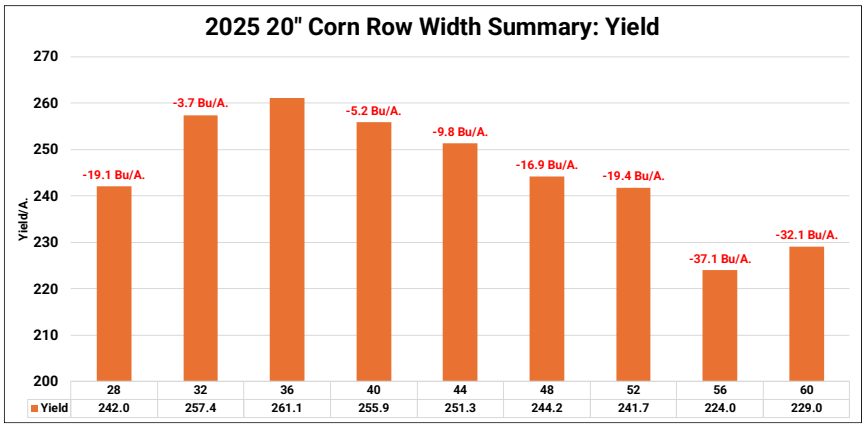
PTI ILLINOIS

2025 PTI Results

20” Narrow Row Corn After Corn Seeding Rate Study

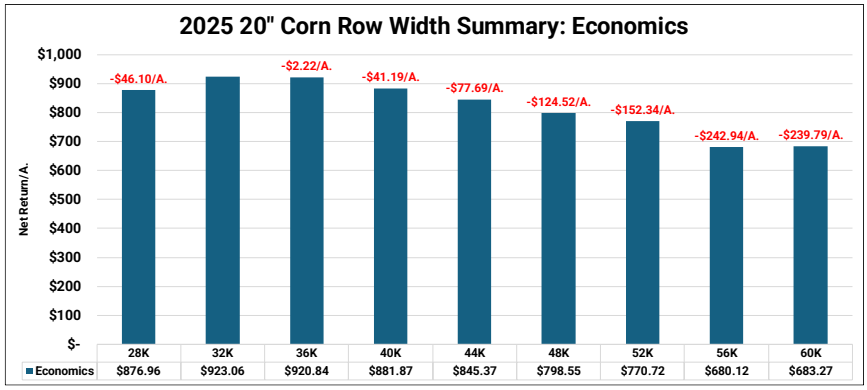
Objective: This trial evaluates a narrow system of 20” rows with nine seeding rates of 28K, 32K, 36K, 40K, 44K, 48K, 52K, 56K, and 60K.

Results: Agronomic optimum yield occurred at the 36K seeding rate at 261.1 Bu/A. Lowering seeding rates to 32K provided losses of **-3.7 Bu/A.** However, 28K suffered losses of **-19.1 Bu/A.** Increasing seeding rates from 40K to 52K resulted in reduced yields of **-5.2 Bu/A.** to **-19.4 Bu/A.** Ultra-high seeding rates of 56K to 60K offered yield losses from **-32.1 Bu/A.** to **-37.1 Bu/A.**



As for economics, 32K achieved economic optimum. As seeding rates were lowered to 28K, economic losses of **-$46.10/A.** occurred.

Increasing seeding rate to 36K resulted in a loss of only **-$2.22/A.**, 40K to 44K absorbed significant losses of **-$41.19/A.** to **-$77.69/A.** and the highest seeding rates of 48K to 60K proved the largest losses of **-$124.52/A.** to **-$242.94/A.**



In conclusion, 2025 20” row corn achieved economic seeding rate at much lower populations than past years. 40K has typically offered the highest economic returns.

Planting Date: May 15th *Hybrid: DKC 66-18VT2RO* *Population: Varied* *Row Width: 15”* *Rotation: CAC* *Corn Price: $4.13* *Seed: $350/Bag*

Multi-Year Narrow Corn vs 30” Row Width Study

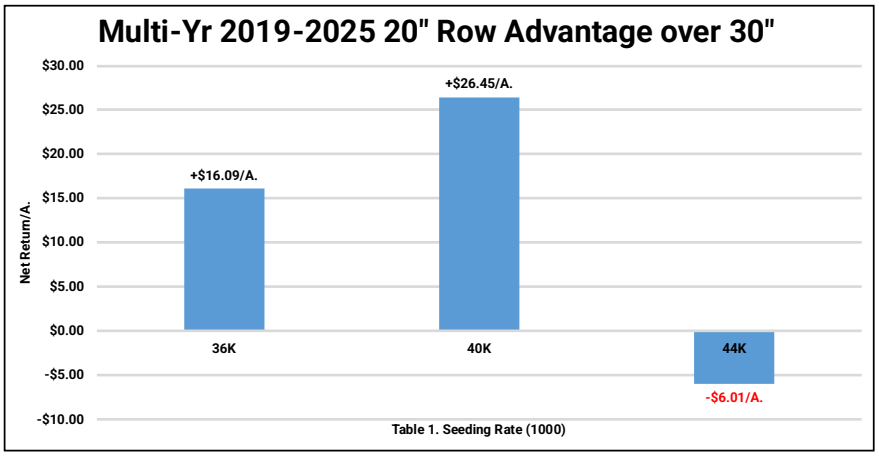
Each year we have thousands of growers that come to the PTI Farm to have a conversation about agronomics. One question we talk about often is corn row width. Many farms today that are on 30” corn rows say they switched from wide 38” or 36” wide rows back in the early 70’s. If this is the case, growers have been implementing 30” row corn systems for nearly 50 years. The question now is, has 50 years been long enough doing the same thing over and over, or is time now for a change to another system that could offer higher yields and profitability?

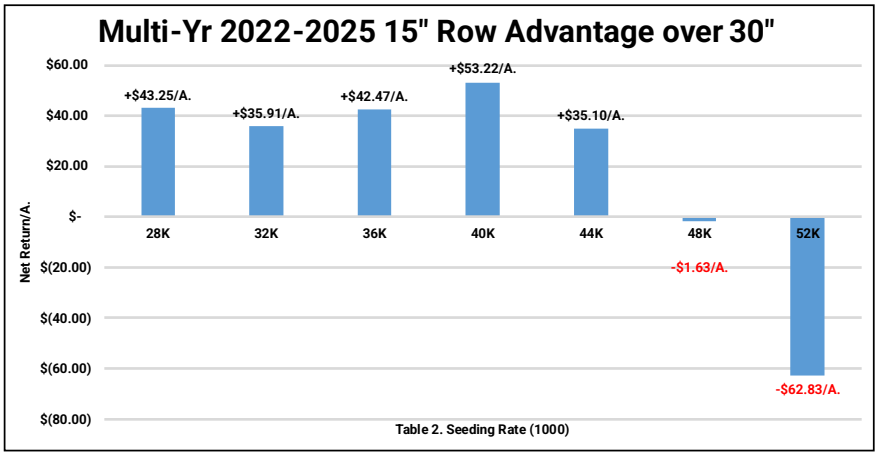
The question comes down to this; What revenue gain would cause a farmer to feel the need to convert their farming operation and over-all management to narrow row corn and switch away from the industry status quo of 30” rows?

Table 1. illustrates multi-year data over the time-frame of 2019-2025 and reveals 20” rows offering an overall economic advantage of +$16.09/A. compared to 30” rows planted at 36K seeding rates.

Table 2. illustrates multi-year data over the time-frame of 2022-2025 and reveals 15” row corn offering highest economic advantages of +$42.47/A. compared to 30” rows at 36K seeding rates.

PTI Farm data suggests that both 20” and 15” rows have proven economic optimum gains at 40K seeding rates. However, 15” rows are averaging overall gains +$26.77/A. to that of 20” rows.





Preceon® Short Stature Corn Row Width/Seeding Rate Study

Objective: To evaluate yield and economic impact of planting short stature corn hybrids in both 30" and 15" rows, planted at seeding rates of 34K, 42K, and 50K.

Short stature corn is a new platform of corn that is designed to be significantly short in stature in order to have increased tolerance to lodging and green snap. Overall plant height is shortened due to node "stacking" from ear placement to the soil surface. Shorter height also allows for more flexible timing and the ability to use ground application of other crop inputs, like fungicides, insecticides and nitrogen.

PRECEON™ SMART CORN SYSTEM

Due to improved plant standability, short corn can allow farmers to explore higher planting densities, providing the potential to produce more on every acre. With 30" corn row width being the industry standard, this study's goal is to help determine how the yield potential and economic impact of short corn in wide row 30", compares to narrow row 15" corn at typical 34K seeding rates to that of higher rates of 42k and 50K.

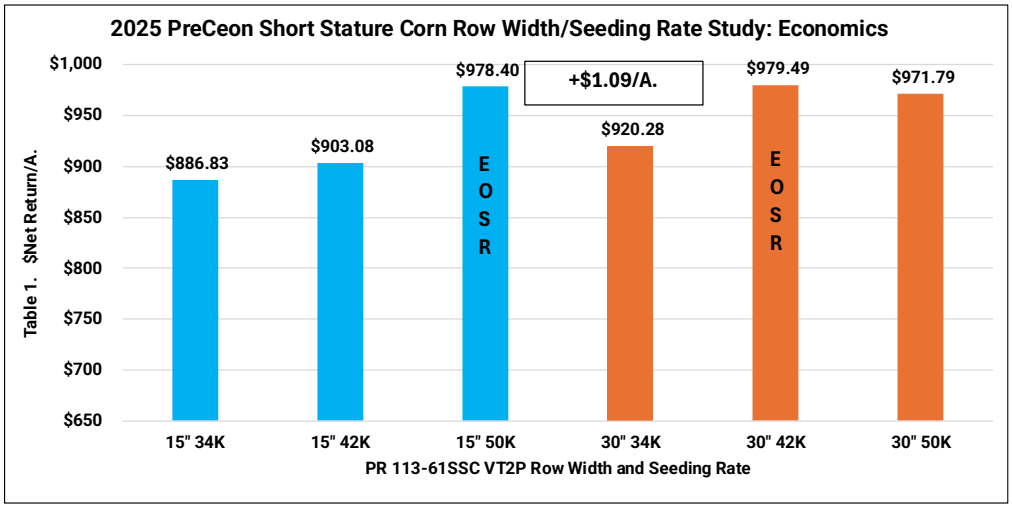
Figure 1. 15" Row Width Corn

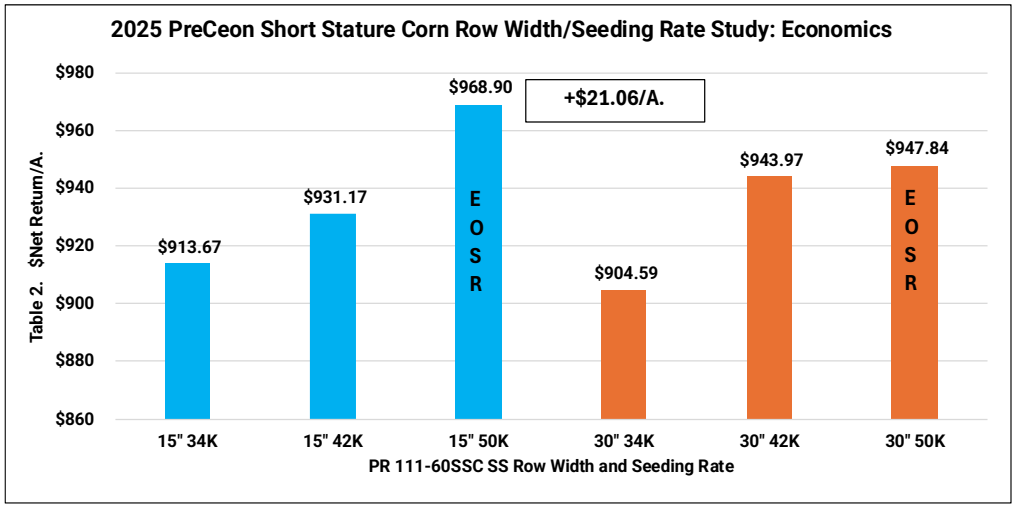
Figure 2. Industry Standard 30" Corn Row Width

Preceon® Short Stature Corn Row Width/Seeding Rate Study

Results: PR 113-61SSC VT2P resulted in economic optimum seeding rate (EOSR) when planted in 30" rows at 42K and 15" rows at 50K. Overall, 30" corn outperformed 15" rows by an average of +8.3 Bu/A. However, 15" row short corn excelled at the higher seeding rates. It is interesting to note that the EOSR between the 15" and 30" rows, was only +$1.09/A. difference.

PR 111-60SSC VT2P resulted in economic optimum seeding rate of 50K in both 15" and 30" row widths. Overall, 30" corn outperformed 15" narrow rows by an average of +2.3 Bu/A., however 15" row EOSR excelled by +$21.06/A. compared to the 30" EOSR.



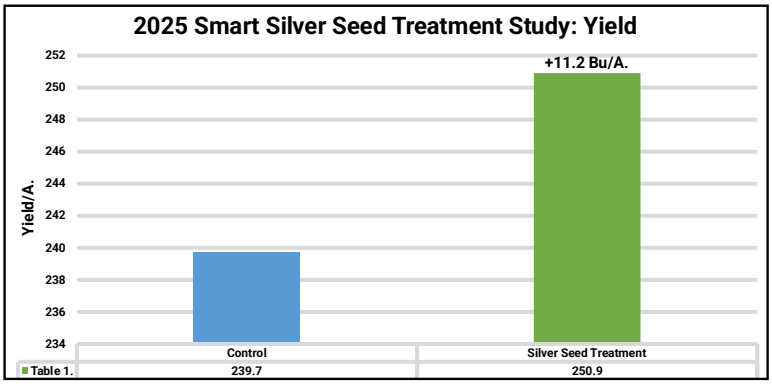


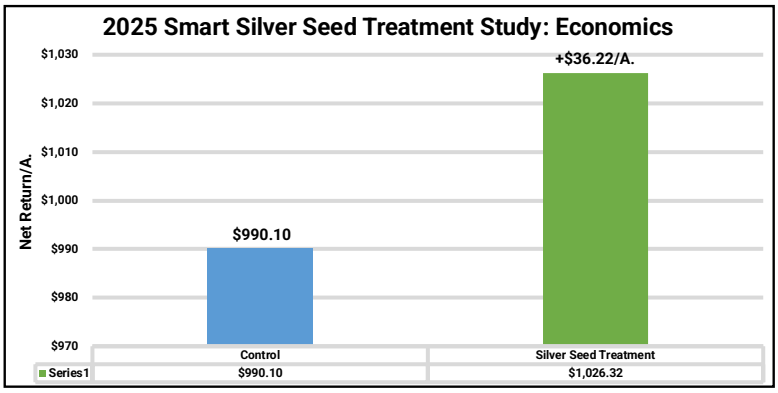
Planting Date: May 12th Hybrid: PR 113-61ssc VT2P, PR 111-60ssc VT2P Population: 34K,42K,50K Row Width: 30"/15" Rotation: CAB Corn Price: $4.13 Seed Cost: $300/Bag

Corn Smart Silver™ Seed Treatment Study

Objective: To evaluate the yield and economic impact of Smart Silver™ applied as a seed treatment. Smart Silver, produced by Green Evolution Technologies is the first of its kind, pure nano silver. Nano-silver particles offer seed resistance to disease pathogens, which reduces stress. Silver also decreases seed water requirements by 25% and could potentially decrease overall plant water consumption. Recently, silver nanoparticles have attracted interest in the pharmaceutical market, as silver has potential antibacterial activity, anti-inflammatory effects, and wound healing efficacy.

Results: Table 1. illustrates smart silver™ resulted in yield advantages of +11.2 Bu/A. with positive net returns of +$36.22/A.





Planting Date: May 10th Hybrid: GH 030U8 Population: 36.5K Row Width: 30" Rotation: CAC Corn Price: $4.13 Silver: $9.90/A.

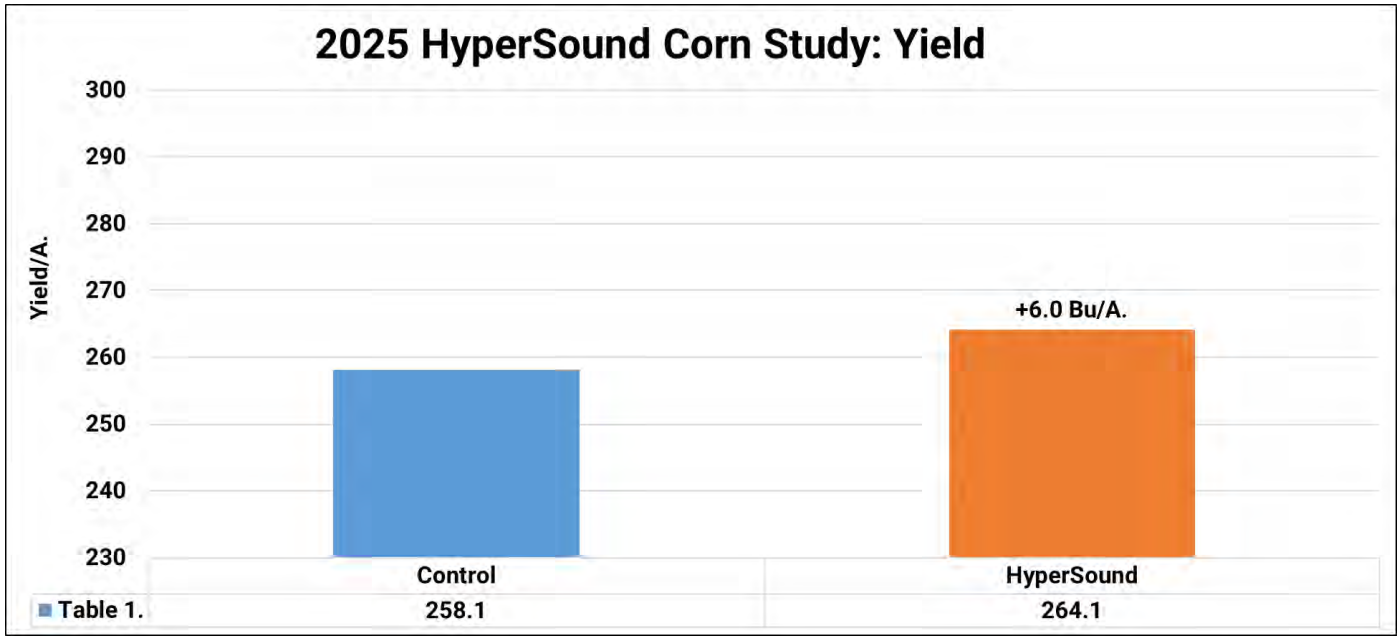
HyperSound Technology Seed Treatment Study

Objective: This trial evaluates the advantages and disadvantages of using HyperSound Technology as a seed treatment. HyperSound Technology by WISE LIFESTYLE is a process of changing the harmonic vibrations to offset the electromagnetic disturbances mobile radio and wireless communication generate.

A quantum field generator uses a femtosecond laser to irreversibly change and optimize the atomic structure (lattice) of crystalline matter such as certain metals and crystallized silicon dioxide. This charged metal begins to emit HyperSound frequencies which influence its environment and neutralizes existing electromagnetic disturbances.

Results: HyperSound treatments resulted in yield gains of +6.0 Bu/A with positive gross returns of +$24.78/A. With a total cost of $18,500 (USD delivered), return on investment would occur at 747 acres

Figure 1. Treating seed with 3" HyperSound Egg



Planting Date: May 10th *Hybrid: DKC 56-26* *Population: 36K* *Row Width: 30"* *Rotation: CAB* *Corn Price: $4.13*

Rosen's StrideBio™ Hopper Box Treatment Study

Objective: To evaluate yield and net return of Stride Bio™, a talc graphic/micronutrient planter box treatment.

Stride Bio is a 80/20 talc graphic blend for planters that also contains Calcium, Magnesium, Sulfur, Iron, Manganese, and Zinc. It places essential nutrition, flow agents, and crop enhancement components directly on the seed to aid in singulation and improve seedling vigor and growth.

Results: Stride Bio™ hopper box treatments offered average yield gains of +4.1 Bu/A. with a postive net return on investment of +$13.95/A.

ROSEN'S INC.
Quality Agricultural Products

STRIDE BIO™ YIELD BURST
ADVANCED SEED COATING

Guaranteed Analysis
0-0-0

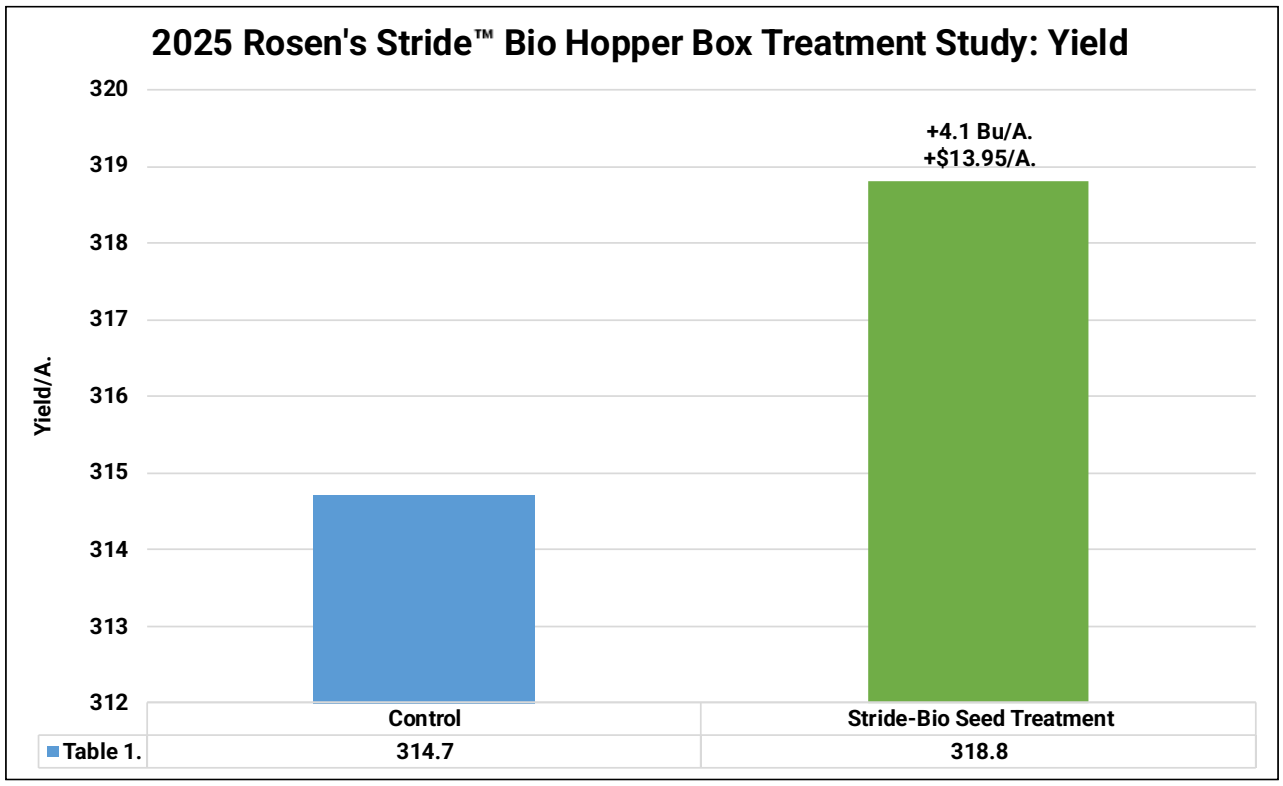
Calcium (Ca)	1.0%
Magnesium (Mg)	0.5%
Sulfur (S)	4.0%
4.0% Combined Sulfur	
Iron (Fe)	0.1%
0.0% Water Soluble Iron	
Manganese (Mn)	4.0%
4.0% Water Soluble Manganese	
Zinc (Zn)	10.0%
4.0% Water Soluble Zinc	

Derived from: Dolomitic Limestone, Iron Oxide, Manganese Sulfate, Zinc Sulfate, Zinc Oxide.

Also contains non-plant food ingredients: Talc & Graphite in an 80/20 ratio.

GENERAL INFORMATION

Stride Bio places essential nutrition, flow agents, and crop enhancement components directly on the seed to aid in singulation and improve seedling vigor and growth. **Stride Bio** is compatible with fungicide, insecticide seed treatments and inoculants, but does not replace those products. **Stride Bio** replaces the need for adding talc or graphite.

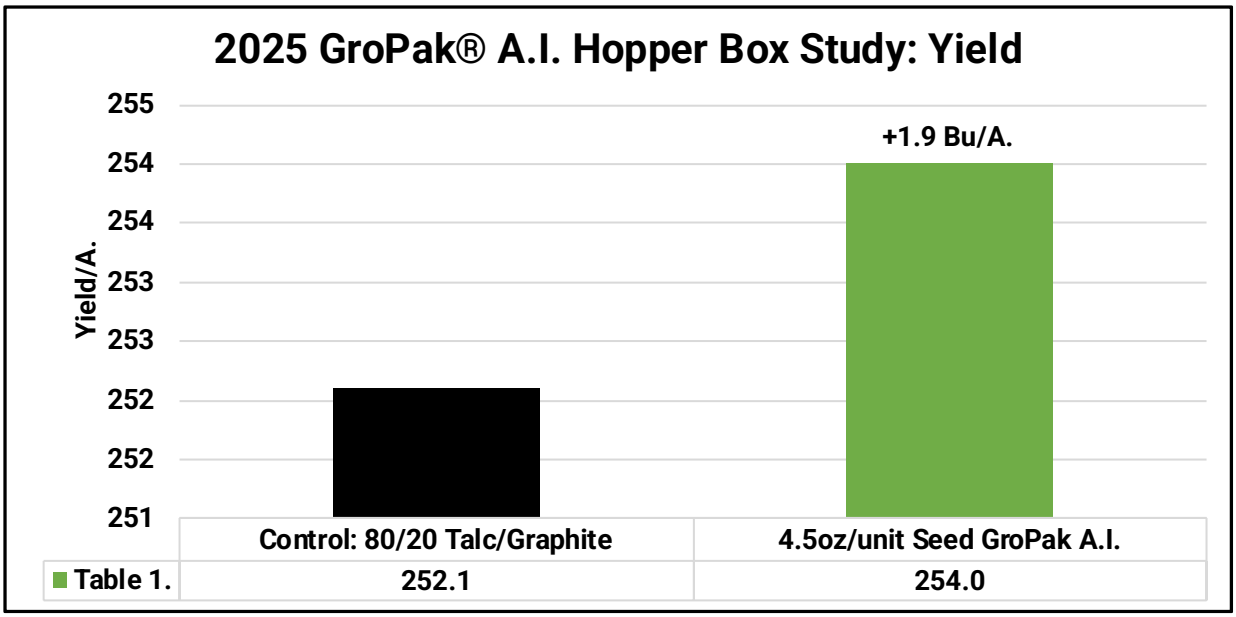


Planting Date: April 18th Hybrid: ProHarvest 81P20 Population: 36K Row Width: 30" Rotation: CAC Corn Price: $4.13 Stride Bio: $3.23/A. Talc/Graphite: $3.25/#.

AgXplore™ GroPaK® A.I. Hopper Box Treatment Study

Objective: To evaluate yield and net return of GROPAK®, a next-generation planter hopper box treatment that aids in germination and emergence by enhancing nutrient uptake and mobility. It is specifically formulated with a micronutrient package to benefit the seed, along with bacteria strains, all combined in a dry talc formulation.

Results: GroPak® A.I. hopper box treatments offered average yield gains of +1.9 Bu/A. with a postive net return on investment of +$5.07/A.

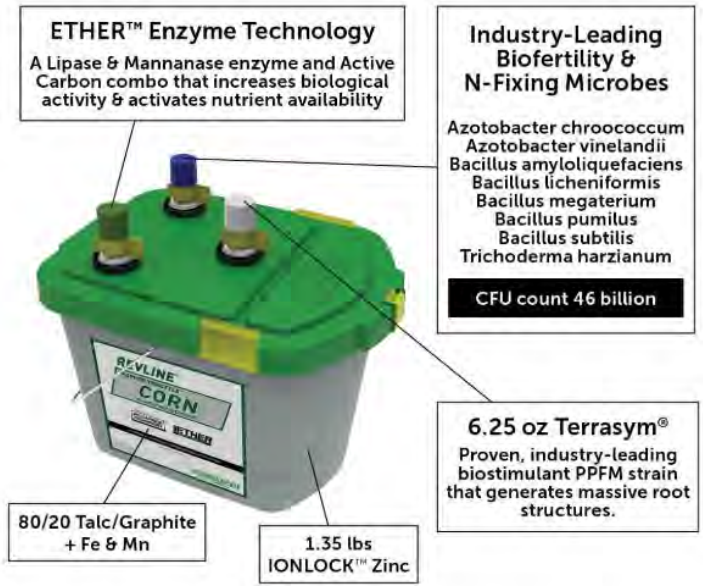


Planting Date: May 2nd Hybrid: DKC 66-06TRE Population:36K Row Width: 30" Rotation: BAC Corn Price: $4.13 GroPak A.I: $3.03/A Graphite/Talc: $3.25/#

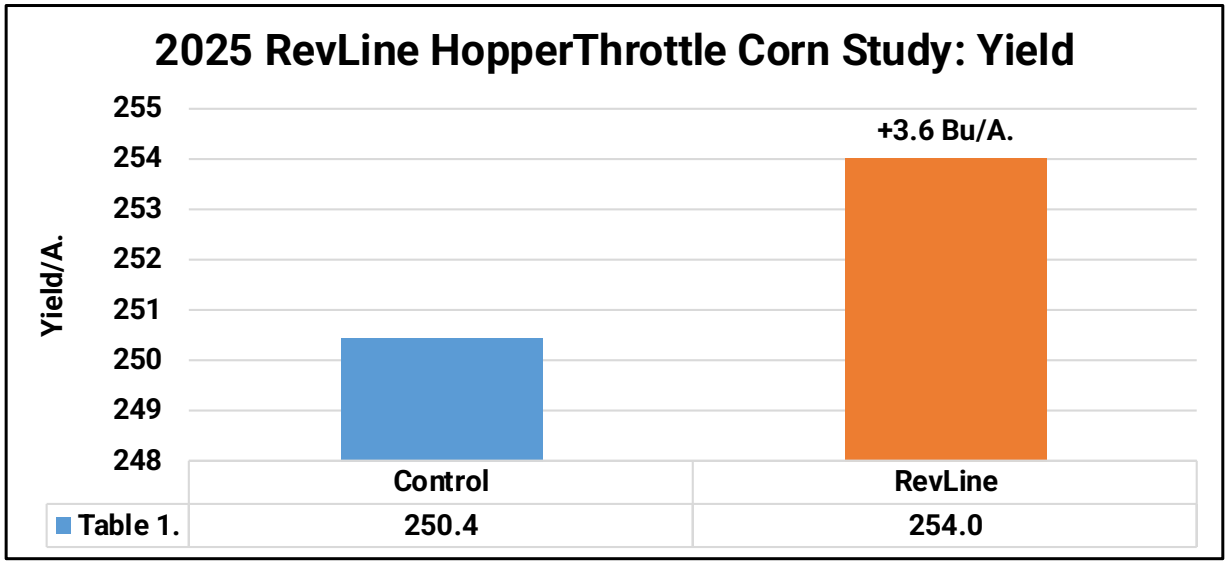
REVLINE® HOPPER THROTTLE™ Hopper Box Treatment Study

Objective: To evaluate yield and net return of REVLINE® HOPPER THROTTLE™, a talc graphic/micronutrient planter box treatment.

HOPPER THROTTLE™ is an 80/20 talc graphic blend for planters that also contains Manganese, and Zinc. It places essential nutrition, flow agents, and crop enhancement components directly on the seed to aid in singulation and improve seedling vigor and growth.



Results: HOPPER THROTTLE™ hopper box treatments offered average yield gains of +3.6 Bu/A. with a positive net return on investment of +$2.02/A.

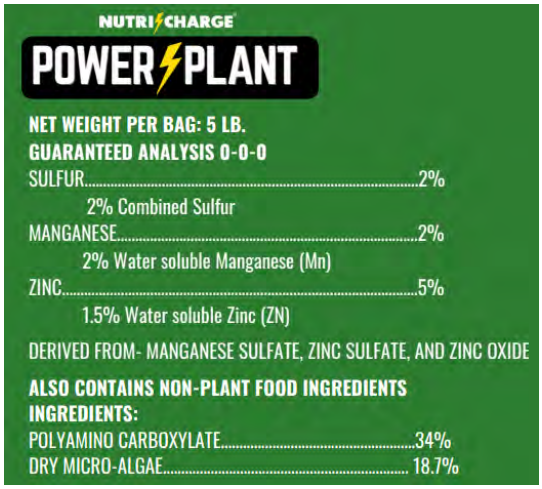


Planting Date: May 10th Hybrid: GH 15J91 Population: 26K Row Width: 30" Rotation: CAB Corn Price: $4.13 HOPPER THROTTLE: $13.00/A. Talc/Graphite: $3.25/A.

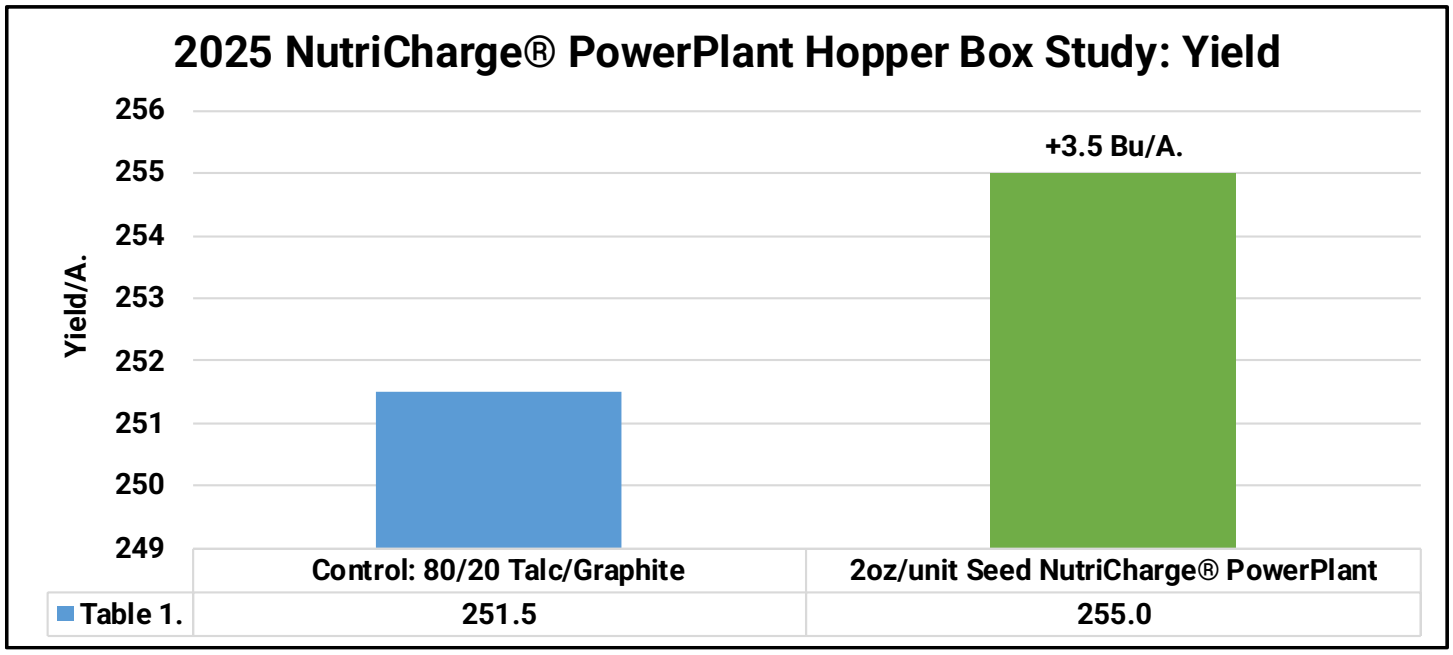
2025 PTI Results

NutriCharge® PowerPlant Hopper Box Treatment Study

Objective: To evaluate yield and net return of NutriCharge® PowerPlant®, a next-generation planter hopper box treatment and advanced seed lubricant designed to replace traditional talc. Powered by NutriCharge® technology, this innovative product leverages microalgae and essential micronutrients to enhance soil biology and ensure reliable phosphorus availability.



Results: PowerPlant hopper box treatments offered average yield gains of +3.5 Bu/A. that equated to postive net return on investment of +$7.53/A.



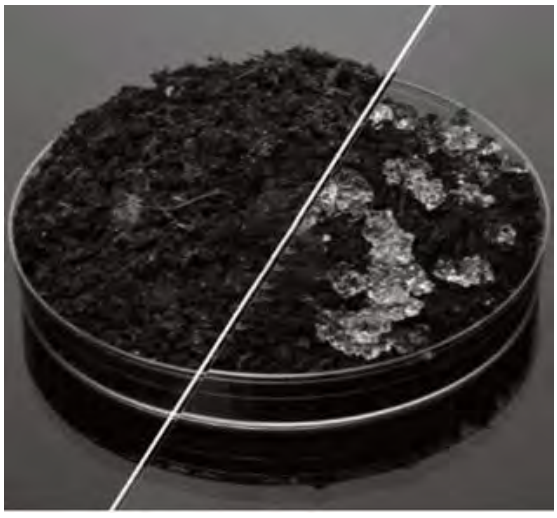
Planting Date: May 2nd Hybrid: Pioneer 1742Q Population:36K Row Width: 30" Rotation: CAB Corn Price: $4.13 PowerPlant: $85/# 3oz/Unit Avg Phos Level: 42#/A.

Smart Hydrogel Soil Moisture Retainer Study

Objective: To evaluate yield and economics of Smart Hydrogel by Green Evolution Technologies. Hydrogel is a retainer product that is incorporated into the soil to retain large amounts of water and nutrients. The absorbed water and nutrients are released during dry soil conditions, allowing the plant access when needed. Hydrogel is being implemented at the PTI Farm to help improve irrigation efficiency and increase water holding capacity.

Hydrogel was applied directly into the soil using the Precision Planting DrySet™ system. DrySet™ is an at-plant system that allows for accurate banded applications. In this case, Hydrogel was banded and lightly incorporated by the planter closing system to allow Hydrogel to surround the furrow and eventual rooting area.

DrySet™ is an all-in-one meter and electric drive system that provides row-by-row, electric motor rate control. DrySet™ was engineered for consistent distribution of granular products on planters with granular tanks and features two different auger options to cover a variety of rate ranges and applications. DrySet™ works in conjunction with the Precision Planting 20|20® system, with row-by-row control each meter functions independently of others, offering benefits like turn compensation, variable rate, and swath control.

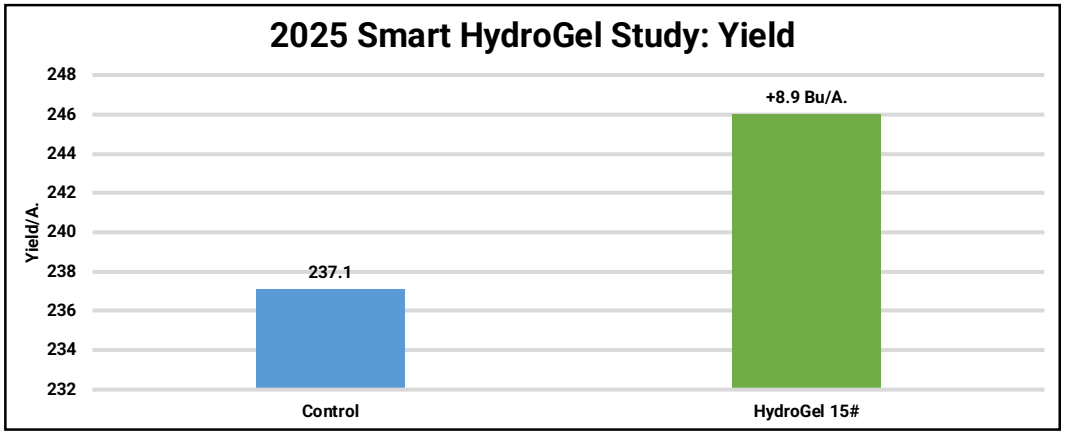


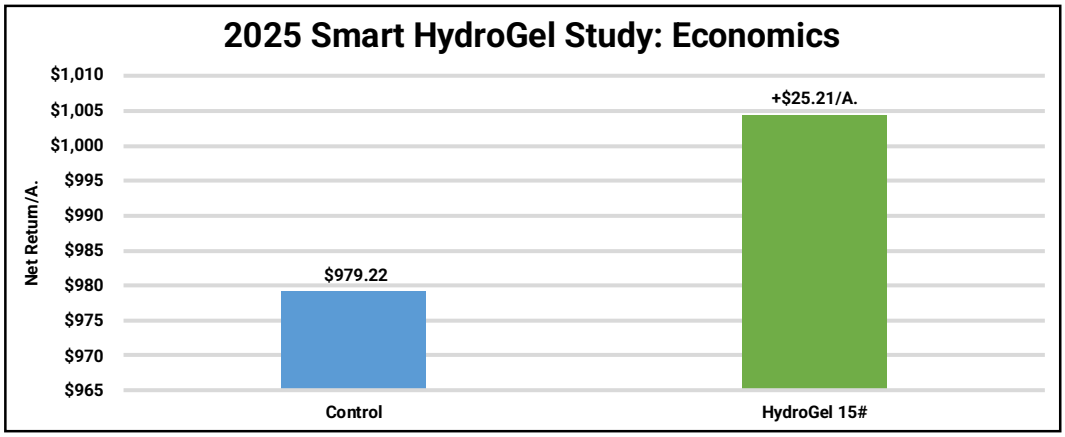
Smart Hydrogel Soil Moisture Retainer Study

Results: 2025 Hydrogel applications resulted in +8.9 Bu/A. yield gains with positive net returns of +$25.21/A.

Multi-year 2024-2025 at-plant applied treatments of Hydrogel has resulted in average yield gains of +14.1 Bu/A., with corresponding economic net return of +$42.63/A. These results equate to a +6.5% increase in yield and a +4.8% economic increase.

Mid season drought conditions at the PTI Farm in the past two growing seasons has resulted in an ideal environment to evaluate the potential of the Hydrogel system. We look forward to continuing studying this product in its 3rd year of testing in 2026.





Planting Date: May 16th Hybrids: GH 03OU8 Pop: 36K Row Width: 30" Rotation: CAB HydroGel: $11.55/A. USDA Code 450 Rebate Included in cost: $3.23/# Corn Price: $4.13

Broadcast vs Banding Dry Fertilizer Study

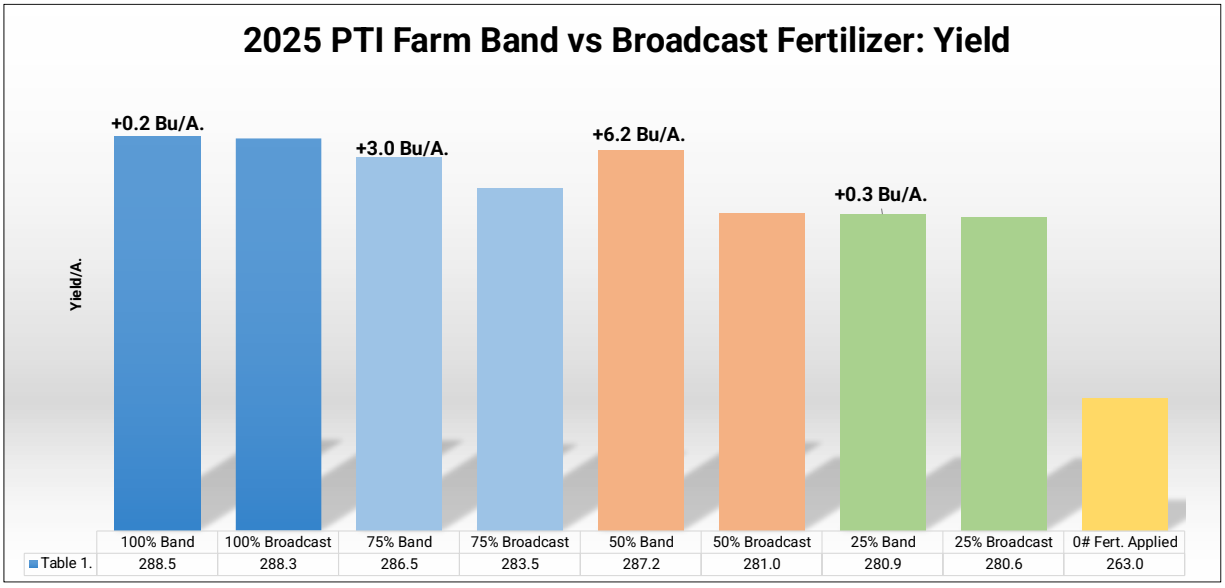
Objective: To evaluate yield and economics of traditional broadcast applications of dry fertilizer compared to 8” deep high concentrated strip-till banding.

Based upon soil test results and yield goals of 240 Bu/A. corn in a corn/soybean non-irrigated rotation, a broadcast surface application was made with a traditional spinner truck (Figure 1). Using the same fertilizer rates, a strip-till bar was used to place fertilizer in high concentrated strips 8” deep on 30” corn rows (Figure 2). Corn was then planted directly into the strips above the 8” fertilizer placement. A KUHN® Krause® 1200 Gladiator® pulling a Montag® Equipment 2208 Gen 2 fertilizer cart was used to implement this testing program for 2025.

Results Table 1. illustrates banded fertilizer out-performed broadcast at every efficiency rate. 100% rates offered +0.2 Bu/A. yield increases, 75% at +3.0 Bu/A., 50% the highest advantage of +6.2 Bu/A. and 25% banded rates at +0.3 Bu/A.

Figure 1. Fertilizer spreader

Figure 2. Strip-Till Banded Fertilizer



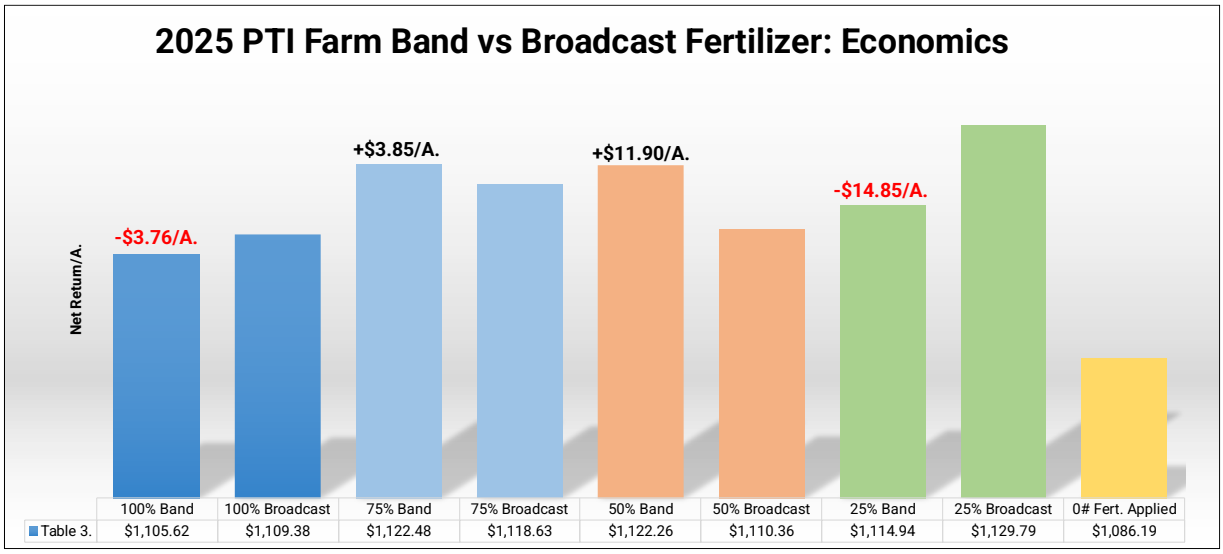
	100% Band	100% Broadcast	75% Band	75% Broadcast	50% Band	50% Broadcast	25% Band	25% Broadcast	0# Fert. Applied
Table 1.	288.5	288.3	286.5	283.5	287.2	281.0	280.9	280.6	263.0

Broadcast vs Banding Dry Fertilizer Study

Using University of Illinois Machinery Cost Estimates in Table 2., strip-till resulted in additional costs of +$12.80/A. in comparison to a conventional tillage program. Using this cost scenario, Table 3. illustrates the economic impact. 100% banded rates of fertilizer offer minimal yield gains, thus resulting in economic losses of **-$3.76/A.** Meanwhile, 75% and 50% banded rates offering small gains +$3.85/A., 50% at +$11.90/A., while 25% bands offered the largest losses at **-$14.85/A.**

Table 2. University of IL Machinery Cost Estimates

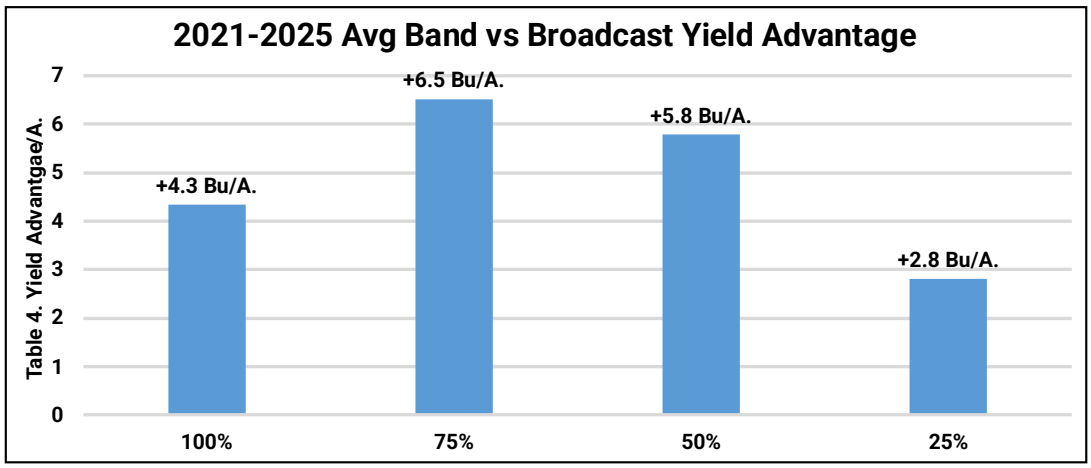
Tillage Practice	Category	Cost
Conventional Till	Soil Finisher	$ 15.30
	Plant	$ 24.40
	Fertilizer Spread	$ 8.00
	Total:	$ 47.70
Strip Till	Strip	$ 26.10
	Burndown	$ 10.00
	Plant	$ 24.40
	Total:	$ 60.50

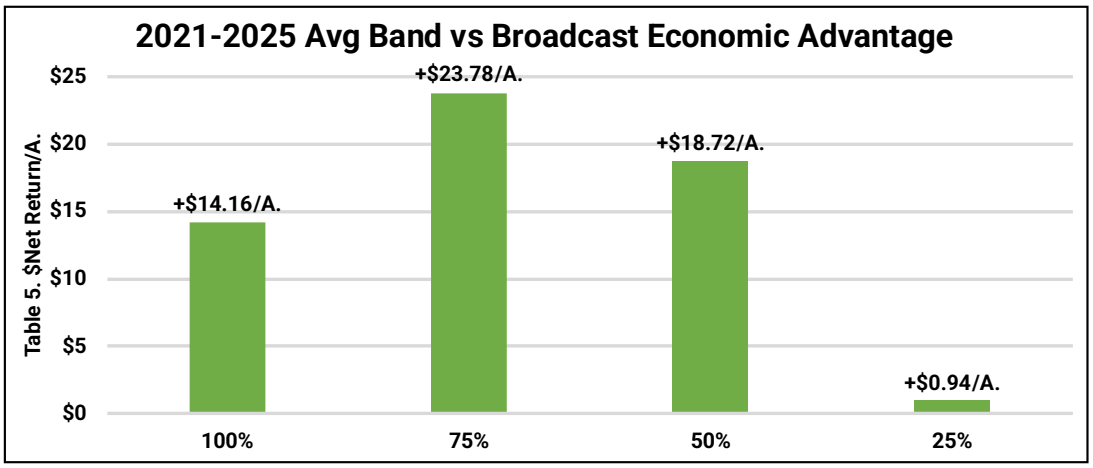


Broadcast vs Banding Dry Fertilizer Study

Table 4. illustrates multi-year data from the PTI Farm over the years 2021-2025. Over this timeframe, banded applications of dry fertilizer have resulted in positive yield gains at every individual fertilizer rate, ranging from +2.8 Bu/A. to +6.5 Bu/A.

Table 5. reflects the economics over the same 5-year time period. 75% and 50% banded rates of fertilizer offered +$18.72 to +$23.78/A. over same broadcasted rates. 100% rates proved a +$14.16/A. gain, while 25% banded rates incurred gains of only +$0.94/A.





Planting Date: April 15th *Hybrid: DKC 68-35* *Population: 36K* *Row Width: 30"* *Rotation: CAB* *Corn Price: $4.13*

Broadcast vs Banding Rate Efficiency Study

Objective: This study evaluates yield and economics of traditional broadcast applications of dry fertilizer compared to concentrated strip-till bands applied 8" in depth under the corn row. The goal of this study is to answer the question; "If I band dry fertilizer versus broadcast applying, can I use a lower rate of fertilizer without sacrificing yield and profitability"?

Based upon soil test results and yield goals of 240 Bu/A. corn in a corn/soybean rotation, dry fertilizer was applied in a traditional broadcast surface application as a spinner truck (Figure 1).

To study placement efficiency, using the same fertilizer rates, a strip-till bar was used to place fertilizer in high concentrated strips 8" deep on 30" corn rows (Figure 2). Corn was then planted directly into the strips above the 8" fertilizer placement.

A KUHN® Krause® 1200 Gladiator® pulling a Montag® Equipment 2208 Gen 2 fertilizer cart was used to implement this testing program for 2023.

To address, rate efficiency, fertilizer was applied at the following rate structure in both strip-till bands and broadcast applications:

- 100% Rate
- 75% Rate
- 50% Rate
- 25% Rate
- 0% Rate

Figure 1. Broadcast Dry Fertilizer

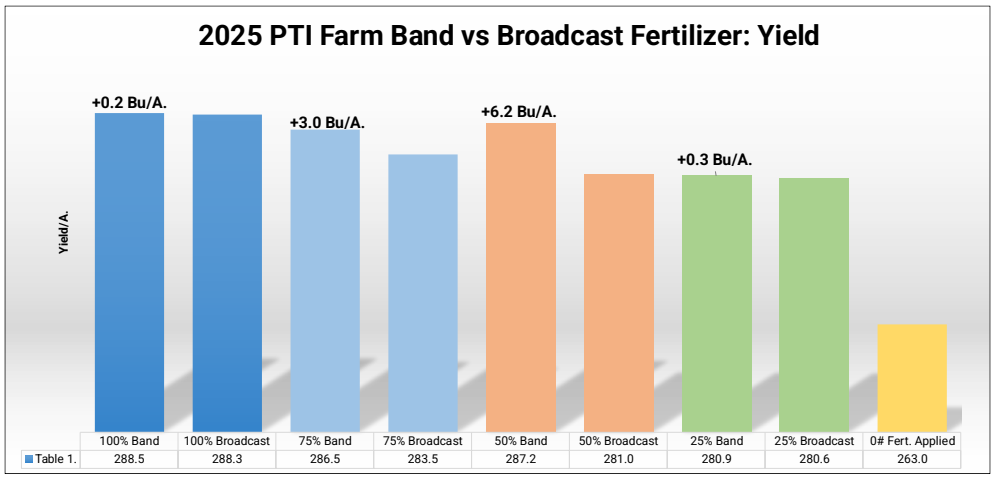
Figure 2. Strip-Till Banded Fertilizer 8" in Depth

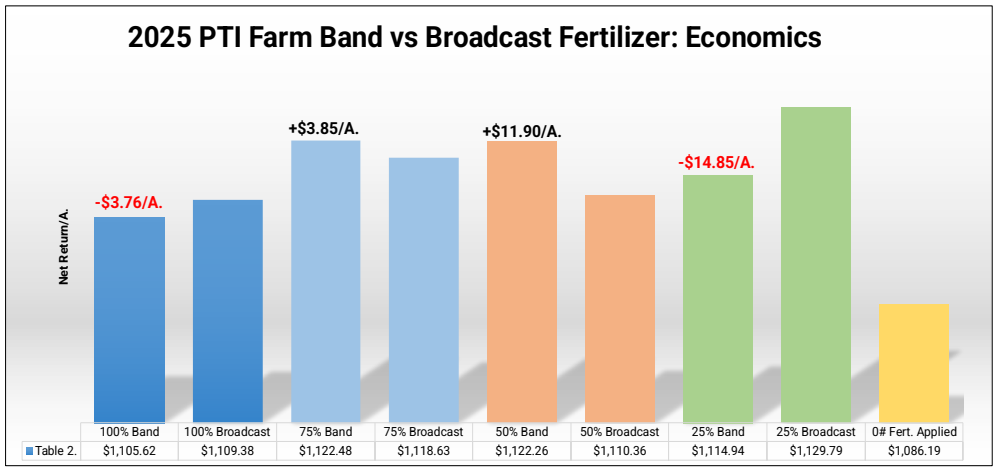
Figure 3. Gladiator® Strip-Till Unit with Montag® Fertilizer Cart

Broadcast vs Banding Rate Efficiency Study

Results: Table 3. illustrates the rates of fertilizer for 2025 Highest overall yield has been achieved from the 100% rate of fertilizer, however reducing fertilizer rates by 25-50% has resulted in yield losses of **-1.3 Bu/A. to -2.0 Bu/A**. Reducing up to 75% of fertilizer rate proved losses of **-7.6 Bu/A**. and finally, applying no fertilizer at all has resulted in the highest losses of **-25.5 Bu/A.**

Table 4. continues to illustrate the economics. Compared to 100% broadcast rates of fertilizer, 75%, 50% and 25% banded rates resulted in gains of +$4.00/A., +$11.88/A., and **-$14.96/A.**



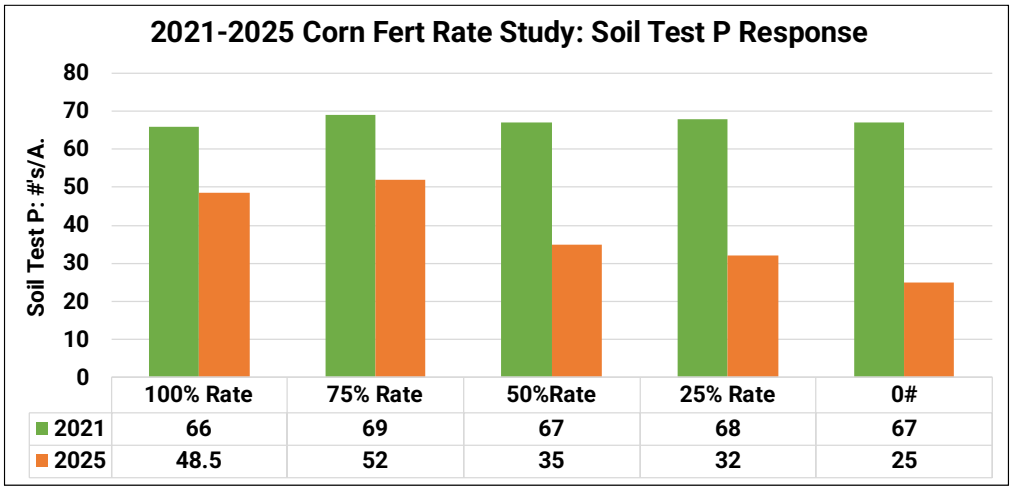


Even though 0# fertilizer rates proved yield losses of **-25.5 Bu/A.**, it resulted in a economic loss of **-$20.38/A.** was realized compared to 100% broadcast application. This economic loss is interesting because it shows that 0# of fertilizer was a yield and economic failure for the first time on the farm. Even with ultra-high cost of fertilizer that farmers are currently facing today.

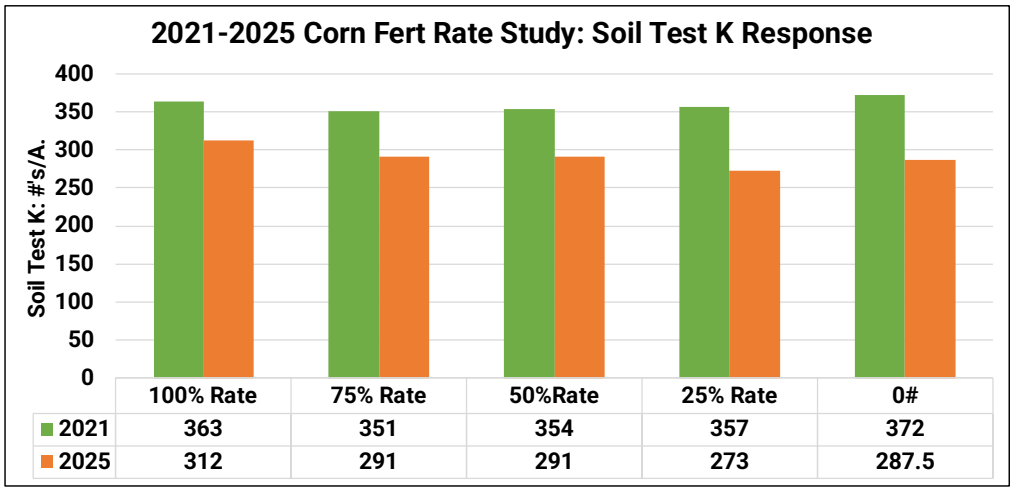
Broadcast vs Banding Rate Efficiency Study

As mentioned earlier, this trial is designed as a 10-yr study to look at a long term approach of evaluating fertilizer performance, cost of fertilizer, and overall soil test levels. 2025 was our 5th year of this long-term study and since soil samples are taken annually, it gives us the ability to monitor soil test levels at each fertilizer rate over time. The tables below summarize soil test P and K levels from our first soil test in year 1, compared to new soil test in our 5th year (2025) in each individual fertilizer rate.

After five years, soil test P levels have decreased from 67#/A. to just 25#/A. where no fertilizer has been applied, 25% rates down to 32#/A., 50% to 35#/A. and 75% at 52#/A. Compared to 100% rates of fertilizer, the 75% rate seems to be holding soil test values while all others have been decreasing.



	100% Rate	75% Rate	50%Rate	25% Rate	0#
2021	66	69	67	68	67
2025	48.5	52	35	32	25



	100% Rate	75% Rate	50%Rate	25% Rate	0#
2021	363	351	354	357	372
2025	312	291	291	273	287.5

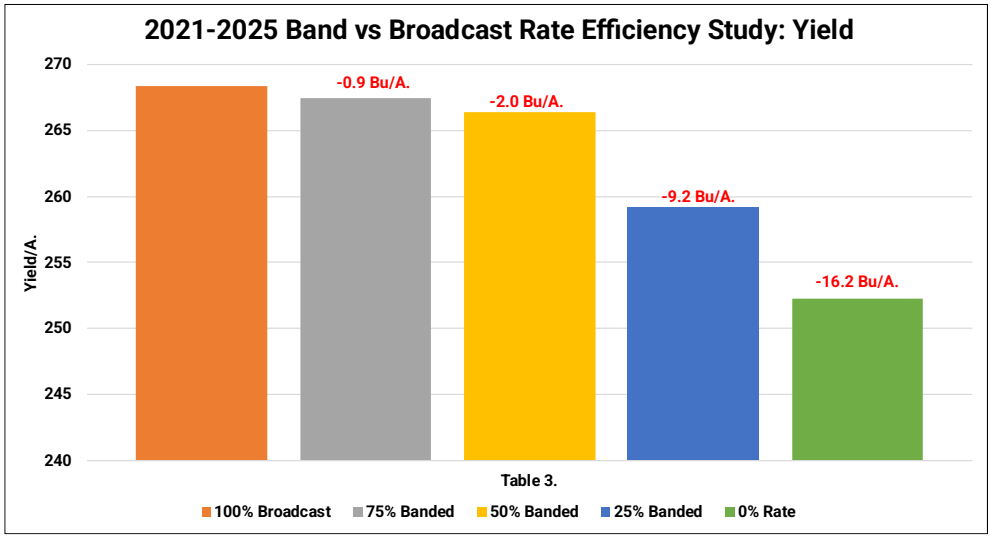
After five years, soil test K levels have decreased from 372#/A. to 287#/A. where no fertilizer has been applied, 25% rates down to 273#/A., both 50% and 75% at 291#/A. In comparison to P levels, K levels have not seen the major soil test decline. As a 10-yr program, it will be interesting to monitor these levels on a yield, economic and soil test evaluation.

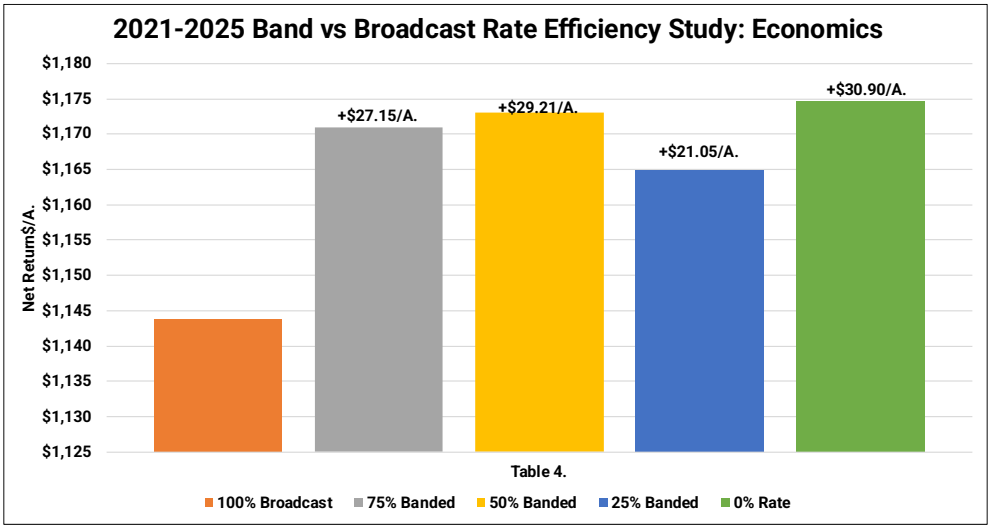
Broadcast vs Banding Rate Efficiency Study

Results: Table 1. illustrates the multi-year yield of all rates of fertilizer after completing five years of this intended ten-year study. Each strip has received the same % rate of fertilizer for the last five years. Highest overall yield has been achieved from the 100% rate of fertilizer, however reducing fertilizer rates by 25%-50% has resulted in yield losses of only **-0.9 Bu/A.** to **-2.0 Bu/A**. Reducing up to 75% of fertilizer rate proved losses of **-9.2 Bu/A**. and finally, applying no fertilizer at all over the past five year has resulted in the highest losses of **-16.2 Bu/A.**

Table 2. continues to illustrate economics. Compared to 100% broadcast rates of fertilizer, 75%, 50% and 25% banded rates resulted in gains of +$27.15/A., +$29.21/A., and +$21.05/A.

Even though 0# fertilizer rates proved yield losses of **-16.2 Bu/A.**, a net profit of +$30.90/A. was realized compared to 100% broadcast applications. This economic gain is a result of ultra-high cost of fertilizer that farmers are currently facing today, without getting enough yield gain to pay for the cost of the fertilizer.



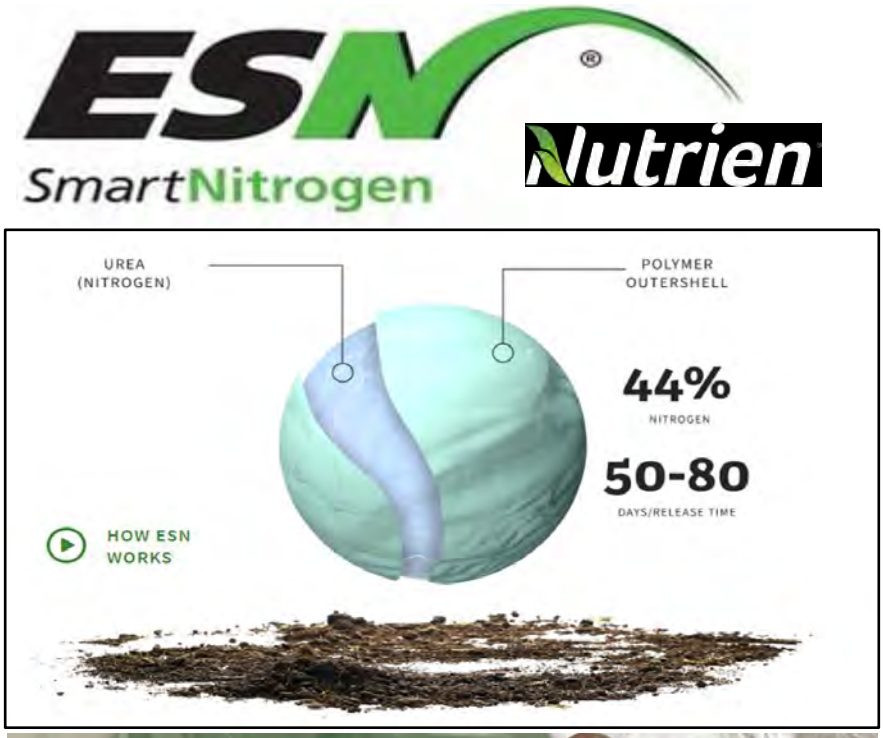


Planting Date: April 15th Hybrid: DKC 68-35 Population: 36.5K Row Width: 30" Rotation: CAB Corn Price: $4.13 DAP: $710/T Potash:$445/T

Fall Strip-Till and Urea Nitrogen Study

Objective: This study evaluates yield and economics of placing encapsulated slow-release urea nitrogen in a fall strip-till band as part of sequential corn nitrogen program.

Nutrien's ESN® Smart Nitrogen, is a 44% controlled release dry-prill nitrogen, comprised of urea contained within a flexible polymer coating. This coating protects the nitrogen from loss mechanisms and releases nitrogen in response to soil temperature. ESN's polymer membrane allows moisture to diffuse into the granule, at a rate that is controlled by soil temperature and matches the nitrogen demand of the growing crop.



ESN Smart Nitrogen was applied at a rate 50# actual N, in a fall strip-till application at a placement depth of 8".

50# of N was then re-allocated to the spring nitrogen program, which consisted of:

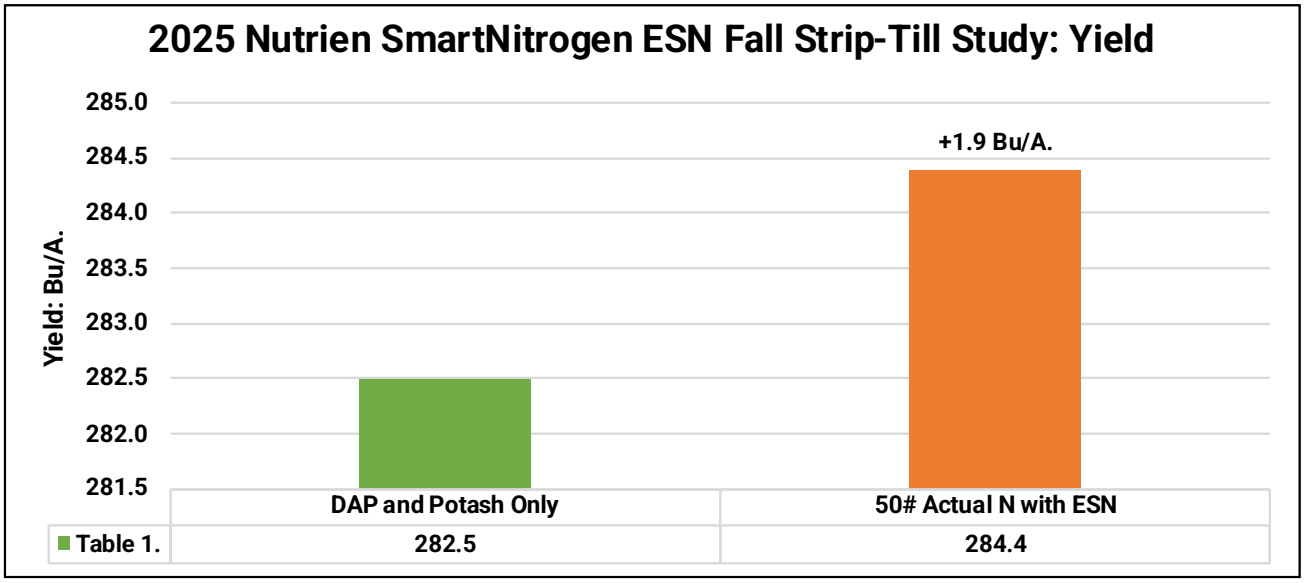
*15 Gal 32% UAN as pre-emerge Weed-N-Feed

*15 Gal 32% UAN at-plant Dual Band Conceal®

*20 Gal 32% UAN V5 Side-Dress (50# Less Side-Dress N in fall applied Urea Strips)

Fall Strip-Till and Urea Nitrogen Study

Results: ESN applications in fall strip-till bands contributed +1.9 Bu/A. yield gains, corresponding to a net return on investment of +$2.85/A. 2024 and 2025 multi-year data has resulted in average yield gains of +4.1 Bu/A. with a return on investment of $12.14/A., proving thus far that ESN can be incorporated into a fall strip-till program as part of successful corn nitrogen program.



Planting Date: April 27th Hybrid: NuTech 73B2V Population: 36K Row Width: 30" Rotation: CAC Corn Price: $4.13 UAN: $0.58/# ESN: $0.68/#

Mosaic® Sulfur/Boron Dry Fertilizer Study

Objective: To evaluate yield and net return of Mosaic® fertilizer products MicroEssentials® SZ® and Aspire® to offer sulfur and boron in addition to traditional dry phosphorous and potassium fertilizer.

MicroEssentials® SZ™ is a 12-40-0-10S-1Zn and combines nitrogen, phosphorus, sulfur, and zinc into one nutritionally balanced granule, creating a single source for balanced crop nutrition. The unique chemistry and precise nutrient ratio of MicroEssentials® features; uniform nutrient distribution, increased nutrient uptake, and season long sulfur availability.

Formulated using Nutriform® technology, Aspire® is a 0-0-58 that provides two forms of boron (Sodium Borate 50% and Calcium Borate 50%) with potassium into a single granule for uniform nutrient distribution, season-long boron availability and flexible spring or fall application.

In this study, both Mosaic® products are equivalent compared to traditional applications of 230#/A. of 18-46-0 DAP and 130#/A. of 0-0-60 potash as a control.

Mosaic®

MicroEssentials SZ

12	40	0	10	1
N	P_2O_5	K_2O	S	Zn

Aspire®

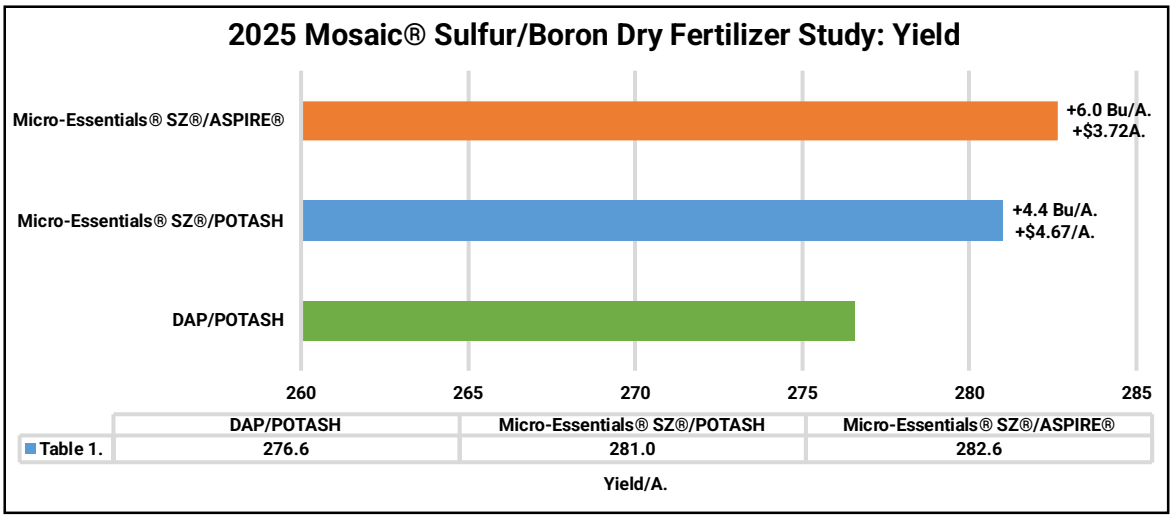
0	0	58	0.5
N	P_2O_5	K_2O	B

Mosaic® Sulfur/Boron Dry Fertilizer Study

Boron (B) is a micronutrient critical to the growth and health of all crops. It is a component of plant cell walls and reproductive structures. Boron, a water-soluble micronutrient, is especially prone to leaching. Since boron is a neutrally charged ion, it floats in ecosystems until it finds a substance to which it can bond to. During periods of heavy rain, boron is flushed out of the soil quickly. Boron serves two primary roles; one is supporting plant cell division, and the second is during the silking stage of development, in which boron helps transfer water and nutrients from the roots up through the plant. B is required in small amounts, in fact a 200 Bu/A. crop only uptakes 0.2lbs of B.

Sulfur (S) is an essential nutrient for corn growth and is a critical nutrient to make required proteins. One bushel of corn typically requires 0.1 to 0.12lbs/Bu. S uptake occurs over the entire growing season, with relatively constant uptake from the 14-leaf stage to maturity. Unlike nitrogen, only 40% to 50% of S is taken up by flowering. S is also very mobile in most soils, like nitrate, because it has a double negative charge and is repelled by the negative charge of the soil, unlike nutrients like potassium, calcium, or magnesium

Results: Mosaic® Micro-Essentials® SZ® offered yield advantages of +4.4 Bu/A. over a traditional DAP program. These yield advantages equated to positive net returns of +$4.67/A. after cost of product. ASPIRE® treatments replacing traditional potash offered yield advantages of +6.0 Bu/A., with returns of +$3.72/A.



Planting Date: April 25th Hybrid: NuTech 73B2V Population: 36K Row Width: 30" Rotation: CAB Corn Price: $4.13 Mosaic® SZ/ASPIRE: $134.64/A. Mosaic® SZ/POTASH: $124.08/A. DAP/POTASH: $110.58/A.

Layer Ash Blend Manure/Compost Study

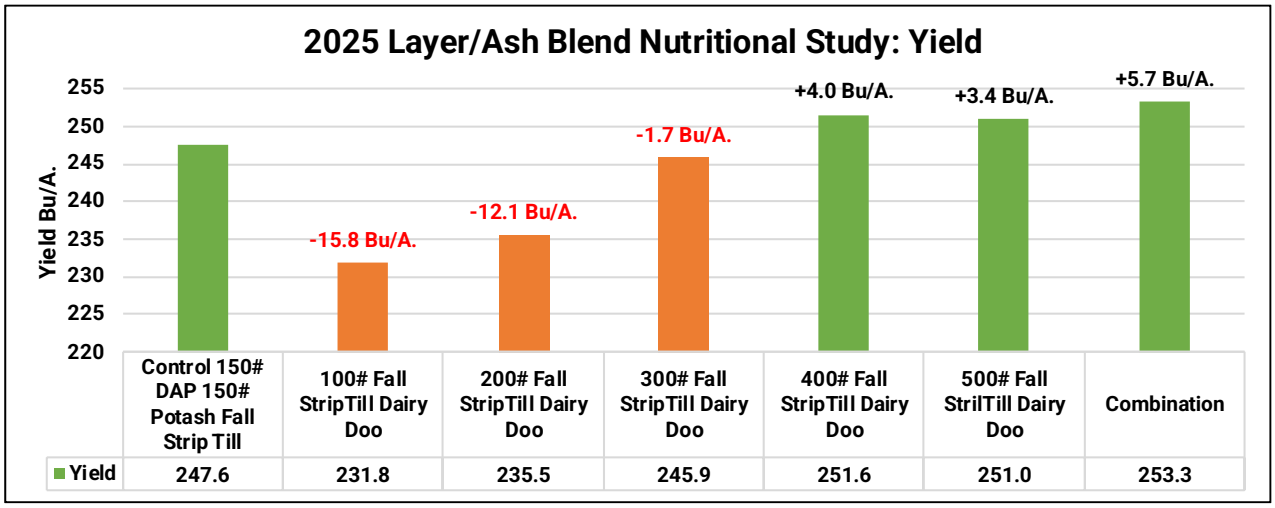
Objective: To evaluate yield and economics of Dairy Doo® Layer Ash Blend, a compost and manure mix that is based around layer manure, combined with compost and Sili-K. This organic, thermophilic, and weed-free designer blend compost/manure adds microbiological activity, calcium, silica, potash, and carbon to the soil while also releasing locked up nutrients and increasing water-holding capacity. Layer Ash Blend can be certified organic and its analysis is NPK: 2-2-2 8Ca and each ton applied consists of 42-44-42 167Ca total #/A.

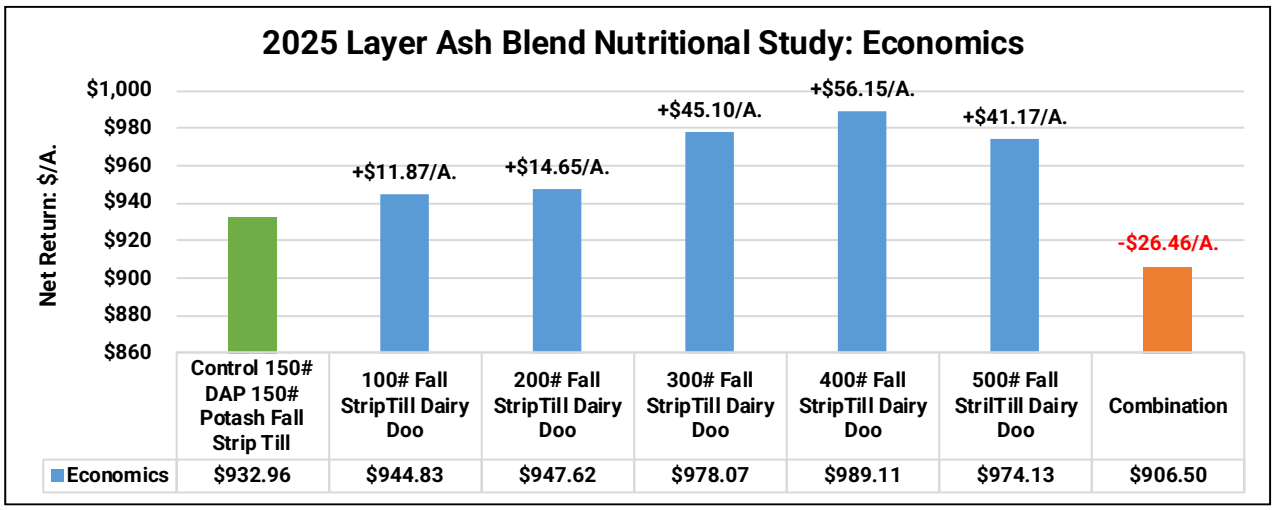
Rates of Dairy Doo were applied in rates of 100#, 200#, 300# and 400#/A. applied in fall strip-till bands and compared to a traditional application of dry 18-46-0 and 0-0-60 fertilizer at 150# each.

Layer Ash Blend Manure/Compost Study

Results: Banded strip-till applications at 400#/A. of Dairy Doo offered both agronomic and economic optimum return on investment with gains of +4.0 Bu/A. and +$56.15/A. over that of traditional synthetic rates of 18-46-0 and 0-0-60. Lower rates of 100-300# resulted in yield losses of **-1.7 Bu/A.** to **-15.8 Bu/A.**, however due lower cost/ton, all proved economic net gains of +$11.87/A. to +$45.10/A.

With the current high price of synthetic fertilizer combined with low commodity prices, the PTI Farm is trying to evaluate alternative fertilization strategies to optimize both yield and profitability. Alternatives such as compost and layer manure, at least in the first year of this study, appear attractive.





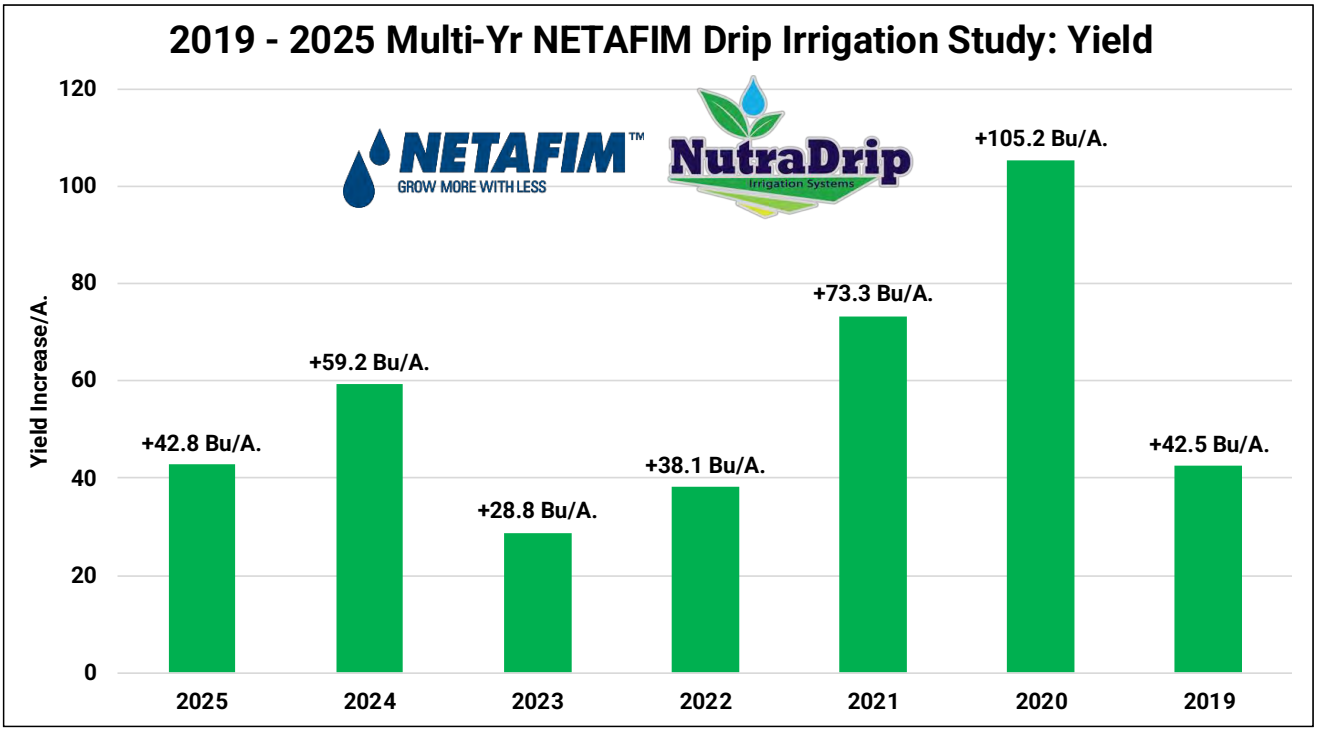
Planting Date: April 28th Hybrids: GH 03U08 Population: 36K Row Width: 30" Rotation: CAB Dairy Doo: $250/Ton Corn Price: $4.13

High Management Corn NETAFIM® Irrigation Study

Objective: This study evaluates NETAFIM® drip tape irrigation designed and installed by NutraDrip Irrigation Systems, and its' ability to feed corn with water and nutrients for high yield potential. This method of irrigating a crop uses NETAFIM® drip tape with small pressure regulated emitters evenly spaced at 24" apart. Water is accessed from a water recycling management program installed at the PTI Farm.

Results: In 2025, NETAFIM® drip tape irrigation resulted in increased average corn yields of +42.8 Bu/A., over the non-irrigated control. 8" of irrigation water was applied through drip irrigation throughout the growing season from June - September. 2025 marks the fourth highest annual yield response over the 7-years of drip irrigation at the PTI Farm.

Multi-Year data over 2019-2025 has proven to increase corn yield by an average of +55.7 Bu/A., while increasing additional gross income by an average of +$245.30/A.



NETAFIM® Sub-Surface vs Surface-Irrigation Study

Objective: This study evaluates NETAFIM® drip tape irrigation and its ability to feed corn with water and nutrients for high yield potential in a surface and sub-surface installation.

This method of irrigating a crop uses NETAFIM® drip tape with small pressure regulated emitters evenly spaced at 24" apart. Water is resource from a water recycling management program installed at the PTI Farm.

Surface irrigation is placed on top of the soil surface on 60" spacing down the middle of the 30" row (Figure 1).

Sub-surface irrigation is buried 14" in depth on 40" centers (Figure 2). Sub-surface irrigation was installed in the fall of 2021.

Figure 1. NETAFIM® Surface Irrigation

Figure 2. NETAFIM® Sub-Surface Irrigation

NETAFIM™ GROW MORE WITH LESS

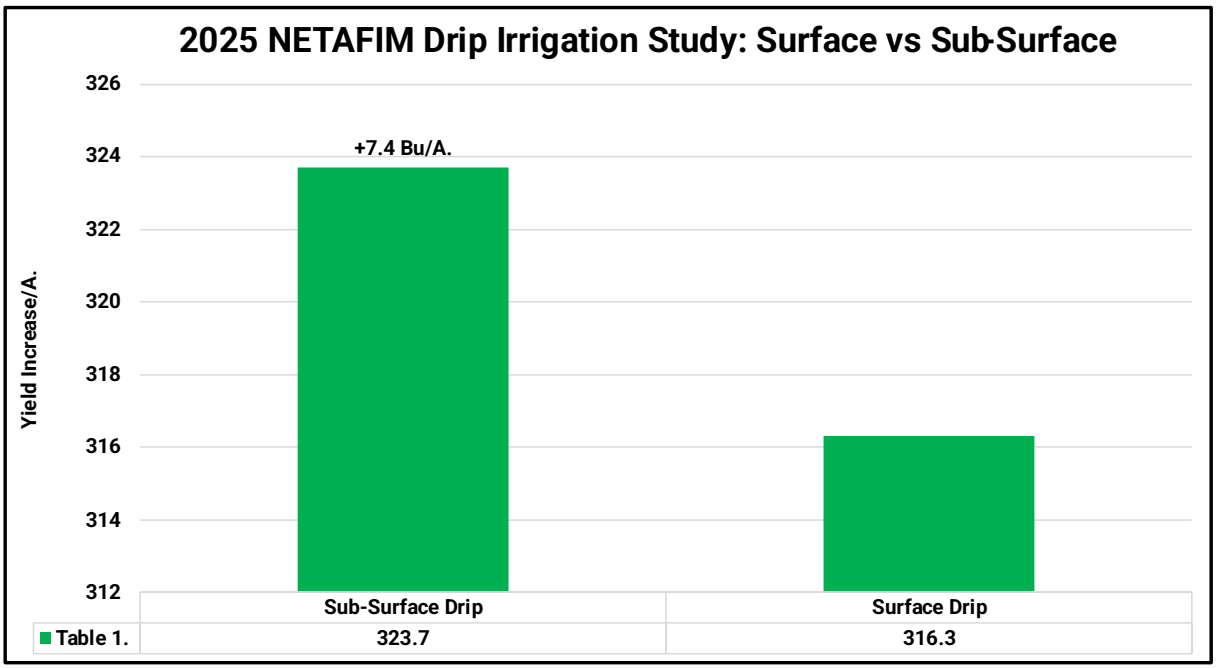
NutraDrip Irrigation Systems

NETAFIM® Sub-Surface vs Surface-Irrigation Study

Results: NETAFIM® sub-surface drip tape irrigation resulted in increased average corn yields of +7.4 Bu/A., over surface applied drip tape. Sub-surface irrigation tape was installed in the fall of 2021 and just like drainage tile, we had a suspicion that it may take some time for sub-surface drip irrigation to settle into place correctly, repair soil density of installation, and get proper water permeability throughout the soil profile quickly. However, sub-surface drip has out yielded surface drip over the past 4 years. 2022-2025 proved yield advantages of +6.6 Bu/A.,+13 Bu/A., and +6.9 Bu/A.

Surface drip irrigation has its advantages and disadvantages. It can be an effective, faster way to get water to a crop, however it can suffer moisture losses being exposed to sunlight, temperature, and wind on the soil surface. Keeping the soil surface moist can also lead to a higher threat of disease. Labor is also a concern, as the tape needs to be manually laid and picked up annually.

8” of rain was applied through drip irrigation throughout the growing season from June - September. Fertigation was also implemented through both systems to apply N, B, Cu, S, P, and K as needed.



Tile Drainage and Sub-Irrigation Study

Objective: This study will evaluate the agronomic and economic benefits of using 15’ and 30’ 3” plastic field tile to not only drain saturated soils (Figure 1.), but to also back-feed irrigation water through the field tile to offer irrigation to a growing crop.

Figure 2. shows the layout of our pattern tiled field installed in the early spring of 2021. Both 15’ and 30’ pattern tile widths were used to understand the difference in the soil’s capillary action or uptake of water. This study is one of many at the PTI Farm designed as long-term 10+ year studies to study consistency and longevity of the system.

Figure 1. Tile Installation

Figure 2. 15’ and 30’ Pattern Tile Installation

ADI Ag Drainage Inc.

Tile Drainage and Sub-Irrigation Study

Results: The first objective of this study was to evaluate the differences between tile spacing. In 2025, 15' pattern tile offered yield advantages of +12.6 Bu/A, which equates to additional gross farm revenue of +$52.04/A.

30' pattern tile offered yield advantages of +5.1 Bu/A. with additional gross revenue of +$21.06/A.

8" of irrigation water was needed throughout the summer months to offset the lack of rainfall. However, even though droughty conditions were present in 2025, tile still offered average yield gains of +8.9 Bu/A.

Based on data from 2022-2025, Table 1. illustrates that 15' tile systems would pay for themselves after 14.2 crop seasons ($1160/A. 15' Tile) and 30' tile in 12 years ($850/A. 30' Tile)

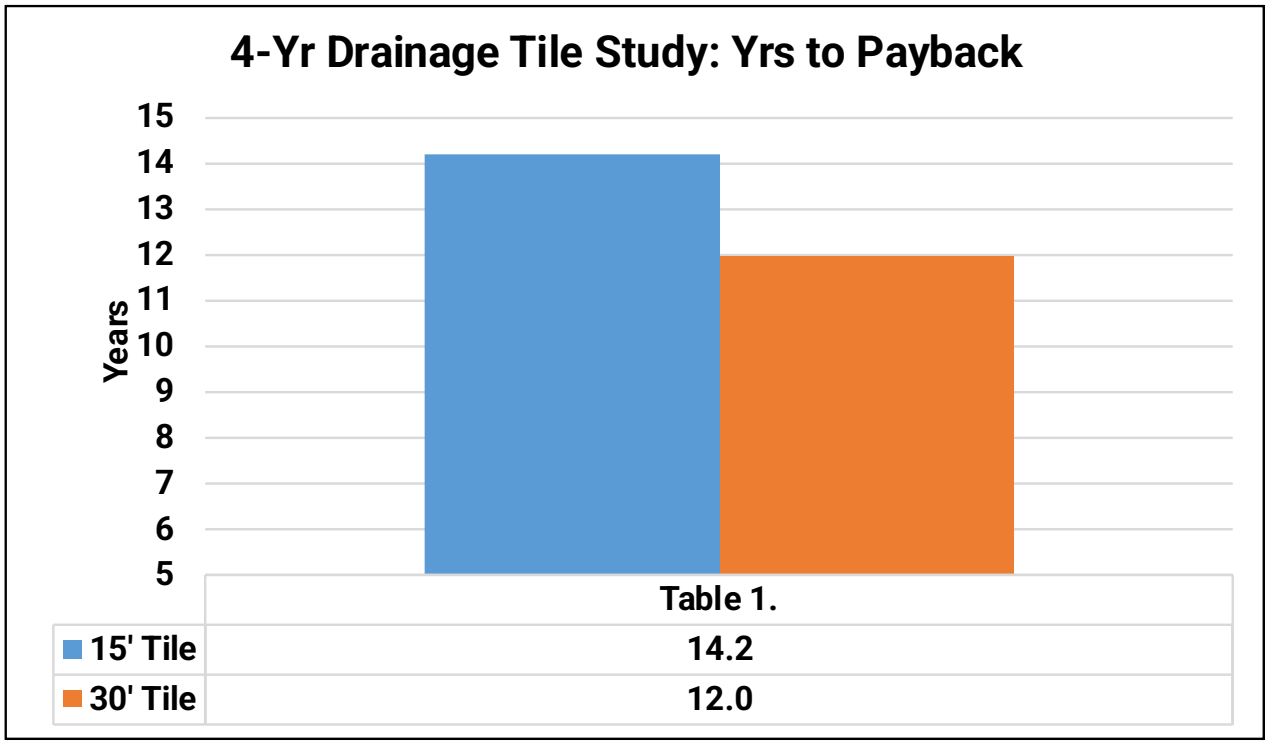


	Table 1.
15' Tile	14.2
30' Tile	12.0

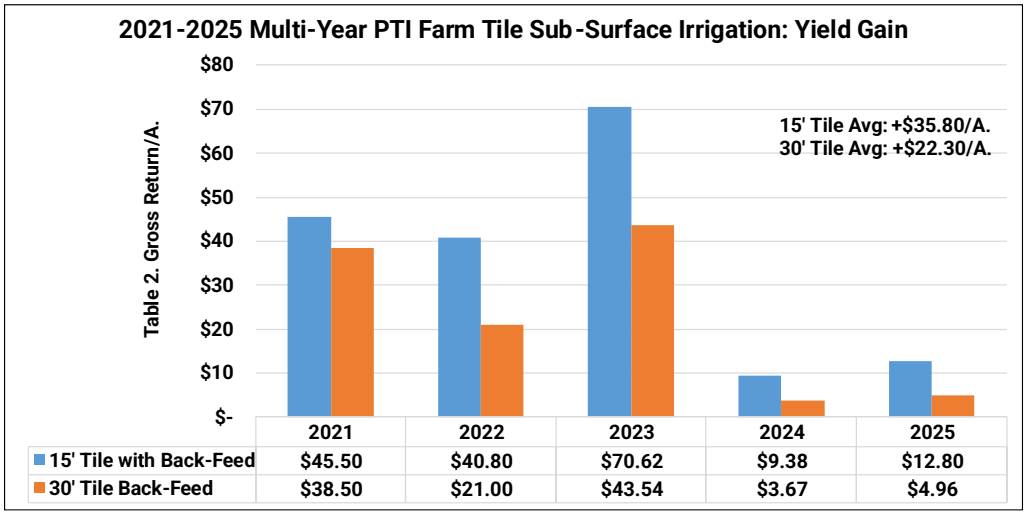
Tile Drainage and Sub-Irrigation Study

Secondly, the other objective of this study is using the drainage tile as option to sub-irrigate. Figure 3. is a photo of a gate system that gives the ability to control the water table. Gates can be added or removed to allow water to "back-feed" or "fill up" the tile, which in turn draws water up into the soil profile. Water is sourced and pumped out of the PTI Farm's water recycling reservoir to back-feed the water through the tile system in the field.

Table 2. illustrates back-feeding of water proved minimal economic returns of +$12.80/A. in 15' tile pattern tile and only +$4.96/A. in 30' tile patterns. However, multi-year data has proven 15' tile averaging +$35.80/A. and 30' at +$22.30/A.

Figure 3. Gate Structures to Control Water Table

Though seemingly small economic gains, what was a 14.2-yr and 12-yr payback period mentioned above from just drainage gains, multi-year back-feeding gains contributed additional funds and lowered payback to 9.9 crop seasons in 15' tile and 9.1 years in 30' tile patterns.



	2021	2022	2023	2024	2025
15' Tile with Back-Feed	$45.50	$40.80	$70.62	$9.38	$12.80
30' Tile Back-Feed	$38.50	$21.00	$43.54	$3.67	$4.96

It should be noted that the minimal yield and economic returns in both 2024 and 2025 were a result of the lack of rainfall. Due to very dry conditions, irrigation water in the field tile needed to be re-directed to drip-tape. Tile sub-surface irrigation was just too deep at 36", thus finding it very difficult for corn to get water at those depths. In a normal rainfall growing season, back-feeding tends to work much easier.

High Management Strip Crop/Livestock Sustainability Study

Objective: To achieve high yield corn in an intense management environment that focuses on using strip-cropping corn, cover crops, and livestock. This sustainability study is intended for livestock to feed our crops and the crops to feed our livestock, while at the same time creating healthier soils.

30” row corn is planted in 10’ alternating strips between a multi-species cover crop. The short stature cover crop allows the corn to capture more sunlight and to create the first step of a high yield environment.

Figure 1. Strip-Cropping Corn and Cover Crops

The cover crop is then planted near June 1st and is allowed to establish tremendous root and top-growth and to utilize the long growing season, unlike traditional cover crop scenarios.

Figure 2. StockCropper Livestock Unit

Three species of livestock are then placed in the cover crop strips in a mobile livestock confinement system called the StockCropper. Sheep are used as the first stage grazers in front of the StockCropper, mowing off much of the cover crop and using it as its stand-alone food ration. As the sheep are grazing, they also supply manure back into the soil. Secondly, hogs are placed in the center of the livestock unit, as a second source of manure being added back to the soil, as well as higher value meat products sold to increase farm revenue. Lastly, meat chickens are placed in the rear of the livestock unit and work as scavengers from the sheep and hogs, but also supply a 3rd species of manure. The StockCropper unit can autonomously or manually move through the cover crop strips to feed the livestock and distribute the manure uniformly.

High Management Strip Crop/Livestock Sustainability Study

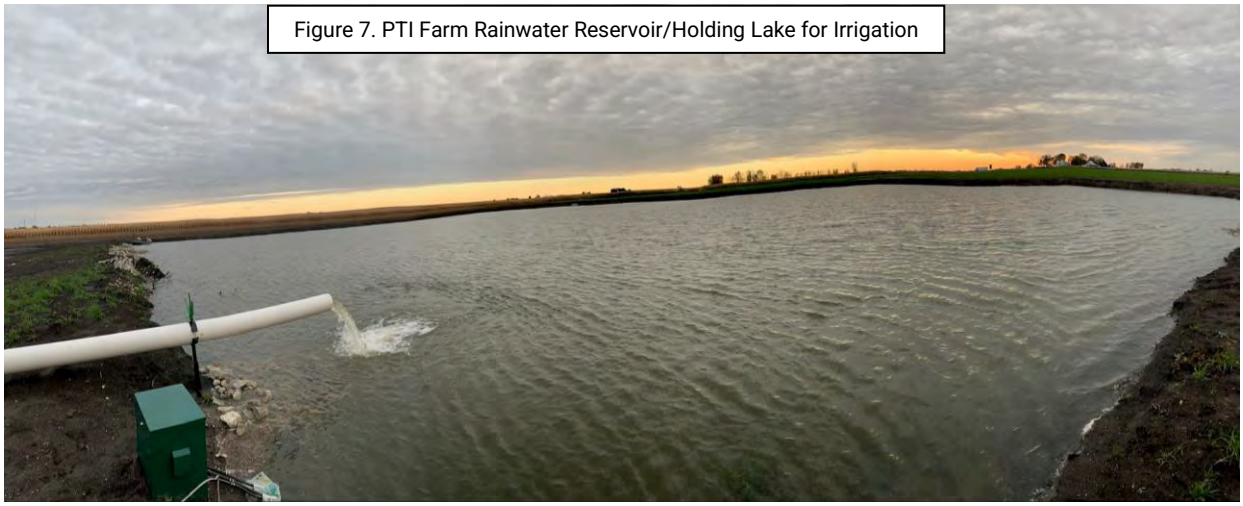
Figure 3. Sheep Grazing Cover Crops

Figure 5. Meat Chickens in Rear Bay

High Management Strip Crop/Livestock Sustainability Study

Another component to this high management study is water management. The trial area has NETAFIM® drip tape placed 14” deep on 40” centers to allow for irrigation throughout the growing season. Below the irrigation is 3” drainage tile on 30’ centers placed 36” to the top of the tile to control excess water when soils are saturated. Field tile removes the water and temporarily holds the rainwater in a reservoir that can then be pumped out to re-cycle the rainwater through the irrigation system. Monthly testing of the reservoir is conducted to monitor any nutrients in the water to evaluate leaching potential and/or any groundwater contamination.

Figure 7. PTI Farm Rainwater Reservoir/Holding Lake for Irrigation



High Management Strip Crop/Livestock Sustainability Study

The control in the study is dryland strip-till, non-strip-crop, average status quo managed corn planted at 36K, fertilized with 200# 18-46-0, 200# 0-0-60, 180# total nitrogen and a VT Miravis®Neo fungicide application.

The high management protocol is listed below. Items below represent **ALL** treatments that required additional costs over the control:

Fall 2024 Residue Digestor/Soil Feeders:

3 Gal QLF® L-CBF BOOST + 3 Gal ATS

Spring 2024 Pre-Plant:

25# Smart Hydrogel soil water retainer

15 Gal 32% UAN WNF,1 Qt APSA-80™ Water Adjuvant, 1 Qt PhycoTerra® Microbial Food

EZ Drop SideDress:

V6 5 Gal ATS, 20 Gal UAN 32%, 2 Gal QLF® L-CBF BOOST, 1 Qt Boron

Fertigation:

June Irrigation: 2” water, 2 Gal ATS, 5 Gal 32%

July Irrigation: 2” water, 2Gal ATS, 9 Gal32%

August Irrigation: 2.5” Water, 1 Gal ATS,

September Irrigation: 1.5” Water

At-Plant Nutrition Conceal® Dual Band:

2 Gal Nachurs® K-Fuse®, 15 Gal Nachur’s SideLine® + 4 Gal ATS + 2 Qts 10% Boron

At-Plant FurrowJet® 3-Way Band:

3 Gal Pritchard Ag LLC Brix Builder, MicroPak, Humate and Sea Kelp

EZ Drop SideDress:

V10 5 Gal ATS, 20 Gal UAN 32% + 1 Qt Boron

Foliar Treatment:

V3 Nachurs® 1 Qt FinishLine® + 1 Gal K-Fuel®

V3 4oz Corteva™ NEXTA™ STAND

V10 Nachurs® 1 Qt MoneyBall® + 20 Gal Plasma Activated Water

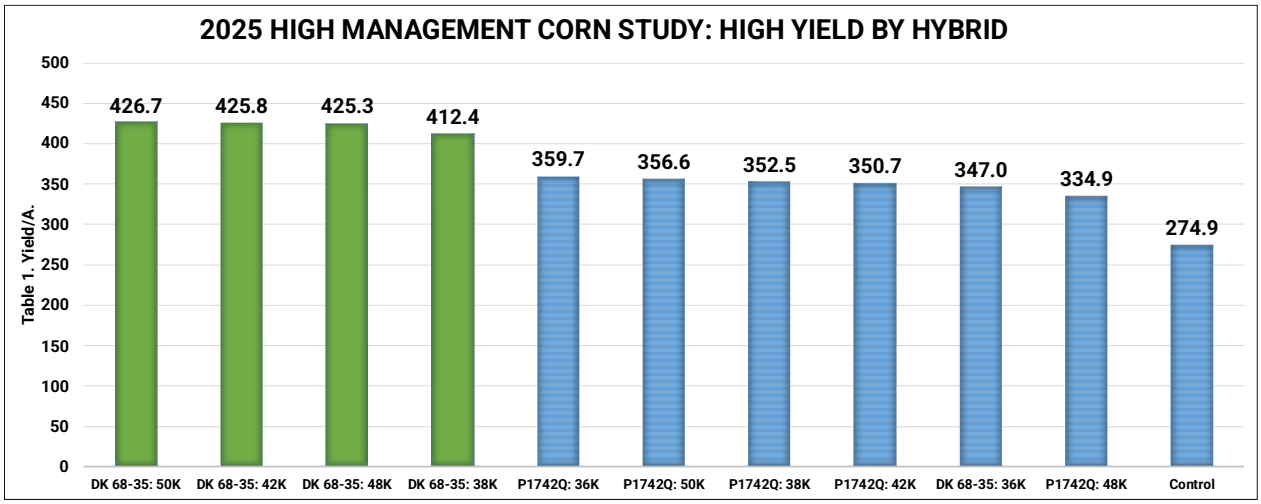
VT: 13.7oz Miravis®Neo + 2 Gal PAW

VT: 3 Gal QLF® L-CBF Amino 15, 1Qt Boron

R3: 7oz Veltyma® + 2 Gal PAW

High Management Strip Crop/Livestock Sustainability Study

Results: Table 1. illustrates yield results of all entries in the study. DeKalb 68-35 topped the charts with a yield of 426.7 Bu/A., while averaging 422.6 Bu/A. in all entries. Pioneer 1742Q topped highest yield at 359.7 Bu/A. while averaging 339.5 Bu/A. in all entries. DeKalb 68-35 outyielded the control by +132.5 Bu/A., while Pioneer 1742Q at +65 Bu/A.

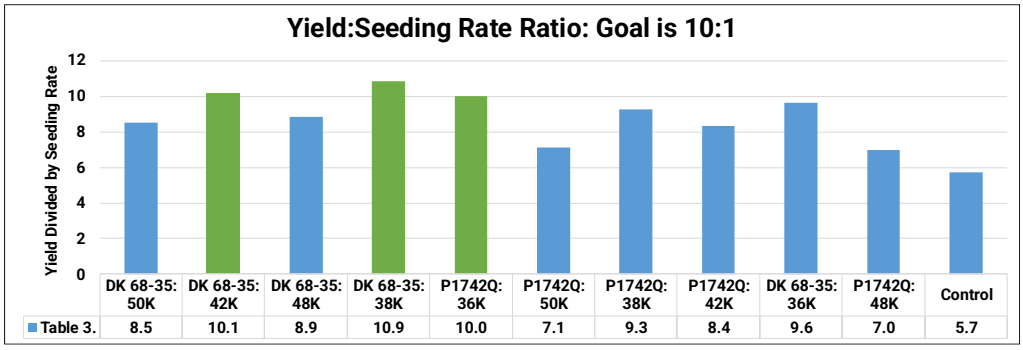


Year	Hybrid	Corn Yield
2018	Pioneer 1197	272.5
2019	DeKalb 53-56	285.0
2020	DeKalb 63-42	368.2
2021	Golden Harvest 15J91	357.9
2022	Channel 212-04	398.4
2023	Pioneer 1742Q	403.7
2024	Pioneer 1742Q	434.9
2025	DeKalb 68-35	426.7

Table 2. summarizes high yield levels at the PTI Farm since its inception back in 2018. 2020 began our first full year of our water management program, where recycling of rainwater from field tile first was initiated.

High Management Strip Crop/Livestock Sustainability Study

It is our goal at the PTI Farm for corn yield to be near 10 times our seeding rate. Table 3. below summarizes yield to seeding rate ratios. The control yield of 274.9 Bu/A. resulted in an average ratio of 5.7 Bu/1000 seeds planted (274.9/36). DKC 68-35 reached 10.9, 10.1, and 10.0 Bu/1000, while Pioneer 1742Q achieved 10.0 once, respectively.



	DK 68-35: 50K	DK 68-35: 42K	DK 68-35: 48K	DK 68-35: 38K	P1742Q: 36K	P1742Q: 50K	P1742Q: 38K	P1742Q: 42K	DK 68-35: 36K	P1742Q: 48K	Control
Table 3.	8.5	10.1	8.9	10.9	10.0	7.1	9.3	8.4	9.6	7.0	5.7

One very important aspect to consider in any trial, especially a high managed corn trial, is economics. High yield trials simply have more costs and must be paid for. If yield cannot be increased enough to pay the bills, it's simply not sustainable. High yields look great on paper and in the news, but we need bushels to pay for the additional cost of products we are applying.

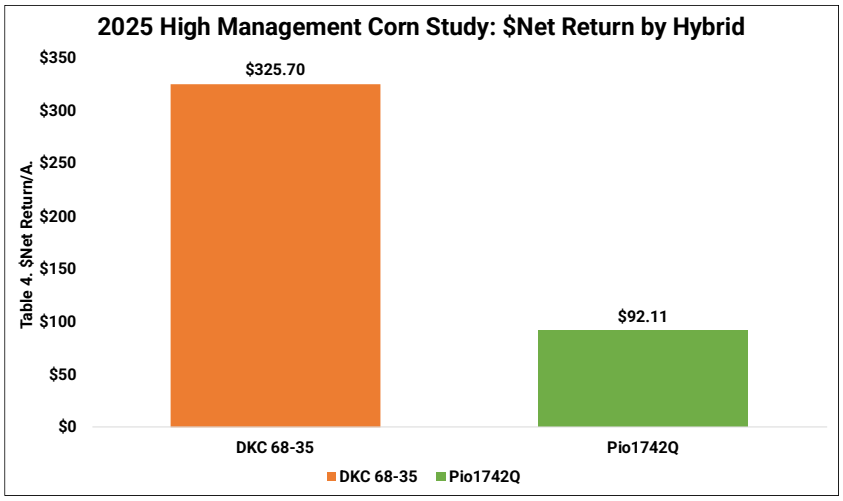


Table 4. illustrates average net return for each corn hybrid, compared to the control. The high management program did in-fact achieve positive net returns, with both hybrids. Pioneer 1742Q achieved average profit of +$92.11/A., while DKC 68-35 returned an additional +$325.70/A.

These returns indicate this high management study is sustainable and not only are we increasing corn yield, but we are netting more dollars/A. Now the question is, how do we accomplish this on more acres and how do we continue to increase corn yield and profitability more? As only a third-year study, we are optimistic that soil test and soil health values will increase and soil biology to explode that will eliminate the need for costly nutrition expenditures going forward. When this happens, profits will soar. Currently, it is our estimation that the sale of livestock (after costs) could match that of soybeans that would normally be planted as a short crop next to the corn.

Planting Date: April 12th Hybrids: P1742Q, DKC 68-35 Population: 36-50K Row Width: 30" Rotation: Corn after Cover/Livestock Corn Price: $4.13

Nitrogen: $0.58/# DAP/Potash: $710/$445 Seed Cost: $360/Bag Total N: 300# High Yield Program Cost: $221.69/A. or 53.7 Bu/A. Break-Even

AgroLiquid® High Management Irrigated Corn Study

Objective: To evaluate the yield and economic impact of a corn liquid starter fertilizer and foliar nutritional program from AgroLiquid® in a high management irrigated environment. This trial consisted of the following:

Treatments and Placement:

#1. Control:	200# DAP, 200# 0-0-60, less 40# N
#2 At-Plant Fertility:	
Conceal® Dual Band: (Figure 1.)	3 Gal/A. AccesS™
FurrowJet®: (Figure 2.)	2 Gal/A. ProGerm®, 1 Gal/A. Nresponse®
	0.5 Gal/A. Micro500™, 2 Gal/A. Kalibrate™
	0.25 Gal/A. Boron, 0.25 Gal/A. LiberateCa™
	0.125 gal/A. Manganese
#3 Post-Plant Applications:	
V4: SideDress:	2 Gal/A. AccesS™, 2 Gal/A. Kalibrate™, 0.125 Gal/A. Boron
VT: 1 Gal	0.125 Gal/A. Boron, 2 Gal/A. Nresponse®
	0.125 Gal/A. Manganese,

AGROLIQUID

Figure 1. Conceal® Placement

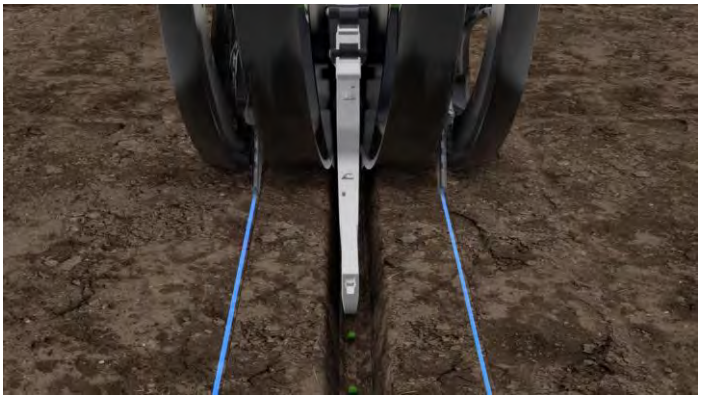


Figure 2. FurrowJet® Placement

AgroLiquid® High Management Irrigated Corn Study

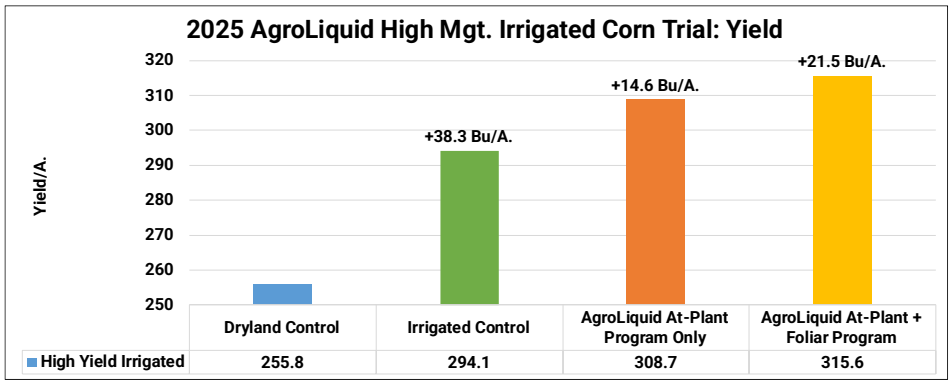
Irrigation on all treatments received 8" of water throughout the growing season. All treatments received 13.7oz/A. of Miravis® Neo at VT and 13.7oz/A. of TrivaPro® at R3 growth stage. All irrigated treatments received +40 additional N units.

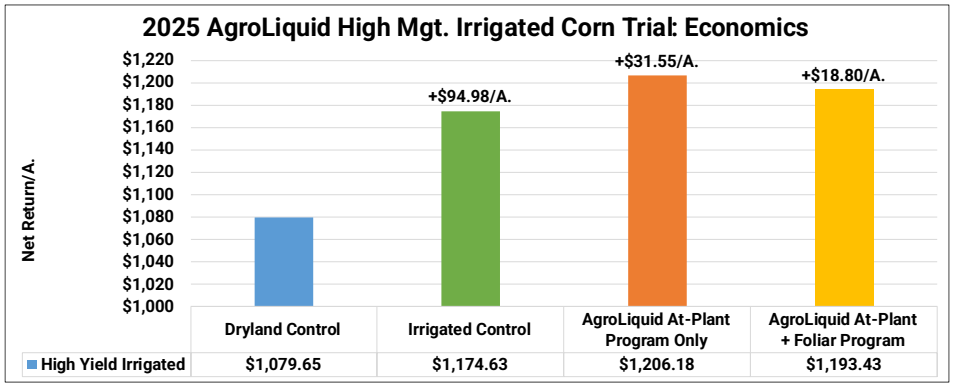
Results: Pioneer 1742Q posted highest yield of 315.6 Bu/A. in the combination irrigated/planter nutrition/and foliar program, +59.8 Bu/A. over the dryland control.

Irrigation resulted in yield gains of +38.3 Bu/A. over the dryland control, resulting in net returns of +$94.98/A.

At-plant AgroLiquid® treatments captured +14.6 Bu/A. gains with a positive return of +$31.55/A. over the irrigated control. These net returns proved highest of all treatments.

Combination at-plant and foliar treatments captured +21.5 Bu/A. gains with a positive return of +$18.80/A. over the irrigated control.





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Planting Date: April 25th Hybrid: Pioneer 1742Q Population: 36-38K Row Width: 30" Rotation: CAB Corn Price: $4.13

At-Plant Conceal® and FurrowJet® Program: $68.75/A. Foliar Program: $41.25/A. Base Irrigation Program: $40/A. Fert Re-Allocation: $40/A. N: $0.58/#

AgroLiquid® High Management Dryland Corn Study

Objective: To evaluate the yield and economic impact of a corn liquid starter fertilizer and foliar nutritional program from AgroLiquid® in a high management dryland environment.
This trial consisted of the following:

Treatments and Placement:

#1. Control:	200# DAP, 200# 0-0-60, less 40# N
#2 At-Plant Fertility:	
Conceal® Dual Band: (Figure 1.)	3 Gal/A. AccesS™
FurrowJet®: (Figure 2.)	2 Gal/A. ProGerm®, 1 Gal/A. Nresponse®
	0.5 Gal/A. Micro500™, 2 Gal/A. Kalibrate™
	0.25 Gal/A. Boron, 0.25 Gal/A. LiberateCa™
	0.125 gal/A. Manganese
#3 Post-Plant Applications:	
V4: SideDress:	2 Gal/A. AccesS™, 2 Gal/A. Kalibrate™, 0.125 Gal/A. Boron
VT: 1 Gal	0.125 Gal/A. Boron, 2 Gal/A. Nresponse®
	0.125 Gal/A. Manganese,

AGROLIQUID

Figure 1. Conceal® Placement

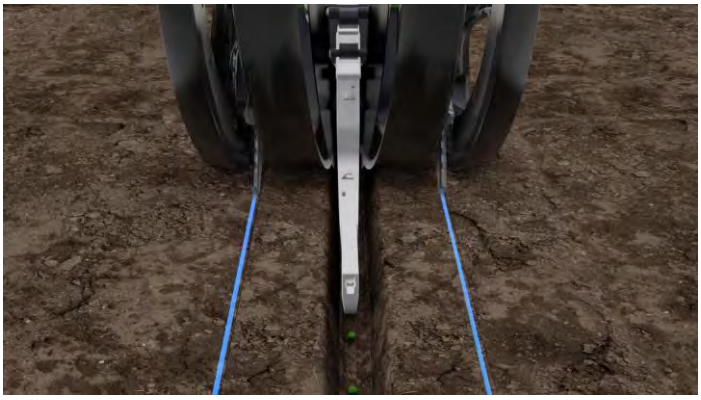


Figure 2. FurrowJet® Placement

AgroLiquid® High Management Dryland Corn Study

All treatments received 13.7oz/A. of Miravis® Neo at VT and 13.7oz/A. of TrivaPro® at R3 growth stage. All high yield treatments received +40 additional N units.

Results: At-Plant AgroLiquid® treatments captured +14.4 Bu/A. gains with a positive return of +$7.52/A. over the control.

Combination at-plant and foliar treatments captured +25.2 Bu/A. gains with a positive return of +$10.88 over the control. These net returns proved highest of all treatments.

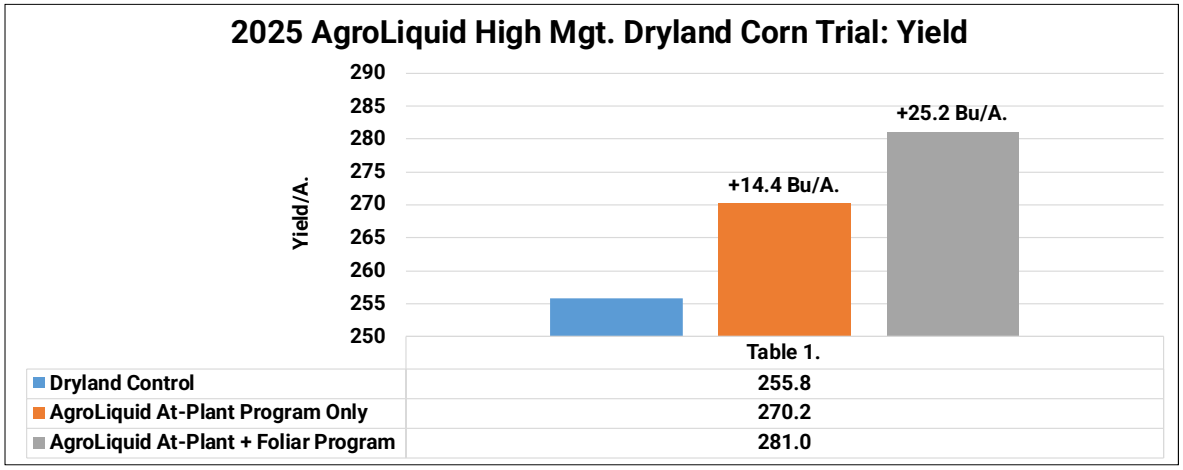


Table 1.	
Dryland Control	255.8
AgroLiquid At-Plant Program Only	270.2
AgroLiquid At-Plant + Foliar Program	281.0

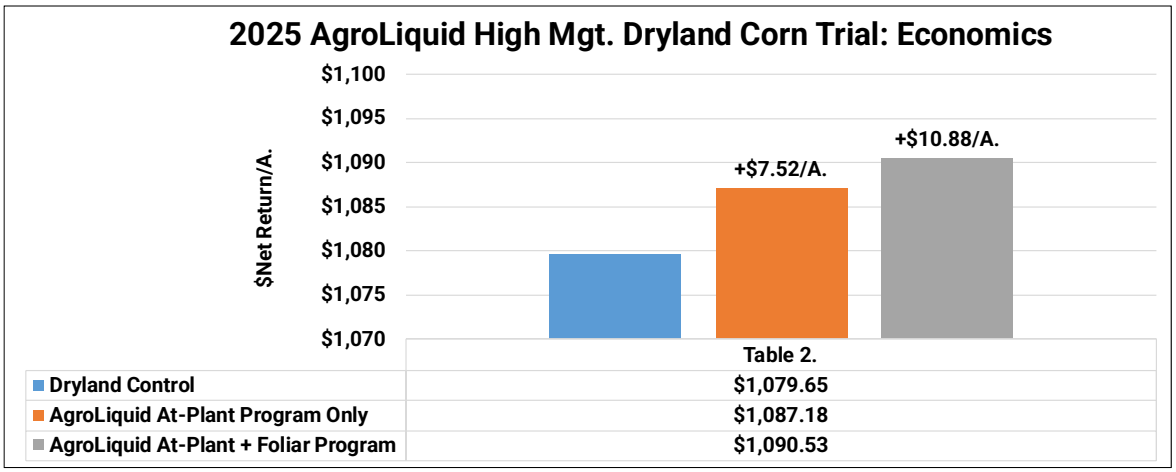


Table 2.	
Dryland Control	$1,079.65
AgroLiquid At-Plant Program Only	$1,087.18
AgroLiquid At-Plant + Foliar Program	$1,090.53

Planting Date: April 25th Hybrid: Pioneer 1742Q Population: 36-38K Row Width: 30" Rotation: CAB Corn Price: $4.13

At-Plant Conceal® and FurrowJet® Program: $68.75/A. Foliar Program: $41.25/A. Base Irrigation Program: $40/A. Fert Re-Allocation: $40/A. N: $0.58/#

Marco Fertilizer High Management Irrigated Corn Study

Objective: To evaluate the yield and economic impact of a corn liquid starter fertilizer and foliar nutritional program from Marco Fertilizer in a high management irrigated environment. This trial consisted of the following:

Treatments and Placement:

#1. Control:	200# DAP, 200# 0-0-60, less 40# N
#2 At-Plant Fertility:	
FurrowJet® 3-Way: (Figure 1.)	3 Gal/A. QuickGrow Complete
	1oz/A. MycoBoost with 3 Gal/A. Water

#3 Foliar Applications :

MARCO Liquid Fertility

V3: 1 oz/A. Poseidon
20 oz/A. Energizer
1 pt/A. Iron Plus

V10: 1 oz/A. Poseidon
20 oz/A. Energizer
2# Foliar Complete

VT: 20 oz/A. Energizer
2# Foliar Complete
32 oz/A. Calcium Plus

R3: 2.5 gal/A. Finisher + 20 Gal/A. Water

Figure 1. FurrowJet® Placement

Marco Fertilizer High Management Irrigated Corn Study

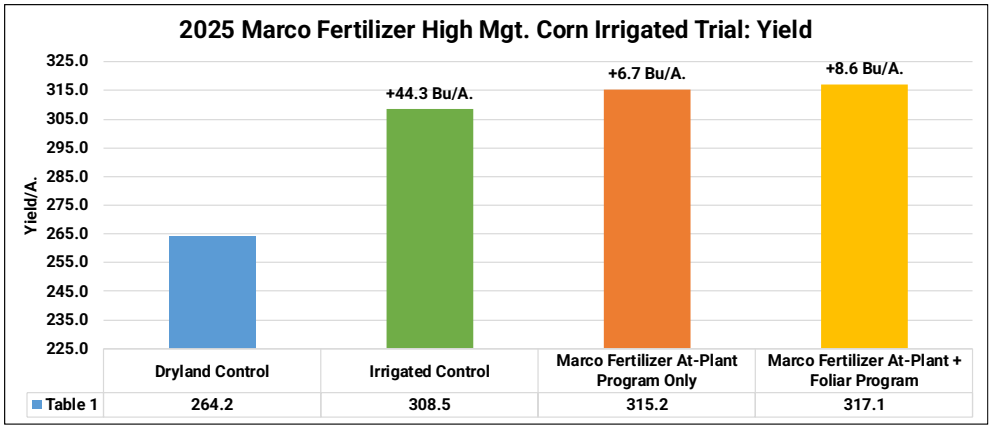
Irrigation on all treatments received 8" of water throughout the growing season. All treatments received 13.7oz/A. of Miravis® Neo at VT and 13.7oz/A. of TrivaPro® at R3 growth stage. All irrigated treatments received +40 additional N units.

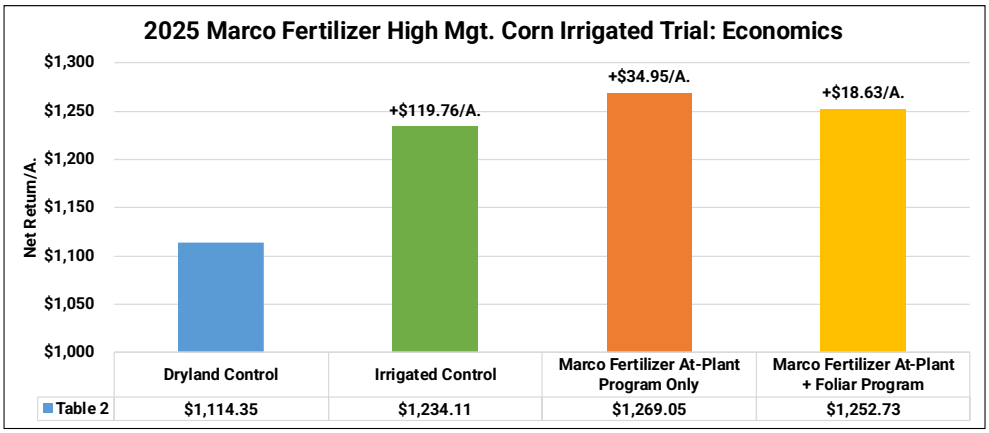
Results: Pioneer 1742Q posted highest yield of 317.1 Bu/A. in the planter nutrition/foliar program, +52.9 Bu/A. over the dryland control.

Irrigation resulted in yield gains of +44.3 Bu/A. over the dryland control, resulting in net returns of +$119.76/A.

At-plant Marco treatments captured +6.7 Bu/A. gains with a positive return of +$34.95/A. over the irrigated control. These net returns proved highest of all treatments.

Combination at-plant and foliar treatments captured +8.6 Bu/A. gains with a positive return of +$18.63/A. over the irrigated control.





Planting Date: April 25th *Hybrid: Pioneer 1742Q* *Population: 36-38K* *Row Width: 30"* *Rotation: CAB* *Corn Price: $4.13*

At-Plant Conceal® and FurrowJet® Program: $32.73/A. *Foliar Program: $64.16/A.* *Base Irrigation Program: $40/A.* *Fert Re-Allocation: $40/A.* *N: $.58/#*

Marco Fertilizer High Management Dryland Corn Study

Objective: To evaluate the yield and economic impact of a corn liquid starter fertilizer and foliar nutritional program from Marco Fertilizer in a high management dryland environment. This trial consisted of the following:

Treatments and Placement:

#1. Control:	200# DAP, 200# 0-0-60, less 40# N
#2 At-Plant Fertility:	
FurrowJet® 3-Way: (Figure 1.)	3 Gal/A. QuickGrow Complete
	1oz/A. MycoBoost with 3 Gal/A. Water

#3 Foliar Applications :

MARCO Liquid Fertility

V3: 1 oz/A. Poseidon
20 oz/A. Energizer
1 pt/A. Iron Plus

V10: 1 oz/A. Poseidon
20 oz/A. Energizer
2# Foliar Complete

VT: 20 oz/A. Energizer
2# Foliar Complete
32 oz/A. Calcium Plus

R3: 2.5 gal/A. Finisher + 20 Gal/A. Water

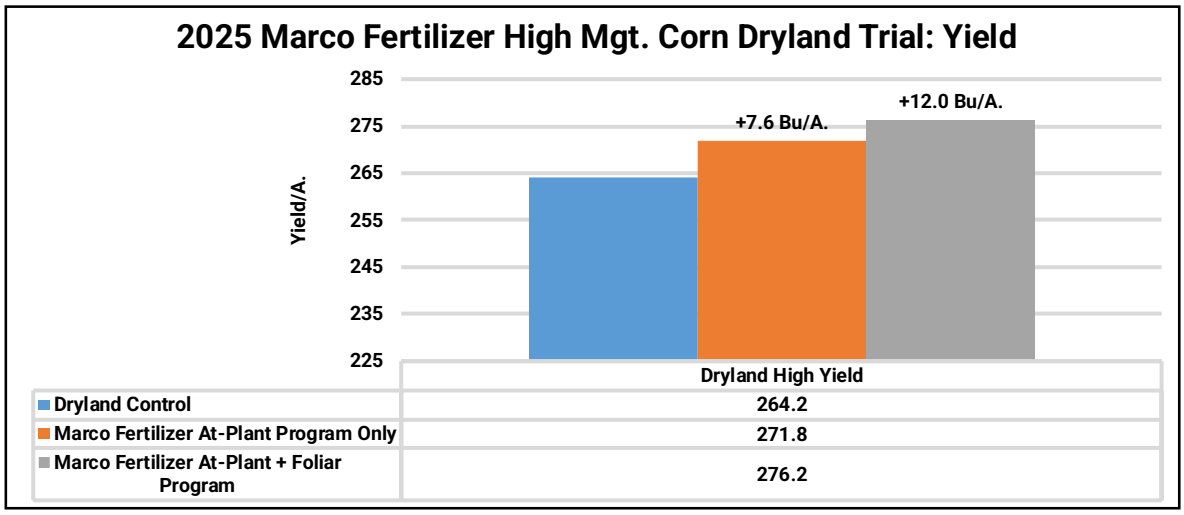
Figure 1. FurrowJet® Placement

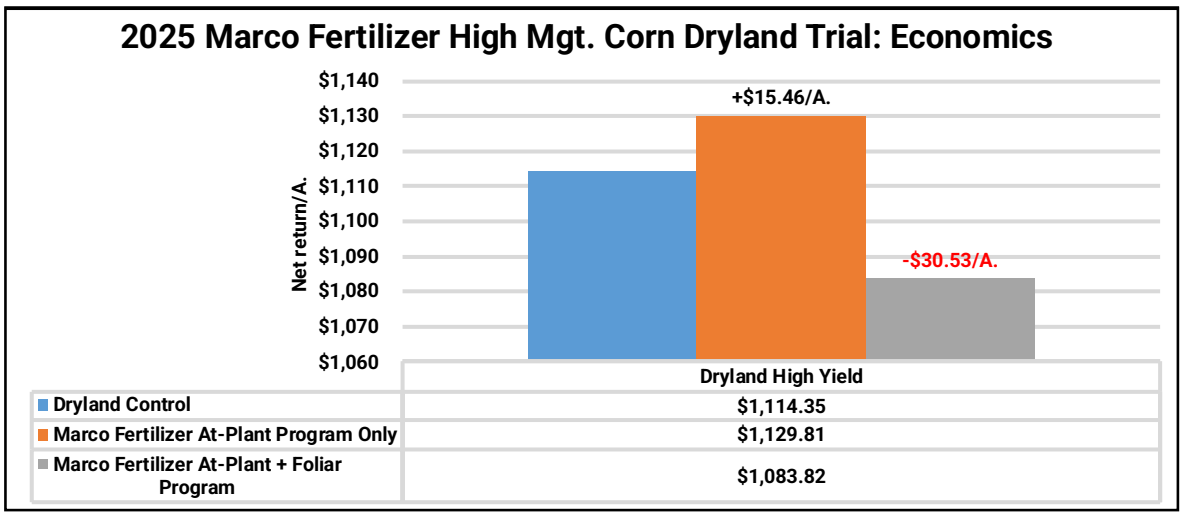
Marco Fertilizer High Management Dryland Corn Study

All treatments received 13.7oz/A. of Miravis® Neo at VT and 13.7oz/A. of TrivaPro® at R3 growth stage. All high yield treatments received +40 additional N units.

Results: At-plant Marco treatments captured +7.6 Bu/A. gains with a positive return of +$15.46/A. over the control. These net returns proved highest of all treatments.

Combination at-plant and foliar treatments captured +12.0 Bu/A. gains with a negative return of **-$30.53/A.** over the control.





Planting Date: April 25th *Hybrid: Pioneer 1742Q* *Population: 38K* *Row Width: 30"* *Rotation: CAB* *Corn Price: $4.13*

At-Plant Conceal® and FurrowJet® Program: $32.73/A. *Foliar Program: $64.16/A.* *Fert Re-Allocation: $40/A.* *N: $.58/#*

Corteva® Biological High Management Irrigated Corn Study

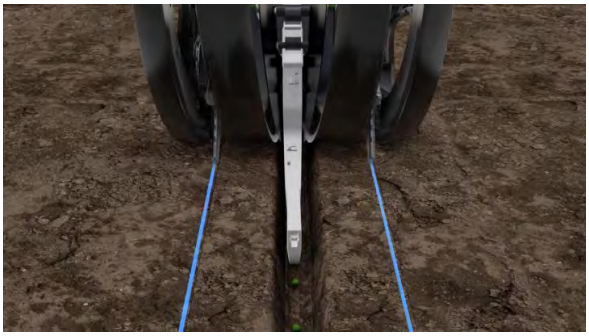
Objective: To evaluate the yield and economic impact of a corn liquid starter fertilizer and foliar nutritional program from Corteva® Biologicals in a high management irrigated environment. This trial consisted of the following:

Treatments and Placement:

#1. Control:	200# DAP, 200# 0-0-60, Less 40# N
#2 At-Plant Fertility:	
Conceal® Dual Band (Figure 1.)	1Qt/A. Harvest Plus™
FurrowJet® (Figure 2.)	4oz/A. NEXTA™ Stand
#3 Foliar Applications:	
CORTEVA™	V4: NEXTA Stand V4: 1Qt/A. Harvest Plus™ VT: 32oz/A. NEXTA™ Swole VT: 8oz/A. NEXTA™ Spark VT: 2.5# Harvest More® Mate®
	NEXTA™

Figure 1. FurrowJet® Placement

Figure 2. Conceal® Placement



Corteva® Biological High Management Irrigated Corn Study

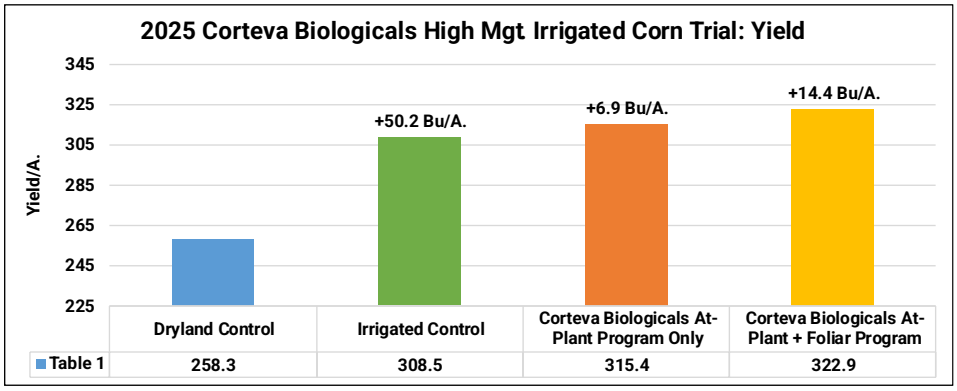
Irrigation on all treatments received 8" of water throughout the growing season. All treatments received 13.7oz/A. of Miravis® Neo at VT and 13.7oz/A. of TrivaPro® at R3 growth stage. All irrigated treatments received +40 additional N units.

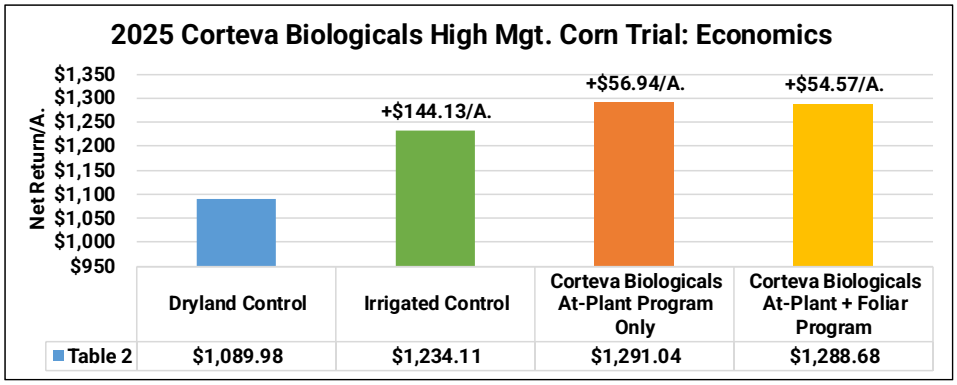
Results: Pioneer 1742Q posted highest yield of 322.9 Bu/A. in the combination irrigated/planter nutrition/and foliar program, +64.6 Bu/A. over the dryland control.

Irrigation resulted in yield gains of +50.2 Bu/A. over the dryland control, resulting in net returns of +$144.13/A.

At-plant Corteva® treatments captured +6.9 Bu/A. gains with a positive return of +$56.94/A. over the irrigated control. These net returns proved highest of all treatments.

Combination at-plant and foliar treatments captured +14.4 Bu/A. gains with a positive return of +$54.57/A. over the irrigated control.





Planting Date: April 25th *Hybrid: Pioneer 1742Q* *Population: 36K* *Row Width: 30"* *Rotation: CAB* *Corn Price: $4.13*

At-Plant Conceal® and FurrowJet® Program: $11.56/A. *Foliar Program: $33.34/A.* *N:$0.58/#* *Base Irrigation Program: $40/A.* *Fert Re-Allocation: $40/A.*

Corteva® Biological High Management Dryland Corn Study

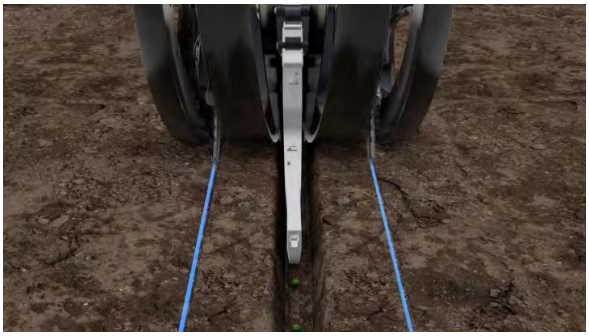
Objective: To evaluate the yield and economic impact of a corn liquid starter fertilizer and foliar nutritional program from Corteva® Biologicals in a high management dryland environment. This trial consisted of the following:

Treatments and Placement:

#1. Control:	200# DAP, 200# 0-0-60, Less 40# N
#2 At-Plant Fertility:	
Conceal® Dual Band (Figure 1.)	1Qt/A. Harvest Plus™
FurrowJet® (Figure 2.)	4oz/A. NEXTA™ Stand
#3 Foliar Applications:	
CORTEVA™	V4: NEXTA™ Stand V4: 1Qt/A. Harvest Plus™ VT: 32oz/A. NEXTA™ Swole VT: 8oz/A. NEXTA™ Spark VT: 2.5# Harvest More® Mate®

Figure 1. FurrowJet® Placement

Figure 2. Conceal® Placement

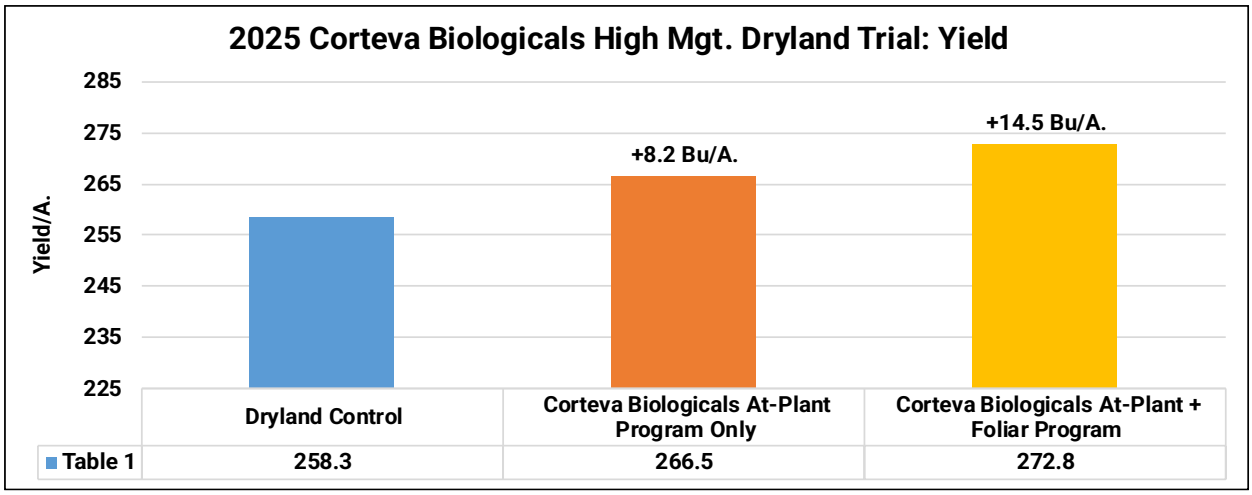


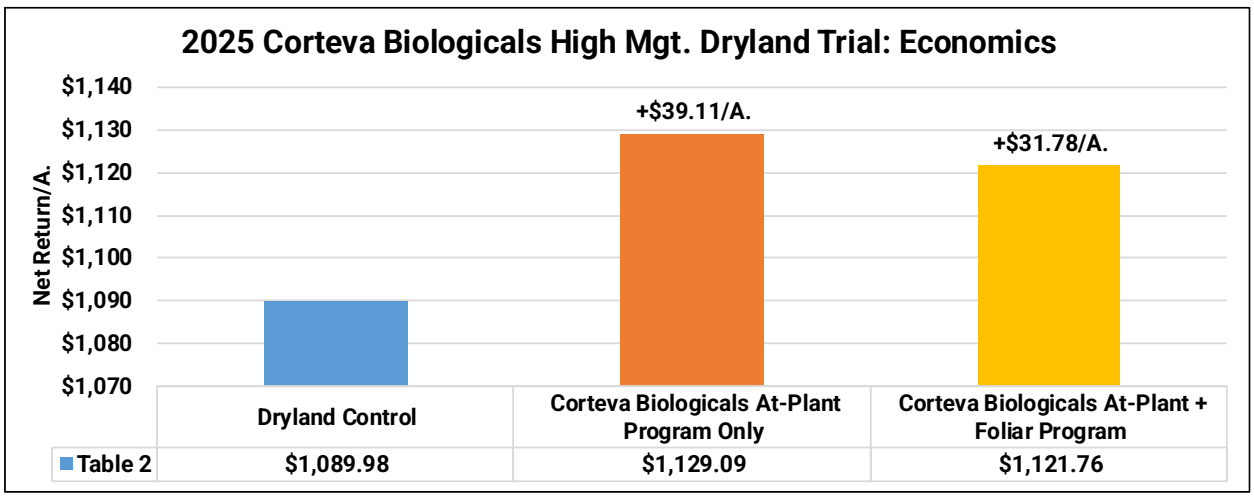
Corteva® Biological High Management Dryland Corn Study

All treatments received 13.7oz/A. of Miravis® Neo at VT and 13.7oz/A. of TrivaPro® at R3 growth stage. All high yield treatments received +40 additional N units.

Results: At-plant Corteva® treatments captured +8.2 Bu/A. gains with a positive return of +$39.11/A. over the control. These net returns proved highest of all treatments.

Combination at-plant and foliar treatments captured +14.5 Bu/A. gains with a positive return of +$31.78/A. over the control.





Planting Date: April 25th *Hybrid: Pioneer 1742Q* *Population: 36K* *Row Width: 30"* *Rotation: CAB* *Corn Price: $4.13*

At-Plant Conceal® and FurrowJet® Program: $11.56/A. *Foliar Program: $33.34/A.* *N:$0.58/#* *Fert Re-Allocation: $40/A.*

Nachurs® Fertilizer High Management Irrigated Nutritional Study

Objective: To evaluate the yield and economic impact of a corn liquid starter fertilizer and foliar nutritional program from Nachurs® in a high management irrigated environment. This trial is a high management program designed for maximum potential yield. Treatments consisted of the following:

Treatments and Placement:

#1. Control:	100# DAP, 200# 0-0-60
#2 At-Plant Fertility:	
Conceal® Dual Band (Figure 1.)	10 Gal/A. SideLine® 15-15-3, 10 Gal 32% UAN
FurrowJet® Center: (Fig. 2.)	1Pt RhyzoLink® PE, 1Pt Microzone Ca®, 4oz Humi-flex FA
FurrowJet® Wings: (Fig. 2.)	6 Gal First Down®
#3 Foliar + SideDress Applications: NACHURS®	V4: 1Qt FinishLine®, 2 Gal TripleOption®
	V8: EZ-Drop SideDress 30 Gal UAN, 2 Gal K-flex® Max, 1 Qt Sideswipe®, 8oz SpeedUp Nano
	V10: 1.5 Gal KnockOut®, 1.5 Pt MoneyBall®
	VT: 1 Gal TripleOption®+ 1 Qt SideSwipe®
	13.7oz Miravis®Neo
	R2: 1.5Gal KnockOut®, 1Qt/A. FinishLine®,7oz Veltyma

Figure 1. Conceal® Dual Band Placement

Figure 2. FurrowJet® Placement

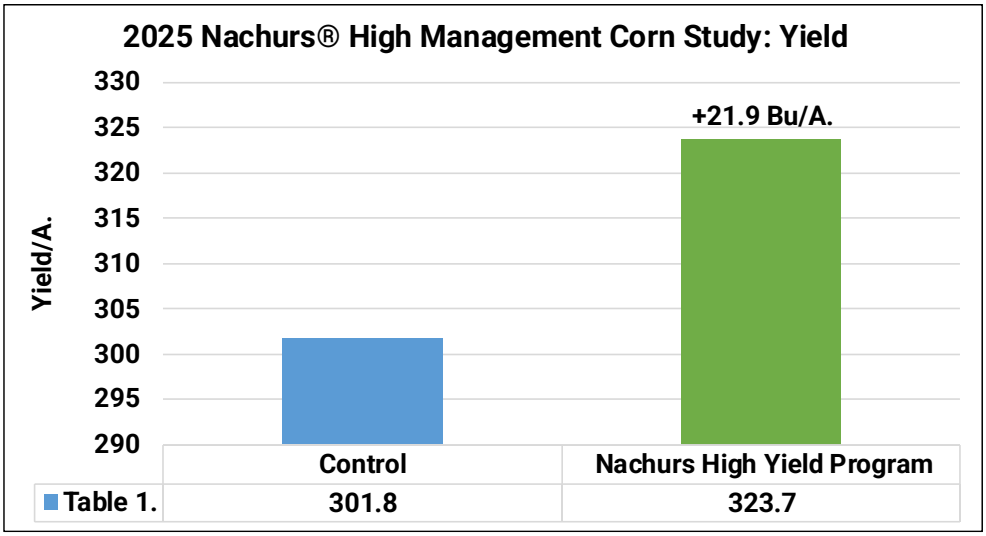
2025 PTI Results

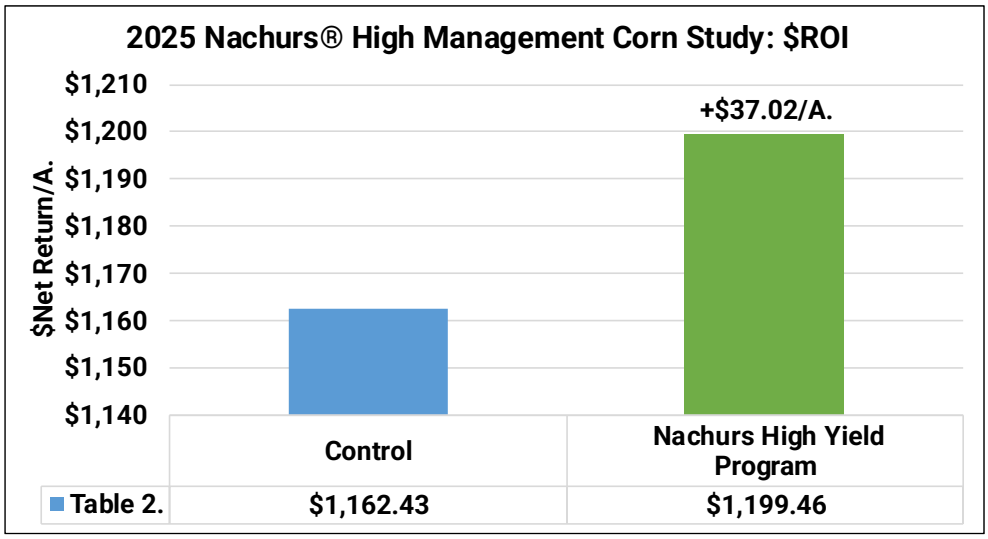
Nachurs® Fertilizer High Management Irrigated Nutritional Study

Irrigation on all treatments received 8" water throughout the growing season. Control replications received 100# of 18-46-0 and 200# of 0-0-60 applied in the fall in a strip-till band.

Results: DeKalb 68-35 tag- teamed with the Nachurs nutritional program, provided yields of 323.7 Bu/A. in the high management program, an additional +21.9 Bu/A. over the control.

These yield gains equated to a positive net return on investment of +$37.02/A.





Planting Date: April 28th *Hybrids: DKC 68-35* *Population: 38K* *Row Width: 30"* *Rotation: CAC, Strip-Till* *Corn Price: $4.13* *Total N: 299#*

Conceal® Program: $43.50/A. *FurrowJet® Program: $48.24/A.* *Fertilizer Re-Allocation: $84/A* *Side-Dress + Foliar Program: $45.68/A.*

Swine Effluent High Management Corn Study

Objective: To evaluate the yield and economics of applying swine effluent as part of a high management nutritional program.

Swine effluent was derived from NutraDrip™ Irrigation Systems, using an on-site manure separation system (Figure 1).

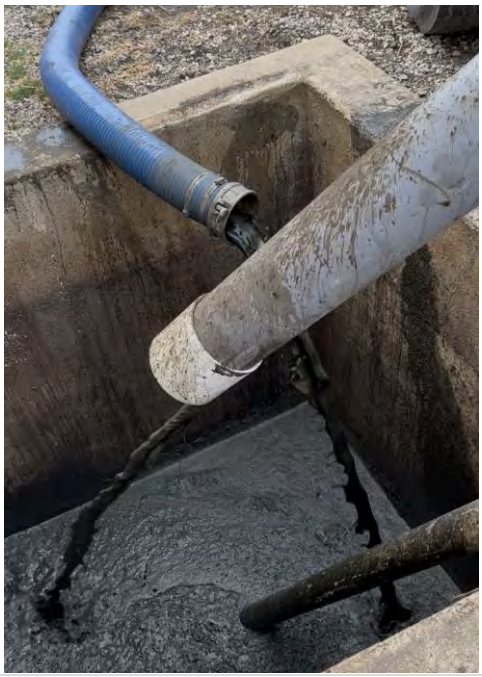
This system separates solid manure, as a result of a two-stage system. First, swine manure is run through a vertical screw press that removes large, coarse solids that could cause blockage in a planting or irrigation system.

Secondly, a micro-filter acts as the final safety net by removing fine particles down to 25 microns, and producing a clean, nutrient rich effluent that's ready for precision application through a planter or irrigation system.

Figure 1. NutraDrip Manure Separation Unit

Figure 2. Dry Separation

Figure 3. Liquid Separation



Swine Effluent High Management Corn Study

Once separated into a clean, nutrient rich liquid, the swine effluent was then transported to the PTI Farm to be used on the planter as an in-furrow starter fertilizer applied through FurrowJet® at rates of 2, 4, and 6 Gal/A., 20 Gal/A. V10 side-dress, and lastly a VT foliar application of 2 Gal/Ac blended with a carrier of 2 Gal/A. water applied with fungicide.

2025 PTI Results

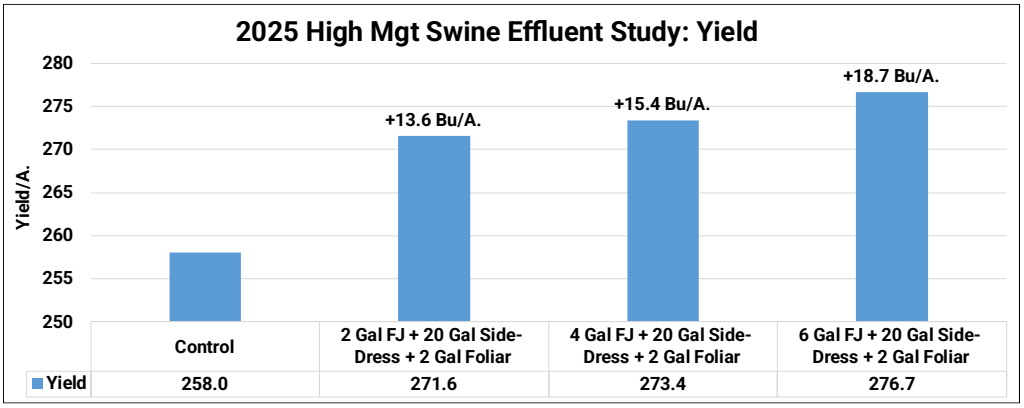
Swine Effluent High Management Corn Study

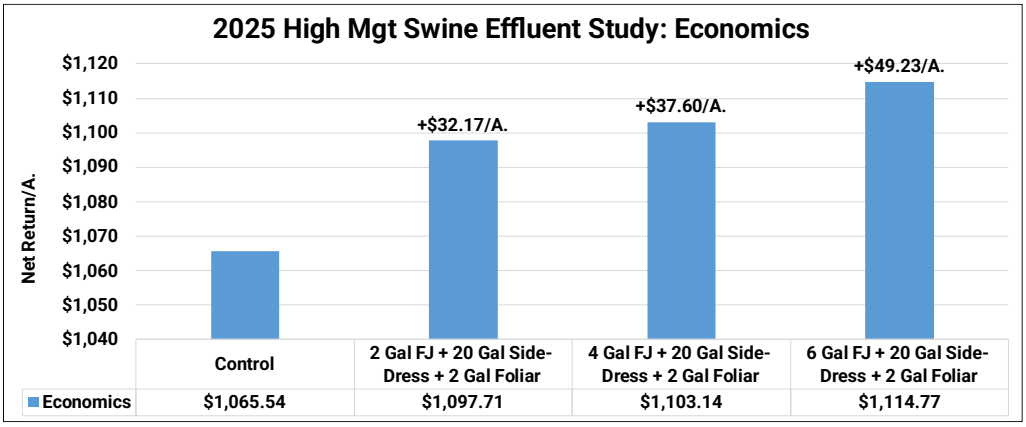
Results: When applying effluent at 3-way sequential program, a positive yield response was realized at all treatments ranging from +13.6 Bu/A. to +18.7 Bu/A. The higher the rate, the higher the yield.

Being the first year of testing with this product, higher rates need to be tested to identify both agronomic and economic optimum. 2025 rates proved too low.

Both yield gains and low product cost are attributed to economic gains ranging from +$32.17/A. to +$49.23/A.

We look forward to continuing testing effluent and learning how to implement this into sound nutritional programs, not only as starter fertilizer, but other management practices as well.





Planting Date: April 20th Hybrid: Pioneer 1742Q Population: 36K Row Width: 30" Rotation: CAB Corn Price: $4.13 Effluent: $1/Gal

Rosen's High Management Irrigated Corn Study

Objective: To evaluate the yield and economic impact of a corn liquid starter fertilizer and foliar nutritional program from Rosen's in a high management irrigated environment. This trial consisted of the following:

Treatments and Placement:

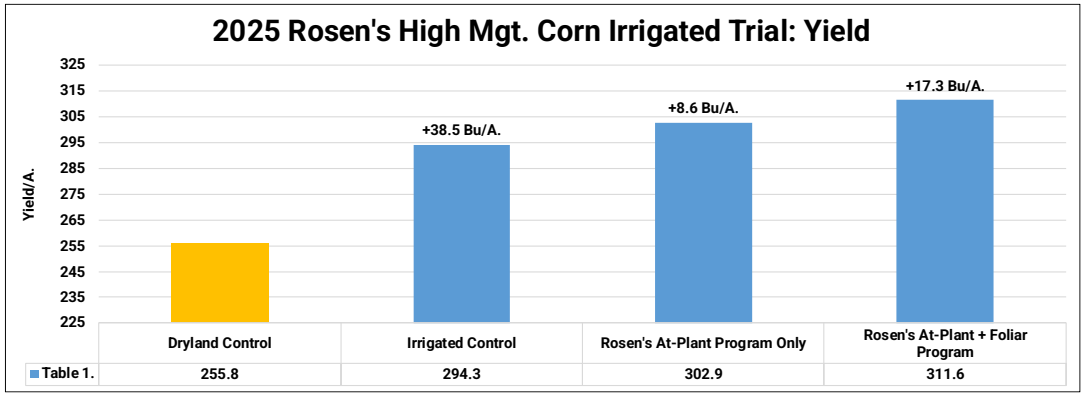
#1. Control:	200# DAP, 200# 0-0-60, less 40# N
#2 At-Plant Fertility:	
FurrowJet®: (Figure 1.)	6 oz/A. Triad™ 1% volume P MAX™LFS 6 grams/A. Manuever™
#3 Foliar Applications:	
	V4: 16 oz/A. EnLiven® 32 oz/A. Legend Elite™ 6 oz/A. Triad™ VT: 8 oz/A. Mach 5™ 32 oz/A. Taurus™ Sulfur 6 oz/A. Triad™ 8 oz/A. Mitigate™ Plus

Figure 1. FurrowJet® Placement

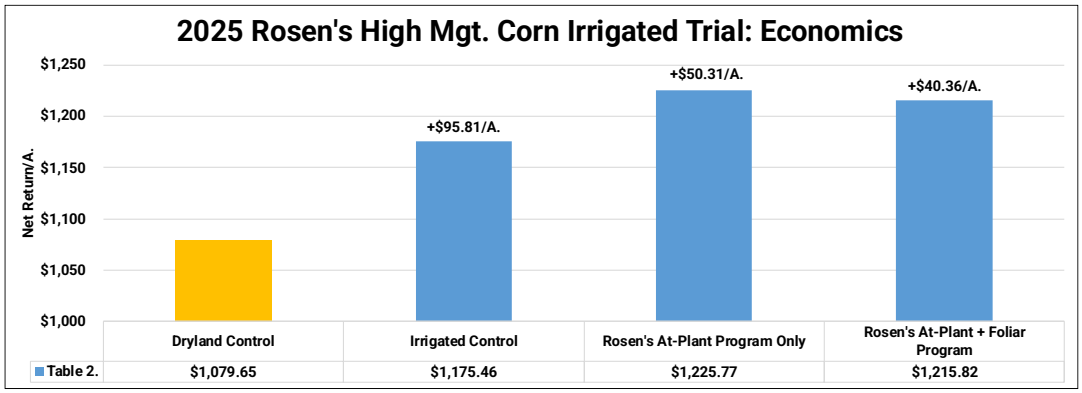
Rosen's High Management Irrigated Corn Study

Irrigation on all treatments received 8" of water throughout the growing season. All treatments received 13.7oz/A. of Miravis® Neo at VT and 13.7oz/A. of TrivaPro® at R3 growth stage. All irrigated treatments received +40 additional N units.

Results: Pioneer 1742Q posted highest yield of 311.6 Bu/A. in the at-plant nutrition/and foliar program, +55.8 Bu/A. over the dryland control.



Irrigation resulted in yield gains of +38.5 Bu/A. over the dryland control, resulting in net returns of +$95.81/A.



At-plant Rosen's treatments captured +8.6 Bu/A. gains with a positive return of +$50.31/A. over the irrigated control. These net returns proved highest of all treatments.

Combination at-plant and foliar treatments captured +17.3 Bu/A. gains with a positive return of +$40.36/A. over the irrigated control.

ROSEN'S INC. Quality Agricultural Products

Planting Date: April 20th Hybrid: Pioneer 1742Q Population: 38K Row Width: 30" Rotation: CAB Corn Price: $4.13 Irrigation: $40/A.

At-Plant Program: $25.20/A. Foliar Program: $45.88/A. $40/A. Fertilizer Re-allocation N: $0.58/#

Rosen's High Management Dryland Corn Study

Objective: To evaluate the yield and economic impact of a corn liquid starter fertilizer and foliar nutritional program from Rosen's in a high management dryland environment. This trial consisted of the following:

Treatments and Placement:

#1. Control:	200# DAP, 200# 0-0-60, Less 40# N
#2 At-Plant Fertility:	
FurrowJet®: (Figure 1.)	6 oz/A. Triad
	1% volume P MAX™ LFS
	6 Grams Manuever™
#3 Foliar Applications:	V4: 16 oz/A. EnLiven®
	32 oz/A. Legend Elite
	6 oz/A. Triad™
	R3: 8 oz/A. Mach 5™
	32 oz/A. Taurus™ Sulfur
	6 oz/A. Triad™
	8 oz/A. Mitigate™ Plus

Figure 1. FurrowJet® Placement

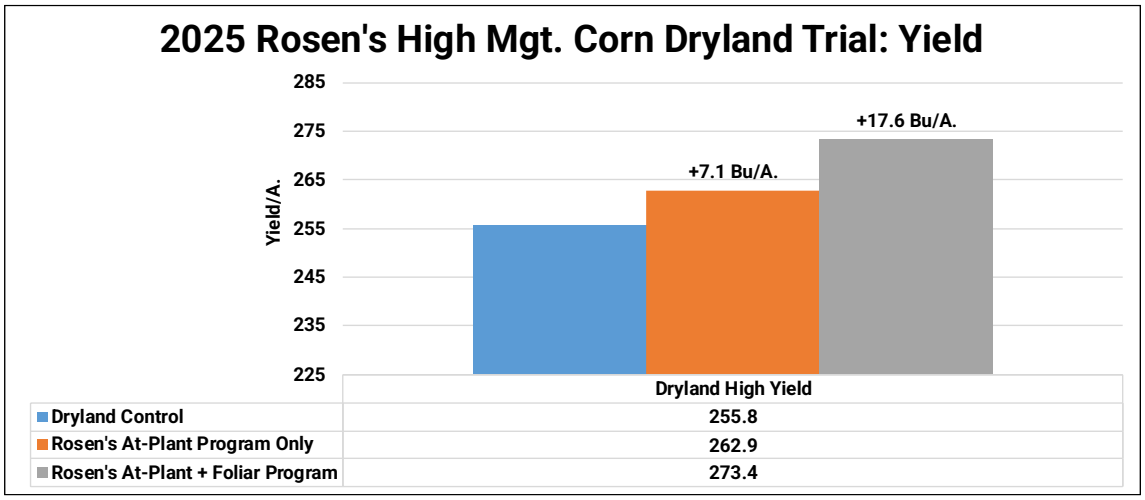
Rosen's High Management Dryland Corn Study

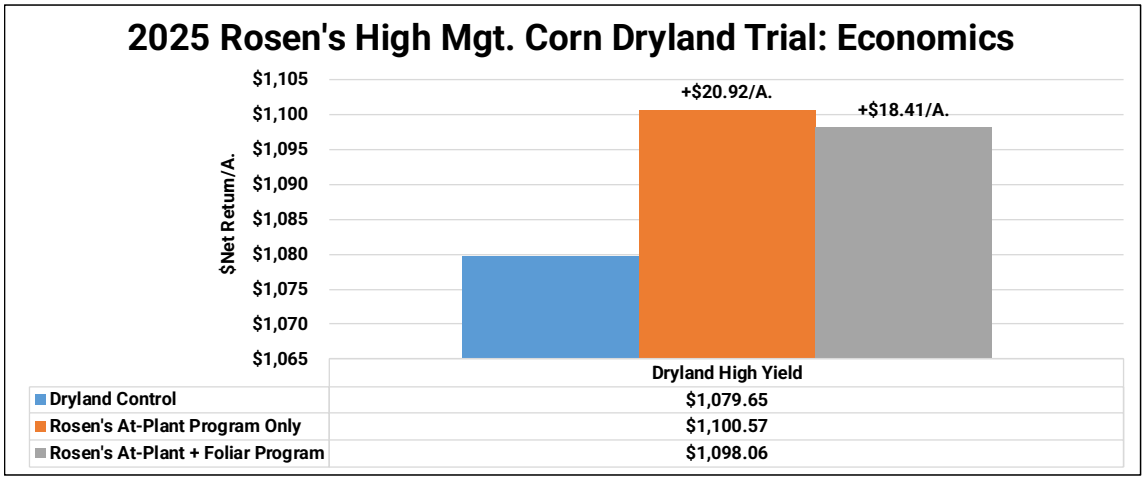
All treatments received 13.7oz/A. of Miravis® Neo at VT and 13.7oz/A. of TrivaPro® at R3 growth stage. All high yield treatments received +40 additional N units.

Results:

At-plant Rosen's treatments captured +7.1 Bu/A. gains with a positive return of +$20.92/A. over the control. These net returns proved highest of all treatments.

Combination at-plant and foliar treatments captured +17.6 Bu/A. gains with a positive return of +$18.41/A. over the control.





Planting Date: April 20th Hybrid: Pioneer 1742Q Population: 38K Row Width: 30" Rotation: CAB Corn Price: $4.13

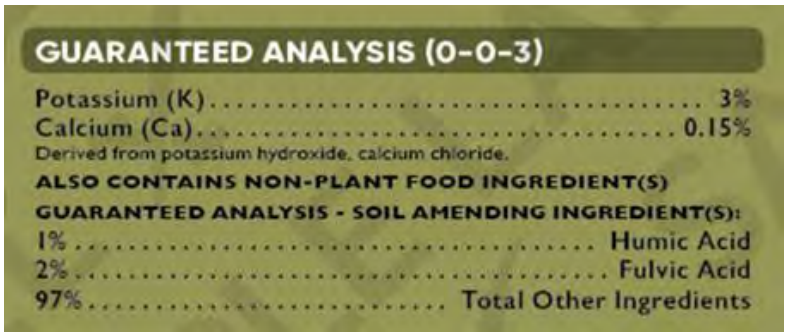
At-Plant Program: $25.20/A. Foliar Program: $45.88/A. $40/A. Fertilizer Re-Allocation Nitrogen: $0.58/#

Redox Bio-Nutrients High Management Corn Study

Objective: To evaluate the effect on yield and economics using Redox Bio-Nutrients RDX-N® in combination with MainstaySi™ and Banx™ in a corn after corn rotation.

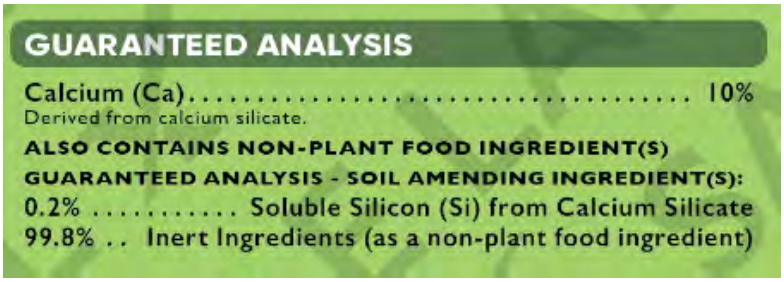
RDX-N® is a plant-active botanical extract designed to elevate nitrogen use efficiently by enhancing the plant's natural metabolism. It's the first and only bio-stimulant of its kind, as it is not a microbe nor a chemical delay. It works by activating metabolic pathways that support sufficient nitrogen uptake, assimilation, and utilization all season long.

Figure 1. RDX-N®



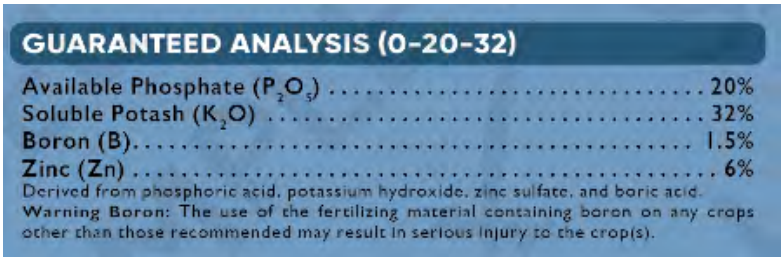
MainstaySi™ is formulated to provide efficient calcium and silicon nutrition. Silicon enhances the proper uptake and organization of calcium for cell wall structure. It is unique in its ability to improve abiotic stress defense and increase cell wall strength.

Figure 2. MainstaySi ™



Banx™ is formulated with the proper ratio of potassium, phosphorus, zinc and boron to build carbohydrates and nutritional reserves within the plant.

Figure 3. Banx™



Redox BIO-NUTRIENTS

2025 PTI Results

Redox Bio-Nutrients High Management Corn Study

Redox Program:

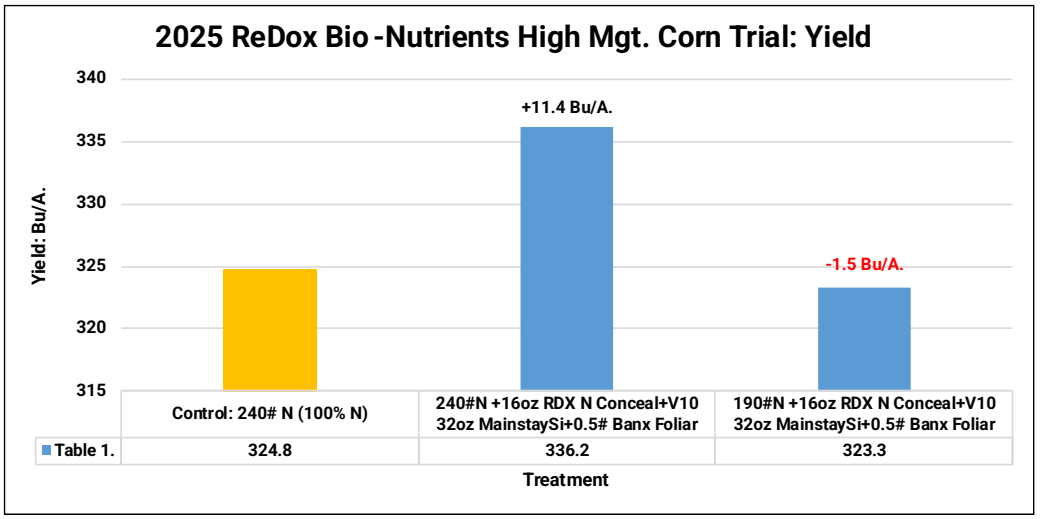
Control:	240# Total N
Treatment 1:	240# Total N, 16oz RDX N Applied At-Plant Conceal® + V10 32oz MainstaySI™, 0.5# Banx™
Treatment 2:	190# Total N,16oz RDX N Applied at-Plant Conceal® + V10 32oz MainstaySi™, 0.5# Banx™

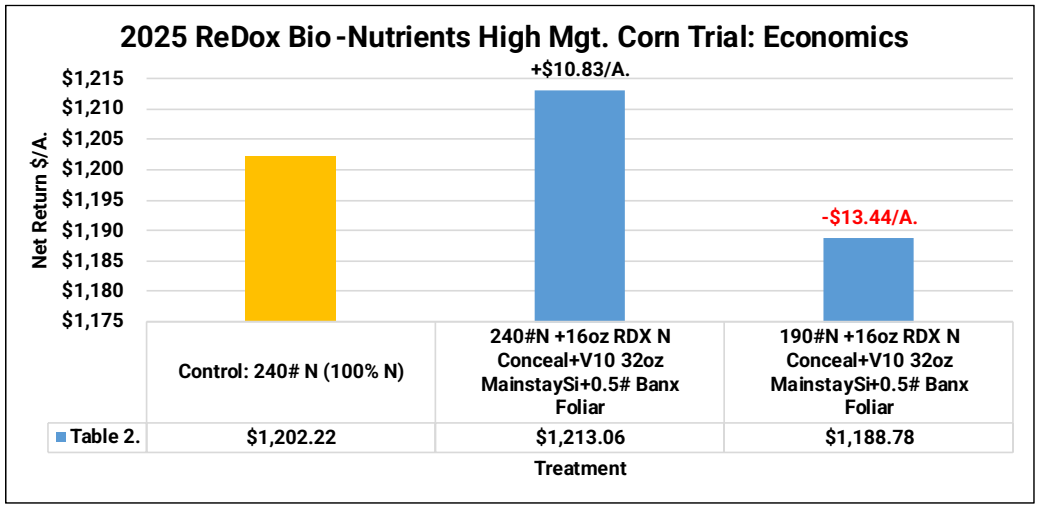
Figure 4. Conceal® Dual Band Placement

Results: Table 1. illustrates that the 100% N program with RDX-N®, Mainstay, Banx proved yield gains of +11.4 Bu/A. with corresponding net returns of +$10.83/A.

Reducing nitrogen by 50# and adding the RDX-N® and foliar program of MainstaySi and Banx resulted in bringing yields back up to within **-1.5 Bu/A.**, however proved losses of **-$13.44/A.**

It should be noted that the foliar products were applied at V10 growth stage and the recommended labeled timing is an earlier V4-V6 application.





Planting Date: April 28th Population: 36K Row Width: 30" Rotation: CAC Corn Price: $4.13 RDX-N®: $12.10/50#N V10: $24.15/A. N: $0.58/#

PTI ILLINOIS

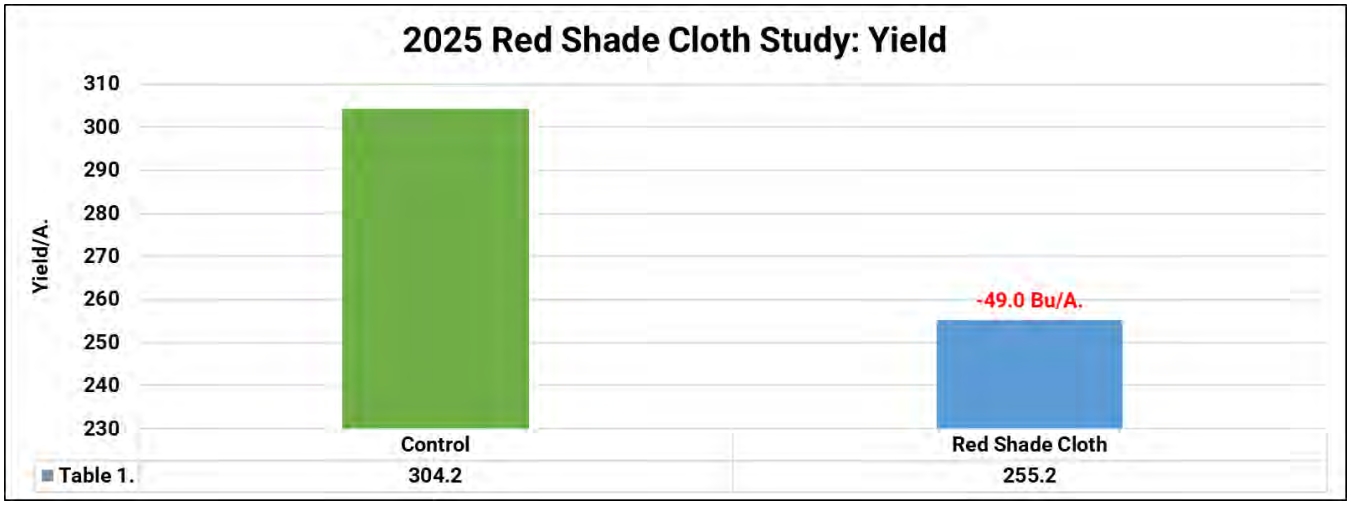
Red Shade Cloth Study

Objective: To evaluate the effect on yield enhancement of installing red shade cloth over corn from growth stages V1 to V12.

Key Benefits of Red Shade Cloth for Corn:

- ✓ Enhanced Photosynthesis: Red cloth shifts the light spectrum, increasing red/far-red light, which promotes chlorophyll activity, boosting sugar/carbohydrate production, especially during summer.
- ✓ Heat & Sun Stress Reduction: It lowers air and leaf surface temperatures, reducing wilting and preventing sun scald
- ✓ Improved Water Management: By reducing heat and transpiration (moisture loss from leaves), it helps soil retain water, meaning less frequent watering and more efficient water use
- ✓ Better Light Diffusion: It spreads light more evenly, preventing hot spots and scorching

Results: Table 1. illustrates red shade cloth resulted in yield losses of **-49.0 Bu/A.**, which would equate to gross economic losses of **-$202.37/A.** More work needs to be done to understand the value of red shade cloth, specifically timing and the overall length of shading. Clearly, 2025 did not offer the results we were aiming for. However, even if we could establish higher yield potential with red shade cloth, it remains unclear how wide scale implementation could occur.



Planting Date: May 8th *Hybrid: DKC 56-26TRE* *Population: 36K* *Row Width: 30"* *Rotation: CAC* *Corn Price: $4.13*

Sunlight Amplification Study

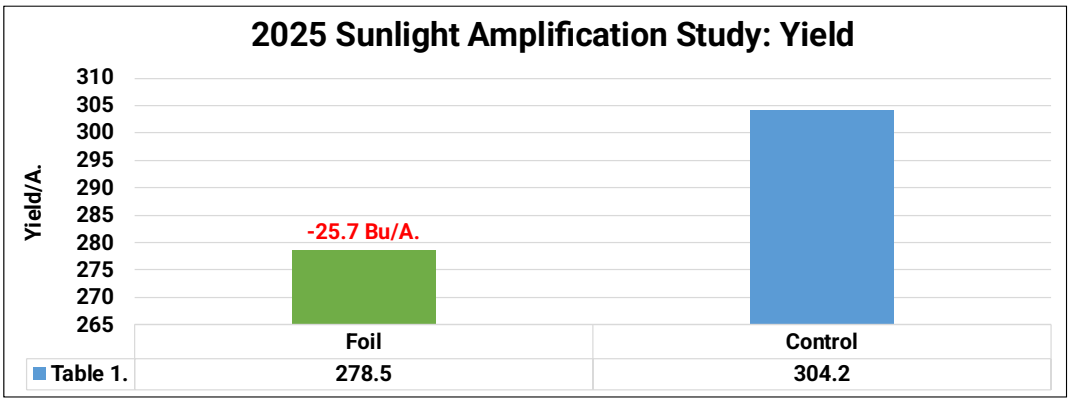
Objective: To evaluate the effect on yield enhancement of installing aluminum foil on the soil surface, in the middle of a 30" corn row to amplify overall sunlight and potentially to more leaf surface area, including the underside of corn leaves.

Key Benefits of Foil in Corn:

- ✓ Increases Photosynthesis: By bouncing light onto all parts of a plant, including the lower and hidden leaves, aluminum foil maximizes light absorption, which boosts the rate of photosynthesis.
- ✓ Promotes Uniform Growth: Plants tend to stretch and lean toward the light source. Reflective surfaces help distribute light evenly, ensuring a balanced shape or even larger leaf surface area.
- ✓ Pest Deterrent: The shiny, reflective surface and metallic sound of the foil can naturally repel pests like aphids, slugs, snails, and birds.

Results: Table 1. illustrates inter-row aluminum foil resulted in yield losses of **-25.7 Bu/A.**, which would equate to gross economic losses of **-$106.14/A.**

Clearly, 2025 did not offer the results we were aiming for. One theory is increased temperature. June, July and August months did have very hot days with rainfall deficit at nearly 8". It stands to reason that overall temperature could have stressed corn at critical growth stages that allowed the yield deficit to occur. More work will be conducted in 2026.



Planting Date: May 8th *Hybrid: DKC 56-26TRE* *Population: 36K* *Row Width: 30"* *Rotation: CAC* *Corn Price: $4.13*

GMO/Non-GMO/Organic Corn Study

Objective: To evaluate the yield and economic differences of a GMO, non-GMO, and an organic corn management program.

This trial focuses on introducing organic and non-GMO farming practices at the PTI Farm. If consumers are willing to pay a premium for organic food, and there is an organic or non-GMO market available for farmers, we feel it prudent to challenge the status quo of conventional farming practices. This is the third organic transition year at the PTI Farm.

Below are the parameters on how each management system is evaluated for yield and cost:

Programs/Treatments:

GMO Program:

Tillage:	Fall Disk Ripper/Spring Soil Finisher
Dry Fertilizer Fall Applied:	200# 18-46-0, 200# 0-0-60
225# Nitrogen:	25% Weed-N-Feed, 25% Conceal®, 50% Side-Dress
Herbicide:	1.2 Qt Acuron® Flexi/Atrazine PRE fb 1.2 Qt Acuron® Flexi/1Qt Atrazine/ 30oz Roundup
GMO Traited Seed:	Wyffels 7945
Fungicide:	VT Miravis®Neo Fungicide

Non-GMO Program:

Tillage:	Fall Disk Ripper/Spring Soil Finisher
Dry Fertilizer Fall Applied:	200# 18-46-0, 200# 0-0-60
225# Nitrogen:	25% Weed-N-Feed, 25% Conceal®, 50% Side-Dress
Conventional Herbicide:	1.2 Qt Acuron® Flexi/Atrazine PRE fb 1.2 Qt Acuron® Flexi/1Qt Atrazine
Non-GMO Seed:	Prairie Hybrids 7445
Fungicide:	VT Miravis®Neo Fungicide

2025 PTI Results

GMO/Non-GMO/Organic Corn Study

*All products organic certified

Organic Program:

Tillage:	Fall Disk Ripper/Spring Soil Finisher
Dry Product:	300# Phinite® Organic Fertilizer (3-12-0)
Dry Product:	150# Sea-90 Dehydrated Sea-Water/Sodium Cl.
Organic Seed:	Prairie Hybrids 7461
Pre-Emerge:	40 Gal PAW + 5 Gal QLF® TerraFed
FurrowJet® 3-Way:	3.25 Gal QLF® TerraFed™ 1N-0P-3K +10 Gal PAW+ 1.75 Gal BioXRG K-Ferm-Organic™ potassium acetate
Conceal® Dual Band: (Fig. 1)	15 Gal Avé Organics® 10-0-0 organic ammonium nitrate + 4 Gal QLF® TerraFed™ 1N-0P-3K
Weed Control:	VE-V2 Carbon Robotics LaserWeeder™ G2
	V4 Garford Camera based Robocrop guided hoe
	V4 Kadelbach Manufacturing Weed Flamer
V6 Foliar:	2 Gal QLF® TerraFed™ +20 Gal PAW + 1 Gal BioXRG K-Ferm-Organic™ 0-0-12 potassium acetate
V10 EZ Drop Side-Dress:	15 Gal Avé Organics organic ammonium nitrate + 4 Gal QLF® TerraFed™ 1N-0P-3K
V12 Foliar:	1 Gal Nachurs® Pura-K™ 0-0-10, 10 Gal PAW Water
VT Foliar:	1 Gal Nachurs® Pura-K 0-0-10, 2 Gal QLF® TerraFed™, 20 Gal Green Lightning PAW Water
R3 Foliar:	20 Gal Green Lightning PAW Water

GMO/Non-GMO/Organic Corn Study

Figure 1. Planter Conceal® and FurrowJet® Applications

Figure 2. Carbon Robotics LaserWeeder™ G2

Figure 3. Kadelbach Manufacturing Weed Flamer

Figure 4. Garford Robocrop Guided Hoe

Figure 5. Miller N-Place™ Max

Figure 6. EZ-Drops™

GMO/Non-GMO/Organic Corn Study

Results: The organic program proved overall yield losses of **-30.4 Bu/A.**, compared to a status quo traditional commercial GMO program. Seeing these losses may cause some hesitation for organic corn, however the true story lies in overall economics of the programs. Using an $8/Bu. sale price ($3.87/Bu premium), organic corn offered a positive return on investment of an impressive +$138.32/A. over the conventional GMO program. Being new to organic farming, we look forward to continuing understanding and improving organic management practices.

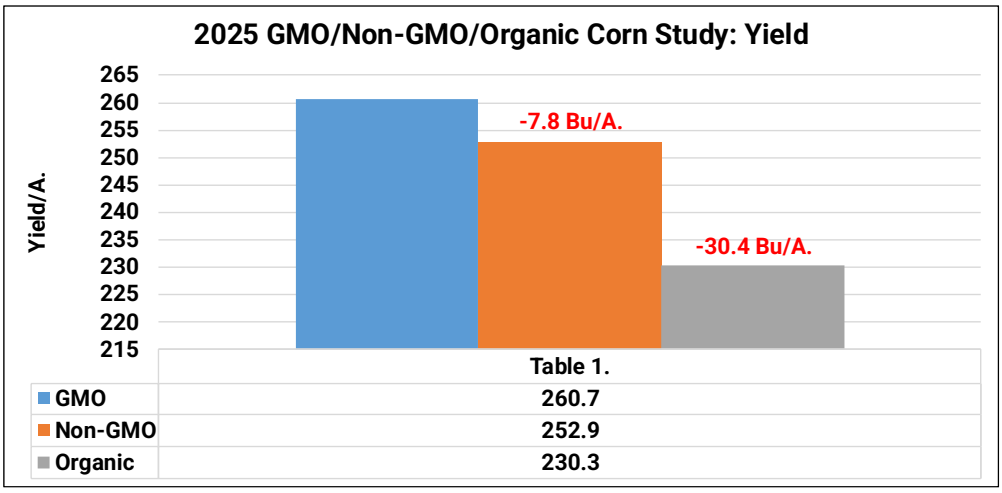


Table 1.	
GMO	260.7
Non-GMO	252.9
Organic	230.3

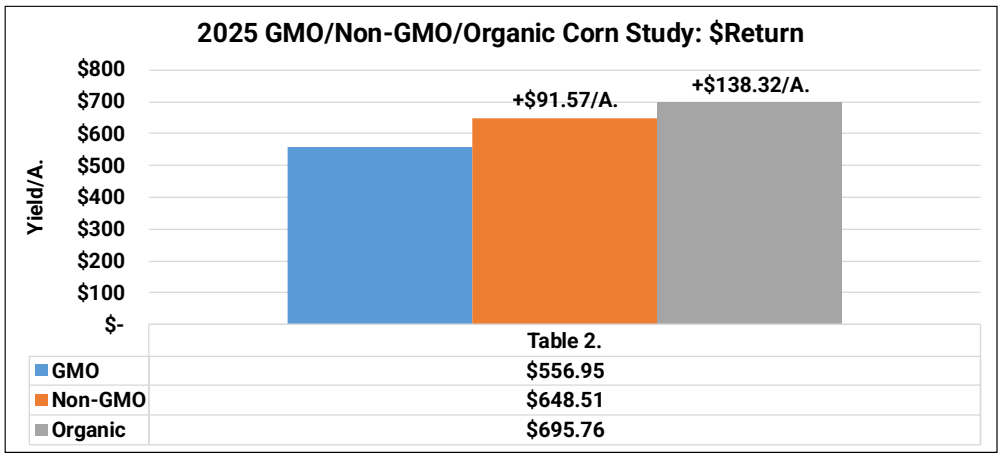


Table 2.	
GMO	$556.95
Non-GMO	$648.51
Organic	$695.76

The non-GMO platform resulted in yield losses of **-7.8 Bu/A.**, however with a $0.25/Bu/A. premium complimented with a lower seed and herbicide cost, resulted in economic gains of +$91.57/A. Interesting to note, the only real management change with the non-GMO program was herbicide and seed, which made the program fairly simple. With herbicide, all glyphosate was removed from the program, while the same residual and post program was the same for the GMO program. All other GMO management practices were the same in non-GMO.

Planting Date: May 15th Population: 36K Row Width: 30" Rotation: CAB Corn Price: $4.13/$8.00 Non-GMO Premium: $0.25/Bu

Conventional Program: $519.75/A. Non-GMO Program: $459.19/A. Organic Program: $1,146.58/A

Organic Corn Weed Control Study

Objective: To evaluate the yield and economic differences of weed control programs in an organic corn management program.

One of the biggest concerns in organic farming is effective weed control. Since herbicide chemistry cannot be implemented in an organic program, this trial focuses on three different methods of weed control including the following:

Figure 1. Carbon Robotics LaserWeeder™ G2

Figure 2. LaserWeeder™ G2 diode lasers and cameras

2025 was the PTI Farm's first year evaluating the LaserWeeder™ G2 from Carbon Robotics. This LaserWeeder uses computer vision, deep learning, and robotics to target and eliminate weeds with lasers. This technology eliminates hand labor, reducing potential labor costs/ shortages, while eliminating the need for herbicides and mechanical cultivation.

Carbon Robotics LaserWeeder targets weeds with sub-millimeter accuracy at the meristem of the weed, eliminating them while leaving crops untouched and unharmed. By replacing the need for chemicals and mechanical tools, LaserWeeders protect soil health and promotes stronger healthier crops for optimal yield and quality.

Powered by Carbon AI, an advanced deep learning system for plant identification, utilizes a growing dataset of over 150 million plants labeled from three continents. A 40 foot LaserWeeder G2, covers 3-6 acres/hour with submillimeter accuracy, killing up to 99% of weeds using 32X240W diode lasers, with 48 high resolution cameras, and 320 high intensity LED bedtop lights. Cost of application for 2025 is $190/A. for 2-pass weed control program.

CARBON ROBOTICS

Organic Corn Weed Control Study

2025 was the PTI Farms 2nd year evaluating the Garford Robocrop guided hoe. Each cultivator is made to be suitable for every operation, a wide range of shares are available including the traditional duck foot A share, flat A shares, L blades, and Garford's specially developed Slash blade which ensures no "slip by" but also has good plant foliage clearance. This unit was equipped with Robocrop, an implement mounted camera guidance system. Cameras track crop rows and shift the implement to the left or right, maximizing accuracy and allowing full coverage. Cost of application for 2025 is $15/A.

Figure 3. Garford Robocrop guided hoe

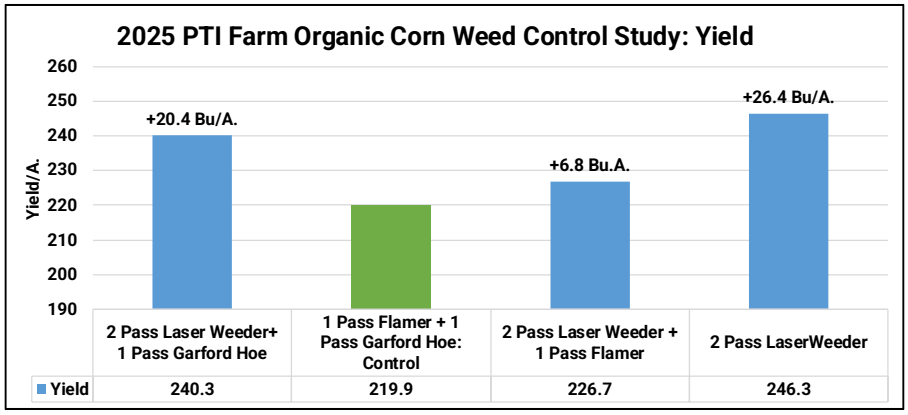
2025 is the 1st year using a Kadelbach Flame Weeder. Kadelbach's RowFire™ Flame Weeders are engineered with the industry's only dual-orifice burners for hotter, nonstop flame that stays lit and uniform across every row—no matter the conditions. Flame weeders use targeted heat to kill weeds on contact, reducing the need for multiple passes in the field. This process targets new-growth weeds at a cellular level, causing immediate wilting with little to no effect on the crop. It's an organic weed killer designed for minimal soil disturbance, potentially reducing weed flushes. Cost of application for 2025 is $18/A.

Figure 4. Kadelbach Flame Weeder

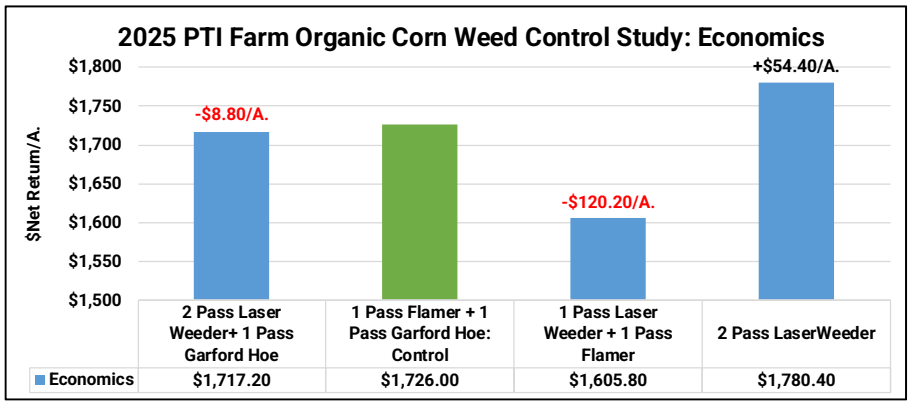
Organic Corn Weed Control Study

Results: The tables below illustrate the yield and economic performance of all weed control programs. This data proves just how important an effective weed control program is in an organic system. With an $8/Bu organic corn price, yield drag due to weed control performance, combined with overall system costs, can negate profits very quickly.

- ✓ The 1-pass Flamer and 1-pass Garford guided hoe was used as the control in this study, since this is the only technology, we have traditionally used to control weeds in organics. This 2-pass system proved yields of 219.9 Bu/A.



- ✓ The 2-pass V1 & V3 LaserWeeder complimented with the 1-pass V5 Garford Robocrop guided hoe, proved +20.4 Bu/A. higher corn yield, but resulted in net losses of **-$8.80/A.** due to the higher cost of weed control.

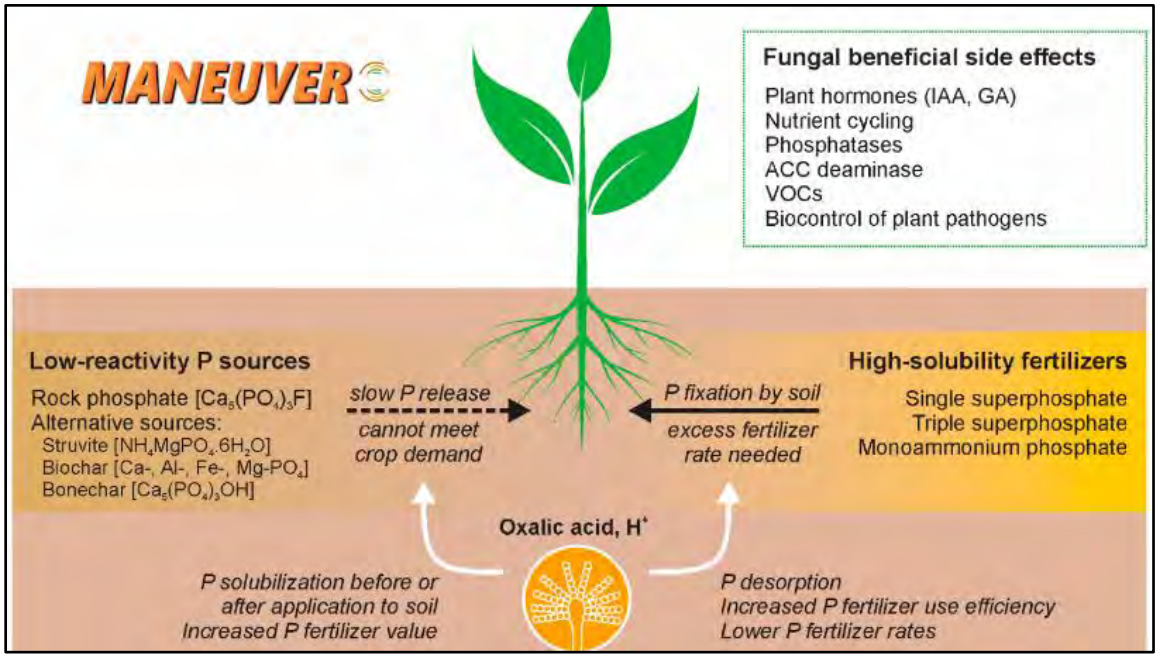


- ✓ The 2-pass V1 & V3 LaserWeeder complimented with the 1-pass V5 Flamer system proved yield gains of +6.8 Bu/A., along with the highest economic losses in the study of **-$120.20/A.**
- ✓ The 2-pass LaserWeeder weed control program achieved highest yield at 246.3 Bu/A. with +$54.40/A. net economic returns.
- ✓ In general, LaserWeeder offered highest yield gains, due to zero soil disturbance while no crop injury issues.

Planting Date: May 15th Population: 36K Row Width: 30" Rotation: CAB Corn Price: $8.00 Organic Premium Hybrid: Prairie Hybrids 7461
Flamer Pass:$18/A. LaserWeeder 2 Pass: $190/A. Garford Cultivator: $15/A.

Rosen's Manuever™ Biological Study

Objective: To evaluate yield and economics of Rosen's Manuever™, a biological product designed to enhance microbial acquired nutrition in crops. It utilizes specific microbes to tap into nutrient pools through nitrogen fixation, mineralization, and solubilization. These processes convert atmospheric nitrogen, organic matter, and insoluble minerals into plant-available nutrients helping to supplement synthetic fertilizers and improve yield potential.



This study evaluates Manuever™ in five different application timings including the following:

1. Pre-emerge Broadcast application
2. Pre-emerge + Stride®Bio Seed Treatment
3. At-plant FurrowJet® (Figure 1.) application
4. V4 Side-Dress application with 32% UAN
5. Combination of all 4 above treatments

Figure 1. FurrowJet® Placement

ROSEN'S INC.
Quality Agricultural Products

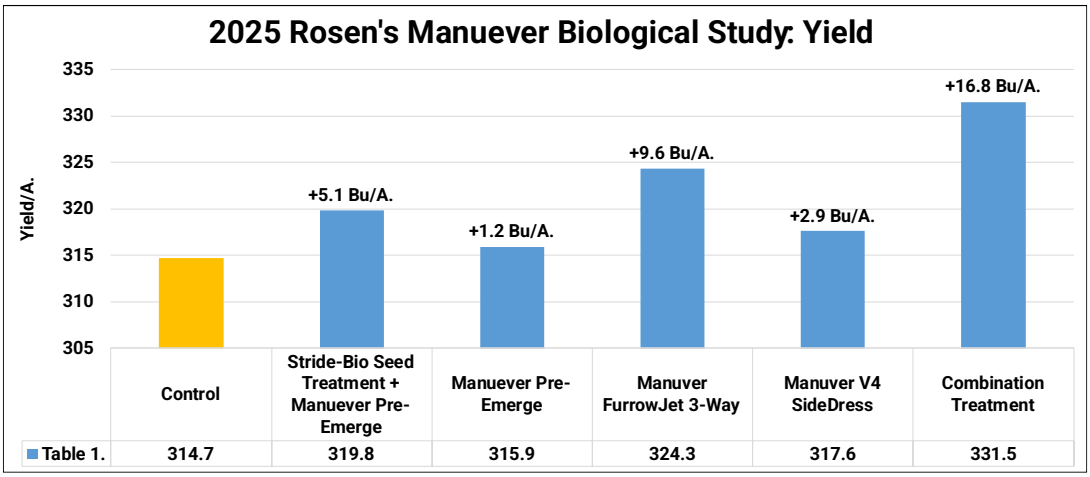
Rosen's Manuever™ Biological Study

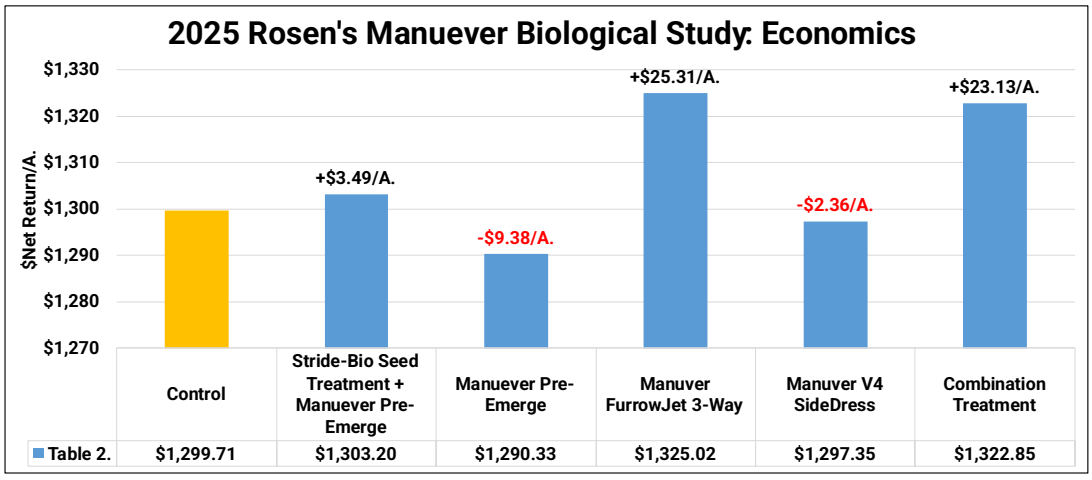
Results: The tables below illustrate that highest overall yields came from the 4-way combination treatment. These multiple applications resulted in yield gains of +16.8 Bu/A. with corresponding positive returns of +$23.13/A.

As for individual application response, at-plant FurrowJet® treatments proved yield gains of +9.6 Bu/A. with a return on investment of +$25.31.

Manuever™ in addition to Stride®Bio seed treatment offered +5.1 Bu/A. gains, however only proved economic gains of +$3.49/A.

Pre-emerge and side-dress applications offered minimal response resulting in losses of **-$2.36/A.** and **-$9.49/A.** respectively.





Planting Date: April 18th Hybrid: Pioneer 1742Q Population: 36K Row Width: 30" Rotation: CAC Corn Price: $4.13 StrideBio: $3.23/A. Manuever: $14.34/A.

Corn Smart Silver™ FurrowJet® Study

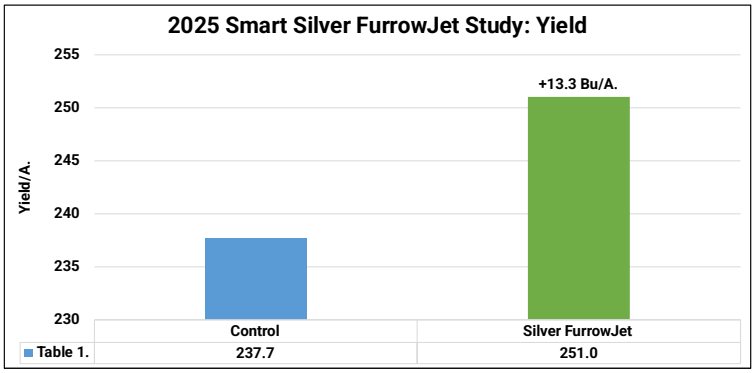
Objective: To evaluate the yield and economic impact of Smart Silver™ applied in furrow via FurrowJet® (Figure 1). This is a product produced by Green Evolution Technologies. It is the first of its kind, pure nano silver. The nano-silver particles offer seed resistance to disease pathogens, which reduces stress. Silver also decreases seed water requirements by 25% and could potentially decrease overall plant water consumption. Recently, silver nanoparticles have attracted interest in the pharmaceutical market, as silver has potential antibacterial activity, anti-inflammatory effects, and wound healing efficacy.

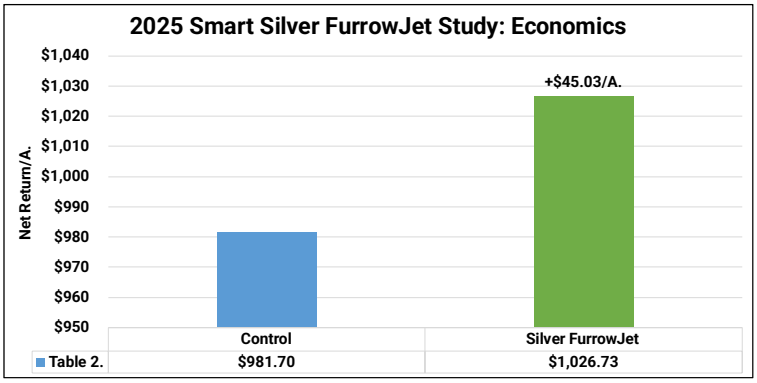
Figure 1. FurrowJet® 3-Way Placement

Results: Table 1. illustrates FurrowJet® (Figure 2.) applied Smart Silver™ resulted in yield advantages of +13.3 Bu/A. (+5.6%) with positive net returns of +$45.03/A. (+4.6%)

As a first-year product at the PTI Farm, we are encouraged by these results and look forward to learning more about Smart Silver™ in the future.

Figure 2. FurrowJet®





Planting Date: May 10th *Hybrid: GH 03U08* *Population: 36K* *Row Width: 30"* *Rotation: CAC* *Corn Price: $4.13* *Silver: $9.90/A.*

2025 PTI Results

Redox Bio-Nutrients RDX-N® CAC Nitrogen Management Study

Objective: To evaluate the effect on yield and economics using Redox Bio-Nutrients RDX-N®(Figure 1.) in a corn after corn rotation. It is a plant-active botanical extract designed to elevate nitrogen use efficiency by enhancing the plant's natural metabolism. RDX-N® is the first and only bio-stimulant of its kind, as it is not a microbe nor a chemical delay. It works by activating metabolic pathways that support sufficient nitrogen uptake, assimilation, and utilization all season long.

Figure 1. RDX-N® Active Ingredients

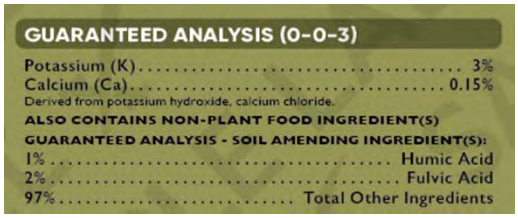
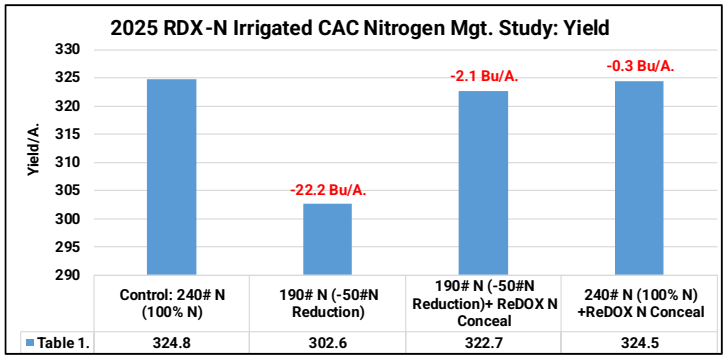


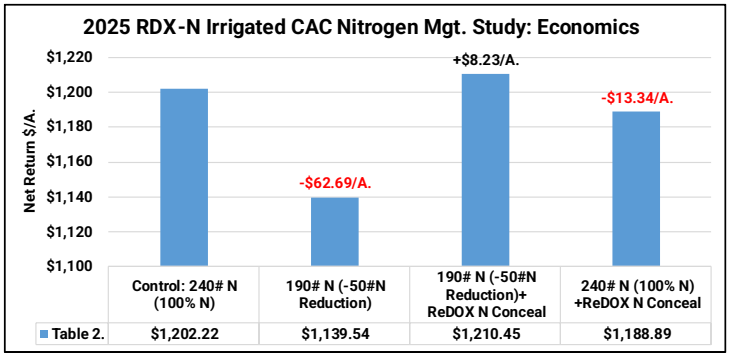
Figure 2. Dual-band Conceal®

For this agronomic study, nitrogen rate is evaluated at 100% full rates (240#N) as well as 50# N reductions (190# N). RDX-N® was then tank-mixed with full rate nitrogen, as well as the 50#reduction. RDX-N® was applied at planting via Conceal® treatments (Figure 2).

Results: Table 1. illustrates 100% nitrogen rates of 240#N/A., offered yields of 324.8 Bu/A. Reducing nitrogen by 50#N/A. resulted in yield losses of **-22.2 Bu/A.** with economic losses of **-$62.69/A.** Adding RDX-N® to the reduced 50# N rate brought overall yield to within **-2.1 Bu/A.** of the control and proved positive net returns of +$8.23/A. Full 100% rate of nitrogen plus RDX-N® resulted in no additional yield gain with economic losses of **-$13.34/A.**

In summary, Redox Bio-Nutrients RDX-N® treatments did in fact offer the ability to reduce nitrogen rates without sacrificing economic losses.





Planting Date: May 10th Hybrid: DKC 68-35 Population: 36.5K Row Width: 30" Rotation: CAC Corn Price: $4.13 UAN 32%: $0.58/# RDX-N®: $12.10/A.,16oz/A.

2025 PTI Results

Redox Bio-Nutrients RDX-N® CAB Nitrogen Management Study

Objective: To evaluate the effect on yield and economics using Redox Bio-Nutrients RDX-N® (Figure 1.) in a corn after soybean rotation. It is a plant-active botanical extract designed to elevate nitrogen use efficiency by enhancing the plant's natural metabolism. RDX-N® is the first and only bio-stimulant of its kind, as it is not a microbe nor a chemical delay. It works by activating metabolic pathways that support sufficient nitrogen uptake, assimilation, and utilization all season long.

Figure 1. RDX-N® Active Ingredients

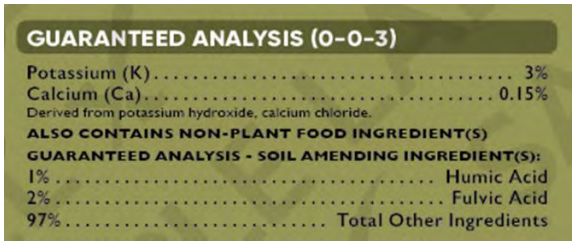


Figure 2. Dual-Band Conceal®

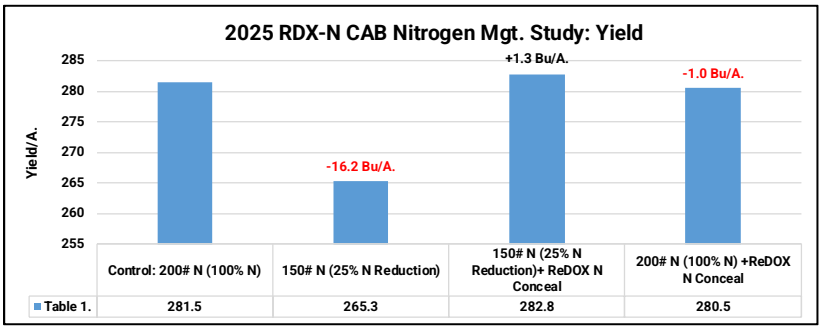
For this study, nitrogen rate is evaluated at 100% full rates (200#N), N reductions of 50#/A.(-25%), with and without RDX-N® in an at-plant Conceal® application (Figure 2).

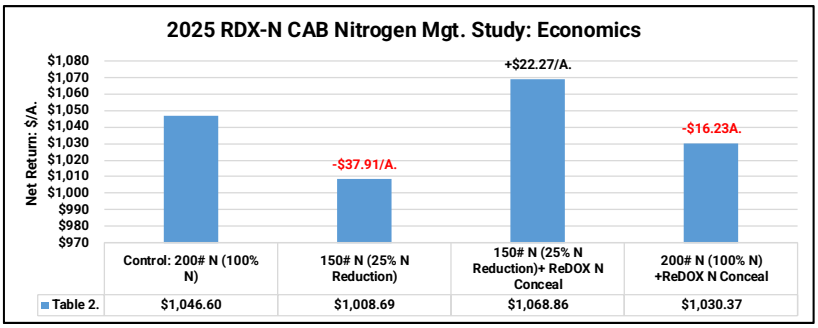
Results: Table 1. illustrates 100% nitrogen rates (200#N) resulted in yields of 281.5 Bu/A.

Reducing nitrogen by 50# resulted in losses of **-16.2 Bu/A.** and **-$37.91/A.**

Adding RDX-N® to the reduced N rate brought overall yield up to +1.3 Bu/A. of the control and proved positive net returns of +$22.27/A. Adding RDX-N® to 100% N rate, resulted in no additional yield gain, thus economic losses of **-$16.23/A.**

In summary Redox Bio-Nutrients RDX-N® treatments did in fact offer the ability to reduce nitrogen rate without sacrificing economic losses.





Planting Date: April 28th Hybrid: DKC 68-35 Population: 36K Row Width: 30" Rotation: CAB Corn Price: $4.13 UAN 32%: $0.58/# RDX-N®: $12.10/A., 16oz/A.

NanoCOTE® Urea Treatment Study

Objective: To evaluate yield and economics of NanoCOTE®, a patented nanoparticle technology that improves the delivery of macro and micronutrients in dry fertilizers through a unique and flexible coating technology. NanoCOTE® products utilize multiple mechanisms to improve the overall uptake of nutrients. The core technology is built around a flexible biodegradable co-polymer which disperses nutrients and is infused with nanoparticles designed to increase plant nutrient uptake.

50# of actual nitrogen was applied with urea (46-0-0) and side-dressed in a 6" wide band with a Miller N-Place™ Max side-dress applicator (Figure 1).

Urea was treated with NanoCOTE® to help improve the delivery and plant uptake of nitrogen.

Urea was banded via a dry tank and blower system that accurately places urea prills near the base of the corn plant. Work is being done with the toolbar to incorporate or cover the urea prills with soil to protect against volatilization.

Advanced flow and blockage visibility was implemented by pairing Clarity™ with the 20|20 monitoring system.

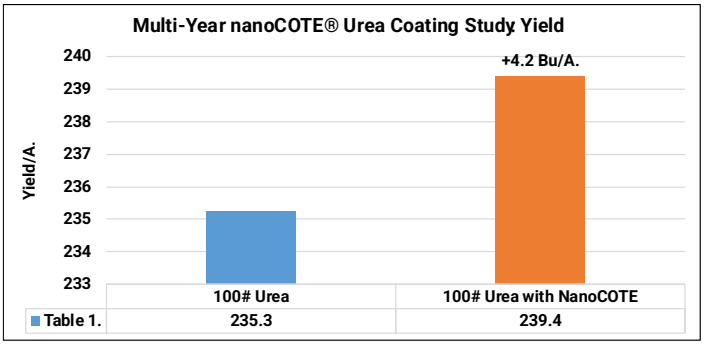
Figure 1. Miller N-Place™ Max Side-Dress Toolbar

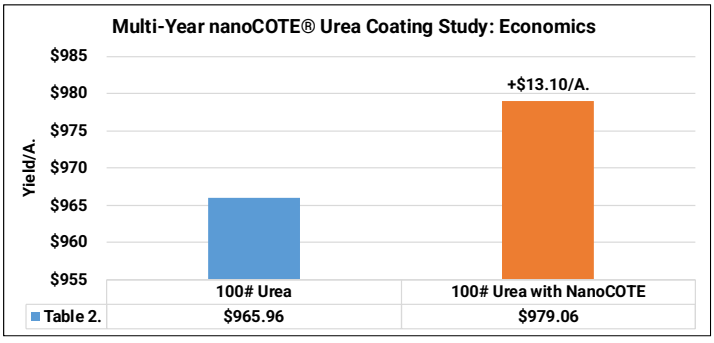
NanoCOTE® Urea Treatment Study

Results: Table 1. illustrates multi-year average yield gains of +4.2 Bu/A. when NanoCOTE® was applied to side-dress urea nitrogen.

These yield gains corresponded to an average positive return on investment of +$13.10/A. (Table 2.)

Figure 2. Banded Urea on V6 Corn





Planting Date: May 5th Hybrid: DKC 66-06TRE Population: 36K Row Width: 30" Rotation: CAB Corn Price: $4.13 NanoCote®: $3.75/A.

Nurizma® Soil Insecticide/Seed Trait Study

Objective: To evaluate the yield and economics of applying Nurizma® at planting, as a FurrowJet® single band application (Figure 1.) on SmartStax® and VT Double PRO® traited corn.

Nurizma® insecticide from BASF, is an in-furrow insecticide product with a unique mode of action that protects against common belowground pests, including corn rootworm larvae, wireworms, white grubs and seed corn maggots at the source: the roots. Nurizma® insecticide's active ingredient, broflanilide was the first group 30 registered and sold as an in-furrow insecticide.

VT Double PRO® corn contains dual modes of action for protection against above-ground pests, like European and Southwestern corn borers, fall armyworm, and corn earworm.

SmartStax® traited seed controls a broad spectrum of pests which includes larvae of above-ground insects such as European corn borer, black cutworm, southwestern corn borer, corn earworm, fall armyworm, western bean cutworm, as well as below-ground feeding larvae including western corn rootworm and northern corn rootworm.

Figure 1. FurrowJet® In-Furrow Application

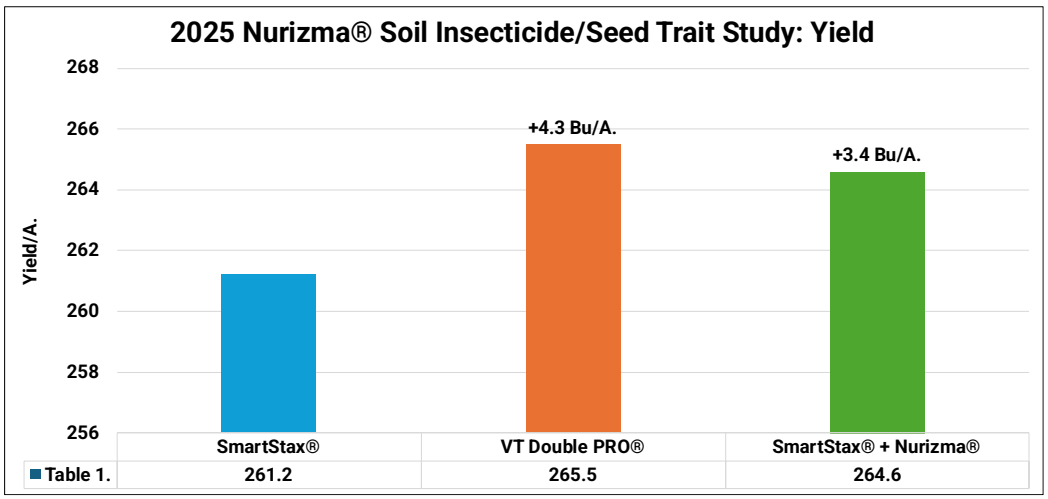
Nurizma™

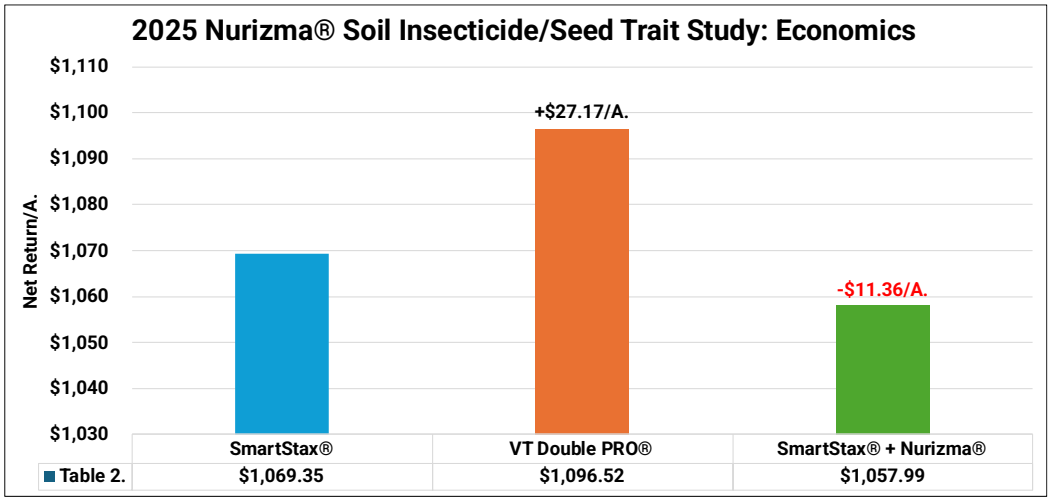
BASF We create chemistry

Nurizma® Soil Insecticide/Seed Trait Study

Results: Table 1. illustrates planter applied treatments of Nurizma® resulted in yield gains of +3.4 Bu/A. in addition to having the SmartStax® trait. The same genetics, but with a VT Double Pro® trait platform (non-rootworm) resulted in a yield gain of +4.3 Bu/A.

Applying Nurizma® insecticide in addition to traited corn, proved yield gain, however, not enough to achieve positive economic return. Table 2. tells the economic story with Nurizma® applications resulting in economic losses of **-$11.36/A.** In 2025, the presence of corn rootworm feeding was very low. This low pressure, combined with higher seed/trait prices, resulted in VT Double Pro with highest returns of +$27.17/A.





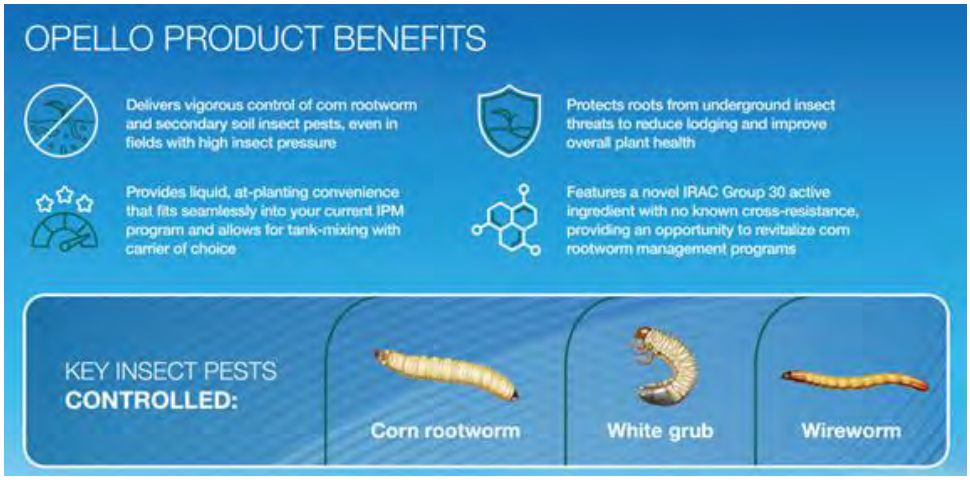
Planting Date: May 11th Hybrid: Wyffels7878SS ($291/Bag), 7876VT2P ($270/Bag) Population: 36K Row Width: 30"

Tillage: Strip-Till Rotation: CAC Corn Price: $4.13 Nurizma®: $25.40/A

Opello® Soil Insecticide/Seed Trait Study

Objective: To evaluate the yield and economics of applying Opello® applied at planting as a FurrowJet® single band application (Figure 1.) on both SmartStax® and VT Double PRO® traited corn.

Opello® plinazolin technology insecticide from Syngenta features a novel mode of action and is the trademark of a new active ingredient that protects plant health with outstanding performance on a wide range of harmful pests that affect key crops. Opello® delivers unprecedented insect control on stinkbugs, mites, thrips, caterpillars, flies, and beetles. Opello® recently received registration (winter 2025) and will begin to be available throughout North America.



VT Double PRO® corn contains dual modes of action for protection against above-ground pests, like European and Southwestern corn borers, fall armyworm, and corn earworm.

SmartStax® traited seed controls a broad spectrum of pests which includes larvae of above-ground insects such as European corn borer, black cutworm, southwestern corn borer, corn earworm, fall armyworm, western bean cutworm, and below-ground feeding larvae of western corn rootworm and northern corn rootworm.

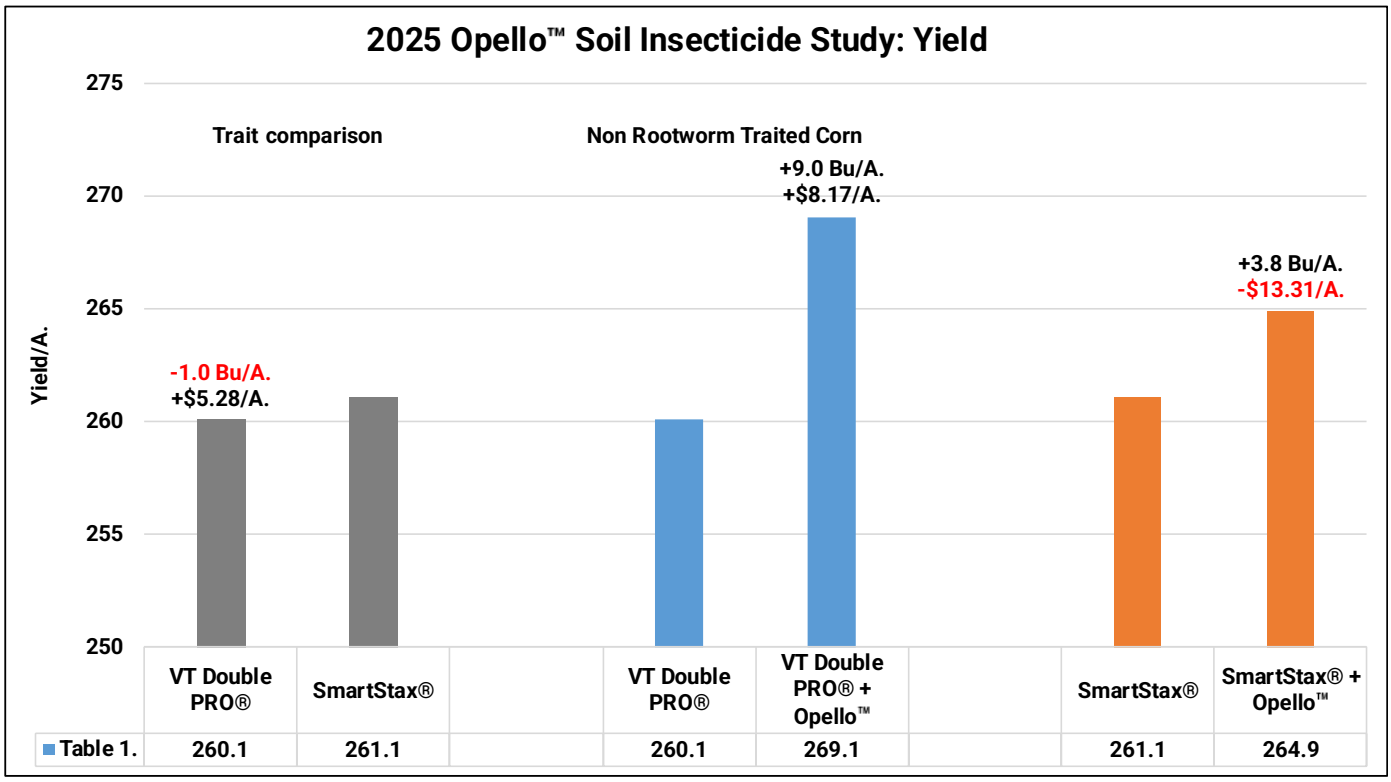
Figure 1. FurrowJet® In-Furrow Application

2025 PTI Results

Opello® Soil Insecticide/Seed Trait Study

Results: Table 1. illustrates Opello® insecticide applied to non-rootworm traited corn provided a yield gain of +9.0 Bu/A., resulting in economic gains of +$8.17/A.

Applying Opello® insecticide in addition to rootworm-traited corn, proved yield gains of +3.8 Bu/A., however resulting in economic losses of **-$13.31/A.**



Planting Date: May 19th *Hybrid: Wyffels7878SS ($291/Bag), 7876VT2P ($270/Bag)* *Population: 36K* *Row Width: 30"*

Tillage: Strip-Till *Rotation: CAC* *Corn Price: $4.13* *Opello: $29/A*

Persistent BioControl Nematode Corn Rootworm Study

Objective: To evaluate the yield and economics of applying a naturally occurring blend of entopathogenic nematodes that are designed to feed on corn rootworm larvae (*Diabrotica virgifera)*.

Persistent BioControl Nematodes offers a new tool with persistent insect attacking nematodes. These nematodes are microscopic worms that live in the soil and feed on corn rootworm for multiple seasons for a new and unique pest management strategy.

Persistent BIOCONTROL

This trial is designed as a multiple-year study to evaluate the population growth and control of nematodes after the first-year application. Nematodes were tank-mixed with 20 Gal/A. of water and applied at planting as a Conceal® single band application (Figure 2.) DeKalb 65-95 VT2P was planted at two locations, offsite from PTI, that have been in the heartbeat of corn rootworm pressure since the late 1980's.

Figure 1. Persistent BioControl Nematodes

Figure 2. Conceal Dual Placement 3" from Seed

Persistent BioControl Nematode Corn Rootworm Study

Below is a diagram of the five stages of how corn rootworm larvae feeding nematodes identify, feed and infect bacteria, multiply and regenerate.

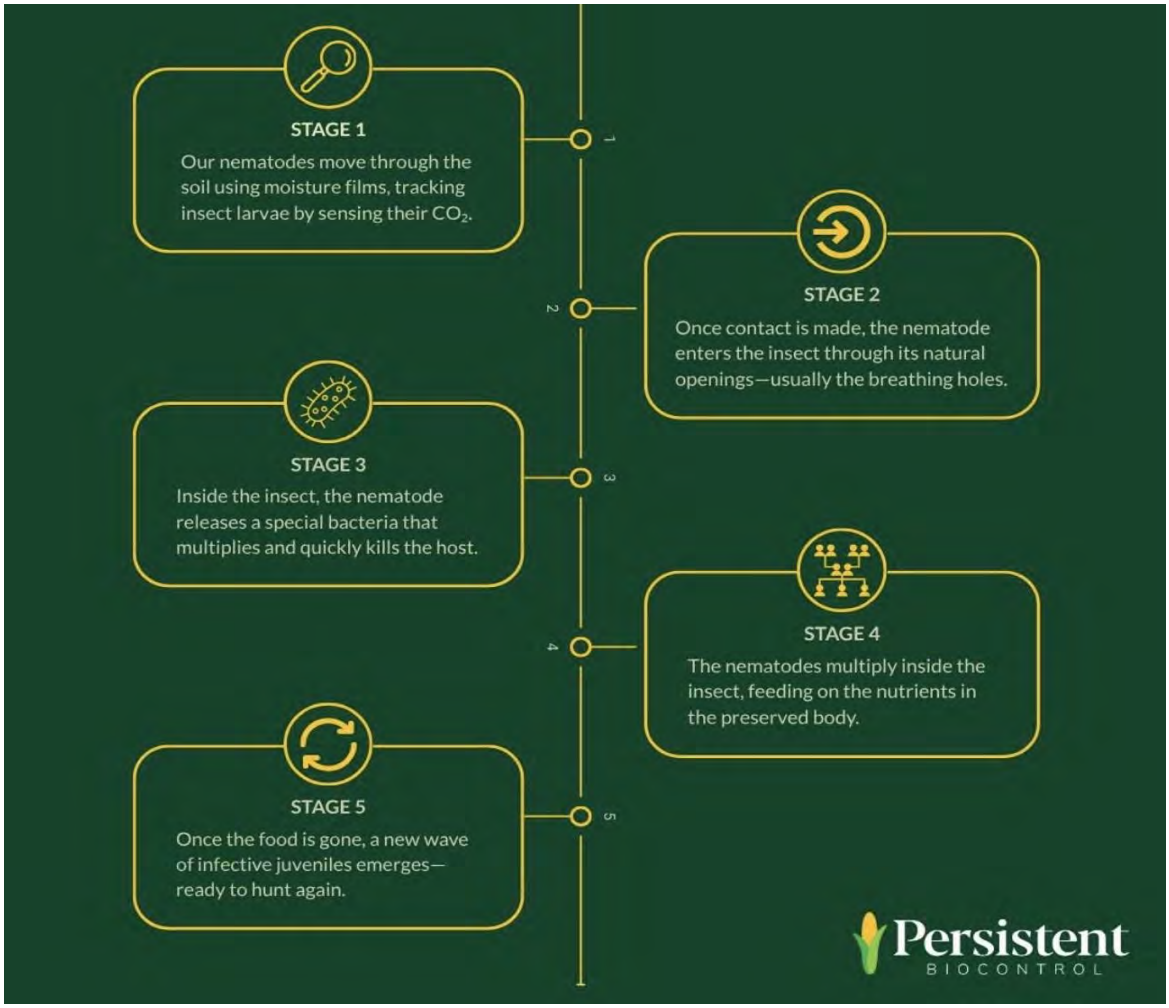


Figure 3. Entopathogenic Nematodes under microscope

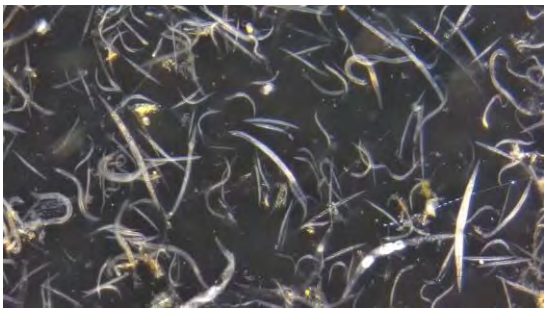


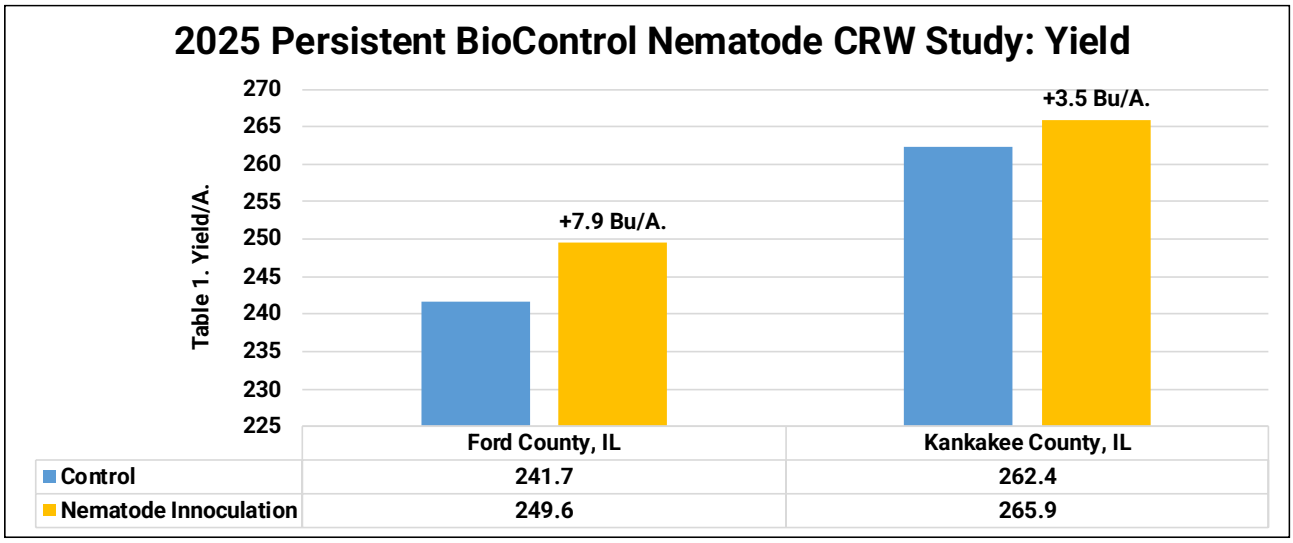
Figure 4. Waxworm cadavers used to breed nematodes

Persistent BioControl Nematode Corn Rootworm Study

Results: Table 1. illustrates positive yield was documented at both locations with gains of +7.9 Bu/A. and +3.5 Bu/A., averaging +5.7 Bu/A.

With a cost of $70/A., a one-year breakeven would result in yield increases of +16.9 Bu/A., which did not occur.

However, nematode inoculation is designed to persist in the soil, working to control corn rootworm larvae for potentially 7-years or more. In a 7-year 50% corn/soybean rotation, a simple way to approach cost/A. may be to average the $70/A cost over the corn years, equating to an annual cost of $20/A., which is lower than most traditional corn rootworm control products today. $20/A. would require a breakeven yield response of +4.8 Bu/A. using today's corn price. As the nematodes populate, hopefully the yield response will increase over time.



Estimates show that nearly 40% of corn grown in the United States are infested with corn rootworm. Growers in the Midwest certainly have battled corn rootworm for decades. The United States Department of Agriculture estimates that corn rootworms cause $1 billion in lost revenue each year, including $800 million in yield loss and $200 million in cost of treatment for corn growers.

Persistent BioControl nematodes could offer growers a new tool in the toolbox as another unique integrated pest management practice to help control corn rootworm.

Planting Date: May 3rd *Hybrid: DKC 65-95VT2P* *Population: 36K* *Row Width: 30"* *Rotation: CAC* *Corn Price: $4.13* *Nematodes: $70/A*

Swine Effluent Starter Fertilizer FurrowJet® Study

Objective: To evaluate the yield and economics of applying swine effluent, at-plant in a FurrowJet® 3-way application.

Swine effluent was derived from NutraDrip™ Irrigation Systems, using an on-site manure separation system (Figure 1).

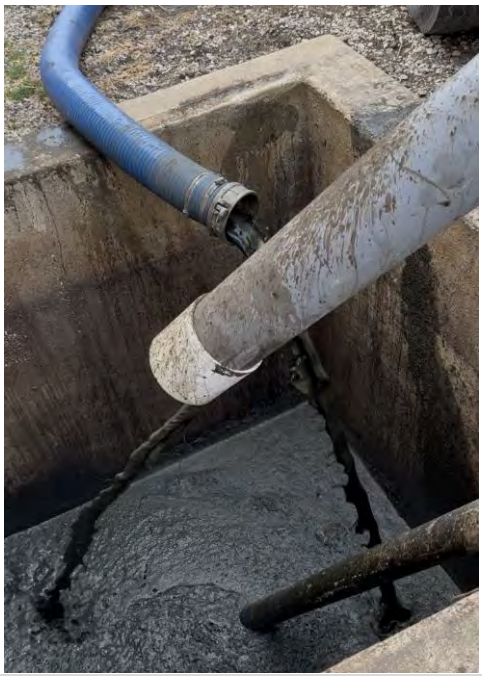
This system separates solid manure, as a result of a two-stage system. First, swine manure is run through a vertical screw press that removes large, coarse solids that could result in blockage of planting or irrigation systems.

Secondly, a micro-filter acts as the final safety net by removing fine particles down to 25 microns, and producing a clean, nutrient rich effluent that's ready for precision application through a planter or irrigation system.

Figure 1. NutraDrip Manure Separation Unit

Figure 2. Dry Separation

Figure 3. Liquid Separation



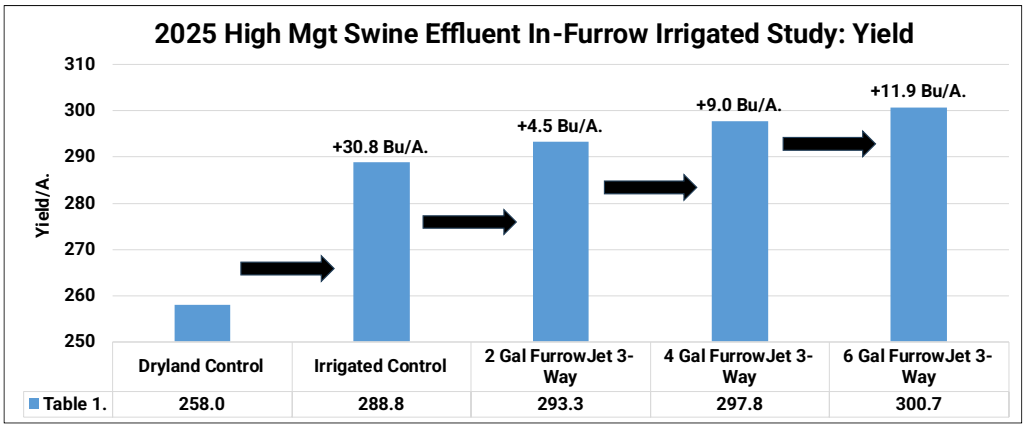
Swine Effluent Starter Fertilizer FurrowJet® Study

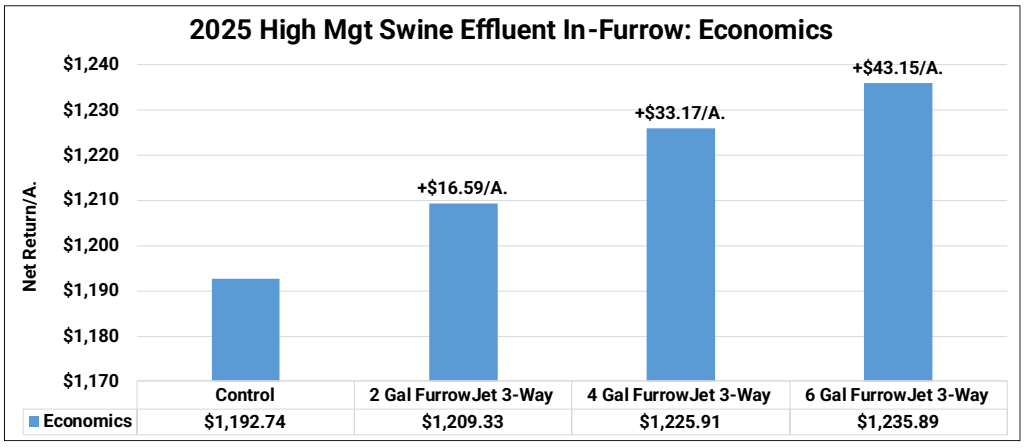
Once separated into a clean, nutrient rich liquid, the swine effluent was then transported to the planter to be used as an in-furrow starter fertilizer applied through FurrowJet®, picture below.

Results: Positive yield was realized at all effluent rates applied on the planter ranging from +4.5 Bu/A. to +11.9 Bu/A. The higher the rate, the higher the yield. Being the first year of testing with this product, higher rates need to be tested to identify optimum economics.

However, 2025 results look promising at the low rates of only 2, 4 and 6 Gal/A. on the planter. These low rates attributed to economic gains of up to +$48.52/A.

We look forward to continuing testing effluent and learning how to implement this into sound nutritional programs, not only as starter fertilizer, but other management practices as well.





Planting Date: April 20th Hybrid: Pioneer 1742Q Population: 38K Row Width: 30" Rotation: CAB Corn Price: $4.13 Effluent: $1/Gal

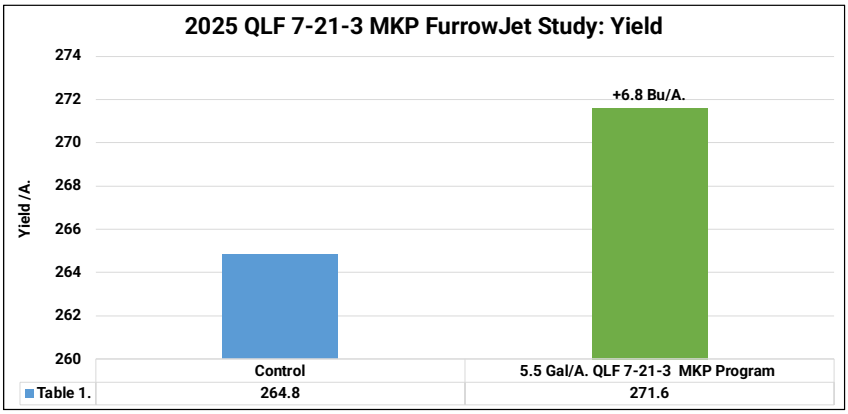
QLF® 7-21-3 MKP FurrowJet® Study

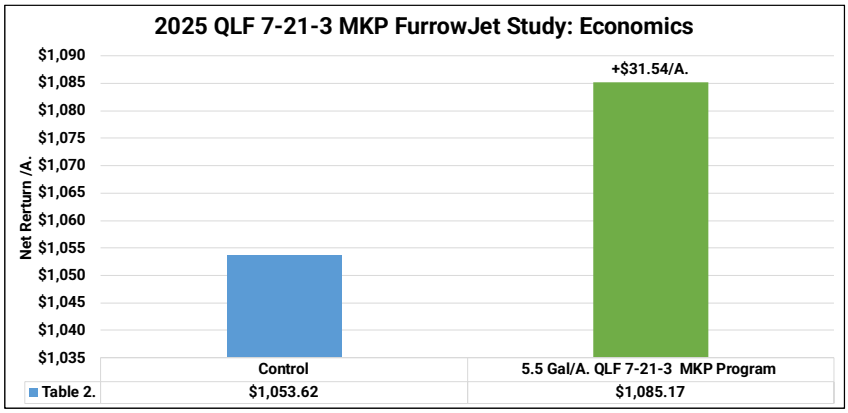
Objective: To evaluate yield and economic return of QLF® Agronomy's Liquid Carbon-Based Fertilizer (L-CBF) starter 7-21-3 MKP applied through a FurrowJet® in-furrow tri-band system (Figure 1.) at 5.5 Gal/A. (4.75 Gal 7-21-3, 1Qt CornSpike, 1Pt Kelpack).

Figure 1. FurrowJet® 3-way Placement

QLF® 7-21-3 MKP is liquid starter blend derived from premium orthophosphate MKP (monopotassium phosphate) for plant available phosphorus, available carbon from sugar cane molasses as an energy source for soil microbes and enhanced biological function with an added fermentation yeast extract.

Results: Table 1. illustrates that QLF® 7-21-3 MKP resulted in yield advantages of +6.8 Bu/A with corresponding economic gains of +$31.54/A.





Planting Date: April 25th Hybrid: Wyffels 7876 Population: 36K Row Width: 30" Rotation: CAC Corn Price: $4.13 QLF® Program: $36.54/A. Fert. Re-Allocation Program: $40/A.

Green Lightning Plasma Activated Water In-Furrow Study

Objective: To evaluate yield, net return, and nitrogen use efficiency (NUE) of Green Lightning plasma activated water. Green Lightning is a mechanism to replicate a naturally occurring process that leads to nitrogen. During a lightning storm, static electricity rearranges the nitrogen molecule in the air, and this modified molecule is contained within the rain. Green Lightning devices create lightning in a controlled environment under the same premise. Air and water are sent into a static electric field for the nitrogen molecule to go through a rearrangement process that allows attachment of the water present, flowing through the machine, and deposits an end product as NO2 (nitrite) and NO3 (nitrate).

A six head system called the THUNDER 365, produces product for 550 acres of corn annually. This system is designed for use by a farmer, in his/her own tool-shed, to make plasma activated water by using only a 110v power, grounding rods, and a water supply.

This study compares the use of Green Lightning plasma activated water applied as an in-furrow treatment applied through FurrowJet®, a planter fertilizer attachment that enables placement of fertilizer on the seed as well as 3/4" on each side of the seed (Figure 3.) at applied rates of 4, 8, 12 and 16 Gal/A.

Figure 1. Green Lightning Plasma Activated Water Machine

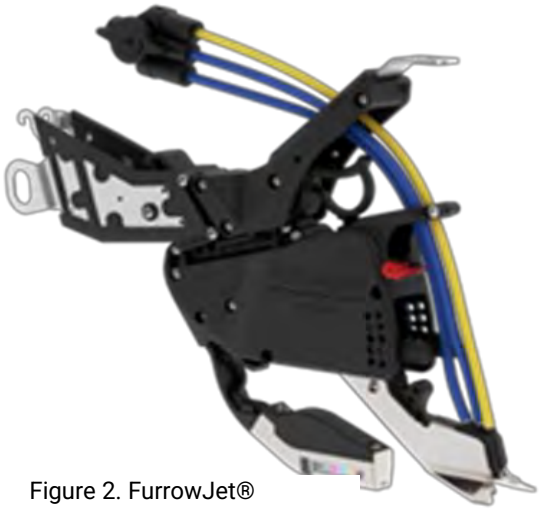


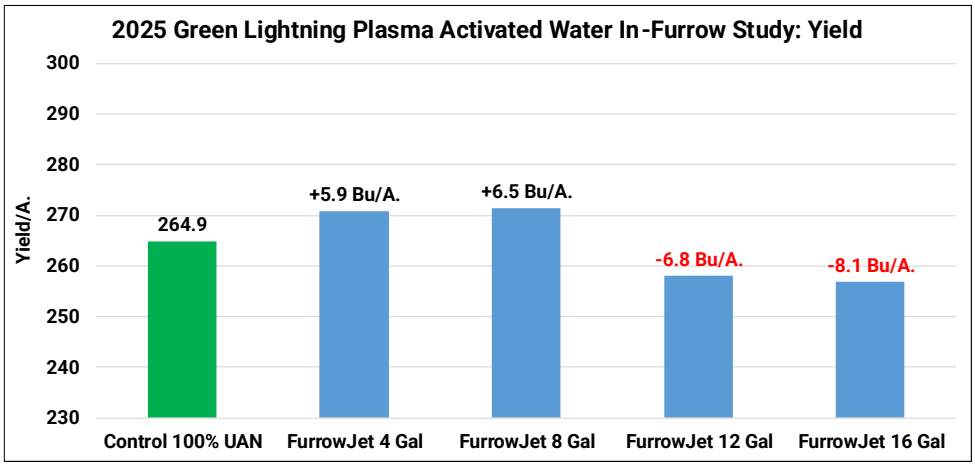
Figure 2. FurrowJet®

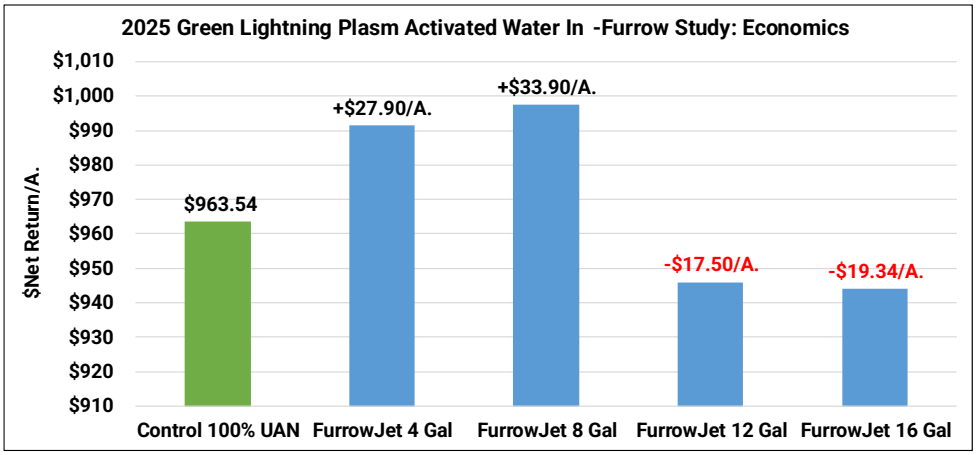
Figure 3. FurrowJet® 3-way Placement

Green Lightning Plasma Activated Water In-Furrow Study

Results: The tables below illustrate a yield advantage of +5.9 Bu/A. and +6.5 Bu/A.at application rates of 4 Gal/A. and 8 Gal/A. and netted returns of +$27.90/A. and +$33.90/A. Higher rates of 12 Gal/A. and 16 Gal/A. resulted in yield losses of **-6.8 Bu/A.** and **-8.1 Bu/A.** As PAW treatments increased in rates over 8 Gal/A., total commercial nitrogen was decreased too much and proved diminished economic returns of **-$17.50/A.** and **-$19.34/A.**

In our 3rd year of testing with this product, we are still trying to understand the nuances of successfully creating a consistent product. As an environmentally friendly product that is very affordable to produce, if this product could effectively work, it could offer farmers a substantial decrease in one of the highest farm inputs, nitrogen.





Planting Date: April 25th Hybrid: Wyffels 7876 Population: 36K Row Width: 30" Rotation: CAC Corn Price: $4.13 Green N: $0.05/Gal. N: $0.58/#

Green Lightning Plasma Activated Water N Replacement Study

Objective: To evaluate yield, net return, and nitrogen use efficiency (NUE) of Green Lightning plasma activated water(PAW). Green Lightning is a mechanism to replicate a naturally occurring process that leads to nitrogen. During a lightning storm, static electricity rearranges the nitrogen molecule in the air, and this modified molecule is contained within the. Green Lightning devices create lightning in a controlled environment under the same premise. Air and water are sent into a static electric field for the nitrogen molecule to go through a rearrangement process that allows attachment of the water present, flowing through the machine, and deposits an end product as NO2 (nitrite) and NO3 (nitrate).

A six head system called the THUNDER 365, produces nitrogen for 550 acres of corn annually. This system is designed for use by a farmer, in his/her own tool-shed, to make plasma activated water by using only a 110v power, grounding rods, and a water supply.

This study compares the use of Green Lightning PAW as a total replacement or partial replacement of commercial nitrogen. To accomplish this, 4 program treatments were made during the growing season:

1. 100% Commercial 32% UAN (225# N)
2. 2/3 Commercial 32% UAN (150# N)

   1/3 Green Lightning PAW (40 Gal)
3. 1/3 Commercial 32% UAN (75# N)

   2/3 Green Lightning PAW (80 Gal)
4. 100 % Green Lightning PAW (129 Gal)

Figure 1. Green Lightning Plasma Activated Water Machine

2025 PTI Results

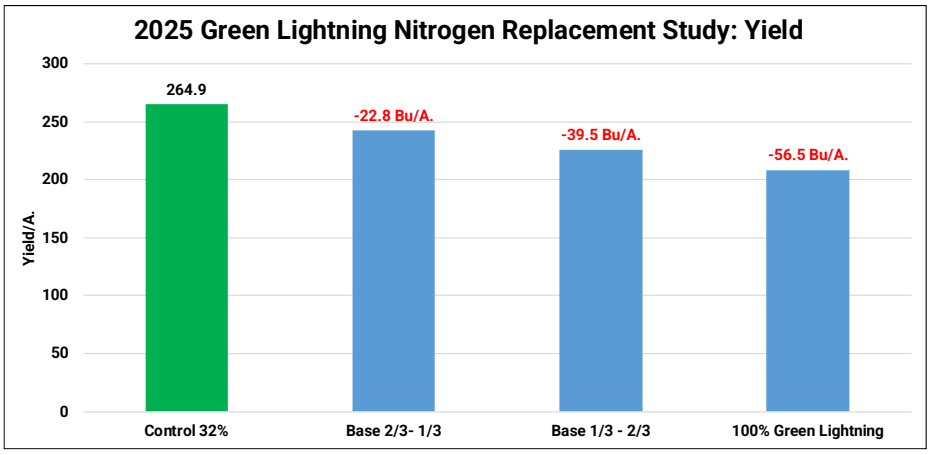
Green Lightning Plasma Activated Water N Replacement Study

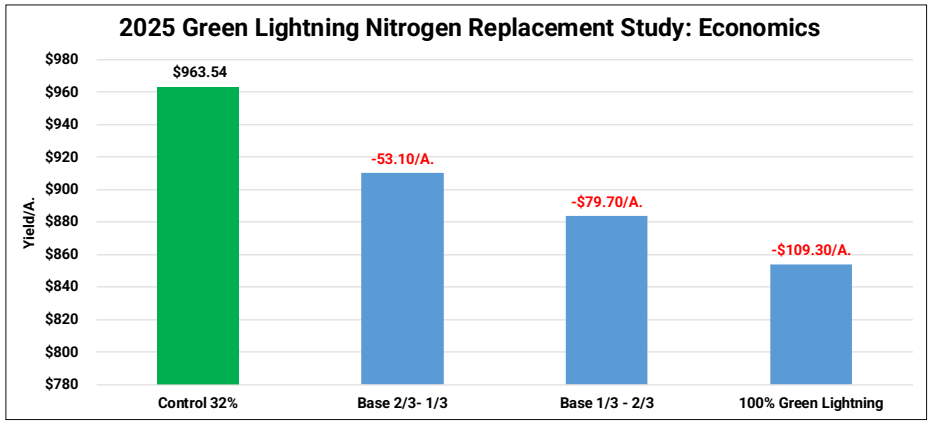
Results:

- ✓ Full nitrogen replacement with Green Lightning failed to the tune of **-56.5 Bu/A**. with economic losses of **-$109.30/A.**
- ✓ Replacing 2/3 of a commercial nitrogen program with Green Lightning resulted in yield losses of **-39.5 Bu/A.** and economic losses of **-$79.70/A.**
- ✓ Replacing 1/3 of a commercial nitrogen program with Green Lightning resulted in yield losses of **-22.8 Bu/A.** and economic losses of **-$53.10/A.**

2025 was our 3rd year of testing this product, with the last two crop seasons being a complete disaster in regard to nitrogen replacement.

As an environmentally friendly product that is very affordable to produce, we had hoped Green Lightning plasma activated water could offer farmers a substantial decrease in one of the highest farm inputs, being nitrogen. However, until quality and performance issues are resolved, we cannot recommend this product as a nitrogen replacement.





Planting Date: April 20th Hybrid: GH 15J91 Population: 36K Row Width: 30" Rotation: CAC Corn Price: $4.13 Green N: $0.05/Gal. N: $0.58/#

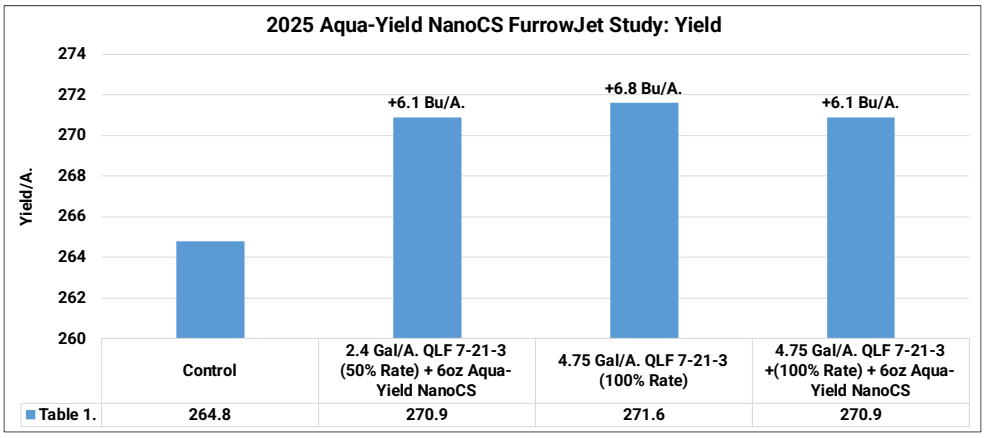
Aqua-Yield® NanoCS® FurrowJet® Study

Objective: To evaluate yield and economics of NanoCS® by AQUA-YIELD, a starter fertilizer enhancer with a robust combination of NanoShield® Technology, balanced NPK, Zinc, and Bio Stimulant. Aqua-Yield products contain nanoparticles that penetrate cell walls and creates a nano-sized shield around nutrient/molecules/ions. This technology delivers essential nutrients into the seed for rapid germination and growth.

This trial aims to establish the efficiency of Aqua-Yield's NanoCS® nano-liquid based fertility product in-furrow starter fertilizer. This is only applied in the center band of FurrowJet®.

Figure 2. FurrowJet®

Figure 1. FurrowJet® In-Furrow Application



AQUA-YIELD®

NanoCS™

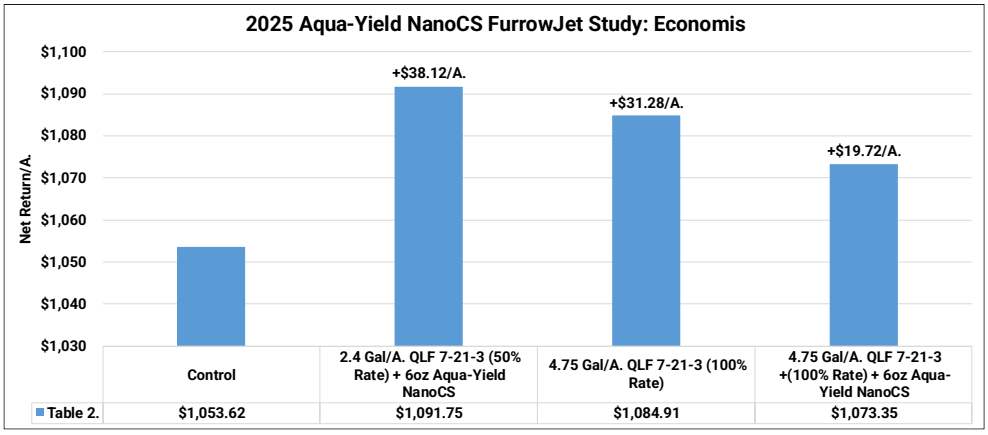
Aqua-Yield® NanoCS® FurrowJet® Study

Results: Table 1. illustrates yield results of all treatments. The control treatment brought yields of 264.8 Bu/A.

Aqua-Yield's 6oz NanoCS® tank-mixed with 50% (2.4Gal) QLF® 7-21-3 rates resulted in +6.1 Bu/A. yield improvement over the control treatment. Finally, 6oz NanoCS® + 4.75 Gal/A. of QLF® 7-21-3 resulted in yield gains of +6.1 Bu/A. Just applying QLF® 7-21-3 resulted in +6.8 Bu/A.

Table 2. illustrates the overall economics of the fertility study. Reducing QLF® 7-21-3 applications by 50% and tank-mixing NanoCS® at 6oz resulted in economic gains of +$38.12/A. While a 100% rate of QLF® 7-21-3 along with 6oz Nano CS showed positive returns of +$19.72/A.

2025 was the PTI Farm's 5th year testing NanoCS®. In 2021, NanoCS® resulted in +0.3 Bu/A. yield gains with corresponding net revenue gains of +$6.87/A., in 2022, NanoCS® resulted in +3.3 Bu/A. yield gains with corresponding net revenue gains of +$29.20/A. with both years using 10-18-4 in-furrow starter fertilizer. In 2023, we saw yield increases of +8.0 Bu/A. along with economic gains of +$13.81/A. with a 6-20-4. Finally in 2025 we saw +6.0 Bu/A. along with economic gains of +$27.41/A.



Planting Date: May 11th Hybrid: GH 15J91 Population: 36K Row Width: 30" Rotation: CAB Corn Price: $4.13 QLF 7-21-3: $4.85/Gal NanoCS: $8.67

2025 PTI Results

Corteva® NEXTA™ Biological Corn Study

Objective: To evaluate the yield and economic impact of Corteva's NEXTA™ START, GROW, FINISH biological program.

This trial consisted of the following treatments:

Treatments and Placement:

Control:	Untreated		
NEXTA™ START: In-Furrow			
	Conceal® Dual Band (Figure 1.)	1Qt/A. Harvest Plus™	8-0-0, S, B, Mn,Zn
	FurrowJet® (Figure 2.)	4oz/A. NEXTA™ Shield	N, K, Cobalt, Moly
NEXTA™ GROW: 1st Foliar Pass			
		V4: 4oz NEXTA™ Stand	Cytokinin, GA&I3A Acid
		V4: 1Qt/A. Harvest Plus™	8-0-0, S, B, Mn,Zn
NEXTA™ FINISH: 2nd Foliar Pass			
		VT: 32oz/A. NEXTA™ Swole	Cytokinin, Boron,Moly
		VT: 8oz/A. NEXTA™ Spark	Cytokinin
		VT: 2.5# Harvest More® Mate®	5-10-27, Ca,Mg,B,Cu,Mn,Zn

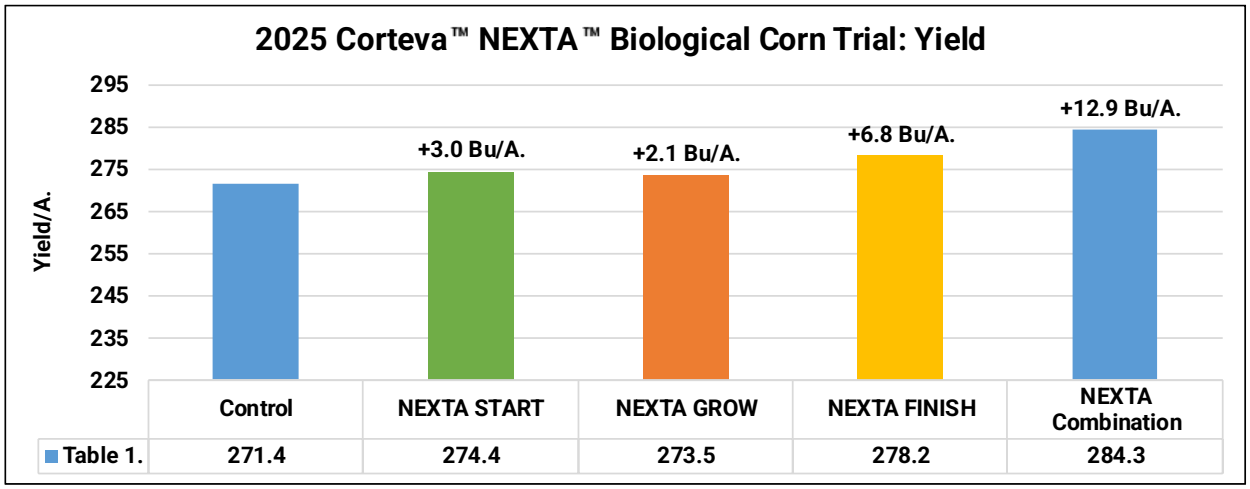
Figure 1. FurrowJet® Placement

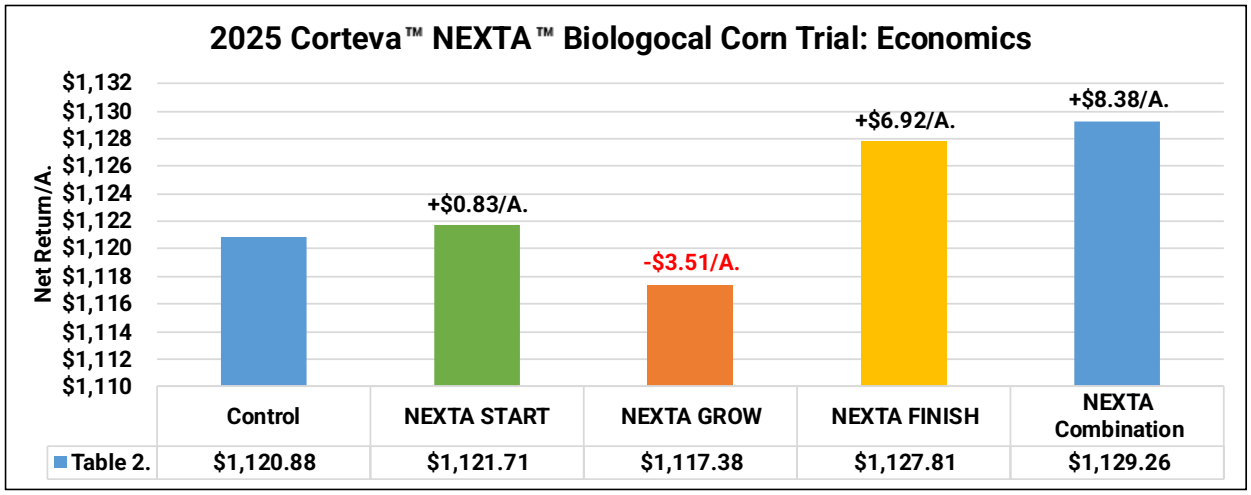
Figure 2. Conceal® Placement

Corteva® NEXTA™ Biological Corn Study

Results:

- ✓ At-Plant NEXTA START treatments captured +3.0 Bu/A. gains with a positive return of +$0.83/A. over the control.
- ✓ NEXTA GROW V4 foliar treatments proved lowest yield tally of all treatments at +2.1 Bu/A. with negative return on investment of **-$3.51/A.**
- ✓ NEXTA FINISH R2 foliar treatments were highest yield of all individual treatments at +6.8 Bu/A. with net return of +$6.92/A.
- ✓ Combination START, GROW, FINISH at-plant and foliar treatments captured highest overall yield response of +12.9 Bu/A. with highest overall return of +$8.38/A.





Planting Date: April 20th *Hybrid: Pioneer 14830Q* *Population: 36K* *Row Width: 30"* *Rotation: CAC Strip-Till* *Corn Price: $4.13*

NEXTA START: $11.56/A. *NEXTA GROW: $12.18/A* *NEXTA FINISH: $21.16/A*

2025 PTI Results

Ethos® Elite FurrowJet® Study

Objective: This FurrowJet® system (Figure 1.) trial evaluates the yield and net return of Ethos® Elite LFR®, an insecticide/biofungicide that combines an effective and trusted pyrethroid insecticide, bifenthrin (of Capture® LFR®), with two proprietary biologicals, *Bacillus velezensis* and *Bacillus subtilis*, for a broad spectrum of control against seedling and early-season diseases and soilborne pests.

ETHOS ELITE LFR
INSECTICIDE/BIOFUNGICIDE

Active Ingredients:	By Wt.
Bifenthrin *:	15.7%
Bacillus velezensis strain RTI301 **:	2.5%
Bacillus subtilis strain RTI477 **:	2.5%
Other Ingredients:	79.3%
	100.0%

Figure 1.

This combination defends against insect pest such as corn rootworms, wireworms, grubs, seed corn maggots, cutworms, and common stalk borers. This also defends against diseases such as Fusarium, Pythium, Rhizoctonia and Phytophthora.

The bio-fungicide in Ethos® Elite forms a protective barrier on root surfaces and builds over time as spores germinate and colonize roots and root hairs.

Results: Ethos® Elite treatments applied through FurrowJet® offered positive yield gains of +8.9 Bu/A. (Table 1.) Eight years of testing (2018-2025) has realized average yield gains of +8.4 Bu/A. along with an average return on investment of +$17.60/A. (Table 2.)

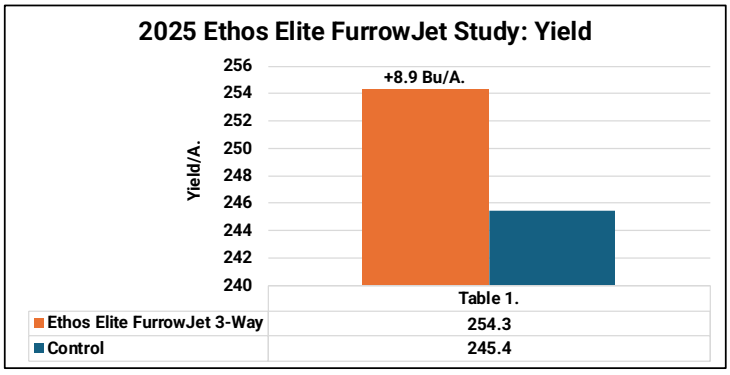


Table 1.

Ethos Elite FurrowJet 3-Way	254.3
Control	245.4

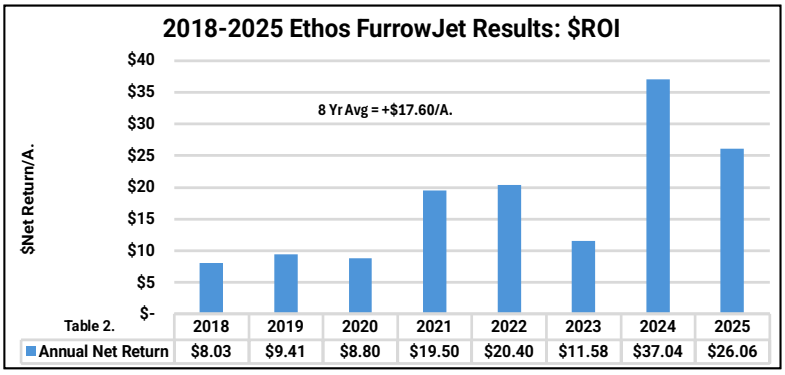


Table 2.

	2018	2019	2020	2021	2022	2023	2024	2025
Annual Net Return	$8.03	$9.41	$8.80	$19.50	$20.40	$11.58	$37.04	$26.06

Planting Date: May 5th Hybrid: GH 15J91 Population: 36K Row Width: 30" Rotation: CAC Corn Price: $4.13 Ethos® Elite: $10.70/A. Rate: 5.3 oz/A

PTI ILLINOIS

2025 PTI Results

Xyway® LFR® FurrowJet® Study

Objective: To evaluate the yield and economic return of Xyway® LFR®, a fungicide with the active ingredient Flutriafol (Figure 1). Xyway® LFR® fungicide is promoted as a revolutionary at-plant fungicide formulation that provides season-long disease protection from the inside out of the roots, stalks, and leaves.

Figure 1.

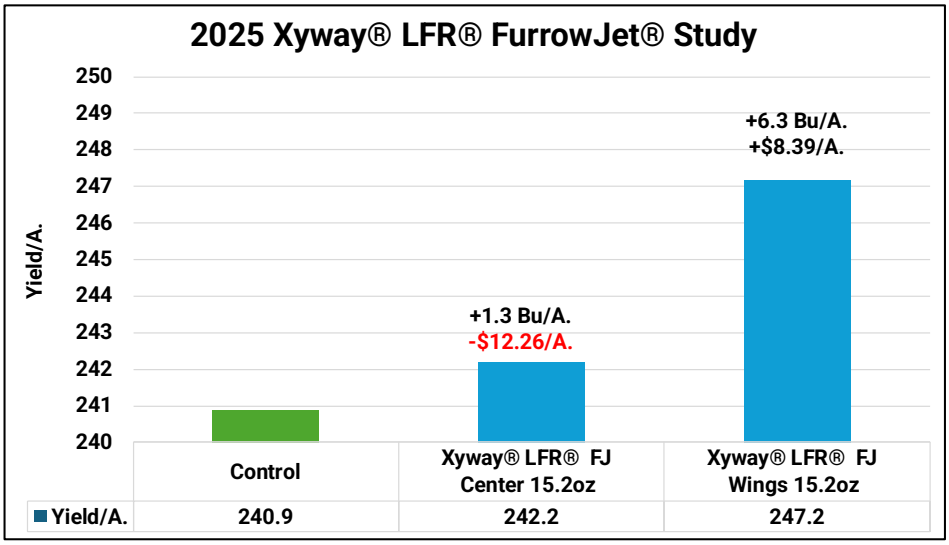
EPA Reg. No. 279-9638	EPA Est. No. 279-DE-001
Active Ingredient:	**By Wt.**
Flutriafol	26.4%
Other Ingredients:	73.6%
TOTAL:	**100.0%**

Contains 2.5 pounds per gallon of the active ingredient flutriafol. Suspension Concentrate.

This study evaluates Xyway® LFR® applied in various soil applied situations. First, Xyway® LFR® is evaluated as an in-furrow treatment applied through FurrowJet®, a planter fertilizer attachment that enables placement of fertilizer on the seed as well as 3/4" on each side of the seed (Figure 2). To achieve this dual-band placement, the wings on FurrowJet® system angle downward to cut into the sidewall and place fertilizer alongside the seed in a dual-band. By doing this, lifting and fracturing can occur that potentially could remove soil smearing or compaction created by disc openers.

Figure 2. FurrowJet® In-Furrow Planter Attachment

Results: Xyway®LFR® applied on top of the seed through FurrowJet® Center resulted in yield gains of +1.3 Bu/A. This small yield gain resulted in an economic loss of **-$12.26/A.** It should be noted that this application is off label, as this fungicide needs to be placed away from the seed.



Xyway® LFR® placed ¾" off to the side of furrow with FurrowJet® wings, proved yield gains of +6.3 Bu/A. This difference in placement resulted in improved gains of +$8.39/A.

Planting Date: May 12th Hybrid: DKC 65-95 Population: 36K Row Width: 30" Rotation: CAC Corn Price: $4.13 Xyway® LFR®: $17.63/A.

Capture® LFR® FurrowJet® Study

Objective: This in-furrow application trial applied via FurrowJet® (Figure 2.) evaluates yield and economics of Capture® LFR®, an in-furrow liquid insecticide containing the active ingredient Bifenthrin (Figure 1.) in a liquid fertilizer ready (LFR®) formulation.

Figure 1.

EPA Reg. No. 279-3302	**EPA Est. 279-NY-1**
Active Ingredient:	**By Wt.**
Bifenthrin*:	17.15%
Other Ingredients:	82.85%
	100.0%

*Cis isomers 97% minimum, trans isomers 3% maximum.

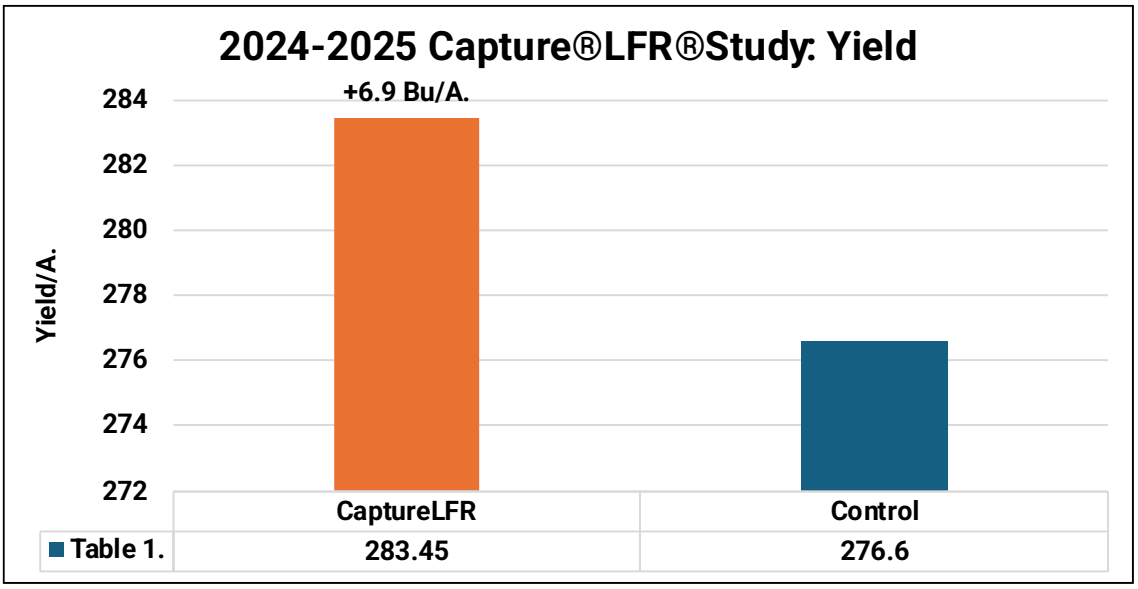
This product contains 1.5 pounds active ingredient per gallon.

Capture® LFR® controls seed and seedling pests such as wireworm, corn rootworm, cutworm, grubs, armyworm, seed corn maggot and common stalk borer.

Figure 2. FurrowJet®

Results: In 2025 Capture® LFR® offered positive yield gains of +4.8 Bu/A. resulting in an economic gain of +$7.35/A.

Multi-Year data from 2024-2025 growing seasons (Table 1.) proves an average yield response of +6.9 Bu/A. and positive economic gain of +$15.60/A.



Planting Date: May 5th Hybrid: DKC 65-95 Population: 36K Row Width: 30" Rotation: CAC Corn Price: $4.13 Capture® LFR®: $12.47/A.

2025 PTI Results

Corn Summary of 2025 FurrowJet® Applications

Study	Classification	Yield (Bu/A.)	$ROI
Organic over GMO	Organic	-30.4	$ 138.32
Non-GMO over GMO	Non-GMO	-7.8	$ 91.57
High Management Irrigated Corn Corteva At-Plant Program	Starter Fertilizer	6.9	$ 56.94
High Management Irrigated Corn Rosen's At-Plant Program	Starter Fertilizer	8.6	$ 50.31
High Management Corn Swine Effluent 6 FurrowJet, 20 Sidedress,2 Foliar	Effluent	18.7	$ 49.23
Smart Silver In-Furrow	Starter Fertilizer	13.3	$ 45.03
Swine Effluent FurrowJet 6 Gal	Effluent	11.9	$ 43.15
High Management Dryland Corn Corteva At-Plant Program	Starter Fertilizer	8.2	$ 39.11
2.4 Gal 7-21-3 + 6oz Aqua-Yield NanoCS	Starter Fertilizer/ Biological	6.1	$ 38.12
April 15th Corn Planting Date with Starter	Starter Fertilizer	8.6	$ 37.73
High Management Corn Swine Effluent 4 FurrowJet, 20 Sidedress,2 Foliar	Effluent	15.4	$ 37.60
High Management Irrigated Corn Nachurs	Starter Fertilizer	21.9	$ 37.02
April 25th Corn Planting Date with Starter	Starter Fertilizer	8.1	$ 35.51
High Management Irrigated Corn Marco At-Plant Program	Starter Fertilizer	6.7	$ 34.95
Plasma Activated Water 8 Gal In-Furrow	Nitrogen	6.5	$ 33.90
Swine Effluent FurrowJet 4 Gal	Effluent	9	$ 33.17
High Management Corn Swine Effluent 2 FurrowJet, 20 Sidedress, 2 Foliar	Effluent	13.6	$ 32.17
High Management Irrigated Corn AgroLiquid At-Plant Program	Starter Fertilizer	14.6	$ 31.55
7-21-3 MPK	N-P-K Starter	6.8	$ 31.54
4.75 Gal 7-21-3	N-P-K Starter	6.8	$ 31.28
Plasma Activated Water 4 Gal In-Furrow	Nitrogen	5.9	$ 27.90
May 12th Corn Planting Date with Starter	Starter Fertilizer	6	$ 26.79
May 19th Corn Planting Date with Starter	Starter Fertilizer	5.8	$ 26.16
Ethos Elite	Biological/ Insecticide	8.9	$ 26.06
Rosen's Manuever FurrowJet 3-Way	Biological	9.6	$ 25.31
High Management Dryland Corn Rosen's At-Plant Program	Starter Fertilizer	7.1	$ 20.92
4.75 Gal 7-21-3 + 6oz Aqua-Yield NanoCS	Starter Fertilizer/ Biological	6.1	$ 19.72
Swine Effluent FurrowJet 2 Gal	Effluent	4.5	$ 16.59
Capture LFR	Insecticide	6.9	$ 15.60
High Management Dryland Corn Marco At-Plant Program	Starter Fertilizer	7.6	$ 15.46
AgroLiquid Dry Fertilizer Replacement	Starter Fertilizer	7.1	$ 9.57
Xyway LFR FurrowJet Wings	Fungcide	6.3	$ 8.39
VT Double PRO + Opello	Insecticide	9	$ 8.17
High Management Dryland Corn AgroLiquid At-Plant Program	Starter Fertilizer	14.4	$ 7.52
NEXTA Start	Biological	3	$ 0.83
SmartStax + Nurizma	Insecticide	3.4	$ (11.36)
Xyway LFR FurrowJet Center	Fungcide	1.3	$ (12.26)
SmartStax + Opello	Insecticide	3.8	$ (13.31)
Plasma Activated Water 12 Gal In-Furrow	Nitrogen	-6.8	$ (17.50)
Plasma Activated Water 16 Gal In-Furrow	Nitrogen	-8.1	$ (19.34)
Average		6.4	$ 27.74

2025 PTI Results

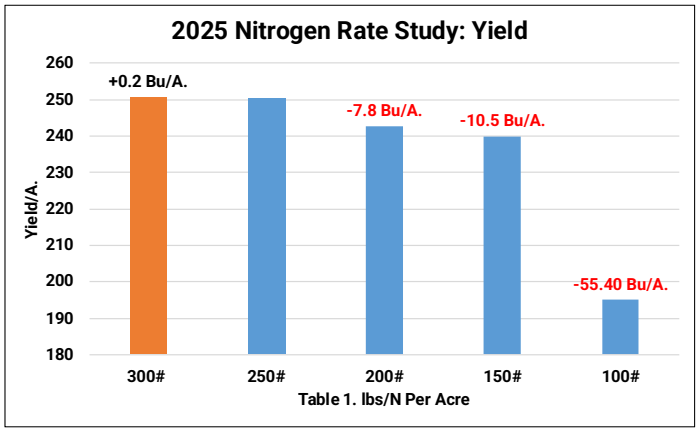
Nitrogen Rate Study

Objective: To evaluate the yield and economic impact of implementing different nitrogen rates ranging from 100#N to 300#N.

All nitrogen applications were made in a 3-way split application approach, with 25% of the total N applied as a Weed-N-Feed broadcast (Figure 1.), another 25% at-plant through dual band Conceal® (Figure 2.), and 50% at V9 side-dress (Figure 3.)

Conceal® is a unique planter attachment that allows growers to place nitrogen in a high concentration dual or single band positioned 3" away from the seed trench in depths near 1.5" (Figure 2). The Conceal® system uses existing planter space, utilizing a backswept knife located within the center of the planter's gauge wheels (Figure 1). As nitrogen is applied, it is sealed within the soil profile by the gauge wheels, preventing potential volatilization losses that are typically problematic with surface type nitrogen applications.

Results: 2025 agronomic optimum was reached when applying 300# of Nitrogen. However, 150# of nitrogen was the economic optimum. Applying 150 nitrogen may have resulted in a **-10.5 Bu/A.** loss, but had a positive return of +$14.64/A.



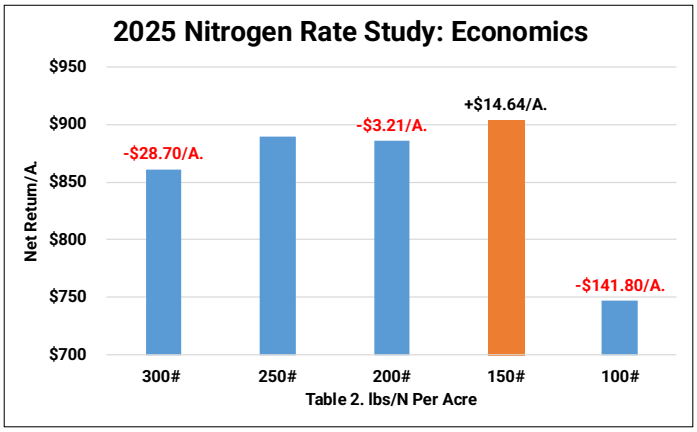


Figure 1. Weed-N-Feed Nitrogen

Figure 2. Conceal® At-Plant

Figure 3. Side-Dress Nitrogen

Planting Date: April 23th Hybrid: Wyffels 7878SS Population: 36K Row Width: 30" Rotation: CAC Corn Price: $4.13 N Price: $0.58/#

PTI ILLINOIS

2025 PTI Results

Nitrogen Placement Study

Objective: This study evaluates the performance of six different nitrogen placement programs. These six programs consist of single one and done programs, 2-way split applications, and 3-way split programs. As a baseline, the 100% Weed-N-Feed (Treatment #1) is facilitated as the control for this trial.

1. 100% Weed-N-Feed (WNF): 240# N as Surface applied 32% UAN: Control
2. 50% WNF+50% Side-Dress (SD): 120# N WNF+ 120# N V6 side-dress
3. 50% Conceal® Dual Band+50% SD: 120# N Conceal® Dual Bands + 120# N V6 SD
4. 25% Conceal®+25%WNF+50% SD: 90# N WNF + 90# N Conceal® Dual Bands + 120# SD
5. 25% Conceal®+25%WNF+50% Urea SD: 90# N WNF + 90# N Conceal® Dual Bands + 120# Urea SD
6. 25% Conceal®+25%WNF+50% NPlace: 90# N WNF + 90# N Conceal® Dual Bands + 120# SD

Single Application

Dual Split Applications

Triple Split Applications

Results:

- ✓ Triple split 25%WNF+ 25% Conceal® Dual Band+ 50% EZ Drop Side-Dress offered the largest gains of +7.8 Bu/A. with a net return of +$20.61/A over the one and done control.
- ✓ Urea side-dress offered the lowest net returns in the study, suffering **-$22.77/A.**, due to the lack of rainfall for incorporation.

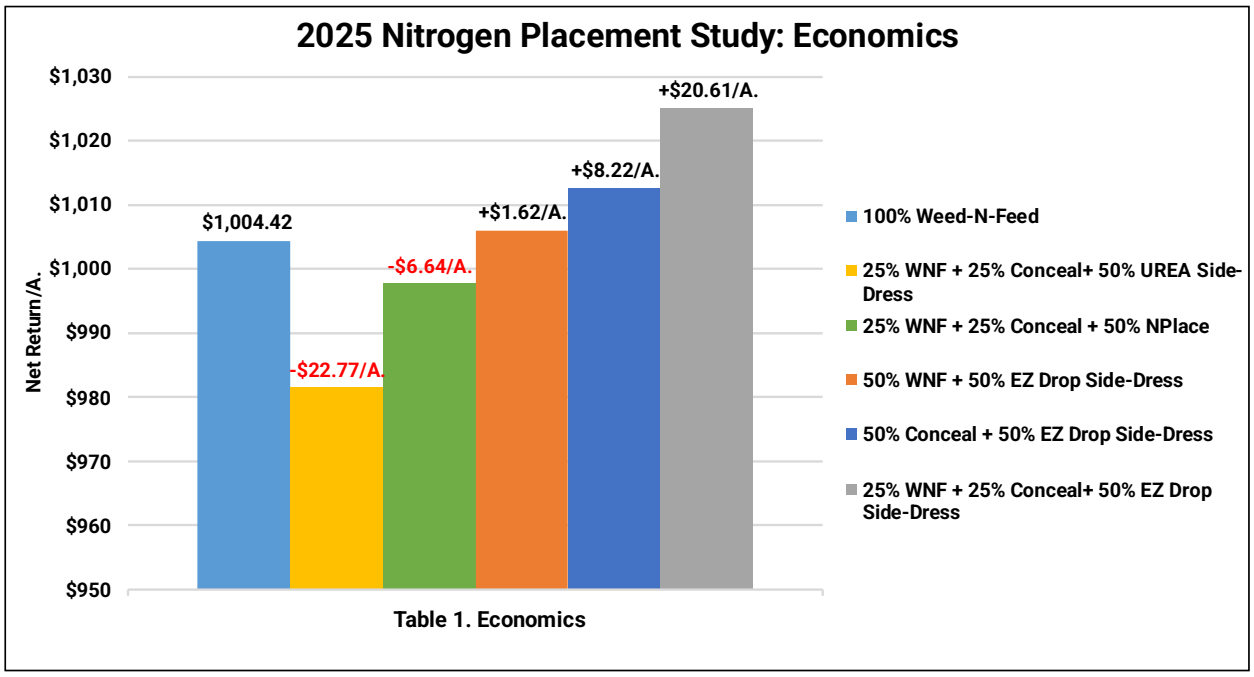


Table 1. Economics

Planting Date: April 23rd Hybrid: Wyffels 7878SS Population: 36K Row Width: 30" Rotation: CAC Corn Price: $4.13 SD:$11.60/A. Urea Stabilizer: $12/A. N Price: $0.58/#

Urea vs UAN Nitrogen Side-Dress Study

Objective: To evaluate yield and economics of 50# actual pounds of side-dressed nitrogen with dry urea (46-0-0) and liquid UAN (32-0-0).

All nitrogen applications were side-dressed with a Miller N-Place™ Max side-dress applicator (Figures 1-2).

The right side of the toolbar allows the opportunity to band urea, while the left side allows for liquid banding all in the same pass.

Urea is applied via a dry tank and blower system that accurately bands urea prills near the base of the corn plant. UAN is also applied via on-board liquid tanks, banding 32% UAN near the base of the plant.

Figures 1-2. Miller N-Place™ Max Side-Dress Toolbar

Urea vs UAN Nitrogen Side-Dress Study

Figure 3. illustrates dry urea is applied in 6” bands surrounding the corn plant. Urea on the soil surface removes concerns from leaf tissue burn with typical broadcast or top dress applications. Cover wheels (Figure 5.) then follow the urea and mix or throw soil on top of the urea to protect it from volatilization.

Volatilization is the loss of N through the conversion of ammonium to ammonia gas, which is released into the atmosphere.

Figure 4. shows the liquid drops of the N-Place toolbar that also allow for banding of the liquid 32% UAN. UAN is placed in a 6” band surrounding the corn plant in-row. Cover wheels then follow the UAN and mix or throw soil on top to protect it from volatilization.

Figure 3. Banded Urea on V6 Corn with cover boards removed for picture

Figure 5. Incorporating Cover Wheels

Figure 4. Banded Liquid UAN on V6 Corn

Urea vs UAN Nitrogen Side-Dress Study

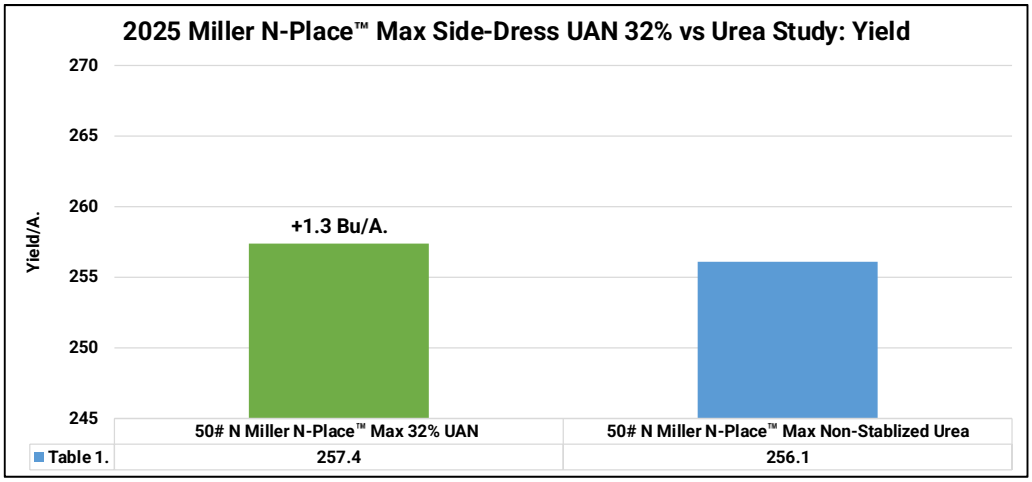
For dry urea applications, advanced flow and blockage visibility was implemented by pairing Clarity™ with the 20|20 monitoring system.

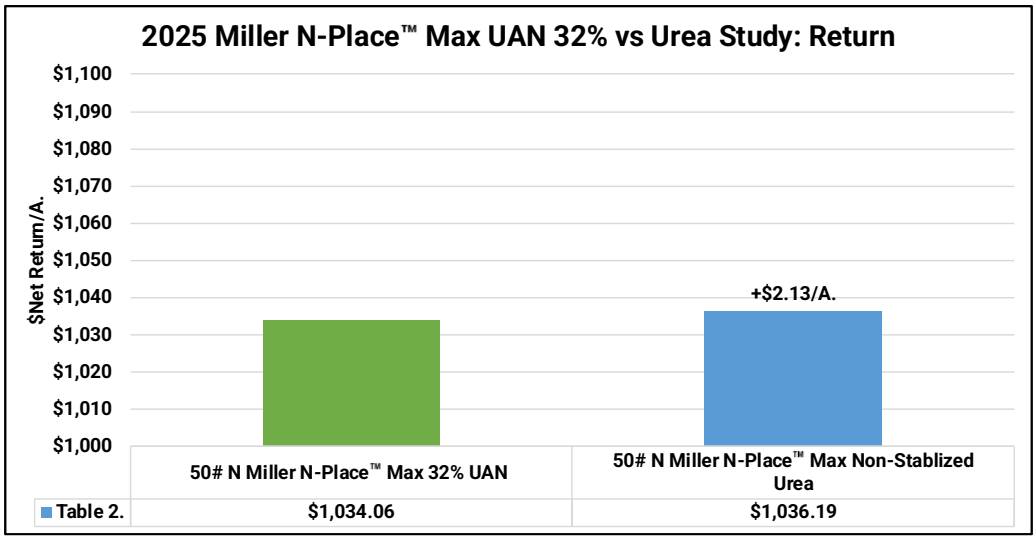
For liquid 32% applications, this bar was fitted with Pump Stack®, a liquid fertilizer hydraulic pump, paired with EMHD® and EM FlowSense™ (Figure 6.) to ensure a top-notch fertilizer application, as well as row control across the bar. EMHD® controls liquid application rates using an electromagnetic flow meter. This opens your options for a wider range of liquid products. EM FlowSense™ allows you to measure the rate of fertilizer you are applying on each row of the bar, to make you aware of any row-to-row variability that is occurring. With a Pump Stack® system, paired with EMHD®, and EM FlowSense™ you can be confident in your application rate across every row.

Figure 6. EMHD® + EM FlowSense™

Urea vs UAN Nitrogen Side-Dress Study

Results: Urea applications resulted in slightly lower yields of **-1.3 Bu/A.** However, due to urea priced at a lower cost/A., urea netted a higher return on investment of +$2.13/A. (Table 2.) This data proves urea can be an excellent source of nitrogen for corn, if it's protected from volatilization by stabilizers and/or soil incorporation. In this case, the cost of a stabilizer was not necessary, as the N-Place Max cover boards acted to move enough soil to protect urea. More work needs to be done to accurately "throw or cover" soil onto the nitrogen product, but promising results with no cost of stabilizer products, banding nitrogen to get close to root, and eliminating any concerns of burn that topdressing usually does.





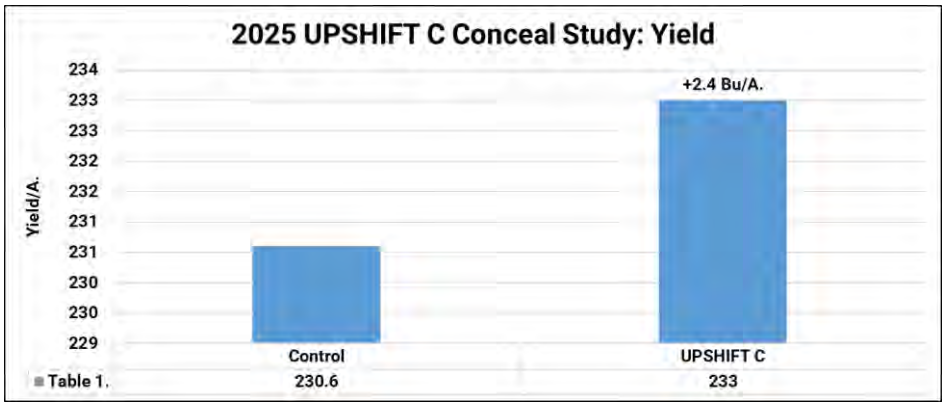
Planting Date: May 2nd Hybrid: Becks 6374V2P Population: 34K Row Width: 30" Rotation: CAB Corn Price: $4.13 UAN:$0.58/# Urea: $0.43/#

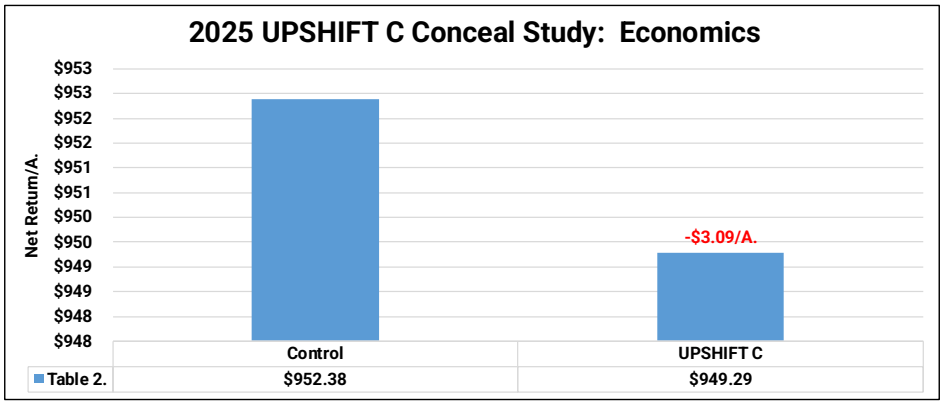
UPSHIFT® C Conceal® Study

Objective: To evaluate yield and economics of UPSHIFT® C. This product is powered by ETHER™ Enzyme Technology combining two enzymes specifically identified to increase phosphate availability, increase nutrient and water availability, boosting plant growth, while maximizing microbial activity. ETHER™ Enzyme Technology is designed to kick start the uptake of available soil nutrients and water, while maximizing microbial activity. UPSHIFT® C dissolves in water and was at-plant applied through dual band Conceal® (Figure 1).

Results: Table 1. illustrates a yield response of +2.4 Bu/A., with negative returns of **-$3.09/A.**

Figure 1. Conceal® Dual Band





Planting Date: April 28th Hybrid: DKC 66-18 Population: 36K Row Width: 30" Rotation: CAB Corn Price: $4.13 UPSHIFT® C: $13.00/A.

Unicorn Ignite Conceal® Study

Objective: To evaluate yield and economics of Interpose Ag's Unicorn Ignite fertilizer, a 10-30-30 liquid fertilizer applied in an at-plant single band Conceal® (Figure 1). application.

Interpose AG makes proprietary fertilizer blends with an approach of "pounds, not ounces" philosophy to fertilizer, which results in highly concentrated, substantial amounts of the most essential nutrients for corn and soybeans.

This study is designed to remove $40 of fall dry fertilizer as a re-allocation program and then complement Unicorn Ignite at-plant with Conceal® to add a high concentrated liquid banding as part of a relay program.

Results: Table 1. illustrates yield responses of +6.3 Bu/A. to +9.2 Bu.A. gains, with 8 Gal/A. proving agronomic optimum.

Table 2. proves economic optimum rate at 4 Gal/A. with returns of +$22.02/A.

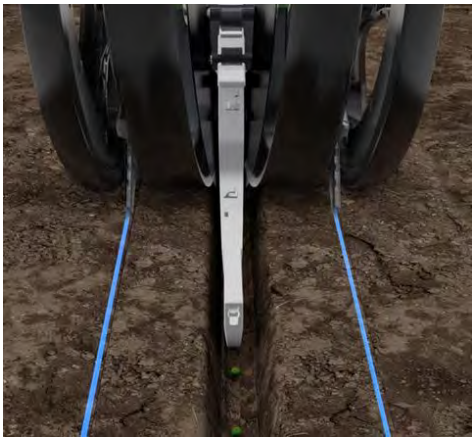
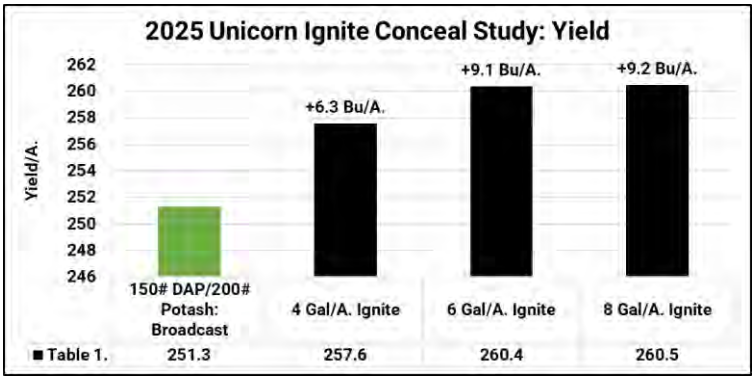
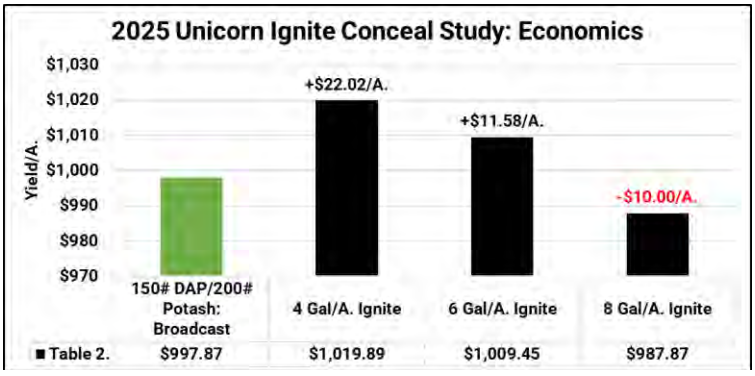


Figure 1. At-Plant Conceal®





Planting Date: April 28th Hybrid: Pioneer 1742Q Population: 36K Row Width: 30" Rotation: CAB Corn Price: $4.13 Ignite: $11/Gal DAP: $735/Ton 0-0-60: $460/Ton

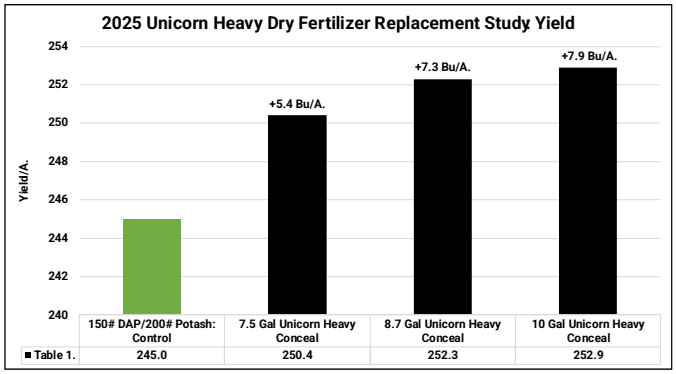
Unicorn Heavy Conceal® Study

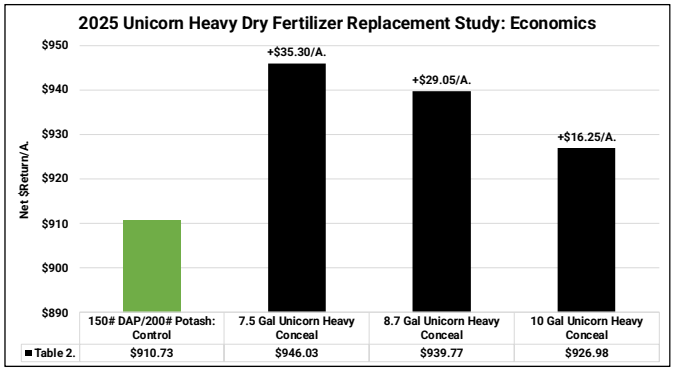
Objective: To evaluate yield and economics of Interpose Ag's Unicorn Heavy fertilizer, a 2-26-37 liquid fertilizer applied in an at-plant single band Conceal® (Figure 1.) application. This study is designed to replace a 150# 18-46-0/200# 0-0-60 Fall broadcast fertilizer program with that of 7.5, 8.7, and 10 Gal/A. of Unicorn Heavy.

Interpose AG makes proprietary fertilizer blends with an approach of "pounds, not ounces" philosophy to fertilizer, which results in highly concentrated, substantial amounts of the most essential nutrients for corn and soybeans.

Results: Table 1. illustrates all Heavy treatments resulted in positive yield responses over dry fertilizer, with gains of +5.4 to +7.9 Bu/A. gains. Table 2. summarizes all Heavy treatments also resulted in economic gains over fall dry applications, with 7.5 Gal/A. achieving economic optimum at +$35.30/A.

Figure 1. At-Plant Conceal®





Planting Date: April 28th Hybrid: Pioneer 1742Q Population: 36K Row Width: 30" Rotation: CAB Corn Price: $4.13 Heavy: $11.75/Gal DAP: $735/Ton 0-0-60: $460/Ton

AgroLiquid® Dry Fertilizer Replacement Study

Objective: To evaluate the yield and economic impact of a corn at-plant + side-dress liquid starter fertilizer program from AgroLiquid® compared to a traditional dry DAP 18-46-0 and Potash 0-0-60 Fall applied program.

This trial consisted of the following:

Treatments and Placement:

#1. Control:	200# DAP, 200# 0-0-60 Fall Broadcast Applied
#2 At-Plant Fertility:	
Conceal® Dual Band: (Figure 1.)	3 Gal/A. AccesS™
FurrowJet®: (Figure 2.)	7 Gal/A. ProGerm®
	0.5 Gal/A. Micro500™
	4 Gal/A. Kalibrate™
	0.125 Gal/A. Boron
	0.25 Gal/A. LiberateCa™
#3 Post-Plant Appplications:	
V4: SideDress:	2 Gal/A. AccesS™
	2 Gal/A. Kalibrate™
	0.125 Gal/A. Boron

Figure 1. Conceal® Placement

Figure 2. FurrowJet® Placement

AgroLiquid® Dry Fertilizer Replacement Study

Results: 100% banded AgroLiquid® fertilizer treatments resulted in +7.1 Bu/A. gains with a positive return of +$9.57/A. over the broadcast dry fertilizer control.

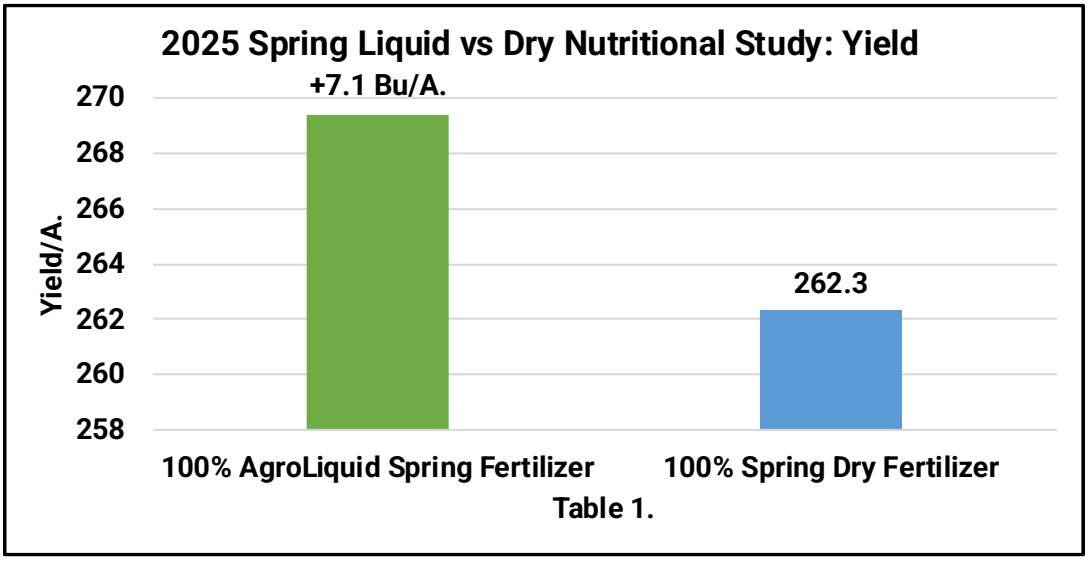


Table 1.

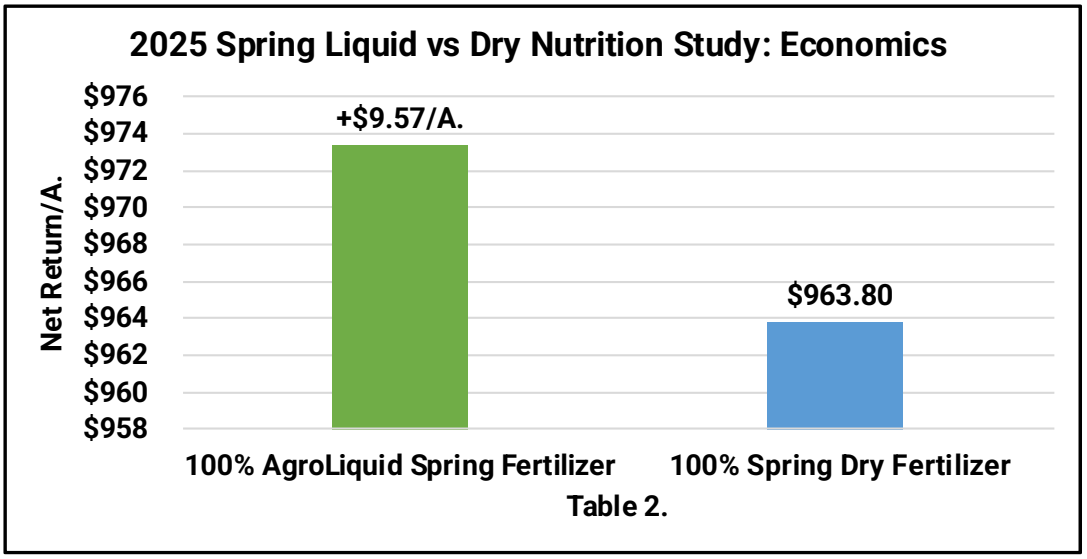


Table 2.

Planting Date: April 25th Hybrid: DKC 65-95 Population: 36K Row Width: 30" Rotation: CAB Corn Price: $4.13

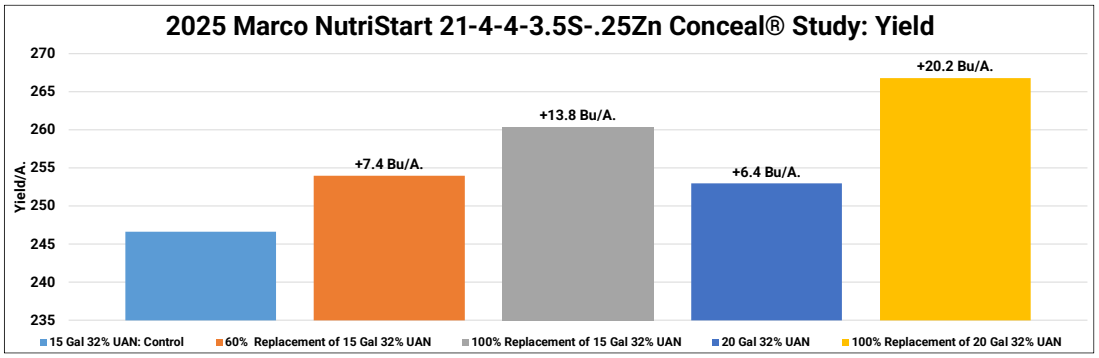
AgroLiquid® Program: $139.25/A. DAP/Potash Dry Program: $119.50/A.

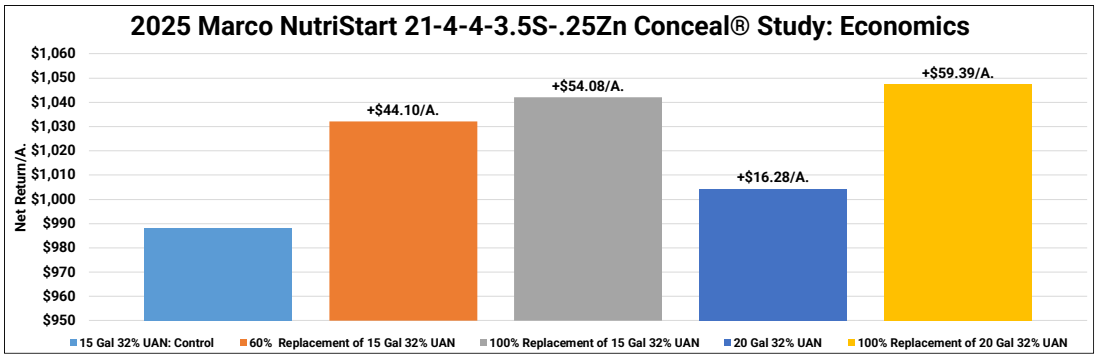
2025 PTI Results

Marco Fertilizer NutriStart Conceal® Study

Objective: This trial evaluates the yield and net return of Marco Fertilizer's NutriStart 21-4-4-3.5S-2.5Zn as a tank-mix partner or total replacement of 32% UAN applied through dual band Conceal® (Figure 1).

This trial was designed for growers who apply at-plant nitrogen with Conceal®, but do not have a second tank and pump to apply in-furrow starter fertilizers, but would like to add phosphorus, potassium, zinc, and sulfur, blended with 32% nitrogen, without the hassle of blending and compatibility issues.





Results: NutriStart 21-4-4-3.5S-.25Zn proved gains of +7.4 Bu/A. and net returns of +$44.10/A. when used as a 60% replacement.

100% replacement of 15Gal 32%, resulted in gains of +13.8 Bu/A. and +$54.08/A.

Increasing 15Gal of UAN to 20Gal on the planter, resulted in gains of +6.4 Bu/A. and +$16.28/A.

100% Replacement of 20Gal of 32%, resulted in gains of +20.2 Bu/A. and +$59.39/A., the highest of the study.

Figure 1. Conceal® Dual Placement

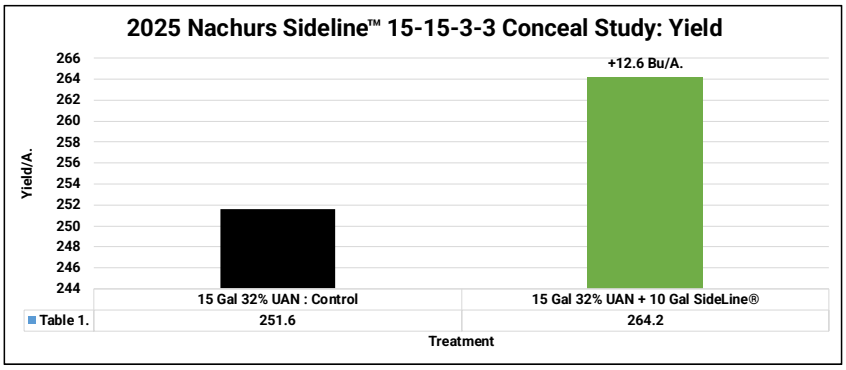
Planting Date: April 24th Hybrid: DKC 114-99 Population: 36K Row Width: 30" Rotation: CAB Corn Price: $4.13 NutriStart: $2.77/GAL Fert Re-allocation: $30

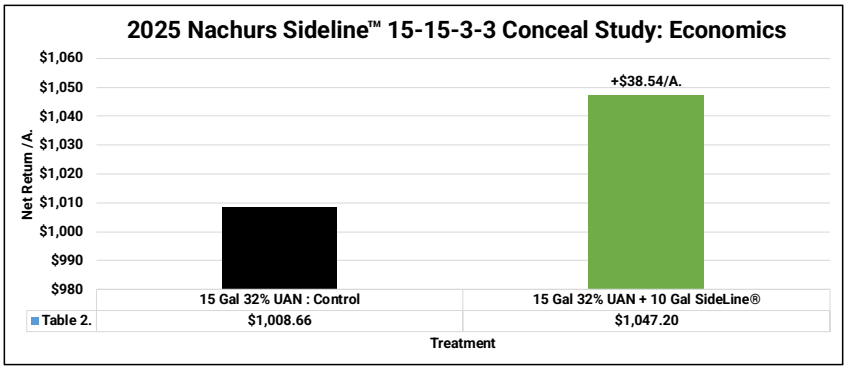
2025 PTI Results

Nachurs® Sideline™ Study

Objective: This trial evaluates the yield and net return of Nachurs® Sideline™ 15-15-3-3 as a tank-mix partner with 32% applied through dual band Conceal® (Figure 1). This trial was designed for grower's who apply at-plant nitrogen with Conceal®, but do not have a second tank and pump to apply in-furrow starter fertilizers, but would like to add phosphorus and potassium blended with 32% nitrogen, without blending and compatibility issues.

Sideline™ is formulated to deliver dual modes of action for phosphorus nutrition: orthophosphate for immediate plant availability and uptake potential, and polyphosphate for controlled release over the growing season. SideLine™ is a low salt liquid fertilizer manufactured to provide important nutrients (N,P,K,S) for maximum plant growth and development.



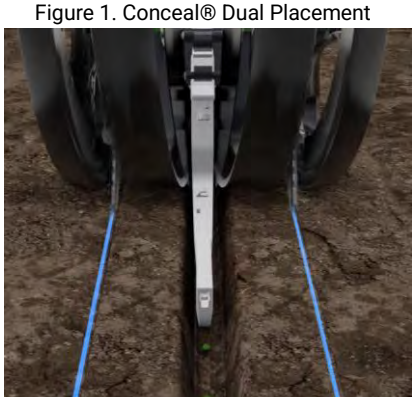


Results: Table 1. illustrates 15-15-3-3 at 10 Gal/A. tankmixed with 15 Gal/A. of 32% UAN, proved yield gains of +12.6 Bu/A.

A fertilizer re-allocation of $30 was implemented to reduce dry fertilizer from Fall spreading to allow for liquid banded applications on the planter.

Table 2. summarizes 15-15-3-3 resulted in a positive return on investment of +$38.54/A.

Figure 1. Conceal® Dual Placement

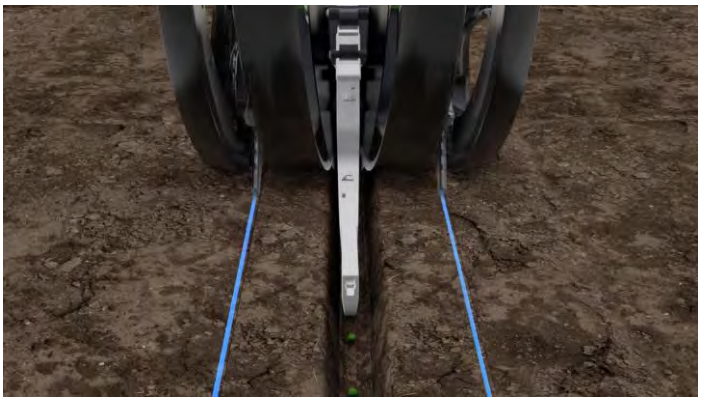


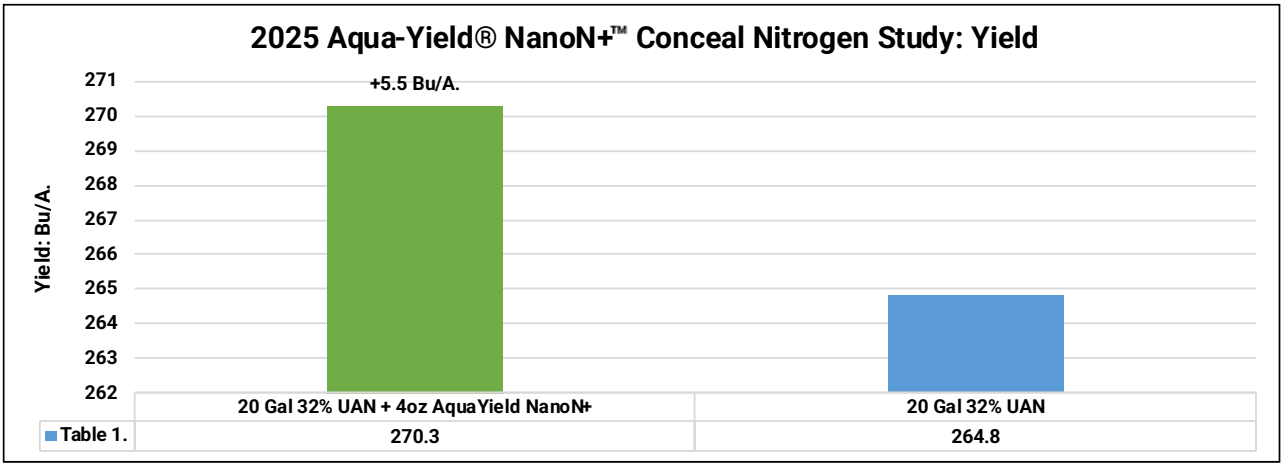
Planting Date: April 24th Hybrid: DKC 114-99 Population: 36K Row Width: 30" Rotation: CAB Corn Price: $4.13 Sideline™ 15-15-3-3: $4.35/GAL Fert Re-allocation: $30

Aqua-Yield® NanoN+™ Conceal® Nitrogen Study

Objective: To evaluate yield and economics of NanoN+™ by Aqua-Yield®. NanoN+™ uses nano liquid technology to improve nitrogen use efficiency and can be added to most liquid fertilizer blends containing nitrogen to enhance uptake. Nano liquid products effectively work as a delivery system for nutrients and protect molecules from environmental losses and deliver them to plants at the cellular level. A process called endocytosis brings the nano liquid particles into the cell where the payload is delivered. This trial aims to establish the efficiency of Aqua-Yield's NanoN+™ nano-liquid based fertility product in tandem with 32% UAN nitrogen fertilizer. NanoN+™ was applied at planting in a dual band Conceal® application (Figure 1).

Figure 1. Conceal® Placement





AQUA-YIELD®

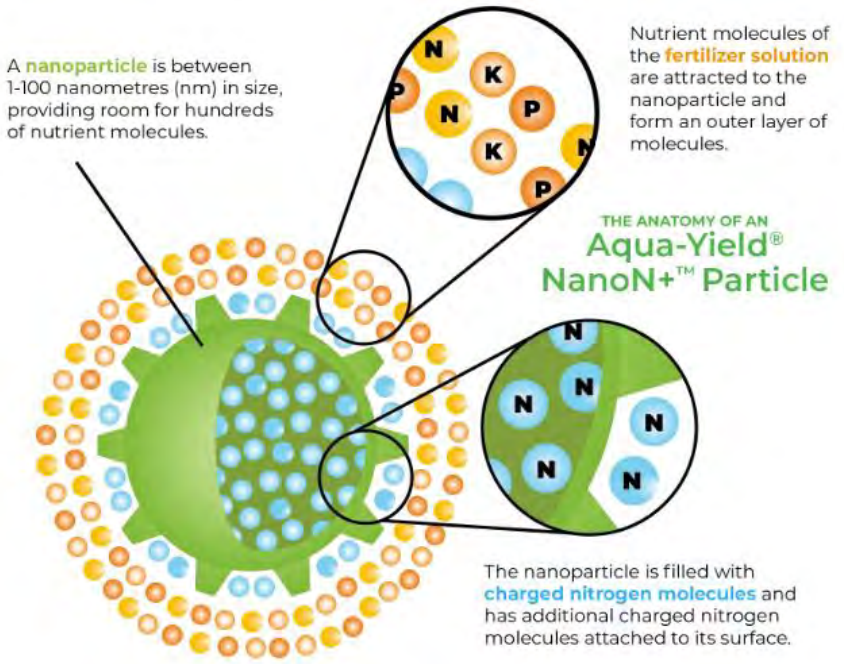
NanoN+™

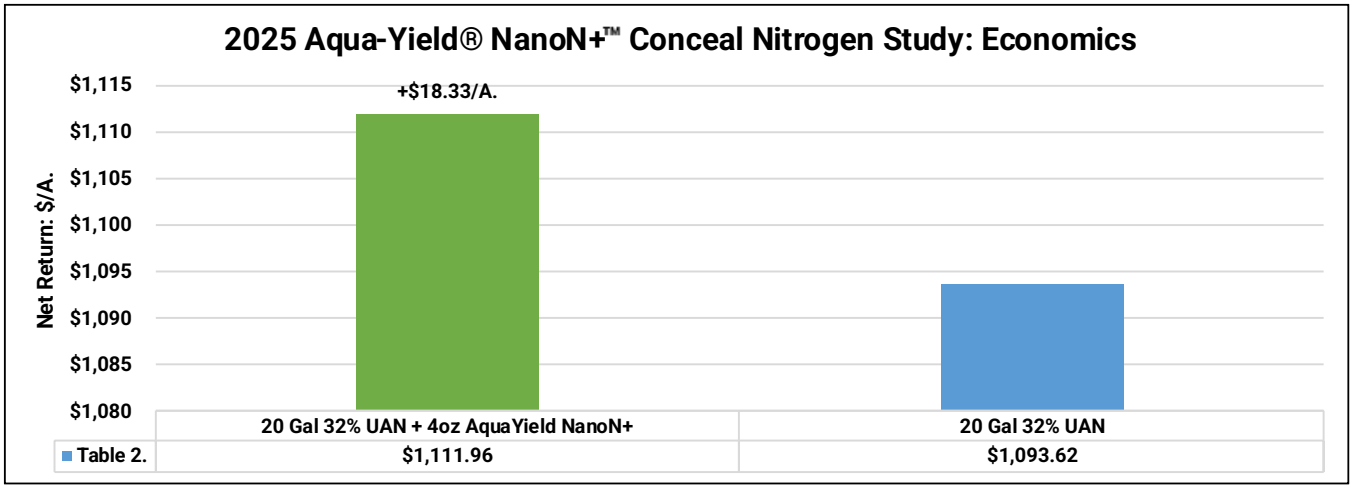
Aqua-Yield® NanoN+™ Conceal® Nitrogen Study

Results: Table 1. illustrates Aqua-Yield's NanoN+™ tank-mixed with 20 Gal/A. of 32% UAN resulted in +5.5 Bu/A. yield improvement over the control.

Table 2. illustrates the overall economics of the fertility study where NanoN+™ resulted in positive economic gains of +$18.33/A.

2022-2025 multi-year data has averaged positive yield gains of +6.2 Bu/A. with economic returns of +$25.00/A.



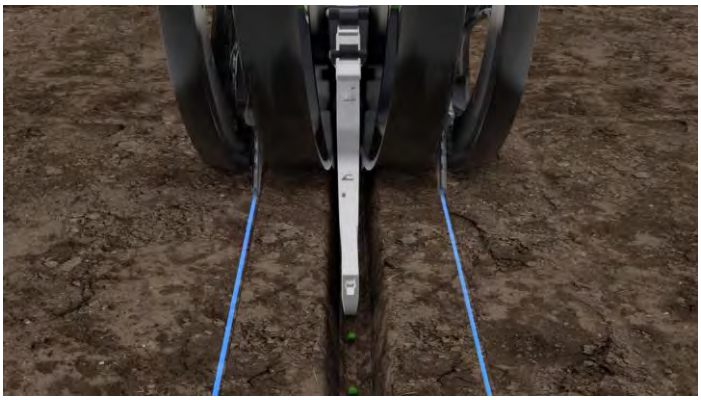


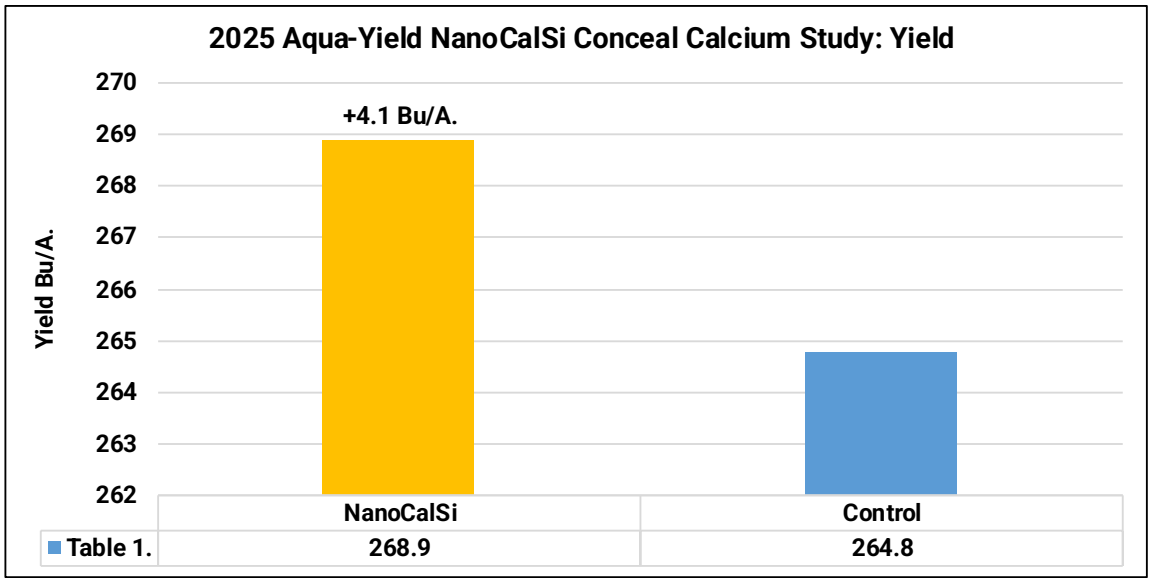
Planting Date: April 28th Hybrid: Wyffels 7878SS Population: 36K Row Width: 30" Rotation: CAC Corn Price: $4.13 NanoN+™: $4.38/A.

Aqua-Yield® NanoCalSi® Calcium Study

Objective: To evaluate yield and economics of NanoCalsi® by Aqua-Yield®. NanoCalSi® provides a highly plant available form of calcium to support healthy plant growth with the help of Nanoliquid™ technology. NanoCalSi® makes a delivery of calcium possible when selective plant uptake restricts calcium absorption. It encapsulates the inputs into tiny nanoparticles that glide through foliar and root barriers, lodging themselves in the right locations within a plant to deliver their payloads. Effectively works as a delivery system for nutrients and crop protection products, the particle protects molecules from environmental losses and efficiently delivers them to plants at the cellular level. NanoCalSi® was applied at-plant via dual band Conceal® (Figure 1.)

Figure 1. Conceal® Placement





AQUA-YIELD®

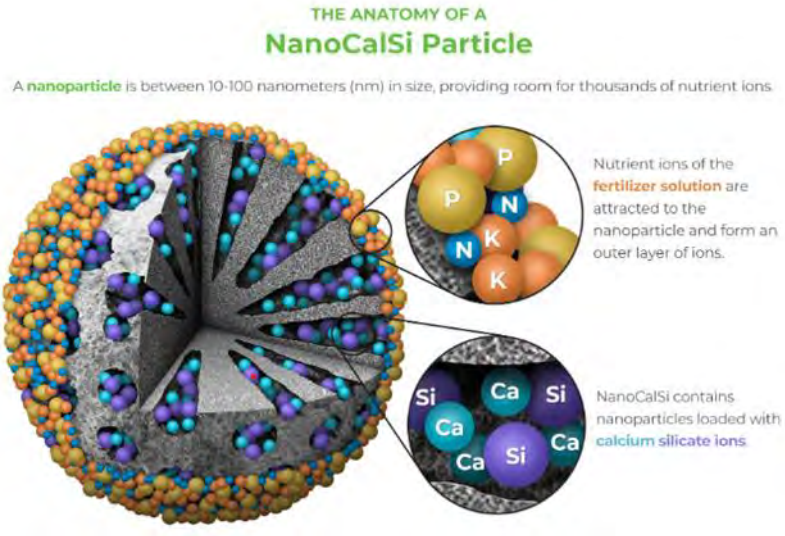
NanoCalSi®

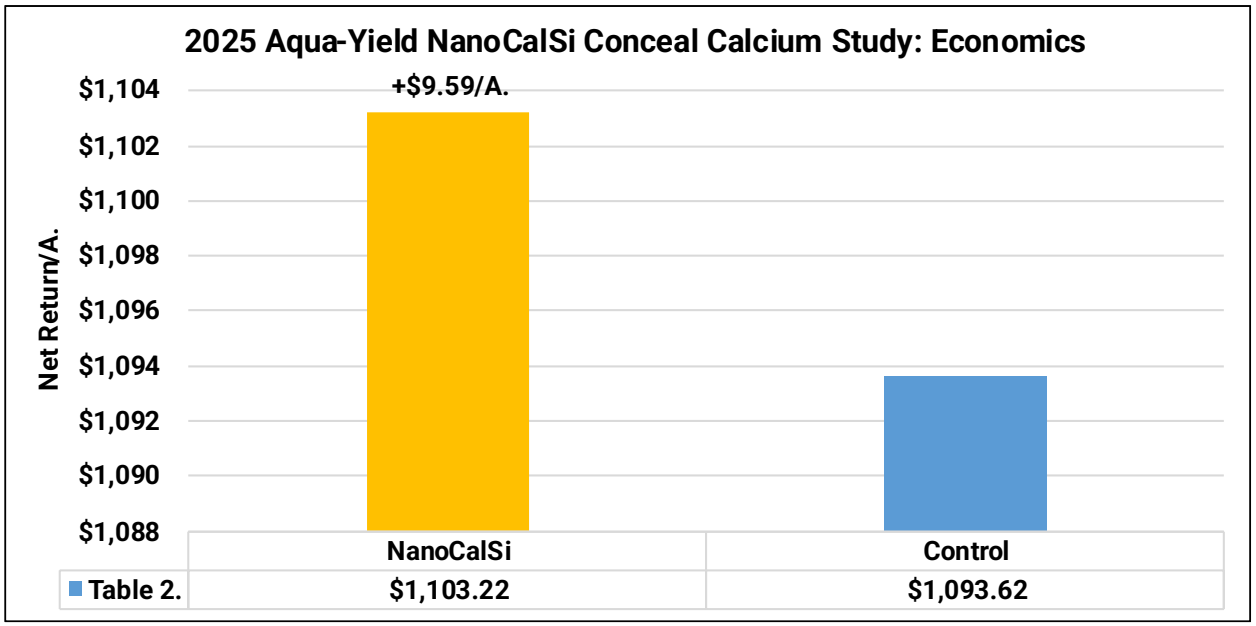
2025 PTI Results

Aqua-Yield® NanoCalSi® Conceal® Calcium Study

Results: Table 1. illustrates applying NanoCalSi® resulted in yield advantages of +4.1 Bu/A.

Table 2. shows the overall economics of the fertility study where NanoCalSi® resulted in a positive economic gain to the tune of +$9.59/A. better than the control. 2025 was our first year of testing NanoCalSi® and we look forward to testing this in the future.





Planting Date May 5th *Hybrid: Wyffels 7878SS* *Population: 36K* *Row Width: 30"* *Rotation: CAC* *Corn Price: $4.13* *NanoCalSi®: $7.34/A.*

2025 PTI Results

Xyway® LFR® Conceal® Study

Objective: To evaluate the yield and economic return of Xyway® LFR®, a fungicide with the active ingredient Flutriafol (Figure 1). Xyway® LFR® fungicide is promoted as a revolutionary at-plant fungicide formulation that provides season-long disease protection from the inside out, root, stalk, and leaf.

Figure 1.

EPA Reg. No. 279-9638	EPA Est. No. 279-DE-001
Active Ingredient:	**By Wt.**
Flutriafol	26.4%
Other Ingredients:	73.6%
TOTAL:	**100.0%**

Contains 2.5 pounds per gallon of the active ingredient flutriafol. Suspension Concentrate.

A Conceal® system is a unique planter attachment that allows growers to place product in a high concentration dual or single band positioned 3" away from the seed trench (Figure 3.) in depths near 1.5". The Conceal® system uses existing planter space, utilizing a backswept knife located within the center of the planter's gauge wheels. As product is applied, it is sealed within the soil profile by the gauge wheels.

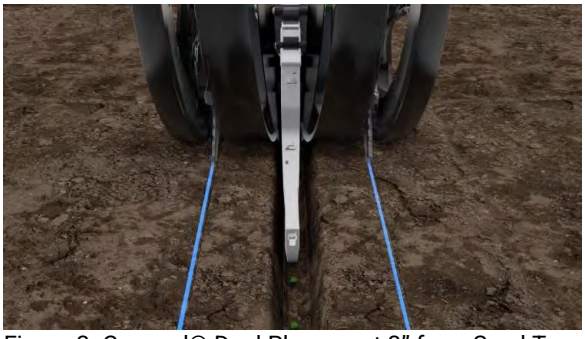
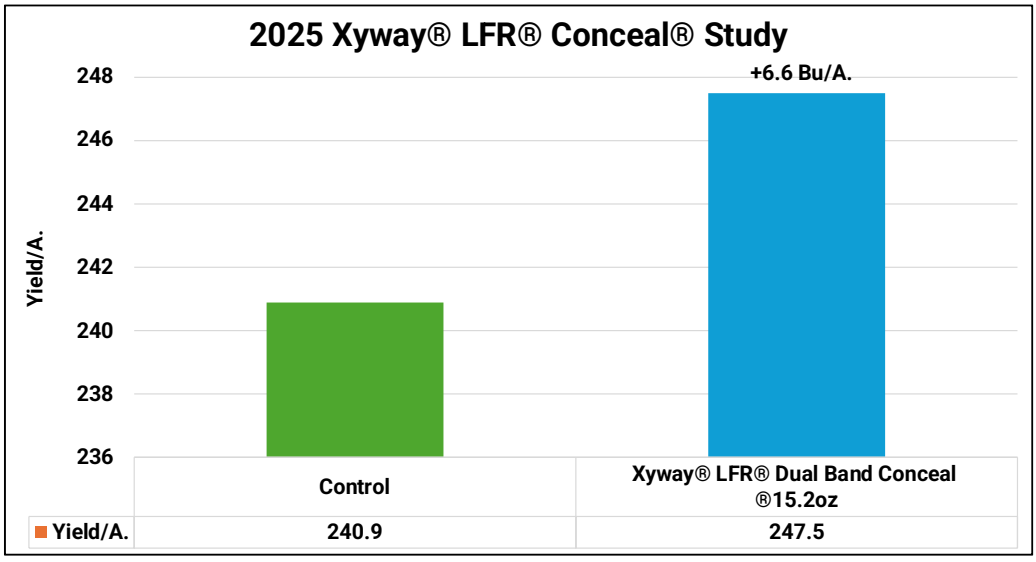


Figure 3. Conceal® Dual Placement 3" from Seed Trench

Results:

Xyway® LFR ® applied through Conceal® resulted in a yield gain of +6.6 Bu/A. and a positive net return of +$9.63/A.



Planting Date: May 12th Hybrid: DKC 65-95 Population: 36K Row Width: 30" Rotation: CAC Corn Price: $4.13 Xyway® LFR®: $17.63/A.

Xyway® LFR® Nano-N+® Conceal® Study

Objective: To evaluate the yield and economic return of Xyway® LFR®, a fungicide with the active ingredient Flutriafol. Xyway® LFR® fungicide is promoted as a revolutionary at-plant fungicide formulation that provides season-long disease protection from the inside out, root, stalk, and leaf.

XYWAY™ LFR® FUNGICIDE

EPA Reg. No. 279-9638 EPA Est. No. 279-DE-001

Active Ingredient:	By Wt.
Flutriafol	26.4%
Other Ingredients:	73.6%
TOTAL:	100.0%

Contains 2.5 pounds per gallon of the active ingredient flutriafol. Suspension Concentrate.

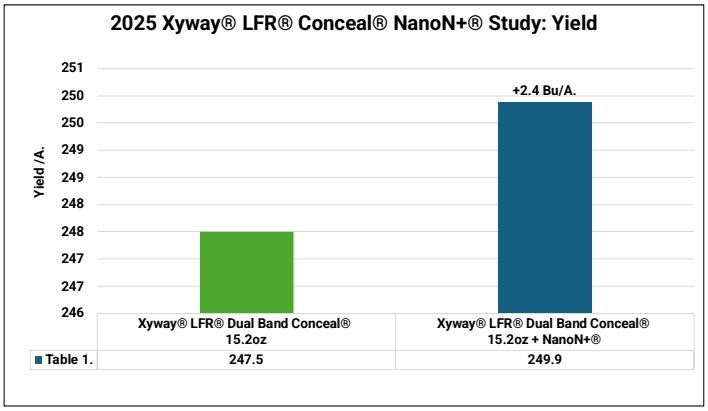
A Conceal® system is a unique planter attachment that allows growers to place product in a high concentration dual or single band positioned 3" away from the seed trench (Figure 3.) in depths near 1.5". The Conceal® system uses existing planter space, utilizing a backswept knife located within the center of the planter's gauge wheels. As product is applied, it is sealed within the soil profile by the gauge wheels.

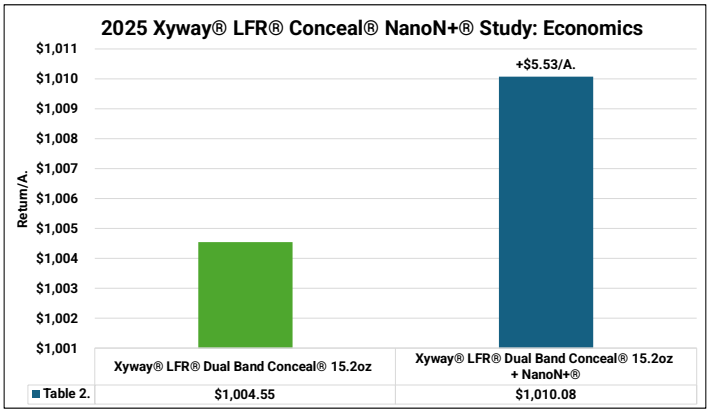
Figure 3. Conceal® Dual Placement 3" from Seed Trench

Results: NanoN+ paired with Xyway® LFR® resulted in a positive yield gain of +2.4 Bu/A. with net return of +$5.53/A.

FMC An Agricultural Sciences Company

NanoN+®





Planting Date: May 12th Hybrid: DKC 65-95 Population: 36K Row Width: 30" Rotation: CAC Corn Price: $4.13 NanoN+®: $4.38/4oz.

2025 PTI Results

Corn 2025 Summary of Conceal® Applications

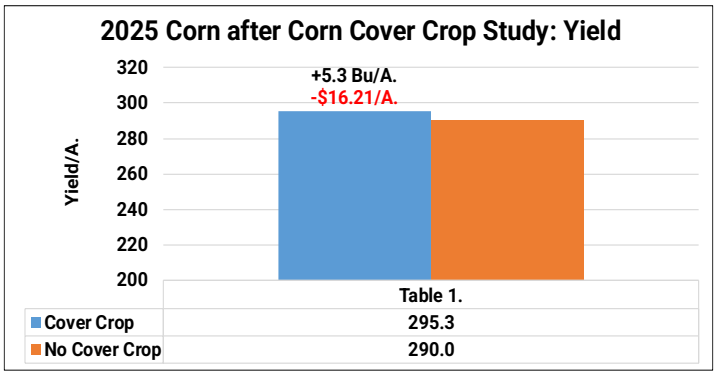
Study	Classification	Yield (Bu/A.)	$ROI
Organic over GMO	Organic	-30.4	$ 138.32
Non-GMO over GMO	Non-GMO	-7.8	$ 91.57
Marco Nutristart 21-4-4-3.5S-.25Zn - 100% replacement of 20 Gal 32%	N-P-K-S-Zn Starter Fertilizer	20.2	$ 59.39
High Management Irrigated Corn Corteva At-Plant Program	Starter Fertilizer	6.9	$ 56.94
Marco Nutristart 21-4-4-3.5S-.25Zn - 100% replacement of 15 Gal 32%	N-P-K-S-Zn Starter Fertilizer	13.8	$ 54.08
Marco Nutristart 21-4-4-3.5S-.25Zn - 60% replacement of 15 Gal 32%	N-P-K-S-Zn Starter Fertilizer	7.4	$ 44.10
High Management Dryland Corn Corteva At-Plant Program	Starter Fertilizer	8.2	$ 39.11
SideLine 10 Gal	N-P-K-S Starter Fertilizer	12.6	$ 38.54
High Management Irrigated Corn Nachurs	Starter Fertilizer	21.9	$ 37.02
7.5 Gal Unicorn Heavy	Dry Fertilizer Replacement	5.4	$ 35.30
High Management Irrigated Corn AgroLiquid At-Plant Program	Starter Fertilizer	14.6	$ 31.55
8.7 Gal Unicorn Heavy	Dry Fertilizer Replacement	7.3	$ 29.05
4 Gal Unicorn Ignite	Starter Fertilizer	6.3	$ 22.02
Nano N+	Nitrogen Efficiency	5.5	$ 18.33
10 Gal Unicorn Heavy	Dry Fertilizer Replacement	7.9	$ 16.25
6 Gal Unicorn Ignite	Starter Fertilizer	9.1	$ 11.58
Xyway Conceal	Fungicide	6.6	$ 9.63
NanoCalSi	Calcium Silica	4.1	$ 9.59
AgroLiquid Dry Fertilizer Replacement	Dry Fertilizer Replacement	7.1	$ 9.57
190# N + ReDOX N Conceal	Biological/ Nitrogen	-2.1	$ 8.23
High Management Dryland Corn AgroLiquid At-Plant Program	Starter Fertilizer	14.4	$ 7.52
Xyway+NanoN Conceal	Fungicide/ Nitrogen Efficiency	2.4	$ 5.53
Nematode Corn Rootworm	Biological Inoculation	5.7	$ 3.54
NEXTA Start	Biological	3	$ 0.83
UPSHIFT C	Enzyme/ Biological	2.4	$ (3.09)
8 Gal Unicorn Ignite	Starter Fertilizer	9.2	$ (10.00)
240# N + ReDOX N Conceal	Biological/ Nitrogen	-0.3	$ (13.34)
Average		6.0	$ 27.82

2025 PTI Results

Continuous Corn Cover Crop Study

Objective: This trial is designed to evaluate the yield and economic benefits of a cover crop system in a continuous corn rotation. To evaluate long-term benefits, this trial has been designed as a 10-year study. 40#/A. of a 60/40 blend of barley and oat/radish was planted in the fall of 2024 and fall strip-till was used as the primary tillage system for corn. In the spring, corn was planted directly on the fall strips into the green cover crop. In the past the cover crop has been terminated at 6" in overall height.

Results: Continuous corn planted into our 5th year of our 10-yr study proved +5.3 Bu/A. yield gains (Table 1.) compared to a non-cover crop system. These gains resulted in an economic gain of **-$16.21/A.** after the price of the seed, and application cost.



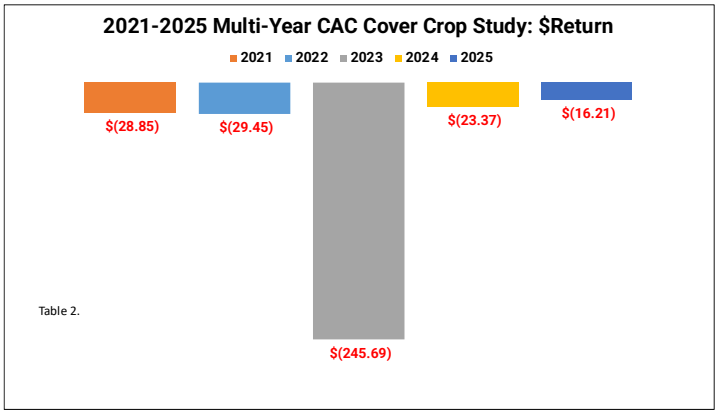


Figure 1. Fall Cover Crop Seeding

Figure 2. Continuous Corn in Cover Crop

Table 2. illustrates 5-yr data of cover crops in the same continuous corn rotation. Over 2021-2025, the PTI Farm experienced a **-6.3 Bu/A.** yield deficit with economic losses of **-$68.71/A.**

We look forward to continuing testing the use of cover crops to evaluate yield and economics of the system, while taking a close look at what cover crops can offer regarding soil health improvement. Being in our 5th year, we are hopeful yield, cash flow, and soil health will improve soon.

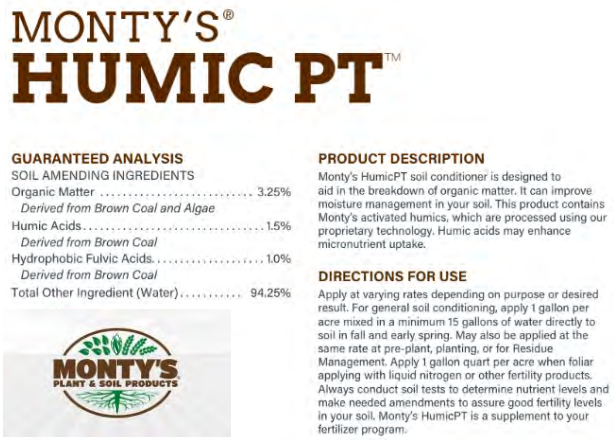
Planting Date: April 15th Hybrid: DCK 68-35 Population: 36K Row Width: 30" Rotation: CAC Corn Price: $4.13 Seed: $38.10 inc.$8 Drill Tillage: Strip-Till

PTI ILLINOIS

Corn After Corn Soil Health Study

Objective: Since the inception of cover crops at PTI, it has been difficult to show yield and profitability advantages. This study is designed to evaluate other practices that could increase soil health while establishing faster yield and profitability improvements.

The following products have been added as soil health products as a part of this 10-yr cover crop study (currently yr 5):


MONTY'S®
HUMIC PT™

GUARANTEED ANALYSIS
SOIL AMENDING INGREDIENTS
Organic Matter 3.25%
Derived from Brown Coal and Algae
Humic Acids 1.5%
Derived from Brown Coal
Hydrophobic Fulvic Acids 1.0%
Derived from Brown Coal
Total Other Ingredient (Water) 94.25%

MONTY'S PLANT & SOIL PRODUCTS

PRODUCT DESCRIPTION
Monty's HumicPT soil conditioner is designed to aid in the breakdown of organic matter. It can improve moisture management in your soil. This product contains Monty's activated humics, which are processed using our proprietary technology. Humic acids may enhance micronutrient uptake.

DIRECTIONS FOR USE
Apply at varying rates depending on purpose or desired result. For general soil conditioning, apply 1 gallon per acre mixed in a minimum 15 gallons of water directly to soil in fall and early spring. May also be applied at the same rate at pre-plant, planting, or for Residue Management. Apply 1 gallon quart per acre when foliar applying with liquid nitrogen or other fertility products. Always conduct soil tests to determine nutrient levels and make needed amendments to assure good fertility levels in your soil. Monty's HumicPT is a supplement to your fertilizer program.

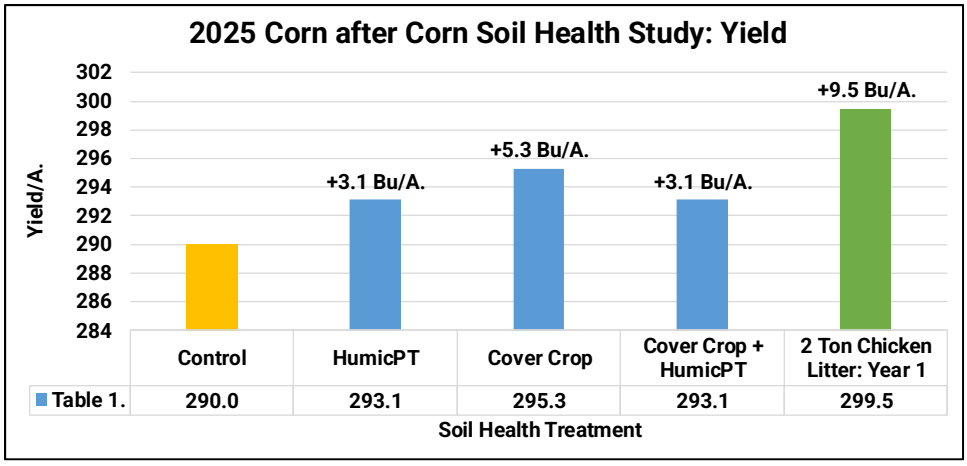
HumicPT™ a soil conditioner applied at-plant via dual band Conceal®, is designed to aid in the breakdown of organic matter. It can improve moisture management in the soil. This product contains Monty's activated humics, which are processed using their proprietary technology.

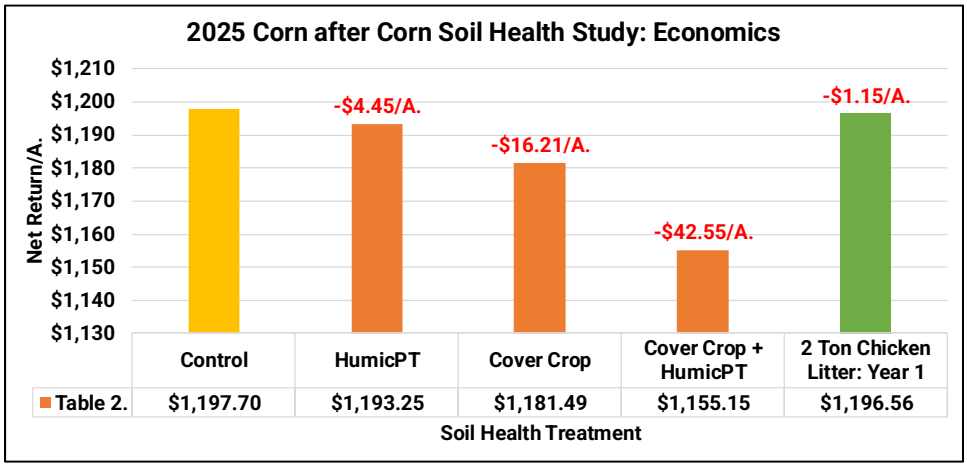
Chicken litter was also added as a soil health treatment. Nutrient rich chicken litter was applied (Figure 1.) at 2 ton/A. before strip-tilling. Chicken litter is an excellent source as a natural fertilizer with vital nutrients (N, P, K micronutrients), and organic matter to improve structure, water retention, and microbial life.

Corn After Corn Soil Health Study

Results:

- ✓ After 5 years of continuous cover crop, we did realize yield gains of 5.3 Bu/A., but failed to prove profitability with losses of **-$16.21/A.**
- ✓ Adding HumicPT as a first-year amendment proved yield gains of +3.1 Bu/A., however incurred economic losses of **-$4.45/A.**
- ✓ Tag teaming HumicPT along with the 5th yr cover crops resulted in minimal yield gains of +3.1 Bu/A. and losses of **-$42.55/A.**
- ✓ First year applications of 2 ton/A. chicken litter nearly reached 300 Bu/A., the highest yield of all treatments. Due to the high cost of litter and logistics proved **-$1.15/A.** losses. It will be interesting over time to see how litter will affect yield, soil health, and profitability.





Planting Date: April 15th Hybrid: DKC 66-06TRE Pop: 36K Row Width: 30" Rotation: CAC Corn Price: $4.13 Litter: $65/Ton Seed: $38.10 inc. $8 drill cost HumicPT: $17.25/A.

2025 PTI Results

Corn after Soybean Cover Crop Study

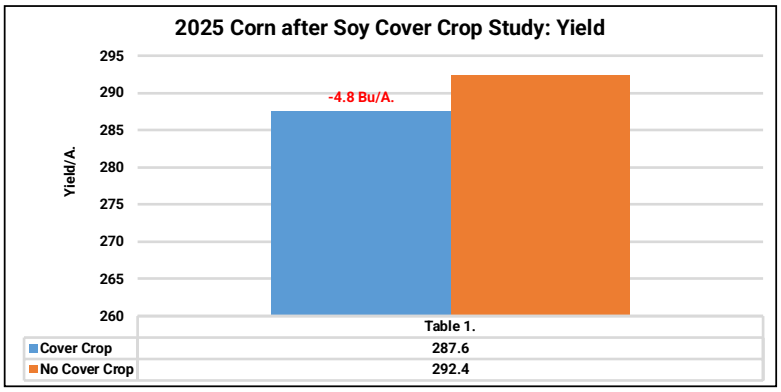
Objective: This trial is designed to evaluate the yield and economic benefits of a cover crop system in a corn/soybean rotation. To evaluate long-term benefits, this trial has been designed as a 10-year study. An 60/40 blend of barley and radish/oat was planted in the fall of 2024 and fall strip-till was used as the primary tillage system for corn. In the spring, corn was planted directly on the fall strips into the green cover crop. In the past the cover crop has been terminated at 6" in overall height.

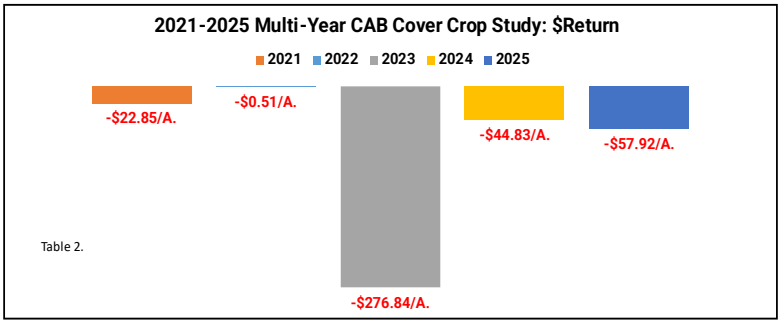
Results: Table 1. illustrates cover crops proved yield losses of **-4.8 Bu/A.** Unfortunately, cover crops have been a true testament to consistency with 5 straight years of economic losses.

Table 2. summarizes multi-year data from 2021-2025, revealing net economic losses annually ranging from as minimal as **-$0.51/A.** to as high as **-$276.84/A.** Over the 5-year time span, cover crops have averaged losses of **-$80.59/A.**

We look forward to continuing evaluating the use of cover crops in corn/soybean rotation over the remaining 5 years of this 10-year study. Our hopes are that the yield and economics of the cover crop system begin to improve, as the system has had 5 years to start the transformation of overall healthier soils, less erosion, soil structure and increased soil biology.

Figure 1. Planting into Strip-Till with Green Cover



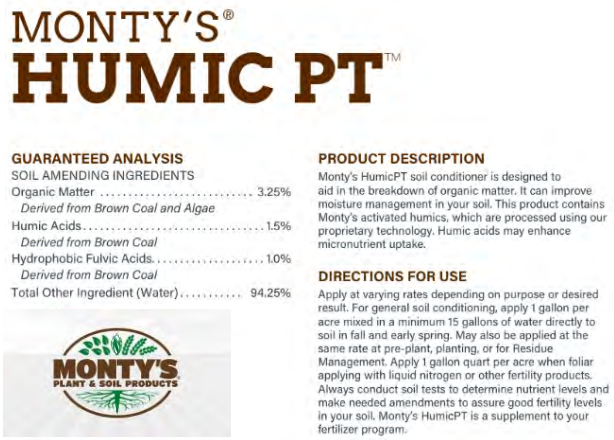


Planting Date: April 18th *Hybrid: DKC 68-35* *Population: 36K* *Row Width: 30"* *Rotation: CAB* *Corn Price: $4.13* *Seed: $38.10 inc. $8 drill cost*

Corn After Soybean Soil Health Study

Objective: Since the inception of cover crops at PTI, it has been difficult to show yield and profitability advantages. This study is designed to evaluate other practices that could increase soil health while establishing faster yield and profitability improvements.

The following products have been added as soil health products as a part of this 10-yr cover crop study (currently yr 5):


MONTY'S®
HUMIC PT™

GUARANTEED ANALYSIS
SOIL AMENDING INGREDIENTS
Organic Matter 3.25%
Derived from Brown Coal and Algae
Humic Acids 1.5%
Derived from Brown Coal
Hydrophobic Fulvic Acids 1.0%
Derived from Brown Coal
Total Other Ingredient (Water) 94.25%

MONTY'S PLANT & SOIL PRODUCTS

PRODUCT DESCRIPTION
Monty's HumicPT soil conditioner is designed to aid in the breakdown of organic matter. It can improve moisture management in your soil. This product contains Monty's activated humics, which are processed using our proprietary technology. Humic acids may enhance micronutrient uptake.

DIRECTIONS FOR USE
Apply at varying rates depending on purpose or desired result. For general soil conditioning, apply 1 gallon per acre mixed in a minimum 15 gallons of water directly to soil in fall and early spring. May also be applied at the same rate at pre-plant, planting, or for Residue Management. Apply 1 gallon quart per acre when foliar applying with liquid nitrogen or other fertility products. Always conduct soil tests to determine nutrient levels and make needed amendments to assure good fertility levels in your soil. Monty's HumicPT is a supplement to your fertilizer program.

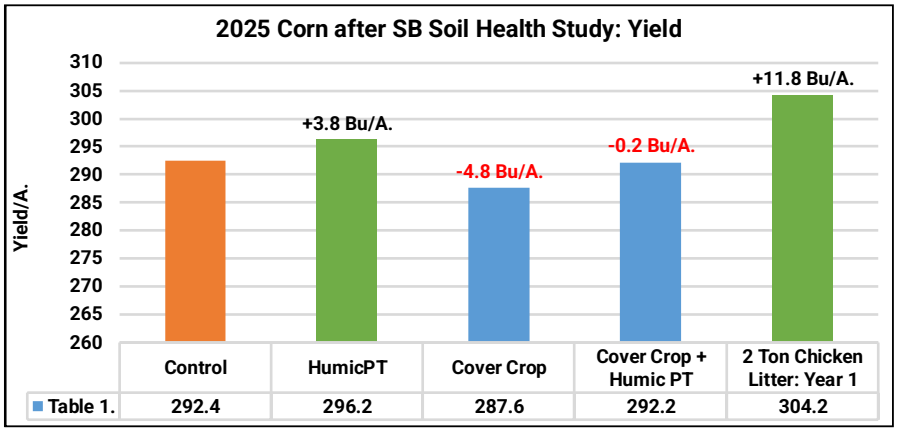
HumicPT™ ,a soil conditioner applied at-plant via dual band Conceal®, is designed to aid in the breakdown of organic matter. It can improve moisture management in the soil. This product contains Monty's activated humics, which are processed using their proprietary technology.

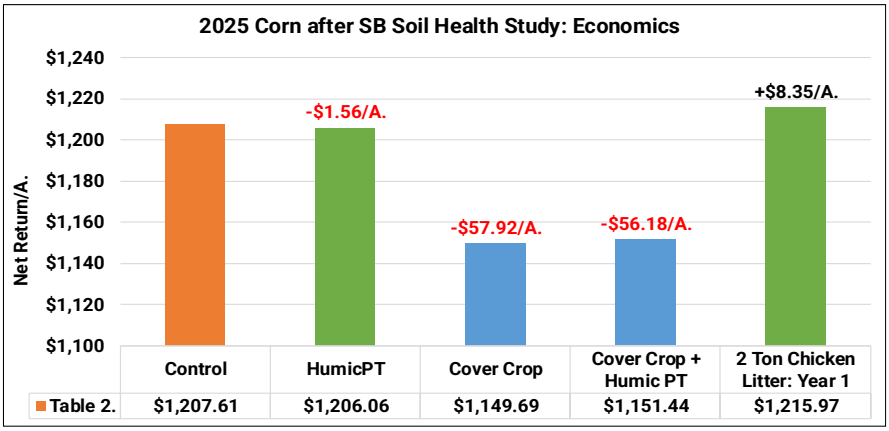
Chicken litter was also added as a soil health treatment. Nutrient rich chicken litter was applied (Figure 1.) at 2 ton/A. before strip-tilling. Chicken litter is an excellent natural fertilizer source with vital nutrients (N, P, K micronutrients), and organic matter to improve structure, water retention, and microbial life.

Corn After Soybean Soil Health Study

Results:

- ✓ After 5 years of continuous cover crop, yields fell to **-4.8 Bu/A.**, and proved net losses of **-$57.92/A.**
- ✓ Adding HumicPT as a first-year amendment proved yield gains of +3.8 Bu/A., and with net gains of +$1.56/A.
- ✓ Tag teaming HumicPT along with the 5th year cover crops resulted in minimal yield loss of **-0.2 Bu/A.** and **-$56.18/A.**
- ✓ First year applications of 2 ton/A. chicken litter tipped the scale to 304.2 Bu/A., the highest yield of all treatments. In this study, chicken litter proved to be the only profitable treatment at +$8.35/A. It will be interesting over time to see how litter will affect yield, soil health, and profitability in the remaining 5 years of this 10-year study.





Planting Date: April 15th Hybrid: DKC 66-06TRE Pop: 36K Row Width: 30" Rotation: CAB Corn Price: $4.13 Litter: $65/Ton Seed: $38.10 inc. $8 drill cost HumicPT: $17.25/A.

Green Lightning Plasma Activated Water Nitrogen Foliar Study

Objective: To evaluate yield, net return, of Green Lightning plasma activated water as a foliar application to corn.

Green Lightning is a mechanism to replicate a naturally occurring process that leads to nitrogen. During a lightning storm, static electricity rearranges the nitrogen molecule in the air, and this modified molecule is contained within the rain. Green Lightning devices create lightning in a controlled environment under the same premise. Air and water are sent into a static electric field for the nitrogen molecule to go through a rearrangement process that allows attachment of the water present, flowing through the machine, and deposits an end product as NO2 (nitrite) and NO3 (nitrate).

A six head system called the THUNDER 365, produces nitrogen for 550 acres of corn annually. This system is designed for use by a farmer, in his/her own tool-shed, to make nitrogen by using only a 110v power, grounding rods, and a water supply.

This study compares the use of Green Lightning nitrogen as a 20 Gal/A. post foliar application at growth stage V6.

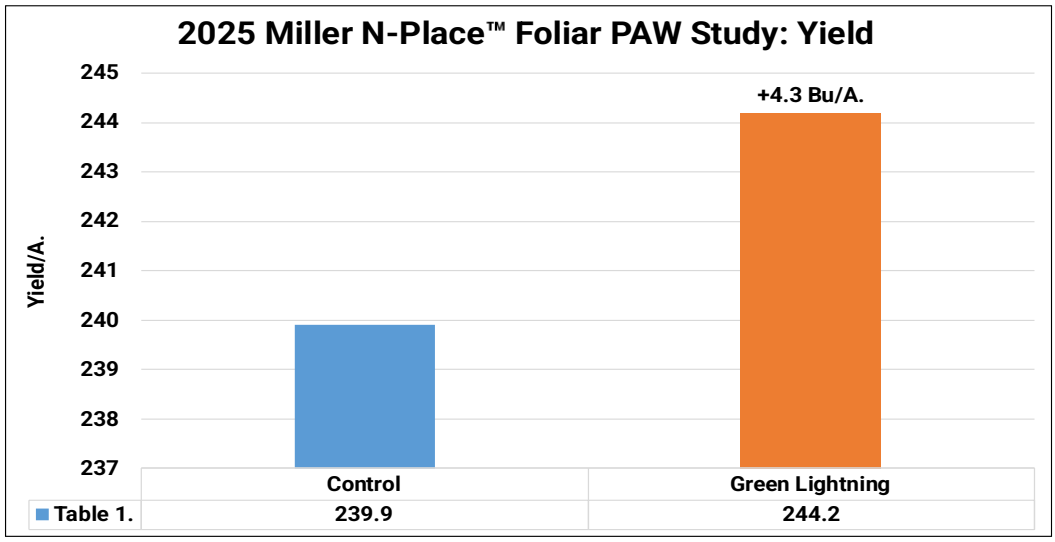
All nitrogen foliar applications were side-dressed with a Miller N-Place™ Max side-dress applicator (Figure 1).

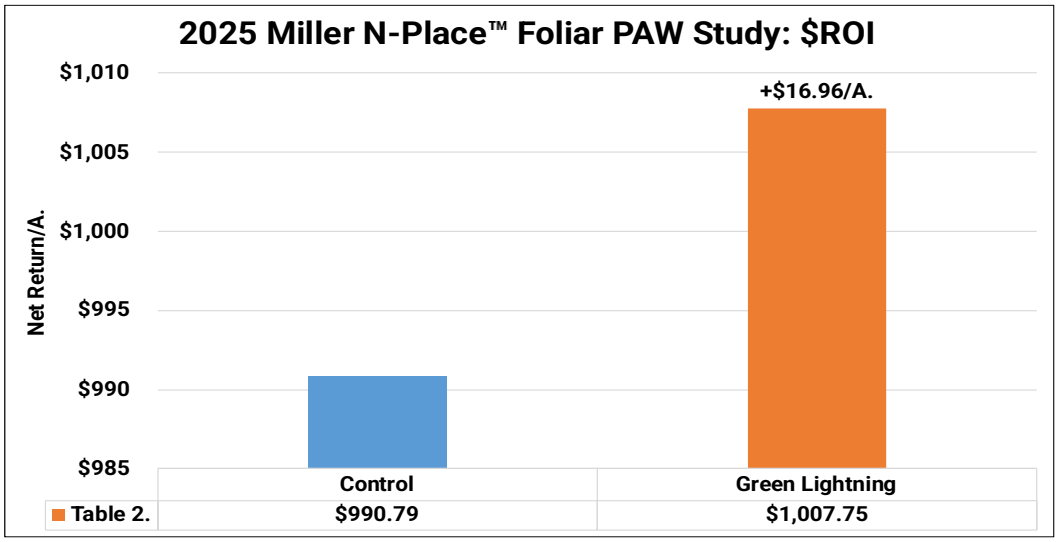
The applicator is setup with dual band twin fan spray nozzles that spray over, under and on the side of the leaf canopy, rather than traditional spray applications that only cover the top canopy.

Figure 1. Miller N-Place™ Max Side-Dress Toolbar

Green Lightning Plasma Activated Water Nitrogen Foliar Study

Results: Tables 1-2. illustrate that foliar applications of Green Lightning plasma activated water resulted in yield gains of +4.3 Bu/A., with corresponding net return of +$16.96/A.





Planting Date: May 5Th Hybrid: DKC 66-06 Trecepta Population: 36K Row Width: 30" Rotation: CAB Corn Price: $4.13 Green Lightning: $0.04/Gal

2025 PTI Results

Corn Veltyma® Foliar Fungicide Study

Veltyma® BASF We create chemistry

Active Ingredients*:
mefentrifluconazole: 2-[4-(4-chlorophenoxy)-2-(trifluoromethyl)phenyl]-1-(1H-1,2,4-triazole-1-yl)propan-2-ol 17.56%
pyraclostrobin: (carbamic acid, [2-[[[1-(4-chlorophenyl)-1H-pyrazol-3-yl]oxy]methyl]phenyl]methoxy-, methyl ester) 17.56%
Other Ingredients: 64.88%
Total: 100.00%
*Veltyma™ fungicide contains 1.67 lbs mefentrifluconazole and 1.67 lbs pyraclostrobin per gallon.

EPA Reg. No. 7969-409 **EPA Est. No.**

Mefentrifluconazole	Group	3	Fungicide
Pyraclostrobin	Group	11	Fungicide

Objective: To evaluate the yield and economics of Veltyma® fungicide applied by drone with an EA-J100 at 2 Gal/A.

Veltyma® contains Revysol®, which is a DeMethylation Inhibitor (DMI) fungicide that is part of the triazole group of fungicides initially labeled for 17 crops, including corn and soybeans. Veltyma® gives excellent control of anthracnose, eye spot, gray leaf spot, northern corn leaf blight, southern corn leaf blight, common rust, southern rust, and tar spot. Veltyma® has a label which expands the window of application from V10-R3.

Results: The table below illustrates that VT foliar applications of Veltyma® resulted in yield gains of +29.5 Bu/A. at the VT growth stage. Due to these high yield results, a positive net return of +$91.63/A. was achieved. 2025 was a year of high leaf disease presence, with Southern Rust making itself known in a large way. Tar Spot also provided issues with disease pressure later in the season.

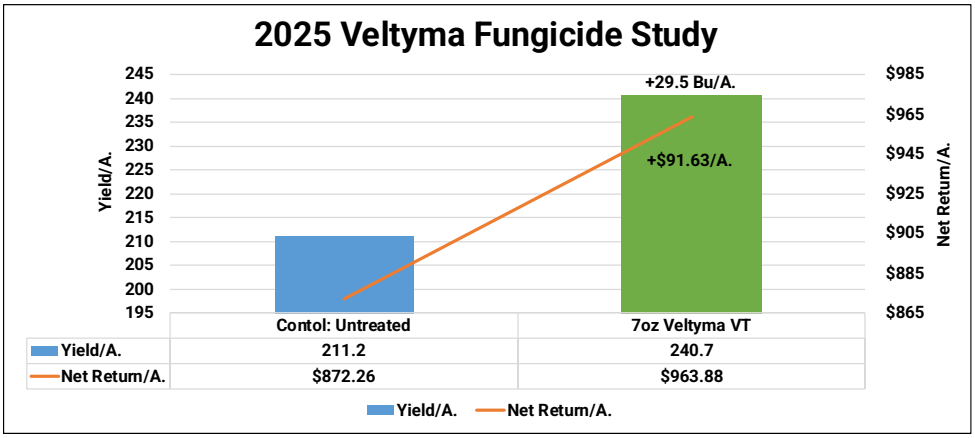


Figure 1. Southern Rust in Corn

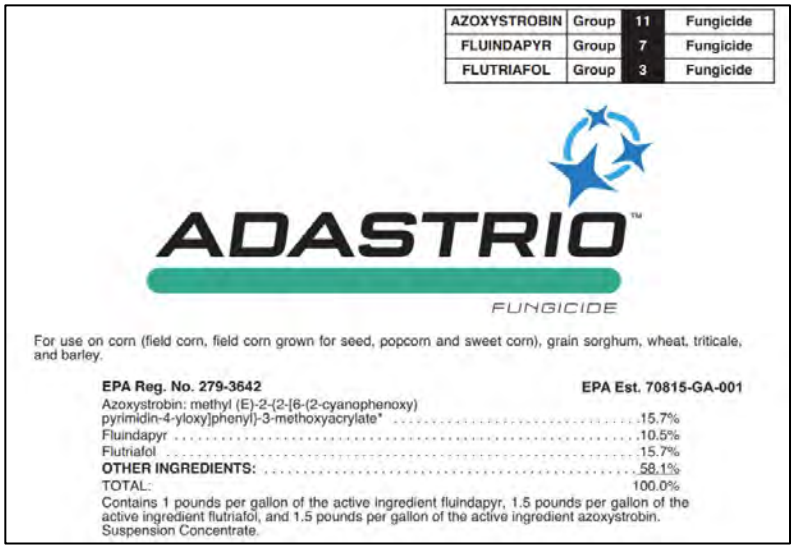
Planting Date: April 21st Hybrid: Becks 6374VT2P Pop: 36K Row Width: 30" Rotation: CAB Corn Price: $4.13 Veltyma®+App: $30/A.

PTI ILLINOIS

2025 PTI Results

Adastrio® Corn Foliar Fungicide Study

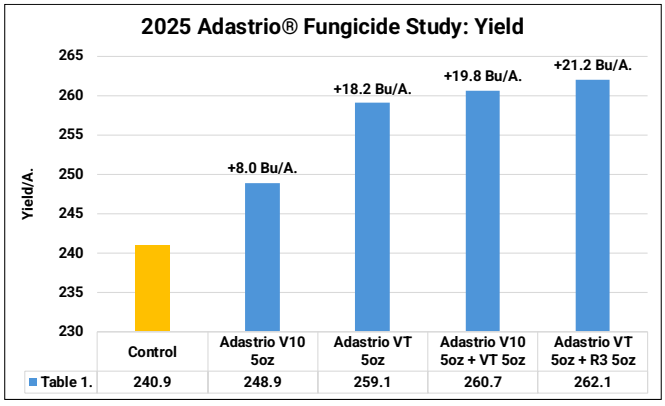
Objective: To evaluate the yield and net return of Adastrio® fungicide. Adastrio® contains three modes of action, which include azoxystrobin (Group11), the new SDHI fluindapyr (Group 7), and flutriafol (Group 3). Flutriafol is a highly systemic fungicide with translaminar activity that protects the sprayed leaf throughout the growing season, helping prevent additional disease development like tar spot, southern rust, gray leaf spot, northern corn leaf blight, and others.

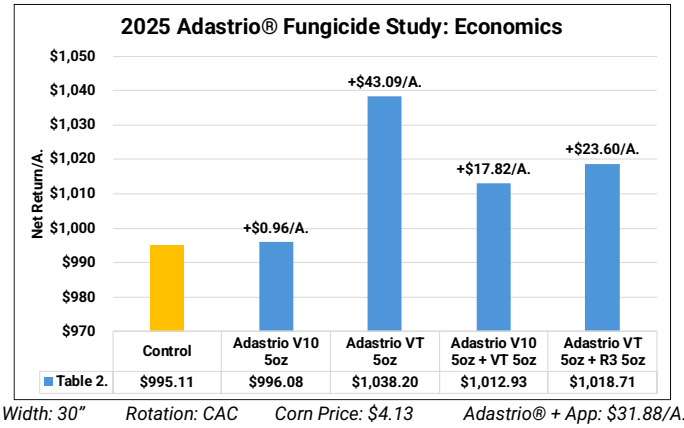


Results: Table 1. illustrates the foliar applications of Adastrio® resulted in a yield advantage of +8.0 Bu/A. when applied at V10, and +18.2 Bu/A. when applied at VT. Sequential treatments of fungicide proved additional yield advantages of +1.6 Bu/A. at V10/VT and +3.0 Bu/A. when applied at VT/R3.

Table 2. reveals the economics of all treatments. After the cost of application and fungicide, Adastrio® V10 treatments proved minimal economic returns of +$0.96/A, while VT treatments proved much larger returns of +$43.09/A.

Sequential treatments did prove yield gains over the VT application, resulting in economic losses of **-$19.49/A.** and **-$25.27/A.**





Planting Date: May 8th Hybrid: DKC 114-99 Pop: 36K Row Width: 30" Rotation: CAC Corn Price: $4.13 Adastrio® + App: $31.88/A.

2025 PTI Results

Miravis® Neo Corn Foliar Fungicide Study

Objective: To evaluate the yield and economics of a Miravis®Neo fungicide applied with a spray drone at 2Gal/A. at VT and R3 growth stage.

Miravis®Neo fungicide combines propiconazole, azoxystrobin and Adepidyn technology, one of the most powerful, broad spectrum SDHI molecules available, and delivers superior plant-health benefits and improved preventive and curative control of key diseases such as Gray Leaf Spot, Common and Southern Rust, Tar Spot, Eye Spot, Anthracnose, Diplodia Ear Rot, and Physoderma Brown Spot.

Results: Miravis®Neo treatments at VT growth stage proved yield gains of +17.5 Bu/A. with positive economic returns of +$40.93/A. Sequential treatment at VT and again at R3, proved yield gains of +20.8 Bu/A. with positive returns of +$23.20/A. However, single VT treatments proved additional gains of +$17.72/A.

Multi-year data from 2021-2025, Miravis®Neo has proved economic advantages of +$30.03 when applied at VT, and +$19.15/A. when sequentially applied at VT+R3.

Miravis® Neo

ADEPIDYN® Technology*

syngenta

Active Ingredients:	
Pydiflumetofen**	7.0%
Azoxystrobin***	9.3%
Propiconazole****	11.6%
Other Ingredients:	72.1%
Total:	100.0%

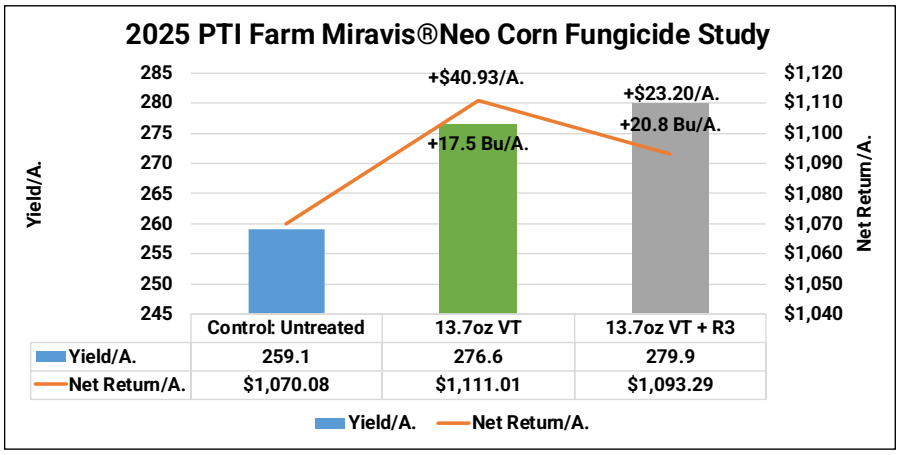


Figure 1. Talos T60x

Planting Date: April 27th Hybrid: Pioneer 1742Q Population: 36K Row Width: 30" Rotation: CAB Corn Price: $4.13 Miravis®Neo + App: $31.35/A.

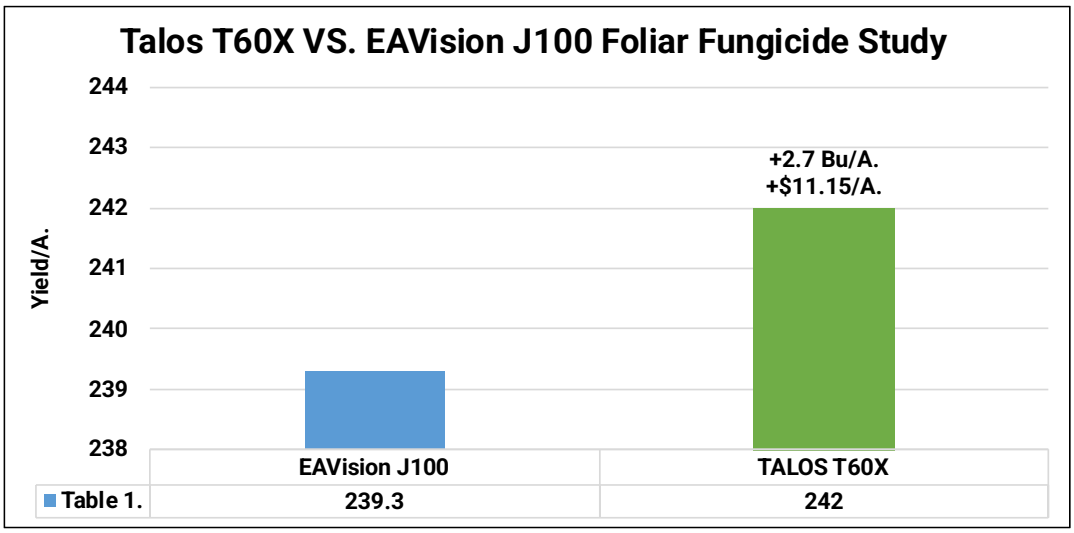
Talos T60X vs. EAVision J100 Corn Foliar Fungicide Study

Objective: To evaluate the yield and economics of spraying corn fungicide with a Talos T60X compared to a EA J100 unmanned aerial vehicle (UAV).

The Talos T60X can cover 56 acres per hour with max flying speed of 45 ft/s., a 13.2-gallon tank, a max coverage of 36 ft, and a powerful flow rate 4.8 gal/min with 2 nozzles.

The EA J100 can cover 60 acres per hour with max flying speeds of 45 ft/s. paired with 36 ft coverage with a 16-gallon tank, and a max flow rate of 6.3 gal/min with 4 nozzles.

Results: Table 1. illustrates that both UAVs were comparable in performance, however, the Talos T60X achieved +2.7 Bu/A. higher yields with an economic advantage of +$11.15/A.



Planting Date: April 27th Hybrid: Pioneer 1742Q Population: 36K Row Width: 30" Rotation: CAB Corn Price: $4.13

Talos T60X Supplied by Green Creek Drones EAVision J100 Supplied by Agri Spray Drones and Hunsinger Seed

Fungicide Ground vs. UAV Foliar Spray Application Study

Objective: To evaluate the yield and net return of Miravis®Neo fungicide applied at VT growth stage, applied via ground and by drone.

Miravis®Neo

This study evaluates a traditional ground fungicide application with a Hagie® high-clearance sprayer (Figure 1.), at a carrier rate of 20 Gal/A. Additionally, the use of a Talos T60X spray UAV (Unmanned Ag Vehicle) was also evaluated at carrier rates of 2 Gal/A. (Figure 2).

PYDIFLUMETOFEN	GROUP	7	FUNGICIDE
PROPICONAZOLE	GROUP	3	FUNGICIDE
AZOXYSTROBIN	GROUP	11	FUNGICIDE

Active Ingredients:
Pydiflumetofen** 7.0%
Azoxystrobin*** 9.3%
Propiconazole**** 11.6%
Other Ingredients: 72.1%
Total: 100.0%

Miravis®Neo fungicide combines propiconazole, azoxystrobin and Adepidyn technology, one of the most powerful, broad spectrum SDHI molecules available, and delivers superior plant-health benefits and improved preventive and curative control of key diseases such as Gray Leaf Spot, Common and Southern Rust, Tar Spot, Eye Spot, Anthracnose, Diplodia Ear Rot, and Physoderma Brown Spot.

Figure 2. Talos T60X UAV

Figure 1. Hagie® high-clearance sprayer

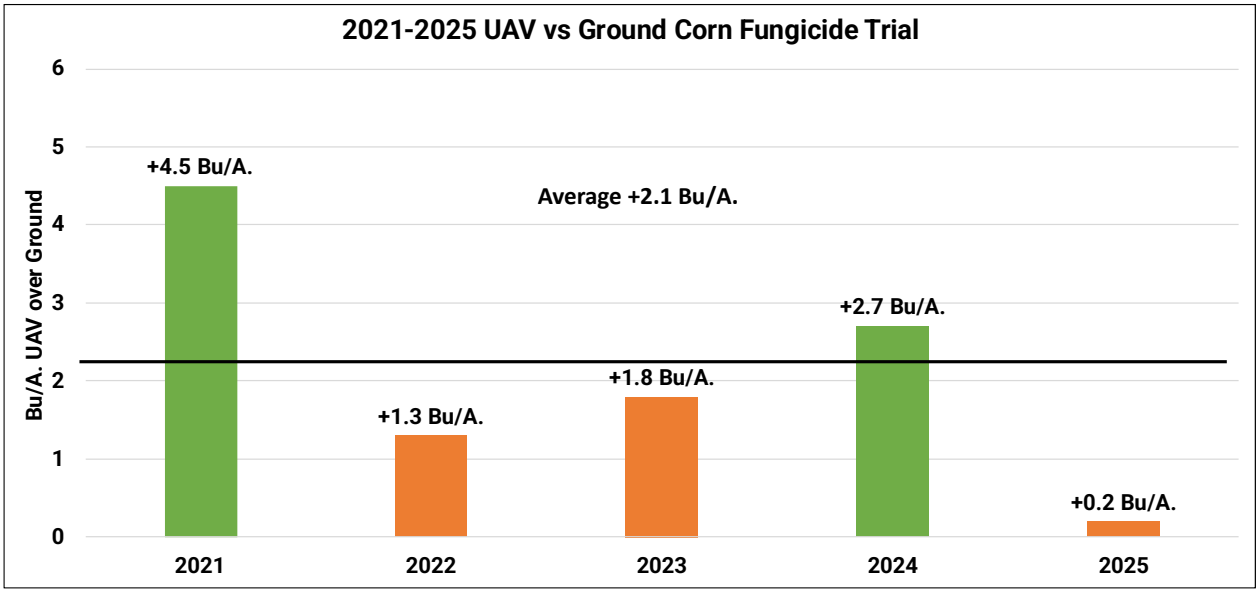
GREEN CREEK DRONES

Fungicide Ground vs. UAV Foliar Spray Application Study

Results: The table below illustrates that 2025 VT foliar applications of Miravis®Neo resulted in average yield gains of +16.3 Bu/A. The Hagie® high clearance sprayer and the T60X UAV resulted in similar performance, within 0.2 Bu/A.

In our 5th year of evaluating spray UAV applications, it does appear that this technology is an effective method to apply crop protection products. From 2021 to 2025, UAV applications have resulted in average yield gains of +2.1 Bu/A. with additional average net returns of +$10.22/A.

Advantages to UAV technology include precise application due to downward propeller air movement, low carrier rates, the absence of ground or soil engagement, and the ability to spray in fields with topography challenges. Disadvantages include flight time duration, tank capacity, battery charge, and insurance/licensing. Thank you to Green Creek Drones located in Effingham, IL for supplying the Talos T60X for this study.



Date: April 25th *Hybrid: Pioneer 1742Q* *Pop: 36K* *Row Width: 30"* *Rotation: CAB* *Corn Price: $4.13*

Ground Application: Turbo TwinJet Twin Flats 11005, 80# PSI 20 Gal/A. *UAV Application: 2 Gal/A.*

Green Lightning Plasma Activated Water Fungicide Carrier Study

Objective: To evaluate yield and economics of Green Lightning plasma activated water (PAW) applied as a carrier with a VT corn fungicide.

Green Lightning is a mechanism to replicate a naturally occurring process that leads to nitrogen. During a lightning storm, static electricity rearranges the nitrogen molecule in the air, and this modified molecule is contained within the. Green Lightning devices in a controlled environment work under the same similar premise. Air and water are sent into a static electric field for the nitrogen molecule to go through a rearrangement process that allows attachment of the water present, flowing through the machine, and deposits an end product as NO2 (nitrite) and NO3 (nitrate).

This study compares a VT Miravis®Neo corn fungicide drone application with PAW water as the carrier at 2 Gal/A., compared to a traditional water carrier.

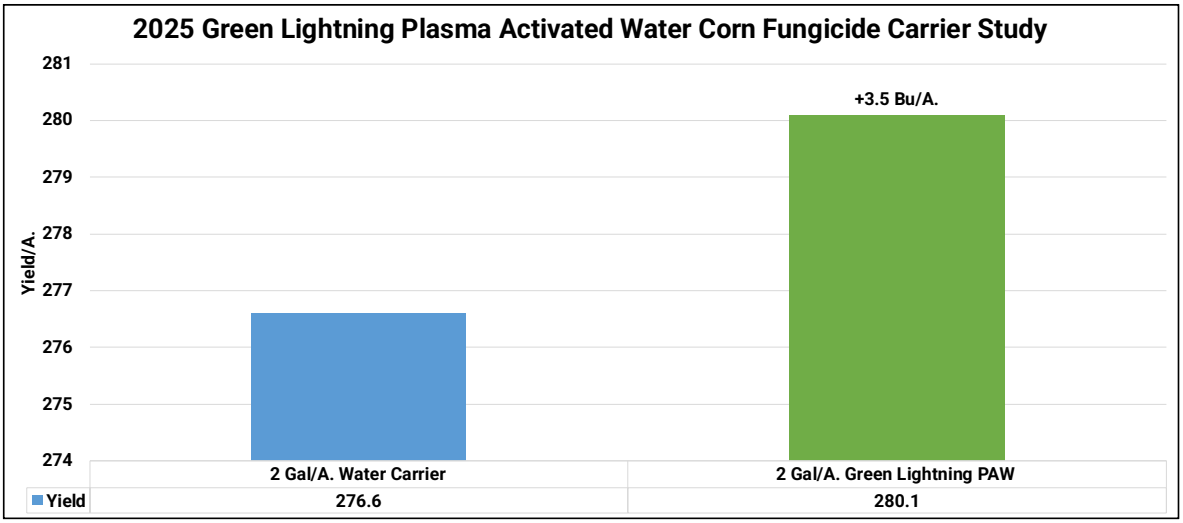
Figure 1. Green Lightning Plasma Activated Water Machine

Figure 2. Talos T60X Drone Application

Green Lightning Plasma Activated Water Fungicide Carrier Study

Results:

- ✓ Replacing water with Green Lightning plasma activated water applied with corn fungicide applications resulted in yield gain of +3.5 Bu/A.
- ✓ +3.5 Bu/A. yield gains corresponded to economic gains of +$14.38/A.
- ✓ Due to the low cost of PAW water ($0.04/Gal), minimal yield gain is required for return on investment.
- ✓ PAW water's most likely advantage is the benefit of a small amount of nitrogen and it could act as a potential synergistic avenue of allowing fungicide into the leaf structure and attacking leaf disease pathogens. PAW is also very low in pH, which may aid in leaf disease control.



In our 3rd year of testing this product, we are still trying to understand the nuances of best management practices with this product. What started out as a replacement nitrogen product two years ago, we suspected that it may have a good fit as a tank-mix in other applications.

Planting Date: April 28th Hybrid: GH DK 66-18 Population: 36K Row Width: 30" Rotation: CAB Corn Price: $4.13 Green N: $0.04/Gal.

2025 PTI Results

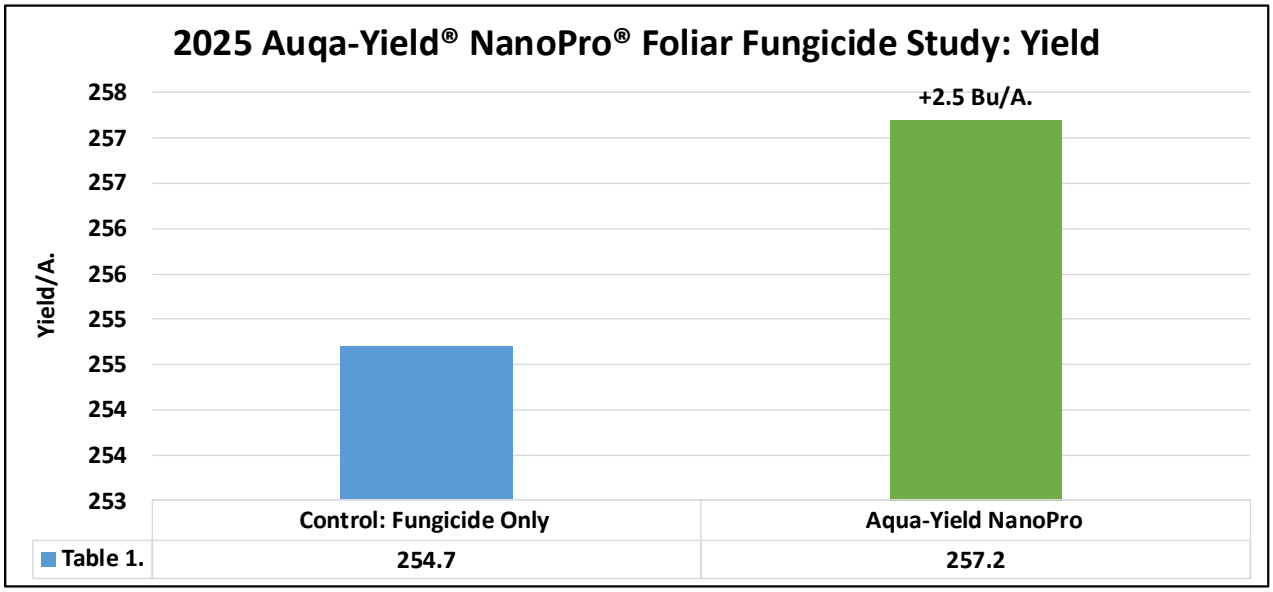
Aqua-Yield® NanoPro® Foliar Fungicide Study

Objective: To evaluate yield and economics of NanoPro® by Aqua-Yield®. NanoPro® is a carrier adjuvant that enhances the uptake of crop protection products.

This trial aims to establish the efficiency of Aqua-Yield's NanoPro® as a tank-mix partner with a corn fungicide applied at the VT growth stage (13.7oz/A. Miravis® Neo).

Results: Table 1. illustrates Aqua-Yield's NanoPro® resulted in +2.5 Bu/A. yield improvement over the control of a standard fungicide application at VT growth stage.

With a +2.5 Bu/A. yield response, NanoPro® resulted in positive economic gains of +$7.05/A.



Planting Date: May 5th *Hybrid: Wyffels 70495* *Population: 36K* *Row Width: 30"* *Rotation: CAB* *Corn Price: $4.13* *NanoPro®: $3.28/A.*

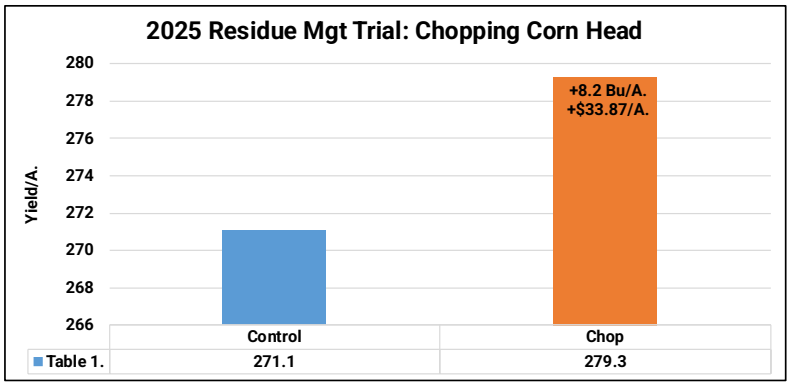
PTI ILLINOIS

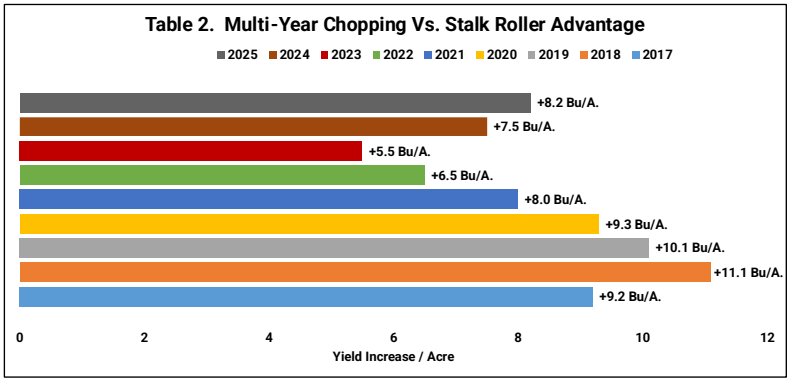
Chopping Corn Head Study

Objective: To study the yield impact of utilizing a chopping corn head in a continuous corn conventional tillage rotation. A Capello DIAMANT™ chopping head is used to create replicated strips of chop and non-chop residue management trials. The goal of this trial is to evaluate sizing of residue, allowing heavy stalks and residue to break down faster to advance the degradation process and in turn, reducing the carbon penalty associated with continuous corn environment.

Results: Table 1. illustrates that chopping corn residue improved corn yields by +8.2 Bu/A. and increased gross revenue by +$33.87/A.

Multi-year data from 2017-2025 has indicated consistent results with chopping advantages of +5.5 Bu/A. to +11.1 Bu/A.

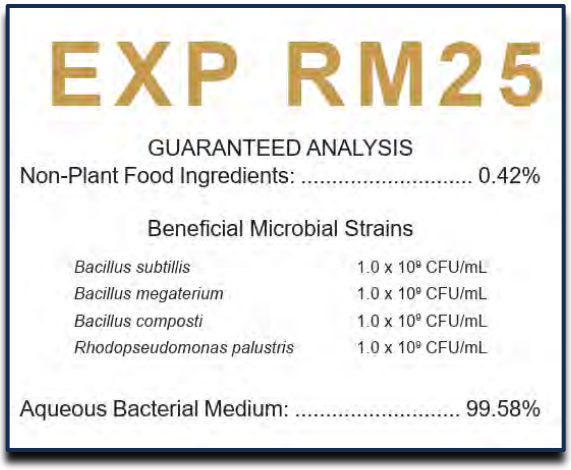




Planting Date: April 24th Hybrid: DKC 66-06Trecepta Population: 36.5K Row Width: 30" Rotation: CAC Corn Price: $4.13

Rosen's EXP RM25 Fall Residue Digester Study

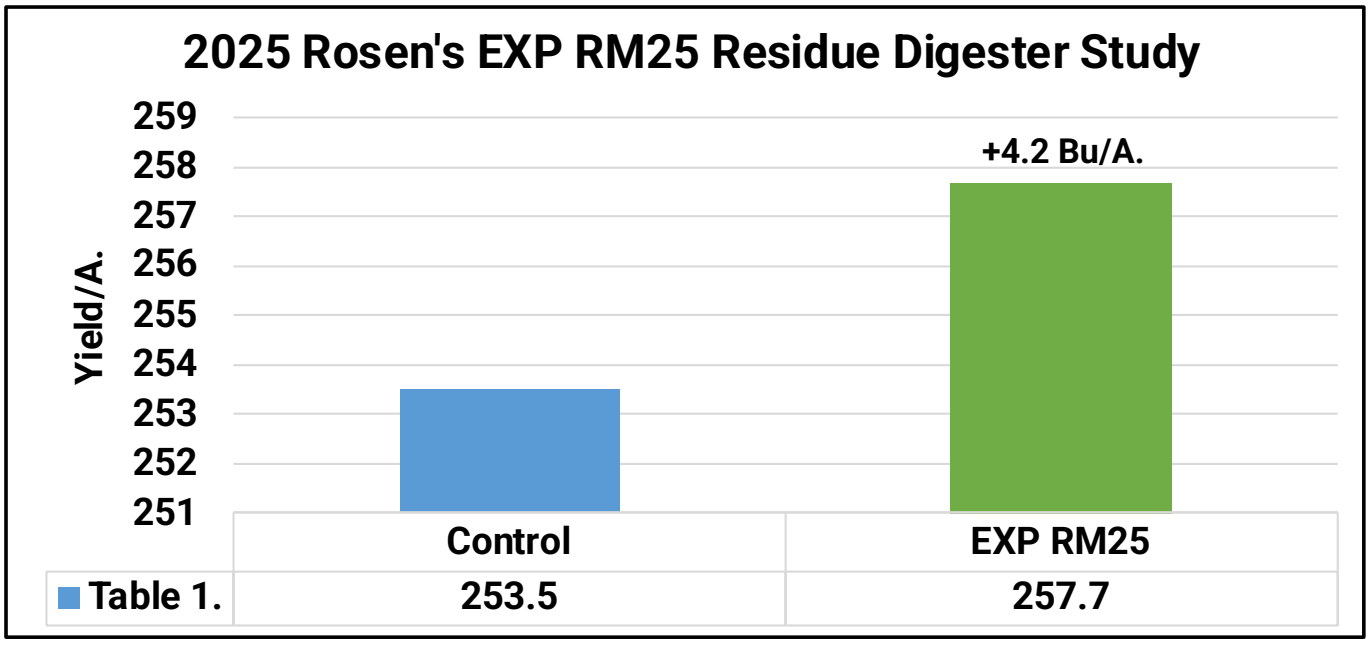
Objective: To evaluate yield and economics of **EXP RM25,** a customized blend of enzymes, bacteria, and fungi specifically selected to accelerate the breakdown of crop residue. EXP RM25 was applied as a liquid broadcast in early fall after corn harvest.



EXP RM25 can be fall or spring applied as a standalone pass or in-conjunction with a herbicide or fertilizer application. It may also be co-applied with herbicides, insecticides, fungicides and adjuvants in accordance with all product labeling requirements.

Results: In this continuous corn study, Fall 2024 applications of EXP RM25 resulted in a +4.2 Bu/A. yield advantage over the control. After cost of product, EXP RM25 netted positive gains of +$8.45/A.

No application charges are included in ROI calculation, since program was used as a tank-mix in part of a Fall burndown program.



Fall App: October 19th Planting Date: April 24th Hybrid: GH 15J91 Population: 36K Row Width: 30" Strip-Till Rotation: CAC Corn Price: $4.13 RM25:$8.90/A.

Phantom Yield Loss Study:

Objective: To evaluate yield and economics of harvesting multiple corn hybrids at earlier and later harvest moisture levels. The goal of this study is to determine if higher moisture grain at harvest offers higher yields and if so, is there a "phantom" yield loss that occurs when corn harvest occurs at lower grain moistures?

Many times, at the PTI Farm corn harvest gets delayed due to weather or even switching crops to harvest soybeans. It is not common during this moisture transition in corn to observe lower actual yield when corn harvest begins again at lower moisture grain levels. This phenomenon is called by many farmers as "invisible" or "phantom" yield loss.

Why does corn potentially yield less as grain moisture levels decrease naturally in the field? The following are factors that could contribute to phantom yield losses:

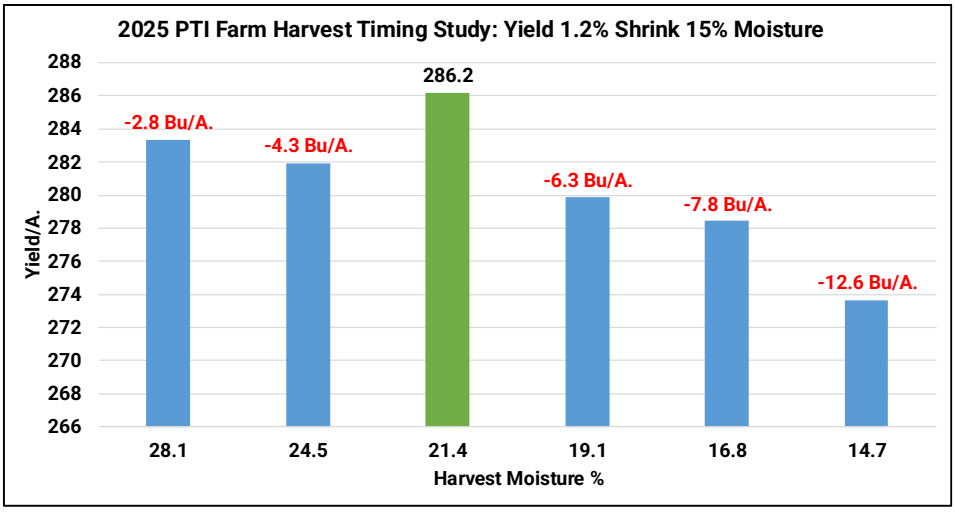
***Wind Damage and/or Stalk Lodging**	***Dry Matter Loss from Respiration**
***Ear Rots Leading to Kernel Damage**	***Insect Damage Leading to Kernel Damage**
***Increased Butt Shelling at Corn Head**	***Increased Fines, Cracked Dry Kernels**

2025 PTI Results

Phantom Yield Loss Study:

Results: In 2025, four corn hybrids were used in this study including DeKalb 66-06 Trecepta, 68-35VT2P, 65-95VTP, and Pioneer 1742Q. Each hybrid was harvested at average grain moisture levels of 28.1%, 24.5%, 21.4%, 19.1%, 16.8% and 14.7%. Table 1. illustrates highest yield of 286.2 Bu/A. occurred at the 21.4% moisture level. Higher harvest moistures resulted in yield losses of **-2.8** to **-4.3 Bu/A.** As moisture declined, corn yield decreased by **-6.3 Bu/A**. at 19.1%, **-7.8 Bu/A.** at 16.8%, and **-12.6 Bu/A.** at 14.7%. Over the three years this study has been in place, 2025 is the first year the highest moisture corn has not offered highest corn yield.

Table 2. illustrates multi-year data over 2023-2025. Over this period, the highest harvest moisture of corn has produced highest yields.



As corn dried in the field down to 24%, yield fell **-3.3 Bu/A.**, at 20% **-5.7 Bu.A.**, at 18% to **-10.3 Bu/A.** and finally 15% suffering the largest yield losses at **-15.2 Bu/A.**

The biggest question surrounding this study is whether yield loss is coming from "phantom" yield loss or is it just physical field harvest loss? Based upon field loss measurements, 80%-90% or more of the losses are associated with improper combine settings, header loss, down corn or molds etc.

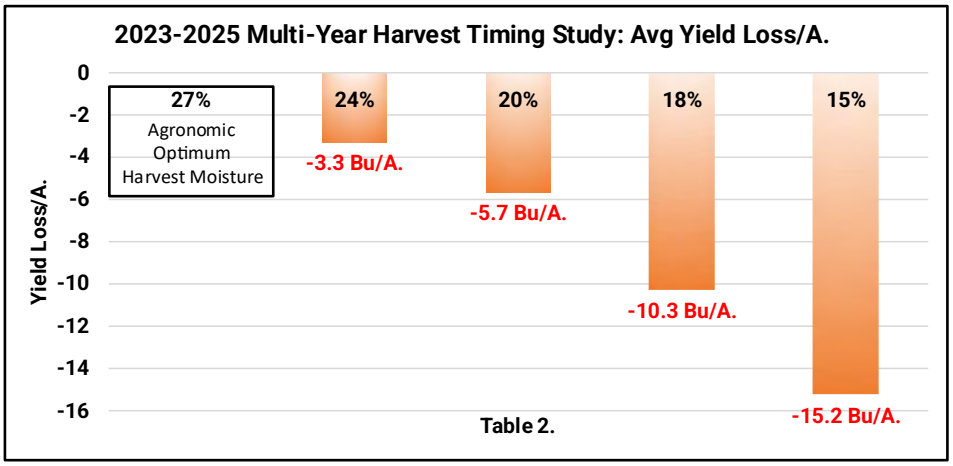


Table 2.

Planting Date: April 25th *Hybrid: DKC 65-95VT2P, 66-06TRE, 68-35VT2P, Pioneer 1742Q* *Population: 36K* *Row Width: 30"* *Rotation: CAC* *Corn Price: $4.13*

Shrink Commercial: 1.4% at 14% Moisture *Shrink On-Farm: 1.2% at 15% Moisture*

On-Farm vs Commercial Corn Drying Study

Objective: To evaluate yield and economics of harvesting multiple corn hybrids at earlier and later harvest intervals of 26%, 24.3%, 19% and 14.2% grain moisture levels. This study will determine the most economical grain harvest moisture, comparing on-farm drying, versus a grower taking their grain to a commercial grain terminal.

The PTI Farm partnered with GSI Grain Systems on the construction of a new 70,000 grain storage facility with a GSI Q214 continuous flow dryer (Figure 1.) in 2023. This facility is used to dry and store corn from grain harvest at the PTI Farm.

Figure 1. GSI Grain Storage Facility with Q214 Quiet Dryer

2025 PTI Results

On-Farm vs Commercial Corn Drying Study

Figure 1. illustrates cost of drying corn at a local grain terminal that the PTI Farm delivers grain to each harvest. Commercial shrink is calculated at 1.4% at 14% grain moisture.

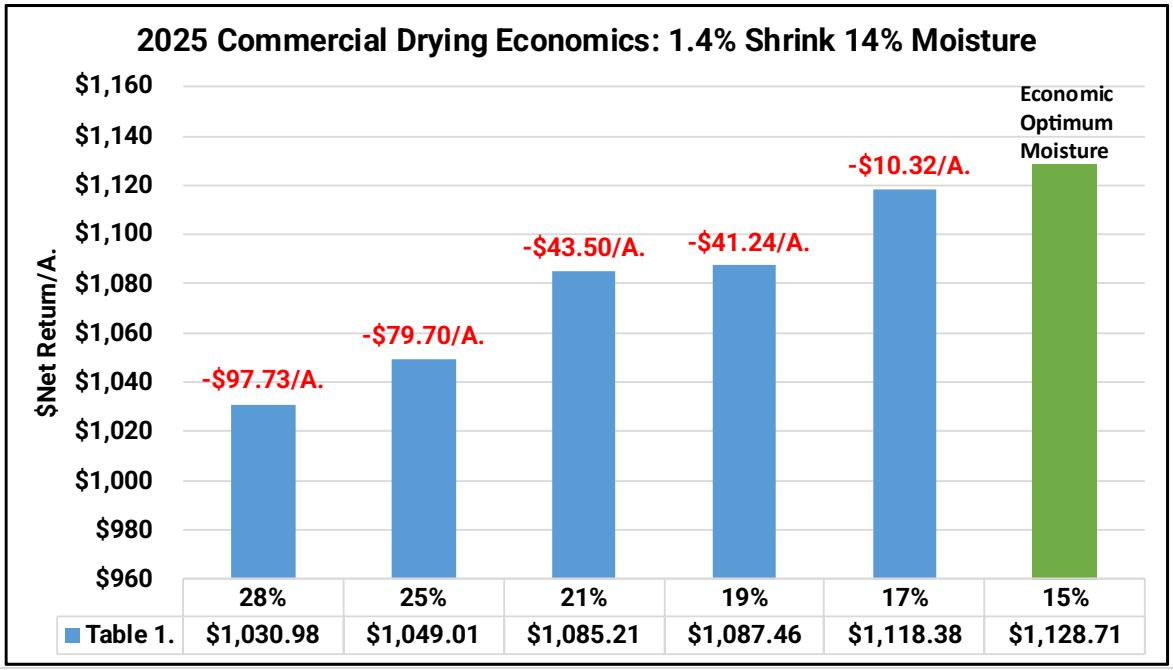
For on-farm drying with the GSI Q214 continuous flow dryer, using propane gas, drying charges averaged $0.019/moisture point/bushel. For example, if grain was harvested at 26%, eleven points of moisture was removed to 15% #2 corn. The on-farm cost of this grain drying with liquid propane gas and electricity tallied $0.015/pt of moisture. On-farm calculations use 1.2% shrink at 15% moisture. Four corn hybrids were used in the study with maturities ranging from 114-117 day.

Figure 1. Commercial Grain Drying Rates:

28%:	$0.32/Bu.	All Calculated at 1.4% Shrink down to 14% Moisture	
25%:	$0.275/Bu.		
21%:	$0.21/Bu.		
19%:	$0.17/Bu.	17%:	$0.08/Bu.

Results: Table 1. illustrates average net return for all harvest moistures in a commercial cost, grain elevator delivery at harvest. In 2025, the drier the corn, the higher the net returns.

- ✓ 15% moisture corn achieved economic optimum harvest moisture
- ✓ 17% moisture corn resulted in harvest costs of **-$10.32/A.**
- ✓ 19% and 21% moisture corn netted harvest costs of **-$41.24/A.** to **$43.50/A.**
- ✓ 25% moisture corn increased harvest costs to **-$79.70/A.**
- ✓ 28% moisture corn tipped the scale with impressive losses of **-$97.73/A.**

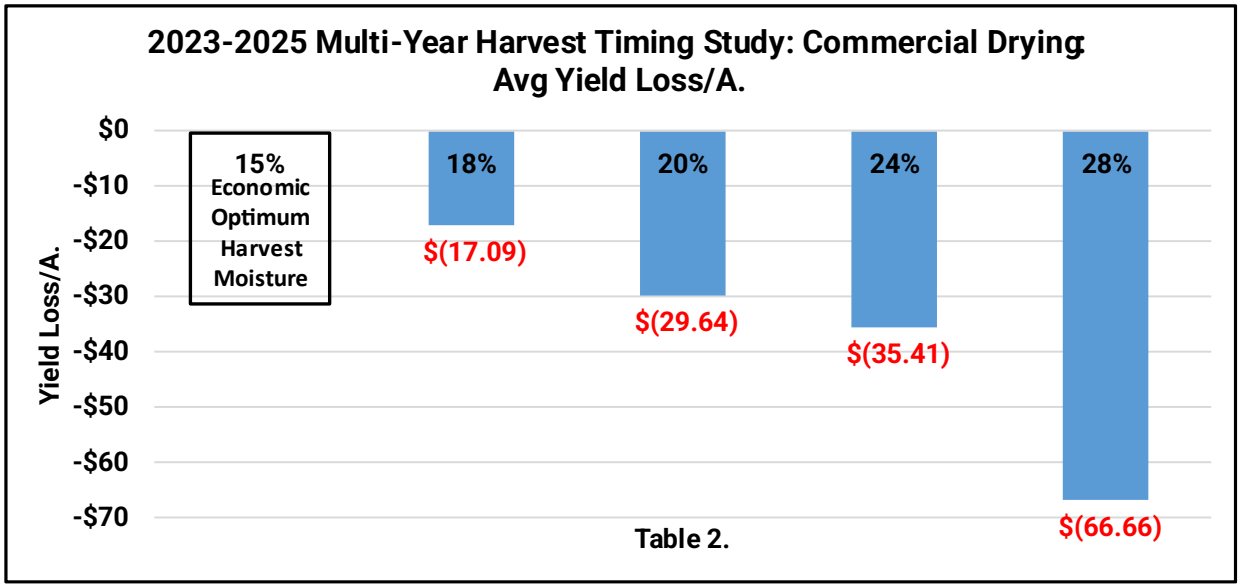


PTI ILLINOIS

On-Farm vs Commercial Corn Drying Study

Table 2. illustrates 2023-2025 multi-year net return averages for all harvest moistures in a commercial cost, grain elevator delivery at harvest.

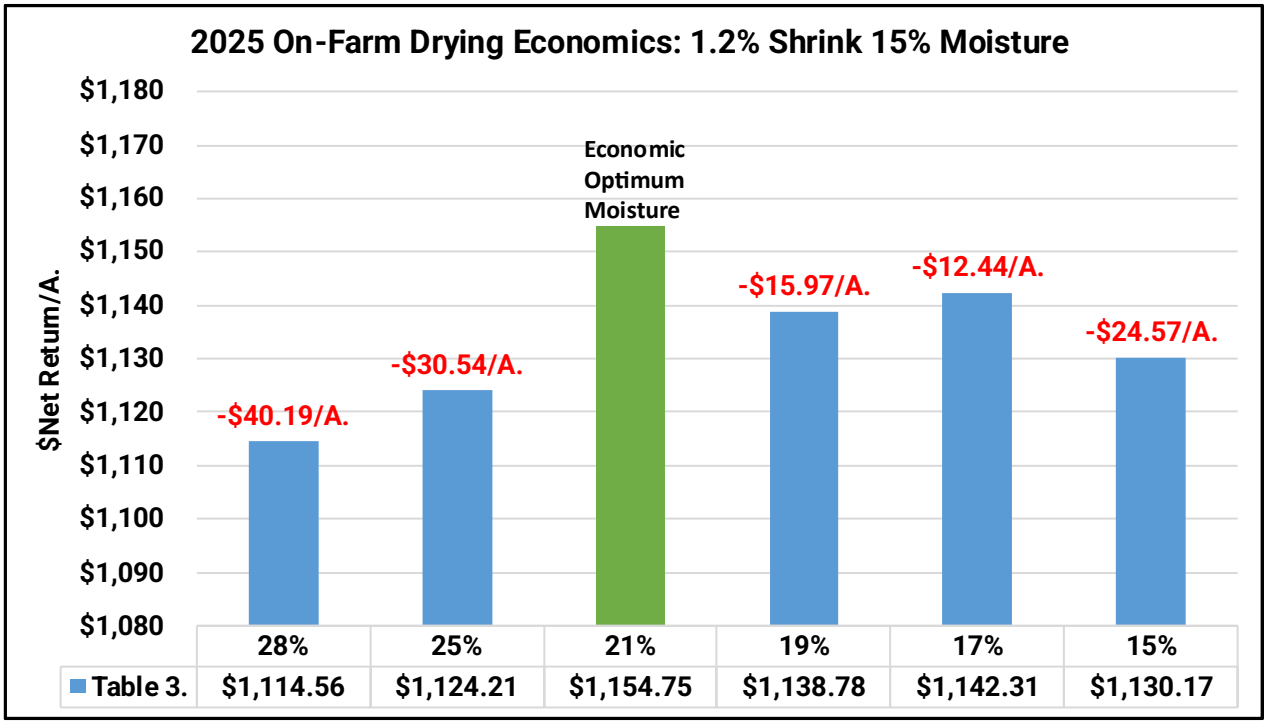
- ✓ 15% corn achieved economic optimum harvest moisture.
- ✓ 18% harvest moisture resulted in a cost of **-$17.09/A.**
- ✓ 20% to 24% harvest moisture increased cost to **-$29.64/A.** to **-$35.41/A.**
- ✓ 28% harvest moisture incurred highest losses of **-$66.66/A.**



On-Farm vs Commercial Corn Drying Study

Table 3. illustrates average net return for all harvest moistures dried **on-farm** with the GSI drying system at harvest.

- ✓ 21% corn achieved economic optimum harvest moisture.
- ✓ Wetter harvest moistures of 25% and 28% resulted in losses of **-$30.54/A.** to **-$40.19/A.**
- ✓ Drier harvest moistures of 17% and 19% netted losses of **-$12.44/A.** and **-$15.97/A.**
- ✓ 15% corn netted losses of **-$24.57/A.**

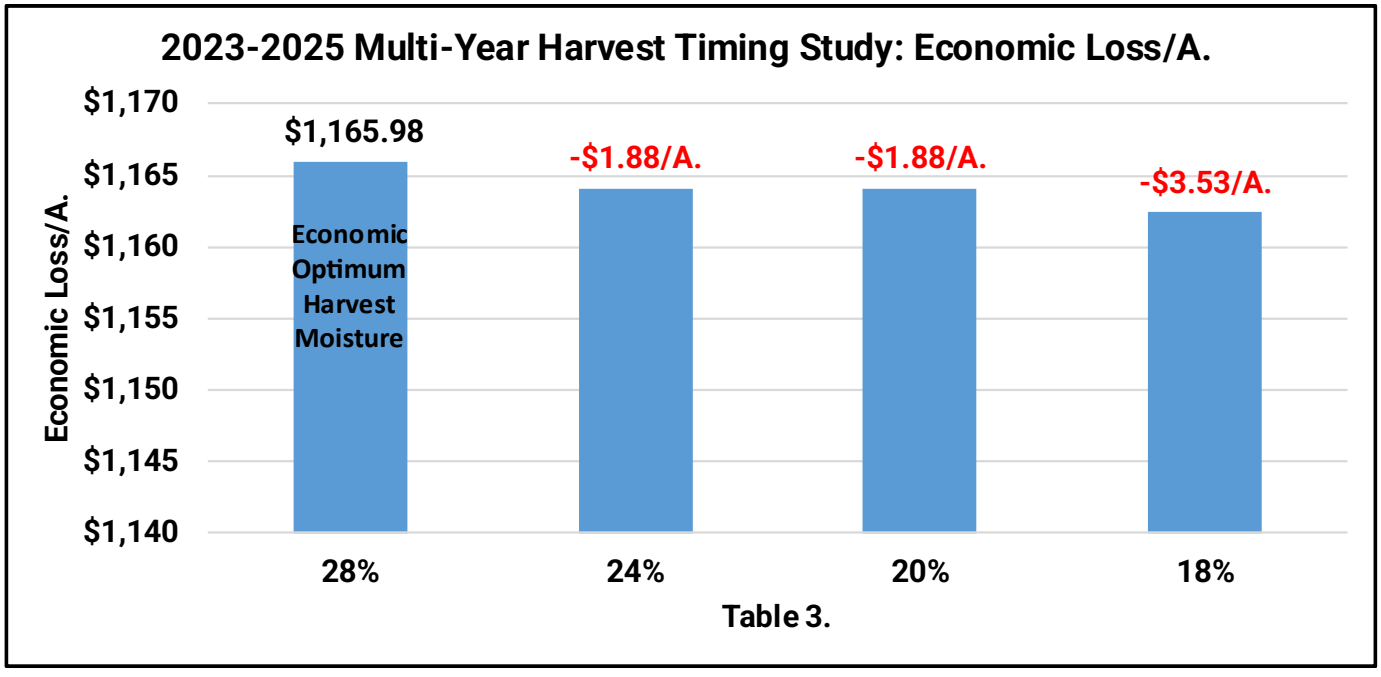


2025 PTI Results

On-Farm vs Commercial Corn Drying Study

Table 3. illustrates average net return for all harvest moistures dried **on-farm** with the GSI drying system at harvest.

- ✓ 28% corn achieved economic optimum harvest moisture.
- ✓ Allowing corn to dry down to 24% and 20% only resulted in overall losses of **-$1.88/A.**
- ✓ 18% harvest moisture netted losses of only **-$3.53/A.**

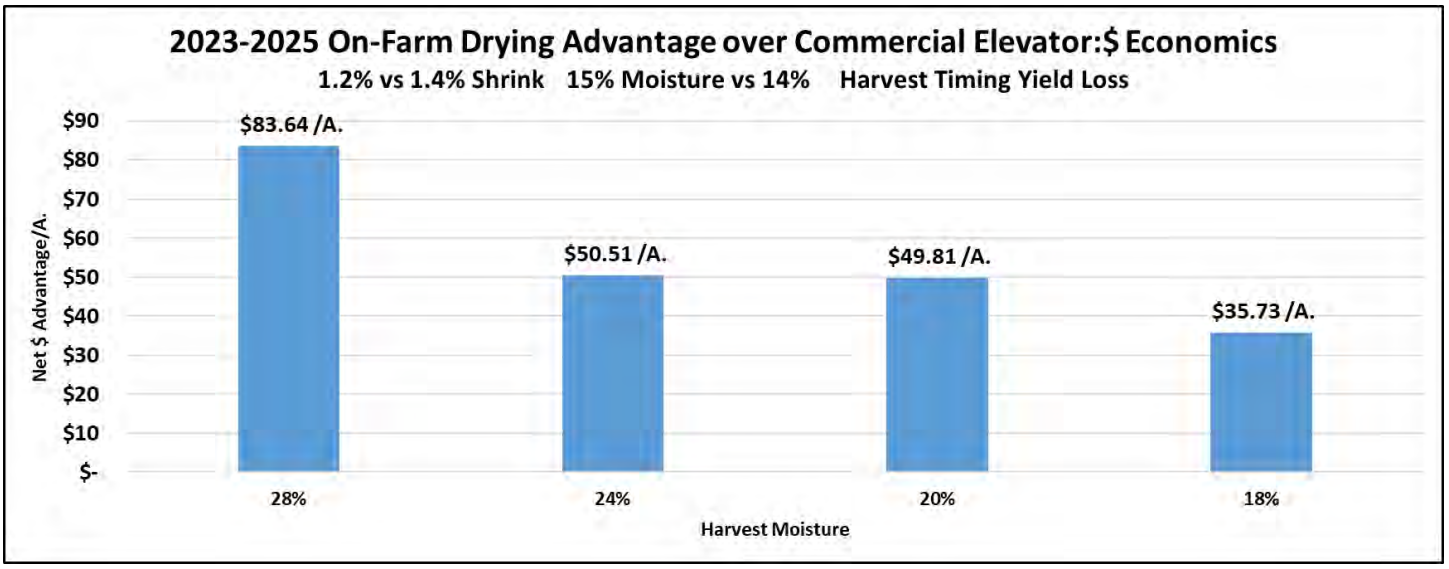


On-Farm vs Commercial Corn Drying Study

In summary, in our third year of testing our GSI Systems grain drying facility, we did uncover economic advantages for drying corn on-farm compared to commercial grain facilities, with savings averaging near +$55/A. in additional revenue and/or savings of expense.

It is interesting that on-farm drying is completely inverted from that of commercial drying charges. On-farm drying does offer much more affordable drying charges and in tandem with harvest timing yield loss, has offered a stable window to harvest corn at higher moistures.

Compared to commercial drying costs, on-farm drying at the PTI Farm has reduced drying expenses by nearly 40% annually.



Planting Date: April 25th *Hybrid: DKC 65-95VT2P, 66-06TRE, 68-35VT2P, Pioneer 1742Q* *Population: 36K* *Row Width: 30"* *Rotation: CAC* *Corn Price: $4.13*

Shrink Commercial: 1.4% at 14% Moisture *Shrink On-Farm: 1.2% at 15% Moisture* *Propane:$1.69/Gal*

Corn Tillage Study

Objective: To evaluate the yield and economic impact of various tillage programs in a corn after soybean rotation. Tillage programs include conventional till, strip-till, vertical till, no-till and in-line rip.

Figure 1. KUHN® Gladiator®

Figure 2. Kuhn® Dominator® 4857

Corn Tillage Study

Figure 6. 2026 Univ. of IL Machinery Cost Estimates

Tillage Practice	Category	Cost
Conventional Till	Ripper	$ 40.40
	Soil Finisher	$ 15.30
	Plant	$ 24.40
	Total:	$ 80.10
StripTill	Strip	$ 26.10
	Burndown	$ 10.00
	Plant	$ 24.40
	Total:	$ 60.50
Vertical Till	Vertical	$ 18.50
	Burndown	$ 10.00
	Plant	$ 29.60
	Total:	$ 58.10
No Till	Plant	$ 29.60
	Burndown	$ 10.00
	Total:	$ 39.60
In-Line Ripper	V-Ripper	$ 29.90
	Soil Finisher	$ 15.30
	Plant	$ 24.40
	Total:	$ 69.60

Figure 3. Planting in No-Till

Figure 4. Kuhn® EXCELERATOR® XT 8010 Vertical Tillage

Figure 5. Kuhn® 4835 In-Line Ripper

2025 PTI Results

Corn Tillage Study

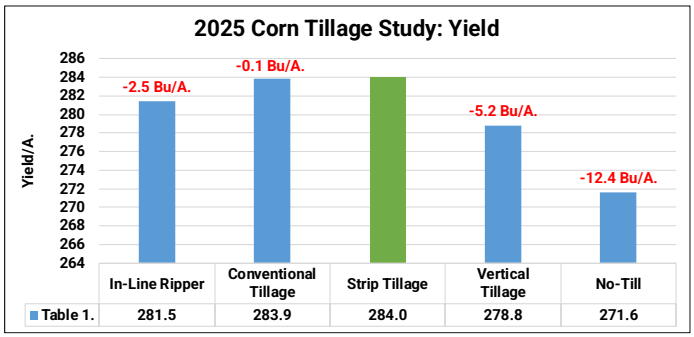
Results: To understand both yield and economics, the 2026 University of Illinois Machinery Cost Estimate Summary is used to calculate individual cost of the tillage programs (Figure 6). For the three reduced tillage programs, a $10/A. burn-down is also included.

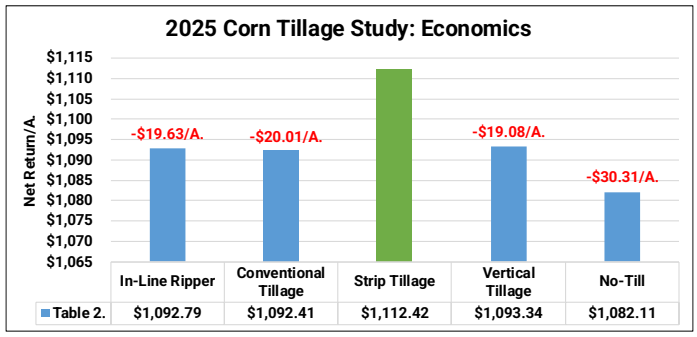
Table 1. summarizes the overall yield for each tillage segment. Yield varied by 12.4 Bu/A. between all tillage programs. Strip-till offered highest yields at 284 Bu/A., while no-till the lowest at 271.6 Bu/A.

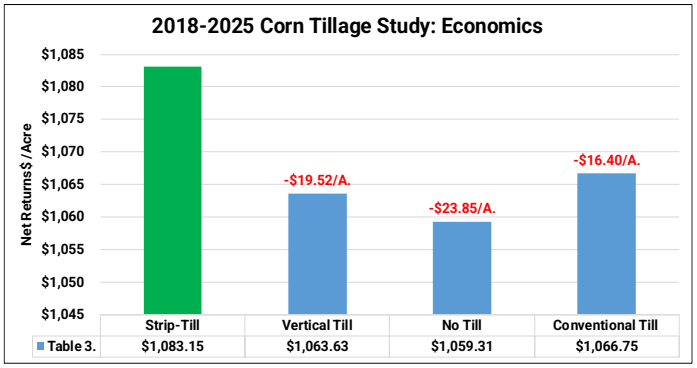
After applying all appropriate costs to each individual tillage segment, strip-till offered the highest overall revenue in this tillage system study in 2025.

Conventional tillage resulted in losses of **-$20.01/A.**, vertical tillage **-$19.08/A.**, and finally no-till at **-$30.31/A.** (Table 2).

Table 3. illustrates multi-year data from the PTI Farm over 2018-2025. Strip-till over this time frame has provided the highest overall net returns, with all other tillage programs lagging behind with losses of **-$16.40/A.**, **-$19.52/A.** and **-$23.85/A.** respectively.





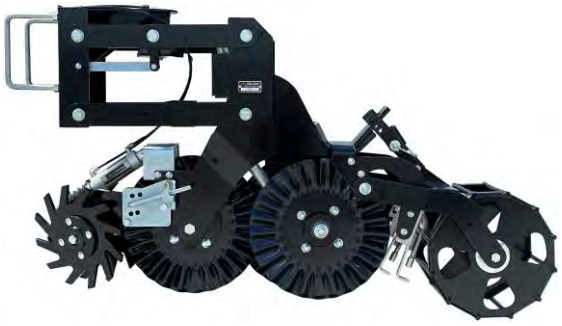


Planting Date: May 5th *Hybrid: DKC 114-99* *Population: 36K* *Row Width: 30"* *Rotation: CAB* *Corn Price: $4.13*

Strip Freshener Study

Objective: To evaluate spring strip freshening to facilitate consistent soil warming and bring existing fall strips to life. Original fall strips made in October after harvest were freshened in April before planting using a Vulcan Equipment ZoneMaster.

Figure 1. Vulcan ZoneMaster Strip

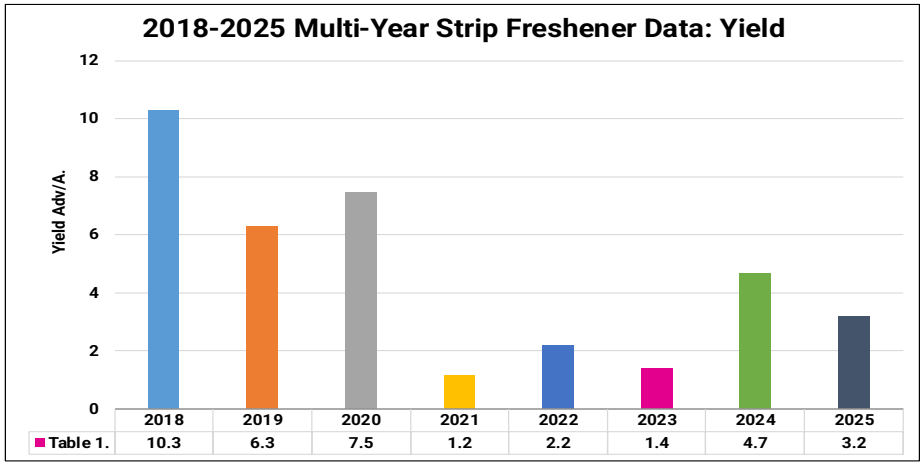


Features:

- ZoneMaster uses parallel linkages to the row unit allowing it to conform to irregularities in the ground, and to increase flexibility, which results in accurate individual row unit depth control.
- Adjustable rolling baskets act as gauge wheels to keep the coulters at the desired depth. The ZoneMaster also has adjustable air bags that make optimizing down-pressure quick and easy.
- Operates at 6 to 10 mph and 1 1/2" to 4" deep, depending on depth setting.
- Uses Precision Planting CleanSweep® to easily adjust residue managers

Strip Freshener Study

Results: Table 1. illustrates Spring strip freshening in 2025 increased average yield by +3.2 Bu/A. This table also summarizes 8-yr (2018-2025) multi-year data showing positive yield gains from freshening every year. Average multi-yr yield response is +4.6 Bu/A., with yield ranging from +1.2 Bu/A. to +10.3 Bu/A.



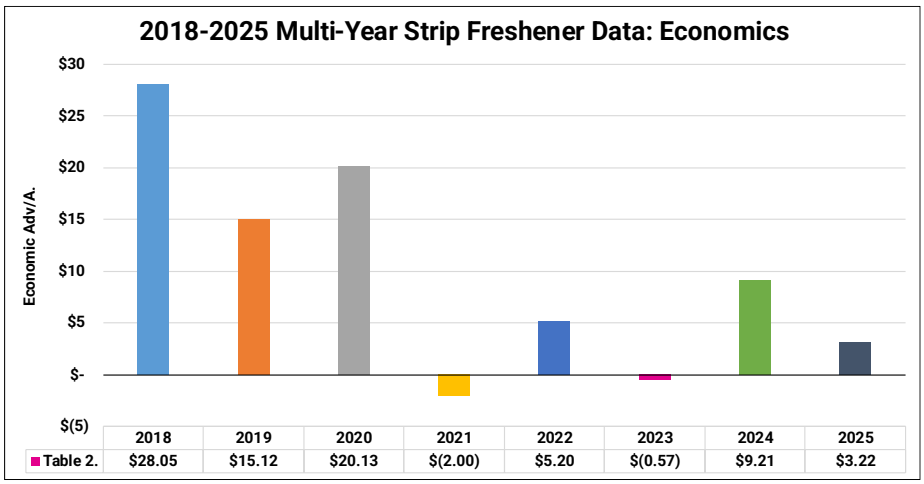


Table 2. illustrates net return on investment over the same time period. 2025 strip freshening resulted in net positive gains of +$3.22/A.

Multi-yr data has resulted in average net economic gains of +$9.79/A., using a custom cost of $10/A. for calculating application charge. Of the 8 years in testing, 6 years have proven profitable, giving a 75%-win rate. Although a high win rate percentage, only 3 years have proven economic gains of +$10/A. or more. Given the low net return, a grower might consider this recreational tillage 5 of the 8 years.

In general, with growers who strip-till, we advise them to have three scenarios to keep in mind. Our first and best option is to Fall strip-till and not have to make another trip until planting, to eliminate traffic and expense. Our second option is to freshen the strips if they didn't make it through the Winter months well. Lastly, if a strip freshener cannot fix or repair the strip, be prepared to tear it up and start over again with field cultivation, but plant in the same strip area if nutrient banding occurred in the Fall strip-till.

Planting Date: May 1st Hybrid: Becks 6041Q™ Population: 36K Row Width: 30" Rotation: CAB Corn Price: $4.13 Custom Freshen Cost: $10/A.

2025 PTI Results

Pre-Plant Strip Freshening Nitrogen Application Study

Objective: To evaluate pre-plant spring strip freshening to facilitate applying 32% UAN nitrogen with the strip freshener, compared to applying nitrogen on the planter and as a broadcast. Original fall strips made in October after harvest were freshened while applying nitrogen in April before planting.

Strip freshener nitrogen was applied at 20 Gal/A. and tendered using a Yetter 1600 gallon all wheel steer pup tank.

A Vulcan ZoneMaster (Figure 1.) strip freshener bar was fitted with Pump Stack® (Figure 3.), a liquid fertilizer hydraulic pump. It was then paired with EMHD® and EM FlowSense™ (Figure 4.) to ensure accurate row by row control across the bar. EMHD® controls liquid application rates using an electromagnetic flow meter. This opens up options for a wider range of liquid products. EM FlowSense™ allows you to measure the rate of fertilizer you are applying on each row of the bar, to make you aware of any row-to-row variability that is occurring. With a Pump Stack® system, paired with EMHD®, and EM FlowSense™ you can be confident in your application rate across every row.

Figure 1. Vulcan ZoneMaster Strip Freshener™

Figure 2. 1600 Gal Yetter All Wheel Steer Cart

Figure 3. Pump Stack®

Figure 4. EMHD® + EM FlowSense™

Pre-Plant Strip Freshening Nitrogen Application Study

The at-plant nitrogen was applied on the planter with a Conceal® dual band application. A Conceal® system is a unique planter attachment that allows growers to place nitrogen in a high concentration dual or single band positioned 3” away from the seed trench (Figure 5.) in depths near 1.5”. If corn is planted at a 2” depth, Conceal® system fertilizer placement is 3X-0.5X2.

Conceal® uses existing planter space, utilizing a backswept knife located within the center of the planter’s gauge wheels (Figure 5). As nitrogen is applied, it is sealed within the soil profile, preventing potential volatilization losses typically seen with surface type nitrogen applications.

Figure 5. Conceal® Dual Placement 3” from Seed

2025 PTI Results

Pre-Plant Strip Freshening Nitrogen Application Study

Results: Table 1. illustrates both the Conceal® and the strip freshened applied nitrogen proved +5.8 Bu/A. to +10.6 Bu/A. higher yields than broadcast applied nitrogen. Both performed well, but we are suspicious of freshened N to have more of an incorporated application, rather than a true concentrated band on each side of the furrow.

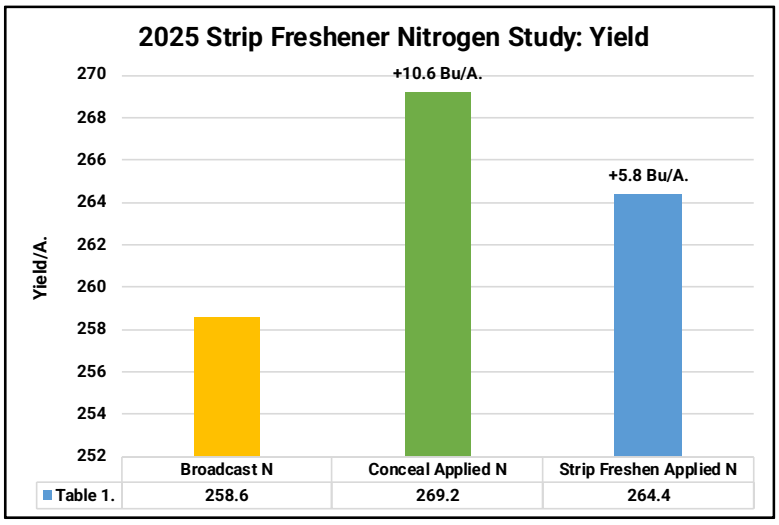
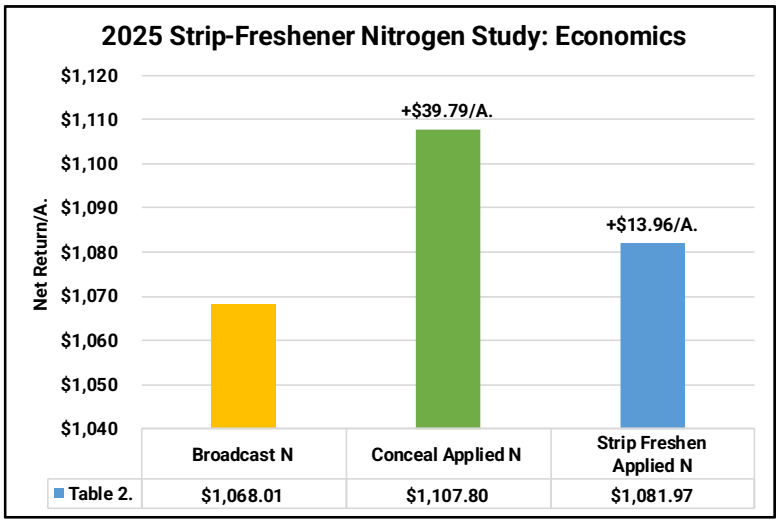


Table 2. illustrates net return on investment with gains of +$39.79/A. for planter applied N and +$13.96/A. for strip freshener applied N, leaving a +$25.83/A. advantage for the planter system. In this scenario, freshening strips would need a yield increase of +6.3 Bu/A. to offset this discrepancy.



We also know that planter applied N would have the initial cost of the Conceal® system on the planter itself, however with an additional return of +$39.79/A., a 16-row planter equipped with a dual-band system would potentially break even near 403 acres. In many cases, this would be a one-year break-even purchase.

Planting Date: May 1st Hybrid: Becks 6041Q™ Population: 36K Row Width: 30" Rotation: CAB Corn Price: $4.13 Custom Freshen Cost: $10/A

Conceal® Dual Band System: $1000/row, 16 Row Planter, 1000 Acres Annually, 4-Yr Amortization Broadcast N: Weed-N-Feed 32%UAN Pre-Plant.

PTI ILLINOIS

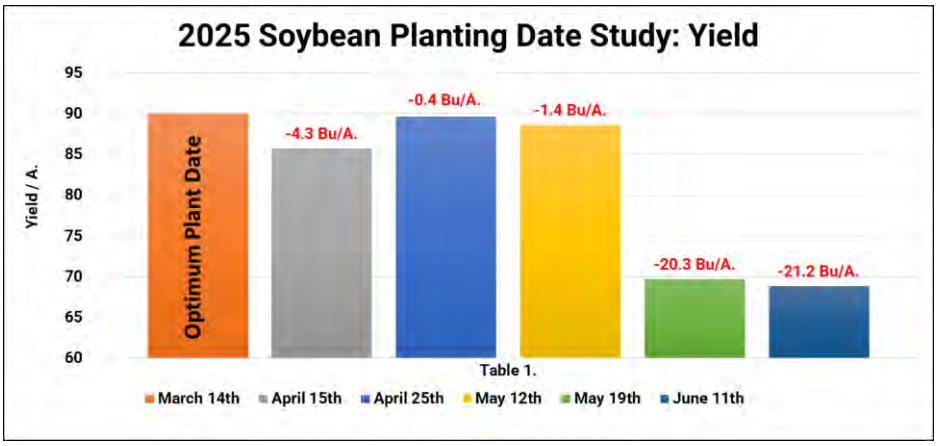
2025 PTI Results

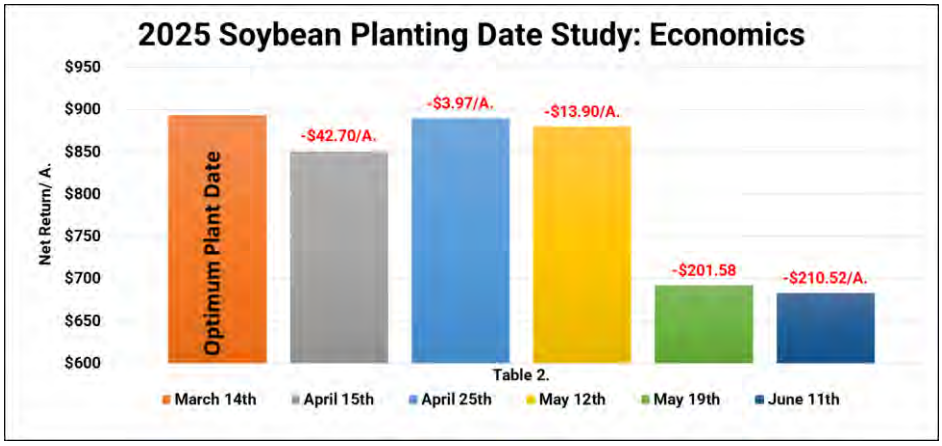
Soybean Table of Contents:

Soybean Planting Date Study

Objective: To evaluate various soybean planting dates throughout the spring to determine optimum planting date. Once optimum yield is discovered, data can then be analyzed to determine the deviation of yield at both early and late planting dates compared to traditional norms. With the recent trend of earlier soybean planting dates achieving higher yields, it is our intention to plant as early as possible in this study and plant every week throughout the spring planting season when fit.

Results: Table 1. illustrates yield results of six planting dates over March 14th, April 15th, April 25th, May 12th, May 19th, and June 11th. Optimum planting date occurred on March 14th, receiving the highest yield of 90.0 Bu/A.





April 15th plantings fell **-4.3 Bu/A.** behind the optimum March 14 planting, with economic losses of **-$42.70/A.**

April 25th and May 12th, plantings only fell by **-0.4 Bu/A.** to **-1.4 Bu/A.** with losses of **-$3.97/A.** and **-$13.90/A.**

May 19th started the downswing in yield with losses of **-20.3 Bu/A.** June 11th also offered losses of **-21.2 Bu/A.**, with both dates resulting in losses of over **-$200/A.**

Early planted soybeans have generally resulted in some of the highest soybean yields at the PTI Farm and 2025 was no exception to this rule. In general, early March up to May12th plantings offered excellent yield. After May 19th yield fell hard with large losses. Late planted soybeans suffered severe drought conditions in August and September.

Planting Date: Varied *Variety: Golden Harvest 3994E3* *Population: 120K* *Row Width: 30"* *Rotation: BAC* *SB Price: $9.93*

2025 PTI Results

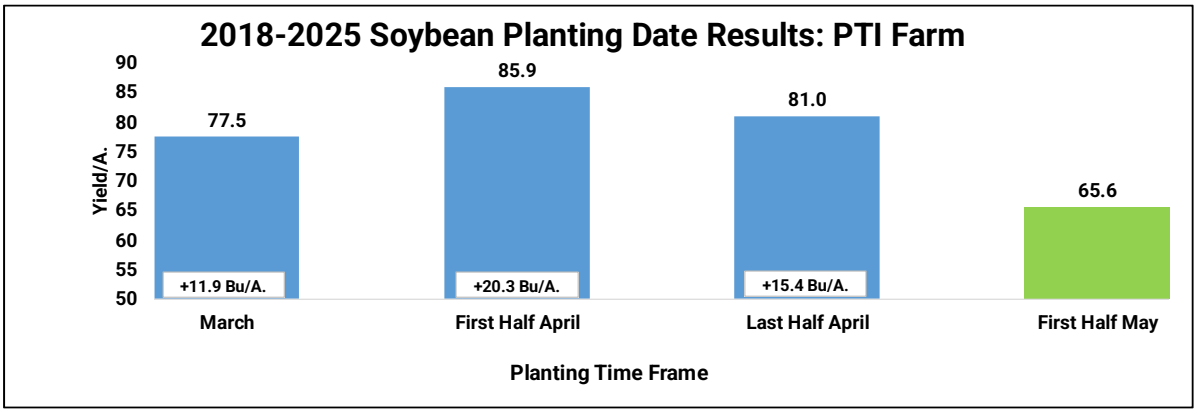
Multi-Year Early Plant Date Soybean Study:

Objective: To evaluate the yield and economics of early planted soybeans compared to traditional later soybean plant dates. Pushing planting dates earlier; extends the growing season, leading to earlier flowering dates, and overall higher yield potential.

Results: The table below illustrates multi-year early planted soybean data from the PTI Farm. Traditionally, planting dates during the first week of May is very common for soybeans. However, multi-year data from 2018-2025 has proven earlier planting can result in significant yield increases.

Ultra-early planting dates in March have accomplished +11.9 Bu/A. yield gains compared to that of traditional planting dates in the first week of May. As planting dates were made in either the first half or second half of April, yield gains of +20.3 Bu/A. to +15.4 Bu/A. were observed

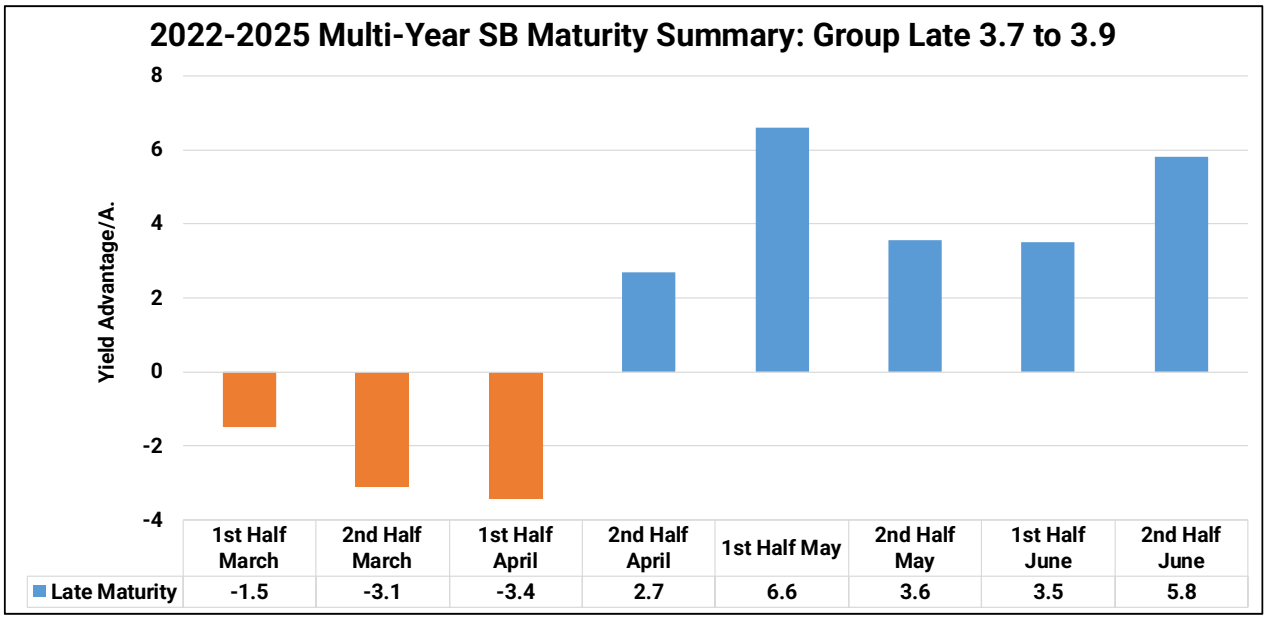
In general, PTI data suggests that if a grower is capable of moving planting dates earlier, increased yield is obtainable if managed correctly. Simply moving planting date earlier to the last half of April has increased soybean yield by +19%, compared to first half May plantings. Early planting soybeans has offered nice yield gains with zero cost to the grower.



Soybean Early Plant Maturity Study

Objective: With the recent trend of earlier soybean planting dates achieving higher yields, it poses the question "If I plant soybeans early, should I plant an earlier or later maturing soybean?" This planting date study compares early group 2.7 to 2.9 maturity group soybeans, to that of later 3.7 to 3.9 maturities planted from March through June.

Results: The table below summarizes the yield advantage of the late maturity soybeans. Early planting dates of March through 1st half of April have shown an advantage of +1.5 Bu/A. to +3.4 Bu/A. for the early maturity soybeans. However, after April 15th the later maturities have proven yield advantages of +2.7 Bu/A. to +6.6 Bu/A.



	1st Half March	2nd Half March	1st Half April	2nd Half April	1st Half May	2nd Half May	1st Half June	2nd Half June
Late Maturity	-1.5	-3.1	-3.4	2.7	6.6	3.6	3.5	5.8

Planting Date: Varied Variety: Early 2.7-2.9 Late 3.7 to 3.9 Population: 120K Row Width: 30" Rotation: BAC

Soybean Starter Fertilizer Response by Planting Date Study

Objective: To monitor the performance of starter fertilizer at various planting dates. When does starter fertilizer give the highest returns? Does starter fertilizer respond differently at earlier planted dates versus later? In this study we evaluate five planting dates consisting of March 14th, April 15th, April 25th, May 12th, and May 19th with and without a starter fertilizer, monitoring its performance throughout the planting season.

The starter fertilizer program used for this study consists of the following:

Product	Fertilizer Analysis	Placement of Fertilizer
3 Gal/A. Triple Option®	4-13-17-1S	FurrowJet® 3-way

All starter fertilizer treatments were implemented as a re-allocation program where $20/A. was removed from the fall dry program to prevent over-application and overspending of nutrients.

Figure 1. FurrowJet® Placement

2025 PTI Results

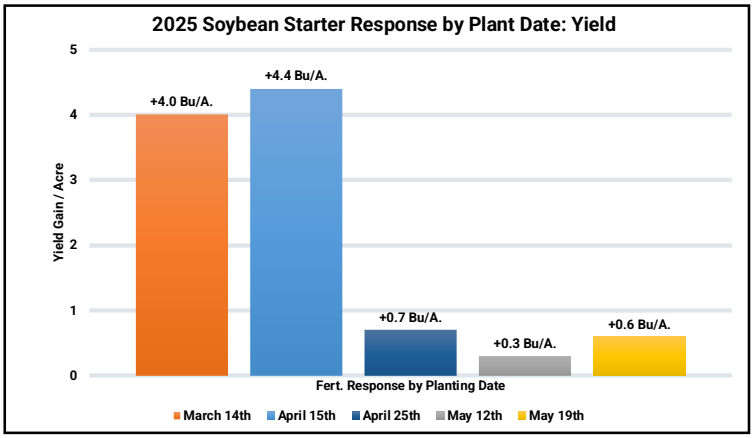
Soybean Starter Fertilizer Response by Planting Date Study

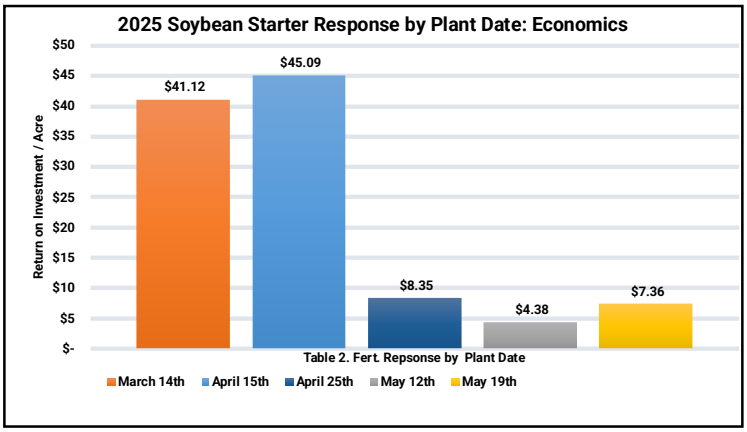
Results: Table 1. illustrates all starter fertilizer treatments offered positive yield and economic returns at each of the five planting dates. 2025 starter fertilizer treatments offered the highest yield gains of +4.0 Bu/A. to +4.4 Bu/A. at early March 14th and April 15th plantings.

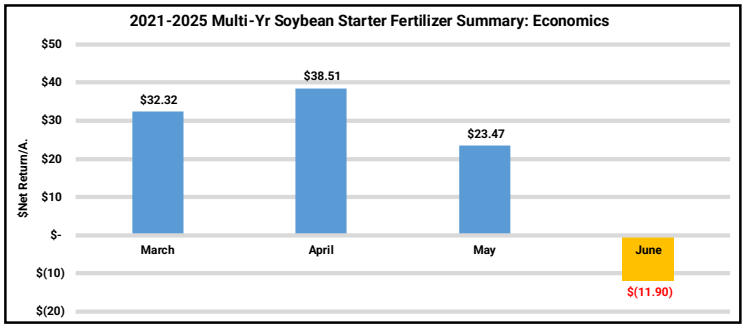
As planting dates shifted past April 25th, yield gains slipped to gains less than a bushel/A.

Multi-year data over 2021 to 2025 has proven highest average net return at March and April soybean plantings with net returns of +$32/A. to near $38/A., May plantings fall to +$23/A., while June plantings failing to offer enough yield gain to offset the fertilizer cost with net losses of near **-$12/A.**

The flexibility of re-allocating and adjusting fall plow down to allow for starter fertilizer on the planter creates a free insurance program for growers to hedge risk to combat cool wet challenging spring weather with a free starter program. If the starter does not perform, the grower has no cost increase in the overall program.







Planting Date: Varied *Variety: GH 3994E3* *Population: 120K* *Row Width: 30"* *Rotation: BAC* *SB Price: $9.93*

Triple Option: $6.20/Gal *$20 Fertilizer Reallocation*

PTI ILLINOIS

2025 PTI Results

SmartDepth® Soybean Planting Depth Study

Objective: To evaluate yield and economic performance of various manual soybean planting depths consisting of 1” to 3” in ¼” increments, compared to automated variable depth planting using SmartDepth® control.

Figure 1. Seed Furrow

Digging seeds is a time consuming yet important task at planting time (Figure 1). Getting your eyes on the furrow where the seeds are placed will allow you to understand if those seeds are in an environment to thrive. Is the seed being planted into adequate moisture? Until now, we didn't know this for every seed, and we were unfortunately simply guessing.

With a SmartFirmer® sensor (Figure 2.) you can now have virtual eyes in the furrow. Soil moisture is a critical component for seed germination, uniform plant emergence, and ultimately crop yield. SmartFirmer® sensors gives row-by-row visibility to soil moisture in the seed furrow, allowing farmers to choose the right planting depth as soil conditions change. Currently, the recommendation for ideal furrow moisture levels to achieve adequate soybean emergence, is near 32%. Using the 20|20® monitor (Figure 3.) in tandem with SmartFirmer® sensors, we now have the ability to evaluate furrow moisture in real-time. Based on this real-time information, growers can make decisions based on live sensing data.

Figure 3. 20|20® Monitor System

Figure 2. SmartFirmer® Sensor

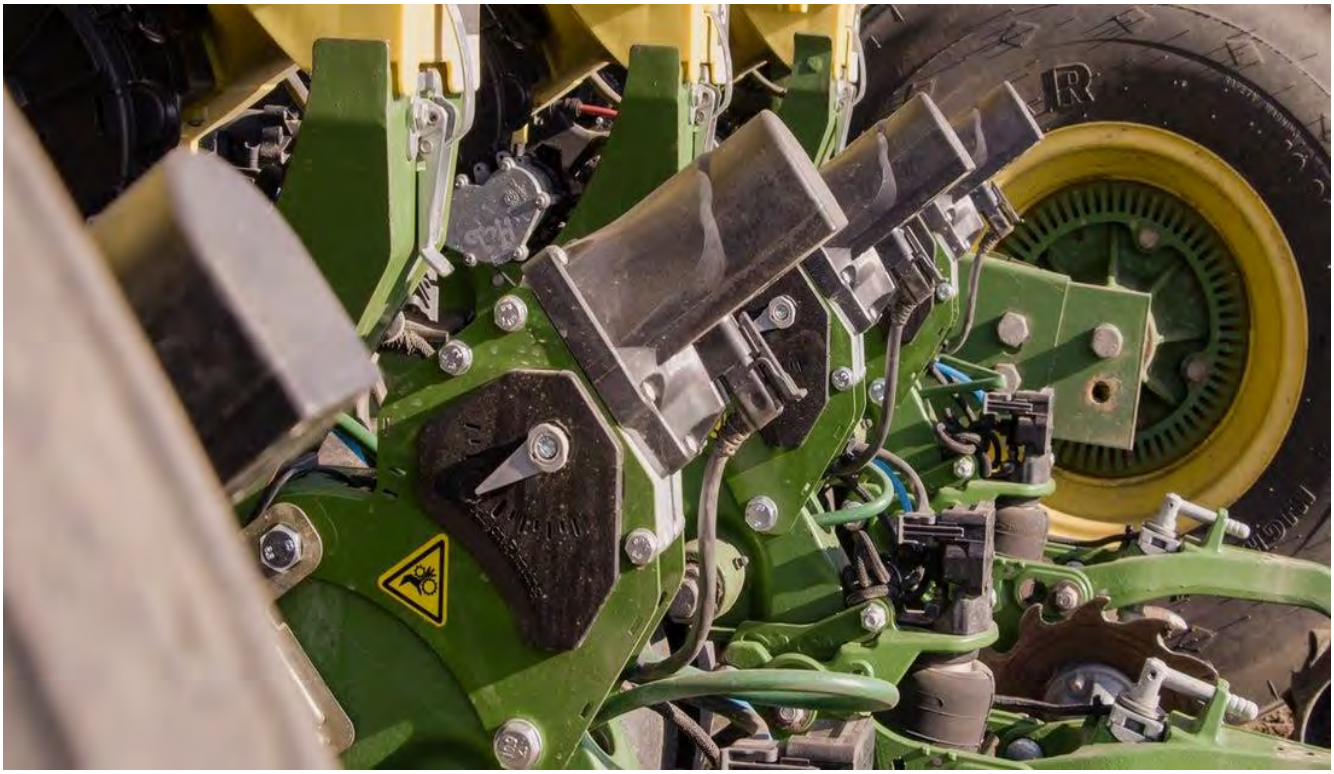
PTI ILLINOIS

SmartDepth® Soybean Planting Depth Study

Figure 4. illustrates SmartDepth®, a unique product that takes the technology one additional step further, allowing planting depth to be changed on a planter, by section or individual row basis. This can be done manually from the tractor cab and 20|20® console, or automatically using furrow moisture values from SmartFirmer® sensors. Growers can customize their own settings to optimize both furrow moisture and planting depth values (Figure 5). This control allows growers to measure, react, and take control of planting depth to optimize emergence timing.

Figure 5. SmartDepth® Customization Screen

Figure 4. SmartDepth® Control System

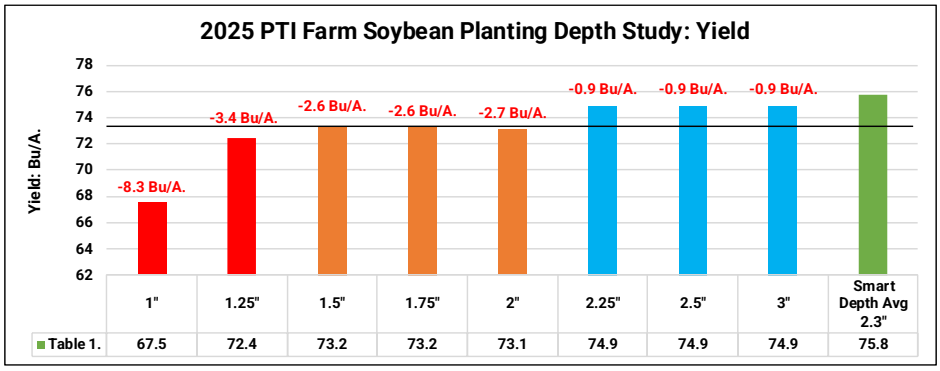


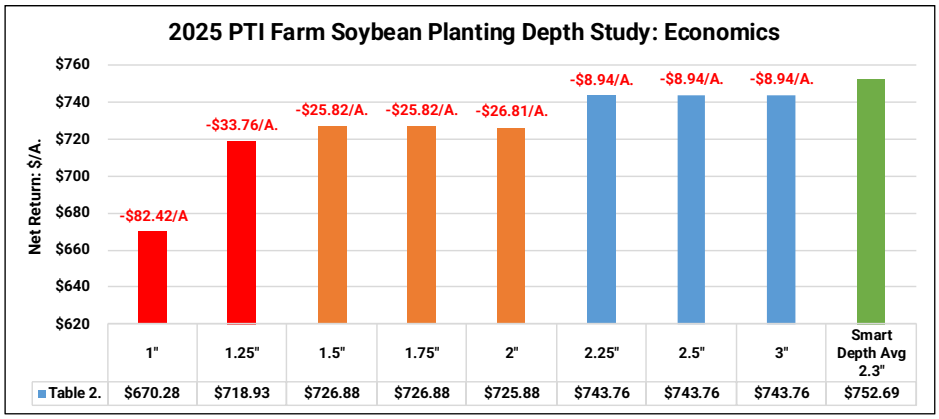
2025 PTI Results

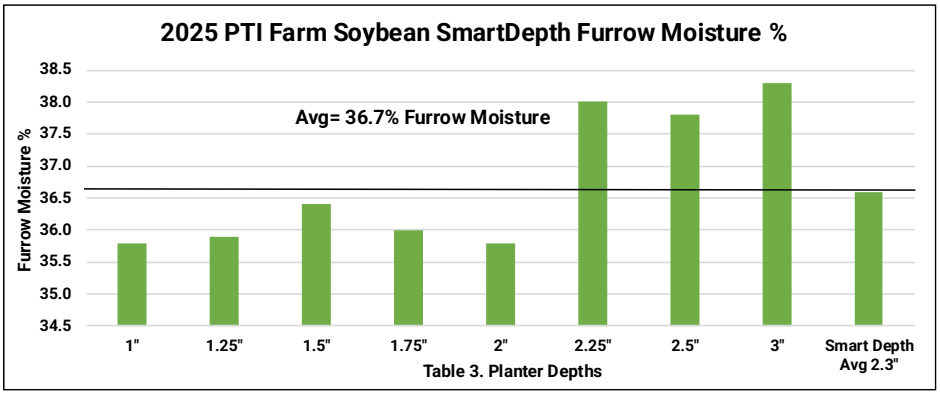
SmartDepth® Soybean Planting Depth Study

Results: Tables 1-2. reveal that SmartDepth® offered the highest yield in the study at 75.8 Bu/A. Manual depth setting results can be evaluated as three different "buckets". First, deeper depths of 2.25" to 3" yielded identically, but **-0.9 Bu/A.** off the pace from SmartDepth®. These depths resulted in economic losses of **-$8.94/A.** Secondly, manual depths of 1.5" to 2" also resulted in identical yield performance near 73 Bu/A., but off **-2.6 Bu/A.** to **-2.7 Bu/A.** with economic losses of **-$25/A.** to **-$26/A.** Finally, the shallow depth settings resulted in the largest losses in the study. 1.5" resulted in losses of -3.4 Bu/A. and **-$33.76/A.,** while the shallowest setting of just 1", tallied losses of **-8.3 Bu/A** with largest economic losses of **-$82.42/A.**

Table 3. illustrates average furrow moisture of 36.7% across all planter rows when SmartDepth® was used to obtain ideal planting depth into moisture. Currently, the recommendation for ideal furrow moisture levels to achieve adequate soybean emergence is near 33%. More work needs to be done to understand how to continually customize settings to achieve proper planting depth automatically. However, it does appear that by using SmartDepth®, SmartFirmer® and a 20|20® monitor system, growers can measure and chase the furrow moisture line and adjust planting depths as they deem appropriate.







Planting Date: May 10th Variety: Asgrow 27FX1 Tillage: Strip-Till Population: 130K Row Width: 30" Rotation: BAC Soybean Price: $9.93

PTI ILLINOIS

Reveal® Residue Management Study

Figure 1. Reveal® System

Objective: This study evaluates the yield and economic benefit of Reveal® frame mounted row cleaners in a soybean after corn conventional tillage environment.

Residue management is a necessary part of today's operation to maximize profitability. Tougher stalks and more corn-on-corn acres mean a heavier load of residue that needs to be controlled. Residue in the seed trench competes with seedlings for moisture and can harbor diseases.

Reveal® (Figure 1-2.) is frame mounted, so unlike other row cleaners it gets rid of that row unit chatter. It has a gauge wheel that precisely controls the depth of the cleaning tines. It also has an airbag that makes sure the depth that it's set at, stays consistent. The pressure of the airbag can be controlled on the 20|20® monitor (Figure 3).

In this agronomic study, Reveal® is compared to the absence of row cleaners at 20 PSI Notch 1 down settings.

Figure 3. 20|20® System

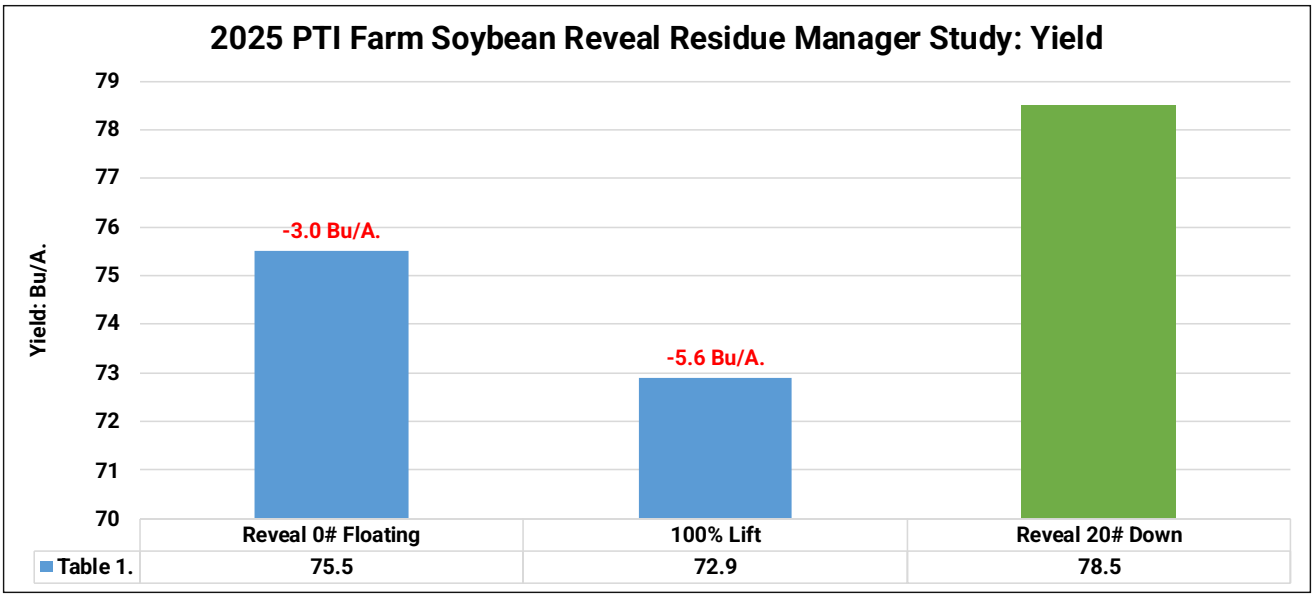
Figure 2. Reveal® System

Reveal® Residue Management Study

Results: Table 1. Illustrates 100% Lift (no row cleaners) resulted in positive yield losses of **-5.6 Bu/A.** compared to the grower standard of 20# down. At $9.93/Bu., this equates to economic losses of **-$55.61/A**. and proves to be a core principle of planting that a grower should not overlook.

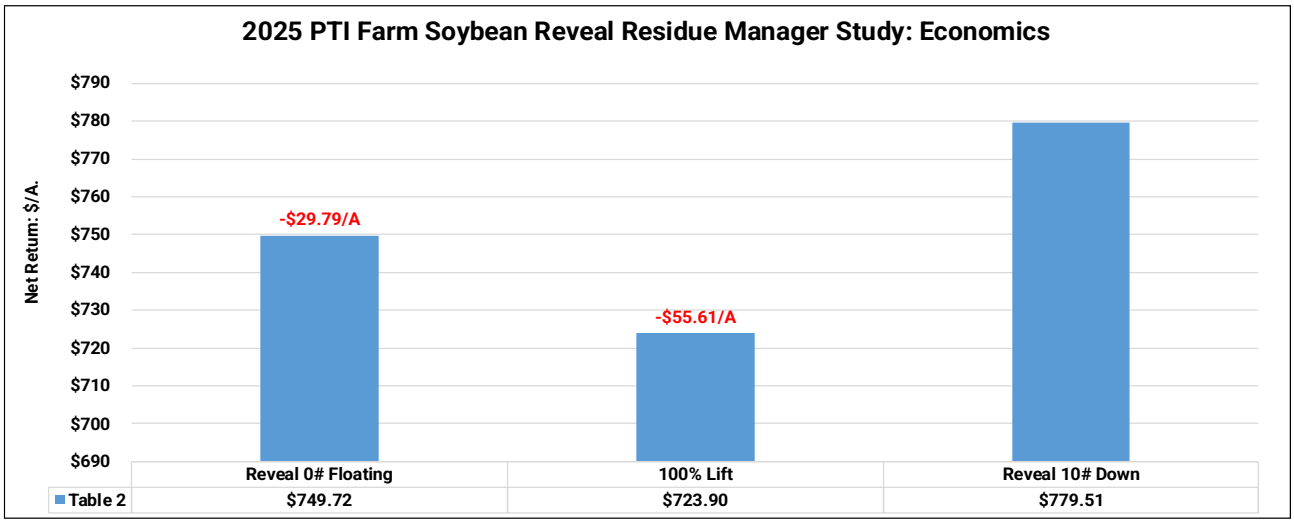
Reveal® set at 0# floating resulted in losses of **-3.0 Bu/A.** and **-$29.79/A.**

Figure 4. Reveal® System



Reveal® Residue Management Study

Table 3. illustrates multi-year data comparing the absence of residue managers, floating residue managers to Reveal® set at 20 PSI down. Over the past six years, 20 PSI had an economic advantage of +$38.78/A. over 100% lift (no residue managers) and +$20.95/A. over a floating residue management system

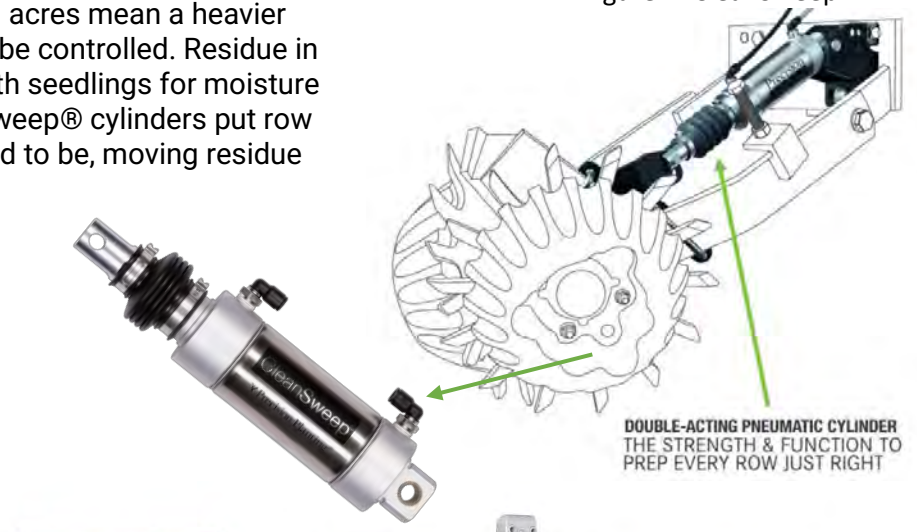


Planting Date: May 8th *Variety: Asgrow 27FX1* *Tillage: Strip-Till* *Population: 130K* *Row Width: 30* *Rotation: BAC* *SB Price: $9.93*

CleanSweep® Residue Management Study

Objective: This study evaluates the benefits of planter row cleaners equipped with CleanSweep® cylinders. Residue management has become a necessary part of today's operation to maximize profitability. Tougher stalks and more corn-on-corn acres mean a heavier load of residue that needs to be controlled. Residue in the seed trench competes with seedlings for moisture and harbors disease. CleanSweep® cylinders put row cleaners right where they need to be, moving residue but not the soil. Continuous adjustments can be made as field conditions change with the cab-mounted controller to easily lift or make more aggressive adjustments.

Figure 1. CleanSweep®



In this study, we use air pressure to adjust CleanSweep® cylinder settings on Yetter 2967 spike row cleaners to allow the ability to change and evaluate the aggressiveness of row cleaners. These settings were then evaluated to study yield and economic advantages.

These agronomic settings consisted of:

- Lifting the row cleaners 100% to simulate the lack of row cleaners.
- A "floating" (0# psi) position that allows the row cleaner to ride along top of the soil surface with no air control, lift, or down-pressure.
- 20# of air down-pressure, just aggressive enough to wipe crop residue and clods out of the way to lead a clean path ahead of the planter gauge wheels and seed disc openers.

CleanSweep® Residue Management Study

Results: Table 1. illustrates CleanSweep® cylinder multi-year yield results from the PTI Farm. Over 5 years of data, 100% lift (no row cleaners) provided an average yield loss of **-0.8 Bu/A.**, compared to the 20PSI down grower setting. Floating row cleaners proved average gains of +0.9 Bu/A. compared to the more aggressive grower setting of 20#psi down.

Figure 2. Yetter Row Cleaners with CleanSweep®

Tables 2. summarizes average economic gains from CleanSweep® cylinders during the 20, 21, 22, 24, 25 growing seasons. During this time-period, row cleaners equipped with CleanSweep® cylinders at 20#psi down realized a +0.8 Bu/A. yield gain compared to using no row cleaners. These gains resulted in gross revenue increases of +$8.97/A.

This same 20#psi down setting also had decreased yields over the 0# float position by **-0.9 Bu/A.** and consequently decreased revenue by **-$10.56/A.**

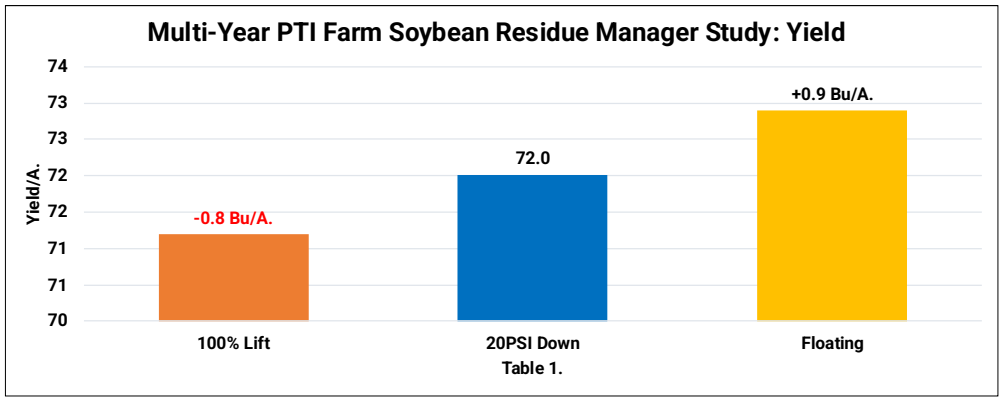


Table 1.

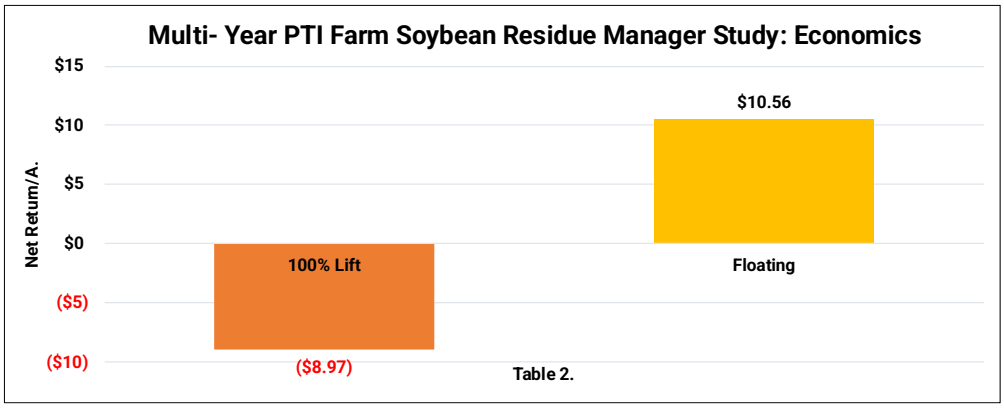


Table 2.

Planting Date: May 24th Variety: GH 3035E3 Population:130K Row Width: 30" Rotation: BAC Soybean Price: $9.93

DownForce Management Study

Objective: This soybean study evaluates yield impact of implementing proper downforce compared to too light or too heavy row unit settings. Planter row unit downforce is a common agronomic issue that often goes unaddressed. When downforce matches field conditions, the depth of planting is consistent and correct. Too light of row unit downforce causes planting depth to shallow up, potentially placing seed in dry soil, creating poorly rooted plants that struggle for water and nutrients. Conversely, too much downforce can lead to furrow side-wall compaction, also creating an environment that can cause limited plant access to water and nutrients.

Figure 1. DeltaForce® Cylinder

DeltaForce® system replaces the springs or air bags on your planter with hydraulic cylinders (Figure 1). It automatically increases or decreases weight with military precision, on each row individually. When one row encounters conditions different than another (wheel tracks, old roadbeds, clay knobs, headlands, etc.), each will adjust independently (Figure 2). Row by row, foot by foot, even seed by seed an environment that fosters uniform germination, optimum growth and maximum yield can be produced.

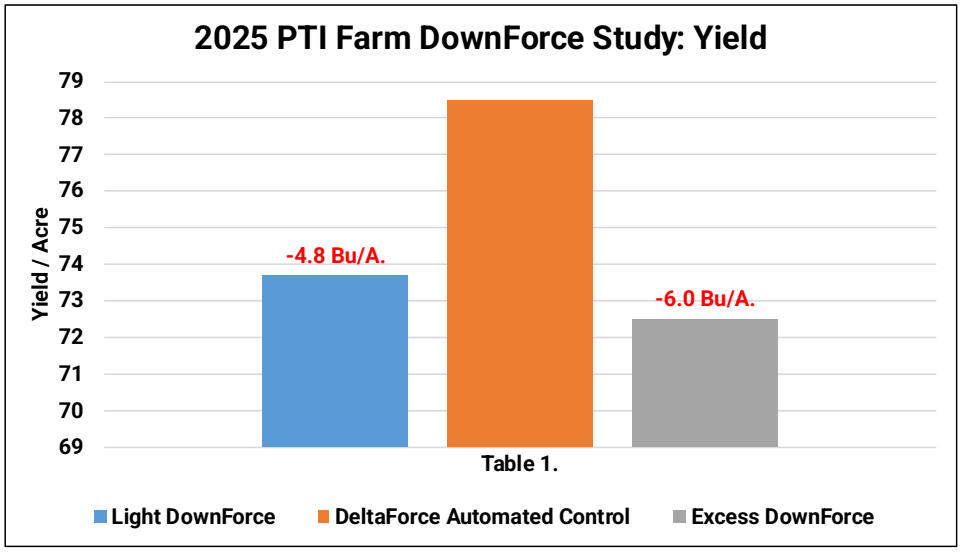
Figure 2.

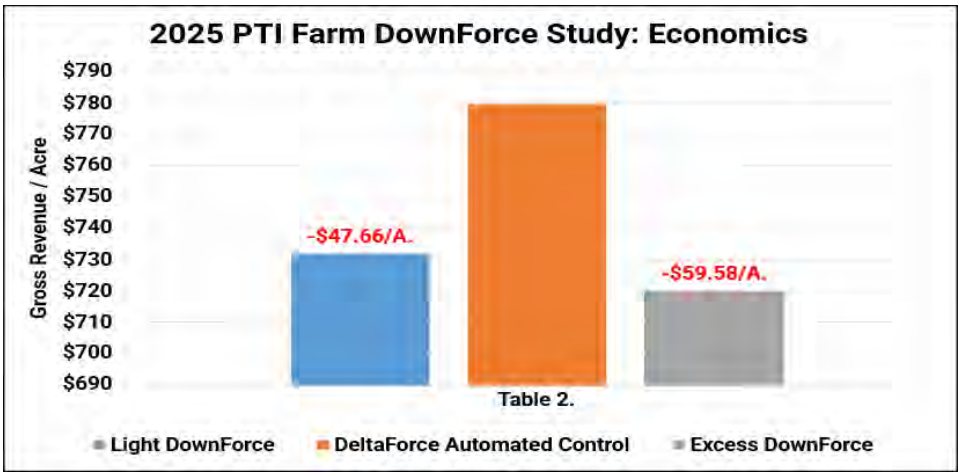
DownForce Management Study

Results: Tables 1-2. illustrates the yield and economic response of DeltaForce® automated control compared to excessive and light downforce settings. Settings for this study include.

- Too light of Downforce (175# lift, 100# down)
- Proper Downforce (Automated Custom 90#)
- Excess Downforce (550# down, 100# up)

2025 data resulted with light downforce realizing yield losses of **-4.8 Bu/A.**, with corresponding net economic losses of **-$47.66/A.** Heavy downforce caused yield losses of **-6.0 Bu/A.**, with economic losses of **-$59.58/A.**

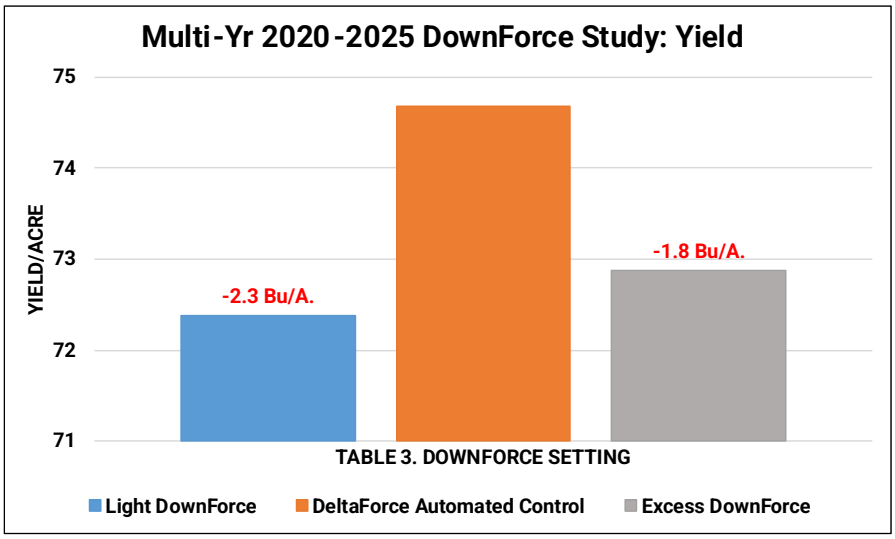


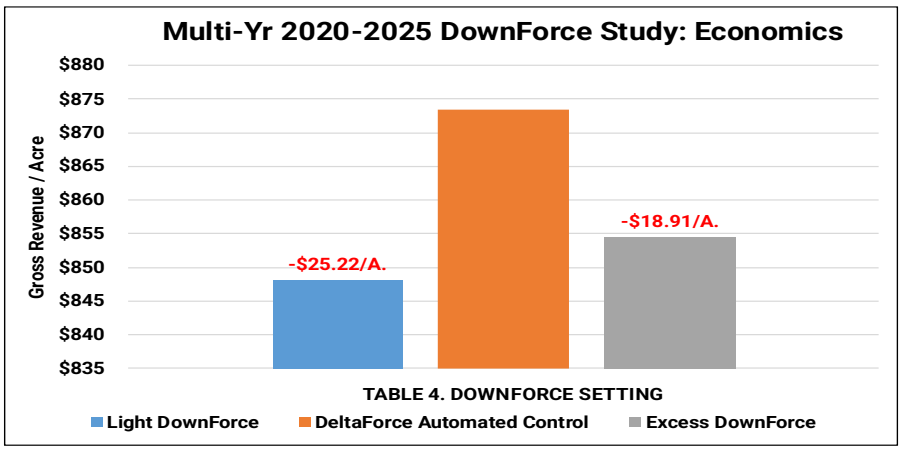


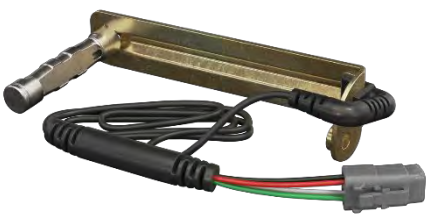
2025 PTI Results

DownForce Management Study

Tables 3-4. illustrate multi-year data which resulted in light downforce having yield losses of **-2.3 Bu/A.**, with corresponding net economic losses of **-$25.22/A.** Heavy downforce caused yield losses of **-1.8 Bu/A**., with economic losses of **-$18.91/A.**







Planting Date: May 10th *Variety: Asgrow 27 FX1* *Population: 130K* *Row Width: 30"* *Rotation: BAC* *Soybean Price: $9.93*

PTI ILLINOIS

2025 PTI Results

Keeton® Seed Firmer Study

Objective: This study evaluates the benefits of Keeton® Seed Firmers (Figure 1). Seeds don't always land right at the bottom of the trench where they belong. With its unique, in-the-trench design, the Keeton® Seed Firmer gently firms those seeds to the bottom of the V-trench (Figure 1). The end result is even depth, correct seed-to-soil contact, and most importantly uniform germination.

Results: Keeton® seed firmers resulted in yield gains of +1.1 Bu/A. with a return on investment of +$10.92/A. The table below illustrates multi-year data over the time period of 2020-2025 where Keeton® Seed Firmers have resulted in an average yield gain of +1.4 Bu/A, with a net return of +$16.51/A.

At a cost of $40/row for Keeton® Seed Firmers and quick attach brackets for a 16-row planter, using the +$16.51/A. increase in revenue, break-even occurs at only 39 acres.

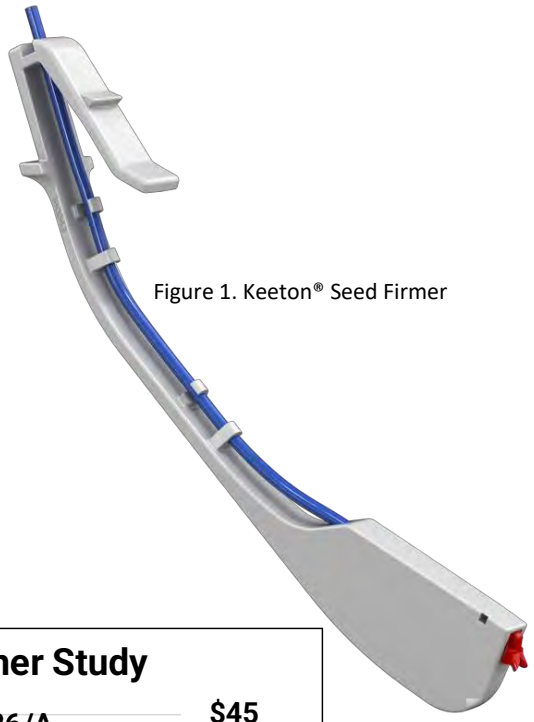
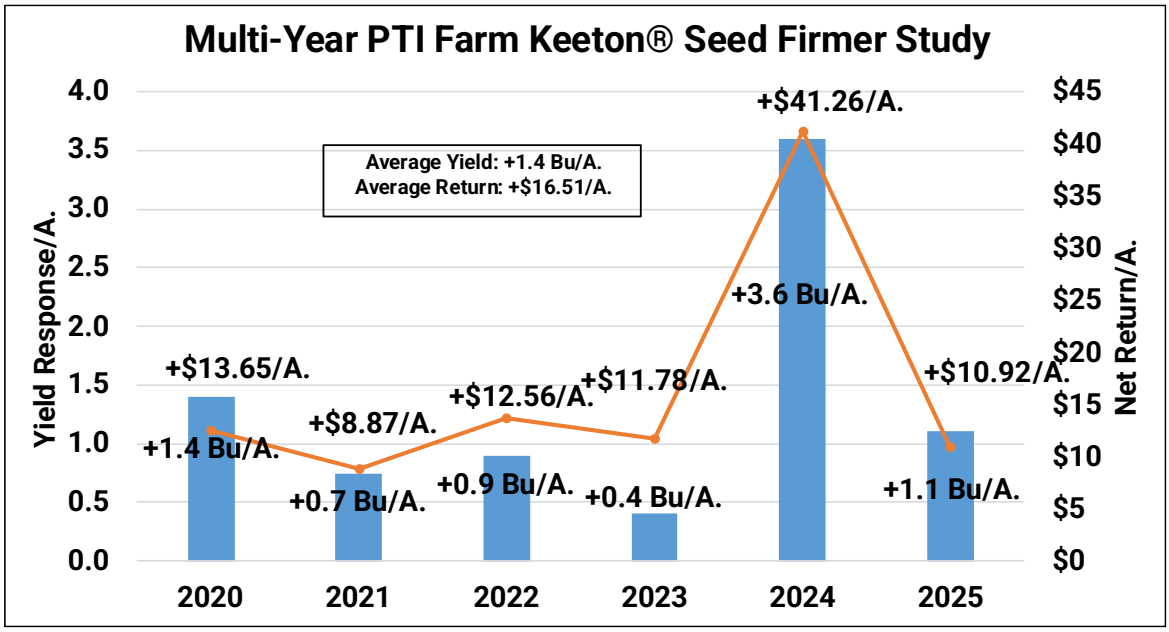


Figure 1. Keeton® Seed Firmer



Planting Date: May 10th *Variety: Asgrow 27FX1* *Population: 130K* *Row Width: 30"* *Rotation: BAC* *Soybean Price: $9.93*

PTI ILLINOIS

2025 PTI Results

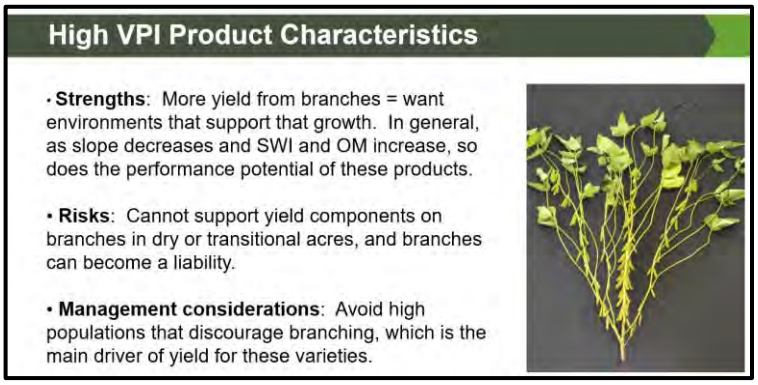
Multi-VPI Variety and Seeding Rate Study

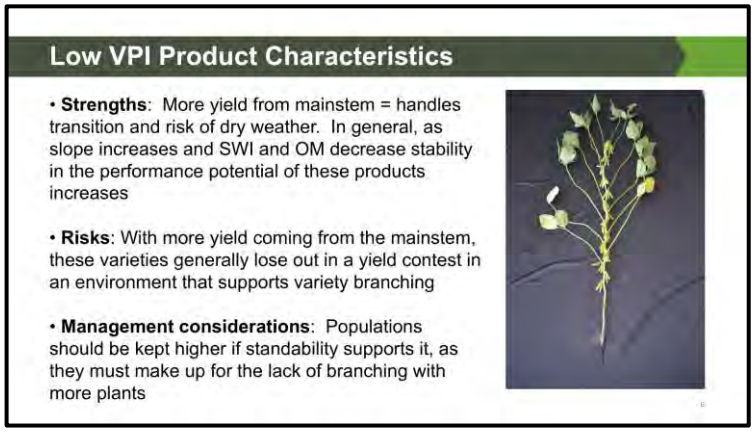
Objective: To analyze the yield and economic benefits of multi-variety planting, utilizing the Variety Productivity Index (VPI) mechanism of soybean varieties to accurately place and manage seeding rates at a subfield level. Multi-variety and VR seeding rates outperform static seeding rates in most environments by accounting for the opportunities and risks of subfield environments and the mechanisms that determine yield components of individual soybean varieties. This trial is a joint project with Precision Planting®, BASF®, and Advanced Agrilytics®. BASF's Credenz® 3105E (low VPI) and 3014E (high VPI) were used in this study.

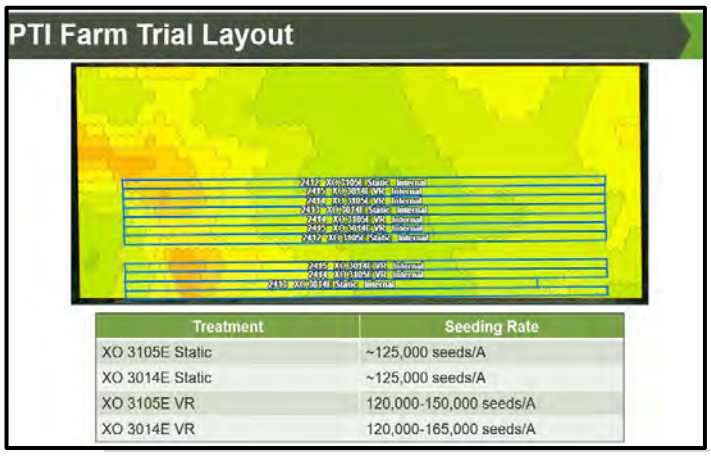
High VPI soybean varieties generate more yield from branching abilities. In general, as organic matter and soil water availability increases, so does yield potential. However, this VPI cannot support branching in drought scenarios and yield diminishes. High seeding rates should be avoided that discourage branching.

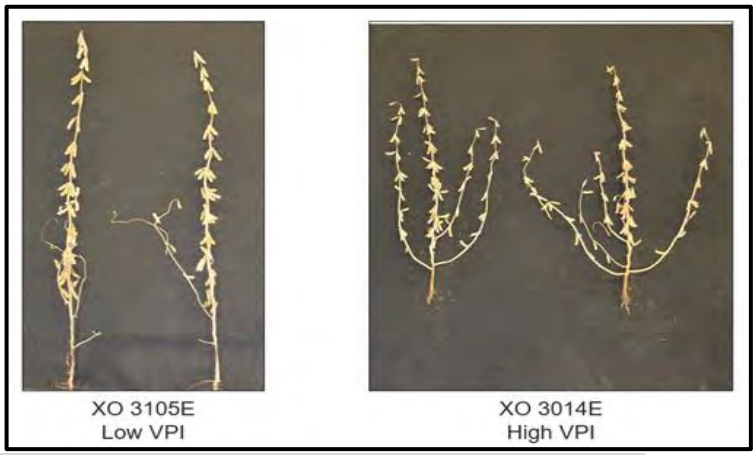
Low VPI soybean varieties generate more yield from its mainstem. In general, as organic matter and soil water availability decreases, stability in yield potential increases. Seeding rates should be kept higher to make up for the lack of branching with more plants.

The prescription map below summarizes how both VPI soybean varieties were tested at the PTI Farm in water-limited, stable, and saturated zones.









PTI ILLINOIS

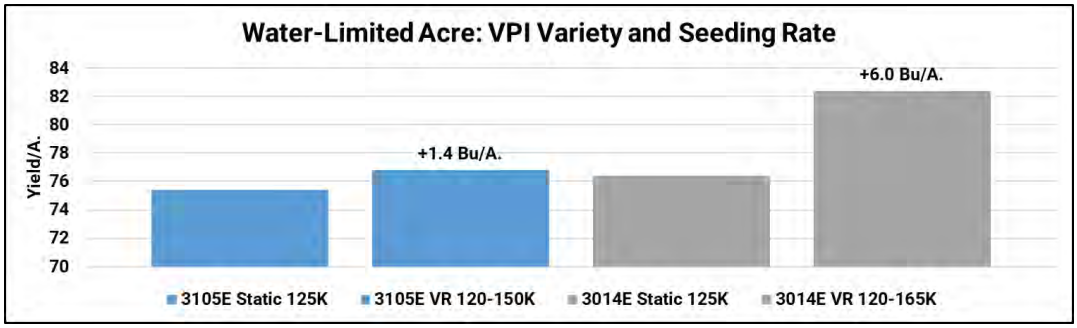
Multi-VPI Variety and Seeding Rate Study

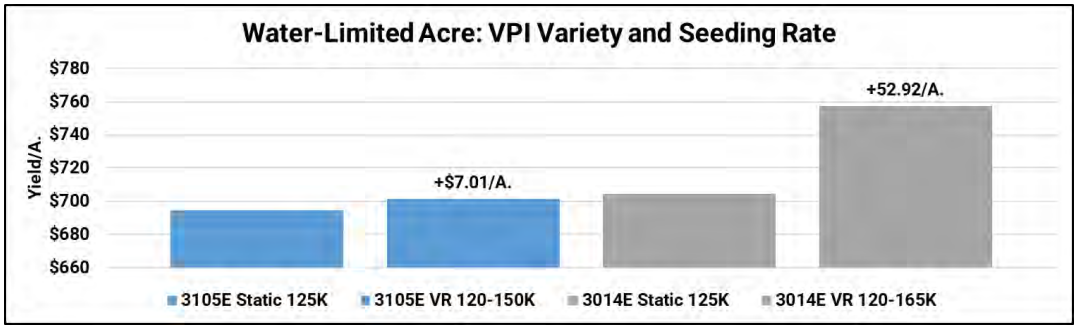
Results: Advanced Agrilytics analyzed the data after harvest and found that on water-limited (drought) acres, 3014E proved yield gains of +6.0 Bu/A. by using both multi-variety and variable seeding to match those yield challenging acres, versus just a static seeding rate of 125K. 3105E also proved advantages, however smaller gains of +1.4 Bu/A.

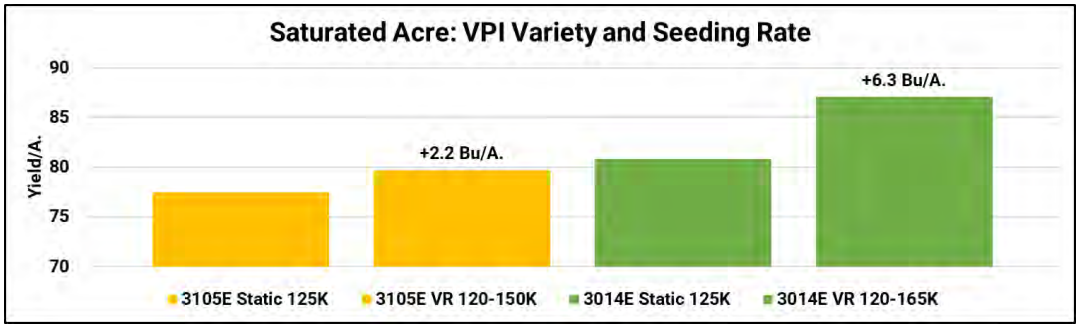
When calculating yield and seed cost, 3014E tallied economic gains of +$52.92/A. and 3105E at +$7.01/A.

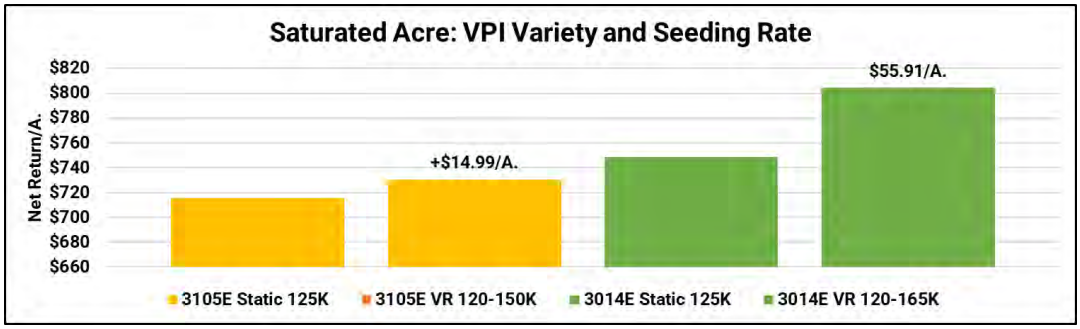
When analyzing the acres that tend to have more availability of water (saturated acres), both varieties also proved gains of +6.3 Bu/A. and +2.2 Bu/A. respectively. These gains equated to positive economic gains of +$14.99 and +$55.91/A.

Understanding VPI and where yield is expressed, tells an exciting story of how to manage both placement and seeding rate of the soybean variety. We look forward to learning more what varieties possess these traits and to place them properly.









Planting Date: May 18th Varieties: Credenz 3014E, 3105E Population: Varied Row Width: 15" Rotation: BAC Soybean Price: $9.93 Seed Cost: $65/Bag

Soybean Singulation Study

Objective: To evaluate the agronomic and economic advantage of singulating soybeans. In this study we compare the use of an 80-hole vs 56-hole soybean crop kit (Figure 1). Typical spacing of soybean plants achieved with singulation is illustrated in (Figure 2.)

Figure 1.

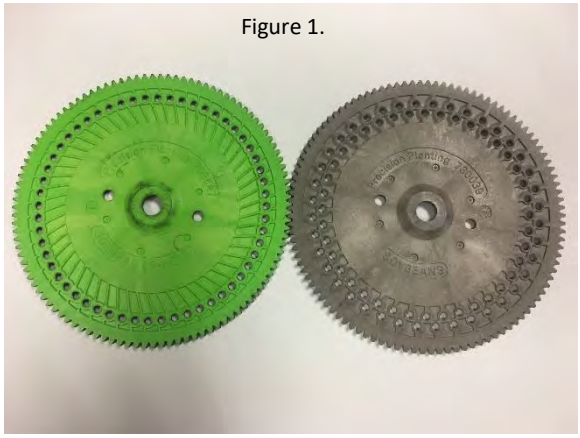
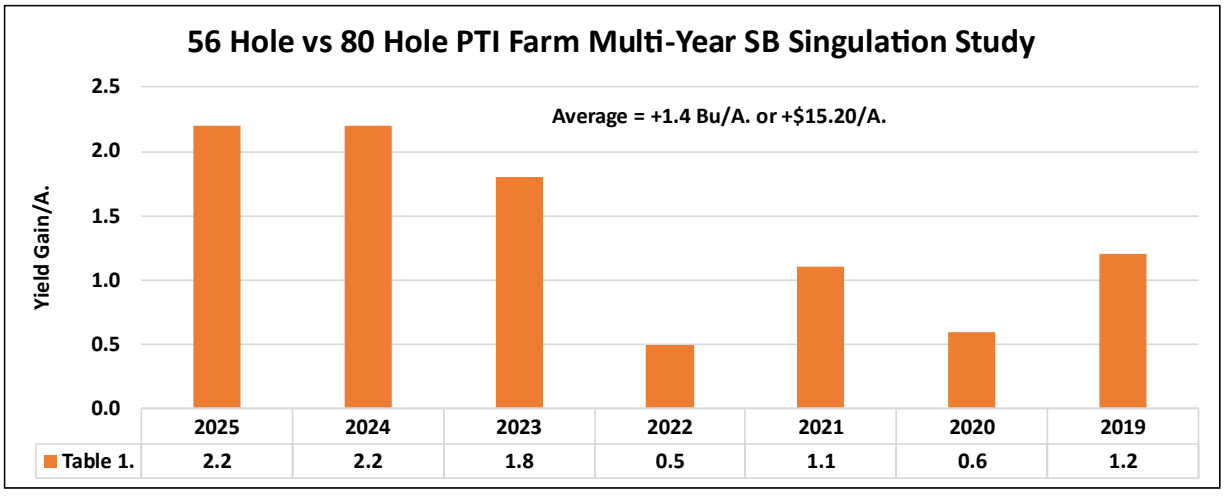


Figure 2.

Results: The table below summarizes the yield increase of singulating soybeans with a 56 hole crop kit. 2019-2025 proved a +1.4 Bu/A. yield gain over this time period. Using these yield gains, along with the commodity price for each year, shows a +$15.20/A. advantage over the gray 80 hole-disc.

The cost of upgrading to the 56-hole disc and new ejector wheel is $58 a row assuming you already have a singulator. When using multi-year economic data, on a 16-row planter it would take a grower 62 acres to break-even on this low cost investment.



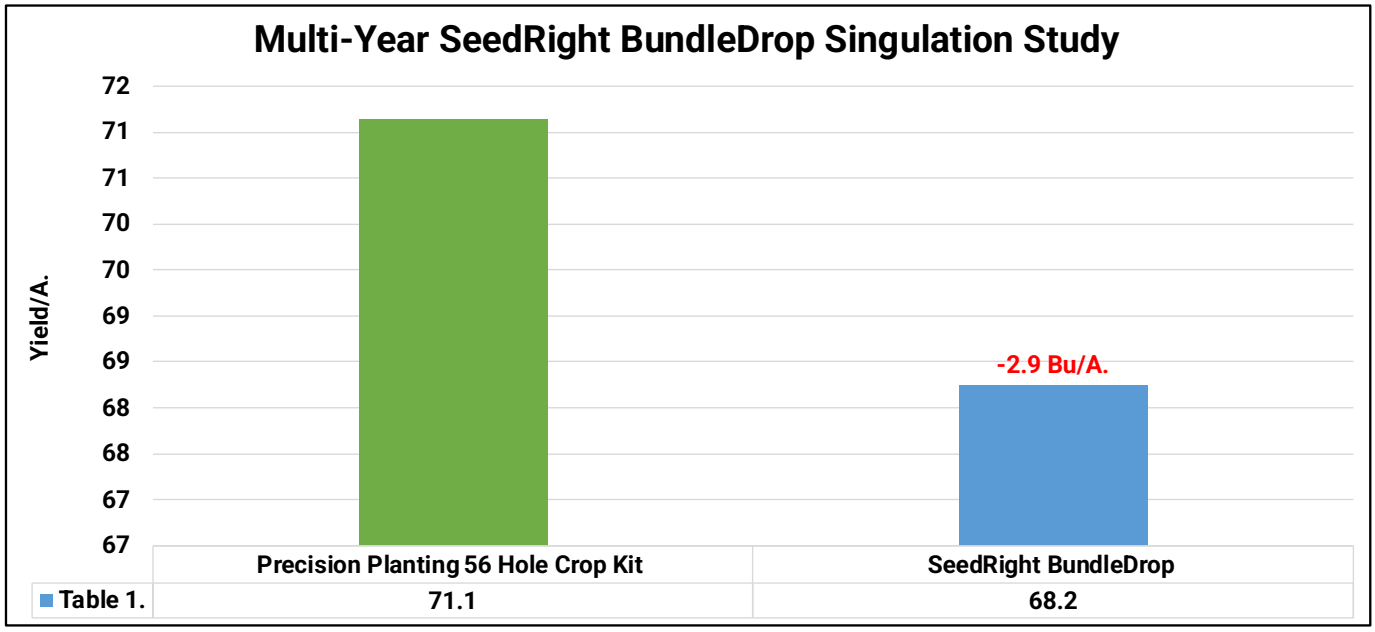
Planting Date: May 10th Variety: Asgrow 27XF1 Population: 130K Row Width: 30" Rotation: BAC Soybean Price: $9.93

2025 PTI Results

SeedRight BundleDrop Singulation Study

Objective: To evaluate the agronomic and economic advantage of planting soybeans into "bundles". The SeedRight BundleDrop plate allows the ability to plant soybeans in bundles of four seeds. This "team" approach is designed to help improve emergence and overall plant stand by multiple soybean plants emerging at the same time in a concentrated area to fight through soil crusting.

Results: In our fourth year of testing BundleDrop, multi-year data proves **-2.9 Bu/A.** with corresponding economic losses of **-$33.26/A.**



Planting Date: May 10th *Variety: Asgrow 27FX1* *Population: 130K* *Row Width: 30"* *Rotation: BAC* *Soybean Price: $9.93*

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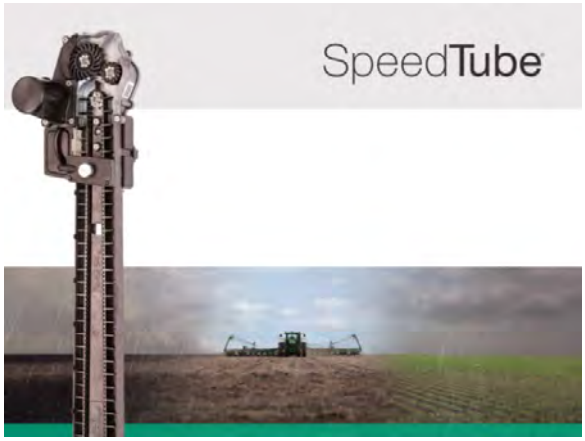
2025 PTI Results

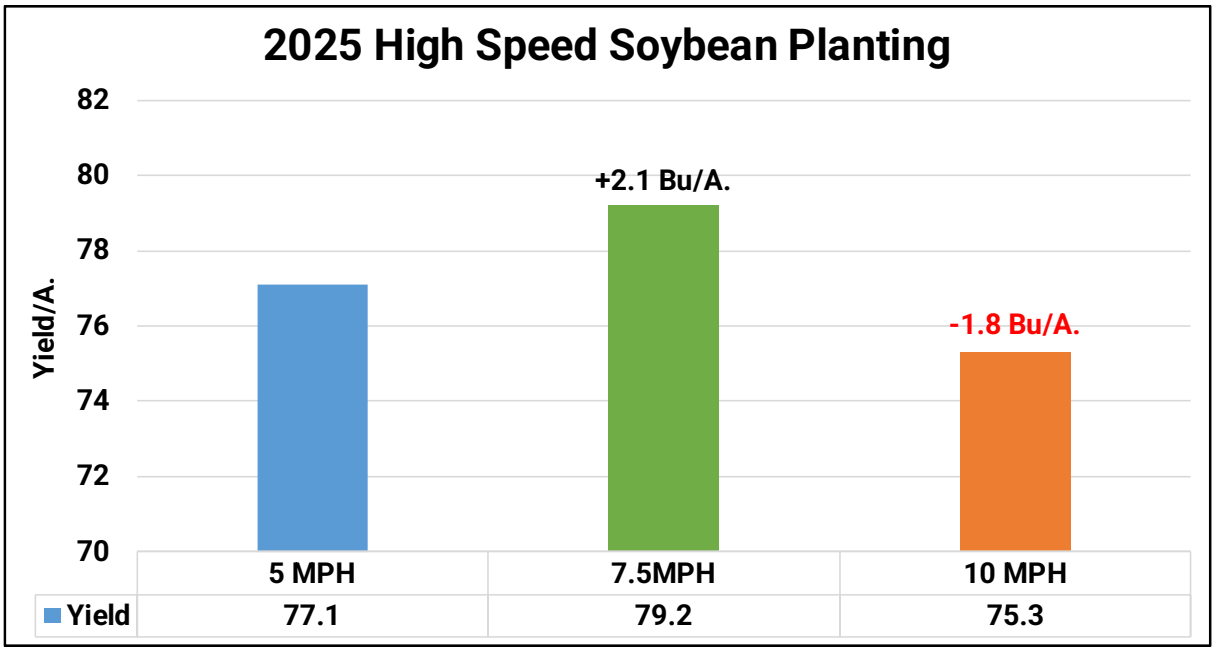
High Speed Soybean



Objective: To evaluate yield response of planting speeds 5, 7.5, and 10 MPH with a SpeedTube® SpeedTube® high-speed planting technology takes the place of conventional seed tubes and consists of a flighted belt. By transporting each seed to the furrow, there is no opportunity for seeds to ricochet into the trench. Even at twice normal planting speeds, seed arrives safely at the bottom of the trench, spaced evenly, every time.

Results: Using SpeedTube® technology, there was only a +2.1 Bu/A. range difference at planting speeds of 5MPH between the two systems. However, at 10MPH SpeedTube® proved yield losses of **-1.8 Bu/A.** compared to a normal SeedTube system.

This data would suggest that growers can plant at significantly higher speeds with SpeedTube® technology without sacrificing planter performance.



Planting Date: May 20th *Variety: Pioneer37A18E* *Population: 130K* *Row Width: 30"* *Rotation: BAC* *Tillage: Strip-Till* *56 Cell Crop Kit*

PTI ILLINOIS

Soybean Closing Wheel Study

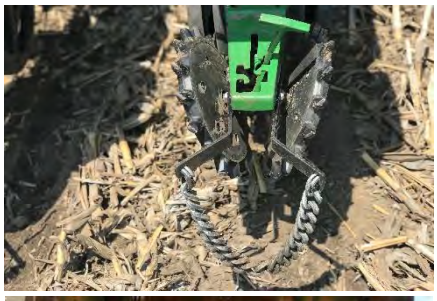
This closing wheel study evaluates yield and economics of six distinctly different types of closing wheel systems including the following:

FurrowForce® Closing and Automatic Control System:

Advantages:	Lifts and fractures sidewall compaction/smear
	2nd stage stitching and removal of air pocket
	Ability for automatic sensing/control of soil variability
Disadvantages:	Rocks can be problematic, increased cost

Non-Sensing Traditional Dual Rubber Closing System:

Advantages:	Sealing or “Pinching” in dry conditions
Disadvantages:	Difficult to lift/fracture sidewalls, struggles to close furrow



Non-Sensing Dual Yetter Poly Twister® Closing System:

Advantages:	Lifts and fractures sidewall compaction/smear
	Center ring acts as depth maintainer
Disadvantages:	Lightweight wheels require increased tension

Non-Sensing Martin-Till® fCrusher Closing System:

Advantages:	Tapered tooth design – Lightweight Cast
	Allows firming and crumbling.
Disadvantages:	Single Stage, Potential to Overpack

Non-Sensing Case Manual Two Stage with Cupped Razor Closing Discs System:

Advantages:	Lifts and fracturs sidewall compaction/smear
	2nd stage removal of air pocket
	Multiple manual settings for easy adjustment
Disadvantages:	Manual Control – no sensing

2025 PTI Results

Soybean Closing Wheel Study

Non-sensing Case Manual Two Stage System:

Advantages: Lifts and factures sidewall compaction/smear

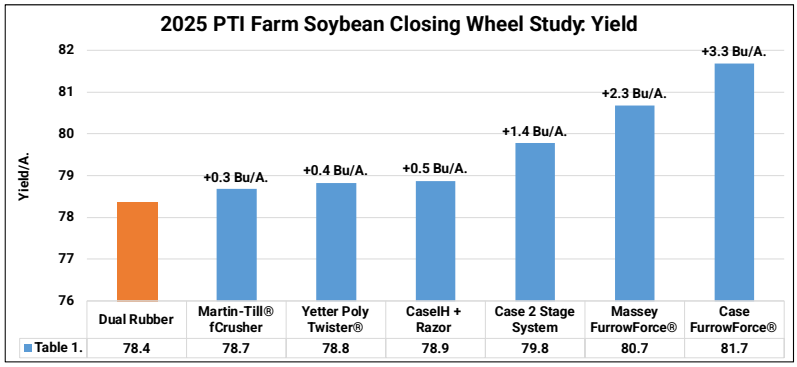
2nd stage removal of air pocket

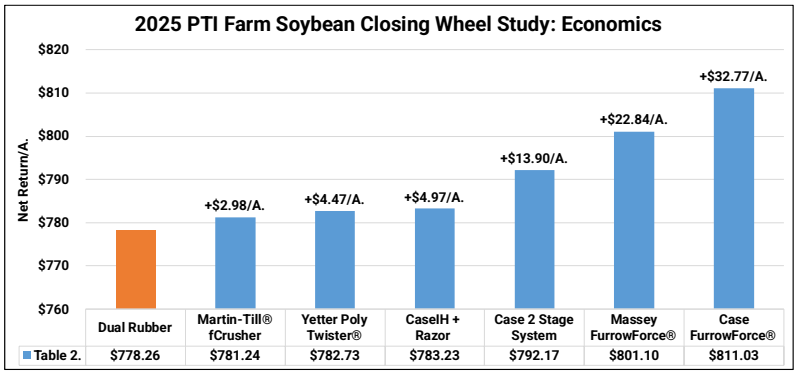
Multiple manual settings for easy adjustment

Disadvantages: Manual control – no sensing

Results:

- ✓ Dual Rubbers offered lowest average yields of 78.4 Bu/A.
- ✓ CaseIH + Razor, Yetter Poly Twister® and Martin-Till fCrusher offered minimal yield gains less than 1 Bu/A., with returns of +$2.98/A. to +$4.97/A.
- ✓ CaseIH 2 Stage proved +1.4 Bu/A. yield gain, with additional returns of +$13.90/A.
- ✓ FurrowForce® offered highest yields at +2.3/A. and +3.3 Bu/A. and net returns of +$22.84 and +$32.77/A. with the CaseIH and Massey planter.





Planting Date: May 15th *Variety: Asgrow® 27XF3* *Population: 130K* *Row Width: 30"* *Rotation: BAC* *SB Price: $9.93*

PTI ILLINOIS

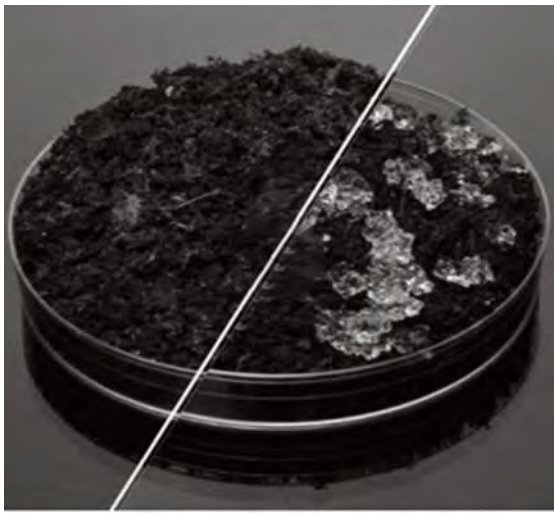
2025 PTI Results

Smart Hydrogel Soil Retainer Residual Study

Objective: To evaluate yield and economics of Hydrogel by Green Evolution Technologies. Hydrogel is a retainer product that is incorporated into the soil to retain large amounts of water and nutrients. The absorbed water and nutrients are released during dry soil conditions, allowing the plant access when needed. Hydrogel is being implemented at the PTI Farm to help improve irrigation efficiency, increase water holding capacity.

Hydrogel was applied directly into the soil, using the Precision Planting DrySet™ system. DrySet™ is an at-plant system that allows for accurate banded applications. In this case, Hydrogel was banded and lightly incorporated by the planter closing system to allow Hydrogel to surround the furrow and eventual rooting area.

DrySet™ is an all-in-one meter and electric drive system that provides row-by-row, electric motor rate control. DrySet™ was engineered for consistent distribution of granular products on planters with granular tanks and features two different auger options to cover a variety of rate ranges and applications. DrySet™ works in conjunction with the Precision Planting 20|20® system, with row-by-row control each meter functions independently of others, offering benefits like turn compensation, variable rate, and swath control.



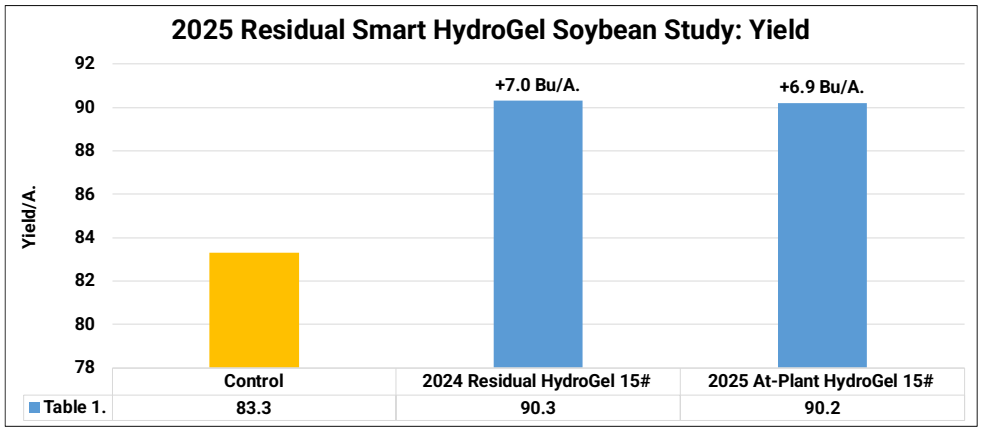
PTI ILLINOIS

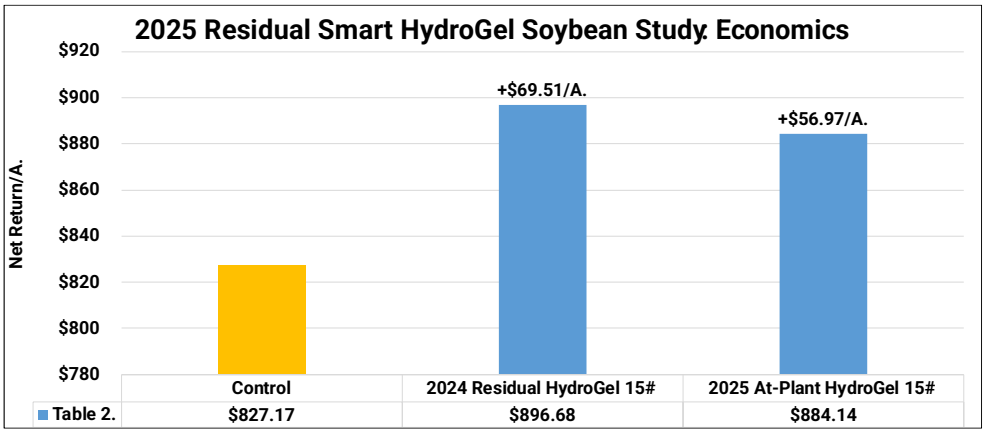
Smart Hydrogel Soil Retainer Residual Study

Results: In our second year of testing we compared multiple different situations, looking for both residual from planting 2024, and fresh product in this spring. All treatments were made at 15#/A.

2024 residual Hydrogel resulted in yield gains of +7.0 Bu/A., with corresponding economic net return of +$69.51/A. New 2025 Hydrogel applications proved similar results, +6.9 Bu/A. yield advantages over the control, with +$56.97/A. net returns.

Mid season drought conditions at the PTI Farm in the past two growing seasons has resulted in an ideal environment to evaluate the potential of the Hydrogel system. We look forward to continuing studying this product in its 3rd year of testing in 2026.





Planting Date: May 10th Variety: GH 3994E3 Population: 120K Row Width: 30" Rotation: BAC HydroGel: $11.55/A. USDA Code 450 Rebate: $3.23/# SB Price: $9.93

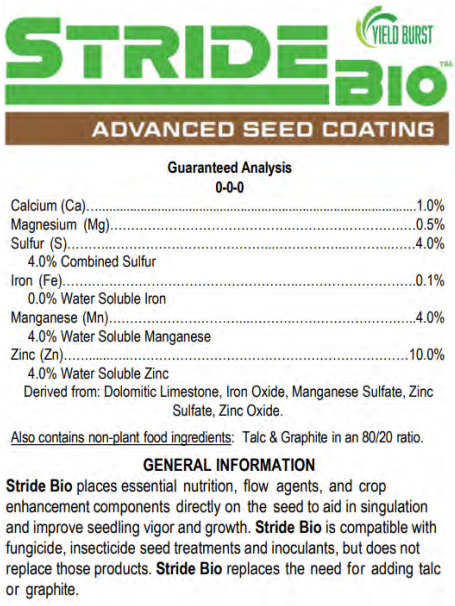
2025 PTI Results

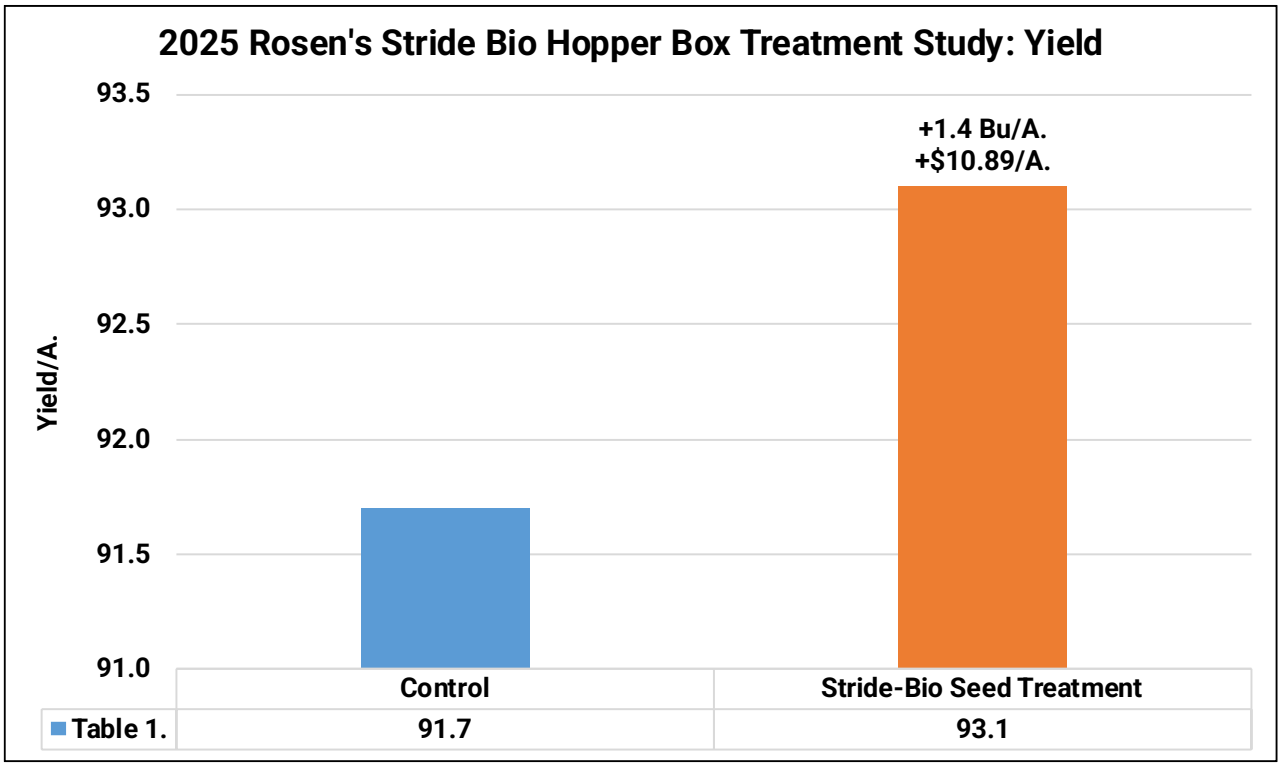
Rosen's StrideBio™ Hopper Box Treatment Study

Objective: To evaluate yield and net return of Stride Bio™, a talc graphic/micronutrient planter box treatment.

Stride Bio is a 80/20 talc graphic blend for planters that also contains Calcium, Magnesium, Sulfur, Iron, Manganese, and Zinc. It places essential nutrition, flow agents, and crop enhancement components directly on the seed to aid in singulation and improve seedling vigor and growth.

Results: Stride Bio™ hopper box treatments offered average yield gains of +1.4 Bu/A. with a postive net return on investment of +$10.89/A.



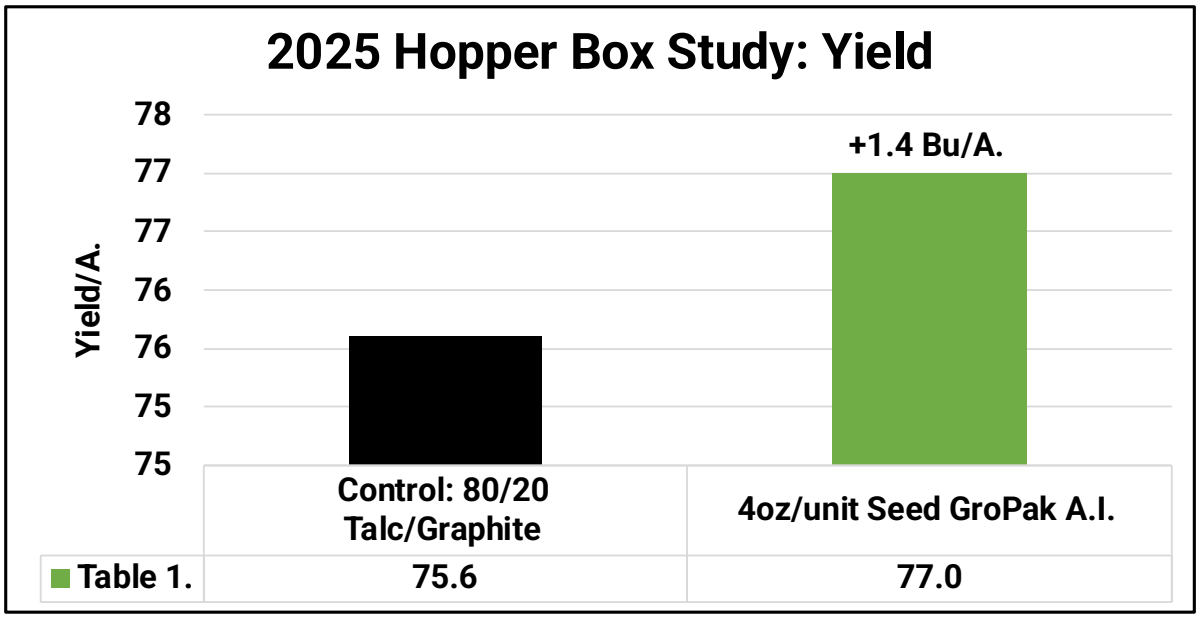


Planting Date: May 15th Variety: ProHarvest 3161E Population: 120K Row Width: 30" Rotation: BAC SB Price: $9.93 Stride Bio: $3.26/A. Talc/Graphite: $0.25/A.

AgXplore® GroPaK® A.I. Hopper Box Treatment Study

Objective: To evaluate yield and net return of GROPAK®, a next-generation planter hopper box treatment that aids in germination and emergence by enhancing nutrient uptake and mobility. It is specifically formulated with a micronutrient package to benefit the seed, along with bacteria strains, all combined in a dry talc formulation.

Results: GroPak® A.I. hopper box treatments offered average yield gains of +1.4 Bu/A. with a postive net return on investment of +$9.97/A.

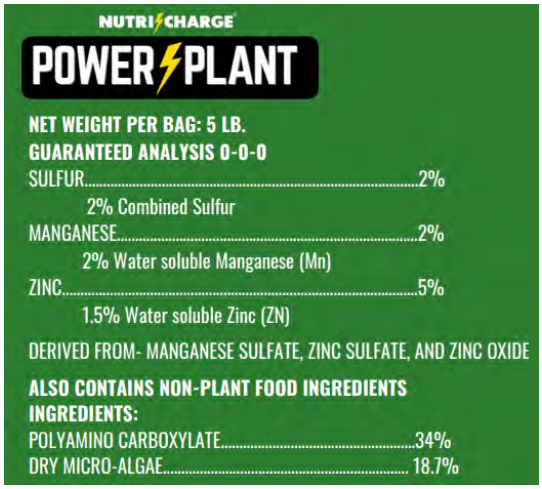


Planting Date: April 23rd Variety: Becks 3300E3 Population: 130K Row Width: 30" Rotation: BAC SB Price: $9.93 GroPak® A.I.: $4.18/A Graphite/Talc: $3.25/#

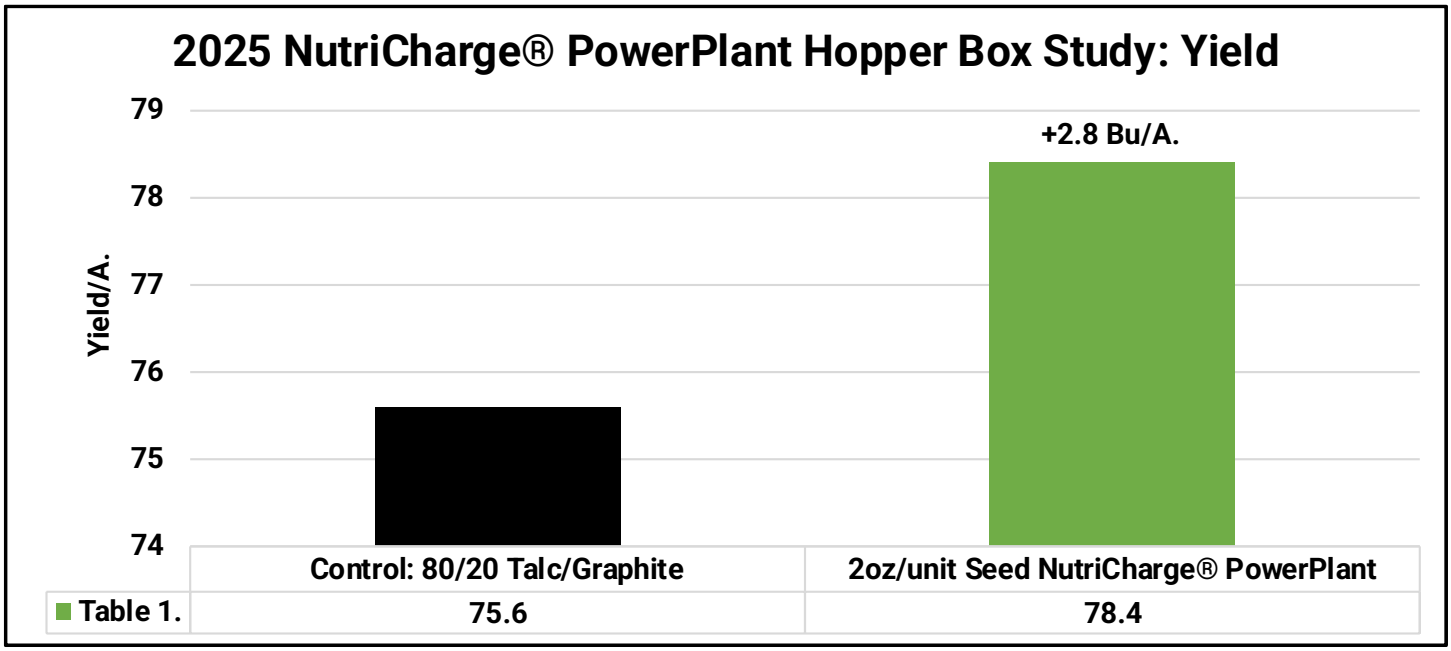
2025 PTI Results

NutriCharge® PowerPlant Hopper Box Treatment Study

Objective: To evaluate yield and net return of NutriCharge® PowerPlant®, a next-generation planter hopper box treatment and advanced seed lubricant designed to replace traditional talc. Powered by NutriCharge® technology, this innovative product leverages microalgae and essential micronutrients to enhance soil biology and ensure reliable phosphorus availability.



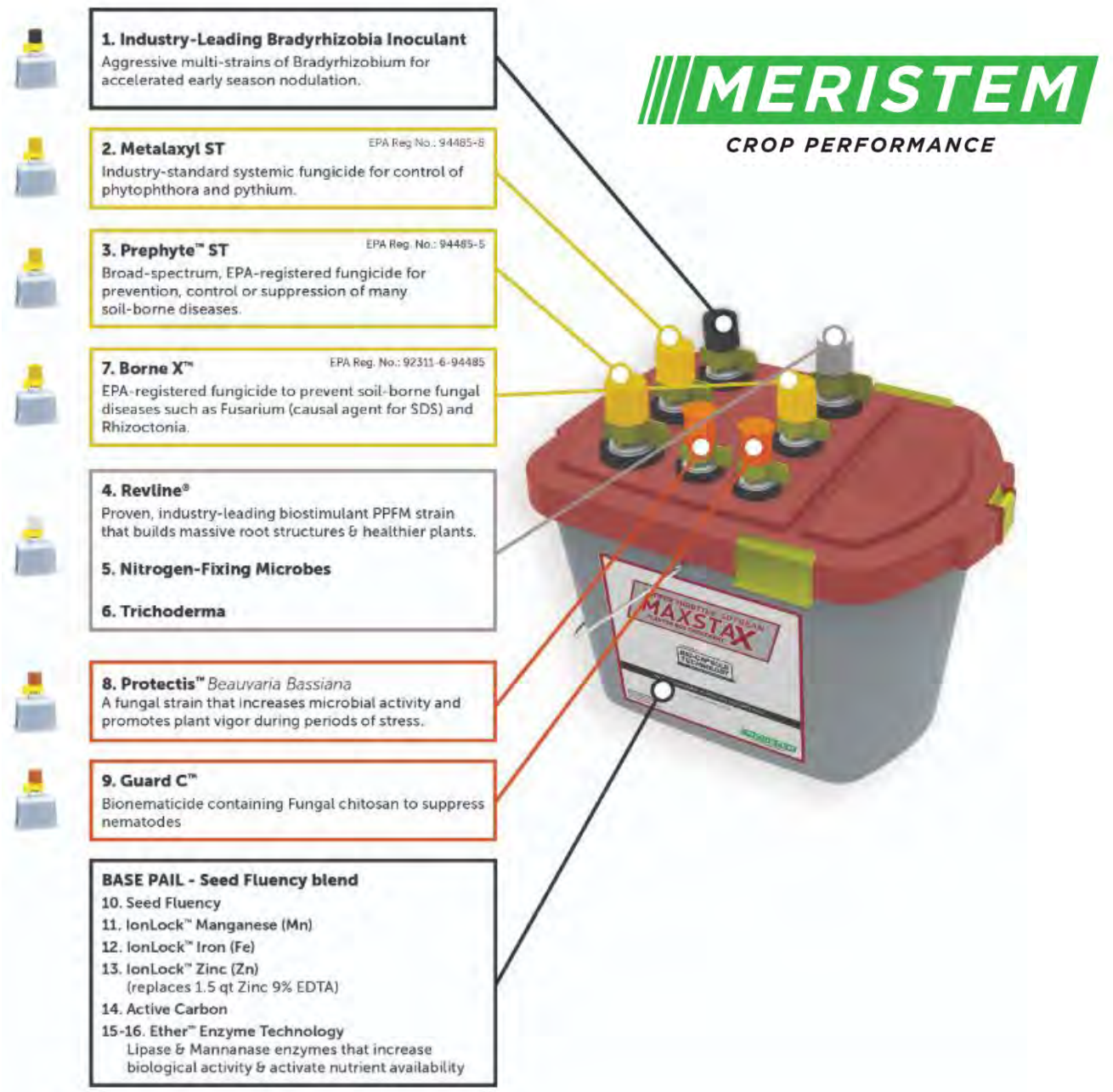
Results: PowerPlant hopper box treatments offered average yield gains of +2.8 Bu/A. that equated to postive net return on investment of +$17.43/A.



Planting Date: May 2nd Variety: GH 3994E3 Population:140K Row Width: 30" Rotation: BAC Soybean Price: $9.93 PowerPlant: $85/#. Avg Phos Level: 42#/A.

MaxStax™ Hopper Throttle® Soybean Box Treatment Study

Objective: To evaluate yield and net return of Hopper Throttle® MaxStax Soybean, a co-pack powered by Meristem's patented Bio-Capsule Technology, in a easy-to-use system to deliver multiple, EPA-registered inputs via seed fluency.

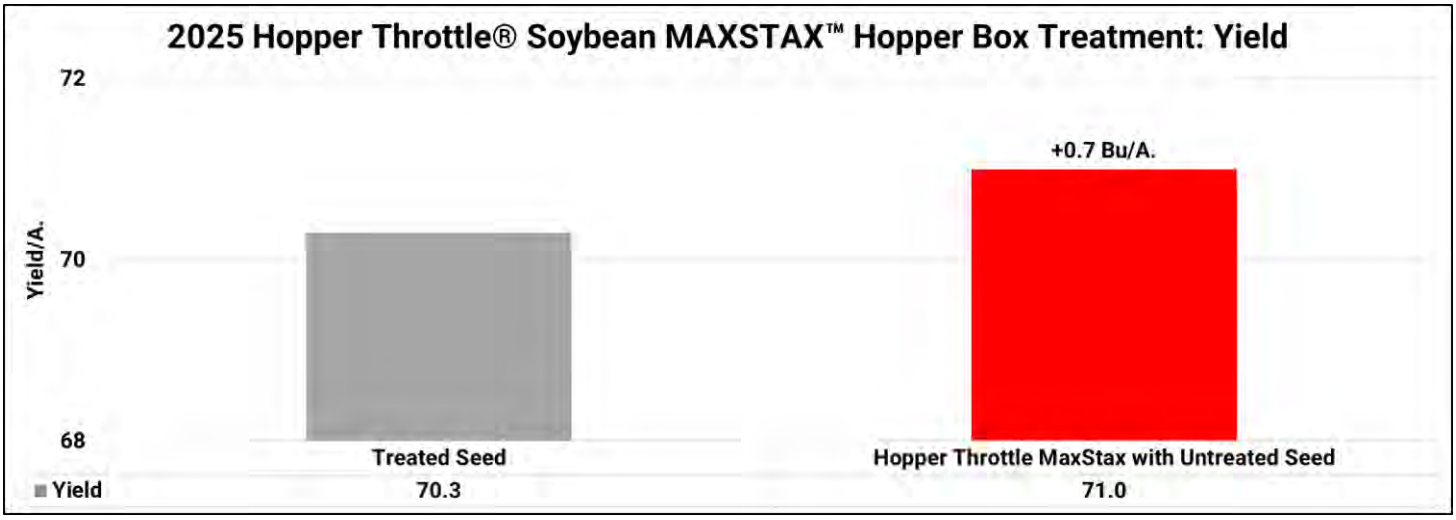


MaxStax™ Hopper Throttle® Soybean Box Treatment Study

A combination of 16 crop inputs, HT MaxStax soybean includes a multi-strain bradyrhizobia inoculant, Metalaxyl ST, the Prephyte ST and Borne X biofungicides, the bioinsecticide Guard X, the Guard C bionematicide, the Protectis beauveria bassiana microbe, Revline biostimulant, N-fixing microbes and trichoderma, in addition to the base pail of seed fluency and IonLock™ Zn, Fe & Mn with Ether Enzyme Technology and active carbon.

Powered by the patented BIO-CAPSULE™ Technology, Meristem claims farmers now have an easy-to-use system to replace costly traditional liquid soybean seed treatment. Farmers can buy naked seed and use seed fluency to efficiently deliver fungicides, insecticides, inoculants, biocontrols and micronutrients.

Results: MAXSTAX™ hopper box treatments offered average yield gains of +0.7 Bu/A. that equated to a net return on investment of **-$5.05/A.**



Planting Date: May 18th Variety: GH 2922E3 Population:36K Row Width: 30" Rotation: CAB Soybean Price: $9.93 MAXSTAX: $32/A. Seed Treatment: $20/unit

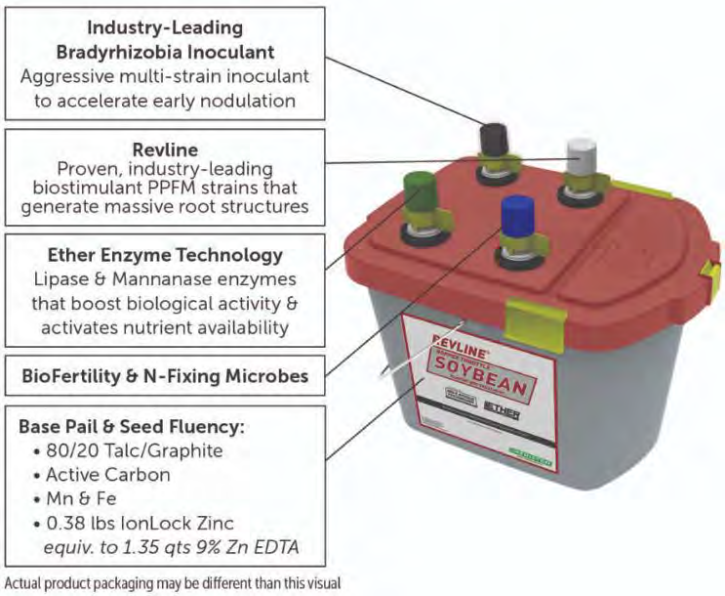
2025 PTI Results

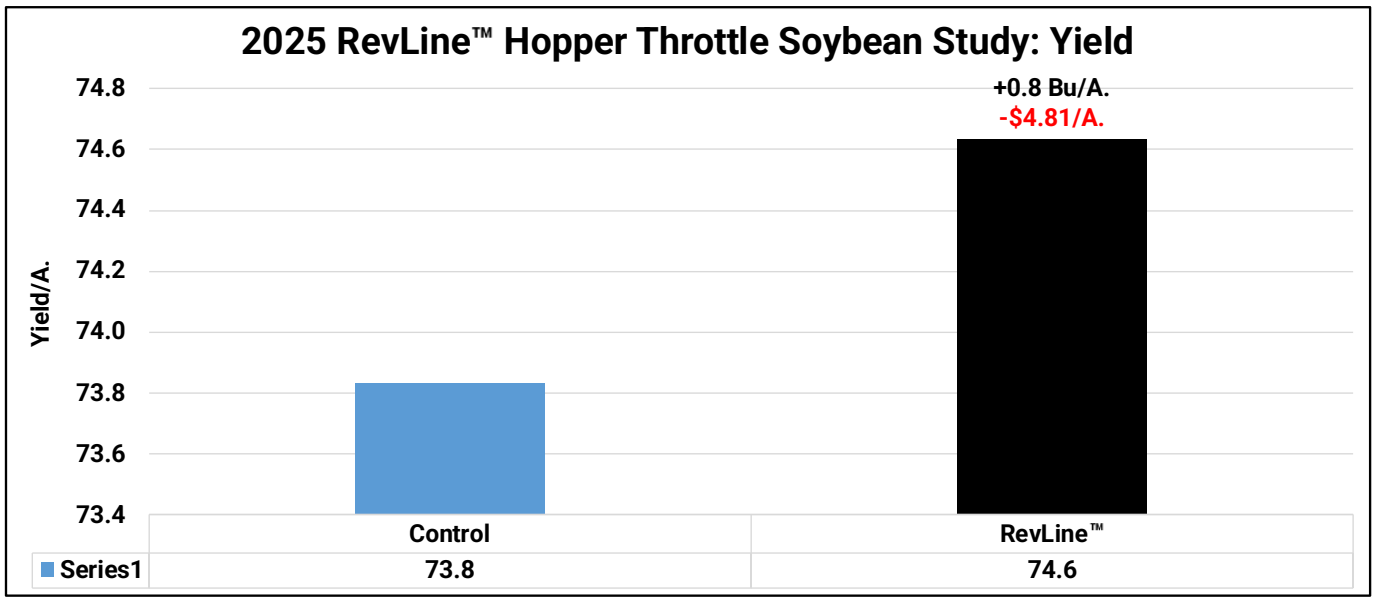
REVLINE® HOPPER THROTTLE™ Hopper Box Treatment Study

Objective: To evaluate yield and net return of REVLINE® HOPPER THROTTLE™, a talc graphic/micronutrient planter box treatment.

HOPPER THROTTLE™ is an 80/20 talc graphic blend for planters that also contains Manganese, and Zinc. It places essential nutrition, flow agents, and crop enhancement components directly on the seed to aid in singulation and improve seedling vigor and growth.

Results: HOPPER THROTTLE™ hopper box treatments offered average yield gains of +0.8 Bu/A. with a negative net return on investment of **-$4.81/A.**



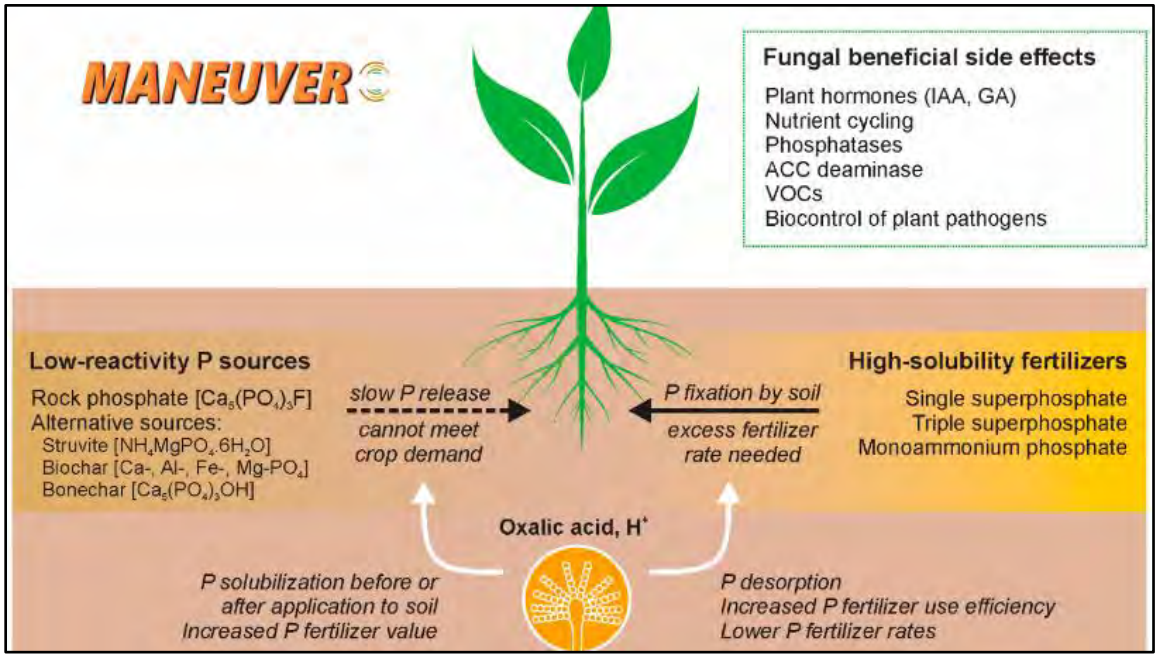


Planting Date: May 10th Variety: Asgrow 27XF1 Population: 130K Row Width: 30" Rotation: CAB SB Price: $9.33 HOPPER THROTTLE: $13.00/A. Talc/Graphite: $3.25/#.

PTI ILLINOIS

Rosen's Manuever™ Biological Study

Objective: To evaluate yield and economics of Rosen's Manuever™, a product designed to enhance microbial acquired nutrition in crops. Manuever™ utilizes specific microbes to tap into nutrient pools through nitrogen fixation, mineralization, and solubilization. These processes convert atmospheric nitrogen, organic matter, and insoluble minerals into plant-available nutrients helping to supplement synthetic fertilizers and improve yield potential.



This study evaluates Manuever™ at five different application timings including the following:

- ✓ Pre-Emerge Broadcast Application
- ✓ Pre-Emerge + Stride®Bio Seed Treatment
- ✓ At-Plant FurrowJet® (Figure 1.) Application
- ✓ V4 Side-Dress Application with 32% UAN
- ✓ Combination of all 4 treatments

Figure 1. FurrowJet® Placement

ROSEN'S INC.
Quality Agricultural Products

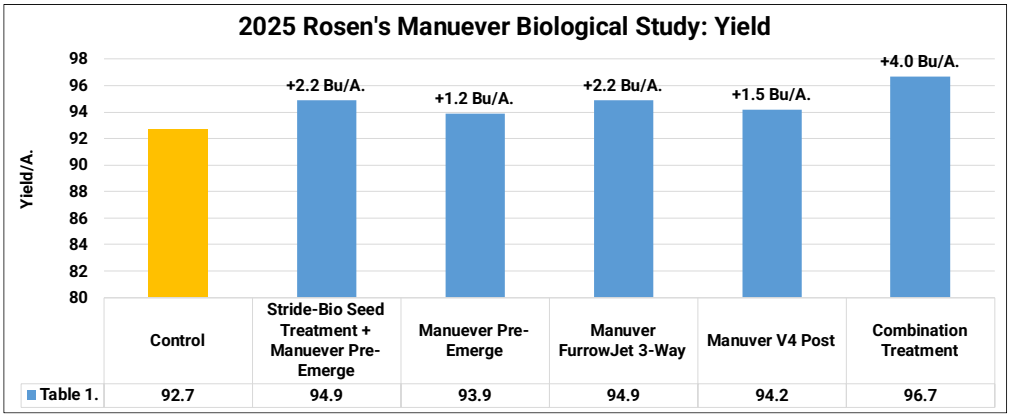
2025 PTI Results

Rosen's Manuever™ Biological Study

Results:

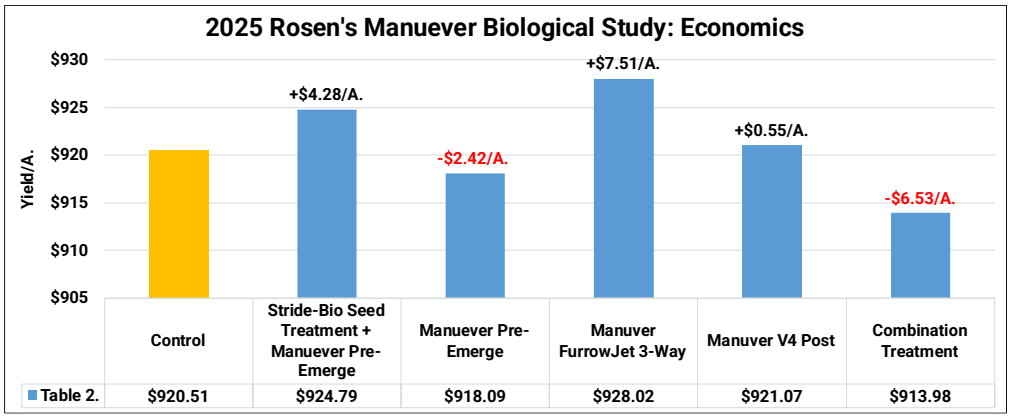
- ✓ Highest overall yields came from the 4-way combination treatment. These multiple applications resulted in yield gains of +4.0 Bu/A., however with corresponding negative returns of **-$6.53/A**. after cost of treatment.

- ✓ At-plant FurrowJet® treatments proved yield gains of +2.2 Bu/A. with a return on investment of +$7.51/A., the highest of the study.



- ✓ Manuever™, in addition to Stride®Bio seed treatment offered +2.2 Bu/A. gains, with economic gains of +$4.28/A.

- ✓ V4 post applications offered responses of +1.5 Bu/A., with +$0.55/A. returns.



- ✓ Pre-Emerge applications resulted in yield gains of +1.2 Bu/A., however with net losses of **-$2.42/A.**

Planting Date: April 29th Variety: ProHarvest 3150E3 Population: 130K Row Width: 30" Rotation: CAB Corn Price: $9.93 StrideBio: $2.39/oz Manuever™: $2.39/Gram

PTI ILLINOIS

Corteva™ Biologicals Soybean Study

Objective: To evaluate the yield and economic impact of a soybean liquid starter fertilizer and foliar nutritional program from Corteva in a high management irrigated environment. This trial consisted of the following:

Treatments and Placement:

#1. Control:	150# 18-46-0, 150# 0-0-60, R3 Miravis®Neo

#2 At-Plant Fertility:	
FurrowJet® Wings: (Figure 1.)	8oz NEXTA SHIELD
Conceal® Dual Band: (Figure 2.)	1qt Harvest Plus

#3 Foliar Applications:	
CORTEVA™	V3: 4oz NEXTA SHIELD, 8oz NEXTA SPARK, 1qt Harvest Plus R3: 32oz NEXTA SWOLE, 8oz NEXTA SPARK, 2.5# Harvest More (5-5-45)

Figure 1. FurrowJet® Placement

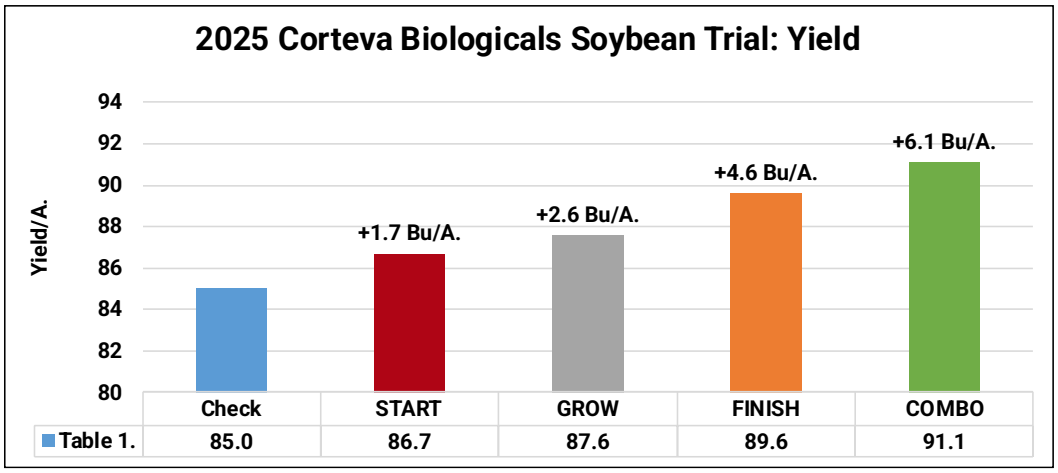
Figure 2. Conceal® Dual Band Placement

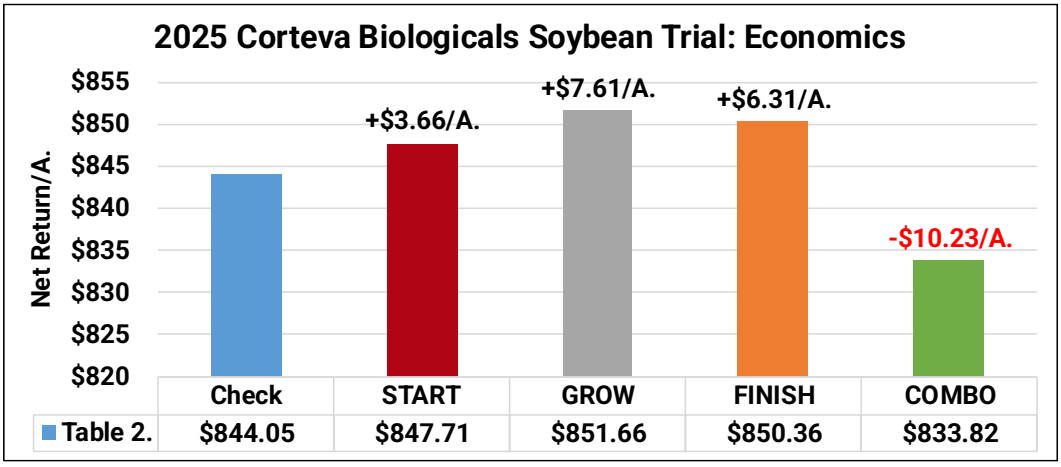
Corteva™ Biologicals Soybean Study

All treatments received 8.00" of rain throughout the growing season as well as fungicide applications of 13.7oz/A. Miravis® Neo at R3 growth stage.

Results: START treatments resulted in yields of 86.7 Bu/A., +1.7 Bu/A. over the control. Grow Treatment resulted in yield of 87.6 Bu/A., +2.6 Bu/A. over the control. Finish treatments resulted in yields of 89.6 Bu/A., +4.6 Bu/A. over the control. Combination treatments pushed yield to 91.1 Bu/A., +6.1 Bu/A. over the control.

START, GROW, and FINISH treatments resulted in net returns ranging from +$3.66/A. to +$7.61/A. However, when all programs are combined a negative net return of **-$10.23/A**. was achieved.





Planting Date: May 5th Variety: Pioneer 37Z06E Population: 120K Row Width: 30" Rotation: BAC SB Price: $9.93

START: $13.22/A. GROW: $18.21/A. FINISH:$39.37/A.

2025 PTI Results

Soybean Cover Crop Study:

Objective: This trial is designed to evaluate the yield and economic benefits of a cover crop system in a soybean/corn rotation. To evaluate long-term benefits, this trial has been designed as a 10-year study. 2025 is year 5 of the 10-yr trial.

20#/A. of a cereal ryegrass/barley mix was planted in the fall of 2024 (Figure 1.) and strip-till was then used as the primary tillage system after the ryegrass emerged. In the spring, soybeans were planted directly on the fall strips and into the green cover crop (Figure 2). Termination of the cover crop was implemented at when rye achieved 20” in height.

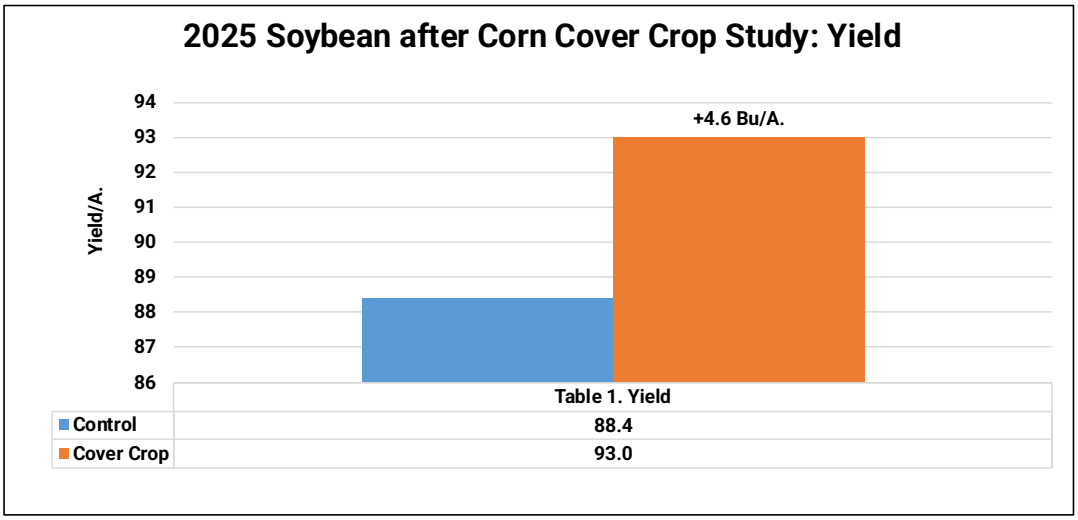
Figure 1. Fall Cover Crop Seeding

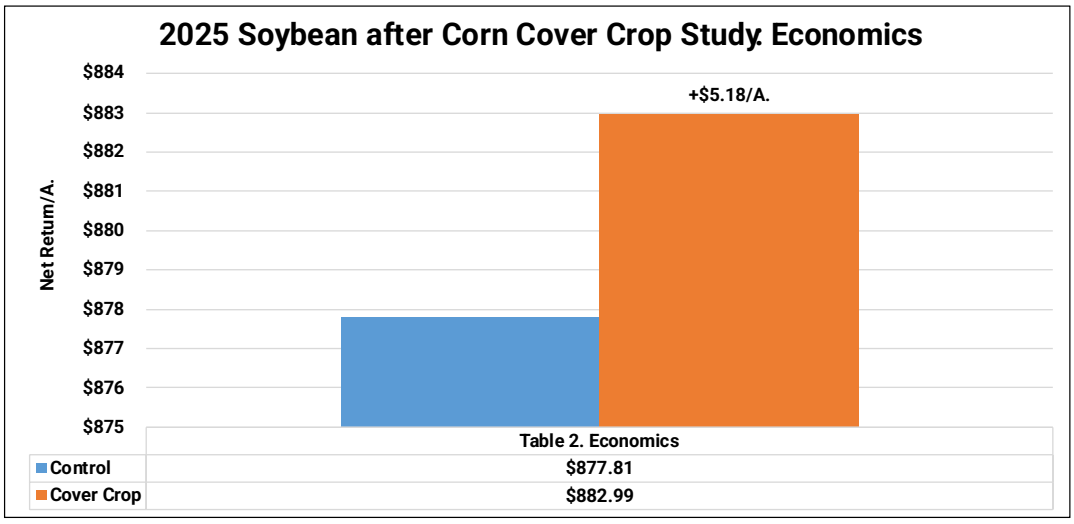
Figure 2. Planting on Strip-Till into Green Cover

Soybean Cover Crop Study

Results: Table 1. illustrates soybeans in the cover crop system proved +4.6 Bu/A. yield gains over the non-cover crop control.

Table 2. depicts net return on investment of the cover crop system. After the small yield gain and the cost of seed and planting, the cover crop system resulted in economic gains of +$5.18/A. in 2025. It should be noted that this is the first time cover crops have proved economic gains in the 5 years of this study.



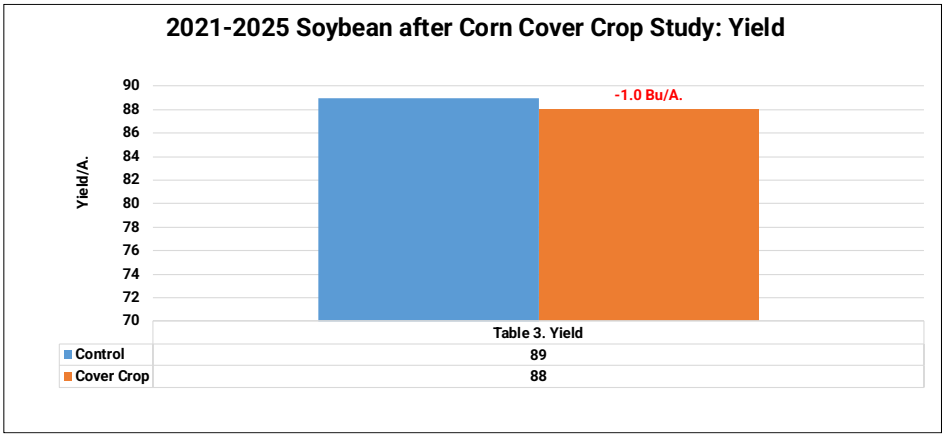


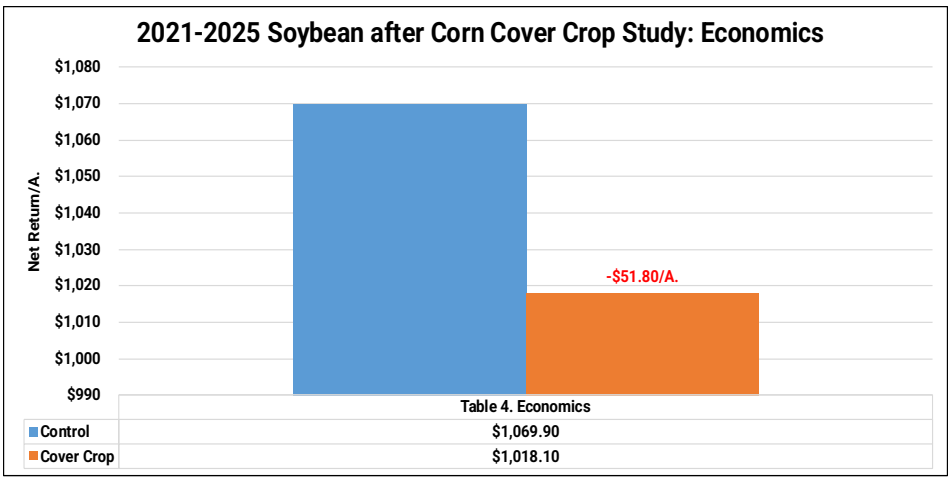
2025 PTI Results

Soybean Cover Crop Study

At the PTI Farm, we believe we need to evaluate the performance of cover crops over time. As a 10-yr study this will allow us to measure annual average cash flow, along with hopefully the increase of soil health over time. Table 3. illustrates multi-year yield data and after five years of evaluating soybeans planted into a cover, yield losses today stand at **-1.0 Bu/A.**

More importantly, Table 4. explains the multi-year economics. Soybeans in a cover crop system at the PTI Farm have resulted in economic losses **-$51.80/A.** thus far in five of our ten-year program.





It should be important to note that no program or subsidy cost re-imbursements are calculated in this study. If a grower were to qualify for a program, it could help discount the cost of the cover program and help offset losses.

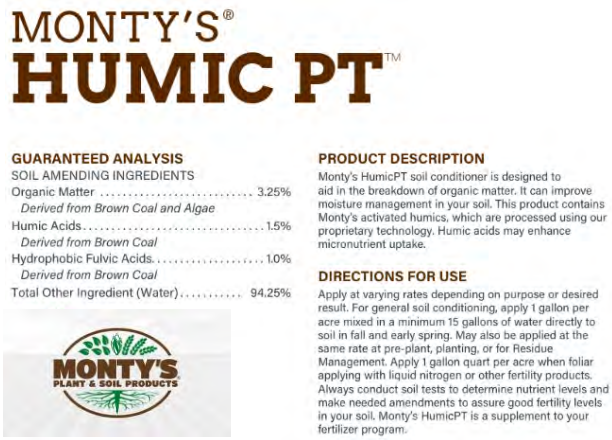
We look forward to continuing to test the use of cover crops in a soybean after corn rotation and to evaluate yield and economics of the system, while taking a close look at what cover crops can offer regarding soil health improvement. While the PTI Farm has lower soil erosion concerns due to smaller degrees of slope, we are trying to understand other advantages that a cover crop system could add to favor farm sustainability.

Planting Date: April 13th Variety: Golden Harvest® 3994E3 Population: 130K Row Width: 30" Rotation: BAC SB Price: $9.93 Cover Crop: $40.50/A inc. $8 Drill

Soybean After Corn Soil Health Study

Objective: Since the inception of cover crops at PTI, it has been difficult to show yield and profitability advantages. This study is designed to evaluate other practices that could increase soil health while establishing faster yield and profitability improvements.

The following products have been added as soil health products as a part of this 10-yr cover crop study (currently yr 5):


MONTY'S®
HUMIC PT™

GUARANTEED ANALYSIS
SOIL AMENDING INGREDIENTS
Organic Matter 3.25%
Derived from Brown Coal and Algae
Humic Acids 1.5%
Derived from Brown Coal
Hydrophobic Fulvic Acids 1.0%
Derived from Brown Coal
Total Other Ingredient (Water) 94.25%

MONTY'S PLANT & SOIL PRODUCTS

PRODUCT DESCRIPTION
Monty's HumicPT soil conditioner is designed to aid in the breakdown of organic matter. It can improve moisture management in your soil. This product contains Monty's activated humics, which are processed using our proprietary technology. Humic acids may enhance micronutrient uptake.

DIRECTIONS FOR USE
Apply at varying rates depending on purpose or desired result. For general soil conditioning, apply 1 gallon per acre mixed in a minimum 15 gallons of water directly to soil in fall and early spring. May also be applied at the same rate at pre-plant, planting, or for Residue Management. Apply 1 gallon quart per acre when foliar applying with liquid nitrogen or other fertility products. Always conduct soil tests to determine nutrient levels and make needed amendments to assure good fertility levels in your soil. Monty's HumicPT is a supplement to your fertilizer program.

HumicPT™, a soil conditioner applied at-plant via dual band Conceal®, is designed to aid in the breakdown of organic matter. It can improve moisture management in the soil. This product contains Monty's activated humics, which are processed using their proprietary technology.

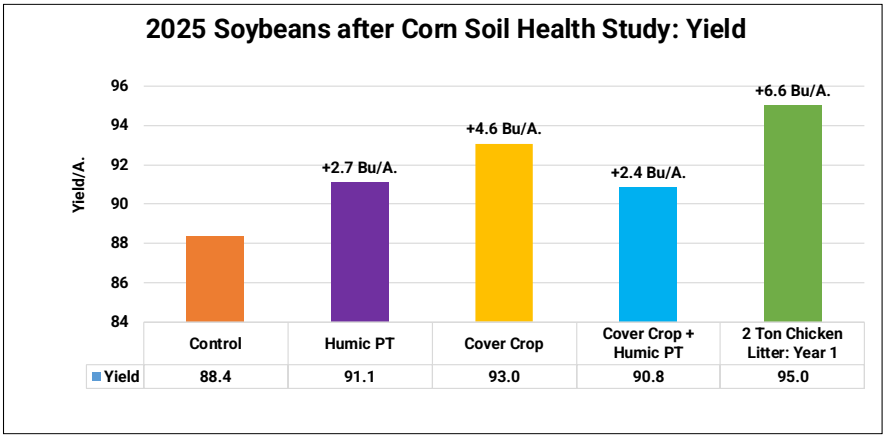
Chicken litter was also added as a soil health treatment. Nutrient rich chicken litter was applied (Figure 1.) at 2 ton/A. before strip-tilling. Chicken litter is an excellent natural fertilizer source with vital nutrients (N, P, K micronutrients), and organic matter to improve structure, water retention, and microbial life.

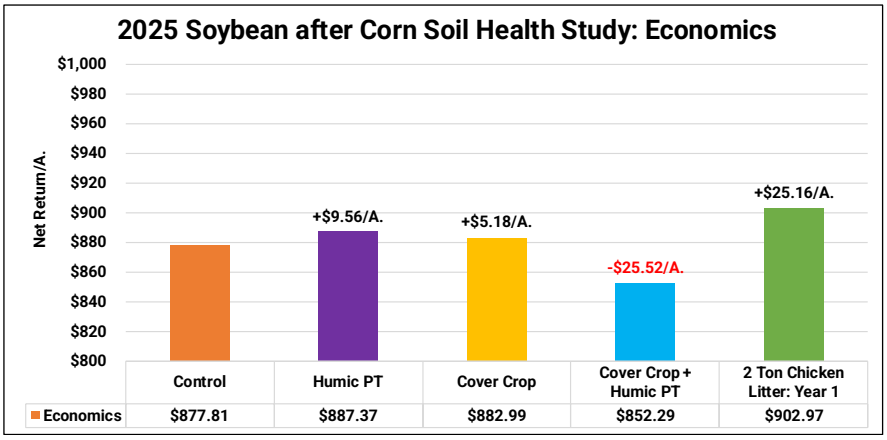
Figure 1. Chicken Litter Application

Soybean After Corn Soil Health Study

Results:

- ✓ After 5 years of continuous cover crop, yields gained +4.6 Bu/A., and proved net gains of +$5.18/A.
- ✓ Adding HumicPT as a first-year amendment proved yield gains of +2.7 Bu/A., and with net gains of +$9.56/A.
- ✓ Tag teaming HumicPT along with the 5th year of cover crops resulted in yield gains of +2.4 Bu/A., but with ecocomic losses of **-$25.52/A.**
- ✓ First year applications of 2 ton/A. chicken litter tipped the scale to 95.0 Bu/A., the highest yield of all treatments. In this study, chicken litter proved profitable at +$25.16/A. It will be interesting over time to see how litter will affect yield, soil health, and profitability in the remaining 5 years of this 10-year study.





Planting Date: April 15th Variety: GH 3994E3 Population: 36K Row Width: 30" Rotation: BAC Soybean Price: $9.93

Cover Crop: $40.50/A. HumicPT: $17.25 Litter: $40.38/A.

Broadcast vs Banding Dry Fertilizer Study

Objective: To evaluate yield and economics of traditional broadcast applications of dry fertilizer compared to 8" deep high concentrated strip-till banding.

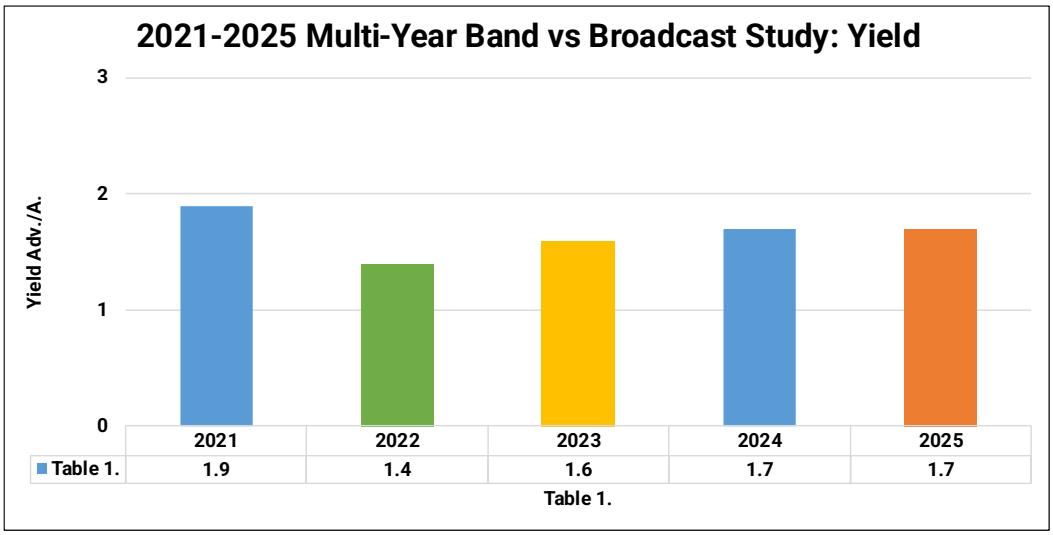
Figure 1. Broadcast Dry Fertilizer

Based upon soil test results and yield goals of 70 Bu/A. soybeans in a corn/soybean non-irrigated rotation, 18-46-0 and 0-0-60 was applied in a traditional broadcast surface application made with a traditional spinner truck (Figure 1). Using the same fertilizer rates, a strip-till bar was used to place fertilizer in high concentrated strips 8" deep on 30" corn rows (Figure 2). A KUHN® Krause® Gladiator® pulling a Montag® Equipment 2208 Gen 2 fertilizer cart was used to implement this testing program for 2025.

Figure 2. Strip-Till Banded Fertilizer

Results Table 1. illustrates strip-till banded fertilizer resulted in average yield gains of +1.7 Bu/A. over traditional broadcast applications in 2025.

Multi-year data suggests a +1.7 Bu/A. yield gain and equates to additional net returns of +$10.85/A.



Planting Date: April 28th *Variety: Asgrow® 27XF3* *Population: 130K* *Row Width: 30"* *Rotation: BAC* *SB Price: $9.93* *Strip-Till: $9.60/A.*

Broadcast vs Banding Rate Efficiency Study

Objective: To evaluate yield and economics of traditional broadcast applications of dry fertilizer compared to concentrated strip-till bands applied 8” in depth under the corn row.

To study placement efficiency, dry fertilizer was applied in a traditional broadcast surface application as a spinner truck (Figure 1.) and soybeans were planted into strip-till tillage program.

Using the same fertilizer rates, a strip-till bar was then used to place fertilizer in high concentrated strips 8” deep on 30” corn rows (Figure 2). Soybeans were then planted directly into those strips above the 8” fertilizer placement.

A KUHN® Krause® Gladiator® pulling a Montag® Equipment 2208 Gen 2 fertilizer cart was used to implement this testing program for 2025.

To then study rate efficiency, fertilizer was applied at the following rate structure in both strip-till bands and broadcast applications:

- ✓ 100% Fertilizer Rate
- ✓ 75% Fertilizer Rate
- ✓ 50% Fertilizer Rate
- ✓ 25% Fertilizer Rate
- ✓ 0# Rate

Figure 1. Broadcast Dry Fertilizer

Figure 2. Strip-Till Banded Fertilizer with Montag® cart

Figure 3. KUHN® strip-till unit

Broadcast vs Banding Rate Efficiency Study

Results: Table 1. summarizes overall average soybean yield at each fertilizer rate%. 100% rates offered highest yield advantage of +6.2 Bu/A. compared to 0% rates. 25%, 50%, and 75% fertilizer rates generated small losses of only **-0.9/A.** to **-2.2 Bu/A.**

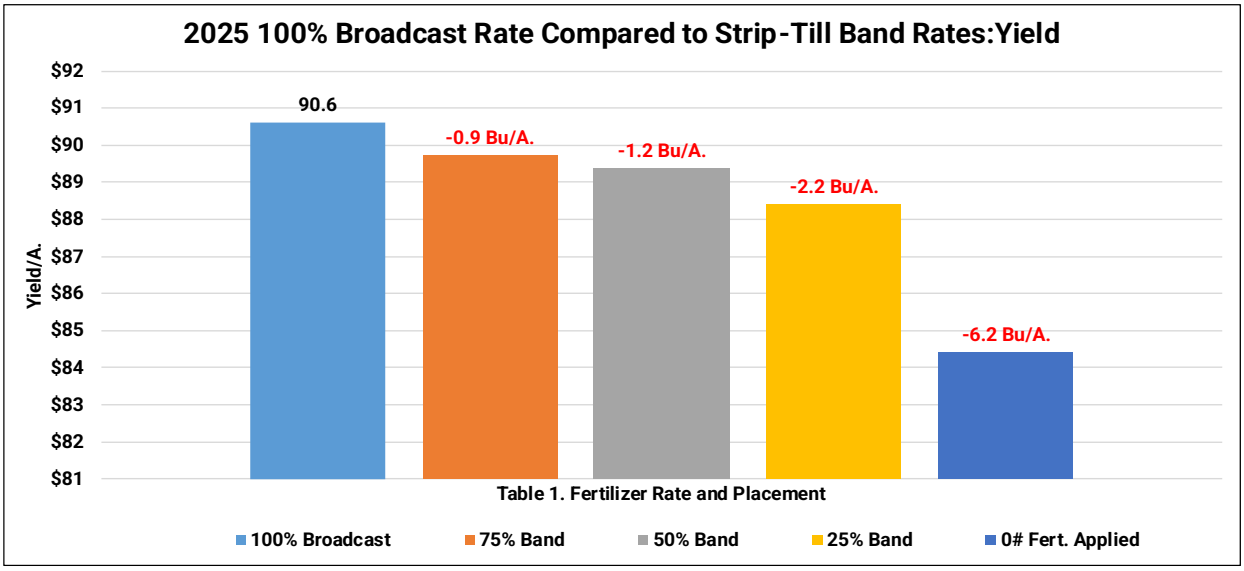
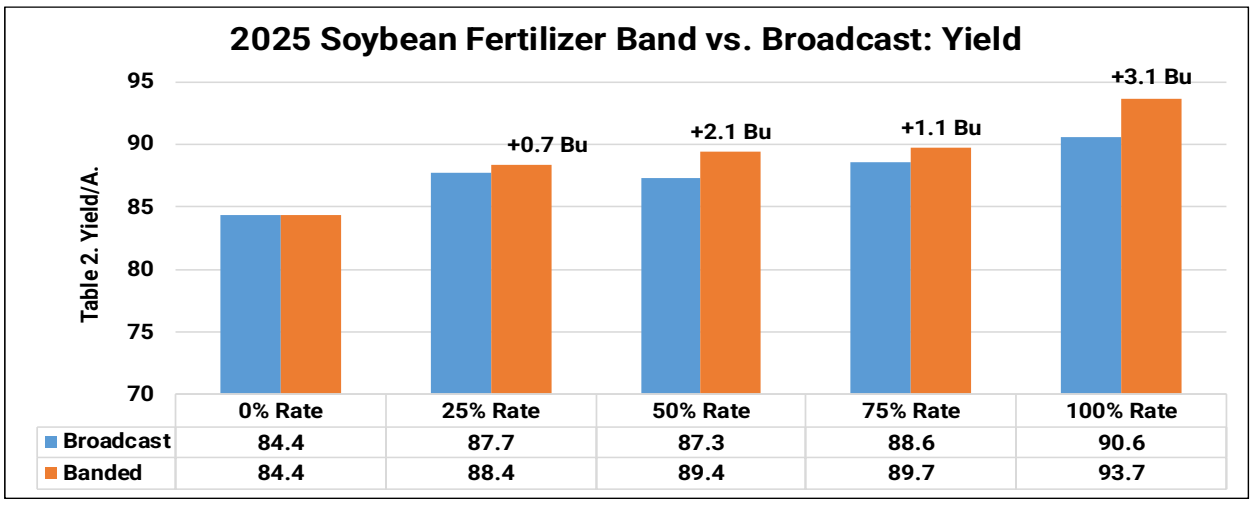


Table 2. illustrates that banding fertilizer out-performed broadcast applications at every rate percentage. Yield gains ranged from +0.7 to +3.1 Bu/A.



	0% Rate	25% Rate	50% Rate	75% Rate	100% Rate
Broadcast	84.4	87.7	87.3	88.6	90.6
Banded	84.4	88.4	89.4	89.7	93.7

2025 PTI Results

Broadcast vs Banding Rate Efficiency Study

Table 3. illustrates the net return of each banded fertilizer rate compared to traditional 100% broadcast applications. 75% rate bands resulted in net gains of +$2.55/A., 50% bands +$16.11/A. and 0% fertilizer +$13.02/A. However, 25% banded fertilizer achieved highest net returns of +$24.82/A.

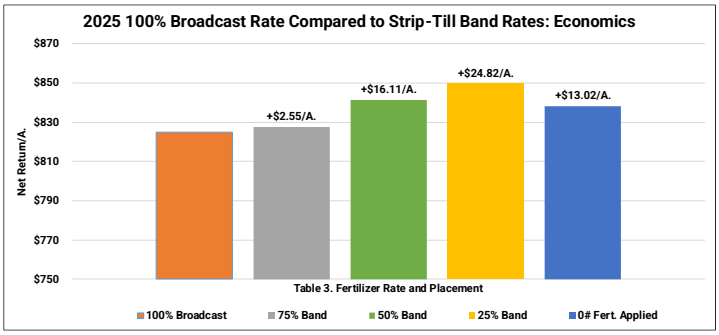
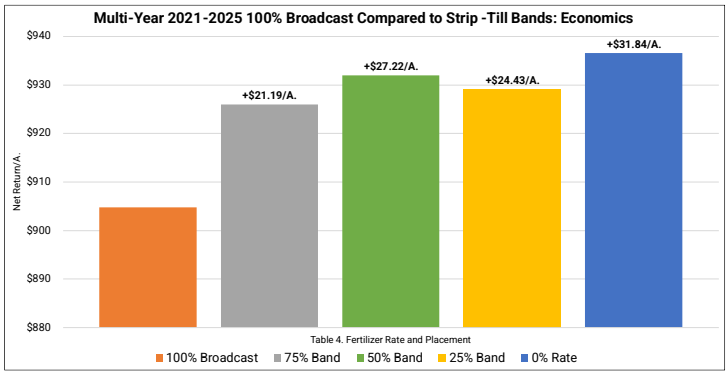
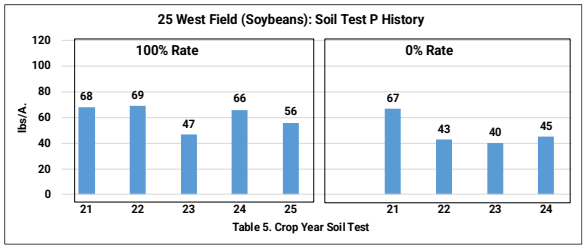
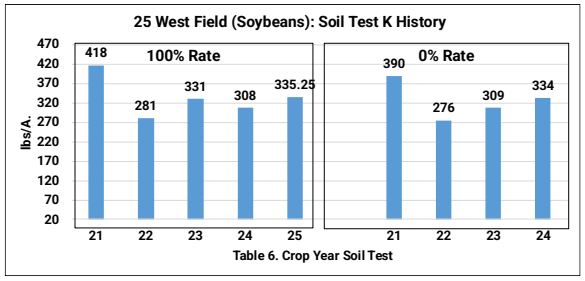


Table 4. summarizes multi-year data over 2021-2025 Banding 75%-25% rates of fertilizer have led to returns of +$21.19 to +$27.22/A. over traditional broadcast spreading. Over the last 5 years, applying 0# fertilizer made an additional +$31.84/A. compared to 100% rates.



Tables 5-6 illustrate average soil P and K levels over the life of this 5-yr fertility study. 0% rates started at excellent of 67#/A. P and has decreased to 31# (**-46%**), which would be considered very low. Soil test K levels began at 390#/A. and has decreased to 306# (**-22%**), which would also be considered low. These values make it difficult to understand that under these low fertility levels, 0# of fertilizer would prove economic optimum? Given the high cost of dry fertilizer ($710 DAP/$445 Potash in Fall 2024) it seems we have not received enough yield benefit to offset the cost.





As part of a 10-year study, this will be interesting to evaluate over the next 5-year period to analyze yield and economics as both fertilizer and commodity prices fluctuate.

Planting Date: April 20th Variety: Asgrow® 27XF3 Population: 130K Row Width: 30" Rotation: BAC SB Price: $9.93 Strip-till: +$9.60 18-46-0: $710/T 0-0-60:$445/T

2025 PTI Results

Calcium Products™ 98G™ Pell Lime Soybean Study:

Objective: This trial evaluates the yield response and economics of pelletized limestone (98G™) applied fall broadcast.

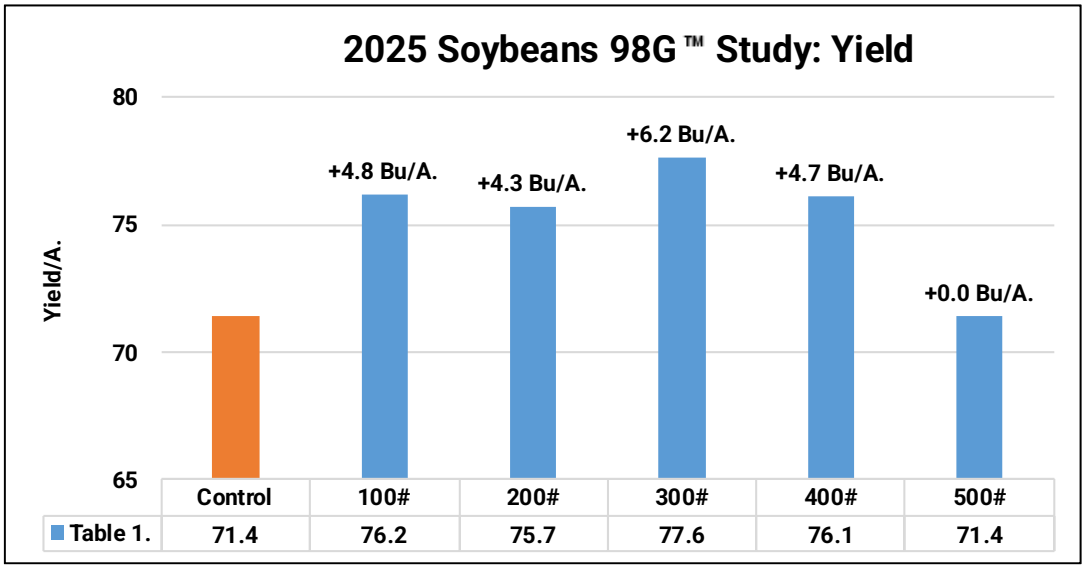
Soil pH is the foundation of nutrient availability and critical to maximizing crop yield. The availability of all nutrients is impacted by soil pH levels, especially phosphorus (P).

When soil pH is below 6.0, it can reduce your yield by as much as 30%. Calcium Products' 98G™ pelletized limestone is the most effective and consistent product to correct and maintain soil pH.

Maintain Soil pH	Change Soil pH Quickly	Enjoy Application
98G can be applied in flat-rate or variable-rate applications. It can be mixed with other dry fertilizers reducing the number of trips across the field and spread spring or fall. This flexibility means you can address soil pH when and how it works for you with the same equipment used to spread other dry fertilizers. Once soil pH is restored, use 98G to maintain pH levels with more frequent,	98G corrects soil pH faster and more completely than aglime. It is the most reactive liming material because it's made from 98% pure calcitic limestone and ground to an ultra-fine powder before it is pelletized. 98G pellets are engineered and manufactured to a specific size and hardness so that the pellets handle well and spread uniformly yet break down in the field to change soil pH. 98G is fully reactive at about three to six months after application.	98G can be applied in flat-rate or variable-rate applications. It can be mixed with other dry fertilizers reducing the number of trips across the field and spread spring or fall. This flexibility means you can address soil pH when and how it works for you with the same equipment used to spread other dry fertilizers.

Soil pH has traditionally been addressed about every four years with aglime. Rather than create a pH "rollercoaster" in the field with infrequent aglime applications, 98G® can be used as part of a pH maintenance program with annual or biannual applications. 98G® is a more reactive liming material than aglime, keeping soil pH at a level to maximize yield potential (typically 6.0) year after year.

Results: Broadcast treatments of 98G™ Pell Lime were applied in broadcast rates of 100#-500#/A. in Fall of 2024. Rates from 100# to 400# provided yield advantages of +4.3 Bu/A to +6.2 Bu/A., while 500# treatments proved no response. 100#/A. rates proved economic optimum at +$29.66/A. net returns.



Planting Date: April 28th Variety: GH 3994E3 Population: 130K Row Width: 30" Rotation: BAC Corn Price: $9.93 Pell Lime: $240/Ton + $6/A Application

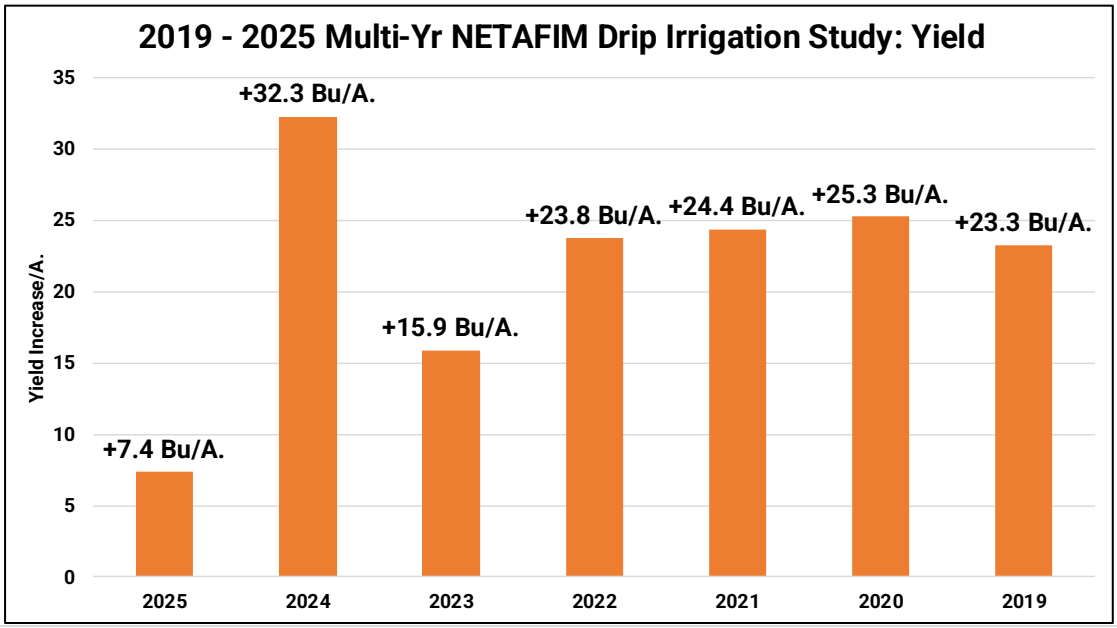
2025 PTI Results

2025 High Management Soybean: NETAFIM® Irrigation Study

Objective: This study evaluates NETAFIM® drip tape irrigation designed by NutraDrip Irrigation Systems and its' ability to feed soybeans with water and nutrients for high yield potential. This method of irrigating a crop uses NETAFIM® drip tape with small pressure regulated emitters evenly spaced at 24" apart. Drip tape in this study is not sub-surface irrigation. It is rather installed on the soil surface to demonstrate how the system works, to growers who come to visit the PTI Farm. Water is accessed from a water recycling management program installed at the PTI Farm.

Results: In 2025, NETAFIM® drip tape irrigation resulted in average yield increases of +7.4 Bu/A. compared to dryland soybeans. 8" of water was applied through drip irrigation throughout the growing season from June - September. 2025 yield response is the lowest obtained in the 7-years of drip irrigation at the PTI Farm.

Multi-Year data has proven irrigation to increase soybean yield by an average of +21.8 Bu/A., while increasing additional gross income by an average of +$246.50/A.



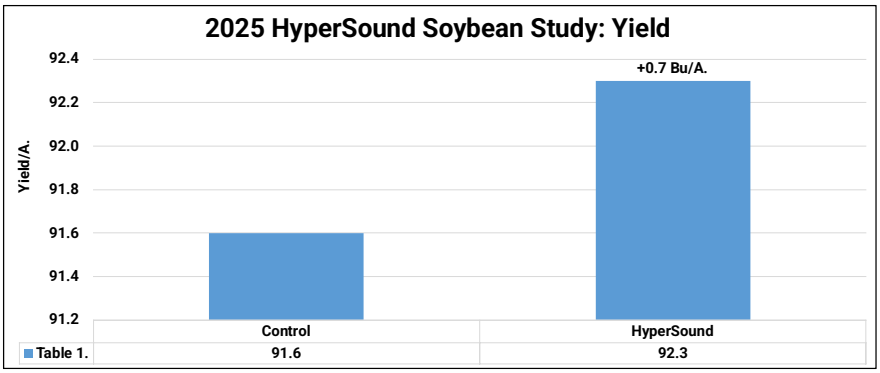
HyperSound Technology Irrigation Study

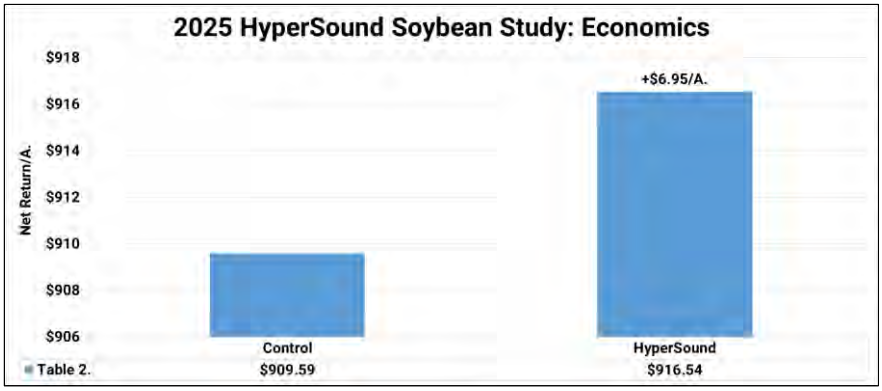
Objective: This trial evaluates the yield and economic return of treating irrigation water with HyperSound Technology. HyperSound Technology by WISE LIFESTYLE is a process of changing the harmonic vibrations to offset the electromagnetic disturbances mobile radio and wireless communication generate.

A quantum field generator uses a femtosecond laser to irreversibly change and optimize the atomic structure (lattice) of crystalline matter such as certain metals and crystallized silicon dioxide. This charged metal begins to emit HyperSound frequencies which influences its environment and neutralizes existing electromagnetic disturbances.

Figure 1. HyperSound Egg

Results: HyperSound treatments resulted in yield gains of +0.7 Bu/A with a positive net return on investment of +$6.95/A.





Planting Date: April 18th Variety: Pioneer 37Z06E Population: 110K Row Width: 30" Rotation: BAC Soybean Price: $9.93

2025 PTI Results

2025 High Management Soybeans: Soybean Seed Size Study

Objective: To evaluate soybean seed size in relation to high yield soybeans. In our 2025 high management soybean trials, our PTI Team wanted to evaluate the abililty to increase soybean seed size, as a result of the various treatments applied throughout the growing season. Seed samples were collected at harvest and then ran through a series of seed counting and weighting excercises to determine actual seed weight and size (Figures 1-2).

Figure 1. Large Soybean Seed Size

Results: Table 1. summarizes the seed size differences of a high managed, irrigated protocol compared to that of a status quo, average management, dry land protocol.

Soybean seed sizes were 3.8% larger in high management treatments and also exhibited higher test weight by 2.0 #'s/Bu. 2025 overall offered above average soybean yields in general, which might explain the lowest difference in soybean size in the five years PTI has weighed/counted soybeans.

Figure 2. Soybean Seed Counter

More work needs to be done to fully understand soybean seed size from various management techniques, but past year's data from PTI suggests bigger beans equates to bigger yields.

2021 data found high management soybeans averaging 2084 seeds/#, 27% larger than low management, 2022 averaging 2750 seeds/#, 14% larger, 2023 averaging 2340 seeds/#, 16% larger and 2024 averaging 2725 seeds/#, 4.8% larger.

Test weight is a "unicorn" to understand, but current overall volumetric grading standards in soybeans usually suggest average soybeans near 57#/Bu in most cases, even though farmers are graded at 60#/Bu.

Table 1.

Program:	Seed Size:	Test Weight:	Yield
Status Quo:	2900 Seeds/#	57.0	89.7
High Management:	2790 Seeds/#	59.0	100.8

Nachurs® High Management Irrigated Soybean Study

Objective: To evaluate the yield and economic impact of a soybean liquid starter fertilizer and foliar nutritional program from Nachurs® in a high management irrigated environment. This trial consisted of the following:

Treatments and Placement:

#1. Control:	150# Dap, 150# 0-0-60, R3 Miravis® Neo

#2 At-Plant Fertility:	
Conceal® Dual Band (Figure 1.)	10 Gal 15-15-3

FurrowJet® 3-way: (Figure 2.)	3 Gal TripleOption®

#3 Foliar Applications:

NACHURS®

V3:	1Qt FinishLine®, 1 Gal TripleOption®
Sidedress:	8oz Speedup, 1Gal FirstDown,1 Gal KFlexMax
R1:	1.5 Gal Nockout®, 1.5 Pt MoneyBall™
R3:	1.5 Gal NockOut®, 1 Qt Finishline®
R4:	1.5 Gal NocKout®, 1 Qt FinishLine®

Figure 1. Conceal® Placement

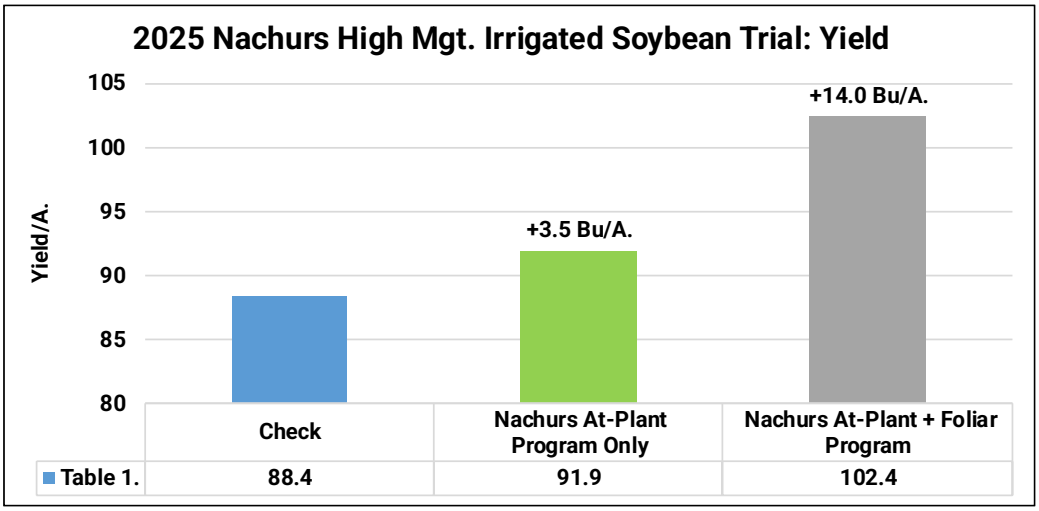
Figure 2. FurrowJet® Placement

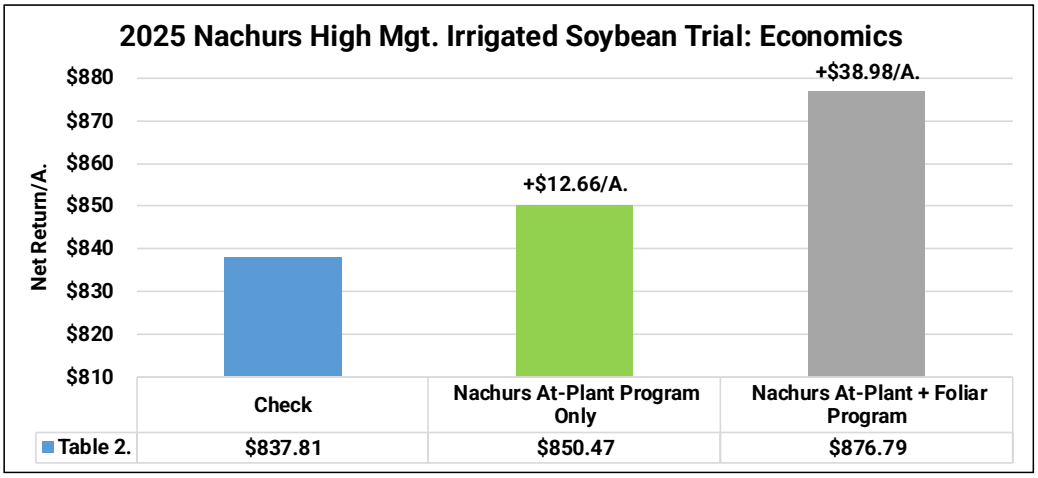
Nachurs® High Management Irrigated Study

Irrigation consisted of 8.00" of rain throughout the growing season and all treatments received fungicide applications of 13.7oz/A. Miravis® Top at R1 and 13.7oz/A. Miravis®Neo at R3 growth stages.

Results: At-Plant FurrowJet® and Conceal® treatments resulted in yields of 91.9 Bu/A., +3.5 Bu/A. over the control. At-plant + foliar combination treatments pushed yield to 102.4 Bu/A., +14.0 Bu/A. over the control.

After all costs, at-plant nutritional treatments proved economic gains of +$12.66/A. Adding the foliar treatments to at-plant applications tallied economic gains of +$38.98/A.





Planting Date: April 20th *Variety: Asgrow 33XF3* *Population: 120K* *Row Width: 30"* *Rotation: BAC* *SB Price: $9.93*

FurrowJet® Program: $62.10/A *Foliar Program: $77.94/A.* *Fert reallocation: $40*

2025 PTI Results

AgroLiquid® High Management Irrigated Soybean Study

Objective: To evaluate the yield and economic impact of a soybean liquid starter fertilizer and foliar nutritional program from AgroLiquid® in a high management irrigated environment. This trial consisted of the following:

Treatments and Placement:

Control:	150# DAP, 150# Potash, R3 Miravis®Top
At-Plant Fertility:	
FurrowJet® Center: (Figure 1.)	2 Gal/A. Pro-Germ® 2 Gal/A. Sure-K™
FurrowJet® Wings (Figure 1.)	0.5 Gal/A. Micro500™ 0.5 Gal/A. LiberateCa® 0.125 Gal/A. Boron
Conceal® Dual Band (Figure 2.)	2 Gal/A. AccesS® 2 Gal/A. Kalibrate™ 10 Gal/A. NGR
Foliar Applications:	V4: 1 Gal/A. Kapitalize™ + .125 Gal Manganese, .125 Gal/A. Boron, 1 Gal/A. Nresponse™ R1: 1 Gal/A. Kapitalize™ + .125 Gal Manganese, .125 Gal/A. Boron, 1 Gal/A. Nresponse™ R3: 1 Gal/A. Kapitalize™ + .125 Gal Manganese, .125 Gal/A. Boron, 1 Gal/A. Nresponse™

Figure 1. FurrowJet® Placement

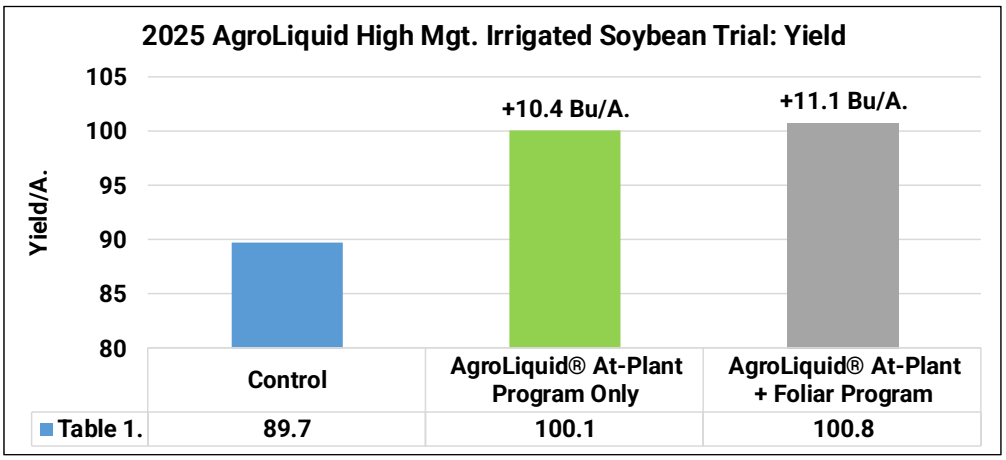
Figure 2. Conceal® Dual Band Application

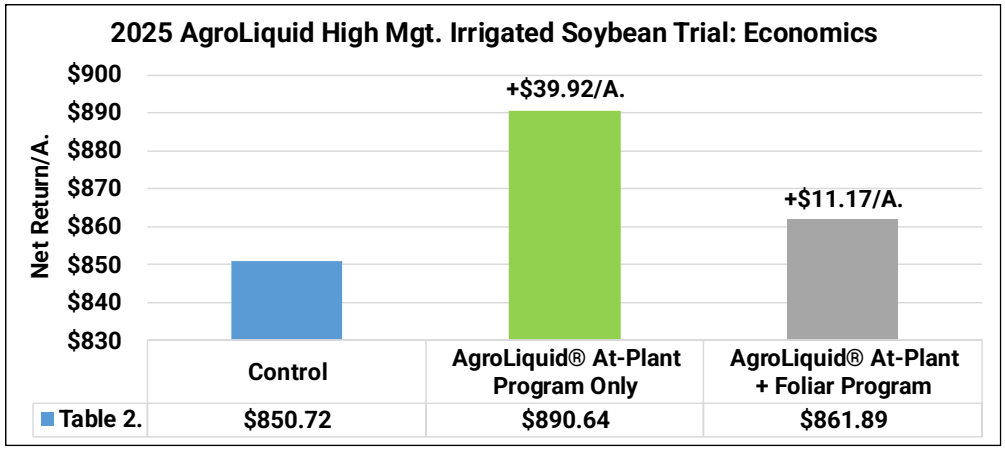
AgroLiquid® High Management Irrigated Soybean Study.

Irrigated treatments received 8.00" of rain throughout the growing season, and all treatments received fungicide applications of 13.7oz/A. Miravis® Top at R1 and 13.7oz/A. of Miravis®Neo at R3 growth stages. Control treatments received 150# DAP and 150# Potash for its dry fertility program.

Results: At-Plant FurrowJet® and Conceal® treatments resulted in yields of 100.1 Bu/A., +10.4 Bu/A. over the control. At-plant + foliar combination treatments pushed yield to 100.8 Bu/A., +11.1 Bu/A. over the control.

After all costs, at-plant nutritional treatments proved economic gains of +$39.92/A. Adding the foliar treatments to at-plant applications tallied economic gains of +$11.17/A.





Planting Date: April 15th Variety: Pioneer 37Z06E3 Population: 120K Row Width: 30" Rotation: BAC SB Price: $9.93

At-Plant Program: $103.35/A. Foliar Program: $35.70/A Fert Reallocation: $40/A.

AgroLiquid® High Management Dryland Soybean Study

Objective: To evaluate the yield and economic impact of a soybean liquid starter fertilizer and foliar nutritional program from AgroLiquid® in a high management Dryland environment. This trial consisted of the following:

Treatments and Placement:

Control:	150# DAP, 150# Potash, R3 Miravis®Top
At-Plant Fertility:	
FurrowJet® Center: (Figure 1.)	2 Gal/A. Pro-Germ® 2 Gal/A. Sure-K®
FurrowJet® Wings (Figure 1.)	0.5 Gal/A. Micro500™ 0.5 Gal/A. LiberateCa® 0.125 Gal/A. Boron
Conceal® Dual Band (Figure 2.)	2 Gal/A. AccesS® 2 Gal/A. Kalibrate™ 10 Gal/A. NGR
Foliar Applications:	V4: 1 Gal/A. Kapitalize™ + .125 Gal Manganese, .125 Gal Boron®, 1 Gal/A. Nresponse™ R1: 1 Gal/A. Kapitalize™ + .125 Gal Manganese, .125 Gal Boron®, 1 Gal/A. Nresponse™

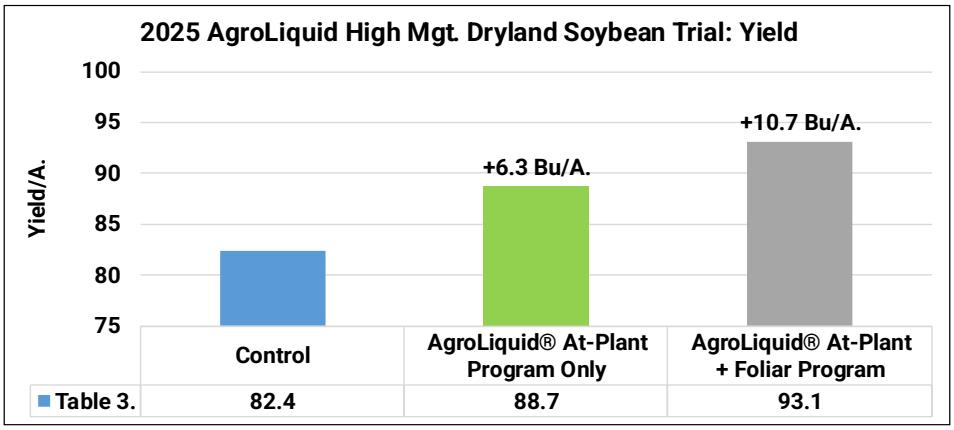
Figure 1. FurrowJet® Placement

Figure 2. Conceal® Dual Band Application

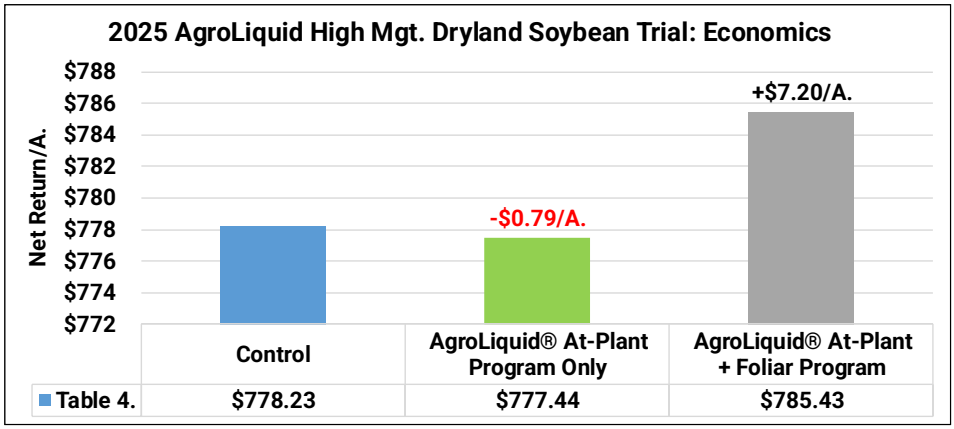
2025 PTI Results

AgroLiquid® High Management Dryland Soybean Study.

Results: At-Plant FurrowJet® and Conceal® treatments resulted in yields of 88.7 Bu/A., +6.3 Bu/A. over the control. At-plant + foliar combination treatments pushed yield to 93.1 Bu/A., +10.7 Bu/A. over the control.



After all costs, at-plant nutritional treatments proved an economic loss of **-$0.79/A.** Adding the foliar treatments to at-plant applications tallied economic gains of +$7.20/A.



Planting Date: April 15th Variety: Pioneer 37Z06E3 Population: 120K Row Width: 30" Rotation: BAC SB Price: $9.93

At-Plant Program: $103.35/A. Foliar Program: $35.70/A. Fert Reallocation: $40/A.

Marco Fertilizer High Management Irrigated Soybean Study

Objective: To evaluate the yield and economic impact of a soybean liquid starter fertilizer and foliar nutritional program from Marco Fertilizer in a high management irrigated environment. This trial consisted of the following:

Treatments and Placement:

#1. Control:	150# 18-46-0,125# 0-0-60, R1 Miravis®Top
#2 At-Plant Fertility:	
FurrowJet® 3-Way (Figure 1.)	1 Pt Soil Assist
	3 Gal QuickGrow Complete
	1 oz MycoBoost

#3 Foliar Applications:

V3: 20 oz Energizer, 1 Pt Iron Plus

R1: 2# Nutri Complete, 2oz Poseidon, 1 Pt Energizer, 1 Qt Calcium Plus

R4: 2.5 Gal Finisher

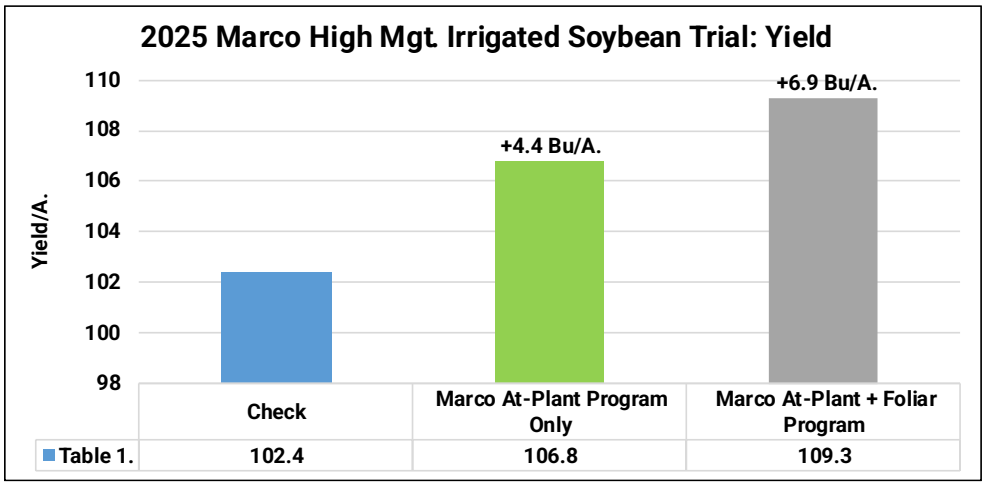
Figure 1. FurrowJet® Placement

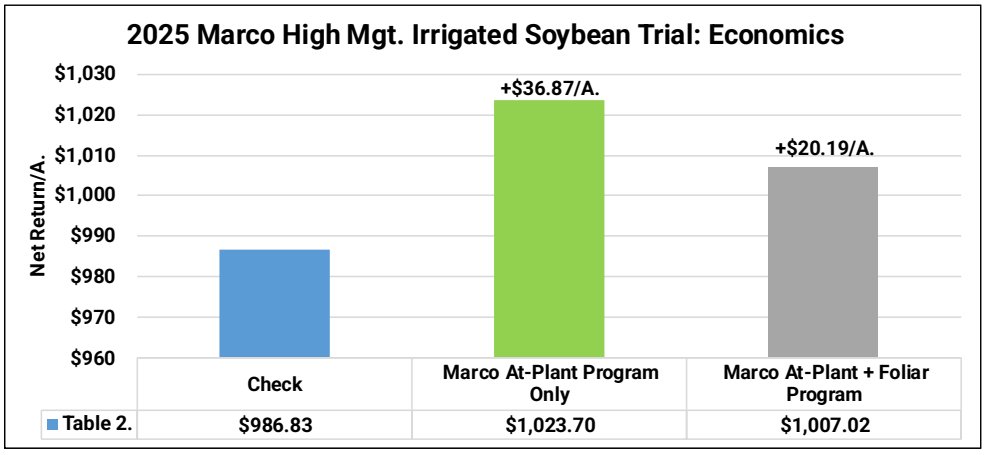
Marco Fertilizer High Management Irrigated Soybean Study

Irrigation consisted of 8.00" of rain throughout the growing season and all treatments received fungicide applications of 13.7oz/A. Miravis® Top at R1 and 13.7oz/A. Miravis®Neo at R3 growth stages.

Results: At-Plant FurrowJet® and Conceal® treatments resulted in yields of 106.8 Bu/A., +4.4 Bu/A. over the control. At-plant + foliar combination treatments pushed yield to 109.3 Bu/A., +6.9 Bu/A. over the control.

After all costs, at-plant nutritional treatments proved economic gains of +$36.87/A. Adding the foliar treatments to at-plant applications tallied economic gains of +$20.19/A.





Planting Date: May 9th *Variety: GH 3035E3* *Population: 120K* *Row Width: 30* *Rotation: BAC* *SB Price: $9.93* *Irrigation: $40/A.*

At-Plant Program: $36.83/A. *Foliar Program: $41.50/A* *$30 Fert-Reallocation*

Rosen's High Management Irrigated Soybean Study

Objective: To evaluate the yield and economic impact of a soybean liquid starter fertilizer and foliar nutritional program from Rosen's in a high management irrigated environment. This trial consisted of the following:

Treatments and Placement:

#1. Control:	150# 18-46-0,125# 0-0-60, R3 Miravis®Top
#2 At-Plant Fertility:	
FurrowJet® Wings: (Figures 1-2.)	1% Volume PMAX® LFS, 6 Grams Manuever®, 6oz Triad™
#3 Foliar Applications:	
ROSEN'S INC. Quality Agricultural Products	V3: 32oz Legend Elite™, 6oz Triad™, 16oz EnLiven® R3: 8oz MACH 5™, 32oz Tauris Sulfur™, 6oz Triad™, 8oz Mitigate® Plus

Figure 1. FurrowJet® Quick-Attach

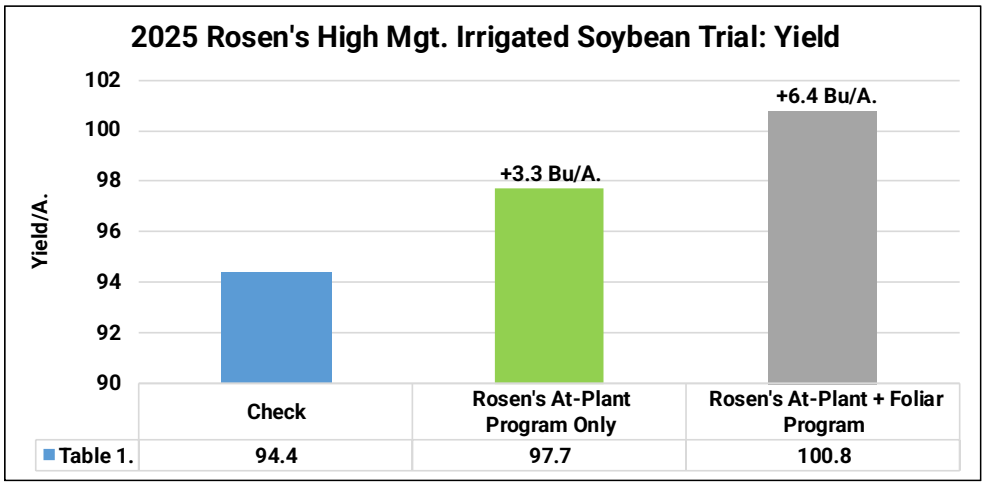
Figure 2. FurrowJet® Placement

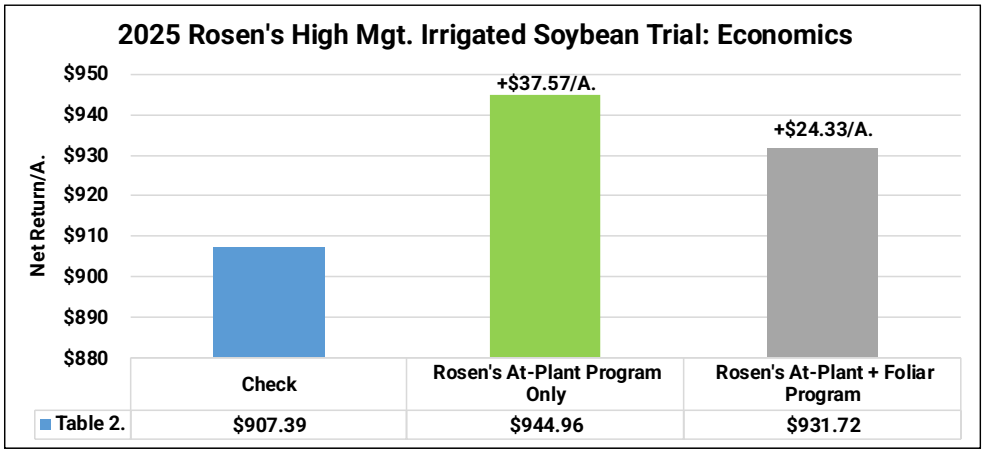
Rosen's High Management Irrigated Soybean Study

Irrigation consisted of 8.00" of rain throughout the growing season and all treatments received fungicide applications of 13.7oz/A. Miravis® Top at R1 and 13.7oz/A. Miravis®Neo at R3 growth stages.

Results: At-Plant FurrowJet® and Conceal® treatments resulted in yields of 97.7 Bu/A., +3.3 Bu/A. over the control. At-plant + foliar combination treatments pushed yield to 100.8 Bu/A., +6.4 Bu/A. over the control.

After all costs, at-plant nutritional treatments proved economic gains of +$37.57/A. Adding the foliar treatments to at-plant applications tallied economic gains of +$24.33/A.





Planting Date: May 9th Variety: GH 3035E3 Population: 120K Row Width: 30 Rotation: BAC SB Price: $9.93

At-Plant Program: $25.20/A. Foliar Program: $44.02/A $30 Fert Reallocation

Corteva® Biologicals High Management Irrigated Soybean Study

Objective: To evaluate the yield and economic impact of a soybean liquid starter fertilizer and foliar nutritional program from Corteva® in a high management irrigated environment. This trial consisted of the following:

Treatments and Placement:

#1. Control:	150# 18-46-0, 150# 0-0-60, R3 Miravis®Neo

#2 At-Plant Fertility:	
FurrowJet® 3-Way: (Figure 1.)	8oz NEXTA SHIELD
Conceal® Dual Band: (Figure 2.)	1qt Harvest Plus

#3 Foliar Applications:	
CORTEVA™	V3: 4oz NEXTA SHIELD, 8oz NEXTA SPARK, 1qt Harvest Plus R3: 32oz NEXTA SWOLE, 8oz NEXTA SPARK, 2.5# Harvest More (5-5-45)

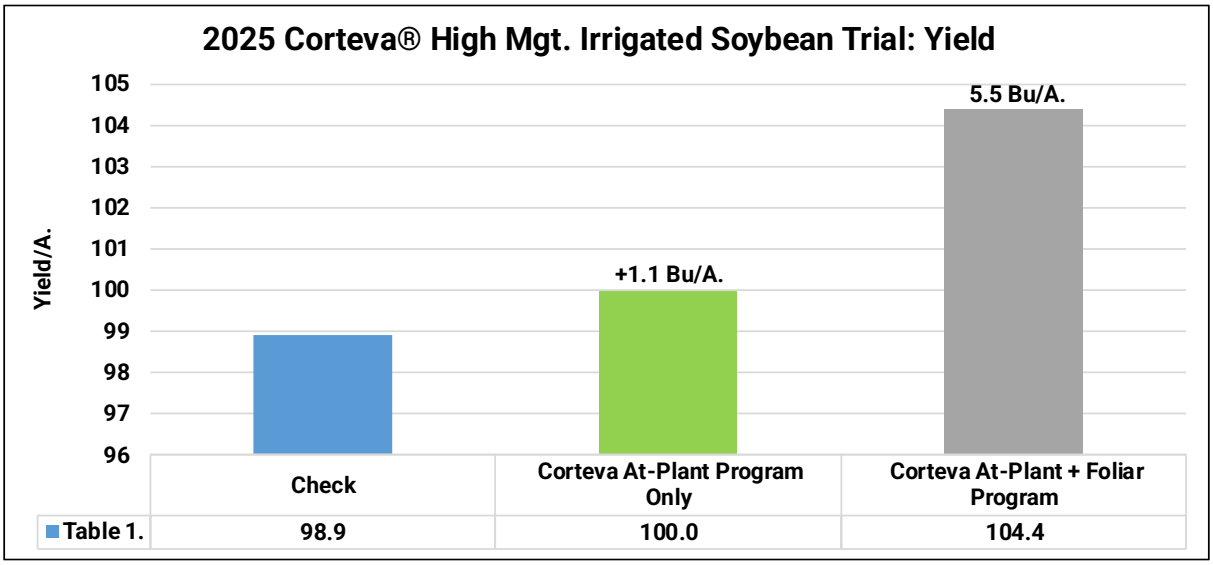
Figure 1. FurrowJet® Placement

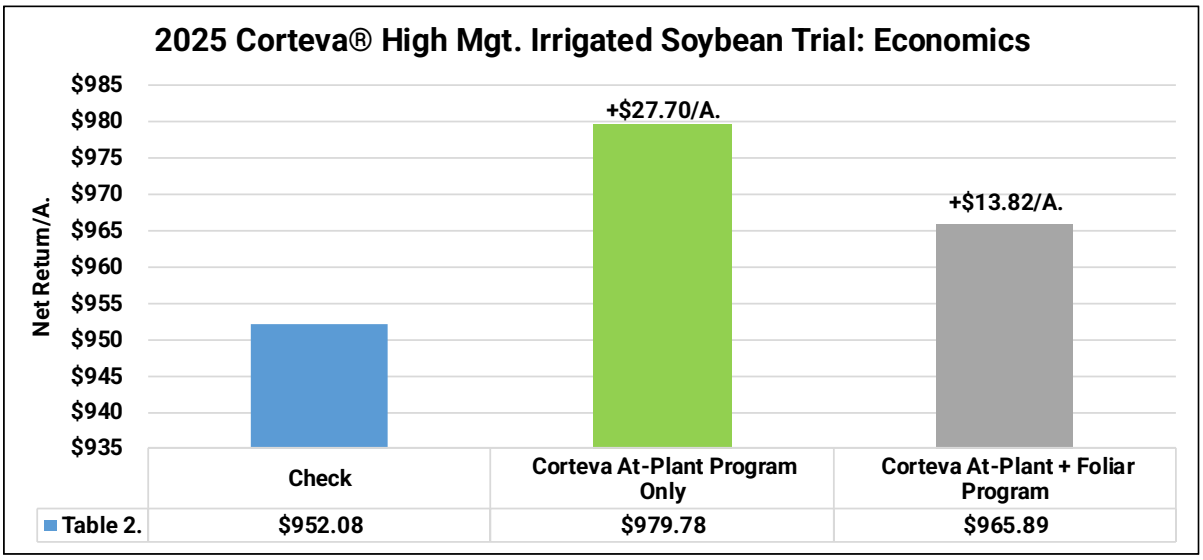
Figure 2. Conceal® Dual Band Placement

Corteva® Biologicals High Management Irrigated Soybean Study

All treatments received 8.00" of rain throughout the growing season as well as fungicide applications of 13.7oz/A. Miravis® Neo at R3 growth stage.

Results: At-Plant only treatments resulted in yields of 100.0 Bu/A., +1.1 Bu/A. over the control. At-plant + foliar applications resulted in yield of 104.4 Bu/A., +5.5 Bu/A. over the control.





Planting Date: May 5th Variety: Pioneer 37Z06E Population: 120K Row Width: 30" Rotation: BAC SB Price: $9.93

START: $13.22/A. GROW: $18.21/A. FINISH: $39.37/A. Fertilizer Reallocation: $30/A.

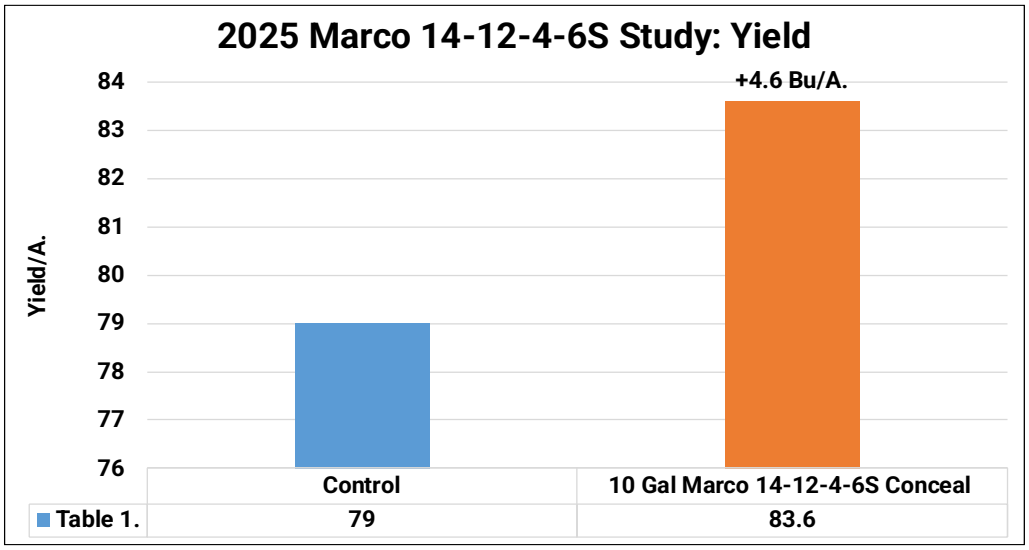
Marco Fertilizer NutriStart BOOST 14-12-4-6S Study

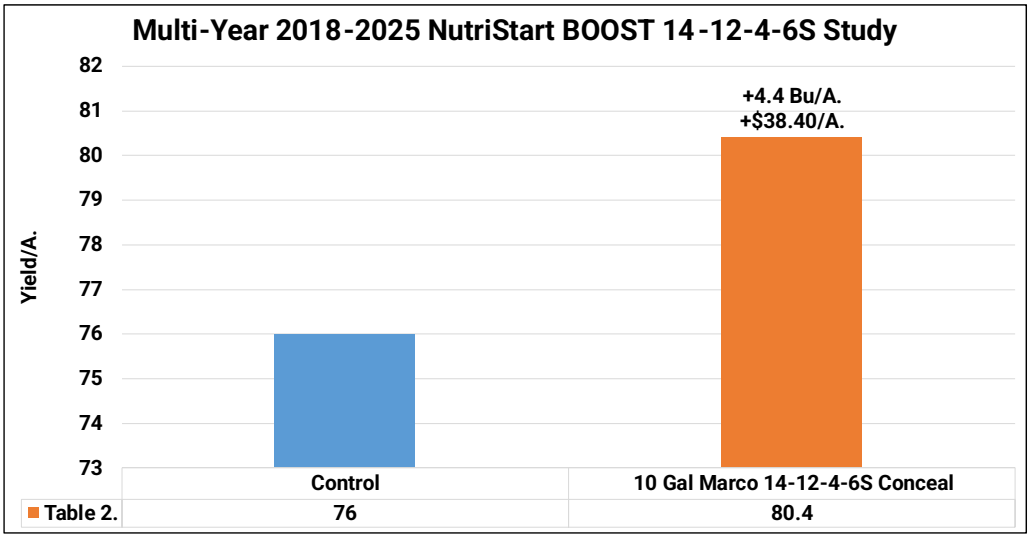
Objective: This trial evaluates the yield and net return of NutriStart BOOST 14-12-4-6S at 15 Gal/A. applied through dual band Conceal®. This liquid fertilizer is a 70% polyphosphate, and 30% orthophosphate formula designed for non-in furrow applications in soybeans. NutriStart products are manufactured with Marco 10-34-0, Potassium - soluble potash (K2O), Sulfur - Ammonium Thiosulfate and Zinc - 9% EDTA.

Figure 1. Conceal® Dual Placement

Results: Table 1. illustrates that NutriStart BOOST (14-12-4-6S) proved positive yield gains of +4.6 Bu/A. at 10 Gal/A. resulting in an economic gain of +$13.18/A. in 2025.

Table 2. summarizes 8-yr data over 2018-2025, indicating a positive +4.4 Bu/A. yield increase and positive economic returns of +$38.40/A.





Planting Date: April 24th *Variety: AG 35XF3* *Population: 120K* *Row Width: 30"* *Rotation: BAC* *SB Price: $9.93* *BOOST 14-12-4-6: $3.25/Gal*

Green Lightning Plasma Activated Water Conceal® Study

Objective: To evaluate yield, net return, and nitrogen use efficiency (NUE) of Green Lightning plasma activated water. Green Lightning is a mechanism to replicate a naturally occurring process that leads to nitrogen. During a lightning storm, static electricity rearranges the nitrogen molecule in the air, and this modified molecule is contained within the rain. Green Lightning devices create lightning in a controlled environment under the same premise. Air and water are sent into a static electric field for the nitrogen molecule to go through a rearrangement process that allows attachment of the water present, flowing through the machine, and deposits an end product as NO2 (nitrite) and NO3 (nitrate).

A six head system called the THUNDER 365, was orginally designed to produce nitrogen for 550 acres of corn annually. However, this study is intended to evaluate PAW on soybeans as a way to measure othercrops other than corn.

Figure 1. Green Lightning Plasma Activated Water Machine

This system is designed for use by a farmer, in his/her own tool-shed, to make nitrogen by using only a 110v power, grounding rods, and a water supply.

This study compares the use of Green Lightning plasma activated applied at-plant through Conceal®, a planter fertilizer attachment that enables placement of fertilizer in a 3X-0.5X2 application (Figure 2.), at applied rates of 10, 20, and 30 Gal/A.

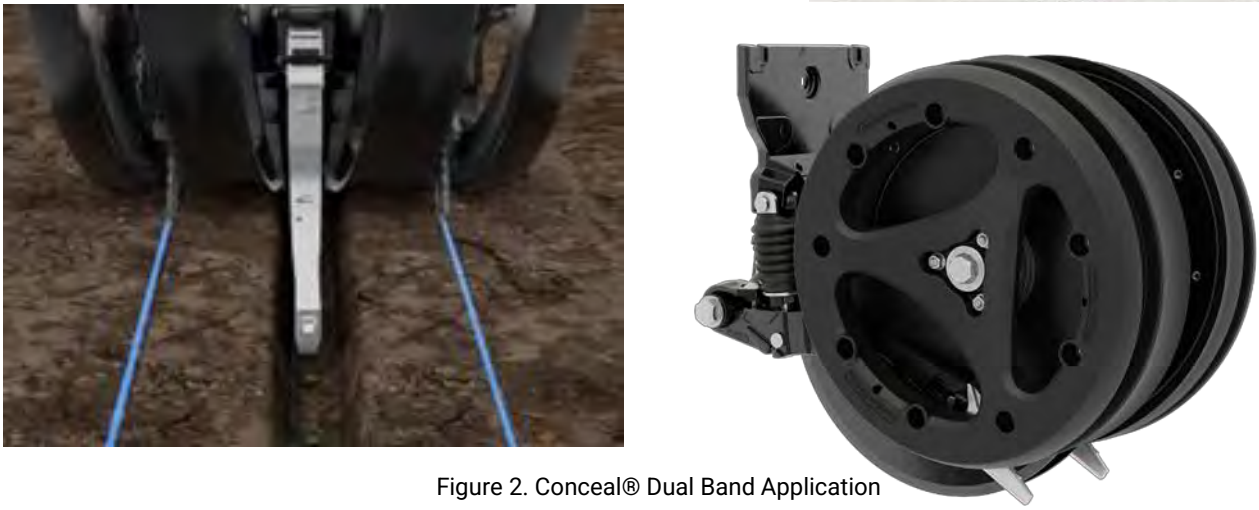
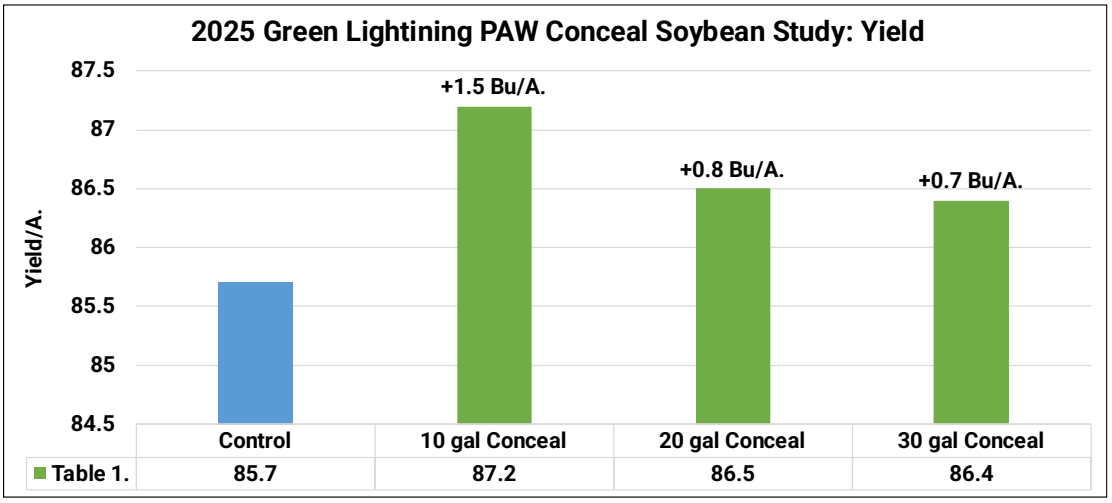


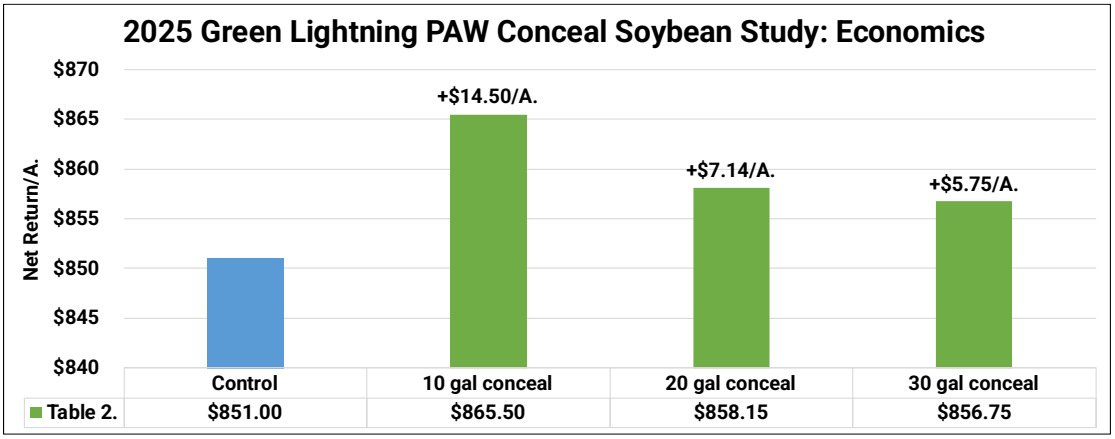
Figure 2. Conceal® Dual Band Application

Green Lightning Plasma Activated Water Conceal® Study

Results: The tables below illustrate a yield advantage ranging from +0.7 Bu/A. to +1.5 Bu/A. The higher the rate applied, the lower the yield response. Due to the low cost/A. of this product all treatments proved economic returns, even though yield response was less than 1 Bu/A. in some treatments. 10 Gal/A. rates netted gains of +$14.50/A. while 20 Gal/A. and 30 Gal/A. netted +$7.14/A. and +$5.75/A. respectively.

As an environmentally friendly product that is very affordable to produce, we are constantly looking for ways to use plasma activated water as a means to increase yield and net return other than a nitrogen replacement in corn.



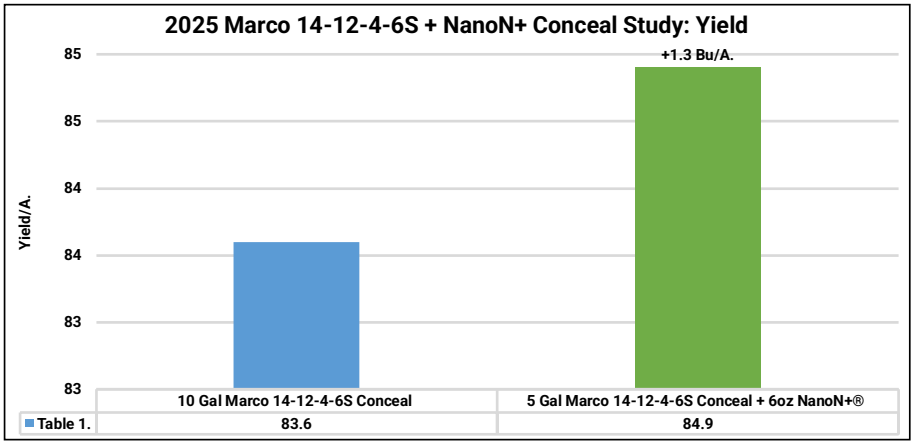


Planting Date: May 13th Hybrid: ProHarvest 3550E3 Population: 120K Row Width: 30" Rotation: BAC Soybean Price: $9.93 Green N: $0.04/Gal.

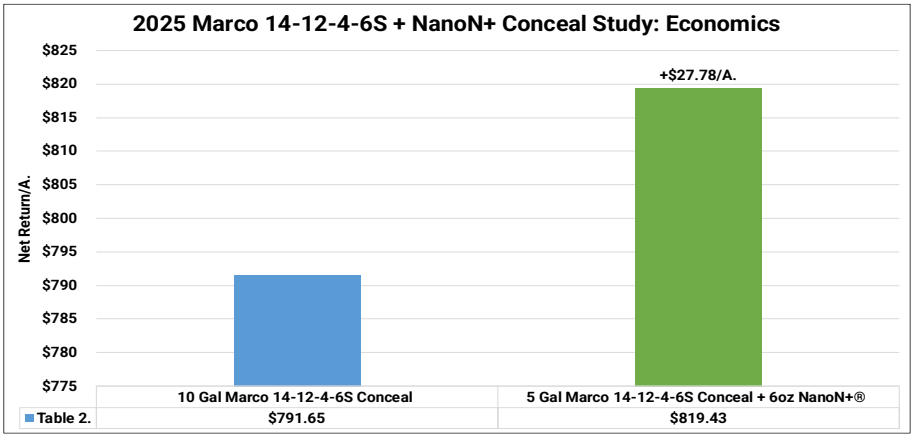
Aqua-Yield® NanoN+® Study

Objective: This trial evaluates the yield and net return of Marco Fertilizer NutriStart BOOST paired with NanoN+. NutriStart BOOST(14-12-12-4-6S) is a 70% polyphosphate, and 30% orthophosphate formula designed for non-in furrow applications in soybeans. NutriStart products are manufactured with Marco 10-34-0, Potassium - soluble potash (K2O), Sulfur - Ammonium Thiosulfate and Zinc - 9% EDTA.

NanoN+® is designed to protect and carry nutrients in liquid solutions to improve efficiency and reduce waste. NanoN+® enhances plant nutrient uptake and availability for liquid nutrient formulations including macronutrient and micronutrient products.



Results: Table 1. illustrates that adding 6oz of NanoN+ with 14-12-4-6S resulted in a positive yield gain of +1.3 Bu/A. These yield gains equated to a positive a positive return on investment of +$27.78/A.



NanoN+®

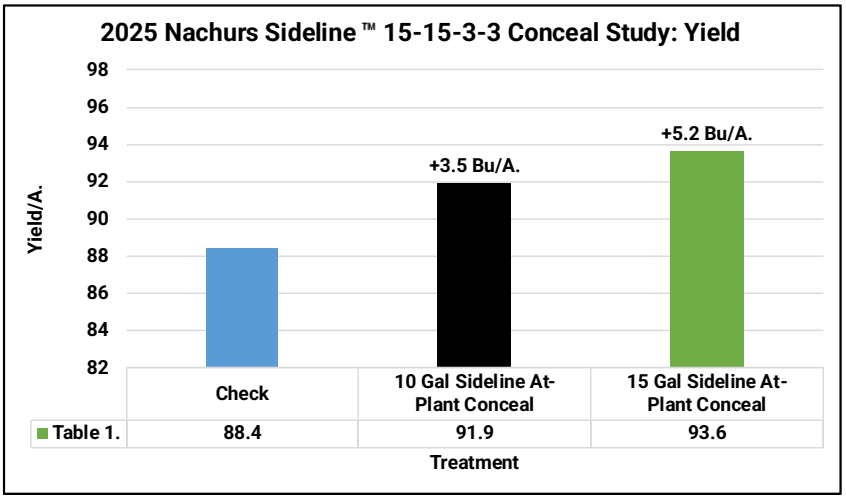
Planting Date: April 24th *Variety: AG 35XF3* *Population: 120K* *Row Width: 30"* *Rotation: BAC* *SB Price: $9.93* *BOOST 14-12-4-6: $3.85/G* *Aqua-Yield NanoN+®: $4.38/A.*

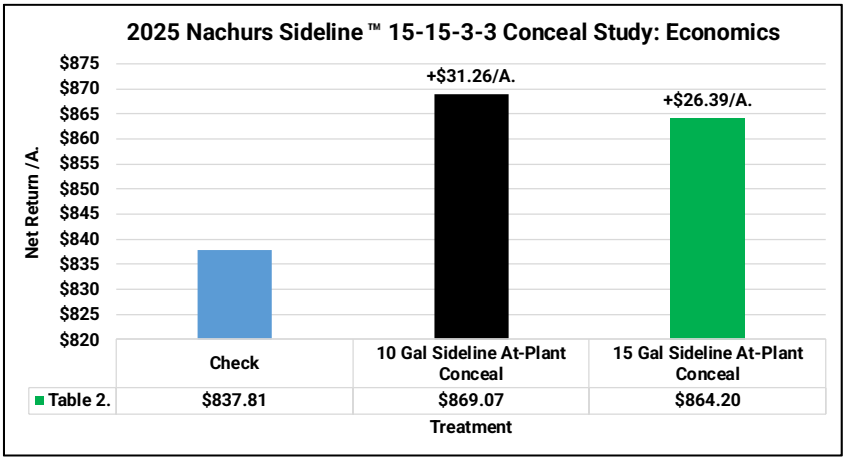
2025 PTI Results

Nachurs® Sideline™ 15-15-3-3 Study

Objective: This trial evaluates the yield and net return of Conceal® system dual band treatments of Nachurs® Sideline™ 15-15-3-3 at 10 and 15 Gal/A. rate. This liquid fertilizer is a high nitrogen, high phosphorus low salt liquid fertilizer manufactured by utilizing quality raw materials which provide important nutrients. (N,P,K,S) for maximum plant growth and development.

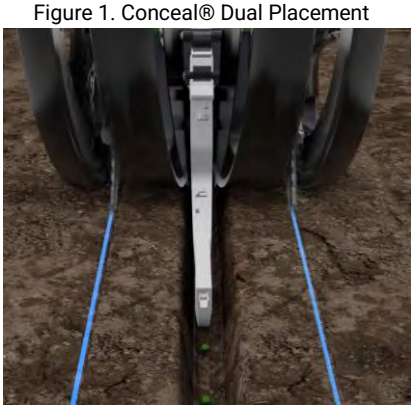
Sideline™ is formulated to deliver dual modes of action for phosphorus nutrition: orthophosphate for immediate plant availability and uptake potential, and polyphosphate for controlled release over the growing season. Ideal use for Conceal® application.





Results: Table 1. illustrates 15-15-3-3 proved positive yield gains of +3.5 Bu/A. at 10 Gal resulting in an economic gain of +$31.26/A. Adding 15 Gal of 15-15-3-3 resulted in a positive yield gain of +5.2 Bu/A. over the control, providing a positive return on investment of +$26.39/A.

Figure 1. Conceal® Dual Placement



Planting Date: April 24th Variety: AG 35XF3 Population: 120K Row Width: 30" Rotation: BAC SB Price: $9.93 Sideline™ 15-15-3-3: $4.35/GAL Fert reallocation: $40

Green Lightning Plasma Activated Water In-Furrow Study

Objective: To evaluate yield, net return, and nitrogen use efficiency (NUE) of Green Lightning plasma activated water. Green Lightning is a mechanism to replicate a naturally occurring process that leads to nitrogen. During a lightning storm, static electricity rearranges the nitrogen molecule in the air, and this modified molecule is contained within the rain. Green Lightning devices create lightning in a controlled environment under the same premise. Air and water are sent into a static electric field for the nitrogen molecule to go through a rearrangement process that allows attachment of the water present, flowing through the machine, and deposits an end product as NO2 (nitrite) and NO3 (nitrate).

A six head system called the THUNDER 365, was orginally designed to produce nitrogen for 550 acres of corn annually. However, this study is intended to evaluate PAW on soybeans as a way to measure othercrops other than corn.

This system is designed for use by a farmer, in his/her own tool-shed, to make nitrogen by using only a 110v power, grounding rods, and a water supply.

This study compares the use of Green Lightning plasma activated applied at-plant through FurrowJet®, a planter fertilizer attachment that enables placement of fertilizer in-furrow (Figure 2.), at applied rates of 4 Gal/A., 8 Gal/A., and 12 Gal/A.

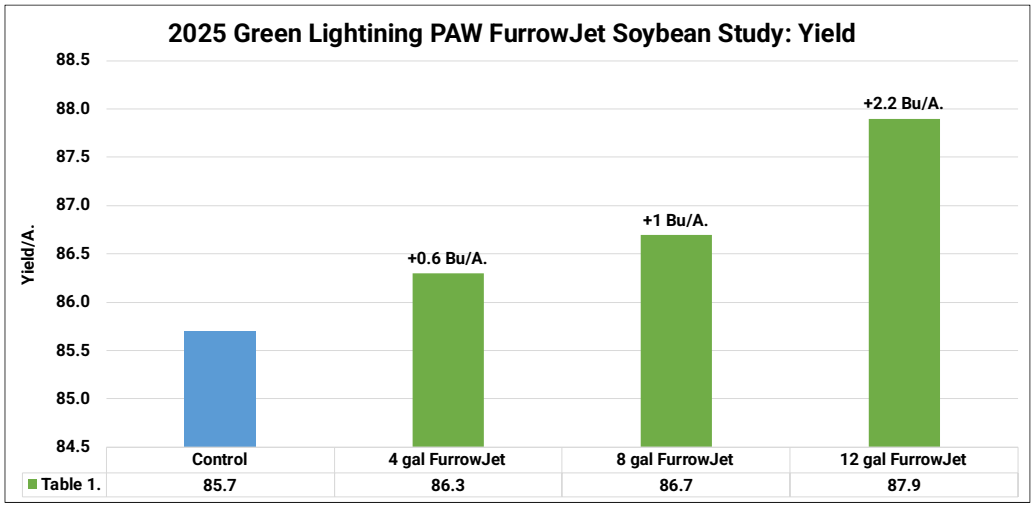
Figure 1. Green Lightning Plasma Activated Water Machine

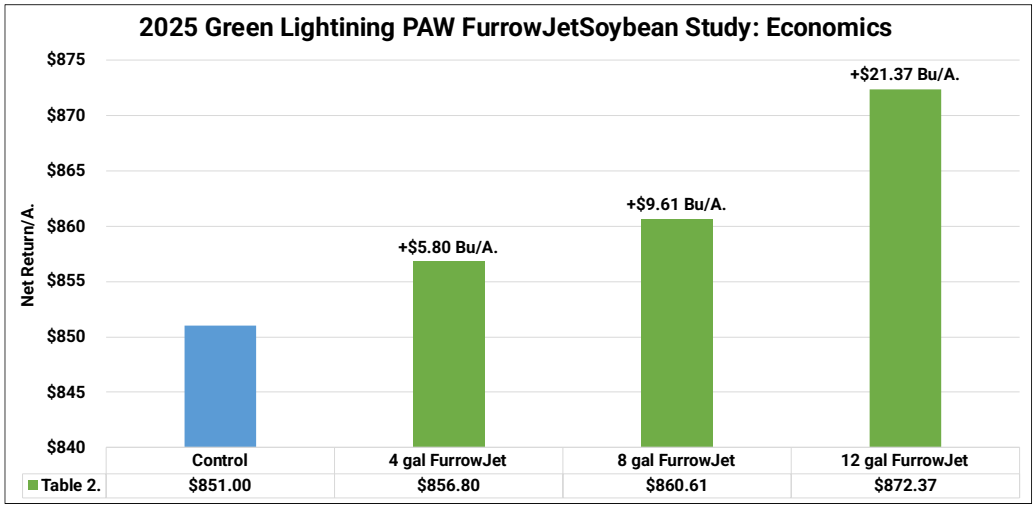
Figure 2. FurrowJet® 3-way placement

Green Lightning Plasma Activated Water In-Furrow Study

Results: The tables below illustrate a yield advantage ranging from +0.6 Bu/A. to +2.2 Bu/A. The higher the rate applied, the higher the yield response. Due to the low cost/A. of this product all treatments proved economic returns. 4 Gal/A. rates netted gains of +$5.80/A. while 8 Gal/A. and 12 Gal/A. netted +$9.61/A. and +$21.37/A. respectively.

As an environmentally friendly product that is very affordable to produce, we are constantly looking for ways to use plasma activated water as a means to increase yield and net return other than a nitrogen replacement in corn.



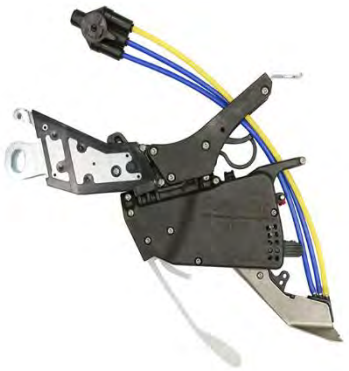


Planting Date: May 13th Hybrid: ProHarvest 3550E3 Population: 120K Row Width: 30" Rotation: BAC Soybean Price: $9.93 Green N: $0.04/Gal.

2025 PTI Results

FurrowJet® Side-Wall Study

Figure 1. FurrowJet®



Objective: FurrowJet® system is a planter fertilizer attachment (Figure 1.) that enables placement of not only an in-furrow starter fertilizer, but also a dual-band of fertilizer 3/4" on each side of the seed. To achieve this dual-band placement, the wings on FurrowJet® system angle downward to cut into the sidewall and place fertilizer alongside the seed in a dual-band. By doing this, lifting and fracturing can occur that potentially could remove soil smearing or compaction created by disc openers. Additionally, closing wheel systems following FurrowJet® wings have a better opportunity to close the seed trench, remove air pockets, and allow for good seed-to-soil contact.

Figure 2. FurrowJet® Dual-Band Wings Fracturing Side-Walls

This study evaluates FurrowJet® dual-band wings offering the ability to cut, lift and remove side-wall compaction in the seed furrow (Figure 2). For this study, no liquid fertilizer was applied.

Results: In 2025, FurrowJet® alleviating sidewall density resulted in +1.1 Bu/A. average yield gains. Table 1. below illustrates multi-year data over 2020-2025 with average yield gain of +1.5 Bu/A. Using a soybean commodity price of $9.93 and a cost of $320/Row for FurrowJet® systems, break-even would occur on a 16-row planter with this scenario at 344 acres, not even considering any liquid fertilizer potential benefit.

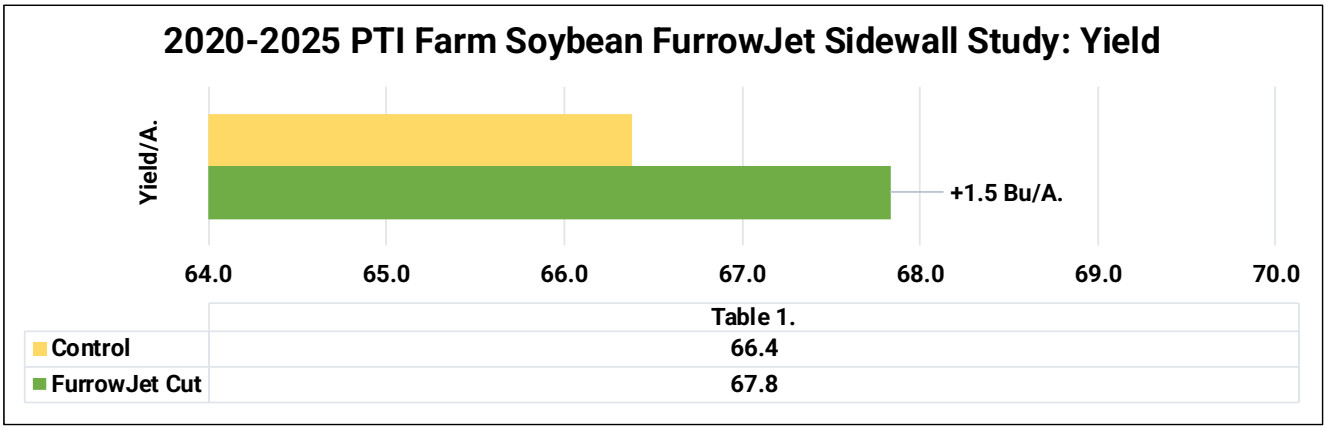


	Table 1.
Control	66.4
FurrowJet Cut	67.8

Planting Date: May 10th *Variety: Asgrow 27FX1* *Population: 130K* *Row Width: 30"* *Rotation: BAC* *Soybean Price: $9.93*

2025 PTI Results

Soybean Summary of 2025 FurrowJet® Applications

Study	Classification	Yield (Bu/A.)	$ROI
April 15th Soybean Planting Date with Starter	Starter Fertilizer	4.4	$ 45.09
Match 14th Soybean Planting Date with Starter	Starter Fertilizer	4.0	$ 41.12
AgroLiquid High Management Irrigated At-Plant	Starter Fertilizer	10.4	$ 39.92
Rosen's High Management Irrigated At-Plant	Starter Fertilizer	3.3	$ 37.57
Marco High Management Irrigated At-Plant	Starter Fertilizer	4.4	$ 36.87
Corteva High Management Irrigated At-Plant	Starter Fertilizer	1.1	$ 27.70
Plasma Activated Water In-Furrow 12 Gal	Starter Fertilizer/ Plasma activated water	2.2	$ 21.37
FurrowJet Side-Wall Cut	Mechanical	1.5	$ 14.90
Nachurs High Management Irrigated At-Plant	Starter Fertilizer	3.5	$ 12.66
Plasma Activated Water In-Furrow 8 Gal	Starter Fertilizer/ Plasma activated water	1.0	$ 9.61
April 25th Soybean Planting Date with Starter	Starter Fertilizer	0.7	$ 8.35
Manuver FurrowJet 3-Way	Starter Fertilizer/ Plasma activated water	2.2	$ 7.51
May 19th Soybean Planting Date with Starter	Starter Fertilizer	0.6	$ 7.36
Plasma Activated Water In-Furrow 4 Gal	Starter Fertilizer/ Plasma activated water	0.6	$ 5.80
May 12th Soybean Planting Date with Starter	Starter Fertilizer	0.3	$ 4.38
Corteva START	Biological	1.7	$ 3.66
AgroLiquid High Management Dryland At-Plant	Starter Fertilizer	6.3	$ (0.79)
Average		2.8	$ 19.00

Soybean Summary of 2025 Conceal® Applications

Study	Classification	Yield (Bu/A.)	$ROI
AgroLiquid High Management Irrigated At-Plant	Starter Fertiizer	10.4	$ 39.92
10 Gal SideLine At-Plant	N-P-K-S Starter Fertilizer	3.5	$ 31.26
14-12-4-6S + 6oz NanoN+	Nitrogen Efficiency	1.3	27.78
Corteva High Management Irrigated At-Plant	Starter Fertiizer	1.1	$ 27.70
15 Gal SideLine At-Plant	N-P-K-S Starter Fertilizer	5.2	$ 26.39
Plasma Activated Water Conceal 10 Gal	Plasma Activated Water	1.5	$ 14.50
NutriStart BOOST 14-12-4-6S	N-P-K-S Starter Fertilizer	4.6	$ 13.18
Nachurs High Management Irrigated At-Plant	Starter Fertiizer	3.5	$ 12.66
Humic PT	Biological	2.7	9.56
Plasma Activated Water Conceal 20 Gal	Plasma Activated Water	0.8	$ 7.14
Plasma Activated Water Conceal 30 Gal	Plasma Activated Water	0.8	$ 5.75
Corteva START		1.7	$ 3.66
AgroLiquid High Management Dryland At-Plant	Starter Fertiizer	6.3	$ (0.79)
Cover Crop + Himc PT	Biological	2.4	$ (25.52)
Average		3.3	$ 13.80

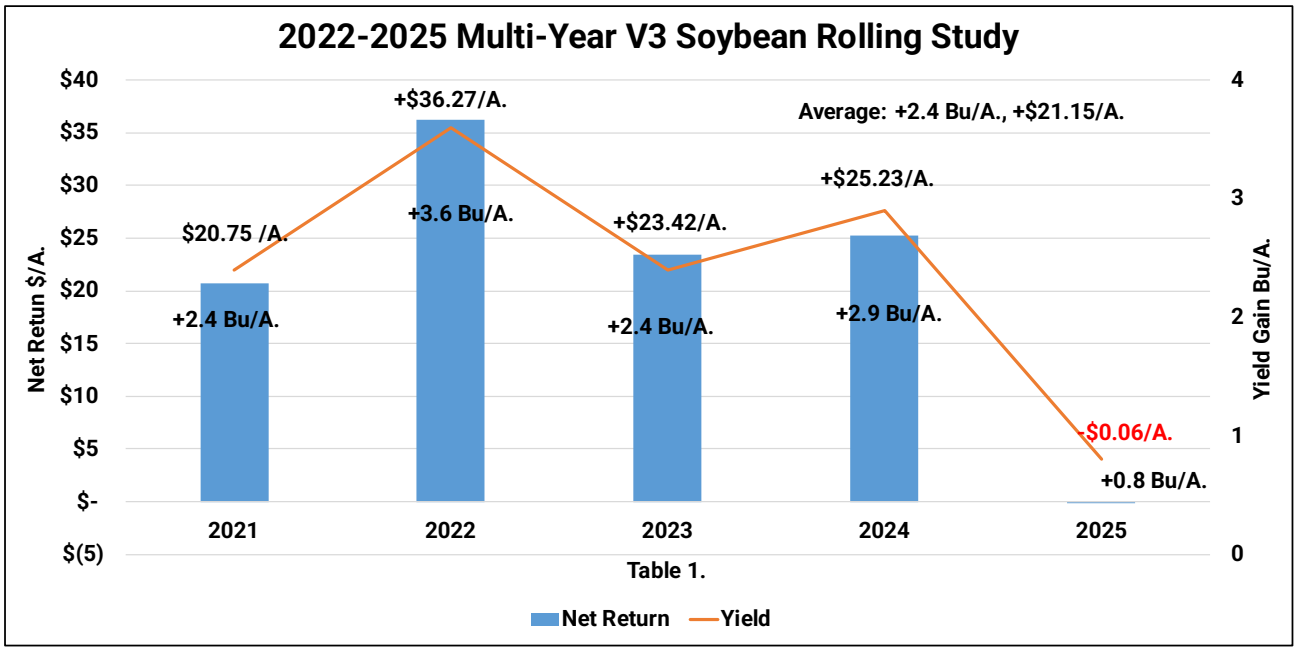
Summers® Soybean Rolling Study

Objective: To study the yield and economic impact of rolling soybeans with a Summers® RH3330 50' land roller .

The benefits of using a roller in soybeans include the following:

- Pushing or pressing rocks into soil to avoid harvest issues
- Lays corn residue flat to aid in cleaner seed at harvest
- Stimulate reproductive growth after rolling damage occurs

Results: Table 1. illustrates multi-year (2021-2025) soybeans rolled at the V2 growth stage have resulted in average yield gains of +2.4 Bu/A. with economic returns of +21.15/A.



Planting Date: Varied *Variety: Varied* *Population: Varied* *Row Width: Varied* *Rotation: BAC, No-Till* *Soybean Price: $Varied* *Rolling: $8/A.*

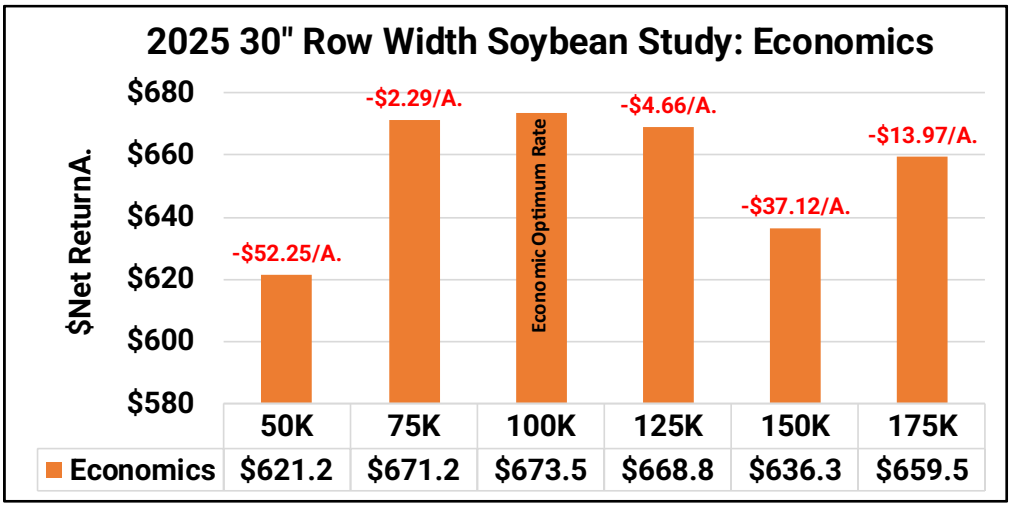
2025 PTI Results

Soybean Row Width & Seeding Rate Study

Objective: This trial evaluates the agronomic and economic impact of planting two soybean varieties (Asgrow 36XF4 and Golden Harvest 2925XF) at seeding rates ranging from 50K to 175K in 15" and 30" row spacing.

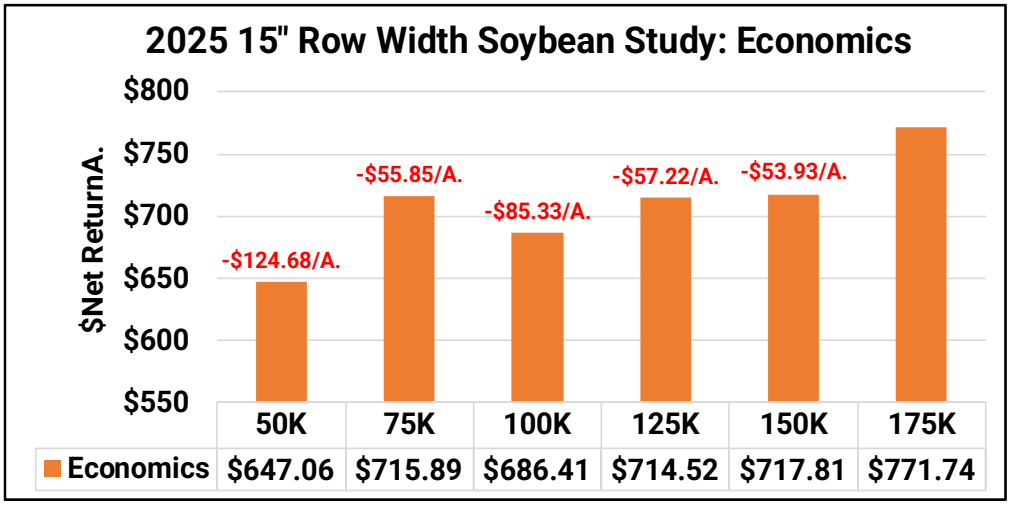
30" Wide Row Results:

- ✓ 175K seeding rates achieved agronomic optimum at 74.6 Bu/A., however 100K/A. was economic optimum
- ✓ Low 50K/A. rates resulted in losses of **-8.3 Bu/A.** and **-$52.25/A.**
- ✓ Deviating 25K on either side of 100K, resulted in economic losses of only **-$2/A.** to nearly **-$5/A.**



15" Narrow Row Results:

- ✓ Highest rates of 175K/A. achieved agronomic and economic optimum at 85.9 Bu/A.
- ✓ Lowest seeding rates of 50K/A. resulted in highest yield losses of **-18.4 Bu/A.**, proving economic losses of **-$124.68/A.**

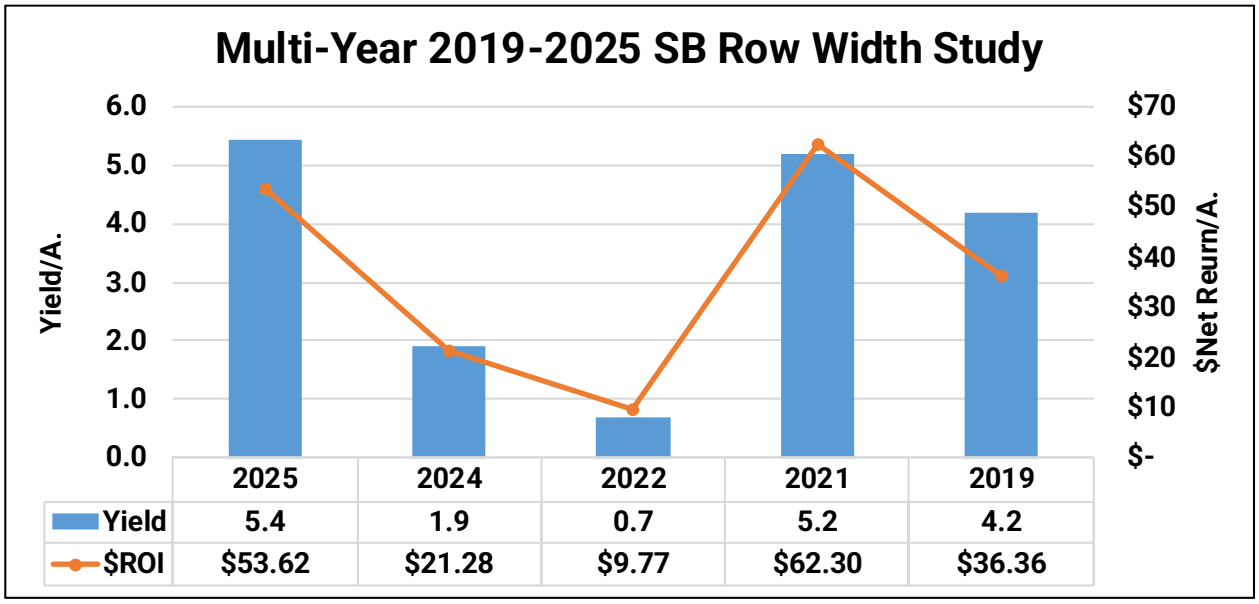


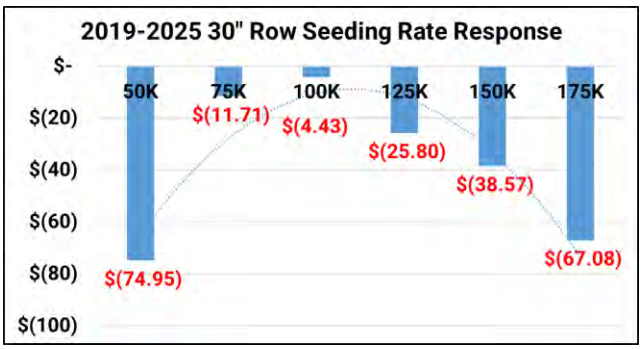
2025 PTI Results

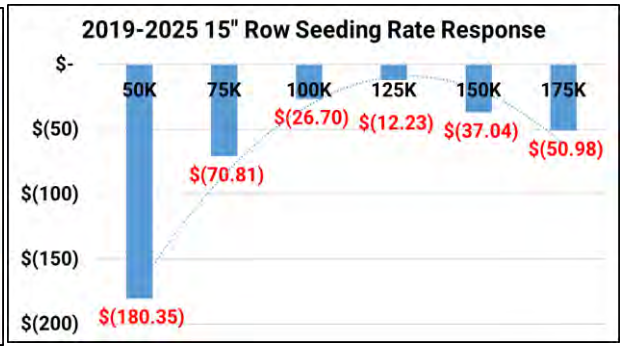
Soybean Row Width & Seeding Rate Study

15" vs 30" Row Width Summary:

- ✓ 15" rows out-performed wide 30" rows by +5.4 Bu/A. on average over all seeding rates
- ✓ +5.4 Bu/A. yield gains at $9.93/Bu. averaged additional average net revenue increase of +$53.62/A.
- ✓ Multi-Year data at the PTI Farm has resulted in narrow row advantages of +3.5 Bu/A. with additional net revenue of +$36.67/A. 30" rows have resulted in economic optimum seeding rates near 100K, while narrow rows near 125K.







Planting Date: May 3rd Variety: Golden Harvest® 2925XF, Asgrow 36XF4 Population: Varied Row Width: 30" Rotation: BAC SB Price: $9.93 Seed: $65/Bag.

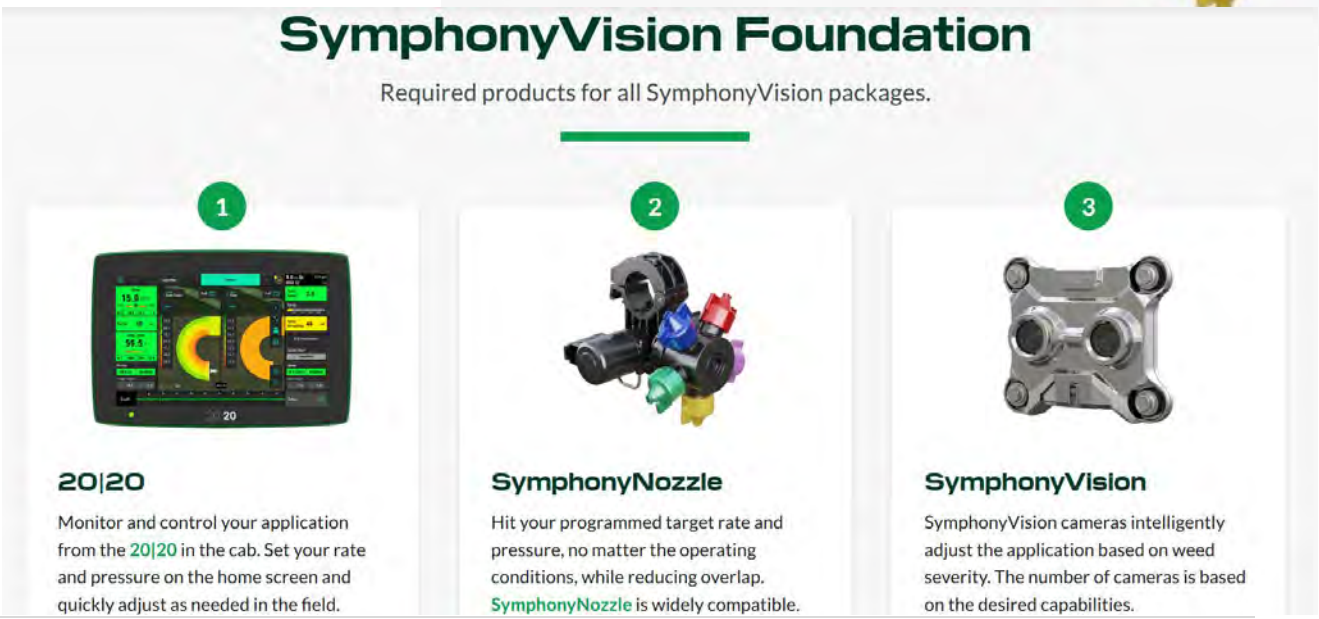
PTI ILLINOIS

SymphonyVision™|Spot Soybean Targeted Study

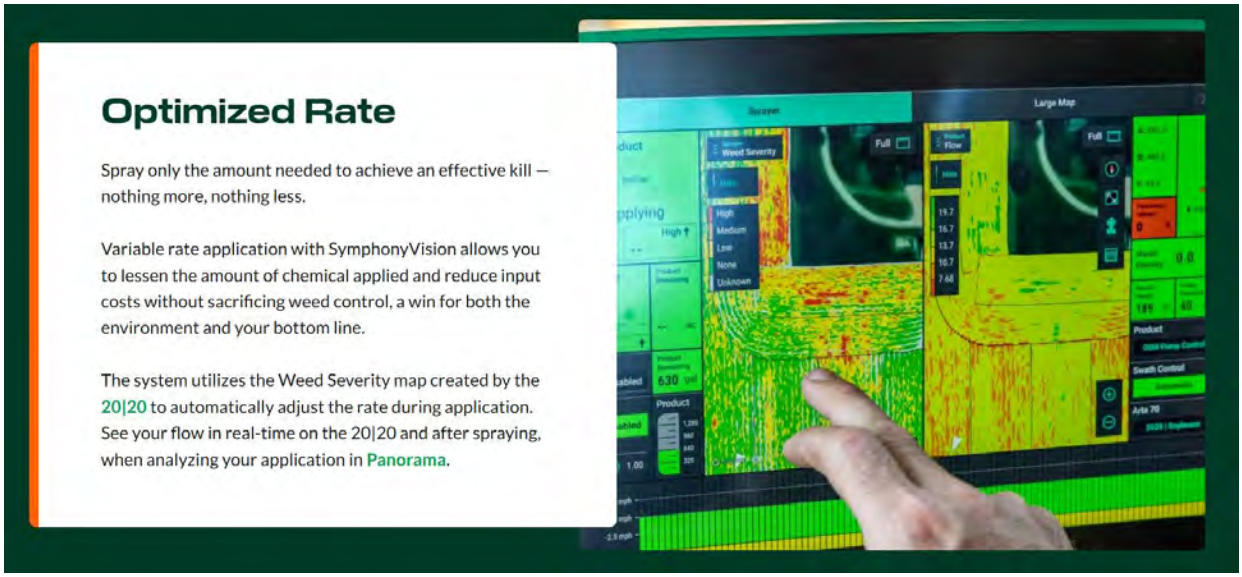
Objective: To evaluate yield and economics using a vision based spraying system to spray post-emergent weed control in soybeans.

Today's sprayers only allow a blanket application, making it hard to apply the right herbicide rate cost effectively due to inconsistent weed size and density. Precision Planting's SymphonyVision™|Spot uses cameras to intelligently adjust herbicide applications based on weed severity, allowing you to save on chemicals, while controlling weeds more effectively. Cameras mounted at 5' spacing along the front of the sprayer boom, are used to detect weed severity to adjust the rate of each individual nozzle automatically when weeds are present, while turning off the nozzles when they are not.

Figure 1. SymphonyVision™|Spot System



SymphonyVision™|Spot Soybean Targeted Spray Study



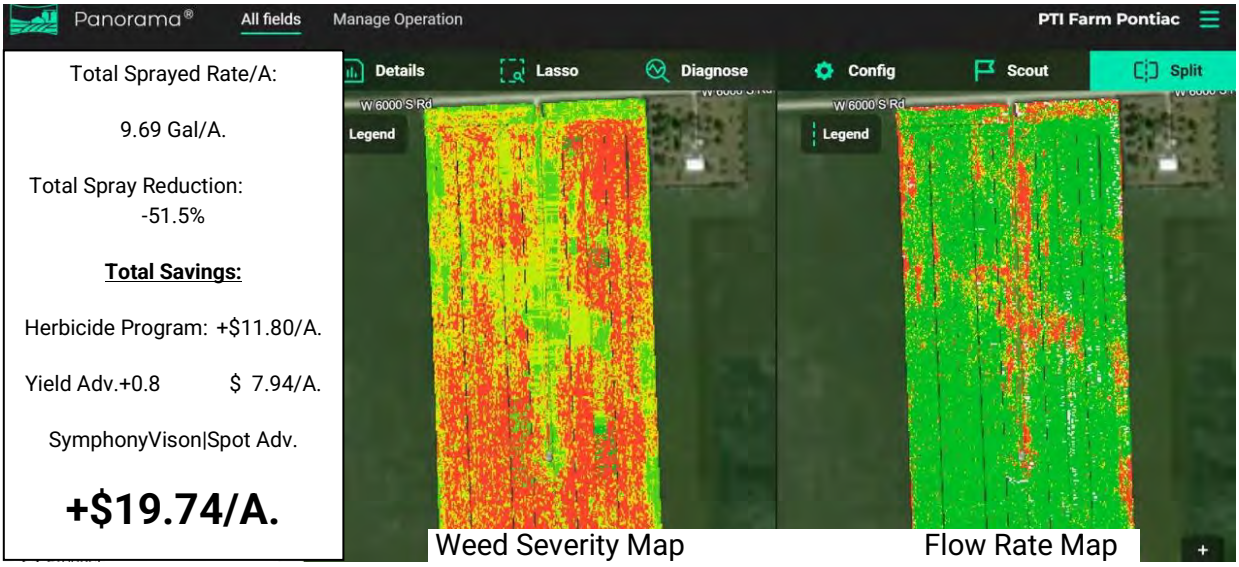
A Massey Ferguson® 530R sprayer, equipped with a 100’ spray boom installed with the Symphony™|Spot system was used for this study. Three individual farm locations were used as a part of the PTI Farm’s off-site testing. Soybeans were sprayed with Enlist One®, Liberty®, Volunteer™ with AMS, crop oil, and drift retardant was tank-mixed to spray enlist soybeans at the V3 growth stage. Total cost for a blanket application was $24.35/A.

Figure 1. SymphonyVision™|Spot System on Massey 530R Sprayer

2025 PTI Results

SymphonyVision™|Spot Soybean Targeted Spray Study

Location #1: Kankakee County, IL 60 Acres: -51% Spray Reduction, +0.8 Bu/A. Yield Advantage



Location #2: Ford County, IL 70 Acres: -48% Spray Reduction, +1.2 Bu/A. Yield Advantage

2025 PTI Results

SymphonyVision™|Spot Soybean Targeted Spray Study

Location #3: Kankakee County, IL 70 Acres: -23% Spray Reduction, +0.5 Bu/A. Yield Advantage

Results: Using the SymphonyVision|Spot system, total spray rate was reduced by -41% as a result of variable rate spraying, using the correct rate to kill weeds effectively and using a "zero" rate when no weeds were present.

Yield was calculated in the "non-spray" areas to evaluate any advantage of soybeans not having to metabolize the post-emergent application. Average yield increase tallied +0.83 Bu/A.

Overall, the targeted spray system resulted in total farm savings of +$17.97/A. For grower with 1000 acres of soybeans, this would equate to total savings of $17,970. Not only did total herbicide rate decrease, weed control was not sacrificed, equaling a win for both the environment and the bottom line for a grower.

Summary	
Location: 1	+$19.74/A.
Location: 2	+$23.61/A.
Location: 3	+$10.57/A.
Average:	**+$17.97/A.**

Row Width: 15" Rotation: CAB SB Price: $9.93 Enlist One®, Volunteer™, Liberty® Program: $24.35/A.

2025 PTI Results

Revytek® Soybean Foliar Fungicide Study

Mefentrifluconazole	Group	3	Fungicide
Fluxapyroxad	Group	7	Fungicide
Pyraclostrobin	Group	11	Fungicide

Revytek™ Fungicide

BASF We create chemistry

Active Ingredients*:

mefentrifluconazole: 2-[4-(4-chlorophenoxy)-2-(trifluoromethyl)phenyl]-1-(1H-1,2,4-triazole-1-yl)propan-2-ol 11.61%

pyraclostrobin: (carbamic acid, [2-[[[1-(4-chlorophenyl)-1*H*-pyrazol-3-yl]oxy]methyl]phenyl]methoxy-, methyl ester) 15.49%

fluxapyroxad: 1*H*-Pyrazole-4-carboxamide, 3-(difluoromethyl)-1-methyl-N-(3',4',5'-trifluoro[1,1'-biphenyl]-2-yl)- 7.74%

Other Ingredients: 65.16%

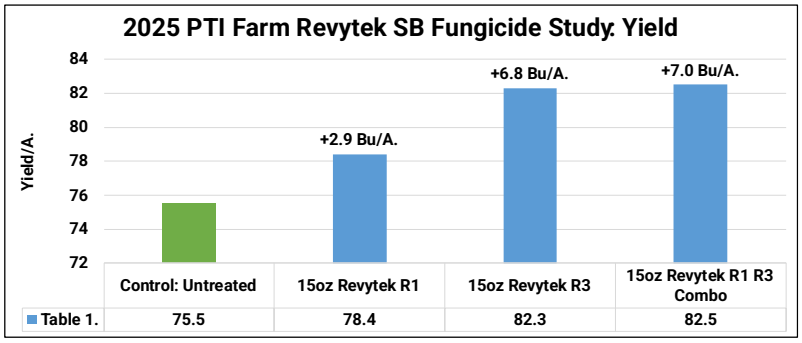
Total: 100.00%

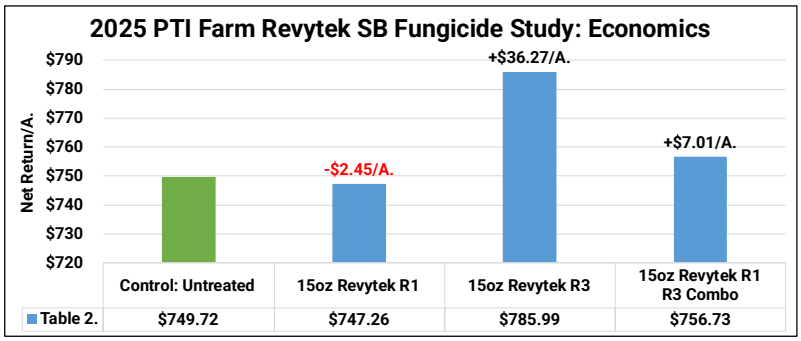
*Revytek™ fungicide contains 1.11 lbs mefentrifluconazole, 1.48 lbs pyraclostrobin, and 0.74 lb fluxapyroxad per gallon.

Objective: To evaluate the yield and net return of a new triazole soybean fungicide introduced in 2020 called Revytek®. Revytek® contains Revysol, which is a DeMethylation Inhibitor (DMI) fungicide that is part of the triazole group of fungicides. It was initially labeled for 17 crops, including corn and soybeans. Revytek® gives excellent control of frogeye leaf spot, septoria, target spot, and Asian soybean rust.

Results: Tables 1. illustrates foliar applications of Revytek® resulted in yield gains of +2.9 Bu/A. at R1 and +6.8 Bu/A.at R3 growth stage applications. Combo R1/R3 resulted in +7.0 Bu/A. yield response.

After cost of application and fungicide, Revytek® proved net returns of **-$2.45/A.** and +$36.27/A. when applied at R1 and R3. The combo treatment resulted in gains of +$7.01/A. respectively.





PTI ILLINOIS

2025 PTI Results

Miravis® Neo Soybean Foliar Fungicide Study

Objective: To evaluate the yield and economics of a Miravis®Neo fungicide applied with a spray drone at 2 Gal/A. at R1 and R3 growth stages.

Miravis®Neo fungicide combines propiconazole, azoxystrobin and Adepidyn technology, one of the most powerful, broad spectrum SDHI molecules available, and delivers superior plant-health benefits and improved preventive and curative control of key diseases such as Gray Leaf Spot, Common and Southern Rust, Tar Spot, Eye Spot, Anthracnose, Diplodia Ear Rot, and Physoderma Brown Spot.

Results: Foliar applications of Miravis®Neo resulted in yield gains of +4.0 Bu/A. at R1 and +6.6 Bu/A.at R3 growth stage applications. Combo R1/R3 resulted in +8.1 Bu/A. yield response.

After cost of application and fungicide, Miravis®Neo proved positive net returns of +$8.37/A. and +$34.19/A. when applied at R1 and R3. The combo treatment resulted in gains of +$17.73/A. respectively.

syngenta

Miravis® Neo

ADEPIDYN® Technology*

Active Ingredients:					
Pydiflumetofen**	PYDIFLUMETOFEN	GROUP	7	FUNGICIDE	7.0%
Azoxystrobin***	PROPICONAZOLE	GROUP	3	FUNGICIDE	9.3%
Propiconazole****	AZOXYSTROBIN	GROUP	11	FUNGICIDE	11.6%
Other Ingredients:					72.1%
Total:					100.0%

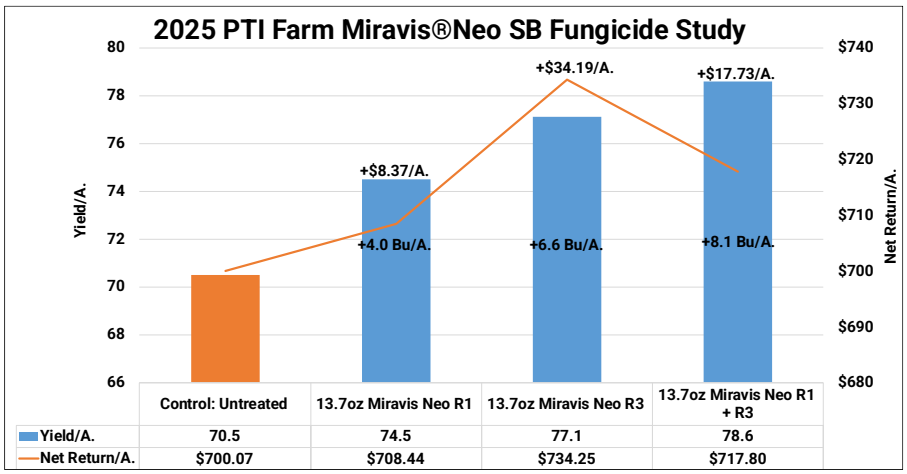


Figure 1. Talos T60x

Planting Date: April 27th Variety: Becks 3300E3 Population: 130K Row Width: 30" Rotation: BAC Soybean Price: $9.93 Miravis®Neo + App: $31.35/A.

Fungicide Ground vs. UAV Foliar Spray Application Study

Objective: To evaluate the yield and net return of Miravis®Neo fungicide applied at VT growth stage, applied via ground and by drone.

Miravis® Neo

PYDIFLUMETOFEN	GROUP	7	FUNGICIDE
PROPICONAZOLE	GROUP	3	FUNGICIDE
AZOXYSTROBIN	GROUP	11	FUNGICIDE

Active Ingredients:	
Pydiflumetofen**	7.0%
Azoxystrobin***	9.3%
Propiconazole****	11.6%
Other Ingredients:	72.1%
Total:	100.0%

This study evaluates a traditional ground fungicide application with a Hagie® high-clearance sprayer (Figure 1.), at a carrier rate of 20 Gal/A. Additionally, the use of a Talos T60X spray UAV (Unmanned Ag Vehicle) was also evaluated at carrier rates of 2 Gal/A. (Figure 2).

Miravis®Neo fungicide combines propiconazole, azoxystrobin and Adepidyn technology, one of the most powerful, broad spectrum SDHI molecules available, and delivers superior plant-health benefits and improved preventive and curative control of key diseases such as Gray Leaf Spot, Common and Southern Rust, Tar Spot, Eye Spot, Anthracnose, Diplodia Ear Rot, and Physoderma Brown Spot.

Figure 2. Talos T60X UAV

Figure 1. Hagie® high-clearance sprayer

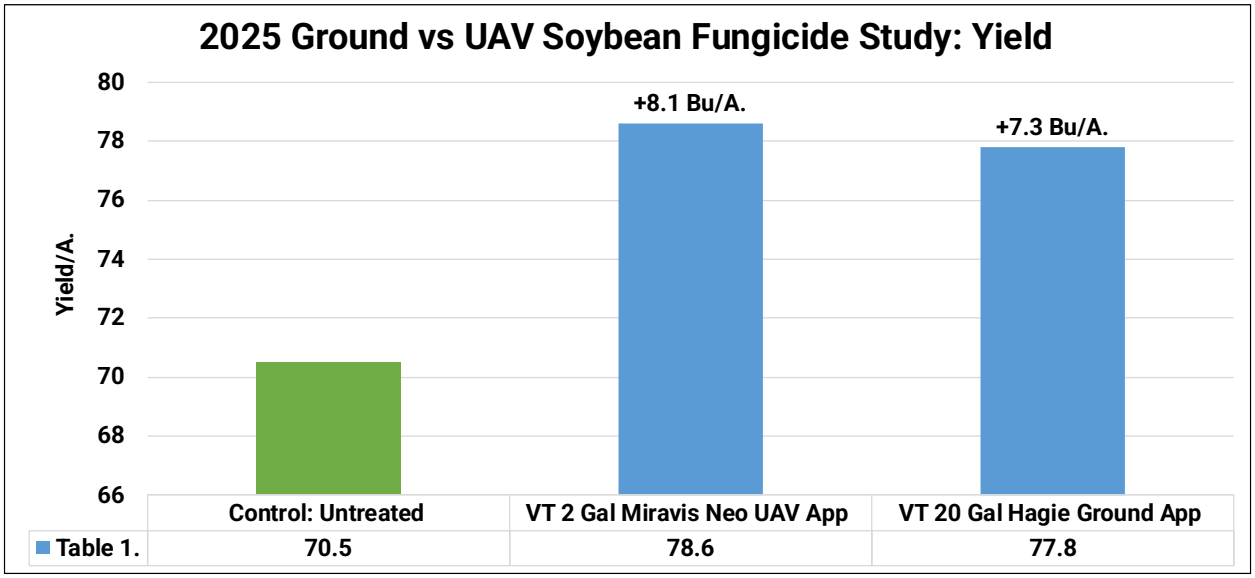
GREEN CREEK DRONES

Fungicide Ground vs. UAV Spray Application Study

Results: Table 1. illustrates that R3 foliar applications of Miravis®Neo resulted in yield gains of +7.3 to +8.1 Bu/A. The Hagie® high clearance sprayer and the T40 spray UAV offered similar yields, ranging within only 0.8 Bu/A. of each other. This yield gain equated to +$7.94/A. additional return.

When used properly UAV technology can offer similar or better results than traditional ground application equipment. 3-yr 2023-2025 data has proven a +$5.05/A. advantage for UAV applications, however a grower would have to evaluate cost of application to determine net economic advantages.

Advantages to UAV technology include precise application due to downward propeller air movement, low carrier rates, the absence of ground or soil engagement, and the ability to spray in fields with topography challenges. Disadvantages include flight time duration, tank capacity, battery charge, and insurance/licensing.



Planting Date: April 24th *Variety: Becks 3300E3* *Pop: 130K* *Row Width: 30"* *Rotation: BAC* *Soybean Price: $9.93*

Ground Application: Turbo TwinJet Twin Flats 11005, 80# PSI 20 Gal/A. *UAV Application: 2 Gal/A.*

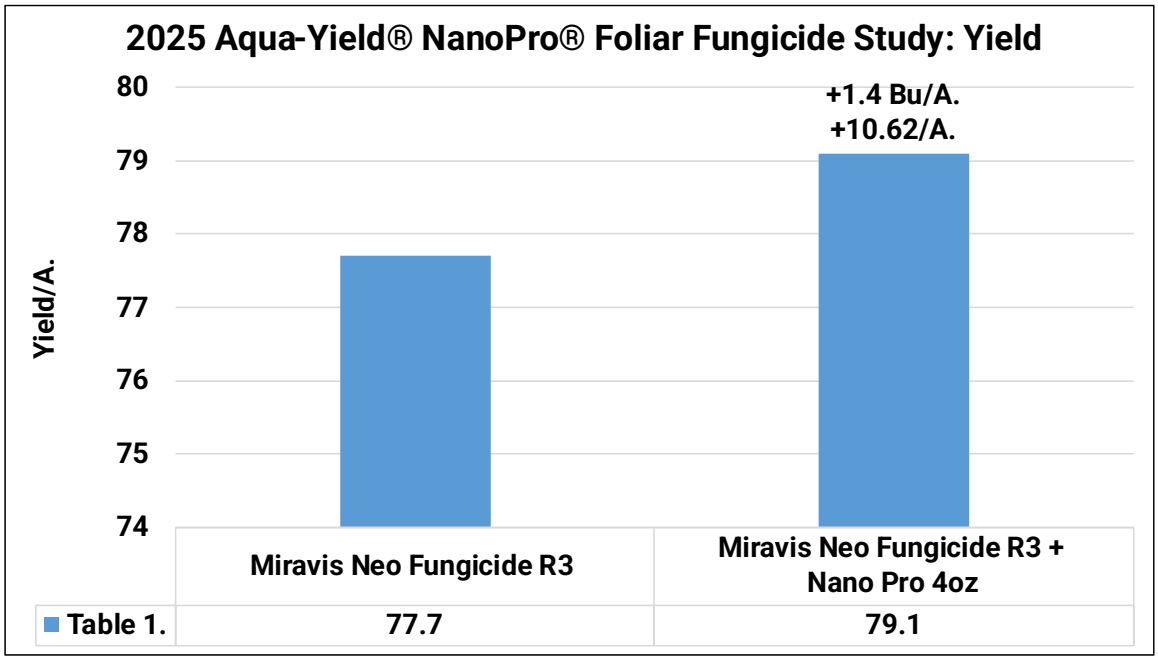
Aqua-Yield® NanoPro® Foliar Fungicide Study

Objective: To evaluate yield and economics of NanoPro® by AQUA-YIELD®. NanoPro® is a carrier adjuvant that enhances the uptake of crop protection products.

This trial aims to establish the efficiency of Aqua-Yield's NanoPro® as a tank-mix partner with a corn fungicide applied at the R3 growth stage (13.7oz/A. Miravis® Neo).

Results: Table 1. illustrates Aqua-Yield's NanoPro® resulted in yield gains of +1.4 Bu/A. yield improvement over the control of a standard fungicide application at R3 growth stage.

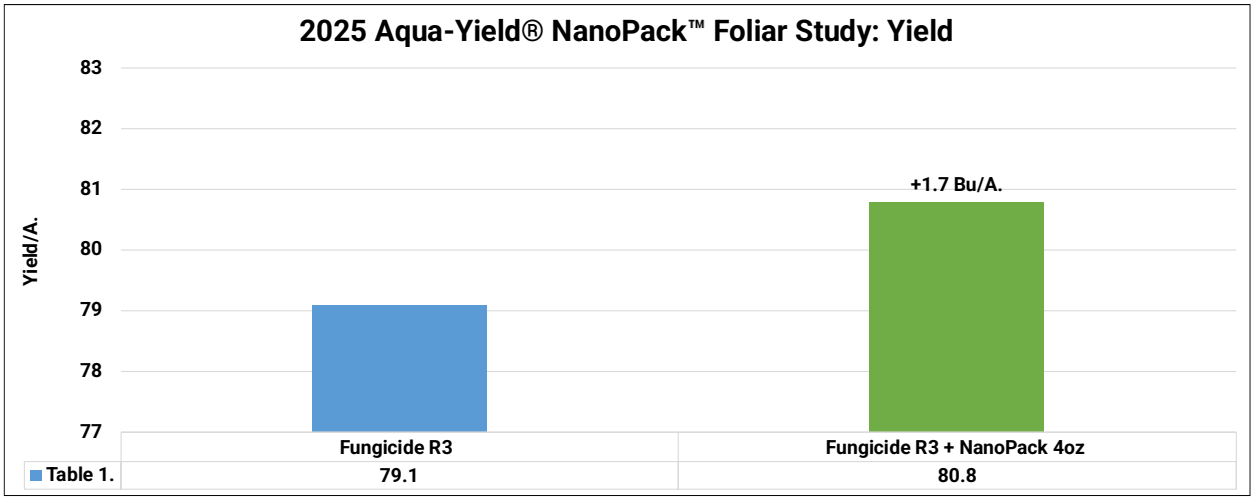
With a +1.4 Bu/A. yield response, economics would suggest that NanoPro® resulted in positive economic gains of +$10.62/A.



Planting Date: May 11th Variety: AG 27XF3 Population: 130K Row Width: 30" Rotation: BAC Soybean Price: $9.93 NanoPro®: $3.28/A.

Aqua-Yield® NanoPack™ Foliar Study

Objective: To evaluate yield and economics of NanoPack™ by Aqua-Yield®. NanoPack™ (0.5Cu-2Fe-1Mn-1Zn) is a micronutrient product that enhances crop yields and promotes plant health by delivering essential nutrients directly to the cellular level. NanoPack™ delivers sulfur, copper, iron, manganese, and zinc through Aqua-Yield® nanoliquid technology. It brings critical micronutrients to plants when soil levels are low and prevents deficiencies that limit crop yield while boosting plant metabolism and overall health. Nanoliquid products effectively work as a deliver system for nutrients and protects molecules from environmental losses and delivers them to plants at the cellular level. A process called endocytosis brings the nanoliquid particles into the cell where the payload is delivered. This trial aims to establish the efficiency of Aqua-Yield's NanoPack™ nano-liquid based fertility product in tandem with Fungicide. NanoPack™ was applied at R3 in tandem with Foliar Fungicide.



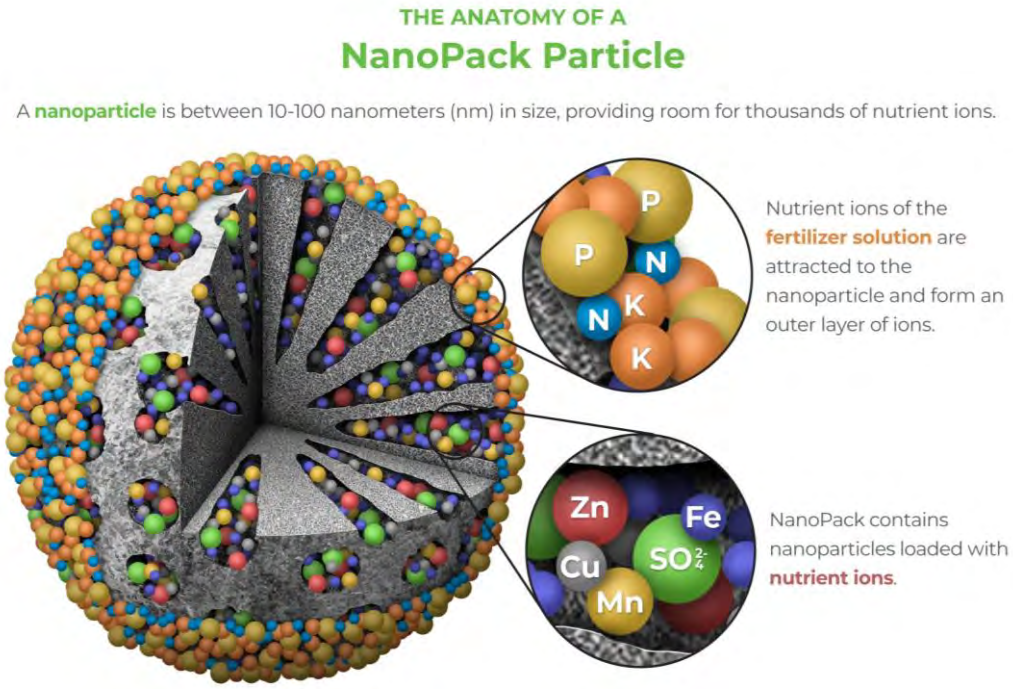
AQUA-YIELD®

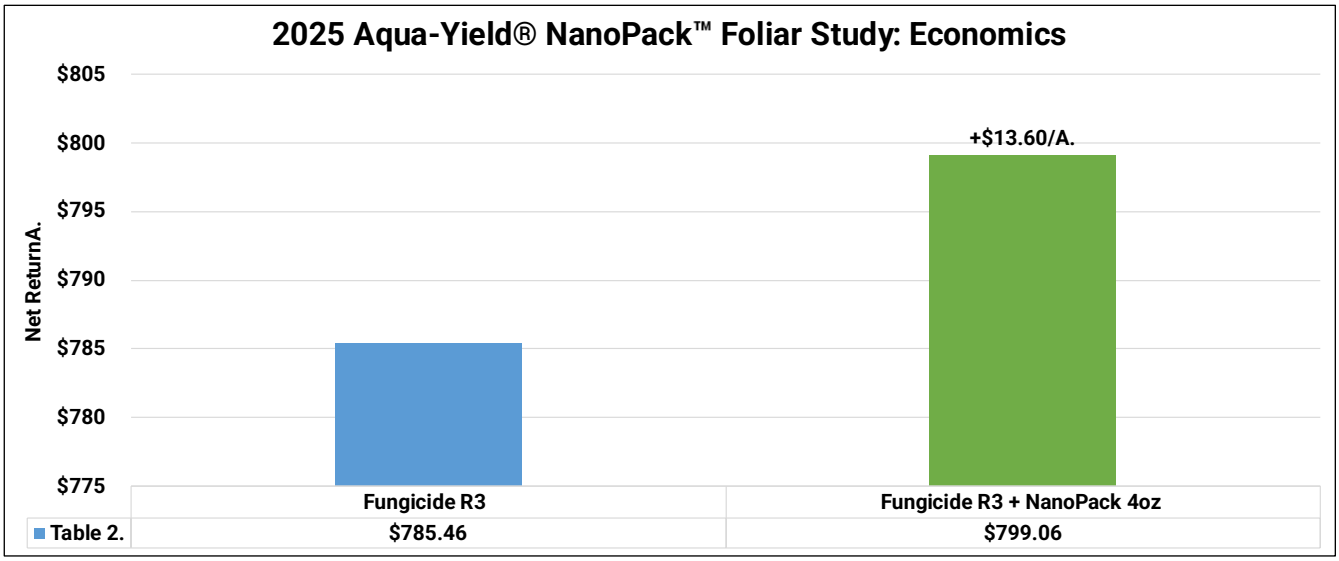
NanoPack™

2025 PTI Results

Aqua-Yield® NanoPack™ Foliar Study

Results: Table 1. illustrates yield results of all treatments. Aqua-Yield's NanoPack™ tank-mixed with fungicide resulted in +1.7 Bu/A. yield improvement over the control. Table 2. illustrates the overall economics of the foliar study where NanoPack™ resulted in economic gains of +$13.60/A.





Planting Date: May 11th *Variety: AG 27XF3* *Population: 130K* *Row Width: 30"* *Rotation: BAC* *Soybean Price: $9.93* *NanoPack®: $3.28/A.*

Soybean Tillage Study

Objective: To evaluate the yield and economic impacts of various tillage programs in a soybean after corn rotation. Tillage programs include conventional till, strip-till, vertical till, no-till and in-line rip.

Figure 1. KUHN® Gladiator®

Figure 2. Kuhn® Dominator® 4857

2025 PTI Results

Soybean Tillage Study

Table 1. Univ. of IL Machinery Cost Estimates

Tillage Practice	Category	Cost
Conventional Till	Ripper	$ 40.40
	Soil Finisher	$ 15.30
	Plant	$ 24.40
	Total:	$ 80.10
StripTill	Strip	$ 26.10
	Burndown	$ 10.00
	Plant	$ 24.40
	Total:	$ 60.50
Vertical Till	Vertical	$ 18.50
	Burndown	$ 10.00
	Plant	$ 29.60
	Total:	$ 58.10
No Till	Plant	$ 29.60
	Burndown	$ 10.00
	Total:	$ 39.60
In-Line Ripper	V-Ripper	$ 29.90
	Soil Finisher	$ 15.30
	Plant	$ 24.40
	Total:	$ 69.60

Figure 3. Planting in No-Till

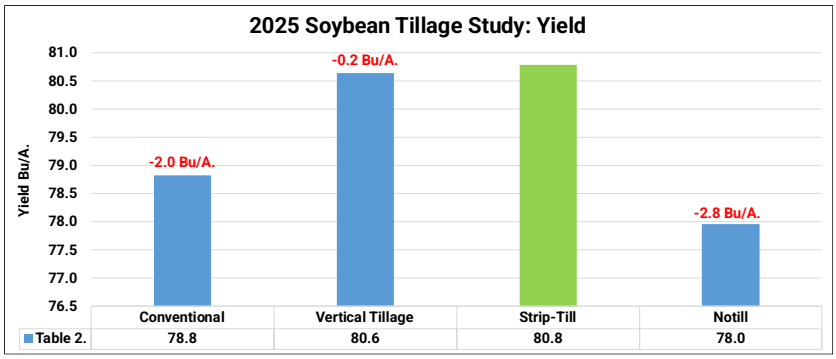
Figure 4.Kuhn® EXCELERATOR® XT 8010 Vertical Tillage

Figure 5. Kuhn® 4835 In-Line Ripper

2025 PTI Results

Soybean Tillage Study

Results: To understand both yield and economics, the University of Illinois Machinery Cost Estimate Summary is used to calculate individual cost of each tillage program (Table 1). For the three reduced tillage programs, an extra $10/A. burn-down is also included due to higher herbicide costs in 2025.



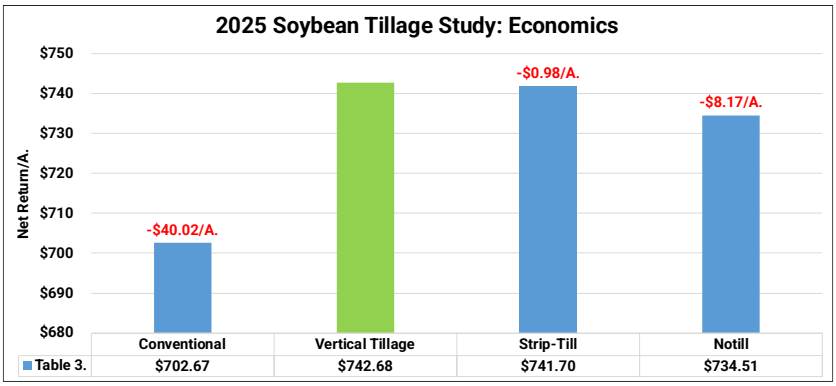


Table 2. illustrates the overall yield for each tillage segment. The yields varied only 2.8 Bu/A. between all tillage programs with Strip-till offering the highest yield of 80.8 Bu/A.

After applying all appropriate costs to each individual tillage segment, Vertical Till offered the highest overall revenue in this tillage system study in 2025. Compared to Vertical till, no-till offered losses of **-$8.17/A.**, strip-till **-$0.98/A.** and conventional tillage with the highest losses of **-$40.02/A.** (Table 3.)

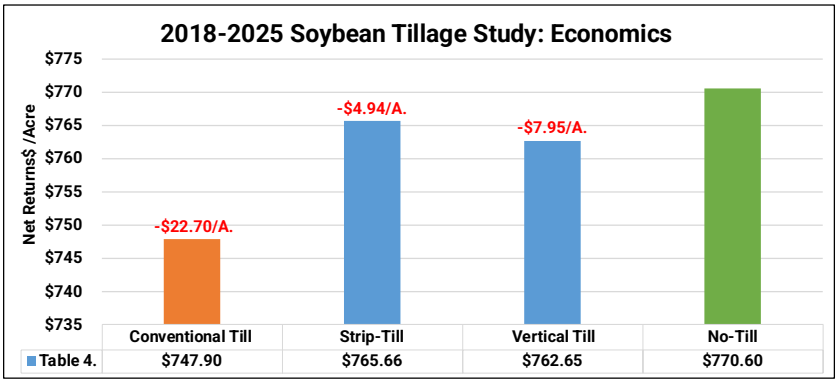


Table 4. illustrates multi-year data from the PTI Farm over the time period of 2018-2025. Over this time frame, no-till has provided economic gains of +$4.94/A. over strip-till, +$22.70/A. over conventional till and +$7.95/A. over vertical tillage.

Planting Date: May 5th Variety: Asgrow 27XF3 Population: 130K Row Width: 30" Rotation: BAC SB Price: $9.93 Additional Burndown: $10/A.

2025 PTI Results

Soybean Pre-Strip Vertical Tillage Study

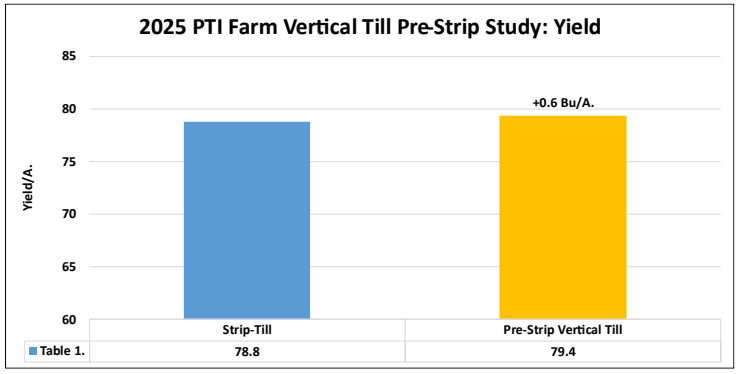
Objective: To evaluate the yield and economic benefit of implementing a vertical tillage pass (Figure 1.) in corn stalks before a fall strip-till application (Figure 2.) to aid in stalk decomposition.

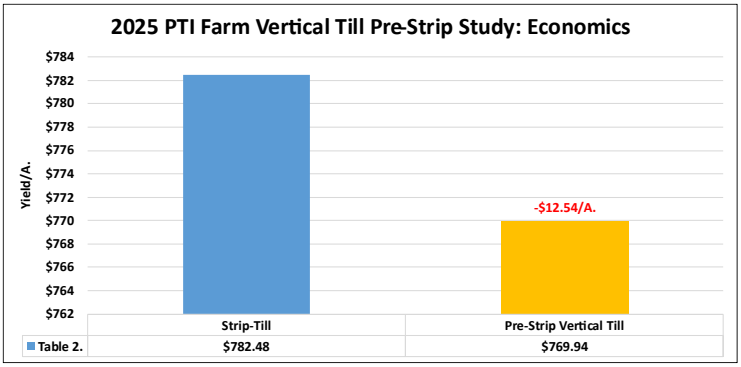
Results: Vertical tillage made pre-strip-till proved to be beneficial with a +0.6 Bu/A. yield contribution. As a result of the extra pass, net economic losses occurred of **-$12.54/A.**

Tillage Practice	Category	Cost
Conventional Till	Ripper	$ 40.40
	Soil Finisher	$ 15.30
	Plant	$ 24.40
	Total:	$ 80.10
StripTill	Strip	$ 26.10
	Burndown	$ 10.00
	Plant	$ 24.40
	Total:	$ 60.50
Vertical Till	Vertical	$ 18.50
	Burndown	$ 10.00
	Plant	$ 29.60
	Total:	$ 58.10
No Till	Plant	$ 29.60
	Burndown	$ 10.00
	Total:	$ 39.60

Figure 1. Kuhn® EXCELERATOR® XT 8010 Vertical Tillage Before Strip-Till

Figure 2. Kuhn® Gladiator





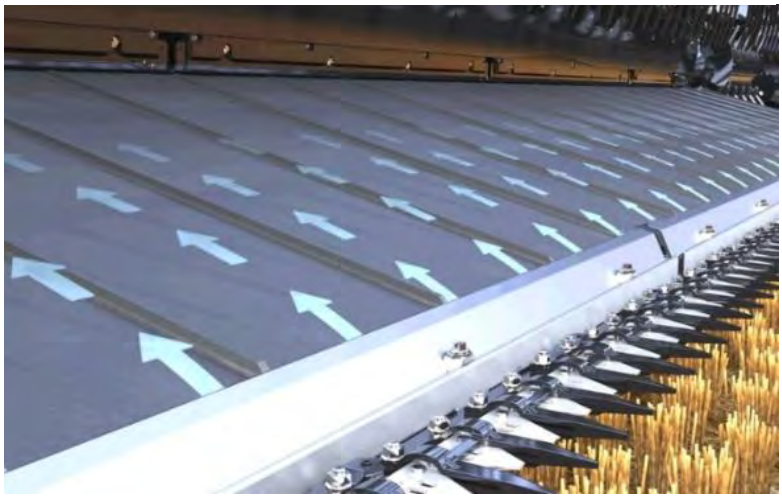
Planting Date: May 15th Variety: Asgrow® 27XF1 Population: 130K Row Width: 30" Rotation: BAC Soybean Price: $9.93

Geringhoff® Razor Air Draper Study

Objective: To evaluate the effectiveness of the Geringhoff Razor Air Draper with an integrated air system, that provides consistent air flow from behind the knives at a uniform speed to carry crop that could be lost back to the belt.

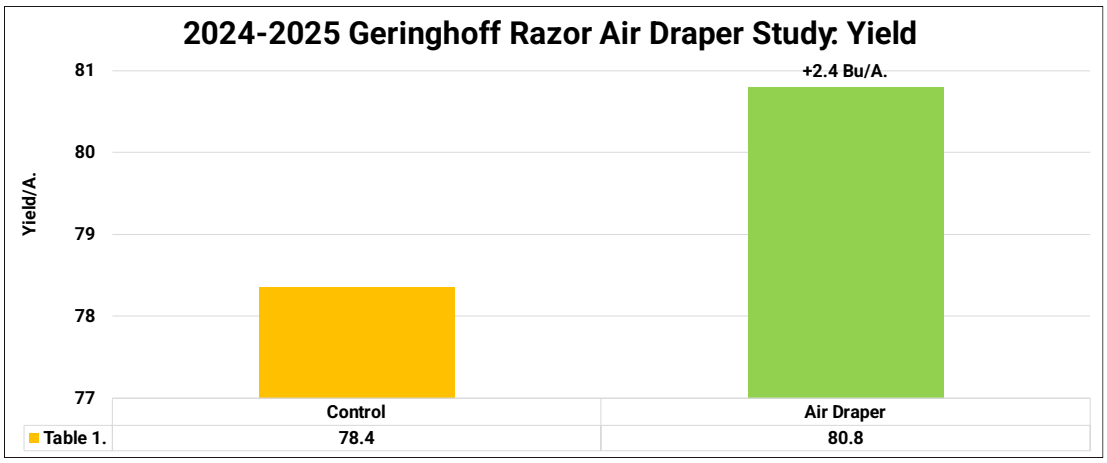
Figure 1. Geringhoff Razor Air Draper

Unlike competitor solutions that use external tubes running in front of the reel where they are at risk of obstructing the crop flow, the unique design of Geringhoff's integrated air system as shown in Figure 2. offers a fully integral air system with no risk of blocking the crop flow. Adjusting the flow rate comes as easy as varying the fan speed that eliminates any mechanical changeovers to adjust to different crops.



Results: Table 1. Illustrates a multi-year average yield increase of +2.4 Bu/A. using the integrated air system.

Regarding economics the Razor Air Draper system provided positive returns +$26.16/A. advantage over a non-air draper system.



Planting Date: May 13th *Hybrid: GH 3994E3* *Population: 136k* *Row Width: 30"* *Rotation: BAC* *Corn Price: $9.93*

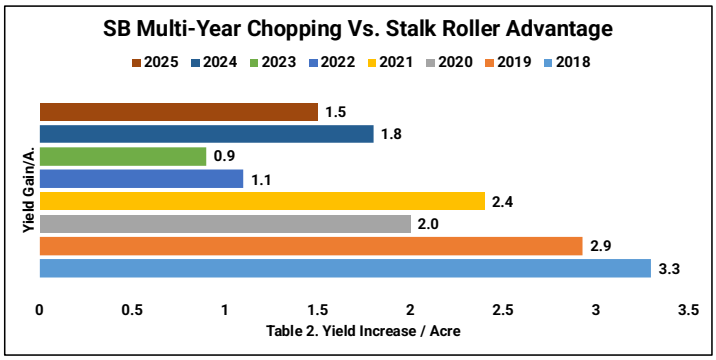
2025 PTI Results

Chopping Head Study

Objective: To study the yield impact of utilizing a chopping corn head in a corn/soybean conventional tillage rotation. A Capello DIAMANT™ chopping head is used to create replicated strips of chop and non-chop residue management trials. The goal of this trial is to evaluate sizing of residue, allowing heavy stalks and residue to break down faster to advance the degradation process and in turn, reducing the carbon penalty associated with continuous corn environment.

Results: Table 1. illustrates that chopping corn residue improved soybean yields by +1.5 Bu/A. in 2025. At a soybean commodity price of $9.93/Bu, this resulted in additional gross revenue of +$14.90/A.

Multi-year data from 2018-2025 indicates yield advantages ranging from +0.9 Bu/A. to +3.3 Bu/A., averaging +2.0 Bu/A. over the 8-year time period.



Planting Date: May 15th *Variety: Asgrow® 27XF1* *Population: 130K* *Row Width: 30"* *Rotation: BAC* *Soybean Price: $9.93*

PTI ILLINOIS

WRAP UP

PTI PRECISION TECHNOLOGY INSTITUTE

Precision Planting is excited to share our 2025 PTI research farm results. We hope they provide useful insights that help drive thoughtful consideration around future crop management. The PTI Farm is working diligently to continue with long-term studies that provide multi-year data analysis for decision-making purposes. We will continue to work with our Precision Planting Premier Dealers to identify opportunities to find new research objectives, driving innovation and development of new solutions in the field. Precision Planting is committed to the development of innovations and insights that allow for the highest yield and ROI opportunities for your farm and family.

One of our goals at the PTI Farm is to come up with new, fresh, and unique ideas, so that when growers visit the farm, they see and experience new technology. **“Challenging the Status Quo”** is an important concept to us and we always want to offer the opportunity for growers to experience, compare, and challenge their traditional ways of farming to other means. We all know that change is inevitable but knowing what and when to change is critical to a business.

At the PTI farm, we are excited about all of the agronomic trials slated for 2026 and you will not want to miss our upcoming field days. We look forward to seeing you throughout July-September at the Precision Planting Precision Technology Institute in Pontiac, IL.

Precision Planting would like to extend our sincere gratitude to the support and dedication of our Precision Planting Premier Dealers. Our dealers are world-class precision agriculture experts, with rigorous training and knowledge of the industry and issues facing farmers today. Our Premier Dealers are experienced professionals helping you know more, and ultimately creating more yield and profitability. The ability to provide unbiased and objective insights into the agronomic research is important to us and we appreciate all Premier Dealers who scheduled and invited growers to the farm in 2025.

Acknowledgements and Legal Statement

The University of Illinois Machinery Cost Estimates provided by The University of Illinois Farm Business
The Iowa State University Tillage Rate provided by the Iowa State University Extension and Outreach.