



Building demand and sustainability through applied research.



*An overview of research initiatives
funded by the Nebraska Corn Board*

What is the “next ethanol”—the emerging new use for corn that will again change the game for Nebraska’s corn farmers? We may not have that answer today, but we will. And thanks to research funded through the corn checkoff, we’re well on our way toward discovering it—along with many other discoveries that are changing the way you will grow corn this year and for years to come.

The Nebraska Corn Board (NCB) works to promote the value of corn by creating opportunities. Research answers the “what if” questions that lead to new uses, new markets and new opportunities. Research provides the scientific facts that help corn farmers tell a powerful story to consumers, thought leaders and policy makers. Research helps us get answers to important questions—and better understand the questions we should be asking.

Applied research is the priority of Nebraska Corn Board investments—getting results and relevant, real-world information that can be quickly delivered to corn farmers and other stakeholders.

The lion’s share of research dollars is invested in partnership with the University of Nebraska—Lincoln. UNL researchers submit proposals to the Nebraska Corn Board’s Research and Stewardship Committee for consideration. The committee pares down the list and then submits its recommendations to the full Nebraska Corn

Board for approval and funding. Nebraska Extension also plays a critical role in communicating research results to farmers and helping them implement the practices and strategies that emerge from the research.

The Research and Stewardship Committee reaches out to other farmers and stakeholders to help prioritize key research topics and areas. Research proposals are reviewed by both peers in the research/academic community and by NCB farmer-directors.

“Every director on the Nebraska Corn Board is a corn producer so we are aware of the opportunities and challenges that exist in our industry,” said Debbie Borg, chair of the NCB research committee. “Still, it’s important that we hear from the corn farmers we represent regarding where they feel emphasis should be placed when it comes to investing checkoff dollars into research. That input helps guide our review and selection of the projects we choose to fund.”

Anticipating and Managing Threats to Your Corn Crop



Palmer amaranth (you probably call it “pigweed”) is developing a resistance to atrazine and HPPD-inhibiting herbicides—and that’s a serious problem for corn farmers, especially in areas of the state with seed corn production that rely on these herbicides for weed control. This study is comparing the efficacy of a variety of herbicide programs to manage Palmer amaranth in both field corn and seed corn operations.

(left) Amit Jhala, UNL Extension Weed Management Specialist, discusses with growers how to control herbicide-resistant Palmer amaranth in corn.

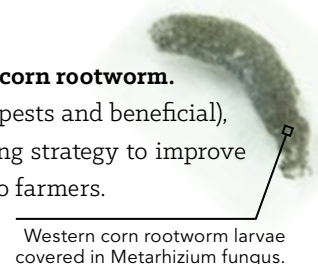
PALMER AMARANTH



Western corn rootworm

Corn rootworm has shown a tremendous capacity to evolve a tolerance in attempts to control it, including even Bt toxins. The innovative use of RNA interference (RNAi) shows promise. This study proposes to use RNAi to block the ability of rootworm larvae to find a host plant by essentially removing their ability to sense carbon dioxide, which is a key host-finding “cue” for these pests.

Another study is identifying a group of fungi that are **natural pathogens of western corn rootworm**. While the research is also studying the effects of these fungi on other insects (both pests and beneficial), employing these fungi in rootworm management could prove to be a groundbreaking strategy to improve yield, reduce pest damage and reduce insecticide exposure to the environment and to farmers.



Western corn rootworm larvae covered in *Metarhizium* fungus.



Sustainability: Growing more with less.

Increasing nitrogen efficiency while reducing environmental impact and improving water quality is the objective of Project SENSE (Sensors for Efficient Nitrogen Use and Stewardship of the Environment). Crop canopy sensors are used to conduct real-time assessments of nitrogen requirements as the applicator is driven through the field—and generate an economic optimum rate of nitrogen application. Data generated from the study will refine current canopy sensor algorithms to generate even more accurate fertilizer rates.



Crop canopy sensors assess corn nitrogen requirements in real time.

Measuring and managing the yield gap between the genetic yield potential of a specific hybrid versus actual yield is the objective of this research project. This study, which continues to build on previous work funded by the Nebraska Corn Board, is specifically focused on how Nebraska corn farmers can better estimate yield potential, determine N and water requirements, and use statewide data for decision making. The goal is to create a robust and evolving database and set of benchmarks that will help corn farmers improve their ability to balance water, nutrients, and management practices in their efforts to sustainably and efficiently get the most out of their corn acres.



Xanthomonas is a bacterial pathogen that has been newly confirmed in Nebraska. The Nebraska Corn Board is working with UNL to determine where this disease is present in the state, how it spreads, how well it survives winter, and its potential impact on yield on various hybrids. Easily mistaken for gray leaf spot, Xanthomonas is different in that it is bacterial, not fungal—and that requires entirely different management strategies. This is an example of an issue that no one saw coming, but one that requires immediate response and investment.

(left) Xanthomonas, a bacterial pathogen, is easily mistaken for gray leaf spot.



Soil Health Initiatives

Soil health is a hot topic, but farmers have known for decades that soil quality is the very foundation of sustainable crop production. The Nebraska Corn Board has been engaged in soil health research, especially the use of cover crops, for some time—and a couple of current research projects continue this effort.

Could cover crops offer as many benefits as high residue cover? This study will look at the use of **cover crops on sloping and sandy soils**, as well as silage and grain cornfields. This three-year project will assess soil and nutrient losses from erosion, nitrate leaching and soil health in two actual in-production cornfields and one research site. Other measurements will include soil aggregate stability, organic matter and water quality.

Another study, in cooperation with the Nebraska Soybean Board, is focused on the feasibility of using cover crops—broadcast or seeded no-till—in **soybean and corn cropping systems**, both rainfed and irrigated. This project is specifically looking at the impact of single and multi-species cover crop mixes and their effect on yield, soil properties, and economic return.

The Nebraska Corn Board is also engaged with the Soil Health Partnership, a national initiative spearheaded by the National Corn Growers Association in collaboration with a diverse group that includes The Nature Conservancy, the Walton Family Foundation, Monsanto, The Environmental Defense Fund and others. The goal is to make agriculture more productive and sustainable through improved soil health. The group defines soil health as the continued capacity of a soil to function as a vital living ecosystem that sustains plants, animals and humans. soilhealthpartnership.org





A Multi-State Corn Collaboration

UNL Presidential Chair to Focus on New Uses for Corn

As corn production continues to outpace demand, it is critical to accelerate research into new markets and new uses.

An endowment from the Nebraska Corn Board will provide support for a Presidential Chair faculty position in the Institute of Agriculture and Natural Resources (IANR) at the University of Nebraska–Lincoln. The sole focus of the position is to conduct research and development related to corn demand, with a particular emphasis on bioproducts and new uses. The endowment ensures that research in this area will exist in perpetuity.

As of this report, the first recipient of the Presidential Chair had not been identified. Recipients will be selected based on teaching and research ability, as well as on academic promise and accomplishment.


There are times when the Nebraska Corn Board looks for opportunities to leverage its research investment in “big picture” initiatives that extend well beyond Nebraska. The Genomes to Fields (G2F) initiative is a great example.

G2F involves multi-state collaboration of public-private entities including university researchers, government agencies, seed companies and scientists. This group will generate a dataset of 500 hybrid corn lines across multiple sites in multiple states over multiple years. In the process, G2F intends to improve the predictability of plant performance under a wide range of growing conditions.

New mobile phenotyping technology will also be employed on a test basis within Nebraska to make in-field measurements of plants and the micro-environment within the field on a weekly basis.

“Essentially, G2F is focused on enhancing our understanding of corn genomics and accelerating the development and deployment of new corn hybrids that will perform well in spite of increased weather variability. This type of resource has never been available to public-sector researchers,” said James Schnable, principal investigator for the project at UNL.

For more information: genomes2fields.org



As ethanol plants change their production processes, it's critical to understand the effect on the nutritional value of the distillers grains co-product.

Keeping Ethanol & Livestock Viable



Nebraska Corn Board-funded research helped lay the groundwork for the growth of the ethanol industry in the state, especially in establishing the value of distillers grains in livestock rations. It was critical to prove to beef producers that this co-product of ethanol production could add value to their operations.

Enhancing demand for distillers grains was also important to the bottom line of the ethanol plants themselves—creating a revenue stream that diversifies their product portfolio and helps them mitigate risk in a volatile market.

That's why checkoff-funded research projects on distillers grains have been going on for decades. The latest project deals with the **changes in the feeding value of distillers grains** that have resulted from changes in the ethanol production process. As ethanol producers use fractionation and fermentation to extract new products (cellulosic ethanol, e.g.) and greater value out of a kernel of corn, livestock producers need to know how those changes affect their rations, their animals and the price they pay for distillers grains. As ethanol producers continue to change their processes, distillers grains research will continue to be a significant investment for the Nebraska Corn Board.



Resistant starches (RS) derived from corn are already being used as ingredients in food to increase dietary fiber content. This study attempts to discover how corn-based RS may work with human intestinal microbes to provide prebiotic fibers that could help reduce weight gain, improve insulin sensitivity, and improve metabolism. Proving these health benefits of corn could help change consumer opinion

about corn in food (think “high fructose corn syrup”) —and increase acceptance and demand.

Can Corn Help Fight Obesity?

Mentoring New Ag Researchers

Students involved in the Innovative Youth Corn Challenge work with agronomic professionals to create their own on-farm research projects.

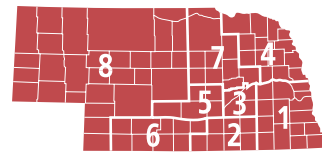


If we're going to be successful in feeding 9 billion people by 2050, we need to be nurturing more scientists and researchers who are going to focus on how we're going to make that happen. The Innovative Youth Corn Challenge offers youth the opportunity to work closely with an agronomic professional while creating their own on-farm research or demonstration plots.

“Today's youth adapt rapidly to the ever-changing world, crave change and challenges, are global in perspective and are constantly creating things,” said Brandy VanDeWalle, the Nebraska Extension educator leading this project. “These are the attributes that will move agricultural production forward if we ensure that our youth are actively engaged. With proper mentoring, youth can explore numerous career opportunities in the agronomy industry and on their own farms.”

The Nebraska Corn Board also supports the On-Farm Research Network led by Nebraska Extension. Through this network, Nebraska farmers work with Nebraska Extension researchers to conduct highly-focused research projects on their farms designed to address specific issues, compare the effects of practices and products, and answer other key agronomic questions. The results are then shared statewide with other farmers in the network, providing "real world" research findings that are more meaningful because they take place on local farms across the state.

Engaging Nebraska Farmers in On-Farm Research



District 1
Dave Bruntz
Friend, NE



District 6
Dennis Gengenbach
Smithfield, NE



District 2
John Greer
Edgar, NE



District 7
David Merrell
St. Edward, NE



District 3
Brandon Hunnicutt
Giltner, NE



District 8
Jon Holzfaster
Paxton, NE



District 4
Debbie Borg
Allen, NE



At-large
Alan Tiemann
Seward, NE



District 5
Tim Scheer
St. Paul, NE



Nebraska Corn Board members represent the eight districts indicated on the map and are appointed by the Governor. One at-large member is elected by the other Board members.

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