

For the Land and Its People



Spring 2026

As the weather warms up, this spring edition of *For the Land and Its People* details the hard work of NDSU Agriculture. You will read about incredible NDSU research happening and how Extension translates that knowledge to the communities we serve. Also, you can experience the centennial celebration of one of NDSU's most prized events through the eyes of its key players. These stories reflect NDSU's dedication to our land and to the people who live on it.

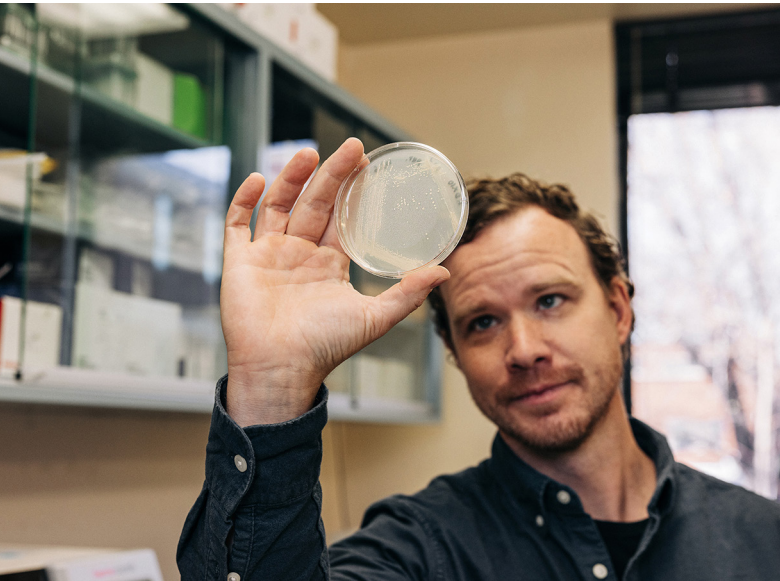
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College of Agriculture, Food Systems, and Natural Resources
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Geddes research team working to maximize symbiotic nitrogen fixation in crops

North Dakota State University Assistant professor and Richard and Linda Offerdahl Faculty Fellow Barney Geddes and his team are working to improve how crops naturally get nitrogen by better understanding how helpful soil bacteria (rhizobia) and legumes work together.

The aim is to boost symbiotic nitrogen fixation, thereby decreasing the use of chemical nitrogen fertilizers on cropland in North Dakota and elsewhere.

The National Science Foundation and USDA have funded the more basic research, says Geddes. The project has also received funding support for translational research from the Richard and Linda Offerdahl Faculty Fellowship, the North Dakota Soybean Council, the Foundation for Food and Agriculture Research, and the Northern Pulse Growers Association.

“The overall goal of the research is to maximize symbiotic nitrogen fixation in agriculture to reduce the need for environmentally and economically costly chemical nitrogen fertilizers,”

says Geddes. “While we continue fundamental research to understand what makes the symbiosis work, we now also do a lot more translational work, helping farmers understand what’s going on in their fields and improving the microbial products available to them.”

“The research by Dr. Geddes is critical to improving our understanding of the symbiosis between plants and the soil microbial community,” says Greg Lardy, Joe and Norma Peltier Vice President for Agriculture at NDSU. “His work has the potential to reduce reliance on nitrogen fertilizers and, ultimately, improve global food security. Dr. Geddes was hired through the AgriBiome initiative funded by the North Dakota State Legislature in the 2019-2021 session.”

The initiative was developed as a priority by the State Board of Agricultural Research and Education (SBARE).

Geddes’s interest in sustainable agriculture began as he grew up on a small farm in southern Manitoba,

Canada, where regenerative agriculture was emphasized to reduce chemical inputs. That led him to pursue his Ph.D. at the University of Manitoba, where he began studying microorganisms, and he has been studying them ever since.

Much of Geddes’s work focuses on root nodule symbiosis, a process in which rhizobia convert atmospheric nitrogen into a usable form for legume crops within specialized root organs.

Rhizobium is a nitrogen-fixing bacterium common in soil, especially in the root nodules of leguminous plants (e.g., beans, peas, soybeans, lentils, peanuts).

“A fundamental aspect of our research is trying to understand the genetics that make up rhizobium populations in agricultural fields and how that impacts the efficiency of symbiosis in legume crops,” says Geddes.

Symbiosis in crops refers to cooperative relationships between plants and microorganisms — primarily bacteria and fungi — where both partners benefit.

“We continue fundamental research into understanding what makes the symbiosis work. We also now do a lot more translational work, working towards helping farmers understand what’s going on in their fields and to improve the microbial products available for their use,” says Geddes.

Lilac Agriculture, Inc., was created to license the technology from Geddes’s research program. Lilac Agriculture is a high-tech company partnering with pulse seed companies to advance a new generation of crop inoculants. The initial rollout will focus on lentils, with ongoing efforts to use advanced genomic tools to improve microbial performance and expand into other crops in the future.

The goal of Lilac is to offer products that use microbes to improve soil.

“A key to having the impact I desired from our program involved getting elite rhizobia we identify into farmers’ hands as products,” says Geddes.

“I explored partnerships with existing companies, but in the end, the most tangible solution seemed to

be to spin off my own in collaboration with several ag industry veterans who shared my philosophy about gaps and challenges in the rhizobium inoculant market,” adds Geddes.

Geddes’s research looks at why naturally occurring rhizobia in soils often outcompete added, more effective strains. Even though these native strains are good at forming root nodules, they don’t fix nitrogen as well, which reduces crop benefits. By studying large collections of rhizobia from farm fields, researchers have identified the genes behind this issue and found a few standout strains that are both competitive and highly efficient.

“Our goal is to identify and develop elite rhizobia that are both highly competitive and efficient nitrogen fixers,” says Gayathri Senanayake, an NDSU Ph.D. student working in the Geddes lab on the research. “In the long term, this could lead to tailored inoculants specially adapted to North Dakota soils and crop varieties, enabling plants to meet their nitrogen needs naturally while enriching the soil

for future crops and hopefully making it no cost for nitrogen fertilizers for farmers.”

“These represent an opportunity to improve the biology that underlies rhizobium inoculant technology for farmers,” says Geddes.

With North Dakota among the leaders in pulse crop yields, the research aligns well with NDSU’s land-grant mission and research.

“North Dakota is a leader in pulse production nationally, including in dry beans, peas, lentils and chickpeas, while soybean production is also rapidly expanding in the region,” says Geddes. “We have some of the highest diversity of legume crops of any state in the U.S., and they have become integral to our agricultural system. Maximizing nitrogen fixation on the farm and harnessing this as a key benefit of growing legumes has a direct impact on North Dakota agriculture.”

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NDSU Ready to Launch Pest Management Tool to North Dakota Farmers

North Dakota State University experts have developed a new app to help farmers in the field.

The upcoming NDSU Pest Management Tool has been designed as a hub for pest management knowledge, which can help agriculturists easily access information wherever and whenever they need it.

This wasn't the first app built for this purpose. The previous app was launched in 2013. Two years ago, the app was dissolved due to the high cost to maintain, and a more sustainable plan was put into action with NDSU Agricultural Data Analytics.

NDSU Extension produces three guides each year for fungicides, insecticides and herbicides. They are some of the most requested Extension publications, with thousands printed each year.

Andrew Friskop, plant pathologist in NDSU's Department of Plant Pathology, Microbiology and Biotechnology, has been working on making this tool an information source for anything related to pesticide use. His goal was to consolidate all three guides into a usable database that agriculturists can use.

"One of the biggest challenges in Extension is making information that can be received by all ages," says Friskop. "We do a great job at reaching our experienced agriculturalists. Some of the new generation of future agriculture leaders has been working with those growers to determine how to best provide information in a one-stop shop at their fingertips."

The tool has taken about two years to create, and it required collaboration from NDSU Extension experts in entomology, plant sciences and plant pathology to help re-enter all the available data about pest management.

None of the previous app language was usable, so Vimlesh Kumar, NDSU Extension application development and analytics engineer, developed the app from scratch.

"The previous version was very basic, and it wasn't fully integrated with the data from the guides," says Kumar.

The new app follows a progressive web app format, meaning it is easily added to a device and doesn't require costly updates. Also new to the tool is an extensive gallery of crop photos to accompany the information, which Kumar says is a crucial part of the app's usability.

"I think the most important thing for users is the visual and usability of the tool," says Kumar.

Users can select the crops and pests, and the tool will provide effectiveness and use information.

The app provides detailed product information, application methods and up-to-the-minute environmental conditions such as temperature and humidity. The app can be used without an internet connection on a smartphone, as well as in a desktop format.

Friskop says that, at the end of the day, he and the collaborators on this tool just want to make the day easier for growers and to guide decision-making wherever they need it most.

Printed copies of the pest management guides will continue to be available at Extension county offices.

The tool is set to launch in late spring 2026, and Friskop is excited to showcase the team's hard work, as well as hearing what growers have to say about their app experiences.

"We really look forward to getting feedback on everything included, whether it's accessibility to additional tools that would be helpful to add," says Friskop.

This management tool has been financially supported by commodity groups.

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The Pest Management Tool can help agriculturists easily access information wherever and whenever they need it.



NDSU Saddle and Sirloin host 100th annual Little International

On Feb. 14, North Dakota State University's Saddle and Sirloin club celebrated its 100th annual Little International event. The event is the longest-running and largest student-sponsored event on campus.

Little "I" is the annual livestock show featuring showmanship classes of beef, dairy, sheep, swine and goats, as well as lamb lead, ham curing and public speaking.

Saddle and Sirloin is a student-run organization dedicated to promoting agricultural education and leadership through hands-on experiences and community engagement. With over 300 members, the club provides opportunities for students to develop skills in livestock management, public speaking and agricultural advocacy.

For the 100th event, the student leaders treated it like any other year.

Linnea Axtman, a senior studying business administration, served as Little I Queen. She led publicity efforts, promoting the event through over 20 TV and radio interviews. On show day, she could be found selling raffle tickets, interviewing alumni and greeting people. From speaking in the spotlight to helping prepare meals behind the scenes, Linnea recalls the months leading up to the event being a lot of work by everyone.

"It's something I'll always look back on fondly," says Linnea, who also serves as the Saddle and Sirloin secretary.

She remembers seeing the dedication and passion of the event organizers and royalty when she went to her first Little I during her first year attending NDSU.

"We spent a lot of time thinking about how the show has grown so much in the last century but also how it has also stayed true to the values and core traditions throughout the years," says Linnea.

The 2026 theme was "Living Shepperd's Vision," which Linnea says extends beyond the event to the community that J. H. Shepperd, agriculturist and North Dakota Agricultural College president, helped create on campus.

This year's event placed greater emphasis on alumni, and it was well attended by past NDSU Animal Science graduates coming from all over the northern Great Plains. Linnea says she had the opportunity to meet with many past royalty at the event, which she says felt very special.

Over 400 people attended the Agriculturist of the Year banquet, according to Taiton Axtman, the Little I show manager.

Taiton spent months planning and coordinating the details to bring the event to life. He helped guide the 27 committee chairs that ran the event and supported over 150 students who showed animals.

Taiton kept all the Little I players in line, "from the emcees to the pooper scoopers."

Additionally, with the Shepperd Arena building set to be replaced soon, he says he needed to have some "difficult conversations about maintenance and access."

Taiton says the event was a success in many ways — he estimates it had the record number of both contestants and attendants, as well as the highest amount of ad dollars donated. However, he looks past the numbers the centennial event drew.

Giving people a chance to experience the ring and connecting students with North Dakota agriculture were what mattered most to him.

"We're proud of the big, grand show we put on this year," says Taiton, "but we're more proud of the opportunities we give the students. Not only do they learn about animal husbandry, but also building their student leadership skills, learning how to problem-solve and working with committee members."

Linnea and Taiton are twin siblings, and Linnea thinks that's a pretty special part of her Little I experience.

"I couldn't have asked for a better Queen to do it alongside," says Taiton.

Taiton credits their parents for teaching the two "how to work with people, how to get along and have tough conversations when they need to be had."

Linnea says her time in Saddle and Sirloin helped her find her place on campus and a community in which she belonged.

"The clubs, the opportunities, the connections — these are the things I take from NDSU that'll make the lasting impacts," says Linnea.

She urges new students to get involved in clubs like Saddle and Sirloin early in their time at NDSU.

FOR MORE INFORMATION:
<https://www.ndsusaddleandsirloin.com/>

100th Little International

NDSU

AGRICULTURE

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NDSU's Land-Grant Mission

The College of Agriculture, Food Systems, and Natural Resources has a tradition of excellence in educating students for real-world careers. Our students learn from and work with world-class scientists in state-of-the-art facilities. These interactions, along with a relatively low student-faculty ratio, provide opportunities for students to develop their critical thinking skills, to work in a team setting, and to capitalize on hands-on learning experiences that will allow them to be competitive in a global economy.

The North Dakota Agricultural Experiment Station consists of seven Research Extension Centers placed strategically throughout the state, the Agronomy Seed Farm in Casselton and the Main Station in Fargo. We work to develop techniques and technologies to enhance the production and use of food, feed, fiber and fuel from crop and livestock enterprises.

NDSU Extension empowers North Dakotans to improve their lives and communities through science-based education. We serve all people of the state through our 52 county and Fort Berthold offices, seven Research Extension Centers and the main campus in Fargo.

For more information on the programs in this publication, contact the faculty and staff listed. For more information about our other programs or have questions, comments or suggestions, please contact me.

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NDSU Research Extension Center 2026 Field Days Schedule

The North Dakota State University Research Extension Centers' annual field days are set. The events take place at the Research Extension Center sites across the state and feature speakers, presentations and tours covering a diverse array of topics. The field days are open to the public.

The dates and locations for the field days are:

July 7 – Central Grasslands Research Extension Center

July 8 – Hettinger Research Extension Center

July 9 – Dickinson Research Extension Center

July 10 – Williston Research Extension Center

July 13 – Agronomy Seed Farm

July 14 – Carrington Research Extension Center

July 15 – North Central Research Extension Center

July 16 – Langdon Research Extension Center

Aug. 5 – Williston Research Extension Center – Nesson Valley

Aug. 6 – Carrington Research Extension Center – Oakes Irrigation Research Site

Visit ndsu.ag/fielddays2026 for more detailed information as the dates get closer.



ndsu.ag/fielddays2026