

JULY 2026

Illinois Field & Bean

A PUBLICATION OF THE ILLINOIS SOYBEAN ASSOCIATION

Illinois Soybean Research Review

*Results from the
2025 Growing Season*



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In the *Illinois Soybean Research Review*, we're breaking down key takeaways from the 2025 growing season, highlighting the Illinois Soybean Association (ISA)-checkoff-funded research that matters most to Illinois soybean farmers.



FROM THE BOARDROOM

Funded by the Illinois Soybean Checkoff



Tim Scates, Treasurer

District 16 Director | Illinois Soybean Association

Safeguarding Transparency

As Treasurer and District 16 Director for the Illinois Soybean Board (ISB), I help oversee the financial checks and balances of ISB to ensure transparency and compliance. As an Illinois farmer and ISB Director, I feel confident in the measures we have in place to comply with regulations regarding the usage of soybean checkoff funds for research, market development, education and communication programs.

BUDGET PROCESS

The budget process begins in March with the Finance Committee, which is made up of individuals nominated from among the Illinois Soybean Board of Directors. All are Illinois soybean farmers.

The Finance Committee reviews forecasted revenue based on external factors including economic and legislative conditions. Upon review, they provide a recommended revenue budget and committee allocation for a framework of budget formulation. Requests for Proposals (RFPs) are opened for submissions from the public at this time, and the RFP window remains open for approximately 60 days.

Once the deadline for RFP submissions has closed, Illinois Soybean Association (ISA) staff thoroughly review each proposal. They examine the services outside organizations have proposed to deliver for the benefit of Illinois soybean farmers and determine which are best aligned with the strategic plan and regulatory compliance before recommending funding to the full board.

ISA's program areas are guided by farmer-led committees. These committees oversee Market Development, Soybean Production and Government Relations. Board members serve on these committees, and are appointed on an annual basis. Before the annual June meeting of the Board, the committees review each RFP submitted within their program area. Then, they recommend which proposals to fund, and those are sent to the board for final approval. Newly funded initiatives begin once the fiscal year starts on Sept. 1.

COMPLIANCE REVIEWS

Every two years, compliance reviews are conducted by the United Soybean Board, under U.S. Department of Agriculture governance. An independent Certified Public Accountant (CPA) is engaged to complete the reviews. The review ensures ISB adheres to all requirements of the Soybean Promotion, Research, and Consumer Information Act.

FINANCIAL AUDITS

Once the independent CPA firm has completed its annual audit, the Finance Committee presents the audit report to the board and reviews the findings together. For compliance purposes, a copy of the ISB audit report must be submitted to the United Soybean Board no later than Dec. 1.

FINANCIAL REPORTING

Financial statements are compiled and provided to the board each month. They must conform to Generally Accepted Accounting Principles (GAAP) as defined by the Financial Accounting Standards Board. This reporting provides financial performance information throughout the fiscal year and assists the board in achieving the organization's objectives.

ORGANIZATIONAL GOVERNANCE

The purpose of the ISB is to represent members' interests on public policy issues at the state and national levels. Additionally, the board invests Illinois' share of soybean checkoff program dollars into research, market development, and education and communication programs that can achieve the organization's mission of improving the profitability of Illinois soybean farmers. The board determines the organization's mission and purpose and maintains a clear strategic focus by providing effective, strategic and fiduciary oversight for the organization.



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CEO'S MESSAGE

Funded by the Illinois Soybean Checkoff



John Lumpe

CEO | Illinois Soybean Association

Where Agriculture Thrives



Every growing season teaches us something new. Conditions change, markets shift, new pests emerge. Weather patterns challenge even the best management plans. Our job is to help you adapt, adopt and make well-informed choices backed by science and data.

This month's *Illinois Field & Bean* Magazine takes closer look at the checkoff-funded research helping drive decisions on Illinois farms. Our *Illinois Soybean Research Review* highlights work focused on practical results and real-world value for soybean growers. Inside this issue, you'll find updates tied to the 2025 growing season and projects designed to answer important questions farmers are facing right now.

Many research projects stand out this year for the direct impact they can have on farm profitability and long-term sustainability. Although the report goes in-depth on each, I want to give you a peak at three of these efforts.

KNOW BEFORE YOU SPRAY, PAGES 11-12

Farmers today must focus on efficiency. It's important to know if pest populations are sufficient to cause economic damage before investing in insecticide applications. Researchers work to investigate threshold guidelines. When you can't see a clear economic benefit from a treatment, that's money left on the table. This work gives farmers a more confident, data-backed answer to a question every grower asks at some point during the season: Do I need to spray or not?

THE DISEASE THAT WON'T QUIT, PAGES 13-14

Red crown rot can cause significant soybean yield loss, particularly when infection occurs early, though risk continues into early reproductive stages. Research helps clarify when crops are most vulnerable and which management tools provide reliable protection. Fungicide seed treatments have delivered the most consistent results in infested fields. Biological products show limited potential and do not provide dependable stand-alone control. At the same time, satellite and drone imagery improve detection of disease hotspots, giving farmers earlier warning.

PLANTING EARLY, MANAGING SMART, PAGES 19-20

Earlier planting can push yield potential higher, but it also raises the risk of crop injury when soils are cool and wet. Research is evaluating how different pre-emergence herbicides perform in early-planted soybeans and identifying which products carry greater risk for stand loss. For farmers who have already made the shift to earlier planting, or are considering it, this work fills a critical gap. Knowing which herbicide

programs are safer under those conditions offers protection before the season really gets started.

Beyond these projects, researchers are also studying sulfur fertility, cover crop and reduced tillage systems, as well as starter fertilizer timing. One project combines soil, crop and weather data with advanced modeling tools to generate location-specific estimates on crop performance, environmental metrics and nutrient loss. This research will help inform practice-based recommendations that protect soil health and water quality, as well as provide insights farmers can use as they explore ecosystem credit programs.

Readers will also get to know how Illinois Soybean Checkoff-funded research projects are selected as our Director of Agronomy Abigail Peterson lays out the funding process, Growing Concerns Survey, On-Farm Trial Network and more.

As you explore this issue, I hope you see more than research projects and trial results. I hope you see a commitment to helping Illinois soybean farmers make informed decisions, manage risk and stay competitive in an increasingly complex environment. Every study, every field trial and every data point represents an investment in the future of our farms.

We're here to ensure Illinois agriculture doesn't simply endure. It thrives.



Big Wins. Stronger Future.

In just one year, soybean farmers are leading the way to protect and grow markets for U.S. soybean oil, keeping farmers at the center of the biofuels conversation.

1

Fixing ILUC: Bringing Real Economics Back to the Table

FFF is working to fix broken Direct Land Use Change models that unfairly penalize crop-based feedstocks like soybean oil.

- Built in-house economic expertise
- Creating transparency and real-world data

Result: A fairer, more accurate system that supports farmer-grown solutions.

2

Advocating for Workable Solutions in California

FFF is fighting for policies that work for farmers and protect soy-based fuels in key markets.

- Promoting soy based biofuels, including SAF
- Ending sustainability standards that place impractical requirements on soy-based fuel

3

Addressing Market Distortions from Used Cooking Oil (UGO)

FFF is challenging the system that gives used cooking oil an unfair advantage in the biofuels market.

- Commissioned independent lifecycle analysis
- Advancing balanced, science-based solutions
- Highlighting accounting inconsistencies



FFF is creating a level playing field that values farmer-produced soybean oil. Together, we're fueling opportunity for generations to come.



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Funded by the Illinois Soybean Checkoff

Illinois Soybean Research Review

*Results from the
2025 Growing Season*

FieldAdvisor.org



Research Driving Results

By Abigail Peterson, CCA, Director of Agronomy,
Illinois Soybean Association

Funded by the Illinois Soybean Checkoff

Every year, as the growing season wraps up, we learn more about what's working and where there's room to improve. Through your checkoff investment, we're able to turn those lessons into practical research that helps farmers make better decisions, improve profitability and strengthen their operations.

At Illinois Soybean Association (ISA), our goal is simple: turn research into real-world value on your farm. Although traditional production research is important, we're focused on the whole soybean system, unlocking how management practices affect yield, profitability, soil and water quality, and long-term sustainability. That means looking at everything from agronomics to economics and making sure research reflects real conditions across Illinois.

FARMER FEEDBACK GUIDES RESEARCH SELECTION

Each year, ISA reviews millions of dollars' worth of research proposals. With input and leadership from farmer board members, those proposals are narrowed down to a select group of projects the reviewers believe will deliver the most value back to farmers. Limited funding is available, so the goal is to invest in work that answers your most important questions.

How do we know what matters most? We ask. Farmer input drives this process every step of the way. Whether feedback is shared during conversations at field days, in discussions with the ISA Agronomy Team or directly via board members, your voice helps shape where checkoff dollars go.



GROWING CONCERNS SURVEY FLAGS TOP ISSUES

One of the most important tools we use is the annual Growing Concerns Survey. In it, farmers across Illinois share what challenges they're seeing and what research would be most helpful.

In the most recent survey, weed management came out as the top priority for the 158 farmers and crop consultants who responded. Also of concern were herbicide-resistant weeds, nutrient management for maximizing yield, fungicide and insect resistance monitoring, and in-field conservation practices.

These priorities ensure that the research we fund stays relevant and useful. We strongly encourage every farmer to take the survey. The more input we receive, the better we can align research efforts with your needs.

SOYBEAN PRODUCTION COMMITTEE PAIRS FARMERS, RESEARCHERS

Another key part of this process is the Soybean Production Committee. This team works with university and industry researchers to connect science with what's happening on farms. Researchers share what they're seeing in trials and labs, and farmers bring real-world experience and challenges to the table.

Recent discussions between the committee and researchers highlighted several trends across Illinois. Management practices continue to evolve, including differences between rented and owned ground. There's a shift toward earlier planting dates. And more farmers are using high-residue systems. These changes need to be considered when developing and testing new recommendations.

One message that came through loud and clear from farmers: return on investment matters. When considering new practices or products, farmers want to understand the impact on a per-acre basis. They also want to know how long it will take for a practice to pay for itself, whether in one season or several years. Making that information clear and usable is critical for adoption.

All ISA-funded research focuses on providing unbiased, soybean-specific information you can trust. If you want to learn more about current projects or connect with researchers directly, you can visit the Field Advisor website and explore the Meet the Researchers page at fieldadvisor.org/research/meet-the-researchers/. It's a great place to find project summaries and learn more about the university researchers investigating key questions on your behalf.

MEET THE SOYBEAN RESEARCHERS

In this year's 2026 Illinois Soybean Research Review, which you'll read in the pages that follow, you will find results from a wide range of projects examining soil health and insecticide return on investment, among other topics. These summaries are designed to help you take what scientists are learning and apply it on your farm.

For example, outdated liming recommendations in the Illinois Agronomy Handbook might limit accurate liming rates and potential profitability. Unlike neighboring states that use buffer pH to better estimate lime needs, Illinois relies on soil water pH and broad soil classifications. This project examines how incorporating buffer pH testing, already common in commercial soil testing, can improve lime recommendations. By updating calibration data and

refining guidance, this research aims to provide more precise, science-based recommendations. The results preview how improved methods can help Illinois growers better manage soil acidity, optimize inputs and enhance productivity.

FROM INSIGHT TO IN-FIELD ACTION

But we know it's not always easy to translate research findings into specific steps you should take next. You need to know how to implement recommendations in your fields.

That's where the ISA On-Farm Trial Network (OFTN) comes in. This program was developed to take research and test it under real farming conditions across the state. In 2025, OFTN included 31 field trial locations in 20 counties, giving us a strong look at how practices perform in different regions and environments.

In addition, demonstration sites have been established at the ISA Agronomy Farm near Heyworth and at the Farm Progress Show site in Decatur so that farmers can see trials up close.

Twenty farmers participated in OFTN Action Trials, including

studies on sulfur fertilization and soybean insecticide ROI. Five farmers also continued managing Legacy Soil Health trials. Results from the insecticide trials and sulfur study, along with tissue analysis, are included in the expanded report that will be available online.

We want to extend a sincere thank-you to the farmers who participated in the first year of OFTN. Your time, effort and willingness to try something new are critical to making this program successful.

As we move into the 2026 season, we'll continue scouting and evaluating trials in the field. We're excited to share what we learn and to work alongside more farmers across Illinois in the next round of trials.

As you review the results in the *Illinois Soybean Research Review*, at FieldAdvisor.org and at outreach events, we encourage you to explore how your checkoff is approaching soybean production issues and to challenge your approach where it makes sense. Together, we can build our soybean systems to be profitable and sustainable for years to come.



PROJECT NAME:

Soybean Stem Pests: Survey, Impact and Education

PROJECT LEADERS:

Ahmad Fakhoury, Southern Illinois University; Jason Bond, Southern Illinois University; Nick Seiter, University of Illinois; Kelly Estes, Illinois Natural History Survey

PROJECT LENGTH:

4 years (2021 - 2025)

BUDGET:

\$323,023



FINAL REPORT:

PURPOSE

This project addressed a key issue for Illinois soybean growers: identifying common insect pests, diseases and associated pathogens affecting soybean stems. The disease portion, led by Ahmad Fakhoury and Jason Bond at Southern Illinois University, combined grower surveys with pathogen identification from symptomatic stems to determine prevalent stem diseases, assess grower concerns and identify pathogens present in Illinois soybean fields. This information will help farmers improve scouting, variety selection and management to reduce the impact of stem diseases.

The insect portion, led by Nick Seiter and Kelly Estes at the University of Illinois, focused on dectes stem borer and soybean gall midge. Dectes stem borer is an established pest that appears to be increasing in importance in Illinois, and researchers evaluated its distribution and relationship to yield loss. Soybean gall midge is a potential invasive pest not yet found in the state; early detection would improve the state's ability to rapidly respond if it is identified.

DISEASE FOCUS AREA

APPROACH:

This project combined a statewide survey of soybean producers with field sampling and molecular identification of stem-infecting fungi.

In 2022, an online survey was distributed to soybean producers, agricultural consultants and industry professionals to assess reported incidence of key stem pests and diseases, management history, perceived risks and preferences for extension services. A total of 71 responses were analyzed to summarize grower observations and concerns.

To complement the survey, symptomatic soybean stems were collected from 58 Illinois counties in 2022 and 2023 (see Figure

1) Pathogens were identified using laboratory methods. This approach combined grower input with direct identification of pathogens associated with stem diseases in Illinois. Isolated fungal pathogens were also stored for future research.

MULTI-YEAR RESULTS SUMMARY

This study found *Diaporthe* species, particularly *Diaporthe longicolla*, *Diaporthe caulivora*, and *Diaporthe sojae*, were the most prevalent soybean stem pathogens in Illinois, present in 75% of samples, especially in warmer, wetter southern regions. Incidence increased with higher temperatures and peaked with moderate to high rainfall, aligning with their preference for warm, moist conditions during the reproductive stages (R3-R6). These pathogens are associated

with Phomopsis seed decay, Northern stem canker and pod and stem blight.

Other pathogens, including *Fusarium* species, associated with root rot and stem rot, and *Macrophomina phaseolina*, associated with charcoal rot, were also present but occurred independently of *Diaporthe*, indicating no interaction. Most infections were single, but severity increased with multiple biotic stresses, such as stem borer damage alongside *Diaporthe*.

Under favorable conditions, fungicides provided limited protection from *Diaporthe* species in some fields. Management practices, including prior crop rotations and cover crops such as cereal rye, did not eliminate risk but may help reduce disease severity.

These findings highlight the need for an integrated approach to managing *Diaporthe*-related stem diseases including scouting, resistant varieties, optimized harvest timing and managing stem borer populations to reduce yield loss.

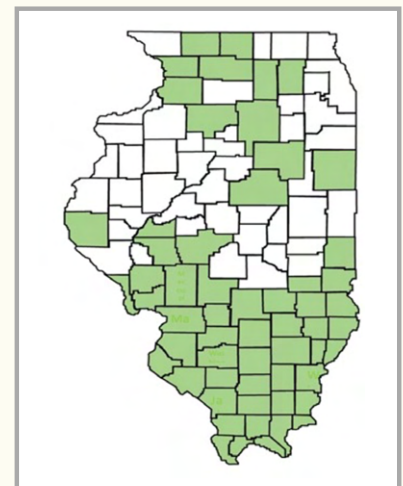


Figure 1: Samples were collected from 58 counties across Illinois during the 2022 and 2023 growing seasons.

INSECT FOCUS AREA

APPROACH:

As part of the Illinois Natural History Survey's annual statewide insect pest survey, Kelly Estes and her team surveyed Illinois soybean fields for soybean gall midge and *dectes* stem borer adults. Each season, personnel surveyed several hundred corn and soybean fields. In 2025, this included 200 soybean fields across 45 Illinois counties.

Members of the Seiter lab focused on surveying *dectes* stem borer larvae. From 2021 to 2023, no-till fields across the state, particularly in southern Illinois, were surveyed in the fall to identify where larvae were most prevalent as they

prepared to overwinter. In summer 2025, the Ewing Demonstration Center in Franklin County and the Orr Research Station in Pike County were selected for more intensive sampling because of established populations. Instead of a single end-of-season sample, soybean residue was collected throughout the summer to track lifecycle development of overwintered larvae, including when pupae and adults appeared.

MULTI-YEAR RESULTS SUMMARY

After three years and several hundred fields sampled, soybean gall midge was not found in Illinois. Farmers should continue monitoring neighboring states, but this potential invasive pest is unlikely to impact Illinois in the near term.

Adult and larval populations of *dectes* stem borer were most prevalent in south-central Illinois, where no-till and reduced-till soybean production are common (Figure 2). Farmers in this region, including Marion, Franklin, Jefferson and Washington counties, should monitor fields for larval infestation as harvest approaches. Fields with more than 30% of plants infested should be prioritized at harvest to reduce lodging, as this insect girdles stems ahead of winter.

In 2025, residue surveys showed *dectes* stem borer adults appeared in late June and continued through early July. This information helps Illinois farmers better understand risk and timing of adult emergence. Scouting

should begin in late July to August, after adults have emerged, eggs are laid and larvae begin to develop.

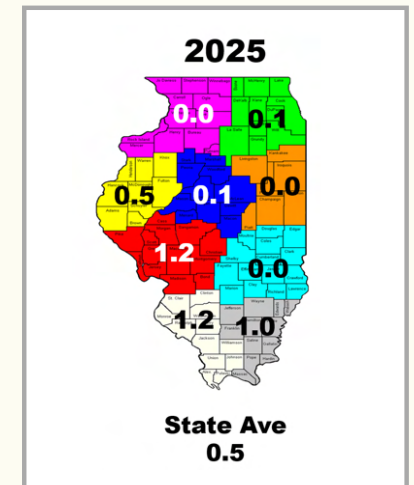


Figure 2: Average *dectes* stem borer counts (adults per 100 sweeps) by crop reporting district.

NEXT STEPS

From an insect perspective, a multistate project funded by the North Central Soybean Research Program is evaluating chemical control options for *dectes* stem borer, along with its impact on yield from stem tunneling and lodging. Stem tunneling is currently thought to have limited impact on yield.

From a disease perspective, researchers plan to submit two scientific articles to peer-reviewed journals. They also are pursuing additional funding to address questions resulting from this study.



PROJECT NAME: RED CROWN ROT ROUNDUP: 2025 RESEARCH FINDINGS

PROJECT LEADER:
Boris Camiletti, University of Illinois

PROJECT LENGTH:
1 year (2024 - 2025)

BUDGET:
\$97,796



YEAR 1 RESULTS:

PURPOSE

Red crown rot (RCR), caused by the fungus *Calonectria ilicicola*, poses a significant threat to soybean fields across Illinois with potential yield losses of up to 50%. Despite its impact, RCR might be underestimated because its symptoms are often confused with Sudden Death Syndrome (SDS). Limited county-level assessments also create uncertainty about how widely the disease has spread and how severe it is.

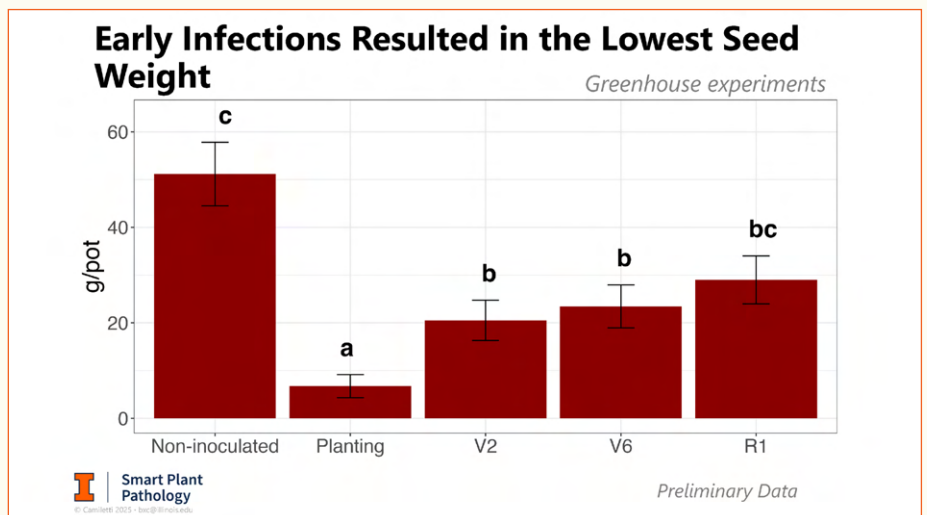
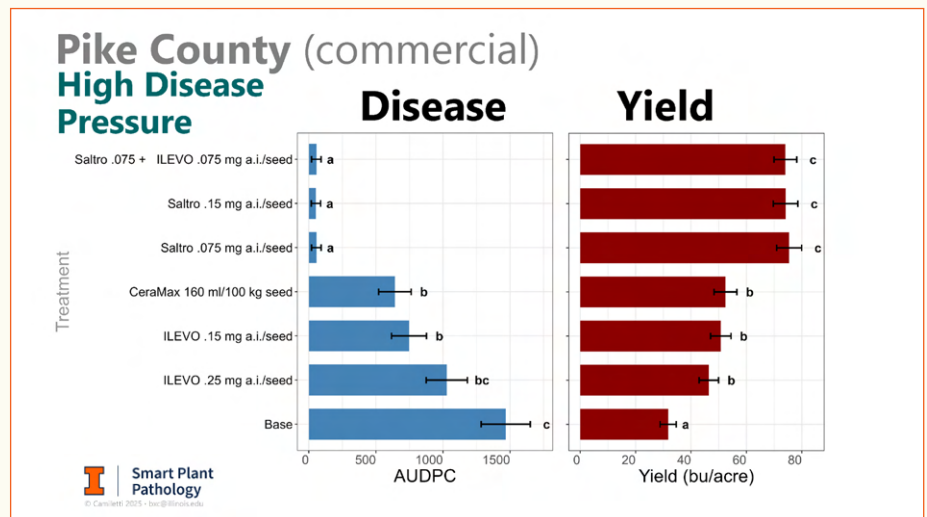
APPROACH:

Boris Camiletti and his team at University of Illinois studied three objectives in 2025 to help growers manage RCR. The research team used greenhouses, outdoor courtyards and growth chambers at the University of Illinois Urbana-Champaign campus, along with field trials in Pike, Madison and Macoupin Counties.

Objective 1: When are soybeans most vulnerable to RCR, how does the presence of soybean cyst nematode (SCN) change disease risk, and what management tools are available that can reduce yield loss in high-pressure fields?

Researchers conducted greenhouse and outdoor courtyard experiments, inoculating plants with RCR at specific timings and SCN levels to evaluate effects on root infection and plant performance. Field trials were also established in RCR-infested plots in Pike County and three naturally-infested commercial fields to assess commercially available seed treatments (Saltro®, ILEVO® and CeraMax®) under real production conditions. Across all experiments, researchers measured disease severity, plant growth and yield data to compare disease pressure and management outcomes.

Objective 2: How can satellite and drone imagery, combined with machine learning, identify where RCR is present, how severe it is and which areas of a field are most at risk?



Researchers collected satellite and drone imagery from Illinois soybean fields with known RCR pressure and paired it with field disease measurements to train a machine learning model to detect canopy-level disease patterns. The model was then applied to commercial fields to identify disease hotspots and guide ground checks and field trial placement. As additional field data was collected, the model was refined and validated to improve accuracy and reliability.

Objective 3: Which, if any, commercially available biological products provide RCR suppression and yield protection in soybeans?

Researchers tested a range of commercial biological seed treatments in growth chamber and outdoor courtyard pot experiments. Seeds were planted in either healthy or RCR-infested soil. Researchers measured plant growth, disease severity and yield to evaluate product performance. Laboratory tests also assessed efficacy and confirmed the identity and quality of the bacteria in the commercial products.

RESULTS

Objective 1: Greenhouse and outdoor courtyard experiments showed early RCR infections cause the greatest yield loss in soybeans, though infections through the R1 growth stage can also significantly reduce yield. No consistent positive interaction was found between SCN and RCR under the conditions tested, indicating SCN alone does not necessarily increase RCR severity.

Field trials showed fungicide performance varied by product and environment; however, among registered seed treatments, Saltro® consistently provided the strongest disease suppression and the best yield performance in RCR-infested fields. ILEVO® and CeraMax® showed moderate disease suppression, although product efficacies varied across locations.

Farmers should prioritize early-season protection, as early infections result in the greatest yield loss, while recognizing infections through R1 can still reduce yield. Fields with a history of RCR should be planted with proven fungicide seed treatments, with Saltro® providing the most consistent suppression and yield protection among registered products.

Because SCN was not shown to increase RCR severity in the SCN-resistant variety tested, there is currently no evidence to support an integrated management plan. However, this work was conducted using a single SCN-resistant variety, and further research across additional varieties is needed to confirm that no interaction exists between these pathogens. In the meantime, RCR risk should continue to be addressed aggressively in infested fields. This approach should be applied across entire fields with a known history of RCR, especially in high-yield or high-value acres where yield loss risk is greatest.

Objective 2: The model identified RCR hotspots in commercial Illinois soybean fields, enabling researchers to place field trials where disease pressure was highest. This demonstrates that the technology can reliably detect disease activity without relying solely on traditional scouting.

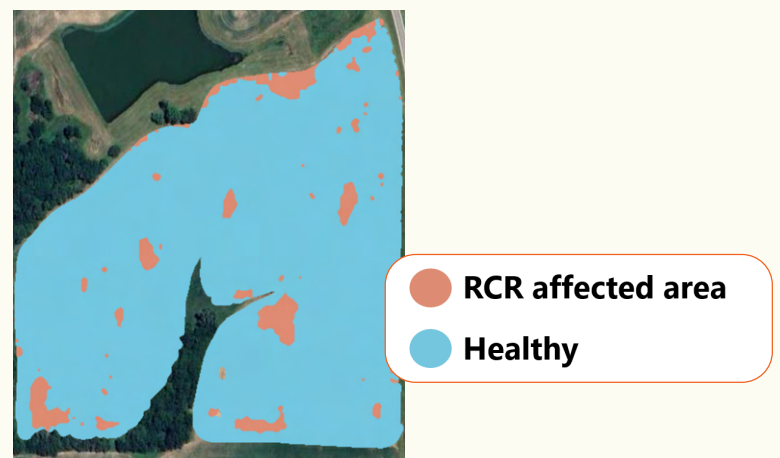
With additional ground-truthing, the model was refined and validated, achieving about 80% accuracy in identifying disease patterns across fields. This allows farmers to use imagery-based maps as an early warning system to locate problem areas, monitor disease spread and evaluate management outcomes over time.

Farmers should consider using satellite imagery to identify RCR hotspots rather than relying solely on in-field scouting. These maps can guide targeted scouting, helping confirm disease presence early and inform decisions on fungicide treatments, seed selection or other management practices. This approach is especially valuable for medium to large operations where full-field scouting is impractical, and disease might go undetected until yield loss occurs. Over time, repeated mapping can help identify consistent high-risk areas and support long-term management and variety decisions.

Objective 3: Several biological products showed partial suppression of RCR in growth chamber and greenhouse experiments; however, control was inconsistent and much lower than that of standard chemical seed treatments.

Products with potential were advanced to courtyard pot trials that more closely mimic field conditions, but no biological consistently provided reliable suppression. Combined disease ratings and seed weight data showed current commercial biological seed treatments alone are not sufficient to manage RCR.

The findings indicate biological products alone cannot reliably control RCR or replace proven chemical seed treatments. Although some products showed limited activity, none consistently provided meaningful protection beyond standard fungicide seed treatments. For fields with a history of RCR, farmers should prioritize chemical seed treatments and consider biologicals only as supplements if future products demonstrate clear added value.



PROJECT NAME:

FIRST STEP TOWARD LIMING RECOMMENDATIONS IN ILLINOIS

PROJECT LEADERS:

Andrew Margenot, University of Illinois; Yuhei Nakayama, University of Illinois; Robert Miller, Agricultural Laboratory Proficiency Program, and Fertilizer Recommendations & Support Tool Lime Project coordinator; Mx. Ezra Moses, University of Illinois

PROJECT LENGTH:
2 years (2023 - 2025)

BUDGET:
\$50,333

is the total two-year project budget, funded by the Illinois Soybean Association, Illinois Corn Growers Association, Illinois Farm Bureau, Illinois Fertilizer and Chemical Association and Illinois Certified Crop Adviser.

YEAR 2 RESULTS:

PURPOSE

Liming recommendations in the Illinois Agronomy Handbook have not been updated in decades, and they do not account for the now-common use of buffer pH to estimate the liming requirement. Although most U.S. states, including neighboring Iowa, Michigan, Indiana and Ohio, base recommendations on buffer pH tests, Illinois relies on soil water pH and broad soil classifications based on organic matter (proxied by color) and cation exchange capacity. Although this provides a reasonable estimate of reserve acidity, it might also introduce error in estimating how much lime is needed to neutralize active (soil water pH) and reserve acidity, which is what buffer pH tests are intended to measure. Because buffer pH testing is already part of routine commercial soil testing, updating Illinois recommendations using new calibration data and buffer pH tests will help growers more accurately determine liming requirements and increase profitability.

APPROACH:

Researchers reevaluated Illinois liming recommendations by:

1. Collecting and characterizing 36 soils representative of Illinois croplands across a range of soil pH values (3.8 to 6.5).
 - Measuring key soil properties, including water pH, salt pH, buffer pH, texture, organic matter and Mehlich-extractable nutrients.
 - Evaluating common buffer pH tests used in surrounding states, including: Sikora, Sikora-2, Adams-Evans and modified Mehlich methods.
2. Conducting a lab incubation study on 24 of the 36 soils with soil water pH below 6.5 to estimate lime requirement and calibrate soil pH tests.
 - Applying seven lime rates (0-6 tons/ac.) and measuring resulting soil water pH after an eight-day incubation – the gold standard approach for lab-based calibration of lime rate and soil pH change.

3.

- Using these results to calculate lime requirement to achieve a soil water pH of 6.5 and to calibrate buffer pH test to lime rate for the target soil pH desired.
3. Conducting 11 on-farm trials (seven in 2025, four in 2026) in central-southern Illinois to evaluate soil pH and yield response to lime rates of 0 tons/ac. to 3 tons/ac., and for additional field-scale validation of lab-based buffer pH calibration. Soil pH and yield are being tracked for two years following the lime application since lime impacts on yields might be delayed.

RESULTS

Lime requirements for the 24 soils ranged from 0 tons/ac. to 3 tons/ac., based on lab results. Buffer pH methods more accurately predicted the lime requirements than water pH. Accuracy improved further when soil properties such as organic matter and texture were included.


Current Illinois recommendations, despite relying on water pH, performed reasonably well but tended to overestimate lime needs. Recommendations from other states (e.g. Delaware and Kentucky), particularly those using Sikora and modified Mehlich buffer pH methods, were generally more accurate. That said, the soil color-plus-texture-with-water-pH approach of the current Illinois recommendations is “close enough,” especially given the lower cost than buffer pH testing. For truly accurate lime rates, however, buffer pH testing is needed.

On-farm trials showed soil pH increased from fall 2024 to spring 2025, but differences among lime rates were not evident at that time. By fall 2025, higher lime rates (2 tons/ac. to 3 tons/ac.) resulted in greater pH increases compared to lower rates. Soybean yields in 2025 ranged from 68 bu./ac. to 71 bu./ac. and did not differ by lime rate. Farmers can continue using the Illinois Agronomy Handbook recommendations for liming with reasonable accuracy.

However, more accurate lime recommendations can be achieved using Sikora/SMP or Mehlich-3 buffer pH tests. The Adams-Evans method is not recommended, as it consistently underestimated lime requirements.

NEXT STEPS

On-farm and small-plot lime rate trials are needed, pending funding, to calibrate buffer pH tests with lime rates at field scale. This next step will allow researchers to develop lime rate recommendations for Sikora and Mehlich-3 buffer pH tests, which have proven appropriate for Illinois soils. Researchers are partnering with GROWMARK Inc. to identify additional on-farm trial locations and welcome any interested farmers in partnering for on-farm lime rate evaluations. Additional funding is needed to expand the number of trials, improve confidence in lime-rate calibrations and evaluate soybean versus corn yield response to lime-rate timing. Additionally, Margenot and his team are preparing results to publish in peer-reviewed scientific journals.



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PROJECT NAME:

QUANTIFYING CONSERVATION BENEFITS FOR ILLINOIS SOYBEAN FARMERS

PROJECT LEADERS:

Kaiyu Guan, University of Illinois;
Ziyi Li, University of Illinois

PROJECT LENGTH:

2 years (2023 - 2025)

BUDGET:

\$296,131



YEAR 2 RESULTS:

PURPOSE

Conservation benefits vary widely by location, but most information available to farmers is based on regional averages or limited experimental sites. This creates uncertainty when considering management changes, particularly as conservation incentives, sustainability metrics and ecosystem services markets continue to emerge. This research aimed to bridge the gap between field trials and practical farm decision-making. By combining soil, weather and crop data with modeling tools, this project provided Illinois growers with location-specific estimates of crop performance, greenhouse gas emissions, soil carbon outcomes and nitrogen losses. This information can help farmers make more informed conservation and management decisions and prepare for participation in emerging carbon and ecosystem services markets.

APPROACH:

This project used remote sensing, field measurements and modeling to estimate conservation outcomes at field scale. Researchers combined soil, weather and crop data with algorithms and modeling tools to evaluate how different practices perform under practical farm conditions.

The model looked at past conditions from 2017 to 2021 and tested scenarios such as adding cover crops, adopting no-till, reducing nitrogen rates by 10% and improving application timing, as well as combining practices. Results included impacts on yield, soil carbon and greenhouse gas emissions, allowing for field-specific comparisons across management options.

Model results were validated using data from seven long-term corn and soybean rotation trials in Illinois from 1999 to 2021, where management practices and yields were well documented.

MULTI-YEAR RESULTS SUMMARY

Soybean-corn rotations reduced nitrogen losses and lowered nitrous oxide and ammonia emissions compared with continuous corn, reflecting improved nitrogen balance and less surplus inorganic nitrogen after harvest. Farmers considering a switch away from continuous corn should prioritize acres prone to nitrogen loss, such as tile-drained or seasonally wet fields, to reduce leaching and gaseous emissions.

Soybean-corn rotations also slowed soil organic carbon buildup or led to slight declines compared with continuous corn at standard nitrogen rates, likely due to faster decomposition of soybean residue. Pairing rotations with carbon-supporting practices such as winter cover crops, reduced tillage and residue retention can help support soil carbon.

Findings from the nitrogen portion of the study showed that timing

and inhibitors can matter as much as rate. Applying nitrogen closer to peak crop demand, such as spring application with early sidedress, and using a nitrification inhibitor improved nitrogen use efficiency, sustained or increased yield, and reduced nitrogen loss and emissions.

Fall nitrogen applications increased losses and reduced or destabilized yield, particularly in wetter springs, even at similar rates. These applications should be limited to situations when they are necessary and used with practices that reduce loss.

NEXT STEPS

The research team published one peer-reviewed article related to this research in the journal *Agriculture, Ecosystems & Environment* titled, "Comparing continuous-corn and soybean-corn rotation cropping systems in the U.S. central Midwest: trade-offs among crop yield, nutrient losses, and change in soil organic carbon." The team is preparing a second article focused on nitrogen management. Researchers also plan to expand this work beyond Illinois.



PROJECT NAME:

INJURY POTENTIAL TO VERY EARLY PLANTED SOYBEANS FROM VARIOUS SOIL-RESIDUAL HERBICIDES AND ACTIVE INGREDIENTS

PROJECT LEADERS:

**Logan Miller, University of Illinois;
Aaron Hager, University of Illinois**

PROJECT LENGTH:

2 years (2023 - 2025)

BUDGET:

\$26,783



YEAR 2 RESULTS:

PURPOSE

Soybeans planted earlier are more likely to emerge in cool, wet conditions. These conditions, along with certain preemergence (PRE) herbicides, can increase the risk of stand loss and crop injury. This project aimed to understand whether specific commercial PRE herbicides or active ingredients are more likely to injure soybeans and reduce yield. Evaluating a range of commercial PRE herbicides will help identify products or herbicide groups farmers might want to avoid when planting early. With this information, farmers can build weed-control programs that protect crop safety while maintaining effective weed control.

APPROACH:

Field research was conducted over two growing seasons in Champaign (2024 and 2025) and one in Perry (2025), using soybean variety 33XF3 with a base seed treatment of Acceleron® in both years. Treatments included several commercially available herbicide premixes applied at 1x labeled rates at planting. In Champaign, early planting occurred April 15, 2024, and April 12, 2025, while conventional planting took place May 19, 2024, and May 17, 2025. The Perry location had a single planting date of March 26, 2025. Sudden death syndrome (SDS)-treated (ILEVO®) and non-SDS-treated soybeans were included across all PRE treatments and planting dates. Researchers recorded soybean injury, stand counts and plant height throughout the season, along with yield. Yield data was not collected at the Perry site.

Early Planted Soybean Response at Champaign and Perry, IL

PRE Treatment^a	CI 7 DAE^b	CI 14 DAE	Yield^c
NTC	2	0	74
Authority Edge	9*	5*	75
Authority First	7*	4*	75
Authority Supreme	7*	3	83
Boundary	3	1	75
Broadaxe	6	3	74
DFF + Mauler	6	7*	81
Dual II Magnum	2	1	76
Fierce EZ	7*	4*	76
Fierce XLT	8*	5*	N/A
Kyber	7*	4*	77
Metribuzin 75 DF	2	0	N/A
Moccasin MTZ	2	1	74
Prefix	2	1	75
Preview	5	2	75
Tendovo	3	1	75
Tripzin	3	1	76
Zidua Pro	6	3	76

Table 1

MULTI-YEAR RESULTS SUMMARY

At Champaign in 2024 and Perry in 2025, PPO-based herbicide premixes (Authority®, Fierce®, etc.) caused the most soybean injury. However, in Champaign in 2025, PPO-based products caused little to no injury. Differences in rainfall timing and total precipitation likely drove these results. Compared with 2024, soybeans in Champaign in 2025 experienced more favorable early-season growing conditions, with no excessive rainfall. In Perry in 2025, soybeans took 26 days to emerge, compared with 13 days in Champaign. This delayed emergence reduced stands at Perry regardless of treatment, while stands in Champaign were not affected.

As in 2024, PRE herbicide had no effect on soybean yield in Champaign in 2025 (Table 1). Unlike in 2024, the early planting date in 2025 (April 12) did not outperform the conventional planting date (May 17).

Results for SDS-treated (ILEVO®) soybeans were mixed. In 2024, May-planted ILEVO® soybeans had an average yield reduction of 11 bu./ac., along with significant stand loss, while April-planted soybeans showed no yield difference. In 2025, ILEVO® did not affect yield or plant stand in May-planted soybeans. However, in April-planted soybeans, ILEVO® increased yield by 4.5 bu./ac. compared with non-SDS-treated soybeans.

Results from the second year reinforced a key takeaway from the first year: Weather during and shortly after soybean emergence remains the most important factor influencing soybean injury and stand reduction.

Farmers can select PRE herbicides that best fit each field based on weed species, seed treatment and soil characteristics, including drainage, pH and organic matter. Because field conditions vary, choosing the right PRE herbicide for each field can help maintain effective weed control while minimizing crop response. Fields prone to standing water are particularly at risk for herbicide injury, especially with early planting. Additional factors such as soil texture,

surface crusting and residue levels might also influence crop response, and differences in soil type between locations (e.g. Perry versus Champaign) could contribute to variability in results.

NEXT STEPS

Researchers are repeating this study in 2026 in Champaign and Perry without funding from the Illinois Soybean Checkoff program.

Note: The 2025 Annual Insights Report included results from the first year of this project. Because of a data analysis error, the reported 5 bu./ac. to 6 bu./ac. yield loss should have been 11 bu./ac.



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PROJECT NAME:

GENETIC ENGINEERING METHODS FOR SOYBEAN CYST NEMATODE CONTROL

PROJECT LEADER:

Matt Hudson, University of Illinois

PROJECT LENGTH:

1 Year (2024 - 2025)

BUDGET:

\$75,186



YEAR 1 RESULTS:

PURPOSE

Soybean cyst nematode (SCN; *Heterodera glycines*) remains the most economically damaging soybean pest, responsible for billions of dollars in yield losses annually. In the U.S., SCN consistently ranks as the leading cause of yield reduction, often without visible symptoms. Current management relies on crop rotation, resistant cultivars and limited chemical use. However, SCN populations are adapting to widely used resistance sources, including PI 88788 and Peking. Nematicides are costly and might provide inconsistent control.

This project aims to identify SCN genes that could be targeted to reduce population. The long-term goal is to develop more precise, durable control strategies that help protect soybean yield.

APPROACH:

This research is being conducted in a laboratory at University of Illinois Urbana-Champaign. SCN progresses through several life stages, from egg to juvenile to adult. Identifying and collecting each stage can be challenging. In the first year of this project, researchers refined growth and

timing to reliably collect SCN at key growth stages under varying conditions, including temperature and soybean variety in order to identify the genes that regulate the production of male and female nematodes.

The team also optimized methods to extract SCN from soybean roots, allowing for

consistent recovery of feeding juveniles and adults for further study.

In addition, researchers developed new methods to analyze gene activity from individual SCN, including refining and publishing a set of genome sequences (a pangenome) for SCN, to allow them to identify

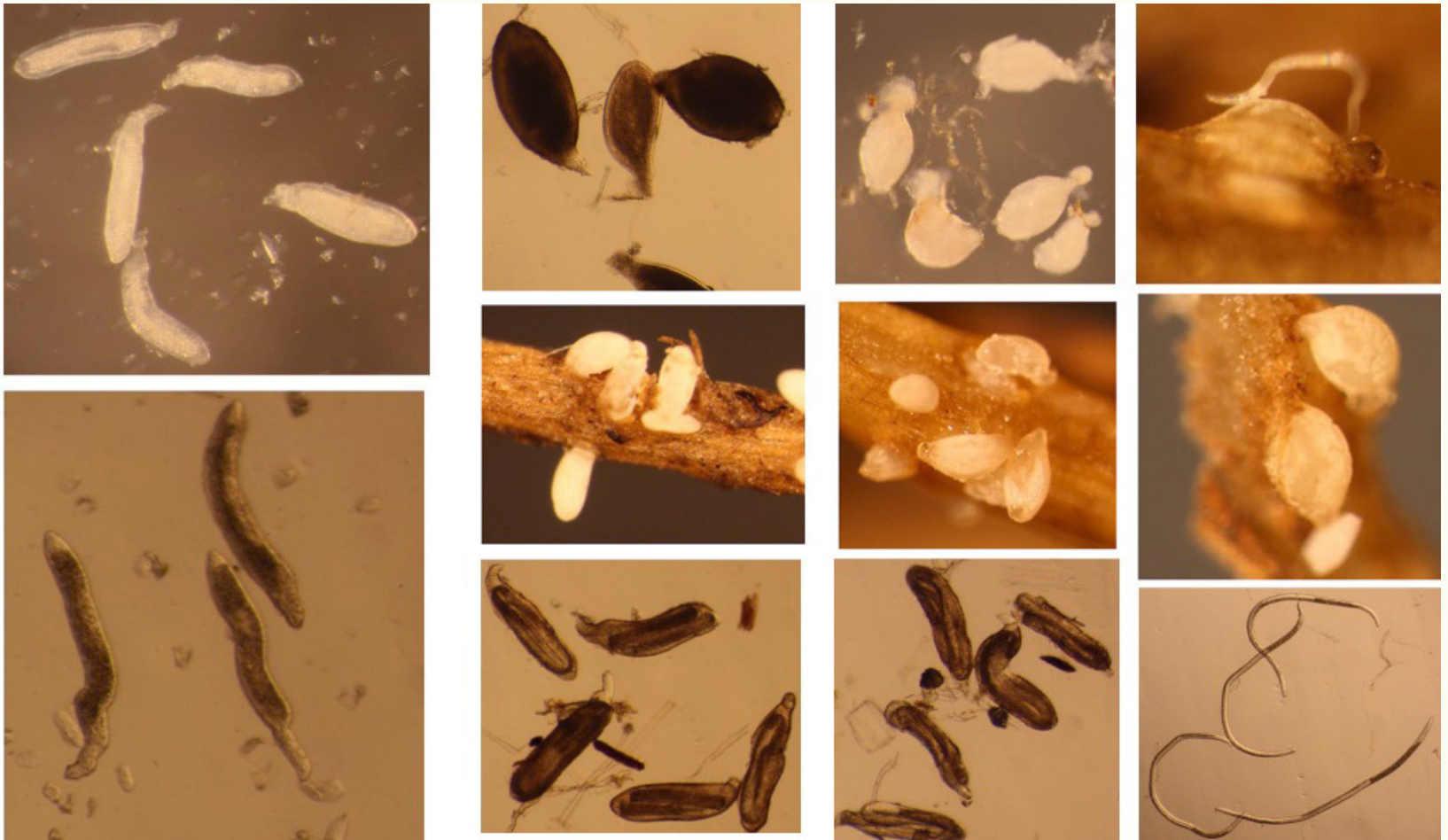
genes in Illinois SCN samples. This approach provides more precise information on how the nematode develops and reproduces, which may help guide future management strategies.



Pangenome analysis of nine soybean cyst nematode genomes reveals hidden variation contributing to diversity and adaptation



Modern Genomics Reshapes Soybean Cyst Nematode Research: Integrating Host Resistance, Nematode Virulence, and Functional Discovery



Images of male and female nematodes isolated using new methods.

RESULTS

Researchers established a reliable system to grow SCN under controlled conditions. Growth chamber conditions were optimized to support both soybean plants and SCN populations, ensuring a consistent supply of nematodes for experimental use. This foundation was essential for all subsequent work.

Last summer, RNA was collected from all targeted stages, including juvenile and adult males and females. RNA samples were sequenced, creating a valuable resource for SCN research. Researchers completed and published the SCN pangenome and, using this information to identify genes, completed the first single-worm RNA-seq analysis conducted across the full life cycle of a plant-parasitic nematode.

This work helps identify genes tied to SCN development and reproduction, including the first genes linked to sex determination. Over time, these findings could support new tools to reduce SCN populations, improve the durability of resistant varieties and help protect soybean yield while lowering input costs. Researchers also

found genes likely involved in how SCN feeds on and interacts with soybean plants, pointing to potential targets for future control strategies.

Early trials also show that soybean variety and some crop inputs may influence the ratio of male to female SCN. Because females drive reproduction, shifting this balance could help reduce SCN populations over time.

NEXT STEPS

This project received an additional year of funding through the Illinois Soybean Checkoff program and is currently underway. The team has already published two peer-reviewed articles in scientific journals from the first year of this project. Scan the QR codes on page 22 to read the full publications.

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Pollinator plot



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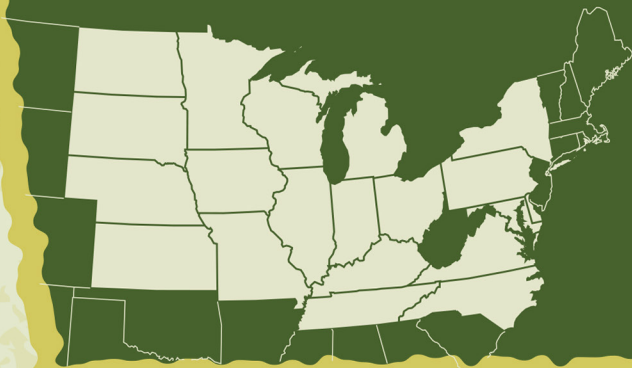
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Protecting the Land— and Protecting Farmers

I have been on our home farm in Potomac my whole life. My grandpa started farming here in the 1950s after moving up from the La Place area, and my dad took over the operation in 1976. After graduating college in 1988, I returned to the farm before spending about eight years working at a chemical dealership. In 2007, I was fortunate enough to come back and begin farming with my dad as a 50% partner. Then, in 2014, he retired and I fully took over the farm operation.

My boys, Michael and Nicholas, came back to the farm in 2014 and 2015. Since then, and especially over the past five years, they have slowly taken on more responsibilities. As a father, there's no better feeling than having your sons want to come back and farm with you. I can probably say the only thing better is having grandkids.

I am now 61 years old, and succession planning becomes much more real at this stage of life. A lot of people put it off because it can get really complicated really fast. And honestly, it's not always an easy thing to talk about. There are lawyers involved, accountants involved, life insurance policies, LLCs – all of the things you have to work through if you want to give the next generation a chance to keep the farm together.

People outside of agriculture don't realize how much of a farm's value is tied up in ground and equipment. On paper, it can look like there is a lot there. But with cash rent, diesel fuel and input costs where they are today, margins are extremely tight. Most of the investment goes right back into machinery, land and keeping the operation going. There is not a lot of cash just sitting around.

That's why the Illinois estate tax is such an important issue for farm families. In Illinois, once an estate's worth goes over the current \$4 million threshold, the tax is applied to the whole value. It applies to every last cent, not just the amount that goes over the limit. As I stated earlier, with farmland, machinery and inputs costing what they do today, it doesn't take long for a farm to reach that point.

If a family doesn't have a plan in place, or if something unexpected happens, it can create a really difficult and sad situation for the next generation. In some cases, it means selling land and equipment just to cover the costs. Honestly, that would just break my heart if my sons or grandchildren had to sell any of the farm that has been in the family for decades.

The goal is to not build something just so it can eventually be split apart. The goal is to keep it going. I got to farm with my dad, and now I get to

farm with my sons. I would love nothing more than to see my grandkids have that same opportunity. Right now, they are ages 14, 4 and 2, and they already love being out on the farm. That means a lot to me. I've started thinking less and less about myself, and more about whether the farm will still be here in one piece years down the road.

Every year, more ground gets sold off or turns into commercial ventures or development. Once that happens, the land rarely comes back into production agriculture. If it does, the new owner has less incentive to care about the sustainability and conservation aspects. Farmers are arguably the greatest stewards of our land, and part of sustainability is making sure family farms can survive for the next generation.

It's time for the Illinois legislature to take a serious look at estate tax policy reform. We haven't seen much movement recently. The last time the estate tax threshold increased was in 2013, when legislators raised the threshold from \$3.5 million to \$4 million.

The reality on the ground is that these rules are out of date and can cost families their livelihood. Farmers are not looking for an advantage but rather for a system that recognizes the capital-intensive nature of modern agriculture and the importance of keeping farms in families. Without some level of reform or adjustment, more family farms will continue to face difficult decisions that could have been avoided.

Farmers need estate tax reform now, and I will lead Illinois Soybean Growers to work toward that goal. That said, we feel the best chance is a big-tent approach that includes small businesses and other allies who are often members of our rural communities. Rising tides raise all ships.



Calcium Clarified: Why Calcium is Vital for Your Soybeans



As growers continue to push the envelope to increase yields and improve ROI on soybean acres, a shift is underway in how the crop is managed, particularly with crop nutrition. The quest for higher yields is no longer just about nitrogen, phosphorus and potassium. It's about a balanced crop nutrition program that includes often-overlooked secondary nutrients like calcium. While calcium often gets overlooked as a primary contributor to yield, it is necessary for developing a healthy and productive soybean crop.

The Role of Calcium in Soybeans

Calcium is an important player in numerous physiological processes within the soybean plant. Calcium helps soybeans form healthy nodules on their roots, which are needed to turn atmospheric nitrogen into a form the plants can use. It helps facilitate cell division and elongation to ensure proper growth from the root to the top of the plant. Calcium also contributes to cell wall strength, which is essential for the plant's structural integrity and its ability to withstand environmental stress. Beyond its structural contributions, adequate calcium levels help the plant manage abiotic stress and improve disease resistance. In addition, calcium helps promote better soil structure, which drives nutrient availability and uptake, and increased microbial activity to foster an environment for vigorous plant growth.

Addressing the Calcium Needs of Soybeans

Today's high-yielding soybeans require more calcium than ever before. However, even when soil tests indicate high calcium levels, it does not guarantee optimal plant availability of the essential nutrient. Therefore, it is often necessary to provide soybeans with a supplemental calcium source to meet the crop's nutrient needs. Supplemental calcium sources can also vary in plant availability. Choosing a plant-available calcium source helps ensure nutrient uptake is maximized during crucial periods of growth and development, in turn delivering a stronger ROI on the fertilizer application.

Get More from Every Acre with SUL4R-PLUS

Modern high-yielding soybean varieties demand more calcium than ever before. However, even when soil tests indicate high calcium levels, the nutrient isn't always readily available to plants. In many cases, less than five percent of the calcium measured in a standard soil test is plant available. This knowledge is important because soluble (plant-available) calcium is often a very small percentage of the overall total calcium reported on a soil test. Field test results illustrated in Figure 1 show soluble calcium only ranged between 1% and 2%.

% Plant-Available Calcium

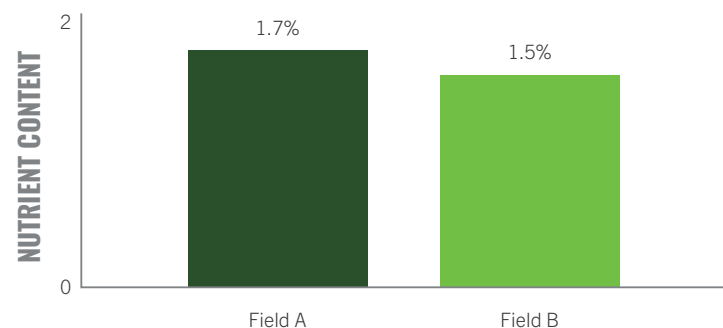


Figure 1.

With a controlled-release, water-soluble formulation, SUL4R-PLUS provides immediate availability and season-long uptake of calcium and sulfur to help crops maximize yield potential. Recent trial data demonstrates SUL4R-PLUS can increase soybean yields up to 12.2 bu/ac, depending on application rate, compared to the untreated check (Figure 2).

Grain Yield

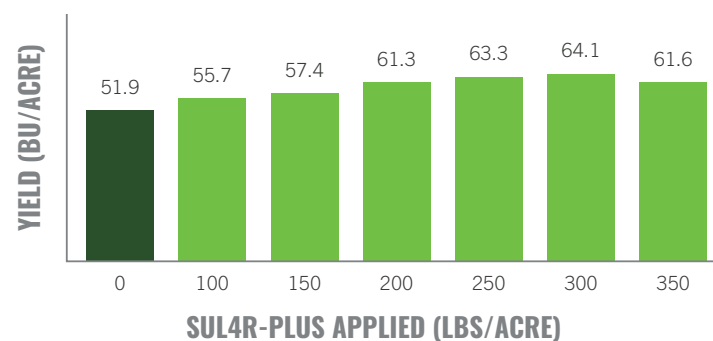


Figure 2.

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