

Nebraska Farmers Examine Cover Crop Water Usage and No-Till Dryland Cropping Systems

Report summary for trial conducted by Keith Berns, Nebraska

Farmers in Nebraska are researching how cover crops work in the north central region and, particularly, how they affect a dryland cropping system.

Providence Farms, LLC is the joint farming venture of brothers Brian and Keith Berns of Bladen, NE. Brian and Keith, along with their families, farm more than 2,000 acres in south central NE. The farm is about 1/3 pivot irrigated and 2/3 dryland, and has been under continuous no-till production for 10-15 years.

The Bernses were interested in conducting a trial study to measure the water usage of various cover crops seeded into no-till dryland wheat stubble after harvest and measuring the impact of the cover crops on the yield of the following year's crop. In 2007, Keith Berns submitted a proposal to the North Central Region SARE (NCR-SARE) Farmer Rancher Grant Program and was awarded \$5,990 for the on-farm research trial.

"The first question and major concern any dryland farmer has about cover crops is: 'How much water will a cover crop use?'" said Keith Berns. "This project attempted to answer that question regarding the use of cover crops in a dryland no-till cropping system."

The Bernses consulted with cover crop specialists to determine what species to use and what mixtures to consider. Factors that were considered in the selection of cover crops were: cost of seed, ease of seeding, variety, and life span. Based on that criteria, cover crops that were used included broadleaves, grasses, legumes, and mixtures.

The Bernses seeded a 20 foot strip of each selected cover crop into wheat stubble. They planted 50 acres of a cover crop

mix on the same field to be used for grazing trials. They installed soil moisture sensors at three different subsoil levels and took photographs to monitor and catalog the growth and water use of their cover crops and cover crop mixes.

The late summer and early fall of 2008 was a wet period for Providence Farms, but they gleaned some useful data from the moisture use trial study. For instance, cover crop mixes showed less water use than did heavy use crops such as sunflowers and soybeans, and cover crop mix water use charts were similar to the water use chart for wheat stubble alone.

As for trial yields, Berns reported that corn planted into cover crop mixes yielded significantly better than corn planted into plain wheat stubble or a monoculture cover crop, and that corn planted into a monoculture cover crop mixes did not yield significantly less than corn planted into plain wheat stubble. Regarding the grazing trials, cover crop mixes provided high quality late fall and winter supplemental grazing for livestock, according to Berns.

Based on the trial results, Berns believes that cover crop mixes can be beneficial to yield of the next crop. They even developed an online cover crop seed selection tool that allows a farmer to choose from nearly 40 different species of legume, brassica, grass, and broadleaf crops.

"The results of this project have made us firm believers in cover crops," said Berns. "We will continue to experiment with different mixes, seeding rates, and plant species. We also hope to continue to monitor water usage of cover crops and also measure yield in the crop following

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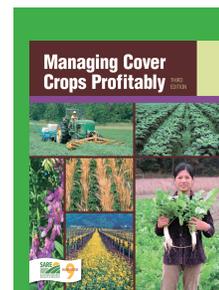


Keith Berns shares information at a cover crop field day. - Photo by Joan Benjamin.

our cover crops."

Providence Farms has spoken publicly nearly 25 times and shared their trial results with more than 1,500 people. They have hosted two on-farm field days. Their work with cover crops has been featured in several articles with others forthcoming. Publications include: *Successful Farmer, Nebraska Farmer, The Furrow, The Leading Edge, Hastings Tribune, and the Blue Hill Leader.*

To obtain more information about the cover crops selected, mixes used, and charts of moisture usage from this NCR-SARE Farmer Rancher Grant project, visit the SARE project reporting website. Simply search by the project number, FNC07-653, at <http://www.mysare.sare.org/> or contact the NCR-SARE office.



Ready to learn more about cover crops? *Managing Cover Crops Profitably* explores how and why cover crops work and provides all the information needed to build cover crops into any farming operation. Download online for free, or order a copy at <http://www.sare.org/Learning-Center/Books/Managing-Cover-Crops-Profitably-3rd-Edition>

SARE's New "Webplex" Opens Door to Sustainable Agriculture



Grant information, videos, books, online courses, profiles of cutting-edge, on-farm research and much more—it's all available with a click of your mouse at SARE's new websites.

Visit any of SARE's redesigned national or regional sites and navigate seamlessly between them to find a wealth of information about where America's farmers, ranchers and ag professionals live and work. A state-of-the-art search function makes it easier than ever to find grant information and dig deep into SARE's library of educational materials, database of research projects and calendar of sustainable ag events in communities across the country.

All sites are mobile-device friendly and offer a bare-bones mirror site for people with slow internet connections. You can also share SARE with RSS feeds, Facebook, Twitter, and other share functions.

Take a Tour of the SARE Sites

SARE Nationwide: www.sare.org

Visit this go-to site for SARE-wide information or seamlessly navigate to regional sites. Stop at the Learning Center for free downloads

of SARE books, bulletins, fact sheets, videos, online courses, and a host of other information products searchable by topic or type.

North Central SARE: www.northcentralsare.org

Live in the Plains states or close by? Visit here for grant information specific to America's central states or read the latest North Central SARE news and research in the region or in each state.

Southern SARE: www.southernare.org

Keep up-to-date on Southern SARE's seven grant opportunities and its professional development program. Read about breakthrough research and upcoming events.

Western SARE: www.westernare.org

Articles, conference proceedings and a host of publications and videos give the latest grant information, news, trends, and research in Western SARE.

Northeast SARE: www.nesare.org

Integration to the webplex is coming soon. In the meantime, visit the current site to learn about grant programs in the Northeast, find helpful resources in the Dig Deeper section, and discover what's happening in your area with the updated State Program pages.

NCR-SARE Welcomes Vance Morey



The North Central Region Sustainable Agriculture Research and Education Program (NCR-SARE) would like to welcome Vance Morey to their staff. Morey has been hired as the Interim Regional Director for the program, replacing Bill Wilcke, who is on disability leave. In addition to serving as the key staff person to the Administrative Council as it develops program goals and make funding decisions, the Regional Director oversees and promotes NCR-SARE to a broad audience. Housed at the University of Minnesota, Saint Paul campus, Morey will provide leadership for the program, supervise staff, and manage grants and budgets.

Morey earned degrees in agricultural engineering from the Michigan State University and Purdue University before becoming a faculty member at the University of Minnesota in 1970. His research has focused on post harvest handling of crops, energy use, and biomass utilization. He has taught a range of courses over the years including processing of agricultural products, food process engineering, engineering computations, and introduction to design.

Morey is a Fellow of the American Society of Agricultural and Biological Engineers. He is also a member of Institute of Food Technologists, Institute for Briquetting and Agglomeration, American Association of Cereal Chemists, American Association for the Advancement of Science, American Society for Engineering Education, and the Council for Agricultural Science and Technology.

Photo courtesy of the Department of Biosystems and Agricultural Engineering in the College of Food, Agricultural and Natural Resources Science at the University of Minnesota.

Changes to NCR-SARE's Grant Programs

NCR-SARE's Administrative Council voted to make changes to some of the NCR-SARE Grant Programs. Some of the changes of note include:

- Farmer and Rancher Grant awards can now be individual (\$7,500 maximum), two-person (\$15,000 maximum), or group (\$22,500 maximum) grants.
- Youth and Youth Educator project duration increased to 24 months.
- Research and Education grant awards can now range from \$10,000 to \$200,000.

Follow instructions in the current year's call for proposals for each grant program. The format specified in the calls for proposals and forms are a little different each year.

Anne, Josh, and Jackson Hauglind at their Wentworth farm. - Photo courtesy of Dakota Rural Action.



Beginning Farmer Program Builds Educational Network in South Dakota

excerpts by Heidi Kolbeck Urlacher

Beginning farmers in South Dakota have a new opportunity to learn first-hand about lowcost, sustainable methods of farming and to gather the tools to successfully launch a farm enterprise thanks to Dakota Rural Action's Farm Beginnings Program.

In 2009 Tonya Haigh and Frank James with Dakota Rural Action submitted a proposal for an NCR-SARE Research and Education Grant and were awarded \$25,000 to evaluate and refine the Farm Beginnings platform, which was developed by the Land Stewardship Project, in order to meet the unique needs of beginning farmers and ranchers in SD. As a result, the SD Beginning Farmer Training and Linking project was developed to build an educational network for beginning farmers in SD.

Eleven families graduated from the 2009-2010 SD Beginning Farmer Training and Linking Program in August 2010. They received 36 hours of classroom instruction on holistic decision making, developing long and short term plans, financial planning, marketing, building a business plan, sustainable farming methods, and connecting to resources. Students were able to participate in Farm Tours and Skills Sessions offered. Five participating families pursued formal mentorship experiences or were employed by established farmers during the course. The SD Farmer Network facilitated informal mentorship for the rest of the participants by providing the opportunity for students to contact established farmers informally to ask advice, seek guidance, or troubleshoot farm-related issues.

Dakota Rural Action staff writer, Heidi Kolbeck-Urlacher, recorded testimonials from two of the programs' graduates. Below are excerpts of their stories.

Aaron Johnson

Aaron Johnson has farming in his blood. His family's farm, Johnson Farms, a 2800 acre operation divided between corn, soybeans, oats, alfalfa, and stock cattle and located south of Madison, SD, has been organic since 1976. But Johnson is just now taking the first steps toward becoming the next generation of organic farmers. A few years ago he had been working contentedly selling seed and agricultural products for Hefty Seeds in Spokane, WA and then in Freeman, SD. Johnson says he would have continued happily in that line of work were it not for an invitation that would change his course of life. He was approached by his cousins, Charlie and Allan, who currently operate Johnson Farms, and presented with an opportunity to come back to the family farm.

"I took a few months to consider it," Johnson said, "and I came to the conclusion that it was a no-brainer. It's a rare opportunity to be asked to come back to the family farm, and farming is something I have always felt called to do. After thinking about it, all signs pointed to yes."

Johnson and his new wife Kirstin enrolled in the Farm Beginnings course hoping to gain skills in financial management, record keeping, and general farm management. They attended the twice-a-month classes, taking in sessions like Whole Farm Planning, Financial Planning, Marketing, and Business Planning, and Connecting with Resources. Along the way they were able to connect with other beginning farmers who were just starting out as well. They graduated from the class in August this year. Since taking

the class they have seen much more communication with family and the farm partners. And they have seen their confidence in farming grow.

And talks are in the works to bring Johnson who has been working up to this point as a farm laborer for his cousins, on as a farm partner.

"I feel so much more prepared and confident about potentially becoming a partner at Johnson Farms, and potentially one day taking over the farming operation," said Johnson. "I have the option of staying on as a laborer or possibly moving to a partner. I could come on with a 10%-20% partnership in Johnson Farms."

This would make him responsible for that percentage of expenses, but he would also receive the same percentage of income. Joining as a partner also makes him more appealing when applying for a loan, as having an investment in the farm makes him less of a financial risk.

Anne Hauglind

Anne Hauglind enrolled in the Farm Beginnings Program last year, and has been attending twice-a-month farmer-led training classes in Brookings since October. The decision to take the Farm Beginnings class came from a desire to "see what farming is all about" said Hauglind. She wanted to gather information about farm management, connect with resources, and learn about new farming ideas. Her husband, Josh, comes from a farm background and Hauglind has a degree in Horticulture, so rural living and farming has always appealed to them, but prior to taking the course they hadn't developed a specific idea and plan for their farming enterprise.

Through the course Hauglind was able to connect with other farm families who were in the process of defining their farm goals, as well as meet established farmers who led the classes and taught subject areas like Whole Farm Planning, Financial Management, Marketing, Business Planning, and Connecting with Resources. Hauglind said it was really good to meet other people who are going through the same struggles, and to recognize the different places each of the students are at in their farm operation. She was also impressed by the level of authenticity and transparency offered by the course presenters. "Where else can you see another farmer's books?" she asked.

Hauglind says the class spurred a lot of dialogue between her and her husband and prompted them to begin thinking about the farm as a whole, rather than just an enterprise.

"The farm isn't just the business, it's made up of everything—you, your family, your lifestyle, and the farm enterprise. It's a whole entity," said Hauglind.

The Hauglinds decision-making process was aided by the course presenters who Hauglind said gave them ideas of what they could do. The Hauglinds see the poultry operation as a launching pad for eventually getting into cattle.

"With chickens you have smaller input and output, but it's a starting point. By the end of five years we'd like to see Josh full-time farming," said Hauglind. "The challenge of course, will be in finding or renting land in order to move into these other areas of production."

Read more about Dakota Rural Action's Farm Beginnings NCR-SARE Research and Education Grant Program project online on the SARE project reporting website. Simply search by the project number, LNC09-311, at <http://www.mysare.sare.org> or contact the NCR-SARE office for more information.



NCR-SARE's Continuing Face of Sustainable Agriculture Project

In 2007, NCR-SARE committed to a new diversity initiative that emphasized building strong relationships with existing programs and organizations that served those that might have been under-served by NCR-SARE. That goal was not only to influence future funding, but also how NCR-SARE would communicate and engage in outreach in the region. NCR-SARE developed a Diversity Goals Narrative to clarify NCR-SARE's goals for its new diversity initiative and initiated a special call for the Diversity Research and Education Grant Program.

The special call for the Diversity Research and Education Grant Program's purpose was to fund people and/or projects that could help NCR-SARE reach and work with underserved audiences to improve agricultural sustainability in the region. Simultaneously, an NCR-SARE Diversity Committee was formed to respond to NCR-SARE's goal to reach and work with underserved audiences.

Barbara Norman, a third generation farmer on her blueberry farm in Van Buren County, MI, was awarded the first ever NCR-SARE Diversity Grant for \$100,000 to develop "The Continuing Face of Sustainable Agriculture" project.

"The Diversity Initiative is a reflection of our acknowledgment that we could use some help in setting up systems and

practices in becoming more diverse and serving more diverse audiences," said Bill Wilcke, Regional Director for NCR-SARE.

In conjunction with NCR-SARE, Norman selected three specific areas to concentrate efforts for this project: Detroit, MI, Kankakee, IL, and the historical farms of Nicodemus, KS, based on demographic data and the potential to build on key relationships with service providers.

Norman collaborated with several service providers including Michigan Integrated Food and Farming Systems (MIFFS) outreach coordinators, Iyabo Farms, and the Kansas Black Farmers Association to reach underserved communities. Organizations in the region such as Kansas State University, Michigan State University, University of Illinois, and other USDA agencies became involved as events were planned. Participants included Detroit urban farmers in Detroit, MI, small-scale African-American farmers in Kankakee County, Hopkins Park Village, and Pembroke Township, IL, and the historic community of African American farmers in Nicodemus, KS.

"Service providers in other states within the north central region are also interested in working with underserved farmers; however, they need the mentoring of an experienced outreach person who can make the connections within the underserved community that lead to successful projects,"

explained Norman. "Leaders in the underserved communities recognize the advantage of receiving mentoring from experienced farmer advocates who can bring them together with the service providers who can help them."

MIFFS outreach staff, Iyabo Farms, and the Kansas Black Farmers Association met with potential leaders and early adopters in the targeted communities, developed partnerships with service providers who showed interest in working with the underserved communities, held grant-writing workshops, and established their project as a means to develop relationships among SARE leaders, adopters of sustainable agriculture concepts, underserved farmers, and service providers.

"This project carried the SARE Sustainable Agriculture story to well over 2,000 small scale, limited-resource producers and families," said Norman. "The Continuing Face of Sustainable Agriculture Project has exposed them to SARE bulletins, pamphlets, books, and grant opportunities."

According to Norman, this project, by the way of outreach and personal mentoring, reached out beyond its targeted geographic areas.

"We have clearly demonstrated a definite no-boundaries, relationship-building project. The sustainable working partnerships and collaborations that have evolved led to a continuing mentoring program with overall regional success," said Norman.

Read more about the Continuing Face of Sustainable Agriculture project online on the SARE Project reporting website. Simply search by the project number, LNC08-307, at <http://www.mysare.sare.org> or contact the NCR-SARE office for more information at ncrsare@umn.edu.

For more NCR-SARE grant project information about Michigan blueberries, turn to page 8 of this newsletter.

"I think this project will contribute tremendously to sustainable agriculture in the region in the long term. The more people we get involved, the more the word will spread. More people will be aware of SARE and what SARE has available. As more farmers see the advantage of working with SARE, it's going to become more exciting."

- Barbara Norman

NCR-SARE Elects New Administrative Council Representatives

Corinne Alexander, Deborah Allen, Mike Anderson, Darin Eastburn, Julie Fox, Vance Owens, Donn Teske and Shaun Vickers are new members of Administrative Council (AC) for the NCR-SARE program this year.

Corrine Alexander will be serving the NCR-SARE Administrative Council as the Indiana Extension representative. Alexander is an Associate Professor of Agriculture Economics at Purdue University and serves as an Extension specialist in the area of grain marketing. Alexander has Extension programs on price risk management and marketing value-added products, with a focus on food-grade grains and organic products.

Professor in the Department of Soil, Water and Climate at the University of Minnesota, Deborah Allen, has been elected to serve as the Minnesota research representative to the NCR-SARE Administrative Council. Among other activities, Allen's present work focuses on effects of alternative cropping systems on soil carbon and nitrogen dynamics and soil quality. Practices she has examined for their effects on soil properties and

plant yields include organic management, reduced tillage, greater plant population densities, use of cover crops, and crop rotations.

Mike Anderson has been elected to serve as the Foundation/Nonprofit representative to the NCR-SARE Administrative Council. Anderson sits on the board of the Ohio Ecological Food & Farm Association, where he used to be an Organic Education Program Coordinator.

Darin Eastburn has been elected to serve as the Illinois research representative to the NCR-SARE Administrative Council. Associate Professor of Plant Pathology at University of Illinois at Urbana-Champaign, Eastburn's research has focused both on understanding factors that influence disease development, as well as evaluating potential disease management strategies.

Julie Fox has been has been elected to serve as the Ohio Extension representative to the NCR-SARE Administrative Council. Fox serves serves as a Tourism Development and Direct Marketing Specialist for The Ohio State University providing leadership for statewide teams to advance economic and community development throughout Ohio.

Professor in Forage Crops Production and Ecology at South Dakota State University,

Vance Owens, has been elected to serve as the South Dakota research representative to the NCR-SARE Administrative Council. Owens' research responsibilities include management and production of forage and biomass crops. Among other activities, Owens serves as the Associate Editor for *Forage and Grazinglands*.

Donn Teske has been elected to serve as the Kansas farmer representative to the NCR-SARE Administrative Council. Teske is the fifth generation of farmers to operate his farm in Northeastern Kansas. Among other activities, he is in his eleventh year as Kansas Farmers Union president and sits on the National Farmers Union board of directors.

Nebraska State Resource Conservationist, Shaun Vickers, has been elected to serve the NCR-SARE Administrative Council as the Natural Resources Conservation Service Representative. Among other activities, Vickers has worked with the Northern Plains Sustainable Agriculture Society in organizing regional meetings and tours dealing with sustainable agriculture topics such as organic farming and hoop houses.

NCR-SARE would like to extend gratitude to the following AC members who either fulfilled their terms or are stepping down: Maurus Brown, David Campbell, Rhonda Janke, Tim Kautza, Rob King, Gary Redding, Robin Salverson, and Cheryl Simmons.

Sustainable Control of Internal Parasites in Small Ruminant Production Fact Sheet

Sheep and goat production is a growing enterprise for small and limited resource farmers. Small ruminants (sheep and goats) are adaptable to many different production systems and can be raised with relatively few inputs, but they face huge production challenges. Control of internal parasites, especially gastrointestinal nematodes including *Haemonchus contortus* (barberpole worm, stomach worm), is a primary concern for many sheep and goat producers and is particularly challenging in humid regions. Grazing animals ingest infective larvae from grass and shorter forages. The larvae develop into adults in the abomasum (true stomach) of ruminants. The adult parasites feed on blood in the abomasum and lay their eggs, which are excreted in the ruminants' feces. The life cycle continues when the eggs hatch and larvae develop on pasture, where they can be ingested by the grazing ruminants.

Internal parasites have become more difficult to manage in small ruminants because of the parasites' increasing resistance to all

available chemical dewormers. Parasite problems negatively impact the animals' health, reduce productivity, and increase treatment costs. Pastures with heavy stocking rates in high-rainfall regions are especially vulnerable to the buildup of parasites. The cost of internal parasite infection includes treatment expense, reduced animal weight gains and performance, and even animal death.

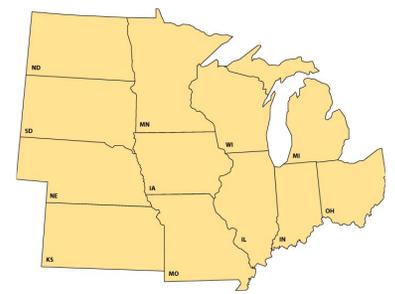
In response, the Southern Consortium for Small Ruminant Parasite Control (SCSRPC) has investigated several methods of sustainable gastrointestinal nematode parasite control, including Smart Drenching (including FAMACHA®), copper oxide wire particles (COWP), condensed tannin-containing plants, specifically sericea lespedeza (*Lespedeza cuneata*), selection of resistant breeds, and other alternative methods.



This fact sheet provides basic information on each approach and cites resources for training and further information. Download for free at <http://sare.org/SmallRuminant> or contact the NCR-SARE office for more information.



Photo by Joan Benjamin.



NCR-SARE In Your State

How is NCR-SARE active in your state?

Did you know SARE supports Extension specialists in every state and island protectorate to serve as local sustainable agriculture resources? These SARE State Coordinators' responsibilities include professional development—promotion, networking and coordination, especially of SARE-related activities—and communication and evaluation.

View documents about SARE grants in your state or learn more about your SARE State Coordinator by visiting SARE online at <http://www.northcentralsare.org/Professional-Development-Program/State-Programs>, or contact the NCR-SARE office.

Grant Advising

Did you know that the Michael Fields Agricultural Institute Grant Advisor can help you apply to grant and cost-share programs of your state or the federal government that could help you improve your farming business?

Contact Grants Advisor, Deirdre Birmingham, at (608) 219-4279 or deirdreb@mindspring.com for more information.

Recently Funded Grants in the NCR

NCR-SARE has made public the lists of projects most recently recommended for funding for each of its grant programs: Farmer Rancher, Research and Education, Professional Development, Graduate Student, and the Farmer Rancher Grant Program's Youth and Youth Educator.

Go to <http://www.northcentralsare.org/Grants/Recent-Grant-Projects> to find links to lists of the projects recently recommended for funding.

NCR-SARE administers these grant programs, each with specific priorities, audiences, and timelines. The focus for each of the NCR-SARE grant programs is on research and education.

Funding considerations are made based on how well the applicant articulates the

nature of the research and/or education components of their sustainable agriculture grant proposals.

NCR-SARE Administrative Council (AC) members decide which projects will receive NCR-SARE funds. A collection of farm and non-farm residents, the AC includes a diverse mix of agricultural stakeholders in our 12 states. Council members hail from regional farms and ranches, the Cooperative Extension Service, universities, and nonprofits.

In addition, regional representatives of the U.S. Department of Agriculture, the Environmental Protection Agency, the Natural Resources Conservation Service, and NCR agribusinesses, state agencies, and foundations sit at the table to distribute grant money.

Since 1988, the USDA's NCR-SARE program has awarded more than \$40 million worth of competitive grants to farmers and ranchers, researchers, educators, public and private institutions, nonprofit groups, and others exploring sustainable agriculture.

NCR-SARE Welcomes Rob Myers

The NCR-SARE program would like to welcome Rob Myers to the NCR-SARE staff. Myers has been hired as the Professional Development Program (PDP) Coordinator for the program, replacing Interim PDP Coordinator Linda Kleinschmit and her predecessor, Paula Ford. The PDP coordinator provides leadership for the region's professional development effort. Myers will work closely with Linda Kleinschmit, who will continue in her role as PDP Associate Coordinator.

Myers did his graduate work at University of Minnesota, obtaining M.S. and Ph.D. degrees in agronomy. Following completion of his Ph.D., he served as a

Congressional Science Fellow, working on the U.S. House of Representatives Agriculture Committee. He then spent five years as a faculty member in agronomy at University of Missouri, subsequently serving as national director of SARE from 1995-97. He grew up on a family farm in central IL and attended Illinois State University as an undergraduate in agricultural science.

Myers will be based in Columbia, MO, where he was previously founder and director of the Thomas Jefferson Agricultural Institute, a nonprofit organization working on crop diversification and agricultural sustainability.



Photo by Amy Myers.



Student Studies Soil Management and Organic Blueberry Production in Michigan

Michigan State University graduate student, Jesse Sadowsky, conducted an observational study to determine the effect of both organic and conventional management on plant health and soil biology in blueberry fields in Michigan.

- Photo by Beth Stuever.

Michigan State University (MSU) graduate student, Jesse Sadowsky, received an NCR-SARE \$9,900 Graduate Student Grant to conduct an observational study to examine the effects of both organic and conventional management on plant health and soil biology in blueberry fields in Michigan. According to USDA-ARS, Michigan is the number one blueberry-producing state in the U.S. However, according to Sadowsky, organic blueberries represented less than 0.3% of the total blueberry acreage in Michigan at the start of Sadowsky's project.

"We realized that comparing already existing certified organic blueberry fields with conventional fields was a great opportunity to address the extent to which microbial communities and some of the biological processes they carry out diverge after organic transition of mature blueberry fields," said Sadowsky.

Sadowsky added that because of their ability to break down and transfer organic nitrogen to the plant, ericoid mycorrhizae may be of particular importance in organic blueberry production, but their presence in blueberry fields has not been assessed under MI conditions. Ericoid mycorrhizae are a symbiotic relationship between fungi and the roots of plants, possessing properties that can improve nutrient uptake.

Materials/Methods

Sadowsky carried out an observational study to describe characteristics of plant and soil health on commercial organic and conventional blueberry production fields in Michigan. His team located a representative sample of certified-organic production fields and matched each with a conventional field. Pairings were based primarily on USDA National Resource Conservation Service (NRCS) soil type, but cultivar and field age were considered and matched as closely as possible. Weed management, fertilization practices, and types of soil amendments applied differed sharply between the organic and conventional fields. Soil, roots, and fruit were collected from each of the growers' fields over two years and five sampling dates. Measured variables included levels of blueberry root colonization by ericoid mycorrhizal fungi, activity of several soil enzymes involved in carbon and nutrient cycling, size of labile soil carbon and nitrogen pools, and incidence of blueberry stem dieback and fruit rot diseases. In addition, a six-month greenhouse experiment investigated how different species of ericoid mycorrhizal fungi and dairy compost or feather meal as nitrogen sources interact to influence growth and mycorrhizal colonization of young blueberry plants.

Results/Outcomes

According to Sadowsky, organically grown fruit had a higher incidence of anthracnose rot while conventionally grown fruit had a higher incidence of alternaria rot. Mycorrhizal colonization levels were significantly higher in organic blueberries.

"To the surprise of some organic growers, ericoid mycorrhizae were abundant on many of the conventional blueberry farms in our study," said Sadowsky. "Because ericoid mycorrhizae are present at moderate to high levels on both organic and conventional blueberry farms, they may play an appreciable role in nutrient uptake on both types of management systems. However, the precise role of ericoid mycorrhizae in intensively managed highbush blueberries remains to be determined in future studies."

Sadowsky also discovered that organic and conventional blueberry production practices differed in their effects on soil processes such as carbon and nitrogen cycling. Although organic and conventional blueberry soils were similar in terms of total organic matter content, pH, and other standard chemical measures, the labile soil carbon cycled more rapidly on organic farms, and both nitrogen-acetylglucosaminidase activity (which acts to mobilize nitrogen from cell walls of dead fungi and many other soil organisms) and the size of the potentially mineralizable nitrogen pool were enhanced by organic management.

"This finding suggests protein-based organic fertilizers could be more likely than compost to elevate late-season nitrogen (N) levels in blueberry fields," said Sadowsky.

A greenhouse experiment demonstrated that inoculation with ericoid mycorrhizal fungi increased shoot growth of plants fertilized with feather meal, while compost enhanced the survival of mycorrhizal fungi. At 165 days after compost and feather meal application, the N-supplying capacity of compost was nearly exhausted while feather meal continued to release N. This finding suggests protein fertilizer is more likely than compost to elevate late-season N levels in blueberry fields, according to Sadowsky.

Conclusions

Sadowsky says that, recognizing that organic and conventional blueberry soils differ on a biological basis has implications for understanding how soils in each management system will respond to management inputs. For example, enriching the pool of potentially mineralizable nitrogen and activity of nitrogen-mobilizing enzymes may be valuable for satisfying crop nutrient needs in organic fields, but may be relatively less important on conventional fields where nitrogen is applied in forms that are immediately available to plants.

"Additionally, we are certain that our interactions with growers throughout the study, including individualized reports that summarized the measures we recorded in their fields, were informative and demonstrate that microbial communities and biological processes in blueberry soils are influenced both by inherent field characteristics and the grower's approach to management," said Sadowsky.

Read more about Sadowsky's NCR-SARE Graduate Student Grant Program project online on the SARE project reporting website. Simply search by the project number, GNC08-099, at <http://www.mysare.sare.org> or contact the NCR-SARE office for more information.



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ABOUT NCR-SARE

NCR-SARE has awarded more than \$40 million worth of competitive grants to farmers and ranchers, researchers, students, educators, public and private institutions, nonprofit groups, and others exploring sustainable agriculture in 12 states.

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

Are you interested in becoming a project coordinator for a 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.

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GRANT PROGRAM TIMELINES*

Farmer Rancher Grant Timeline

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

Graduate Student Grant Timeline

Fall - Call for Proposals
January - Proposals Due
March - Funding Decisions
Fall - Funds Available to Recipients

Research and Education Grant Timeline

April - Call for Pre-Proposals
June - Pre-Proposals Due
Early Fall - Preproposal Status Notification
Late Fall - Full Proposals Due
March - Funding Decisions Made
Fall - Funds Available to Recipient

Professional Development Grant Timeline

Late March - Call for Pre-Proposals
Late May - Pre-Proposals Due
Late June - Preproposal Notification
Late August - Full Proposals Due
November - Funding Decisions Made
Early Spring - Funds Available to Recipient

Youth and Youth Educator Grant Timeline

Early August - Call for Proposals
Mid January - Proposals Due
March - Funding Decisions
Spring - Funds Available to Recipients

*Timelines are subject to change.

NORTH CENTRAL REGION SUSTAINABLE AGRICULTURE RESEARCH AND EDUCATION PROGRAM CONTACT INFORMATION

Phone: 612-626-3113

Email: ncrsare@umn.edu

<http://www.northcentralsare.org/>

SARE Outreach: <http://www.sare.org/>



Photo by Zac Wedemeyer.