

Sustainable Agriculture Research & Education

FIELD NOTES



North Dakota Ranchers Improve Pasture Quality with Cover Crops

The Newsletter
of the NCR-SARE
Program

Winter 2015
Issue 33

Donnie and Trisha Feiring own and operate Feiring's Cattle Company in Beach, North Dakota, a 120-head registered Black Angus cow calf operation. They also run 35 head of commercial yearling heifers. Without a lot of machinery on the ranch, the Feirings tend to think outside of the box when it comes to operational concerns.

In 2013, the Feirings were particularly concerned about the health, vigor, and productivity of 50 acres of domesticated grass pasture on their land. The acres were cropped and then seeded back to smooth brome grass about 30 years ago. The Feirings noticed that the productivity, health, and vigor of the plants had declined. Even with adequate moisture in 2011, the Feirings did not have optimal production from the pasture. They had more bare ground than desirable and they wanted to graze it more frequently. Donnie Feiring said the soil was degraded to the extent that the Feirings needed to commit some serious time, energy, and resources to improvements.

In 2013, Donnie Feiring applied for an NCR-SARE Farmer Rancher grant and received \$6,905 to increase the productivity, health, and vigor of the pasture. With the grant, he seeded 40 acres of a multi species cover crop into the declining brome grass stand. He also conducted soil biology and infiltration tests and bale grazed as many of the 40 acres as possible. Bale grazing is an approach where hay bales are left in the pasture where they are cut rather than being moved to a feedlot or other location.

In 2014, Feiring reported increased organic matter, improved soil health, and increased production on the 40 acres under the SARE project. He reported a "tremendous difference" between the growth of the cover crops on bale grazed areas versus the growth of the cover crops on non-bale grazed areas. The bale grazed rings stayed cooler, held more moisture, and had more

organic matter. The bale grazed rings also had four times the production of the rest of acres planted and were the first areas that the cattle grazed when they were turned in.

"We are seeing improvement on the 40 acres," said Feiring. "There's more plant variety and it seems that there's improved infiltration. Is the improvement as fast as I want it to be? No, but I can see that the plants that are coming in are thicker and denser."

Over the course of the project, as many as 70 farmers, ranchers, and Extension agents visited the Feirings operation to observe the pasture. Perhaps one of the farms influenced the most by the Feirings' research was their own extended family, Trisha's parents. Donnie said that his in-laws were pretty skeptical about cover crops, but after seeing the results of the work on the Feiring's 40 acres, they put in almost 600 acres of cover crops on their farm in 2015.

The Feirings plan to continue the work by planting a long season cover crop on 25-30 acres in the coming year, although they have yet to determine the mix. They also plan to do more soil sampling and look more closely at water infiltration; Feiring suspects that infiltration has improved, but he wants to measure it.

"We'll keep working on this and improving," said Feiring. "It's more for my two girls than it is for me. If we can get our soils right, they can weather drought and other conditions better, and better soils will make it better



With SARE support, farmers, ranchers, and Extension agents visited Feiring's Cattle Company in Beach, North Dakota to see a pasture that was improved through the use of cover crops. Photo by Trisha Feiring.

for our kids. We're looking to the future; if we're going to be sustainable long-term, we've got to keep thinking outside the box. By utilizing techniques such as cover crops, bale grazing, and high stock density grazing, we believe that the land can be improved without tilling it and replanting it," said Feiring.

Read more about the Feiring's NCR-SARE Farmer Rancher Grant project online on the SARE project reporting website. Simply search by the project number, FNC13-908, at <http://mysare.sare.org/> or contact the NCR-SARE office at ncrsare@umn.edu.



Cover crops have been shown to boost yields, break through a plow pan, and add organic matter to the soil. Learn more about how cover crops can benefit

a ranch operation for free online at www.sare.org/covercrops



NCR-SARE Grants for Sustainable Agriculture

NCR-SARE has online resources to help you learn more about writing proposals for NCR-SARE's grant programs. Read tips, tutorials, and watch videos online at www.northcentralsare.org/Grants/Write-a-Successful-Grant

Grant-Writing Assistance

Did you know that the Michael Fields Agricultural Institute Grant Advisor can help you apply for grants that could help you achieve your farming or ag-related business goals? If you are an urban farmer, beginning farmer, limited resource farmer, or a member of a historically socially disadvantaged group in the Midwest, you are invited to contact grants advisor [Deirdre Birmingham](mailto:Deirdre.Birmingham@mfai.org) for free grant advising help from the Michael Fields Agricultural Institute. Contact Birmingham at (608) 219-4279 or deidreb4@gmail.com for more information.

New Online Resources for Youth Educators

SARE Topic Rooms are organized collections of multi-media information on important topics in sustainable agriculture. SARE recognizes that youth programs are a way to introduce new and exciting farming and ranching options to youth, parents, and community members. The materials in this new online topic room can help youth educators learn, demonstrate, and share information about sustainable agriculture.

Visit SARE's Youth Education topic room at www.sare.org/Learning-Center/Topic-Rooms/Youth-Education.



SARE State Coordinators

SARE sustainable agriculture coordinators help train agriculture professionals in sustainable practices, share SARE project results, and work with SARE grant applicants. If you have questions about SARE in your state, your SARE state coordinator can help. [Find your SARE State Coordinator and view documents about funded grants in your state by visiting NCR-SARE online at \[www.northcentralsare.org/State-Programs\]\(http://www.northcentralsare.org/State-Programs\) or contact the NCR-SARE office at \[nrcsare@umn.edu\]\(mailto:nrcsare@umn.edu\).](#)

White House Recognizes SARE Colleagues

The hundreds of farmers and ranchers who have lent their expertise over the years to the SARE program are pioneers in sustainability. Three of those pioneers were among the 12 people honored this fall by the White House as Champions of Change for Sustainable and Climate-Smart Agriculture: Larry Cundall, Keith Berns, and Martin Kleinschmit.

As chair of the Western SARE Administrative Council, Glendo, Wyoming, rancher Larry Cundall applies a spirit of innovation to help guide SARE funding toward producer-led research that gives farmers and ranchers the tools they need to make their operations more sustainable.

Keith and Brian Berns first tested cover crops on their family farm in Bladen, Nebraska, in 2007 using a SARE grant. Today, the brothers are national leaders in the advancement of cover crops, including management of a seed business with 3,500 customers who plant cover crops on 1 million acres across the country.

Martin Kleinschmit owns an organic farm in Nebraska and has served as a farmer member of the NCR-SARE technical committee that reviews project proposals, and his wife, Linda, served in various leadership positions with NCR-SARE for 10 years.

Grant Highlights

Learn more about exciting SARE-supported projects! Use the project number listed with these projects to find more information at <http://www.mysare.sare.org/>, or follow NCR-SARE on Facebook or Twitter to receive regular updates like these.

With SARE support, Charuth Van Beuzekom Loth developed a goat's milk business, Dutch Girl Creamery, in Nebraska. She won an American Cheese Society blue ribbon for her Rosa Maria manchego-style cheese in July 2015. This is SARE grant FNC04-513.

SARE grant recipient Abbe Turner and other innovative Ohioans are currently working on agricultural solutions for diverting food waste from landfills in Ohio. This is SARE project FNC15-1017.

With support from a SARE grant, Lutie High School and Middle School students visited a 17-acre farm where they learned about high tunnels and livestock, and learned how to inoculate logs to grow shiitake mushrooms. This is SARE project YENC15-088.

Clare Hintz and other producers used a SARE grant to successfully direct market non-traditional perennial berries in Northern Wisconsin. This is SARE project FNC12-864.

Ray Hansen received a SARE grant to control invasive species in his Iowa timber stand by browsing goats and conducting prescribed burns. This is SARE grant FNC15-996.

Abbey Wick and North Dakota State University Extension Soil Health received a SARE grant to adapt cover crops for improved soil health in the Northern Plains. Follow Wick's research updates using her twitter handle, @NDSUsoilhealth. This is SARE grant project ONC15-012.

2016 NCR-SARE Farmers Forum at PFI

The next NCR-SARE Farmers Forum will be held at the 2016 Practical Farmers of Iowa Conference. The Farmers Forum is an annual event that gives farmers, ranchers, researchers, and educators the chance to share information about sustainable agriculture practices with a national audience.

The event will take place January 22-23, 2016 in Ames, Iowa. For more information visit, www.practicalfarmers.org/2016-annual-conference.

Sustainability Fellows Visit the Cornhusker State

Sustainable Agriculture Fellows headed into the field with Jim Knopik's cow herd to see how mob grazing and other sustainable ranching practices have influenced the soil, plant life, and wildlife on his Nebraska ranch. Photo by Marie Flanagan.



Nebraska's landscape is one of distant horizons, rolling plains, sandy hills, and acre after acre of agriculture. In a state where ninety-three percent of the state's land is in production agriculture, cattle ranches span thousands of acres, and local food systems are on the rise, learning opportunities abounded for a group of educators like the Sustainable Agriculture Fellows.

The Sustainable Agriculture Fellows program is a two-year training opportunity in sustainable agriculture for Extension workers. Supported by SARE and the National Association of County Agricultural Agents (NACAA), the program enhances understanding of sustainable agriculture and provides broad-based, national exposure to successful and unique sustainable agriculture programs. This fall, the fellows embarked on an agricultural tour of Nebraska, and took an in-depth look at one Nebraska family farm.

Tour stops included Nebraska farms, ranches, and educational institutions, including: the Horticulture Department and the Institute for the Culinary Arts at Metro Community College in Omaha, the University of Nebraska-Lincoln's Innovation Campus, Shadowbrook Farm's high tunnels and creamery near Denton, the McLean family farm and feedlot near Benedict, Jim Knopik's mob grazing ranch near

Fullerton, The Grain Place, (an organic farm and processing plant in Marquette), the Berns' family farm and cover crop seed business near Bladen, and the Raising Nebraska Building at the Nebraska State Fair Grounds. Facilitated conversation kept the fellows engaged during locally-sourced meals and van rides across the hills and plains of Nebraska.

The Fellows used a training tool developed by the Northeast SARE program called "Reading the Farm" to review detailed farm information, observe, and engage in facilitated discussion with Kevin Loth and Charuth Van Beuzekom Loth of Shadowbrook Farm and Dutch Girl Creamery near Denton, Nebraska. During the Reading the Farm exercise the Fellows met with the Loth family, and shared knowledge and insights within the context of the Loth's vegetable farm and goat's milk creamery businesses. After the tour, the fellows provided a written report summarizing their feedback for Shadowbrook Farm and Dutch Girl Creamery. That kind of engagement with producers and other Extension agents is one of the main draws to the Sustainable Agriculture Fellows program.

As we walked through pasture grasses at Jim Knopik's ranch the day after the Reading the Farm exercise, Utah State University Extension agent and 2013 Fellow, Matt Palmer, reflected on the program, and explained how the

Reading the Farm exercises have improved his interactions with farmers and have helped him better meet the needs of his local clientele.

"It has been very valuable," explained Palmer. "When I go back to the county that I'm from and I view farms, I understand how my recommendations interact with their other enterprises. I'm more apt to take a holistic view of their farm."

Before sitting down to talk about cover crops with the Berns family at Green Cover Seed, University of Missouri Regional Horticultural Specialist and 2014 Fellow Patrick Byers echoed Palmer's sentiments, saying that the Sustainable Agriculture Fellows program has fulfilled his expectations and more.

"I've worked with farmers for many years," said Byers. "This was a chance to delve more deeply into all aspects of sustainability and to build my skills as a person who is empathetic to the realities of sustainability for the farmers that I serve...I really can't say enough things about what it has meant to me to be a Fellow."

Curious about the Sustainable Agriculture Fellows program and the Reading the Farm tool? Learn about the people and the program online at www.sare.org/fellows.

Beth Bedell Announces Retirement

The staff of NCR-SARE would like to extend a hearty congratulations and a heartfelt thank you to Beth Bedell, who retired from the NCR-SARE program in December 2015. Bedell came to the NCR-SARE program in 2007 as an Associate Administrator after working as an Organic Certification Program Coordinator with the Minnesota Crop Improvement Association. During her tenure with NCR-SARE, Bedell worked diligently to streamline program and accounting processes, making the program more efficient and effective for grant recipients and staff. Looking forward to retirement, Bedell is planning on travelling more and devoting time to other interests. Best of luck on your new adventures, Beth.

NCR-SARE staff (left to right): Beth Nelson, Rob Myers, Joan Benjamin, Beth Bedell, Marie Flanagan, and (top right) Jean Andreasen. Photo by Diane Mayerfeld.



Illinois Students Show Garden PRIDE

Freeport High School students learned about sustainable vegetable production and marketing through their SARE-supported PRIDE Garden. Photo by Monica Pierce.



At an Illinois high school where the team mascot is a pretzel, you might expect to find a bunch of good-natured Midwesterners. And while that may be true, the students, teachers, and volunteers at Freeport High School in Freeport, Illinois are anything but lighthearted when it comes to growing and selling food from their student-run garden, which they named PRIDE (Positive, Respectful, Impressive, Disciplined, Educated).

Freeport High School FFA adviser and agriculture teacher Monica Pierce was hired as the agriculture instructor at Freeport three years ago. Having recently completed her Master's degree thesis research on the effects that urban youth gardening programs can have on urban youth, she was aware that youth gardening programs can positively influence youth's leadership skills, preference of eating fruits and vegetables, and skills and knowledge related to agriculture. She was excited to bring that type of program to Freeport High School.

In 2013, Pierce received a \$1,997 NCR-SARE Youth Educator grant to establish a student farm and community supported agriculture operation (CSA) to educate Freeport High School students about sustainable vegetable production, as well as sustainable marketing options for small farm businesses. Pierce hoped that the garden would provide practical applications for the theoretical concepts taught in the classroom, and so far she has been pleased with the results of Freeport's PRIDE Garden and community supported agriculture (CSA) program.

"Prior to this grant, I was working as a classroom agriculture teacher," explained Pierce. "We would talk about sustainable agriculture in the classroom setting, but students were not able to engage in hands-on

sustainable agricultural production. With the garden, the students have experience to build knowledge on."

According to Pierce, the number of Freeport High School students enrolled in agricultural courses and the number of students engaged in the garden has steadily increased since the program started. In the first year, 21 students were enrolled in agriculture courses, for the second year, that number increased to 50, and for the third year, that number increased to 65. Likewise, during the first year, 4 students worked in the garden during the summer, for the second year 8 students worked in the garden, and during the 2015 growing season, they had 12 students in the garden. Not only are the students engaged, but they take ownership and pride in their work in the garden and the CSA, according to Pierce.

Students learn about all three pillars of sustainability (social, financial, and environmental) through the program. The program strives to be economically sustainable using produce sales and the CSA to cover the operating costs of the farm, and the program works toward environmental sustainability as they manage the farm using sustainable practices such as crop rotation, organic fertilization, and composting. PRIDE staff and volunteers work to make the program socially sustainable by helping students enjoy the work and build friendships across racial lines.

"The most impressive result of this project is how proud the students are of the garden," said Pierce. "We always take a minute at the end of our work day to admire our work for that day. This pride fuels purpose into our work. The more that they learn about the crops and how to take care of them, the more excited they are to tell people about

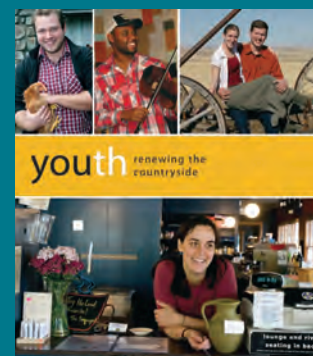
it, and the more they want to make sure that it is being cared for properly."

Looking forward, Pierce is excited about opportunities for collaboration with other area youth programs including a child welfare institution providing residential housing to female youth in need of psychological treatment, and as a volunteer site with the Department of Corrections for teens to engage in community service as part of their correction plan. Pierce expressed hopefulness about the future program and gratitude for the grants and donations they have received, including their SARE grant.

"All of this excitement, for some, comes from an experience that these you might not have had without the support of SARE," said a grateful Pierce. "This pride and excitement may have been left untapped, but luckily, because of your support, we have been able to tap these results out of our wonderful students."

Learn more about Pierce's NCR-SARE Youth Educator project online at www.facebook.com/FreeportStudentFarm/ or on the SARE project reporting website. Simply search by the project number YENC13-065, at <http://mysare.sare.org/> or contact the NCR-SARE office for more information at ncrsare@umn.edu.

Youth Renewing the Countryside profiles 50 inspiring young people—one from every state—who are revitalizing rural America with new enterprises. Read the book for free online at www.sare.org/Youth-Renewing-the-Countryside



Researchers Aim to Conserve Bees for Michigan Berry Growers

When developing risk management strategies, more and more farmers are concerned with native bee habitat preservation. We know that 70 percent of the world's flowering plants, including more than two-thirds of the world's crop species, rely on pollinators to reproduce. In a state that leads nationwide production of blueberries and tart cherries, researchers at the Berry Crops Entomology lab at Michigan State University (MSU) are working on basic questions about insect ecology and management that have practical applications for berry growers.

Emily May is a Pollinator Conservation Specialist for the Xerces Society for Invertebrate Conservation. She is also a recent graduate of MSU, where she did Master's degree work examining the threats to the bees that highbush blueberry growers need, including habitat loss and exposure to pesticides. In 2013, May applied for and received a \$9,962 NCR-SARE Graduate Student grant to study bee communities in highbush blueberries.

"Previous work in our lab had established that the wild bee communities around blueberry fields in southwest Michigan are diverse (over 100 species of bees present during bloom) and have the potential to respond well to conservation-oriented management such as the installation of wildflower plantings," said May. "For this project, we wanted to look at the interactive effects of resources and stressors to determine the best management strategies for conserving wild bee communities on blueberry farms."

With the SARE funds, May was able to assess how the intensity of insecticide applications affects native bees foraging on highbush blueberry, to determine the effects of wildflower plantings on soil-nesting bee communities, and to develop educational resources on how to minimize the effects of pest management activities on beneficial insects.

Insecticide Risk

May's results suggest that the intensity of insecticide use in highbush blueberry can affect the biodiversity of wild bee communities living in and around blueberry fields.

"It is possible that the bees driving the decline in species richness at sites with higher insecticide use are rare species that are not associated with blueberry pollination," said May. "Once we know more about which species are most at risk, we can develop better strategies for conserving bees on farms with intensive pest management practices."

Soil-Nesting Bee Communities

May said that the research team was particularly excited about the results of their bee nesting work, since the locations of bees that nest belowground are inherently difficult to find. With two seasons of fieldwork, they found more bees nesting in the soil in wildflower plantings on blueberry farms than in other habitats around the farms.

"This study complements previous work by showing that bees preferentially nest in these undisturbed wildflower patches, indicating that planting wildflowers may be providing bees with two limiting resources in these landscapes: food and nesting sites," said May. "The results are promising, though further work is needed to assess the true density of bees per square meter across the duration of the growing season."

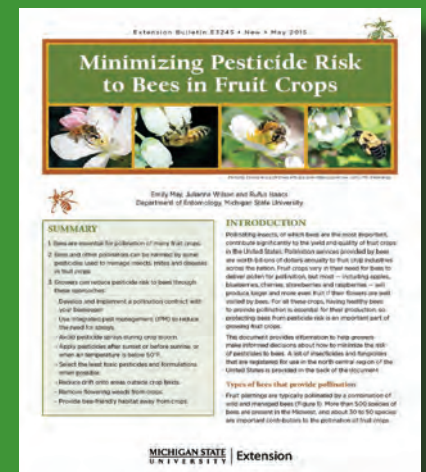
Educational Resources

Approximately 100 farmers attended presentations related to May's project. She said they have also reached about 500 farmers through outreach materials, including a 16-page Extension bulletin called "Minimizing Pesticide Risk to Bees in Fruit Crops."

Read more about this NCR-SARE Graduate Student project online on the SARE project reporting website. Simply search by the project number GNC13-177, at <http://mysare.sare.org/> or contact the NCR-SARE office for more information at ncrsare@umn.edu.



Above: With SARE support, graduate student Emily May studied bee communities in highbush blueberries in Michigan. Photos by Clara Stulgross.



Minimizing Pesticide Risk to Bees in Fruit Crops provides information to help growers make informed decisions about how to minimize the risk of pesticides to bees. A list of insecticides and fungicides that are registered for use in the North Central region of the United States is provided in the back of the document. Read it for free at [http://msue.anr.msu.edu/uploads/resources/pdfs/Minimizing_Pesticide_Risk_to_Bees_in_Fruit_Crops_\(E3245\).pdf](http://msue.anr.msu.edu/uploads/resources/pdfs/Minimizing_Pesticide_Risk_to_Bees_in_Fruit_Crops_(E3245).pdf)



Examining Carbon, Energy, & Climate in North Dakota

by Beth Nelson

Paul Overby implemented practices like no-till and cover crops to improve soil health on his farm in North Dakota. Photo by Beth Nelson.

Bismarck, North Dakota was the starting point for the latest “Food Fuel and Fiber” (FFF) tour—the latest in a series of tours that have followed NCR-SARE’s Regional Professional Development Program (PDP) training “Carbon, Energy and Climate,” held at the Kellogg Biological Station in 2012. FFF tours have been held in several North Central region states and have helped extension educators learn about the latest approaches for improving sustainability of food, fuel, and fiber production

And so, in September, 48 educators gathered in Bismarck, North Dakota. The opening presentation by Glen Muske, a SARE PDP grant recipient and North Dakota Extension educator, set the tone for an emphasis on the “food” aspect. Glen’s grant, “Expanding Opportunities for Sustainable Small Farm Specialty Crop Producers: Training Educators in Feasibility Analysis, Marketing, and Community Building” trained and provided resources to a cohort of educators interested in expanding local food in their area. They provided small start-up funds for specific projects submitted by cohort members, and the result was an impressive list of new regional food production and marketing efforts in North Dakota—everything from establishing winter farmers markets to the new BisMan Community Food Coop, traveling tours, harvest festivals, and efforts to increase farm to school awareness. It was especially gratifying to see the local foods work, since the first NCR regional PDP training focused on “Scaling up Local Food.” At that time, the teams traveling from the western states felt they needed to provide more fundamental support and resources to get basic “local food” efforts up and running. North Dakota seems to be well on its way.

Our first tour step was Burleigh County Soil and Water Conservation District’s Menoken Farm, a research/demonstration farm and educational facility, which has been experimenting with cover crops mixtures and no-till for twelve

years. Their summer field days draw more than 500 educators and practitioners. We moved on to visit the farm of one of the Burleigh collaborating farms, Black Leg Ranch. They made two big management changes in their beef grazing system in order to be able to graze through the winter—they changed their calving date from February to May, and are incorporating lowline genetics into their herd to move to smaller finishing weights. The ranch has also expanded into agritourism with six hunting lodges and a beautifully renovated barn for events—they held a wedding on the ranch every week this past summer. The expansions have allowed the adult children to return to the ranch with their families, and have spread risk among multiple enterprises. Black Leg Ranch stressed how important holistic planning has been for the farm and for the family, and all have participated in Savory’s Holistic Planning training.

We learned about the beginning farmer training from Sue Balcom, director of FARRMS. We then visited the farm of Mike and Lindsay Ostlie, young farmers who had graduated from the training program and were working to specialize in growing garlic and build markets, while experimenting with alternative crops like haskop berries and hops.

At the Carrington Research Extension Center, Steve Zwinger and Frank Kutka introduced us to the research being done on both their

certified organic land at the research center and on-farm, and reported on the cover crop variety trials being supported by SARE grants. We also heard about the sugar beet work being done for ethanol production, since sugar beets tolerate North Dakota’s saline and sodic soils.

Over dinner, we were treated to a research presentation by Justin Zahradka, a senior at NDSU. Justin started research into grazing cover crops four years ago, as part of an FFA youth research project. He’s continued the on-farm project, collecting economic and environmental data, and was recently honored by National FFA for the project by being named the 2015 FFA American Star in Agriscience, one of the highest honors given by FFA.

We continued on to Devil’s Lake, an area that has been adapting to changing water tables and lake levels and changing rainfall patterns—tremendously challenging. Despite these challenges, we visited farms like Paul Overby’s that are “pushing the envelope” for how far north cover crops can be grown; Blaine Schmalz’ diversified farm where he is not only raising organic livestock and organic grains, but building the infrastructure for cleaning and processing organic grains on-farm; and Ruso Ranch, where they switched from raising Durum wheat to grass for livestock grazing, to adapt to the extreme wet climate cycle they now face. They graze pasture 10 months out of the year, and have a good market for their high quality grass-fed beef in Minot.

The tour ended as it began—focused on local food, though this time tour participants were not only able to hear about local food projects, but enjoy the food, catered by Morning Joy Farm and Kitchen, a pasture-based local-market farm and mobile kitchen. As we ate, we reflected on various topics, from the unique challenges of a spread-out population to the geological challenges of the ebb and flow of Devil’s Lake and the sodic/saline soils; it was once again eye-opening to see the diversity of agricultural opportunities and challenges we have in the North Central region.

Steve Zwinger is a research specialist in the agronomy program at the North Dakota State University Carrington Research Extension Center. He has been conducting organic potato research for several years, comparing dryland and irrigated production. Photo by Beth Nelson.



Developing Hazelnut Germplasm for the Upper Midwest

These hazelnut plants in Lake City, Minnesota, have been part of a larger study to identify and propagate high-performing and locally adapted hazelnut plants for the Upper Midwest. Photo courtesy of the Minnesota Clean Energy Resource Team.



Known for the flavor and aroma they lend to coffee, nut pastes, confections, and pastries, the hazelnut is an alternative crop that has garnered interest in the North Central region. Turkey currently produces 75% of the world's hazelnuts, and Oregon's Willamette Valley produces 3%. Growers and researchers are hopeful that hazelnuts can fill a niche in the Upper Midwest as well.

Decades ago, hazelnut breeders crossed the native American hazelnut (*Corylus americana*) with its European cousin (*Corylus avellana*), attempting to combine the productivity of the Europeans with the disease resistance and winter hardiness of the Americans. Lois Braun, a research associate with the University of Minnesota, has been building on their work to develop hazelnuts into a commercial crop in the Upper Midwest. She said the primary obstacle to a viable hazelnut industry in the Upper Midwest is the lack of consistent high quality adapted germplasm. The hazelnuts currently available in this region are seed-propagated, which means that they do not come "true to type." Although genetic diversity is desirable from an ecological perspective, a degree of predictability and uniformity is needed for a commercially viable crop. Almost all woody crops are vegetatively propagated, usually by grafting, which does not work with bush-type American hazelnuts and their hybrids, though it can be used with European hazelnuts, which are trees. Developing methods of vegetative propagation is one of the goals of other members of Braun's hazelnut research team. But first, genotypes that combine all of the traits needed for a commercial crop must be identified—that's Braun's job.

Braun started her hazelnut research as a graduate student working on nitrogen fertilization, which was funded in part by a 2005 NCR-SARE Graduate Student grant. That work led to the realization that improved germplasm was needed, which led to a recently completed 2010 NCR-SARE Research and Education grant on germplasm development.

Braun said her overall goal of working with hazelnuts is to diversify agriculture and enhance ecological and economic sustainability in the Upper Midwest. Woody perennials such as hazelnuts have many ecological benefits.

They cover the soil and protect it from soil erosion year round to reduce runoff and leaching. This protects water quality both from sediments and nutrients. They increase soil carbon sequestration and enhance soil quality, and provide habitat for wildlife. She also pointed out that hazelnuts can help stabilize agricultural incomes because they can provide economic return from windbreaks, shelterbelts, living snow-fences, lake and stream-bank buffers, and marginal land. They are more resilient than annual crops because they are less sensitive to drought and flooding, they have lower requirements for tillage, fertilizers, and pesticides, and timeliness of most of their management practices is not critical.

"The multifunctionality of hazelnuts makes them a potential foundation species for a perennial plant-based bioeconomy," said Braun. "They have a four-tiered high-value potential market: growers may sell them as fresh-eating nuts, as ingredients in processed foods, or for pressing into oil, and may also collect payments for the conservation services they provide."

Braun is part of the Upper Midwest Hazelnut Development Initiative (UMHDI), a group of growers, researchers and extension educators who are working to support the growth and commercialization of the hazelnut industry in the Upper Midwest through grower support, targeted research, and technology transfer. They conduct outreach at conferences, and maintain a website to help keep interested parties informed and connected. According to UMHDI, there are at least 130 hazelnut growers in Wisconsin, Minnesota, and Iowa. UMHDI hosts an annual Upper Midwest Hazelnut Growers Conference that attracts many of these growers.

UMHDI's efforts to develop high-performing and locally-adapted hazelnut cultivars for the Upper Midwest started in 2006 as they scouted for superior hybrid hazelnut (*Corylus avellana* x *americana*) plants on farms and experiment stations in Minnesota, Wisconsin, and Iowa. In 2008, they started to propagate

the best they identified. In 2010 they started a similar process with wild American hazelnuts (*Corylus americana*), which they then started to propagate in 2013.

With new germplasm being added every year, as of fall 2015 the team has assembled a total of 172 accessions in five germplasm performance trials, of which 150 are hybrids, 17 are pure American hazelnuts, and five are named varieties of European hazelnuts. These trials are located at Saint Paul, Lake City and Lamberton, Minnesota, and at Bayfield and Tomahawk, Wisconsin. The next step is to propagate the best genotypes to come out of these trials for further testing, some of it on farms. Because hazelnuts are slow-growing perennials, with a breeding cycle of 17 years, it will be a few years before named varieties are available.

Jason Fischbach, an agriculture agent with the University of Wisconsin Extension and a UMHDl program partner, was recently awarded a \$198,569 NCR-SARE Research and Education grant to take that next step.

"Previous SARE funding established replicated performance trials of superior hazelnut germplasm identified on grower farms," said Fischbach. "This new project will continue the collaborative cultivar development work through establishment of on-farm trials of the best genotypes identified in the performance trials. In addition, this project will develop optimal post-harvest handling practices to optimize product quality and quantify chemical and flavor attributes of candidate hazelnut germplasm to enable market differentiation."

Read more about The Upper Midwest Hazelnut Development Initiative (UMHDI) online at www.midwesthazelnuts.org. Read more about the SARE-supported research mentioned in this story on the SARE project reporting website. Simply search by the project numbers GNC05-042, LNC10-328, and/or LNC15-367 at <http://mysare.sare.org/> or contact the NCR-SARE office for more information at ncrsare@umn.edu.



UMN, BioAgEng Building
1390 Eckles Ave, Suite 120
Saint Paul, MN 55108

Address Service Requested

Nonprofit Org.
U.S. Postage
PAID
Twin Cities, MN
Permit No. 90155



Did you know NCR-SARE is on Facebook, Twitter, and YouTube?
Keep track of our grant opportunities, projects, events, and more.
Search for North Central Region SARE and follow us!



ABOUT NCR-SARE

NCR-SARE has awarded more than \$50 million in competitive grants to farmers and ranchers, researchers, students, educators, public and private institutions, nonprofit groups, and others exploring sustainable agriculture in 12 states across the region.

NCR-SARE funds cutting-edge projects every year through a variety of grant programs.

Are you interested in submitting a proposal for an NCR-SARE grant? Before you write the grant proposal, determine a clear project goal, and engage in sustainable agriculture research on your topic. Need help determining which program is best suited for your project? Go to <http://www.northcentralsare.org/Grants> for more information, or contact the NCR-SARE office.

For more information about any of the NCR-SARE grant programs, go to <http://www.northcentralsare.org/Grants> or contact the NCR-SARE office at 612-626-3113 or ncrsare@umn.edu.

Photo Credits for this issue of Field Notes: Trisha Feiring, Marie Flanagan, Dave Hansen, Emily May, Diane Mayerfeld, Beth Nelson, Monica Pierce, and Clara Stulgross,

GRANT PROGRAM TIMELINES*

Farmer Rancher*

Early August - Call for Proposals Released
Early December - Proposals Due
February - Funding Decisions
Spring - Funds Available to Recipients

Graduate Student*

March - Call for Proposals Released
April - Proposals Due
Late July - Funding Decisions
September - Funds Available to Recipients

Research and Education*

August - Call for Preproposals Released
Late October - Preproposals Due
Late January - Full Proposals Invited
April - Full Proposals Due
Late July - Funding Decisions
Fall - Funds Available to Recipient

Professional Development Program*

February - Call for Proposals Released
April - Proposals Due
Early August - Funding Decisions
October - Funds Available to Recipient

Youth Educator*

Early August: Call for Proposals Released
Mid November: Proposals Due
February: Funding Decisions
Spring: Funds Available to Recipients

Partnership*

Early August: Call for Proposals Released
Late October: Proposals Due
February: Funding Decisions
March: Funds Available to Recipients

*Timelines are subject to change.

NORTH CENTRAL REGION SUSTAINABLE AGRICULTURE
RESEARCH AND EDUCATION PROGRAM

CONTACT INFORMATION

Main Office Phone: 612-626-3113
Email: ncrsare@umn.edu
Online: www.northcentralsare.org



Wildflower plantings provide a habitat for soil-nesting bees. Photo by Emily May.