

Sustainable Agriculture Research & Education

FIELD NOTES

Double Cropping Field Peas May Offer Economic Sustainability for Midwest Swine Producers

Research at Iowa State University (ISU) may be good news for swine producers who have been facing high grain prices. Coordinated by Jim Fawcett, the team's recent research at ISU has demonstrated that field peas can be utilized as a partial substitute for soybean meal or corn in swine diets.

Shaun Greiner, a local swine producer, and Tom Miller, an ISU Extension Swine Specialist, approached Fawcett because they were interested in using field peas for swine diets. Greiner was looking for a more affordable source of feed and had heard that some farmers were having success raising field peas in Illinois.

"Shaun's excitement about the prospect of raising peas for swine rations was infectious," said Fawcett. "I have always been interested in searching for that magic third crop to include in Iowa crop rotations, and thought that this might be a possibility since it already had a market in Iowa."

Located in the Johnson County Extension office in Iowa City, Jim Fawcett has been a Field Agronomist for 25 years, specializing in pest management. Throughout his career, weed control has been a challenge with various crop rotations. Most of Fawcett's experience had been with corn and soybeans, although he did have some experience working with field peas in Wisconsin when he was completing his Ph.D. in weed science.

After some preliminary research, Fawcett and a team of producers, farmers, and Extension Specialists submitted a proposal to the North Central Region Sustainable Agriculture Research and Education Program (NCR-SARE) Research and Education Grant Program in 2005 and were awarded a grant for \$109,651 to study whether double

cropping field peas could offer economic sustainability for Midwest swine producers.

"The typical Iowa swine farmer raises about 5000 head of hogs as well as corn and soybeans," said Fawcett. "In order to use soybeans as a protein source for the swine it is necessary to process the soybeans. Field peas have been grown successfully by farmers in other states and countries and used as a substitute for soybean meal. Inputs which require no processing, grown and used on the farm have generally improved farm profits."

Small scale ISU replicated research plots and field scale cooperator plots were set up to evaluate variety selection, time of planting, harvesting techniques, and pest management of field peas. Feeding trials were conducted to evaluate the economical inclusion rates of field peas into swine rations.

"In each of the feed trials we saw no change in average daily gain or feed efficiency in the diets containing field peas," said Tom Miller. "One thing that was interesting is that in almost all the feed trials although not statistically significant was an improvement in feed per pound of gain (feed efficiency)."

The feeding trials conducted as a part of this project indicated that swine producers could increase their profits by utilizing field peas in the ration, especially when considering the current price of corn and soybean meal (SBM). According to Fawcett, a simple financial formula which producers can use when determining whether field peas should be used in their rations is: $(\text{corn price } \$/\text{bu} \times 420 \text{ lbs}/56 + \text{SBM price } \$/\text{ton} \times 180 \text{ lbs}/2000)/10 = \text{price which can be paid for field peas}$. This is a 30% inclusion rate of field peas replacing corn and soybean meal in the ration. Inclusion rates this high showed no performance difference in any of the trials.

The Newsletter
of the NCR-SARE
Program

Issue 22
Winter/Spring 2010



Jim Fawcett planting field peas into wheat stubble. Photo by Kevin VandDee.

It is likely that until adequate access to field peas is available, Iowa's swine producers will not be able to fully adopt field peas as a source for feed.

"Although the practice of double-cropping field peas has not been adapted by Iowa farmers because of not being competitive with existing crop rotations, farmers are continuing to investigate the use of field peas in other cropping systems," said Fawcett.

Fawcett explained swine producers who are closer to areas where field peas are already raised, such as NW Iowa, can increase their profitability by utilizing field peas in their rations.

"Organic farmers also see some advantage in using field peas as a nurse crop for establishing forages in their rotation," said Fawcett. "The project has also increased the interest in farmers in the region of searching for other cropping systems that are more sustainable."

Read more about ISU's NCR-SARE Research and Education Grant Program project online on the SARE project reporting website. Simply search by the project number, LNC05-257, at <http://www.sare.org/projects/> or contact the NCR-SARE office for more information at ncrsare@umn.edu.

Begin Farming Ohio Website Launched to Assist Beginning Farmers



Source: Begin Farming Ohio

For the first time Ohio's new and beginning farmers have an entire website dedicated to their unique information needs and designed to make it easier for them to find the services and resources they seek. The website URL is <http://www.beginfarmingohio.org/>

The website represents the collaborative efforts of: the Cuyahoga Valley Countryside Conservancy; Ohio Department of Agriculture, Sustainable Agriculture; Ohio Ecological Food and Farm Association (OEFFA); the Organic Food and Farming Education & Research Program of the Ohio State University Ohio Agriculture Research and Development Center; and the Ohio State University Extension. These entities, working together as Begin Farming Ohio, aim to build Ohio's capacity to provide, expand, enhance, and sustain services to beginning farmers.

The new website was developed with an affiliated partner, Innovative Farmers of Ohio (IFO). IFO allocated grant funds awarded by SARE Outreach program to enhance the website development process. IFO provided case studies and resource referral information first published in 2008, one output of *Wisdom in the Land*, a mentor-based pilot program for beginning farmers in central Ohio that IFO operated from 2006-2008.

The website will also provide listings of events of special interest to Ohio's beginning farmers and facilitate searches for educational and funding resources to assist beginning farmers with challenges related to production, marketing, and business management.

"In order to help sustain the future of agriculture, it is important to support beginning farmers," said Ohio Agriculture Director Robert Boggs. "The department is excited to be part of this collaborative effort, which will assist these farmers with less than 10 years experience."

The USDA 2007 Census of Agriculture reports that 21% of U.S. family farms were beginning

farms, and in contrast to established farms beginning farms were more likely to be small farms.

About Begin Farming Ohio and Innovative Partners of Ohio

Begin Farming Ohio was formed in 2008 as a collaboration of higher education, state government, and the non-profit sector to better serve Ohio's beginning farmers. Each of the five founder organizations provides education, training, and other services to farmers and has an employee pool of professionals who are experts in both sustainable agriculture production and farm business management. Additional affiliated partners provide resources that complement the services of the collaborators. See www.beginfarmingohio.org for a complete list of collaborators and affiliates.

Their affiliated partner, Innovative Farmers of Ohio (IFO) is a farmer led, non-profit organization serving Ohio farmers. IFO's membership ranges from small-acreage intensive organic growers to large grain and livestock operations with more than a thousand acres and hundreds of head of livestock. IFO received a grant in 2005 for \$92,560 from the NCR-SARE Research and Education Grant Program to pilot the mentor-based program, *Wisdom in the Land*, for beginning farmers in central Ohio. *Wisdom in the Land* was delivered twice as a 15-month program beginning either November 2006 or 2007, and once as a 6-month program beginning January 2008. The program was customized to the developmental priorities of each group, and offered knowledge-building seminars, skill-building workshops, and dedicated individualized mentoring with an experienced farmer either up to 30 hours or 18 hours.

Read more about Innovative Farmers of Ohio's NCR-SARE Research and Education Grant Program project online on the SARE project reporting website. Simply search by the project number, LNC05-252, at <http://www.sare.org/projects/> or contact the NCR-SARE office for more information at ncrsare@umn.edu.

New Resources from SARE



What Is Sustainable Agriculture is a 12-page publication that provides a sampler of best practices—from marketing and community vitality to cover crops and grazing—as well as eight profiles of producers, educators and researchers who have successfully implemented them.



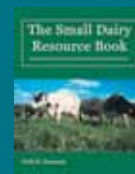
Land & Power: Sustainable Agriculture and African Americans features a selection of the presentations, posters, discussions, and performances that made up the 2007 Tuskegee University event.



Building Soils for Better Crops is a one-of-a-kind practical guide to ecological soil management, now expanded and in full color.



Report from the Field relates stories of innovation from every corner of the United States that are occurring in key areas of American agriculture, including land stewardship, clean energy production, marketing and urban agriculture, to name a few.



Originally published in 2000, *The Small Dairy Resource Book* was updated in 2010 with new entries and revised contact and price information for listed resources.



Local Harvest: A Multifarm CSA Handbook outlines the incentives and opportunities in cooperative marketing and gives a sound platform for building sturdy local and regional models for delivering local food to consumers.



Managing Alternative Pollinators is a first-of-its-kind, step-by-step, full-color guide for rearing and managing bumble bees, mason bees, leafcutter bees and other bee species that provide pollination alternatives to the rapidly declining honey bee.

To order copies of any of these publications, visit SARE online at <http://sare.org/publications/handbooks.htm> or call (301) 374-9696 to place orders that require payment by telephone.

A new program has been developed in Iowa and Kansas to train Extension and other professionals to increase their awareness of Latino culture and community.

The “Building Capacity to Engage Latinos in Local Food Systems” project was designed to provide Extension educators and other agricultural professionals in Iowa and Kansas with the knowledge and skills to identify and respond to the needs and goals of Latino growers and produces and their families.

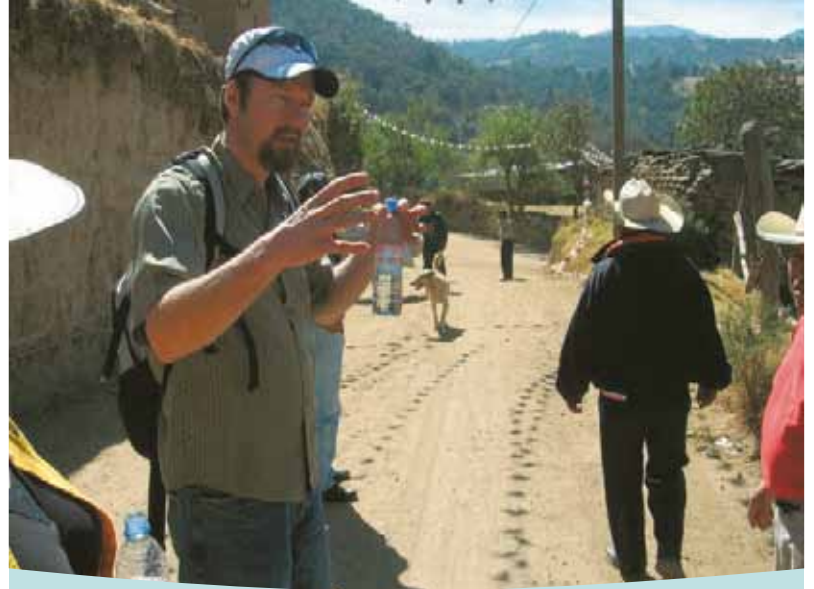
Gerad Middendorf is an Associate Professor of Sociology at Kansas State University. Middendorf’s research interests included rural and environmental studies, the sociology of agriculture and food, and international development. Fluent in Spanish, he has worked in Central America in agricultural extension with small-scale hillside farmers, and he conducted dissertation fieldwork in Central America.

In 2006, Middendorf and Iowa State University (ISU) Community Extension Specialist, Jan Flora, submitted a proposal to NCR-SARE’s Professional Development Grant Program and were awarded \$75,000 for a project which provided opportunities for educators and technical service providers in Cooperative Extension, Natural Resources Conservation Service (NRCS), and other agencies in Iowa and Kansas to learn about local food systems, Latino culture, and Latino growers and producers.

“NCR-SARE was inviting proposals for professional development programs targeted to educators within Extension, NRCS, and other governmental agencies,” said Middendorf. “They were interested in professional development programs and activities that would enhance the sustainability of rural communities and the food and agricultural system.”

Middendorf and Flora, together with Director of the Kansas Center for Agricultural Resources and the Environment, Bill Hargrove, ISU graduate student, Hannah Lewis, and Extension Director of the Kansas PRIDE Program, Dan Kahl, developed a series of professional development activities over the course of the project based on increasing awareness of Latino growers and produces and their families.

“We were aware that Latino farmers are the fastest growing group of minority farmers in the country. Moreover, we knew that there are many recent immigrants in Iowa and Kansas from Mexico and other Latin American countries that have significant agricultural experience in their background,” said Middendorf. “We had been learning anecdotally that there were Latinos in Kansas who were interested and engaged in agriculture, but they infrequently sought out assistance from Extension, NRCS, Farm Service Agency, and other agricultural professionals and technical service providers.”



Building Capacity to Engage Latinos in Local Food Systems in the Heartland

A variety of activities were offered through this project. Kick-off events in Iowa and Kansas included workshops about multicultural outreach and how to engage Latino farm families. On-going training and workshops provided participants an opportunity to learn more about the Latino culture, local communities, and local food systems.

Multicultural training sessions and experiential learning provided participants with an increased awareness of the Latino culture and community, particularly in relation to local food systems. Immersion experiences for participants included regional site visits to meet local people from the immigrant, business, and agricultural communities. According to Middendorf, these activities provided participants an opportunity to improve their skills in engaging Latino audiences, identifying local markets and developing strategies for sustained support programs for Latino farm families.

Participants in were also invited to participate in SARE’s New American Farm Conference 2008 in Kansas City, MO as part of the project’s activities. Nine Kansas participants, representing both Extension and NRCS, attended the conference.

“While the long term, systemic changes are not within the timeframe of this project, there are ways in which this effort contributes to sustainable agriculture in the long term,” explained Middendorf. “Increases in agricultural educator awareness and knowledge have, in some cases, led to changes in educator behavior and practices. It is hoped that these changes will develop into sustained institutional engagement in education and technical services in support of Latino farm families, and ultimately successful Latino farmers engaged in local food systems. Ongoing synergistic activities in both states will be necessary to continue moving toward these long term outcomes.”

Read more about Middendorf’s NCR-SARE Professional Development Grant Program project online on the SARE project reporting website. Simply search by the project number, ENC06-089, at <http://www.sare.org/projects/> or contact the NCR-SARE office for more information at nrcsare@umn.edu.



North Dakota Farming Family Uses Livestock to Restore the Land

Dick Grotberg with some grandkids and cows in a cover crop field. - Photo courtesy of Bethany Prairie Farm Fellowship.

A group of farmers in Wimbledon, ND are working to turn a conventional chemically dependent farm into a fertile, sustainable, organic, farming unit. What started as a farm restoration project for the sake of their beef market ended by using all of the livestock to restore the soil.

Dick and Linda Grotberg, Dick Lovestrand, Rilla Miller, and Virginia Grotberg live and work together as a Christian community in the Bethany Prairie Farm Fellowship. The farm consists of 440 acres, 400 of which are tillable. The livestock consists of 70 Scottish Highland cows, 12 to 15 head of Highland beef, 53 yearlings and calves, three herd bulls, 10 Welsh mares, an American Baskin Curly stallion, one milk cow, 12 Saanen milking goats, 300 broilers, and 150 laying hens.

Bethany Prairie Farm has been Dick Grotberg's home since the 1940's. It has been farmed conventionally since the 1950's. In 2004 the Grotbergs went out of confinement hogs and began purchasing Scottish Highland cattle. In 2004, they began to practice sustainable management practices with the cattle. In 2005, they began the task of restoring the 600-acre conventional farm to a sustainable organic integrated crop/livestock farming unit.

In 2006, the Bethany Prairie Farm Fellowship along with their project partners and a team of soil scientists, agronomists, and other experts, submitted a proposal for their restoration project, and were awarded \$18,000 from the NCR-SARE Farmer Rancher Grant Program. Their goals were

to make an integrated grain/livestock small farm sustainable at the pre-1950 average acreage before chemicals came into use, to maintain economic viability during the transition from conventional to organic agriculture, and provide year around grazing for 70 Highland cow/calf units, 10 Welsh mares, and their Curly foals.

"We started what we are doing for the sake of our beef market and ended by using all of the livestock to restore the soil," said Linda Grotberg. "We want to work together as a body to be faithful stewards of land that is not ours, caretakers of animals we do not own, and teachers by example to whomever God brings into our lives. We are committed to sustainable, organic, responsible agriculture and we are convinced that it is our responsibility to teach the concept to others by how we live, what we think, and what we eat."

The group has researched, learned, and made use of expert advisors to begin to restore their chemically dependent soils to full health and to make the most of crops and livestock integration in the preparation for organic production. Their goal was to establish a base line of their soil's health in order to both compare and measure the success of the project. The on-farm soil quality monitoring project monitored changes in soil quality in contrasting land management practices over time. In particular, the work examined the transition from conventional to organic farming in the Midwest and the corresponding changes in soil biology and fertility. Evaluations were conducted on-farm for paired no-till organic, conventional tillage, and pastureland.

According to Linda Grotberg, their fields now are approximately 25 to 44 acres each, and are designed to follow the contours of the land. With a 9 year rotation, they include grasses and numerous small grain crops. The data collected from this study will provide feedback to land owners and provide training opportunities for National Resource Conservation Service field staff and others on issues related to soil quality. She believes this project can serve as a baseline for soil quality on a system that is in the process of conversion to an organic system.

"It is now all about building healthy soil," said Dick Grotberg. "Our Highland cattle are so helpful. All the land is fenced with high tensile electric fences. We rotate graze the grass. Also we interseeded with turnips and rape seed along with other species to eventually get to the place where we graze 10-12 months. Even now there is no more feed lot manure, as we place the bales on end at present in a pattern to have all the manure and urine spread by the cattle and horses."

The Grotbergs hosted the Northern Plains Sustainable Ag Society Summer Symposium and included the Central ND Pastured Poultry Field Day in the event. About 150 people attended.

Read more about the Bethany Prairie Farm Fellowship Farmer Rancher Grant Program project online on the SARE project reporting website. Simply search by the project number, FNC06-625, at <http://www.sare.org/projects/> or contact the NCR-SARE office for more information at ncrsare@umn.edu.

" We are committed to sustainable, organic, responsible agriculture and we are convinced that it is our responsibility to teach the concept to others by how we live, what we think, and what we eat."
- Linda Grotberg



NCR-SARE Elects New Administrative Council Representatives

Heather Duncan, Jim Goodman, Mark Kuzila, and Steve Wegulo are new members of Administrative Council (AC) for the NCR-SARE program this year.

Heather Duncan will be serving the NCR-SARE Administrative Council as a co-chair of the Technical Committee and the Environmental Protection Agency (EPA) representative. Duncan is an Environmental Scientist for the EPA Pesticides Program, Region 7 where she assists in implementation and enforcement of the Federal Insecticide, Fungicide and Rodenticide Act in Iowa, Nebraska, Kansas, and Missouri. She also serves as the regional contact for drift issues, integrated pest management, and competitive grants, and promotes pesticide stewardship in agricultural and community settings.

Co-owner /operator of a 500-acre certified organic dairy, beef, and crop farm, **Jim Goodman** has been elected to serve as the Wisconsin farmer rancher representative to the NCR-SARE Administrative Council. Among other activities, Goodman serves

on the Board of Directors for Family Farm Defenders, Midwest Environmental Advocates, is Director of the Vernon Electric Cooperative, and serves as a member of the USDA Dairy Industry Advisory Committee. He was named a WK Kellogg Foundation/Institute for Agriculture and Trade Policy Food and Society Policy Fellow for 2008-2009.

Mark Kuzila has been elected to serve as the Geological Survey representative to the NCR-SARE Administrative Council. Kuzila is the Director of the Nebraska Geological Survey and is a member of the North Central Education/Extension Research Activity-Soil and Landscape Assessment, Function, and Interpretation Committee. Among other activities, Kuzila has served as the Principal Soil Scientist and Director of the School of Natural Resources at the University Nebraska-Lincoln.

Assistant Professor/Extension Plant Pathologist from the University of Nebraska, **Steve Wegulo** has been elected to serve as the Nebraska research

representative to the NCR-SARE Administrative Council. Wegulo has a scientific perspective on plant diseases in small grains, forages, and ornamental crops. He is a member of the American Phytopathological Society and has served on the Diseases of Ornamental Plants Committee. In 2009, he won an Outstanding Extension Publication Award, American Society for Horticultural Science.

NCR-SARE would like to extend gratitude to the following AC members who either fulfilled their terms or are stepping down: Illinois farmer rancher representative **Dave Campbell**, Nebraska Extension representative **Karen DeBoer**, national Extension representative **Jerry DeWitt**, foundation/nonprofit representative **Tim Kautza**, Geological Survey representative **Fred Madison**, Wisconsin research representative **Bill Tracy**, and Environmental Protection Agency representative **Barbara Van Til**.

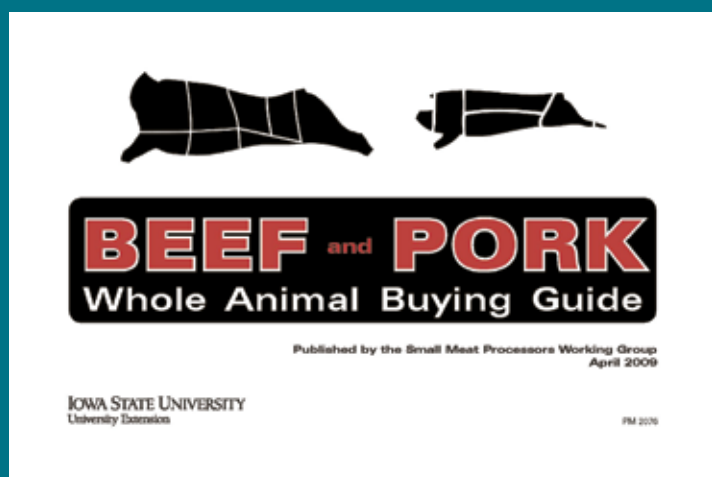
Iowa State University's Small Meat Processors' Working Group Produces Consumer Guide to Whole Animal Buying

A new publication is available for consumers and producers who are interested in learning more about buying and marketing local beef or pork, bringing together useful information into a single resource.

Created by the Iowa State University's Small Meat Processors' Working Group, "Beef and Pork Whole Animal Buying Guide" explains buying whole animals or portions buying pork and beef from local producers.

The publication explains both pork and beef cuts, livestock and meat marketing terminology, storage, processing, aging, meat handling and preparation, and meat inspection. It includes color photos of common retail beef and pork cuts

To download a free PDF or order a print copy, visit <https://www.extension.iastate.edu/store/ItemDetail.aspx?ProductID=13056>.



Hardcopies are available in color (\$6.50) and B&W (\$1) online.

Read more about the Small Meat Processors' Working Group's NCR-SARE Graduate Student Grant Program project online on the SARE project reporting website. Simply search by the project number, GNC07-085, at <http://www.sare.org/projects/> or contact the NCR-SARE office for more information at ncrsare@umn.edu.



Photo by Ennis Walker.

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://sare.org/ncrsare/> 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 in Your State

What are NCR-SARE grantees in your state doing?

Since 1988, SARE has awarded numerous grants in every state and Island Protectorate. Aimed at advancing sustainable innovations, these grants add up to an impressive portfolio of sustainable agriculture efforts across the nation.

SARE has a portfolio summary and grant list for your state. The portfolio summary for each state includes one project highlight, a breakdown of funding by SARE project type, and the total funding for the state since 1988. This is a colorful 2-pager in PDF format that can be printed and distributed. The grants list describes each grant in the state by title, project leader and funding level.

View the documents for your state by visiting SARE online at http://sare.org/highlights/state_summaries.shtml, or contact the NCR-SARE office at ncrsare@umn.edu to receive copies.

Photo by Sig Anderson.

NCR-SARE Welcomes Jean Andreasen

(NCR-SARE) is pleased to welcome Jean Andreasen to their staff. Andreasen has been hired as the Principal Office and Administrative Specialist for the program, replacing Christine Yeager. Housed at the University of Minnesota, Saint Paul campus, Andreasen will support the NCR-SARE program administratively, answering questions, sending out correspondence, managing the databases, and supporting the other NCR-SARE staff members.

Prior to coming to NCR-SARE, Andreasen worked as a consultant for the Dairy Business Innovation Center in

Madison WI, and as the General Manager of PastureLand, a cooperative of grass-based organic dairy producers in southeastern Minnesota. She also served as the Marketing Coordinator for Food Alliance Midwest, Saint Paul MN, and as the Director of Member Services and Outreach for Mississippi Market Natural Foods Cooperative in Saint Paul MN. She graduated with a BA in Fine Arts from Gustavus Adolphus College.

Andreasen is delighted to be part of the NCR-SARE and the Saint Paul Campus in particular as "It's where the University keeps it's cheese and textiles!"



Does a C3-C4 Forage Mix Simultaneously Improve Forage Production and Carbon Sequestration?

Report summary for research conducted by Herika Kummel, University of Wisconsin-Madison

University of Wisconsin-Madison graduate student, Herika Kummel conducted an experiment in two restored prairies in southern Wisconsin to assess their carbon sequestration potential under a gradient of warm-season grass (C4) to cool-season (C3) pasture grass ratios. The sites were the Bison Ridge Ranch in Marquette County and the Wisconsin Integrated Cropping Systems Trial (WICST) at the University of Wisconsin-Madison's Arlington Agricultural Research Station in Columbia County

The project's goal was to improve understanding of ecosystem support, provisioning, and regulating services provided by pasture ecosystems in the Upper Midwest. This work intended to provide much needed understanding about cool-season pastures (C3) and the benefits of restoring native grasses to working lands.

Materials/Methods

At each site, Kummel chose thirty ~100-m² plots for their respective C3:C4 grass ratio. At each plot, a centralized quadrat was permanently marked to monitor soils, environmental conditions, nutrient content, and respiration over time. Plant species cover was estimated with the line-point method performed on permanently marked soil monitoring stations. The quadrat area to be sampled was divided by 5 horizontal and vertical lines forming 25 intersections where the first intercept of a sharpened rod with any part of herbaceous vegetation at each intersection was recorded.

For each sampling event, total species cover was calculated as total species hits divided by the total possible hits for each quadrat. Plants were identified to the species level and grouped into functional groups. Kummel mirrored the classification method used in previous prairies studies. Plant cover data per species and functional groups were taken three times during the season and aggregated to calculate an annual average of cover for each experimental unit.

The two main dominant C4 grass species were the same for both sites, e.g. *Andropogon gerardii* Vitman and *Sorghastrum nutans* (L.) Nash; however, there were differences in the plant communities worth noting. For instance, Bison Ridge Ranch had other species of C4 grasses present. The dominant C3 grass species in both sites were also quite similar. Yet, only Bison Ridge Ranch had the winter annual *Bromus tectorum* L. and only WICST had *Elymus canadensis* L. and *Phleum pratense* L. present.

Kummel used linear regression to address potential

relationships between net ecosystem production (NEP) and vegetation cover by functional group, by plant species cover, and then by plant species richness. Cook's distance test, which measures the influence of individual observations on the regression coefficients, was assessed to identify potential outliers. Furthermore, the fit of a quadratic function was compared to a linear fit using the generalized least squares algorithm in S-plus. Models were compared with likelihood ratio tests. When significant differences were determined, the model with the lowest Akaike's information criterion values was chosen, otherwise the simpler model was determined to be the better fit.

Results/Outcomes

There are several conclusions in this project that can guide land managers and policy makers regarding mixed C4-C3 grasslands.

At the management level, the July C4 grass cover can guide land managers in assessing the productivity of the grassland before the end of the season when the grasses are very tall and the heat strong. To Kummel, it seems also that low-diversity grasslands that are mainly dominated by productive warm-season grasses, such as Conservation Reserve Program lands, may prove to be a great alternative to improve soil organic carbon (SOC). At the same time, a low cover of cool-season grasses in restored prairies may not threaten the potential of the restoration to rebuilt SOC if the C4 grasses dominate.

Kummel's results also show that the higher carbon sequestration in consequence of a higher cover of warm-season grasses is not general across sites and nutrient-poor permanent grasslands may need to be moderately intensified either by increasing organic carbon input or moderate fertilization. In a positive note, many forage species such as *Panicum virgatum* L. have been studied as good sources of bioenergy, and according to this study, more attention could also be given to the potential of *Andropogon gerardii*.

This project shows that management, is research at the farm level, across various soil types and management is still necessary if the carbon sequestered by mixed C4-C3 grasslands is to be considered as an effective strategy to long-term carbon storage and a key part to climate stabilization.

Publications/Outreach

The information gathered during this multi-year study has been presented at two winter field days, one at the Lancaster Research Station and another at the WICST annual meeting. Posters summarizing the field data collection were presented at the 93rd Annual Meeting of the Ecological Society of America, the Wisconsin Ecology Group at the Fall Symposium in Madison, Wisconsin in 2008, and the Farming with Grass meeting sponsored by The Soil and Water Conservation Society in 2008.

Read more about Kummel's NCR-SARE Graduate Student Grant Program project online on the SARE project reporting website. Simply search by the project number, GNC07-077, at <http://www.sare.org/projects/> 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

Nonprofit Org.
U.S. Postage
PAID
Minneapolis, MN.
Permit No. 155



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://sare.org/ncrsare/apply.htm> for more information, or contact the NCR-SARE office.

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

Photo Credits for this issue of Field Notes:
Sig Anderson, Bethany Prairie Farm Fellowship, Joan Benjamin, Marie Flanagan, Abram Kaplan, Kevin VanDee, Ennis Walker, and Kelly Weber.

GRANT PROGRAM TIMELINES*

Farmer Rancher Grant Timeline

Early August - Call for Proposals
Early December - Proposals Due
March - Proposal Status Notification
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: Proposal Status Notification
Spring: Funds Available to Recipients

NORTH CENTRAL REGION SUSTAINABLE AGRICULTURE
RESEARCH AND EDUCATION PROGRAM

CONTACT INFORMATION

Phone: 612-626-3113
Email: ncrsare@umn.edu
<http://sare.org/ncrsare/>
SARE Outreach: <http://www.sare.org/>
New Lincoln University Office
Phone: 573-681-5545
Email: Benjaminj@Lincolnu.edu

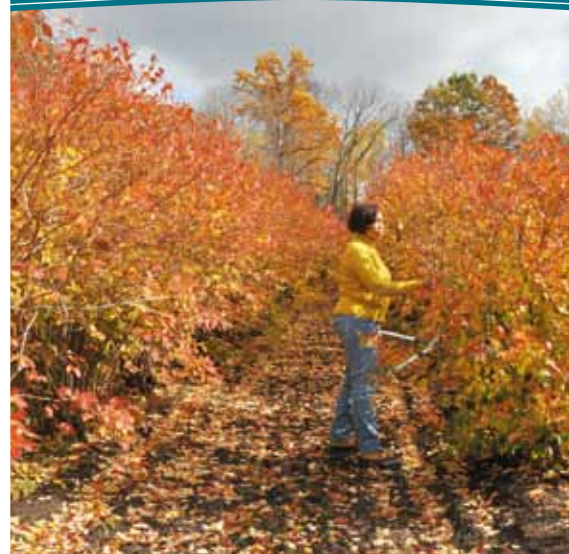


Photo by Kelly Weber.

*Timelines are subject to change.



Green Goal

