

NCR-SARE Farmers Forum

2018 HIGHLIGHT



www.northcentralsare.org

The North Central Region-Sustainable Agriculture Research and Education (NCR-SARE) Farmers Forum is an annual event that gives NCR-SARE grant recipients the chance to share information about sustainable agriculture practices with a regional audience. The talks focus on research, demonstration, and education projects that promote sustainable farming and ranching. The projects emphasize the three pillars of sustainable agriculture: environmental stewardship, profitability, and social responsibility.

This highlight is a summary of reports and presentations from the NCR-SARE Farmers Forums held at the 2018 Wisconsin Fruit and Vegetable Growers Conference and the 2018 Indiana Small Farm Conference. These events featured speakers who received awards from NCR-SARE's grant programs. To read the full reports from these projects, go to the national SARE website at <https://projects.sare.org/search-projects/> and use the project number (e.g., FNC10-809) to read more about the project. You can view videos of these presentations online at www.youtube.com/user/NCRSAREvideo.

The next Farmers Forums will be held at the 2019 Michigan Food and Farming Systems Conference and the Nebraska Sustainable Agriculture Society's 2019 Healthy Farms Conference.

NCR-SARE is a United States Department of Agriculture–National Institute of Food and Agriculture (USDA-NIFA) program that supports and promotes sustainable farming and ranching by offering competitive grants and educational opportunities for farmers and ranchers, researchers, educators, students, institutions, organizations, and others exploring sustainable agriculture. Visit the NCR-SARE website to see a calendar of events, educational resources, grant opportunities, and more at www.northcentralsare.org.

ONC17-025 Michigan State University – Daniel Brainard

Cultivating Partnerships: Building Farm-Research Networks for Improved Physical Weed Control

OBJECTIVE: to broaden understanding of new physical weed control tools and techniques.

RESULTS: Managing and controlling weeds can be a challenge and a frustration for farmers, no matter the farm size or crop. Associate professor of horticulture at Michigan State University, Daniel Brainard, knows that weed management represents a major barrier to sustainable production of both field and vegetable crops. Brainard has been researching new tools and techniques for physical weed control (PWC), and he's starting to share the results.

In 2017, Brainard received a \$25,595 NCR-SARE Partnership grant to bring together growers and researchers in the North Central region to improve understanding and adoption of PWC tools. Shortly after receiving the grant, Brainard and a team of farmers and researchers traveled to Switzerland in April 2017 to a meeting of the Physical and Cultural Weed Control Working Group of the European Weed Research Society. They collected video footage of various tools in action, and recorded interviews of farmers and manufacturers describing the best use of these tools. They tested some of the European tools and techniques on-farm, and demonstrated them locally at their Midwest Mechanical Weed Control field day held in Holt, Michigan in September 2017, which had 140 participants, 100 of whom were farmers. They focused their demonstrations on in-row mechanical cultivation with torsion weeders, flex tine cultivators, and finger weeders:

- The torsion weeder is an in-row cultivation tool that can be set up to be used on multiple or single row systems. It can be used in a variety of systems.
- The flex tine cultivator is a blind and in-between-row cultivation tool (blind cultivation occurs before a crop emerges).



With SARE-supported research and demonstrations, Dan Brainard and his team at Michigan State University have developed new resources for farmers about physical weed control. Photo by Rene Kiss.

It was traditionally designed to be used in small grains but can be used in a wide range of crops to control small weeds.

- The finger weeder is an in-row cultivation implement that can be used for multiple row systems and walk behind tractors. It can be used in direct-seeded or transplanted crops.

“The consensus from both on-farm and research-farm trials was that the finger weeder and flex tine weeders are versatile tools that work well on a wide range of transplanted and large-seeded direct-seeded crops,” said Brainard. “Although the torsion weeder can also work extremely well under the right conditions, it is more difficult to calibrate and integrate into diverse farming systems, and works well under a narrower set of soil and environmental conditions.”

The project is ongoing, but thus far Brainard and his team have created videos demonstrating each of the tools in the field. Watch the videos online at <https://www.northcentralsare.org/Educational-Resources/SARE-Project-Products/In-Row-Mechanical-Weed-Control-Options-for-Farmers-Large-and-Small> (see related story on page 3).

FNC15-1015

Morristown, Indiana – Amy Surburg

Investigation into a Year-Round Complimentary Broiler and Vegetable Farm Enterprise using Mobile High Tunnels

OBJECTIVE: to design and build a mobile greenhouse to accommodate chickens and turkeys in the summer and vegetables in the winter.

RESULTS: From improving soil health to diversifying income streams on the farm, vegetable growers have plenty of reasons for adding poultry to their farms. Amy Surburg of Berry Goods Farm in Morristown, Indiana, wanted to integrate poultry production with winter vegetable production, and she wanted to build a hybrid mobile coop/greenhouse that could be used for chickens and turkeys in the summer and for growing vegetables through the winter.

With a \$7,467 Farmer Rancher grant from NCR-SARE, Surburg and her dad designed a mobile “coop house” that can be used for chickens in the spring/summer, turkeys in the summer/fall, and then washed and used to cover pre-planted fall greens.

“The mobile ‘coop house’ is a versatile design well suited to a small farm and/or urban market garden setting,” reported Surburg. “It allows the farmer to utilize the house for chickens in the summer and high tunnel type growing in winter with very low input costs to build. The ability to move these houses has been a significant advantage for pest population control and for controlling exactly where the chicken manure is applied to the field. In our case, we move the chicken houses between rows of blackberries in early spring and through fields that we plan to rotate into vegetables in the next two years.”



Amy Surburg's “coop houses” can be joined together to make one larger hoop house, with both ends sliding over the crops on either side so as not to damage pre-planted greens. Photo by Amy Surburg.

FNC16-1028 East Jordan, Michigan – Aaron Brower

Optimal Flock Size for Pasture Raised Layers

OBJECTIVE: to test what effect pasture poultry flock size has on production and health.

RESULTS: A number of growers, especially those on small or mid-scale diversified farms, are choosing to raise poultry in alternative ways, many of them reliant upon pasture. Aaron Brower, along with his wife Mary, own and operate Bluestem Farm, a diversified, 4-season farm in Northern lower Michigan. They raise certified organic vegetables on 10 acres. They also raise approximately 1,000 layers, 60 pigs and 1,500 broilers on pasture each year. They keep their chickens in portable houses surrounded by portable electric fences.

In 2016, Brower received a \$7,394 NCR-SARE Farmer Rancher grant to compare three pastured poultry flocks (100, 250, 450) in order to test what affect the size of the flock has on production and health. He wanted it to serve as an example to producers who are considering pasturing their layers and provide insights for safely raising productive laying hens.

In 2016, the three flocks went out to pasture when the fields were ready in April. For the first 2 ½ months they performed similarly. That summer, the 100 layer flock did not struggle nearly as much as the other two flocks in the unusual summer heat. Brower learned from other producers that it was important that the layers’ drinking water not be too hot and that they have ample access to their feeders and waterers during high temperatures. He explained that the birds primarily eat and drink during the cooler parts of the day, and it is important that there is ample space for them to satiate themselves without competition or stress. They increased the amount of feeder and waterer space in the larger flocks, and made adjustments to ensure that the water did not get too hot. They added extra cover for shade and predator protection. With these added adjustments, and a cooler summer, they did not see any significant differences in production between the three sized flocks in 2017.

“What is the optimal layer flock size? Is smaller better? My conclusion for the moment is that size does not matter,” reported Brower. “What



Bluestem Farm's “chicken ships” are on trailers that are moved with a tractor or truck. Each of these ships contains roosts, nest boxes, feeders, and waterers.

PHOTO BY AARON BROWER

matters is that every bird have ample space to eat and drink to reduce stress. There needs to be plenty of shade for every bird and protection from predation to the greatest extent possible.”

That could beg the question, why not confine them to a barn and give them everything they need for optimal performance?

“Our answer is that we place a great deal of value on raising chickens on pasture,” said Brower. “We want them to have a life out of doors with constant access to grass and sunshine as much of the year that our climate allows. Because of this, we open our birds up to a higher degree of predation and stress from the elements. It is our duty as stewards to minimize the dangers and stresses of predation and climate to the greatest degree possible within our systems.”



“Profitable Poultry: Raising Birds on Pasture,” features farmer experiences plus the latest research in a guide to raising chickens and turkeys using pens, movable fencing, and pastures. It’s available for free at www.sare.org/Learning-Center/Bulletins/Profitable-Poultry.

Green Tools: Improving Sustainability by Integrating New In-Row Cultivation Equipment and Competitive Cultivars

OBJECTIVE: to generate useful, farm tested, and detailed observations on the best methods and tools for managing in-row weeds.

RESULTS: Several states across the North Central region including Illinois, Indiana, Iowa, Michigan, Minnesota, Missouri, Ohio, and Wisconsin are commonly referred to as the “corn belt” due to the vast amounts of corn they produce, but did you know that Michigan, Minnesota, and Wisconsin are among the top ten vegetable-producing states in the country (USDA-NASS 2018)? Michigan State University (MSU) graduate student, Sam Hitchcock Tilton, says often the greatest expense in vegetable production is weed control, especially within the crop row. He says in-row tools can substantially reduce hand-weeding costs for vegetable growers, and he’s been learning about new tools with MSU associate professor Daniel Brainard (see related story on page 1 of the Farmer’s Forum Highlight).

“Newer in-row weeding tools from Europe have become available,” said Hitchcock Tilton. “These tools are widely used in Europe. But there is little documented experience of these tools in the U.S. We wanted to trial these new in-row tools and some old ones to see how they can best be used, whether they work better in combination, and their overall promise for growers.”

In 2016, Hitchcock Tilton received an \$11,994 NCR-SARE Graduate Student grant to test a variety of in-row cultivation tools on eight cultivars of carrots.

“We chose to trial the tools in carrots – a slow-growing, tender and popular crop, hoping that carrots would provide a good reflection of the strengths and weaknesses of each tool,” explained Hitchcock Tilton.

Working with MSU’s Dan Brainard, Hitchcock Tilton tested torsion weeders, flex tine cultivators, finger weeders, and disc hillers. He found that in-row tools reduced hand-weeding costs for both small and large vegetable growers, and that combining hilling discs with finger weeders resulted in the least amount of hand-weeding. He says for these tools to work it was essential that the crop was larger than the weeds and that the seedbed had been well-prepared. Regarding the carrot cultivars, he said that although they did discover that certain cultivars of carrots were more cultivation tolerant, their



PHOTO BY NICOLE SOLDANI

With support from SARE, Sam Hitchcock Tilton is working to generate useful, farm tested, and detailed observations on the best methods and tools for managing in-row weeds at Michigan State University.

results were not conclusive enough to make recommendations regarding carrot cultivars. In addition to field trials, Hitchcock Tilton demonstrated the in-row weeding tools to farmers through field days, print magazines, and a podcast appearance. A series of online videos demonstrating the tools in the field can be viewed online at www.northcentralsare.org/In-Row-Mechanical-Weed-Control-Videos.

“The MSU researchers brought a pair of finger weeders to my farm, and the clamps so that they would attach to my tractor,” recalled a vegetable grower from Michigan. “These finger weeders really were able to remove weeds in the row in many of my established crops, and I look forward to trying them in a lot of other applications.”

There will be another Midwest Mechanical Weed Control Field Day in Atlanta, Illinois on September 26, 2018. Email Hitchcock Tilton for more info at hitchc32@msu.edu.



Steel in the Field presents what farmers and researchers have learned about cutting weed-control costs through improved cultivation tools, cover crops, and new cropping rotations. Download it for free at www.sare.org/Learning-Center/Books/Steel-in-the-Field.

Wooster, Ohio – Monica Bongue

Development of a Cooperative Food Distribution Model for Small Farms

OBJECTIVE: to create a sustainable marketplace for the members of a cooperative, and provide fresh and healthy food that is sustainably grown to customers.

RESULTS: Monica Bongue owns Muddy Fork Farm in Wooster Ohio, a certified organic farm for more than 15 years, where she raises vegetables, chickens, ducks, sheep, and goats. She wanted to expand her marketing which consisted of direct sales through farmers’ markets and a small, on-farm CSA. Along with a number of other small, local producers, Bongue received a \$22,500 NCR-SARE Farmer Rancher grant to develop a cooperative food distribution system to connect small growers in her rural area to consumers in nearby urban areas.

“In our rural communities people who care about local food choices have their own gardens, or go to farm stands or local farmer’s markets,” explained Bongue. “Specialty produce growers can produce a lot more food than there is a market for in the community, so it is important to reach to the urban markets. It is possible to do one or two city markets as independent farmers, but a collaborative effort can help reach more of the urban market with less work and more efficiency of production.”

In 2013, the group established a trial CSA with a target market of Cleveland and Akron. They eventually grew into Farm Roots, a multi-farm cooperative that aggregated produce at Local Roots Market and Cafe, where they could package and distribute their CSA shares. They built a relationship with the J. M. Smucker Corporation, and created a CSA program for 45 of the company’s employees. They even set up a program that allowed customers to donate CSA shares to People to People Ministries, a local food bank.

Four years after the grant project was completed, in 2017, Farm Roots dissolved due to organizational and personnel changes. They transferred their remaining funds to a non-profit, A Whole Community Inc., which is continuing some of the community food work that was important to Farm Roots. Bongue continues to direct market her produce with Muddy Fork Farm.

LNC16-380

The Ohio State University – Matthew Kleinhenz

Resources that Help Sustainable-Organic Vegetable Growers Select, Use, and Evaluate Microbe-containing Crop Stimulants (MCCSs) More Effectively

OBJECTIVE: to limit the significant challenges farmers face in making the best use of MCCSs.

RESULTS: The decomposition of organic matter relies on bacteria and fungi that are commonly referred to as soil microbes. Matthew Kleinhenz, The Ohio State University professor and extension specialist, says many microbes are included as leading components of microbe-containing crop stimulants (MCCSs) advertised to enhance soil and crop health, accelerate soil nutrient cycling, and improve crop quality.

“MCCSs appeal to ever-greater numbers of sustainable-organic farmers (SOFs),” said Kleinhenz. “The challenge, however, is that MCCSs are numerous, diverse, and often expensive to apply. Also, most MCCS labels offer little help when selecting or using products.”

In 2016, Kleinhenz received a \$198,842 NCR-SARE Research and Education grant to identify and develop resources for selecting, using, and evaluating the benefits of MCCS to help SOFs and their advisors. The project is ongoing, but Kleinhenz is currently partnering with SOFs, organizations, MCCS manufacturers, and extension-research colleagues to develop technically rigorous, consensus-based, and user-oriented resources.

“Overall, we will improve farmers’ immediate capacities to sensibly and reliably integrate MCCSs into their toolboxes,” said Kleinhenz. “Material, digital, and human networking resources will insure that new research-based information is widely available in user-friendly formats.”

The team has created a list-serv, hosted call-in conversations about practical issues around MCCSs, and has developed a “Bugs in a Jug” website where they’ve posted recordings of the call-in conversations as well as other resources. Visit the site online at <http://u.osu.edu/vegprolab/research-areas/vegebiostimferts/>.

FNC16-1041 Grand Rapids, Michigan – Lance Kraai

Evaluating On-Farm Value-Added Production in Utilizing Unmarketable Produce to Reduce Waste While Helping Small Farms Engage in Agritourism and Become More Profitable

OBJECTIVE: to demonstrate that on-site, value-added production can increase small farm financial viability while also reducing waste by utilizing seconds produce in value-added production.

RESULTS: On a three-acre urban farm in northeast Grand Rapids, Michigan, Lance Kraai is growing produce and jobs. In 2012, Kraai helped start New City Neighbors urban farm to expand the non-profit’s already successful youth employment work. Beyond growing and selling produce to their 200 member CSA, Kraai has explored profitable value-added opportunities available for the non-profit’s farm. Employing youth, they make a variety of value-added items, and have constructed a wood-fired pizza oven and an outdoor cafe for serving pizzas.

In 2016, Kraai received a \$7,379 NCR-SARE Farmer Rancher grant to demonstrate how on-site, value-added production could increase small farm financial viability. With SARE support, he tracked data comparing the production of condiments, soups, and wood-fired pizzas. He also evaluated which product best utilized produce.

Kraai reported that they made \$32.12 per employee hour while making soup, compared to \$22.67 while making pizza, and \$16.87 while making condiments. He noted this number does not include the costs associated with the initial or maintenance costs of a commercial kitchen (they have access to one through their

parent organization). The number is the result of total revenue, with non-farm ingredient costs deducted, divided by total employee hours. As for produce utilization efficiency, Kraai reported that 97.6% of the total product was from farm seconds for condiments, 92.3% of the soups were from seconds, and 76.1% of pizzas were from seconds (pizza required the most off-farm ingredients like dough, cheese, and oil).

“While the margins were best for soup, and while condiments best used seconds, in 2017 the largest demand at our pop up cafe was for wood-fired pizza,” reported Kraai. “In 2017, we piloted seven Thursday afternoon pop up cafes. We sold soup, baked goods, salads, and wood-fired pizza. We grossed \$16,920 in total sales from these seven events. \$8,710 of these sales were from pizza compared to only \$1,823 from soups. Remaining revenue was from baked goods, salads, and drinks. We also saw that the pizza sales brought in new customers that were not currently farm shareholders. Soup did not have enough appeal to bring in new customers.”

Kraai plans to increase pizza and soup production in 2018 with 15 pizza events, and a soup share option as an add-on to their vegetable CSA.



Lance Kraai used his background in construction to build a pizza oven at New City Urban Farm in Grand Rapids, Michigan. It cost \$4,000 in materials and took 80 hours to construct. 10 youth employees help make and sell the pizzas on-site.

PHOTOS BY LANCE KRAAI

Sustainable Pest Management Approaches for Raspberry Growers

OBJECTIVE: to determine if protective structures can allow for innovative and sustainable pest management practices, including the use of specialty plastics and physical exclusion.

PHOTO BY KURT STEPNITZ



Heather Leach (far left) is researching alternative control methods for spotted wing *Drosophila* as a graduate student at Michigan State University.

RESULTS: Spotted wing *Drosophila* (SWD) (*Drosophila suzukii*) is a gnat-sized fly that will damage ripe or ripening fruits such as raspberries, strawberries, and blueberries. Heather Leach, a Michigan State University graduate student in Rufus Isaacs' Berry Crops Entomology lab says that in 2014, SWD caused estimated economic losses of \$159 million in U.S. raspberry production (Burrack et al., unpublished data). The main control method is pesticide applications. Because SWD has rapid population growth, growers often spray insecticides weekly during harvest, abandoning their sustainable integrated pest management programs (Lee et al. 2011).

Leach is working on an integrated pest management scheme for SWD in raspberries in high tunnels, using specialty plastics and insect exclusion netting. In 2015, Leach received a \$9,979 NCR-SARE Graduate Student grant to explore alternative controls for managing SWD, including ultraviolet-reducing plastics and exclusion netting. She conducted her work both at the Horticultural Teaching and Research Center in East Lansing, Michigan and on a commercial farm.

"Few alternative controls beyond chemical control exist for control of this pest, and new management techniques are needed," said Leach. "Growing berries under protected culture is a new and growing method for season extension, but may also be a way to control this invasive fly and other pests."

Leach reported that reducing ultraviolet light did not impact SWD populations significantly, but it did extend the residues of some chemicals on the leaves of raspberries.

As for the exclusion netting, while none of the netted treatments using 80 gram Tek-Knit netting maintained zero SWD captures in the traps, the overall level of infestation remained lower in the netted tunnels than in the open tunnels; exclusion netting resulted in an average reduction of 73% and a four-week delay in the arrival of SWD in high tunnels. Leach says there was little effect on the quality of the raspberries grown under the netted high tunnels.

"Exclusion netting can be a viable way to reduce SWD and other pests without negatively affecting the fruit quality in high tunnel raspberry production," said Leach. "Moreover, we found that the exclusion netting resulted in a delay in the arrival of SWD, which could eliminate SWD in the summer crop of raspberries entirely. Delaying the arrival of SWD also reduces the amount of insecticide that needs to be applied during this time, reducing costs and risk to pollinators. This is one of the first alternative management tactics proposed for SWD that could be used in place of chemical management."



This fact sheet describes some new approaches to control of spotted wing *Drosophila* that are currently in development at MSU by Leach and other researchers. It covers the cultural, biological, and chemical control of spotted wing *Drosophila* in organic crops, and highlights multiple ways that organic producers of various sizes can integrate non-chemical control practices into their farming. Download it for free at www.northcentralsare.org/Leach-MSU-SWD.

University of Minnesota – Eric Middleton

Maximizing Pollinator Protection and Natural Pest Suppression in Minnesota Fruit and Vegetable Crops

OBJECTIVE: to determine effects that these floral plantings have on beneficial insects.

RESULTS: Eric Middleton knows that beneficial insects can provide ecosystem services to agriculture, ranging from pollination to pest suppression. As a graduate student at the University of Minnesota, Middleton received a \$12,000 NCR-SARE Graduate Student grant to compare how floral plantings in the margins of conventionally managed potato fields affect pollinator and predator abundance and richness, as well as biological control of Colorado potato beetle.

"By working on large, conventionally managed farms where floral plantings have been established, we can determine how these plantings perform for their intended goals of conservation in a real world setting. Do they actually provide a stable source of resources in agroecosystems that helps conserve species, or might growers be wasting their money?" posited Middleton.

The project is ongoing, but Middleton reported that floral plantings have led to significantly more Colorado potato beetle eggs consumed in the margins of fields (compared to unmanaged fields). However, the pollinator and predator abundance observed in the floral plantings has not dispersed far into adjacent potato fields. In addition to reporting on his current research, Middleton took the time to reflect on how the grant project has influenced his growth as a researcher.

"When I first started working on this project and beginning my research, I was mostly approaching sustainable agriculture from the view of an entomologist. I focused on how insects can provide benefits to growers and how growers could promote said insects. By conducting my research on active farms, I've learned just how many factors need to be considered—soil type, pathogens, fertilizer applications, dealing with fungi, concerns about weeds, aesthetics and public perception, even state regulations about moving around roads."

University of Wisconsin – Michael Bell

The Fruit and Nut Compass: Developing a Tool and Guiding Principles for Diversified Farms

OBJECTIVE: to use participatory research to develop a tool and guiding principals for diversified farming.

RESULTS:

As interest in diversified perennial production grows, farmers across the region have been searching for sustainable ways to battle pests, tap into lucrative markets, and increase yields as they work to develop biodiverse agricultural ecosystems. [Building on the concept of their Veggie Compass project, and the desire to develop whole farm profit management tools and workshops for perennial systems, in 2016, Michael Bell and Leah Potter-Weight with the University of Wisconsin's Center for Integrated Agricultural Systems \(CIAS\) applied for and received a \\$199,246 NCR-SARE Research and Education grant to develop a similar tool called the Fruit and Nut Compass.](#)

“The idea for the project came from farmers who saw a need for more informed decision-making in diversified perennial systems,” explained Bell. “By meeting this need, the combined outputs of the project strengthen grassroots enterprise development. Our goal is to provide farmers with a Fruit and Nut Compass that will point in a general direction for making diversified farms more socially, environmentally, and economically sustainable.”

The project is ongoing, but using the Veggie Compass as a guide, the CIAS has commenced developing The Fruit and Nut Compass using a participatory approach drawing on the knowledge, experience, and lessons of producers. Outreach will include a combination of in-person trainings, field days, and online content featuring a downloadable tool, videos, and a user's manual.

“Diverse crops and varieties can spread labor needs across the growing season and increase profitability by spreading risk,” said Potter-Weight. “This project helps farmers take advantage of the positive aspects of diversification while avoiding its potential pitfalls.”

Selecting a New Array of Crisp Apples for Increased Consumer Demand and Grower Profit

OBJECTIVE: to identify candidate apple selections for commercial introduction from an array of advanced experimental material under test at multiple grower orchards in Indiana and Ohio.

RESULTS: Apples are the most consumed fruit in the U.S. The United States has 7,500 apple producers who grow, on average, 240 million bushels of apples each year. These producers grow the apples on an approximated 322 thousand acres of land (U.S. Apple Association, 2018). Two of those apple producers are Steven and Connie Doud, who own Doud Orchards in Denver, Indiana. Doud Orchards is the second oldest orchard in Indiana and currently produces, on sixty-seven acres, more than 100 varieties of tree-ripened apples. [In 2015, Steven Doud received a \\$21,735 NCR-SARE Farmer Rancher grant to evaluate apple selections from the Midwest Apple Improvement Association \(MAIA\) for field performance and consumer preference.](#)

The MAIA is an organization founded and maintained by growers to produce apple varieties for the Midwest and wherever those varieties may be adapted. Among its cultivars is MAIA's EverCrisp® apple, which is currently being grown at more than 350 orchards in 32 states. Doud says EverCrisp® promises to be the most widely planted Midwestern apple since Honeycrisp®. He says that with dozens of advanced selections available through the MAIA program, it will be critical to continue to introduce only the best to assure consumer demand.

“It is crucial for long-term viability and profitability of Midwest orchards to maintain a pipeline of new regionally-adapted unique varieties with outstanding growing characteristics and consumer qualities,” said



PHOTO COURTESY OF STEVEN DOUD

The Midwest Apple Improvement Association conducted tasting events such as this one at Doud Orchards in Denver, Indiana throughout the 2015 growing season, with support from an NCR-SARE Farmer Rancher grant.

Doud.

During the course of the project, new apple selections were evaluated for field performance and consumer preference. The first aspect of the project was selecting likely MAIA candidates for their markets/clientele. The second aspect was consumer taste testing and getting the protocols for this work in place. Field trials were conducted at sites in Ohio and Indiana, utilizing plantings of approximately 50 advanced selections on dwarfing rootstock. Data was collected to determine superior horticultural characteristics over the course of a ten week season. Consumer tastings were conducted at eight sites in Indiana and Ohio with more than 2,500 consumers involved. MAIA apples were tested against the best current apples of the autumn 2015 season.

“Our data contributed to MAIA decisions to proceed with patenting, propagating, and releasing two advanced selections after the 2015 season,” said Doud. “Additionally, two selections with specialized home garden qualities are now introduced through a private nursery company.”

Doud says data and observations made during the grant project are being used to make decisions on three new selections in 2018.

“While the MAIA program is an ongoing effort to develop and introduce new superior apple varieties for Midwestern growers and consumers, this SARE project produced data which allowed logical planning for introduction and promotion of a range of advanced selection germplasm,” said Doud.

Apples for Artisanal Cider: Understanding the Characteristics of Single Varietals

OBJECTIVE: to determine which apple varieties will yield high-quality ciders.

RESULTS: Hard cider is a beverage that is rooted in history, dating back to 55 BC when the Romans discovered it in England. Today, it is emerging as a potentially fruitful business opportunity for modern and future producers.

Two of the producers who have contributed to that growth are Wisconsinites Marie and Matt Raboin, who made their first few gallons of cider in 2010. They planted their first trees in 2014, and now have more than 1,000 trees, but they reached a barrier in their cider production when they noticed the scarcity of information about specific cider apple qualities. **In 2016, the Raboins received a \$7,500 NCR-SARE Farmer Rancher grant to determine which trees and apples would yield high-quality ciders.**

Matt is a former outreach specialist with the University of Wisconsin's Center for Integrated Agricultural Systems (CIAS). He says more detailed descriptions of the cider qualities of specific apple varieties will help producers determine which trees to plant and how to blend ciders to make artisan products.

The Raboins purchased fermentation vessels, airlocks, yeast, sanitizer, campden tablets, and other supplies needed for fermenting the ciders. They also purchased all supplies for testing the ciders, including a refractometer, a pH meter, and chemical reagents. Then they assembled a collection of English and French cider apples, American heirloom cider apples, American heirloom multi-purpose apples, unique local apples, and some common eating apples.

They pressed and fermented all of the apples using the same methods (same yeast, same temperature, same yeast nutrients, etc.) to limit variables. Then they tested each juice

and recorded specific gravity, total acidity, total tannins, and brix (a measurement of the approximate amount of sugars) for each. Each of the ciders went through a 3-week primary fermentation followed by a 6-week secondary fermentation. All of the ciders were then bottled and pasteurized. They tasted the finished ciders and evaluated them, recording notes on color, aroma, multiple flavor components, and overall impression.

The Raboins were able to confirm their suspicion that some apple varieties produce more desirable ciders than others, and were able to identify, apple by apple, which characteristics they preferred. At the same time, they learned that many common eating apples also produce an acceptable cider. For their cider business, they have decided to make multiple cider lines, including a line of lower cost ciders that are largely made with common eating apples, and a higher end line of ciders that is largely comprised of specialty cider varieties.

"There were a few apples that were clear standouts compared with others and made very enjoyable ciders," reported Raboin. "Some of our favorites included Yarrington Mill, Marin Oufroy, Wisconsin Russet, Black Gillflower, Plumb Cider, Perry Russet, and Minkler. This gives us some confidence that these may be apples that we would like to grow more of in the future."

In addition to reporting at https://projects.sare.org/sare_project/fnc16-1053/, they posted their results on their website <https://brixcider.com/single-varietal-cider-evaluations>, where visitors to the website can easily click on any of the apples they tested for more information.

University of Wisconsin – Michelle Miller

Comparing Apples to Apples: Participatory Research for Artisanal Cider Producers

OBJECTIVE: to identify 40 apple varieties with strong potential for sustainable cider production based on grower knowledge, experience, and preferences, and share the results with producers.

RESULTS:

Michelle Miller, the Associate Director of University of Wisconsin's Center for Integrated Agricultural Systems (CIAS) has been using participatory research to better understand the growing hard cider industry.

"Over the past 5 years, hard cider has been the fastest growing craft beverage in the U.S.," said Miller. "With increasing prices for cider apples, less focus on the fruit's cosmetic appearance, and new community ties to a local beverage, the emerging cider industry offers opportunities for increasing economic, environmental, and social sustainability in the North Central region. Unfortunately, inadequate information about cider apple varieties and market preferences limit growers ability to tap cider's potential."

Miller has been surveying hard cider makers to learn more about industry trends, apple sourcing, marketing, and distribution to find opportunities with her eye on rural development. Building on Matt Raboin's preliminary SARE-supported work on identifying apple varieties for hard cider (featured left), **Miller received a \$29,999 NCR-SARE Partnership Program grant in 2017 to work with experienced grower partners to identify 40 apple varieties with potential for sustainable cider production.**

Miller's project is ongoing, but she intends to assess the cider properties of each variety through laboratory and sensory evaluation. She will then identify market preferences through focus group research and cooperate with the Seed to Kitchen Collaborative, a University of Wisconsin program that connects plant breeders to farmers and chefs to create well-adapted vegetable varieties for local production. Along with online outreach, conference presentations, and field days, Miller intends to support longer term participatory evaluation and collaboration through a scionwood exchange and grafting workshop.



PHOTOS COURTESY OF MATT RABOIN.

Marie and Matt Raboin received support from an NCR-SARE Farmer Rancher grant to explore apple varieties for hard cider at Brix Cider in Barneveld, Wisconsin.

Northcoast Lamb Co-op: Using Carcass Scanning for Producer Production Criteria

OBJECTIVE: to implement value-based lamb recommendations, emphasizing higher production criteria, which leads to wider product acceptance.

RESULTS: 1865 was a historic year in American history. Abraham Lincoln was president, the Civil War was coming to a close, the Thirteenth Amendment was ratified, and the National Wool Growers Association was formed. This first-ever national livestock association in the U.S. laid the groundwork for the organization we know today as the American Sheep Industry Association (American Sheep Industry Association, 2018).

“The American Sheep Industry may be the oldest livestock organization in the country, however, American lamb consumption and the frequency of consumption is lower than other sources of protein,” explained Ohio sheep producer Laura DeYoung Minning.

As the largest sheep-producing state east of the Mississippi River, Ohio ranks 13th in national sheep production, where the average flock size is close to 40 ewes (NASS, 2018). DeYoung Minning says in Northeast Ohio, there is more demand for locally produced lamb than the average farm flock can supply. She says inconsistencies

among flocks is a major barrier to the industry.

“Of course, many factors influence meat quality and eating quality, from the birth of the lamb to its processing, packaging, and cooking,” explained DeYoung Minning, “But a substantial proportion of the differences in texture, juiciness, and flavor are attributable to variation between individual animals.”

With support from a \$20,526 SARE grant, DeYoung Minning and two other Ohio sheep producers formed the Northcoast Lamb Co-Op, a co-op of producers created to market together to local grocery stores and restaurants. They intend to market consistent, high quality lamb as a healthy red meat choice, which means excess fat or inconsistent quality can damage the quality of the Northcoast Lamb Co-Op brand. In order to ensure quality and consistency, the co-op determined that they would require carcass centralized ultrasound processing scanning for all co-op members.

The three founding member producers each had Dorset flocks with similar production practices including riparian setbacks, rotational grazing, and nutrient management. Each used carcass scanning to evaluate their flocks. They determined that lambs from these flocks were even enough to ensure consistent quality to market lamb using the co-op label. Dorsets were originally chosen by the co-op members, and they met the co-op’s carcass loin eye criterion (an average 2.5 square inch loin between the 12th and 13th rib is used as criteria for acceptance to market lamb in the co-op). The three producers in the co-op want to expand and include other regional producers using the scanning methodology; they found it to be far more reliable than using weight and visual observations, which DeYoung Minning says can result in smaller loin eyes and too much back fat.

“The co-op wants to work with any urban or rural farmer whose purpose is, to not only distribute and market lamb at a profit, but to produce the required high quality, consistent lamb demanded by a more discriminating marketplace,” said DeYoung Minning. “The co-op will continue to assist members in identifying new strategies and methods to improve the quality of their flocks to help meet the rising demand for high value, quality lamb.”

PHOTO BY ROMAN HOBLER.



Dorsets were chosen for the Northcoast Lamb Co-op’s SARE-supported carcass scanning and marketing study due to their accelerated capability, but the co-op will accept other breeds that perform according to their criteria.

To find out more about NCR-SARE’s educational programs and grants, please contact:



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