

Organic Research and Outreach in the North Central Region



February 2015

Organic Research and Outreach in the North Central Region – 2015

Forward

There are over 1970 acres of university land being used for organic research in the North Central Region¹ (NCR). As demand for organic products continues to grow, so does the need for organic agriculture research and outreach. Many land grant universities in the NCR have responded by investing in organic research infrastructure, supporting faculty endeavors, and providing courses on organic production systems. In addition, many universities in the Upper Midwest conduct robust on-farm, participatory research on organic farms.

Prior to implementation of the 1990 Organic Foods Production Act in 2002, land grant universities had been slow to embrace organic agriculture and provide support for organic research, extension and education programs. This situation was first documented in the Organic Farming Research Foundation's (OFRF) 1997 landmark report, "[Searching for the 'O-Word.'](#)" OFRF's follow-up reports, "[State of the States: Organic Farming Research Systems at Land Grant Universities, 2000-2001](#)" and "[2012 Organic Land Grant Assessment](#)," showed slow but steady growth in organic research activities.

This Ceres Trust report, "Organic Research and Outreach in the North Central Region - 2015," documents the growth in organic research, extension, outreach and teaching in the 12-state region eligible for Ceres Trust organic research grants. The report includes state-specific details about student organic farms; certified organic research land and animals; sources of organic research funding; dissemination of organic research results through field days and peer-reviewed journals; organic academic curricula; and other relevant information. The 2015 edition includes descriptions of on-farm research activities in each state.

Ceres Trust retained consultant Jim Riddle, former chair of the National Organic Standards Board and prominent leader in shaping and building the organic sector in this country and beyond, to produce this report. The vast amount of information he has gathered and organized has been compiled in cooperation with organic research leaders in each of the 13 land grant universities in the North Central Region.

The report is posted on the [Ceres Trust](#) website and updated annually. The Ceres Trust is pleased to offer this report to the organic research and education community; to the organic farmers who serve as hosts for on-farm research and provide inspiration and healthful food and agricultural products produced with environmentally-sound methods; and to the consumers who support organic food and farming and help make this progress possible.

¹ The North Central Region includes Illinois, Indiana, Iowa, Kansas, Michigan, Minnesota, Missouri, Nebraska, North Dakota, Ohio, South Dakota, and Wisconsin.

Table of Contents

Forward	2
Acknowledgements	3
Introduction	4
Executive Summary	5
Illinois	8
Indiana	16
Iowa	23
Kansas	31
Michigan	36
Minnesota	50
Missouri	66
Nebraska	75
North Dakota	90
Ohio	97
South Dakota	106
Wisconsin	109
Appendix – Author’s Observations and Comments	124

Acknowledgements

**Primary Author:
Jim Riddle
Organic Independents, LLP**

This report would not have been possible without the cooperation, support, and information provided by the following individuals:

- Dr. Erin Silva, University of Wisconsin-Madison;
- Dr. Peter Sexton, South Dakota State University;
- Dr. Lori Hoagland, Purdue University;
- Dr. Liz Maynard, Purdue University;
- Dr. Brian McSpadden Gardener, The Ohio State University;
- Dr. Patrick Carr, North Dakota State University;
- Dr. Charles Shapiro, University of Nebraska-Lincoln;
- Ms. Kerry Clark, University of Missouri;
- Dr. Rob King, University of Minnesota;
- Ms. Vicki Marrone, Michigan State University;
- Dr. Jaime Pinero, Lincoln University;
- Dr. Cary Rivard, Kansas State University;
- Dr. Kathleen Delate, Iowa State University;
- Dr. James Farmer, Indiana University; and
- Dr. Sam Wortman, University of Illinois-Champaign-Urbana.

Introduction

Organic agriculture research and outreach activities have become fundamental components of the academic programs at many universities in the North Central Region. While some land grant universities' (LGU) organic programs are still under development, others have mature, robust organic research and outreach programs. In addition to organic research, many LGUs in the NCR now offer organic undergraduate minors, concentrations, or certificate programs; graduate student research opportunities; annual organic field days, workshops, and conferences; and certified organic crop and livestock research sites.

This report's purpose is to identify and catalog organic research and outreach activities at the thirteen LGUs in the North Central Region. It should be noted that other state universities, private colleges, community and tribal colleges, non-governmental organizations and institutions, state governments, and the USDA Agricultural Research Service are engaged in various organic research and outreach activities in the region. This report contains limited information on those activities, but does not purport to provide a comprehensive inventory of organic activities outside of the land grant system.

This report is organized alphabetically by state, beginning with Illinois. In descending chronological order, the report contains brief descriptions of current and recent organic research projects, peer-reviewed papers, and extension publications, dating back to 2002 when US National Organic Program (NOP) regulations took effect. In addition, the report lists key contact people and describes academic courses, degree programs, and hands-on learning opportunities, such as student organic farms, and gives the number of acres and animals used for organic research in each state. New in 2015, the report also contains brief summaries of each university's organic on-farm research activities. An attached Appendix includes the primary author's observations and comments.

The web version of this report contains active links² to university organic and sustainable agriculture websites, as well as to research reports and publications posted at the [Ceres Trust](#), [eOrganic](#), [SARE](#) and [USDA CRIS](#) websites, among others.

Finally, the report presents the titles of research projects funded by various United States Department of Agriculture (USDA) programs, including the National Institute for Food and Agriculture (NIFA), Organic Research and Extension Initiative (OREI), Organic Transitions (ORG), and Sustainable Agriculture Research and Education (SARE), as well as those funded by the Ceres Trust, the Organic Farming Research Foundation (OFRF), Organic Valley's Farmers Advocating for Organics (FAFO) fund, and internal university sources.

² If a link does not automatically open the desired page, try inserting the URL, which should appear when you hover your cursor over the linked word or phrase, into the address bar and hit "enter."

Executive Summary

This report finds that 1,970.17 acres of university land are currently being used for organic research in the North Central Region, with all thirteen land grant universities having some organic research land. Only one institution, the University of Minnesota, has a certified organic dairy herd, although The Ohio State University, University of Missouri, Lincoln University, and Michigan State University are conducting organic livestock research at university sites and others, such as the University of Wisconsin, are doing extensive on-farm organic livestock research.

Six universities in the NCR offer organic, sustainable, or agroecology minors or concentrations to undergraduates. One institution, the University of Minnesota, now offers two undergraduate majors that give students an opportunity to focus on organic production. Three institutions offer organic certificate programs. All thirteen universities in the NCR offer graduate student organic research opportunities; eight have student farms using organic methods, with the student farms at Michigan State University and University of Minnesota being certified organic and the University of Illinois student farm in transition.

State-by-state highlights of this report include:

Illinois The University of Illinois has conducted extensive research on soil fertility and cover crops in organic systems, and partners with the Illinois Specialty Growers Association to organize the annual “Illinois Specialty Crops, Agritourism, and Organic Conference” (ISCAOC). Chicago is home to innovative urban agriculture programs. Western Illinois University has a well-established program for organic research and outreach, and Southern Illinois University, Joliet Junior College, and the Chicago Botanic Garden are all conducting organic research and outreach.

Indiana In recent years, Purdue University has expanded its capacity to conduct organic research and outreach, as well as the number of faculty engaged in organic research. Purdue has released new Extension publications; hosts a student farm using organic methods; and conducts organic research at three locations. Purdue also organizes the Indiana Small Farm Conference, which includes sessions on organic production. Indiana University – Bloomington and the University of Notre Dame have campus gardens using organic methods. Indiana University, Ball State University, and Earlham and Goshen Colleges have sustainable agriculture classes. Purdue now has a website with research and resources applicable to organic livestock production.

Iowa Iowa State University continues to operate a robust, multi-disciplinary organic research program with organic research at four ISU locations; maintains an extensive inventory of organic research reports and refereed publications; and offers numerous academic and producer outreach opportunities, including the annual Iowa Organic Agriculture Conference, field days, and excellent web resources. Much of ISU’s organic research contains economic analyses. The Iowa Organic Association and the Practical Farmers of Iowa collaborate with ISU’s organic research and outreach programs.

Kansas There has been strong movement in organic research activities at Kansas State University, led by the Department of Horticulture, Forestry, and Recreation Resources, in addition to the Kansas Center for Sustainable Agriculture and Alternative Crops. The Center provides web access to various resources related to organic production. Specific areas of organic research in horticultural crops have focused on soil microbial biology and tomato grafting. Additionally, a four-year project is underway to reduce produce (spinach and tomato) losses using pre- and post-harvest methods for small-acreage and/or organic growers and is supported by NIFA-AFRI.

Michigan Michigan State University is a leading institution for organic research, education, training, outreach, and information exchange in a wide variety of disciplines. The annual Michigan Organic Reporting Sessions are innovative, interactive daylong events where researchers share progress and results with other researchers, producers, ag professionals and the general public. MSU offers an extensive collection of web resources. MSU's Student Organic Farm is a 10-acre, certified organic year-round teaching and production farm. MSU has added to their crop research by examining the use of hogs in organic apple production.

Minnesota With more than 1000 acres used for organic research, a 110-cow certified organic research dairy herd, and two new organic food system undergraduate majors, the University of Minnesota has made a major investment in organic research capacity. The UMN organic research and outreach program involves faculty from agronomy, horticulture, economics, entomology, animal science, veterinary medicine, and food science. The UMN hosts annual organic crop and dairy field days and provides a wide variety of Extension publications, refereed articles, and web resources. The UMN Library has established an innovative database where published organic research papers are archived, described and linked.

Missouri Two land grant universities are involved with organic research and outreach in Missouri: the University of Missouri (MU) and Lincoln University (LU), the only 1890 land grant university in the North Central Region. The University of Missouri focuses on agronomic crops and practices while Lincoln University focuses on horticultural crops. Organic research and outreach at MU takes place primarily at the Bradford Research Center in Columbia while at Lincoln University it takes place primarily at the Alan T. Busby Research and Integrated Farm, a 280-acre farm used for organic and integrated systems research near Jefferson City. Faculty from Lincoln University are actively engaged in Extension outreach targeting small- and mid-scale farmers in Missouri. The University of Missouri will be opening a 20-acre student farm on campus in 2015 that will utilize organic practices.

Nebraska Organic crop research is conducted on certified organic university land in three of Nebraska's four eco-regions and on a network of farms across the state. Unique areas of inquiry at the University of Nebraska-Lincoln include: biodiversity conservation on working organic farms with a focus on bird populations; comparison of animal manure versus cover crops only as nutrient sources in long-term organic rotations; and flame weeding. Supplementary experiments include cover crop mixtures compared to single species. UNL has developed a *Healthy Farm Index* for long-term, ecological monitoring of biodiversity

indicators and land use patterns. UNL faculty are actively engaged with organic farmers and organizations throughout Nebraska and the Midwest.

North Dakota The overall theme for organic research at North Dakota State University is “The Search for Agricultural Sustainability in the Northern Great Plains.” Research has focused on methods to reduce tillage intensity and terminate cover crops in organic systems, as well as plant breeding and variety selection. NDSU has hosted several organic field days in recent years, as well as integrating organic content in other outreach events. NDSU partners with the Northern Plains Sustainable Agriculture Society on research and outreach. The Entrepreneurial Center for Horticulture at Dakota College at Bottineau conducts organic variety trials in its demonstration fields and high tunnels, and partners with four farms across North Dakota, two of which are certified organic, to provide locations for field tours and producer workshops.

Ohio The Ohio State University’s College of Food, Agriculture, and Environmental Sciences employs more than forty faculty members who are involved in organic research, education, and extension activities, including many who are directly involved in the Organic Food and Farming Education Research (OFFER) program. Areas of organic research include: agronomy; horticulture; soils; food processing; marketing and economics; and livestock (sheep, poultry, and dairy). Ohioline, which is the main outlet for Extension materials in Ohio, lists numerous publications for organic farmers. OSU faculty and staff work in partnership with the Ohio Ecological Food and Farming Association (OEFFA) to deliver field days, workshops and conferences.

South Dakota South Dakota State University received certification for a 4-acre organic research plot in 2012, where trials on winter wheat varieties are conducted. SDSU has worked with the Flandreau Santee Sioux tribe on development of a sustainable organic tribal bison production system. SDSU has a summer field day focusing on organic production and hosts an annual 2-day conference for organic and local food producers with tracks on organic crop, livestock, and vegetable production.

Wisconsin Wisconsin is home to robust, multi-disciplinary organic research, education, and outreach programs, led by faculty from the University of Wisconsin-Madison. Organic programming is also occurring at UW campuses throughout the state, as well as at several community and technical colleges. Faculty and staff, including those affiliated with the UW Center for Integrated Agriculture Systems (CIAS), work closely with organic producers and producer groups, such as Growing Power, Organic Valley, Midwest Organic and Sustainable Education Service (MOSES), and the Michael Fields Agricultural Institute, to conduct on-farm research and deliver field days and other outreach activities. The UW has an extensive list of peer-reviewed articles, Extension publications, and web resources.

State Reports

ILLINOIS

Organic Research Projects

Blasting the Competition Away: Air-propelled Abrasive Grits for Intra-row Weed Management in Organic Grain and Vegetable Crops. Sam E. Wortman, Mohammad Babadoost (University of Illinois), Frank Forcella (USDA-ARS), Sharon Clay, and Daniel Humburg (South Dakota State), 2014-2018, Funding: USDA NIFA-OREI.

Micro-managing Soil Health: Leveraging Plant-Microbe Interactions to Improve the Effectiveness of Cover Cropping Strategies, Anthony Yannarell, 2015-2018, Funding: Ceres Trust.

Keystone Cover Crop Species: Understanding the Relative Contribution of Individual Species to Soil Health. Sam E. Wortman, Department of Crop Sciences, University of Illinois. 2014-2017. Funding: Ceres Trust.

Evaluating Biological Control of Brassica Pests in Urban Land Repurposed for Farming, Lowenstein, David, University of Illinois-Chicago, Emily Minor, (Major professor), 2014-2015. Funding: Ceres Trust Graduate Student Grant.

Growing LOGIC (Local Organic Gardening Initiative of Carbondale): Creating Long-Term, Sustainable Organic and Permaculture Gardens for the SIU Community. Williams, L and L.A. Duram. 2012-15. Funding: Southern Illinois University Green Fund. Sustainability Award.

LOGIC: A Place to Learn and Gather. Laubach, D and L.A. Duram. 2013. Funding: Southern Illinois University Green Fund. Sustainability Award.

REU Site: Convergence Ecology – Research Experience for Undergraduates in Ecological Diversity Across Systems and Disciplines. Nielsen C., and S. Baer (L.A. Duram as non-PI personnel). Southern Illinois University. 2013, Funding: National Science Foundation.

Soil Health Content and Course for eOrganic, Wander, M.M. 2013-2014. Funding: Organic Valley.

Farmer-to-farmer advanced training project, Spaulding, T. R. (Angelic Organics Learning Center, Caledonia, IL), 2012-2105, Funding: USDA-NIFA.

[Building A Sustainable Plant and Food Production Program](#), F. Miller, Joliet Junior College, Joliet, IL. 2011-2014, Funding: USDA NIFA.

[Organic systems and climate change](#), Wander, M. M.; Ugarte, C.; Zaborski, E.; Phillips, E., 2010-2014, Funding: USDA-NIFA.

[Native American Small Farm Working Group: Promoting Integrated Pest Management in Indian Country](#), S. T. Ratcliffe, Crop Science, U of IL Urbana. 2010-2014, Funding: USDA NIFA.

Alleviating Soil Compaction and Improving Weed Suppression with Multifunctional Cover Crops in Organic Grain Production Systems, Maria Villamil. 2010-2013, Funding: Ceres Trust.

[Growing Hydroponic Fodder for Dairy Goats on a Limited Acreage Farm](#), Linda DuShane, Heart's Quest Dairy Goats, Lynn Center, IL. 2013, Funding: SARE.

[Systems Strategies for Weed Management on Organic Grain Farms](#). Joel Gruver, Western Illinois University, 2010-2012, Funding: Ceres Trust.

Translating Sustainable Agriculture to the Backyard Garden in Metropolitan Chicago, Anya Maziak, Chicago Botanic Garden, 2010, Funding: SARE.

[eOrganic: The National Online Information, Training, and Networking System for Organic Agriculture](#). Stone, A.; Wander, M.; Darby, H.; Riddle, J.; Barbercheck, M.; Treadwell, D.; Miller, S.; Gallandt, E.; Alexander, C.; Coolong, T.; Silva, E.; Daley, C., 2009-2012. Funding: NIFA OREN

[Transition to Organic Systems: How to Improve the Use of Winter Cover Crops to Enhance Nitrogen Cycling and Reduce Nitrogen Leaching](#), G. A. Bolero, Crop Science, U of IL Urbana. 2004-2009, Funding: USDA NIFA.

[Roller-Crimper Construction and No-Till Organic Weed Control Trials](#), Jackie de Batista, Irish Grove Farms, Inc., 2008, Funding: SARE.

[Pest Management for Transitioning and Organic Vegetable Production Systems](#), C. E. Eastman, U of IL Urbana. 2002-2008, Funding: USDA NIFA.

[Developing an Effective Strategy for Management of Internal Discoloration of Horseradish Root](#), Mohammad Babadoost Kondri, U of IL, 2007, Funding: SARE.

[Establishment of an Organic, Sustainable Small-Scale Farm Producing Livestock \(Goats/Chickens\) and Vegetables for Niche Markets in Chicago](#), Godwin Akpan, 2007, Funding: SARE.

[Marketing of Small Amounts of Organic Grains through Alternative Broiler Feeds and Direct to Consumer Sales](#), Lisa Haynes, 2007, Funding: SARE.

[Cropping Intensity and Organic Amendments in Transitional Farming Systems: Effects on Soil Fertility, Weeds, Diseases, and Insects](#), Eastman, C. E.; Bazik, M.; Cavanaugh-Grant, D. A.; Cooperband, L. R.; Eastburn, D. M.; Masiunas, J. B.; Shaw, J. T.; Wander, M. M., U of IL. 2003-2008, Funding: USDA NIFA.

[Sustainability of organic systems in Illinois – Windsor Organic Research Trials](#). Jarrell, W. M. 2003-2007, Funding: USDA-NIFA.

Cropping intensity and organic amendments in transitional farming systems, Shin-Yi Marzano, 2006, Funding: SARE.

[Producing agro-food quality conventions through organic certification disputes in Illinois](#), K. Salo, U of IL, 2005-2006, Funding: USDA-NIFA.

[Nitrogen Management and Fertility Systems in Organic Vegetable Production](#), J. M. Swiader, U of IL Urbana. 2001-2006, Funding: USDA NIFA.

[Conducting a Variety Trial to Find the Best Marketable Organic Tomato Product](#),

Louis Reuschel, Ocean Farm, 2004, Funding: SARE.

[Determination of an Economically Optimal Organic Control of Onion Maggots in Allium Crops](#), Lisa Haynes, 2004, Funding: SARE.

[Okra Test Trial of 16 Varieties in an Organic Farming Operation](#), Jon Klingenberg, Manning Farm Inc, 2003, Funding: SARE.

[New Strategies for Management of Vegetable Diseases in Organic and Traditional Farms](#), M. Babadoost, 2003, Funding: SARE.

Western Illinois University conducts a wide range of organic research, [with reports on organic fertilizers; variety trials; planting dates; cover crops; weeds; tillage; and soils](#).

Refereed Publications

Wortman, S. E. and J. Dawson. 2015. Nitrogenase activity and nodule biomass of cowpea (*Vigna unguiculata* L. Walp.) decrease in cover crop mixtures. *Communications in Soil Science and Plant Analysis*. In press.

Wortman, S. E., J. Schmidt, and J. L. Lindquist. 2014. Weed Suppressive Potential of Sudangrass is Driven by Interactions of Root Exudates and Decomposing Shoot Residue. *Crop Management* 13:doi:10.2134/CM-2013-0037-RS

Wagstaff, R. K. and S. E. Wortman. 2014. Crop physiological response across the Chicago metropolitan region: Developing recommendations for urban and peri-urban farmers in the North Central US. *Renewable Agriculture and Food Systems*, doi:10.1017/S174217051300046X.

Acuña, J., and M. B. Villamil, 2014. Short-Term Effects of Cover Crops and Compaction on Soil Properties and Soybean Production in Illinois. *Agronomy Journal*, 106:860-870.

Acuna, Juan C. and Maria B. Villamil. "Short-Term Effects of Cover Crops and Compaction on Soil Properties and Soybean Production in Illinois." *Agronomy Journal* 106.3 (2014): 860-870.

Schutte, B. J., B. J. Tomasek, A. S. Davis, L. Andersson, D. L. Benoit, A. Cirujeda, J. Dekker, F. Forcella, J. L. Gonzalez Andujar, F. Graziani, A. J. Murdoch, P. Neve, I. A. Rasmussen, B. Sera, J. Salonen, F. Tei, K. S. Tirresen, J. M. Urbano, and P. Lutman. 2014. An investigation to enhance understanding of the stimulation of weed seedling emergence by soil disturbance. *Weed Research* 54 (1): 1-12.

Ugarte, C. .M, H. Kwon, S. S. Andrews, and M. M. Wander. 2014. A meta-analysis of soil organic matter response to soil management practices: An approach to evaluate conservation indicators. *Journal of Soil and Water Conservation* 69 (5): 422-430.

Ferguson, Rafter S, and Sarah T. Lovell. "Permaculture for agroecology: design, movement, practice, and worldview. A review." *Agronomy for Sustainable Development* 34.2 (2014): 251-274.

- Duram, L.A. and L. Williams. 2014. Assessing Long-term Support for Student Organic Gardens within a Sustainable Campus. *International Journal of Sustainability in Higher Education* 16 (1). In press.
- Wortman, S. E. 2014. Integrating weed and vegetable crop management with multifunctional air-propelled abrasive grits. *Weed Technology* 28:243-252.
- Marzano, SY, M.M. Wander, M. Villamil, C.M. Ugarte, E. R. Zaborski, D. Eastburn. Transitional cropping systems and organic amendment effects on crop diseases. *Agronomy Journal* 106:519-527.
- Park H.K., Shin H., Feng H. 2014. Response surface modeling for achieving 5-log reduction of E. coli O157:H7 on alfalfa seeds by sonication and mild heat without compromising germination rates. *Institute of Food Technologists annual meeting*, New Orleans, LA.
- Wortman, S. E., R. A. Drijber, C. A. Francis, and J. L. Lindquist. 2013. Arable weeds, cover crops, and tillage drive soil microbial community composition in organic cropping systems. *Applied Soil Ecology* 72:232-241.
- Wortman, S. E., C. A. Francis, M. A. Bernards, E. E. Blankenship, and J. L. Lindquist. 2013. Mechanical Termination of Diverse Cover Crop Mixtures for Improved Weed Suppression in Organic Cropping Systems. *Weed Science* 61:162-170.
- Brainard, D. C., Curran, W. S., Bellinder, R. R., Ngouajio, M., VanGessel, M. J., Haar, M. J., Lanini, W.T., & Masiunas, J. B. 2013. Temperature and Relative Humidity Affect Weed Response to Vinegar and Clove Oil. *Weed Technology*, 27(1), 156-164.
- Francis, C., Miller, M., Anderson, M., Creamer, N., Wander, M., Park, J., Green, T., and McCown, B. 2013. [Food webs and food sovereignty: Research agenda for sustainability](#). *Journal of Agriculture, Food Systems, and Community Development*.
- Ugarte, M. C., Zaborski, E. R., and M.M. Wander. 2013. Nematodes as integrative measures of soil condition in organic cropping systems. *Soil Biology and Biochemistry*. 64:103-113.
- Park H.K., Feng H. 2012. Inactivation of *Salmonella* inoculated on almonds by power ultrasound. *Institute of Food Technologists annual meeting*, Las Vegas, NV.
- Ugarte-Diaz, C.M. and M.M. Wander. 2012. The influence of organic transition strategy on chemical and biological soil tests. *Renewable Agriculture and Food Systems*. doi:10.1017/S1742170511000573.
- Stone. A.G. Treadwell, D.D., Formiga, A.K., McQueen, J.P.G., Wander, M.M., Riddle, J., Darby, H.M., and D. Helba. 2012. eOrganic: The Organic Agriculture Community of Practice for eXtension. *Hortech*. 22:583-588.
- Bicksler, A. J., Masiunas, J. B., & Davis, A. 2012. Canada Thistle (*Cirsium arvense*) Suppression by Sudangrass Interference and Defoliation. *Weed Science*, 60(2), 260-266.
- Wortman, S.E., C.A. Francis, M.A. Bernards, E.E. Blankenship, and J. L. Lindquist. 2012. Mechanical Termination of Diverse Cover Crop Mixtures for Improved Weed Suppression in Organic Cropping Systems. *Weed Science*.

Wortman, S.E., C.A. Francis, M. Bernards, R. Drijber, and J.L. Lindquist. 2012. Optimizing Cover Crop Benefits with Diverse Mixtures and an Alternative Termination Method. *Agronomy Journal* 104:1425-1435.

Wortman, S. E., C. A. Francis, and J. L. Lindquist. 2012. Cover Crop Mixtures for the Western Corn Belt: Opportunities for Increased Productivity and Stability. *Agronomy Journal* 104:699-705.

Wortman, S. E., T. Galusha, S. C. Mason, and C. A. Francis. 2012. Soil Fertility and Crop Yields in Long-Term Organic and Conventional Cropping Systems in Eastern Nebraska. *Renewable Agriculture and Food Systems* 27:200-216.

[Davis, A. S. 2010. Cover-crop roller-crimper contributes to weed management in no-till soybean. *Weed Sci.* 58: 300-309.](#)

Wortman, S.E., J.L. Lindquist, M. Haar, and C.A. Francis. 2010. Increased Weed Diversity, Density and Aboveground Biomass in Long-Term Organic Crop Rotations. *Renewable Agriculture and Food Systems* 25:281-295.

Bicksler, A. J. and J. B. Masiunas. 2009. Canada thistle (*Cirsium arvense*) suppression with buckwheat or sudangrass and mowing. *Weed Technology* 23:556-563.

Wander M.M., Yun W., Goldstein W.A., Aref, S., and S.A. Khan. 2007. Organic N and particulate organic matter fractions in organic and conventional farming systems with a history of manure application. *Plant and Soil*. 291:311-321.

Marriott, M.E. and M.M. Wander. 2006. Total and labile soil organic matter in organic farming systems. *Soil Science Society of America Journal*. 70:950-959.

Marriott, M.E. and M.M. Wander. 2006. Using qualitative and quantitative differences in particulate organic matter to assess fertility in organic and conventional farming systems. *Soil Biology and Biochemistry*. 38:1527-1536.

Grimmer, O. and J. Masiunas. 2005. Weed control potential of oat (*Avena sativa*) cultivars. *HortTechnology* 15(1):140-144.

Grimmer, O. and J. Masiunas. 2004. Evaluation of winter-killed cover crops preceding snap pea. *HortTechnology* 14(3):349-355.

Extension and Outreach Publications

Extension organic content is maintained as part of the [Small Farms Educators Page](#).

Educators actively engaged in organic extension include:

Deborah Cavanaugh-Grant, U of IL Extension, Food Safety, Small Farms, GAP, cvnghgrn@illinois.edu (organizes the [Organic Track](#) of the Illinois Specialty Crops, Agritourism and Organic Conference)

Mekenzie Riley, MS, RD Extension Educator, Nutrition and Wellness, Benefits of organic food meklew@illinois.edu

Michelle Wander from the U of IL has written numerous Extension publications on [soil management in organic systems](#), posted at [the extension.org website](#).

Examples include:

- [Managing Manure Fertilizers in Organic Systems](#)
- [Measures of Soil Biology and Biological Activity](#)
- [NRCS EQIP: What You Need to Know About the Organic Initiative](#)
- [Nutrient Budget Basics for Organic Farming Systems](#)
- [Nutrient Management Plans and Fit with Organic Systems Plan](#)
- [Organic Certification and Soil Conservation Compliance](#)
- [Organic Potting Mix Basics](#)
- [Organic Soil Fertility](#)
- [Soil Fertility in Organic Farming Systems: Much More than Plant Nutrition](#)
- [Use of Tillage in Organic Farming Systems: The Basics](#)

Academic Curricula

The University of Illinois offers one class dedicated to organic agriculture:

Soil Stewardship: From Organic Certification to Conservation Planning NRES 285 Field Experiences

The U of IL offers “Agroecology” and “Horticultural Food Systems” concentrations within the Crop Sciences major in which many students interested in organic agriculture participate. These concentrations often include some of the following classes: Principles of Agroecology, Conservation Biology, Soil Nutrient Cycling, Multifunctional Landscapes, Vegetable Gardening, and Local Food Networks. There are no organic degrees or certificates.

A new class at U of IL titled, “Urban Food Production” (HORT 435) was developed and taught online by Dr. Sam Wortman during the fall semester of 2014. Students learn about local and organic vegetable production practices in and around urban areas.

Graduate Student Opportunities

Graduate student research opportunities are mostly driven by faculty research interests. U of IL faculty have trained, are currently training, or are planning to train graduate students in areas of organic agriculture. The [Agroecology and Sustainable Agriculture Program](#) provides support for graduate student research on topics important to organic agriculture by making a [2 year commitment of a 25% 11-month research assistantship](#) (RA) and tuition and fee waiver to students studying critical issues in agriculture, food systems and their interactions with the environment and society.

Outreach Efforts

Field Day at PrairiErth Farm in Atlanta, IL to highlight Ceres Trust funded organic on-farm research. September 2014.

Presentation and Panel discussion at the National Soil and Water Conservation, Chicago, IL July 2014. Beg, Borrow, or Steal to Improve Soil Stewardship: Will Segmenting Midwest Row Crop Actors Improve Management? Funded by, and focused on NIFA-Organic Transitions Research. Facilitated by M. Wander, C. Ugarte and E. Phillips.

The University of Illinois partners with the Illinois Specialty Growers Association to organize the annual [Illinois Specialty Crops, Agritourism, and Organic Conference \(ISCAOC\)](#), which includes sessions on organic production. The 2015 conference attracted over 100 participants in two Organic tracks focused on grain production, sundry issues, vegetable production, fruit production, soil and fertility, and livestock and forage systems. [2014 Small Farms Winter Webinar Series](#) included 4 sessions (out of 12) covering organic themes.

The U of IL Department of Crop Sciences organizes an [Organic Gardening Day](#).

U of IL 2013 Agroecology and Sustainable Agriculture's Earth Day Symposium – [Understanding and Addressing the GE Crop Critique](#)

Bryan Endres, U of IL, delivered a Legal Issues Webinar – [Building the Base of Your CSA: Best Practices, Including Member, Volunteer, and Intern Agreements](#).

Western Illinois University holds an annual [organic field day](#) at the Allison Organic Farm.

The [Illinois Organic Growers Association](#):

- Supports networking and farmer-to-farmer exchange among farmers interested in organic and sustainable production methods;
- Promotes and develops new and improved production methods that are state- and region-specific;
- Helps growers educate consumers and expand markets for organic agricultural products; and
- Organizes numerous organic, grassfed, and sustainable production field days.

IOGA is supported by the University of Illinois' Agroecology and Sustainable Agriculture Program, U of IL Extension, and the Illinois Stewardship Alliance. The U of IL's Agroecology and Sustainable Agriculture Program provides ongoing financial support for this as one of its 'core programs.'

Web Resources

The following websites contain information about organic and sustainable agriculture in Illinois:

- [U of IL Agroecology and Sustainable Agriculture Program](#)
- [U of IL Extension Small Farms Program](#)
- [U of IL Library Sustainability/Organic Agriculture Resources](#)
- [FamilyFarmed.org](#)
- [Organic content](#) maintained as part of the [Small Farms Educators Page](#)

- [Growing Home](#)
- [Illinois Natural History Survey](#)
- [Illinois Organic Growers Association](#)
- [Illinois Stewardship Alliance](#)
- [The Land Connection](#)
- [Wander Soil Ecology Lab](#)
- Urban Agriculture Research Lab

Hands-on Learning

[The Illinois Sustainable Student Farm](#) is completing the transition to certified organic production on at least half of the farm's six acres.

In Chicago, [Windy City Harvest](#) trains adults in sustainable horticulture and urban agriculture. The certificate program is delivered by the Chicago Botanic Garden in partnership with Richard J. Daley College, a City College of Chicago.

[Growing Home](#) operates several certified organic training farms in and around Chicago, where interns receive a fair wage while learning transferable job skills in Landscaping/Horticulture, Food Service, or Customer Service.

Acres Certified Organic

In spring of 2013, the University of Illinois began transitioning three acres at the [Illinois Sustainable Student Farm](#) to certified organic production. A new 20-acre organic study evaluating landscape pattern and spray drift is being developed by the Department of Natural Resources and Environmental Sciences. Organic transition of the site will begin Spring 2015.

A 5-acre site for woody perennial polyculture was established in 2013 on the Sustainable Student Farm. A 30-acre study of woody perennial polyculture focused on fruit and nut production will be planted in Spring 2015. Organic management and propagation tactics will be explored but the site will not be certified organic.

Faculty from Western Illinois University conduct organic crop research on 80 acres of land at the [Allison Organic Research & Demonstration Farm](#).

Total acres certified, managed organically, or in transition at Illinois research institutions = 103 acres.

Organic Livestock Research

None.

On-Farm Research

Five faculty members and five graduate students conduct on-farm research on seven organic farms in Illinois, focusing on grain, legume and vegetable research. On-farm organic research has been increasing in Illinois. Many researchers and extension educators have developed

strong working relationships with organic farmers in Illinois, which has made on-farm research a great option for accomplishing research objectives.

Key Contacts

- Deborah Cavanaugh-Grant, U of IL Extension, cvnghgrn@illinois.edu
- Bill Davidson, U of IL Extension, wdavison@illinois.edu
- Dr. Adam Davis, Associate Professor, U of IL, asdavis1@illinois.edu
- Dr. Leslie Duram, Professor, Southern Illinois University, duram@siu.edu
- Dr. Darin Eastburn, Associate Professor, U of IL, eastburn@illinois.edu
- Dr. Bryan Endres, Associate Professor, U of IL, benders@illinois.edu
- Zachary Grant, U of IL Extension, zgrant2@illinois.edu
- Dr. Joel Gruver, Assistant Professor, Western Illinois University, J-Gruver@wiu.edu
- Andrew Larson, U of IL Extension, _andylars@illinois.edu
- Dr. John Masiunas, Professor, U of IL, masiunas@illinois.edu
- Dr. Maria Villamil, Assistant Professor, U of IL, villamil@illinois.edu
- Dr. Michelle Wander, Professor, U of IL, mwander@illinois.edu
- Dr. Sam Wortman, Assistant Professor, U of IL, swortman@illinois.edu
- Dr. Anthony Yannarell, Assistant Professor, U of IL, acyann@illinois.edu

INDIANA

Organic Research Projects

Practical approach to foliar pathogen control in organic tomato production through participatory breeding and integrated pest management. Lori Hoagland et al. 2015-2019, Funding: NIFA-OREI

Biological approaches to mediating soil-borne pathogens, Lori Hoagland, 2012-ongoing. Funding: ISDA-Specialty Crop Block Grant and Internal Purdue AgSeed Grant.

Institutional analysis of sustainable food systems in the tri-state area of Indiana, Michigan, and Ohio. PI - Jen Robinson, with Dan Knudsen, Burnell Fischer and Heather Reynolds. Funding: Indiana University Internal.

Collaborative Research to Identify Fertility Amendments that Improve Soil Quality and Mediate Pathogen Outbreaks on Organic Vegetable Farms, Lori Hoagland et al. 2012-2015, Funding: Ceres Trust.

High Tunnel Vegetable Production, Liz Maynard, 2012-ongoing. Funding: Internal and Indiana State Dept. of Agriculture.

Barriers to land access amongst new and beginning sustainable farmers: a case for sustainable farmer, land trust, and community collaboration. James Farmer and Charles Chancellor, Indiana University. 2012-2013, Funding: Internal.

Overcoming the barriers to organic production in West Virginia. James Farmer, Cassie Peters, Evan Hanson, and Fritz Boettner, IN U. 2011-2013, Funding: USDA NIFA-OREI.

Lettuce Variety Observation Trial, Liz Maynard, Purdue, 2013. Funding: USDA Specialty Crop Block Grant, Indiana State Dept. of Agriculture.

Harnessing Farm Wildlife for Weed Management: Measuring Suppression by Rodents and Insects, Carmen Blubaugh (Ian Kaplan, Major Professor), 2013, Funding: Ceres Trust Graduate Student Grant.

Organic Heirloom Tomato Variety Trial, Maria Restrepo, Extension; Shubin K. Saha, Horticulture & Landscape Architecture; Scott Monroe, Extension; Valerie Clingerman, Extension; Dan Egel, Botany & Plant Pathology, 2012-2013, Funding: Internal and USDA Specialty Crop Block Grant, Indiana State Dept. of Agriculture.

[Hydroponic Fodder in an Organic Pastured Poultry System: Can feed costs be reduced?](#)

Lisa Burke, Farming Engineers LLC, Kirklin, IN. 2013, Funding: SARE.

Can ground beetles limit weeds in organic vegetable systems? Carmen Blubaugh, (Ian Kaplan, Major Professor), 2012, Funding: Ceres Trust Graduate Student Grant.

OMRI Certified Products for Fusarium Wilt in Watermelon, Dan Egel & Shubin K. Saha w/ Nathan Kleczewski, Horticulture & Landscape Architecture, 2012, Funding: Indiana State Department of Agriculture Market Promotion and Distribution Grant Program.

Comparing the Effects of Spring and Fall Tillage on Larval Populations of a Beneficial Insect, Carmen Blubaugh, 2012, Funding: SARE.

Assessing Local Foods in Indiana: Farmers' Markets and Community Supported Agriculture. James Farmer, Devorah Shubowitz, Richard Wilk, and Sara Farmer. 2009-2010, Funding: Indiana State Department of Agriculture: Specialty Block Grant Program.

Economics, ecology, education: An integrated approach to ensure the success of organic vegetable growers, Gibson, K., Alexander, C., Beckerman, J., Hallett, S., Hoagland, L., Kaplan, I., Kladvik, E., Marshall, M., Sadof, C. 2010, Funding: USDA-OREI.

Evaluation of OMRI-approved Products for Disease Management of Muskmelon, Daniel S. Egel, Shubin K. Saha, Stacey Johnson, Scott Monroe, Dennis Nowaskie, and Maria Restrepo. 2010, Funding: Indiana State Department of Agriculture Market Promotion and Distribution Grant Program.

Scaling Up Production by Improving Worker Comfort and Efficiency in No-till Organic Seed Garlic Production System, Daniel Perkins, Perkins' Good Earth Farm. 2010, Funding: SARE.

Cropping Systems for Tomato and Squash – Evaluating conventional tillage with plastic or straw mulch and strip-tillage with living mulch for producing squash and tomatoes in organic and conventional systems. 2006-2009, Liz Maynard, Funding: Internal.

Demonstration trials of food grains ozonation — a new chemical-free stored product pest control technology, Maier, D.E., Woloshuk, C.P., Mason, L.J., Alexander, C.E., Hulasare, R., and Subramanyam, B. 2005-2008, Funding: USDA-NIFA.

[Evaluating weed control strategies in organic vegetable production](#), Dale Rhoads, 2008, Funding: SARE.

[Enhancing Year-Round Sales of Quality Farm Product through the Use of On-Farm Geothermal Climate Controlled Storage Facilities](#), Anna Welch. 2007, Funding: SARE.

[Marketing an Organic CSA](#), Michael Hollcraft. 2007, Funding: SARE.

[Field Trials of Organic Herbicides in Vegetable Production](#), Dale Rhoads. 2006, Funding: SARE.

[Value-added Sustainable Animal Production with Natural and Organic Leathers](#), Brent Ladd. 2006, Funding: SARE.

[Development of Organic Weed Control Strategies](#), Dale Rhoads. 2005, Funding: SARE.

[Using farmer input to develop research projects and outreach activities for organic agriculture](#), David Hillger. 2005, Funding: SARE.

Weed Control in Organic Lettuce. 2004-2005. Liz Maynard. Funding: Internal and Gifts.

Organic production systems for apples in the Midwest, Foster, R. E.; Pecknold, P. C.; Hirst, P.; Weller, S. C. 2002-2005, Funding: USDA.

[Benefits & Evaluation of the Application of Compost Tea in Growing Organic Vegetables](#), Dan Flotow. 2004, Funding: SARE.

Refereed Publications

Rudisill, M., Bordelon, B., Turco, R., Hoagland, L. (in press). Sustaining soil quality in intensively managed high tunnel vegetable production systems: a role for green manures and chicken litter. *Hortscience*

Reynolds, H., Smith, A., and Farmer, J., 2014. Local, sustainable food and a steady-state food system. *American Journal of Botany*, 101, 1631-1639.

Farmer, J., Epstein, G., Watkins, S., and Mincey, S. 2014. Constraints on transitioning WV farms to USDA certified organic. *Journal of Agriculture, Food Systems, and Community Development*, 4(4).

Farmer, J., Chancellor, C., Robinson, J. West, S., and Weddell, M. 2014. Agrileisure: Farmers' markets, CSAs, and the privilege in eating local. *Journal of Leisure Research*, 46(3), 313-328.

Hoagland, L., Navazio, J., Cerruti, N., Maynard, L., Kaplan, I., Gibson, K. 2014. Breeding regionally adapted fresh-market tomato varieties for organic production systems in the Midwestern U.S Organic Seed Alliance Conference Proceedings, Corvallis, OR.

Rostagno, M. H., & Ebner, P. D. (in press). Incidence of foodborne pathogens in organic pork. *Organic Meat Production and Processing*.

- Borrelli, K., Koenig, R., Gallagher, R., Pittman, D., Snyder, A., Fuerst, P., Hoagland, L. A. 2012. Alternative strategies for transitioning to organic production in direct-seeded grain systems in eastern Washington II: Soil Fertility. *Journal of Sustainable Agriculture*.
- Hoagland, L., Mazzola, M., Murphy, K.M., Jones, S.S., 2012. Wheat varietal selection and annual vs. perennial growth habit impact soil microbial community and apple replant disease suppression. *Organic Seed Alliance Conference Proceedings*, Port Townsend, WA. pp. 13-15.
- Veldstra, M. D., Alexander, C. E., & Marshall, M. I. 2012. To certify or not to certify? Decomposing the organic production and certification decisions. *Proceedings of the International Food and Agribusiness Management Association 2012 Annual World Symposium*. Shanghai, China. [Available online](#).
- Yue, C., Dennis, J. H., Behe, B. K., Hall, C. R., Campbell, B. L., & Lopez, R. G. 2011. Investigating consumer preference for organic, local, or sustainable plants. *HortScience*, 46(4), 610-615.
- Turner, S. F., Benedict, C. A., Darby, H., Hoagland, L. A., Simonson, P., Serrine, J. R., & Murphy, K. M. 2011. Challenges and opportunities for organic hop production in the United States. *Agronomy Journal*, 103(6), 1645-1654.
- Murphy, K. M., Hoagland, L. A., Yan, L., Colley, M., & Jones, S. 2011. Genotype X environmental interaction for mineral nutrient concentration in organically grown spring wheat. *Agronomy Journal*, 103, 1734-1741.
- Mayen, C. D., Balagtas, J. V., & Alexander, C. E. 2010. Technology adoption and technical efficiency: organic and conventional dairy farms in the United States. *American Journal of Agricultural Economics*, 92(1), 181-195.
- TerAvest, D., Smith, J. L., Carpenter-Boggs, L., Hoagland, L. A., Granatstein, D., & Reganold, J. 2010. Influence of orchard floor management and compost application timing on N partitioning in organically managed apple trees. *HortScience*, 45, 637-642.
- Hoagland, L. A., Hodges, L., Brandle, J. R., Helmers, G. A., & Francis, C. A. 2010. Labor availability in an integrated agricultural system. *Journal of Sustainable Agriculture*, 34, 532-548.
- Gallagher, R. S., Pittman, D., Snyder, A. M., Koenig, R. T., Fuerst, E. P., Burke, I. C., & Hoagland, L. A. 2010. Alternative strategies for the transition to organic production in direct-seeded grain systems in eastern WA I: Crop agronomy. *Journal of Sustainable Agriculture*, 34, 483-503.
- Hoagland, L. A., Carpenter-Boggs, L., Granatstein, D., Mazzola, M., Peryea, F., Smith, J., & Reganold, J. 2008. Orchard floor management effects on nitrogen fertility and soil biological activity in a newly established organic apple orchard. *Biology and Fertility of Soils*, 45, 11-18.
- David E. Hillger, Stephen C. Weller, Elizabeth Maynard, and Kevin D. Gibson 2006. Weed management systems in Indiana tomato production. *Weed Science*: May 2006, Vol. 54, No. 3, pp. 516-520.

Extension and Outreach Publications

- [Disease Management Strategies for Horticultural Crops: Using Organic Fungicides](#)
- [Driftwatch: Watch Out for Pesticide Drift and Organic Production](#)
- [Fertigation in Organic Vegetable Production Systems](#) (eXtension.org)
- [Organic Foods \(Food Entrepreneurship Series\)](#)
- [Organic Vegetable Production](#) (short handout)
- [Organic Vegetable Production](#) (20-page pub)
- [Pesticide Residues in Urban Water Bodies – Organic Farming as a Community Based Mitigation Strategy in Hyderabad Peri-Urban Area](#)
- [Organic Farming Fact Sheets](#)
- [Overcoming the Market Barriers to Organic Production in West Virginia](#)

Academic Curricula

No undergraduate organic or sustainable agriculture degree is available, but Purdue offers a class, “Principles of Organic Sustainable Agriculture.” (BTNY39000/HORT49100)

A Sustainable Food and Farming Systems Major has passed the faculty senate. New major expected to start in Fall 2014/2015.

No undergraduate organic or sustainable agriculture degree is available, but Indiana University Bloomington offers several relevant classes, including:

- SPH O-111 Sustainable Gardening
- SPH O-343 Fundamentals of Sustainable Agriculture
- GEOG G461 Human Dimensions of Global Environmental Change
- SPEA E-400 Farming the City: Global Perspectives on Urban Agriculture and Food Security

[Ball State University](#) offers courses in Sustainable Agriculture (NREM 304/504).

Goshen College offers an [Agroecology Summer Intensive](#), an undergraduate residential curriculum in academic and experiential learning. It comprises four 3-credit courses in Sustainable Agriculture: soils, vegetable crops, agroecology and small farm management/produce marketing. A Certificate Program is available for persons not seeking academic credit.

Graduate Student Opportunities

See description of graduate programs in various departments. Nothing is labeled organic but opportunities exist. For example, Purdue offers an Interdisciplinary Graduate Program in [Ecological Sciences and Engineering](#).

Outreach Efforts

[Indiana Small Farm Conference](#) (2013-current). Organized by Purdue Extension. Includes various sessions with relevance to organic agriculture. 2014 conference included a day-long pre-conference workshop on “Growing Organic,” that covered many questions fruit and vegetable growers have about growing organically. The topics of organic certification, pests, and soil management were covered by certifiers, organic farmers, and Purdue specialists.

Organic Soil Management Workshop (2013) – Daylong workshop discussed various aspects of soil quality and nutrient management in organic systems. The workshop was followed by a tour of on-farm research associated with our Ceres Trust grant (Hoagland et al), and demonstrated how to measure soil quality on the farm.

Meig’s Farm Summer Twilight Tours – Highlight organic specialty crop research at Purdue.

Various programs on vegetable production offered by Purdue Extension include information on organic production and/or tours of organic trials. Recent examples: Extending the Season for Vegetable Crops with High Tunnels and More, Nov. 2013; High Tunnel Open House, Dec. 2012.

[Indiana Horticultural Congress](#) – Purdue helps with annual organic sessions.

[New Ag Network](#) is a listserv for farmers and researchers in the Great Lakes region, including Michigan, Indiana, Illinois and Iowa. Information is appropriate for crop and vegetable farmers seeking input on organic soil building, field management, and cover crop implementation.

Web Resources

- [Small Farms and Local Food Webpage](#) – has resources for organic growers
- [North Central Regional Sustainable Ag and Organic Video Series](#)
- [Organic and Alternative Livestock Production Systems at Purdue University](#)
- [Organic Vegetable Production resource page](#)
- [Indiana University Bloomington Office of Sustainability](#)

See Extension and Outreach Publications listed above, all of which are on the web.

Hands-on Learning

[Purdue Student Farm](#) is managed using organic practices, but not certified.

Purdue University has a community garden similar to the one described by Notre Dame below. Gardeners are also supposed to use organic practices. http://www.purdue.edu/newsroom/purduetoday/faculty_staff_news/2012/120403_VillagGarden.html

The University of Notre Dame’s [campus garden](#) started in May 2010. Garden plots are 5’ X 10’ and their use is free of charge for individuals, families, groups of co-workers, or departments. Gardeners are free to do as they wish with the food they harvest. All gardeners agree to raise their crops organically.

Indiana University Bloomington's [Campus Garden](#) and [Edible Campus](#) Initiatives promote interactive, edible campus gardening spaces that utilize organic growing practices. In addition, [SPROUTS](#) is a student-run organic gardening club.

Acres Certified Organic

[Southwest Purdue Ag Center](#) – 1 acre certified.

[Pinney Purdue Ag Center](#) – 0.4 acre managed organically but not certified (0.2 managed organically since 1993); 0.1 acre in transition for use in high tunnel production.

[Meigs/Throckmorton](#) – 10 acres certified, 8 acres managed organically but not certified.

Total acres certified, managed organically, or in transition = 19.5 acres.

Organic Livestock Research

No certified organic livestock research, but research and resources applicable to organic livestock production are described at: [Organic and Alternative Livestock Production Systems at Purdue University](#).

On-Farm Research

At Purdue, at least three faculty and two graduate students are conducting research on three certified organic vegetable farms. While currently limited, organic on-farm research has been conducted in the past, and more interest/activity is anticipated in the future.

At Indiana University, two faculty members and two graduate students are conducting research on an organic vegetable farm, evaluating cover cropping systems and their impact on specialty crop yields.

Key Contacts

- Dr. Paul Ebner, Associate Professor of Animal Sciences, Purdue, pebner@purdue.edu
- Dr. Dan Egel, Extension Plant Pathologist, SWPAC, egel@purdue.edu
- Dr. James Farmer, Assistant Professor, Indiana University, jafarmer@indiana.edu
- Dr. Kevin Gibson, Associate Professor, Purdue, kgibson@purdue.edu
- Dr. Steve Hallett, Associate Professor, Botany and Plant Pathology, Purdue, halletts@purdue.edu
- Dr. Lori Hoagland, Assistant Professor, Purdue, lhoaglan@purdue.edu
- Dr. Ian Kaplan, Assistant Professor, Purdue, ikaplan@purdue.edu
- Dr. Liz Maynard, Clinical Assistant Professor and Extension Specialist, Purdue, emaynard@purdue.edu

IOWA

Iowa State University Organic Research Projects:

Overcoming Barriers to Consistent Yields in Reduced Tillage Organic Vegetable Production. Dana Jokela, ISU, Ajay Nair, Faculty Advisor, 2014-2015, Funding: Ceres Trust Graduate Student Grant.

Improving Organic No-Till Systems for Enhanced Soil Quality and Weed Management in Organic Vegetable and Grain/Forage Systems, Kathleen Delate, 2012-2015, Funding: Ceres Trust.

Long-Term Agroecological Research (LTAR): Comparison of Organic and Conventional Crops and Crop Rotations: 17-acre certified organic experiment at the ISU Neely-Kinyon Farm, Greenfield, IA; Ongoing, Funding: Leopold Center for Sustainable Agriculture.

Management of New and Invasive Pests in Organic Soybeans: organic-compliant treatments for soybean aphid and bean leaf beetle management (Greenfield), 2009-2015, Funding: Leopold Center for Sustainable Agriculture.

Agronomic and Economic Performance of Organic Corn and Soybean Crops for Value-Added Traits: organic seed variety trials (Greenfield and Crawfordsville). Funding: Leopold Center for Sustainable Agriculture.

Organic Apple and Grape Performance under Iowa Conditions: organic-compliant treatments for codling moth and plum curculio in apples; weed and disease management in grapes (Adel on-farm trial and Greenfield). Ongoing, Funding: Leopold Center for Sustainable Agriculture/United Natural Foundation Initiative.

Sustainable Systems for Cucurbit Crops on Organic Farms, 2009-2012, Mark Gleason, Funding: USDA OREI.

Integrated systems research and development in automation and sensors for sustainability of specialty crops, Steward, B. L.; Darr, M. J.; Tang, L., 2008-2013, Funding: USDA-NIFA.

Strengthening public corn breeding to ensure that organic farmers have access to elite cultivars, (Scott, Carlson, Hurburgh, Smith, Pratt, Montgomery, and Goldstein) 2010-2015, Funding: USDA-NIFA-OREI.

Breeding Non-commodity corn for organic production systems. (Scott, Lamkey, Stone, Smith, Pratt, Montgomery, and Goldstein) 2014-2018, Funding: USDA-NIFA-OREI.

Extramural Research Projects:

Constraints to Profitability of Small Grains in Iowa and the Upper Midwest. Iowa Organic Association. Mary Wiedenhoef and Margaret Smith (ISU), Principal Investigators, 2013-2016, Funding: Ceres Trust.

Enhancing Soil Health and Food Quality in Organic Vegetable Systems (Delate, Cambardella and Chase, and Univ. of Florida) – Greenfield, IA and Gainesville, FL, Funding: USDA-NIFA.

Developing Carbon-Positive Organic Systems through Reduced Tillage and Cover Crop-Intensive Crop Rotation Schemes (Delate, Cambardella and Chase, Ames, IA; 5 LGUs; and Rodale Institute), 2008-2102, Funding: USDA-CSREES.

Enhancing Farmland Water Quality and Availability through Soil-Building Crop Rotations and Organic Practices (Delate, Cambardella and Chase, and co-PIs at USDA-ARS NLAE, Ames, IA), Funding: USDA-CSREES.

Cover Crops for Organic Systems (Delate, Cambardella, Duffy, with NDSU), Greenfield, IA, Funding: USDA-SARE.

Facilitating improved soil quality on organic farms through research and training on no-till vegetable production in the Midwest, Kathleen Delate, 2009-2012, Funding: Ceres Trust.

USDA-ARS (Ames, IA) Organic Research:

Strengthening public corn breeding to ensure that organic farmers have access to elite cultivars: Outreach, Abel C A; Carlson S., 2011-2014, Funding: USDA-ARS/USDA-NIFA

Breeding high-quality corn for low-input and organic farming systems, Pollak L M; Abel C A., 2008-2013, Funding: USDA-ARS.

Enhancing farmland water quality & availability through soil-building crop rotations & organic practices, Cambardella C A; Sauer T J; Jaynes D B; Delate K; Malone R W., 2009-2011, Funding: USDA-ARS.

Enhanced Midwestern cropping systems for sustainability and environmental quality, Singer J W; Kovar J L; Cambardella C A; Hatfield J L., 2008-2011, Funding: USDA-ARS.

Innovative genetic approaches for improving maize germplasm for product quality and adaption to diverse production systems. Scott, MP, Edwards, JW, Abel, CA, 2012-2017, Funding: USDA-ARS.

Additional Organic Research:

[Grass-Fed Beef Nutritional Analysis for Consumer Education and Labeling](#), Kristine Jepsen, Dorchester, IA. 2013, Funding: SARE.

[Internal Parasites in Organic Hog Production – Ivermectin Trial](#), Margaret Dunn, Tom, Irene and James Frantzen, [Practical Farmers of Iowa](#), 2013, Funding: Walton Family Foundation and Organic Valley.

[Suitability of Winter Canola \(*Brassica napus*\) for Enhancing Summer Annual Crop Rotations in Iowa](#), Rafael Martinez-Feria, (Mary Wiedenhoef, Faculty Advisor), ISU. 2013, Funding: SARE.

[Rainwater Harvesting for Irrigation of Organic Vegetables](#), Levi Lyle, LIFE- Levi's Indigenous Fruit Enterprises, 2012, Funding: SARE.

[Scaling Up to Meet Market Demand for Local, Organic Broccoli](#), Chris Blanchard, 2010, Funding: SARE.

Optimizing Row Covers and Perimeter Trap Crops for Cucurbit Pest Management, Jean Batzer, ISU, 2010, Funding: SARE.

Green Manure vs. Brown Manure in an Organic Vegetable System, Mark Quee, Scattergood Friends School, 2010, Funding: SARE.

[Project to Determine the Economic Viability of Black Soldier Fly Grubs as an Alternative Protein](#), Mari Holthaus, Kymar Acres, 2009, Funding: SARE.

[Extended-duration row covers to suppress bacterial wilt on muskmelon: optimizing a new management strategy for organic growers](#), Erika Saalau Rojas, ISU, 2009, Funding: SARE.

Facilitating Change: Reducing the Risks of Transitioning to Organic through a Comprehensive Farmer-and Extension-Based Training Program, Kathleen Delate, ISU, 2008-2011, Funding: SARE.

[Grass-fed and Organic Beef: Production Cost and Profit Potential](#), Margaret Smith, ISU, 2007-2010, Funding: SARE.

Bilingual farmer training and mentorship program, Linda Barnes, Marshalltown Community College, Marshalltown, IA, 2008, Funding: OFRF.

Evaluation of strategies for management of soybean rust in organic systems, DeWitt, J., ISU, 2005-2008, Funding: USDA-NIFA.

[Agro-Forestry Project: Incorporating Grass-Hay Alley Cropping With Organic Nut Production](#), Raymond Hansen, Prairiewood Farm, 2006, Funding: SARE.

[Aronia Berry: A Sustainable Organic Crop](#), Vaughn Pittz, Sawmill Hollow Farm, 2005, Funding: SARE.

[Improving Soil Quality During and After Organic Transition](#), Kathleen Delate, ISU, 2005-2008, Funding: SARE.

[Growing Peas As a Protein Source for Organic Livestock](#), William Welsh
Welsh Family Organic Farm, 2004, Funding: SARE.

[Evaluating Alternative Pest Management Strategies for Organic Apple Production](#), Maury Wills, Wills Family Orchard, 2003, Funding: SARE.

Refereed Publications

Newell M.A., Vogel K.E., Adams M., Aydin N., Bodnar A.L., Ali M., Lauter A.N.M., Scott M.P. 2014 Genetic and biochemical differences in populations bred for extremes in maize grain methionine concentration. *BMC Plant Biology* 14:49.

Mahan A.L., Murray S.C., Crosby K., Scott M.P. 2014 Quality Protein Maize Germplasm Characterized for Amino Acid Profiles and Endosperm Opacity. *Crop Sci.* 54:863-872. DOI: 10.2135/cropsci2012.11.0658.

Delate, K., C. Cambardella, C. Chase, A. Johanns, and R. Turnbull. 2012. The Long-Term Agroecological Research (LTAR) experiment supports organic yields, soil quality, and economic performance in Iowa. *Crop Management* doi:10.1094/CM-2013-0429-02-RS.

Delate, K., D. Cwach, and C. Chase. 2012. Organic no till system effects on organic soybean, corn and irrigated tomato production and economic performance in Iowa. *Renewable Agriculture and Food Systems* 27(1): 49–59.

- Delate, K., C. Cambardella and X. Zhao. 2012. Effect of cover crops, soil amendments and reduced tillage on carbon sequestration and soil health in a long-term organic vegetable system. p. 22-26. In: S. Smith, M. Peet and M. O Reilly (eds.). *Proceedings of Organic Programs Project Directors Meeting*, October 2012. USDA NIFA, Washington, D.C.
- Delate, K. 2012. [Environmental Benefits of Organic Farming](#). Getting into Soil and Water Conservation, p. 22-23. Iowa Water Center, Iowa State University, Ames, IA.
- Carr, P.M., K. Delate, X. Zhao, C. Cambardella, P.L. Carr, and J. Heckman. 2012. Organic farming: Impacts on soil, food, and human health. In: *Soils and Human Health*, E.C. Brevik and L.C. Burgess (eds.), pp. 241-254, Taylor and Francis, New York.
- Delate, K., and C. Cambardella. 2012. [Organic no till production in Iowa: Effects on crop productivity and soil quality](#). American Society of Agronomy Annual Meetings, October 23, 2012.
- Marose, B.H., M. Cavigelli, K. Delate, E. Mallory, C. Shapiro, L. Kolb, C. Reberg-Horton, J. Maul and S. Mirsky. [Growing the e-Organic grains Community of Practice](#). American Society of Agronomy Annual Meetings, October 22, 2012.
- Delate, K., C. Cambardella, C. Shennan, C. Cogger, E. Silva, and X. Zhao. 2012. Organic vegetable research—Twenty years of progress across the U.S. American Society for Horticultural Science Annual Conference, Miami, FL, ASHS, Alexandria, VA.
- Singerman, A., K. Delate, C. Chase, C. Greene, M. Livingston, S. Lence and C. Hart. 2011. Profitability of organic and conventional soybean production under ‘green payments’ in carbon offset programs. *Renewable Agriculture and Food Systems* doi:10.1017/S1742170511000408.
- Wiltshire, K., K. Delate, M. Wiedenhoft, and J. Flora. 2010. Incorporating native plants into multifunctional prairie-pastures for organic cow-calf operations. *Renewable Ag. & Food Systems*. Published on-line 25 Sept. 2010: doi:10.1017/S174217051000044X.
- Wiltshire, K., K. Delate, J. Flora, and M. Wiedenhoft. 2010. Sociocultural aspects of cow-calf persistence in a peri-urban county in Iowa. *Renewable Ag. & Food Systems*. Published on-line 10 December 2010. doi:10.1017/S1742170510000505.
- Romero, F., K. Delate, D. Hannapel, P. Murphy, and L. Liu. 2010. Horticultural and biochemical variations due to seed source and production methods in three Echinacea species. *Journal of Herbs, Spices & Medicinal Plants* 16:167–192. DOI: 10.1080/10496475.2010.511072.
- Delate, K. 2009. Organic grains, oilseeds, and other specialty crops. In: *Organic Farming and Food Systems*. C. Francis (ed.). *Agron. Monogr.* 54. ASA, CSSA, and SSSA, Madison, WI.
- Delate, K., J. DeWitt, A. McKern, D. Rosmann, D.L. Karlen and R. Turnbull. 2009. Bean leaf beetle (Coleoptera: Chrysomelidae) response to soybean variety and organic-compliant treatments in Iowa. *Jour. Agri. Urban Entomol.* 25:145-163.

- Delate, K., and Chase, C. 2009. Compost application and red clover underseeding have mixed effect on organic flax production in Iowa. Online. *Crop Management* doi:10.1094/CM-2009-0615-01-RS.
- Romero, F., K. Delate, G.A. Kraus, A.K. Solko, P. Murphy and D.J. Hannapel. 2009. Alkamide production from hairy root cultures of Echinacea. *In Vitro Cellular and Developmental Biology* 45(5):599–609. DOI: 10.1007/s11627-008-9187-1.
- Delate, K., C. Cambardella, C. Chase, and R. Turnbull. 2008. Beneficial system outcomes in organic fields at the Long-Term Agroecological Research (LTAR) site, Greenfield, Iowa, USA. *Organic E-prints*.
- Chase, C., K. Delate, M. Liebman, and K. Leibold. 2008. Economic analysis of three Iowa rotations. *PMR 1001*. Iowa State University, Ames, IA.
- Delate, K., J. Walker, R. Volz, J. Johnston, A. White, V. Bus, R. Turnbull, D. Rogers, L. Cole, N. How, S. Guernsey, and A. McKern. 2008. Organic apple production in two humid regions: Comparing progress in pest management strategies in Iowa and New Zealand. *HortScience* 43(1):12–21.
- Delate, K., J. T.S. Walker, R. Volz, J. Johnston, A. White, V. Bus, R. Turnbull, D. Rogers, L. Cole, N. How, S. Guernsey, and A. McKern. 2008. Organic apple systems: Constraints and opportunities for producers in local and global markets. *HortScience* 43(1):6–11.
- Delate, K., C. Cambardella, and A. McKern. 2008. Effects of organic fertilization and cover crops on an organic pepper system. *HortTechnology* 18: 215 – 226.
- Karlen, D.L., C.A. Cambardella, C.T. Bull, C.A. Chase, L.R. Gibson, and K. Delate. 2007. Producer–researcher interactions in on-farm research: A case study in developing a certified organic research site. *Agronomy Journal* 99:779–790.
- Delate, K. 2006. Incorporating organic and agroecological approaches into the University curricula: The Iowa State University Graduate Program in Sustainable Agriculture. *HortTechnology* 16(3): 445–448.
- Delate, K., C. Chase, M. Duffy, and R. Turnbull. 2006. Transitioning into organic grain production: An economic perspective. Online. *Crop Management* doi:10.1094/CM-2006-1016-01-RS.
- Delate, K., Turnbull, R., and DeWitt, J. 2006. Measuring and communicating the benefits of organic foods. Online. *Crop Management* doi:10.1094/CM-2006-0921-14-PS.
- Ngouajio, M., K. Delate, E. Carey, A.N. Azarenko, J.J. Ferguson, and W.J. Sciarappa. 2006. Curriculum development for organic horticulture. *HortTechnology* 16(3): 413–417.
- Rogers, D.J., L.M. Cole, K.M. Delate, and J.T.S. Walker. 2006. Managing bronze beetle, *Eucolaspis brunnea*, in organic apple orchards. *New Zealand Plant Protection* 59:57-62.
- Delate, K., J. DeWitt, A. McKern and R. Turnbull. 2005. Integrated approaches to organic pest management in the Midwestern U.S.A.: Case studies of three crops. *Organic-Research.com* – May, 2005 8N –15N.

- Davis, D., K. Delate, C. Brummer and C. Mize. 2005. Effect of forage species and tree type on tree establishment and nutritive value of hay crops in an alley-cropped system. *Agroforestry Systems* 65:43–52.
- Romero, F., K. Delate, and D. Hannapel. 2005. The effect of seed source, light during germination, and cold-moist stratification on seed germination in three species of *Echinacea* for organic production. *HortScience* 40 (6):875-880.
- Delate, K. and C. Cambardella. 2004. Agroecosystem performance during transition to certified organic grain production. *Agronomy Journal* 96: 1288–1298.
- Delate, K. and J. DeWitt. 2004. Building a farmer-centered land grant university organic agriculture program – A Midwestern partnership. *Renewable Agriculture and Food Systems* (Formerly The American Journal of Alternative Agriculture) 19(1): 1–12.
- Delate, K. and H. Friedrich. 2004. Organic apple and grape performance in the Midwestern U.S. *Acta Horticulturae* 638:309-320.
- Vargas, R., [J. Long](#), [N. W. Miller](#), [K. Delate](#), [C. G. Jackson](#), [G. K. Uchida](#), R. C. Bautista, and E.J. Harris. 2004. Releases of *Psytalia fletcheri* (Hymenoptera: Braconidae) and sterile flies to suppress melon fly (Diptera: Tephritidae) in Hawaii. *Jour. Econ. Entomol.* 97(5): 1531-1539.
- Delate, K., M. Duffy and C. Chase. 2003. An economic comparison of organic and conventional grain crops in a long-term agroecological research (LTAR) site in Iowa. *American Journal of Alternative Agriculture* 18(1): 1-11.
- Delate, K. H. Friedrich and V. Lawson. 2003. Organic pepper production systems using compost and cover crops. *Biol. Ag. and Horticulture* 21 (1): 131–150.
- Duppong, L.M., K. Delate, M. Liebman, R. Horton, F. Romero, G. Kraus, J. Petrich and L. Sanders. 2003. The effect of natural mulches on crop performance, weed suppression and biochemical constituents of catnip (*Nepeta cataria* L.) and St. John's wort (*Hypericum perforatum* L.) *Crop Science* 44(3): 44:861-869.
- Friedrich, H., K. Delate, P. Domoto, and G. Nonnecke. 2003. Effect of organic pest management techniques on apple productivity and food quality. *Biol. Ag. and Horticulture* 21 (1): 1–14.
- Delate, K. 2002. Using an agroecological approach to farming systems research. *HortTechnology* 12(3): 345-354.
- Delate, K., C. Cambardella, and D. Karlen. 2002. [Transition strategies for post-CRP certified organic grain production](#). Published 28 August 2002. *Crop Management*

Extension and Outreach Publications

Iowa State has an extensive collection of [organic research reports posted online](#). Reports include research findings on organic corn and soybean variety trials; sweet corn; peppers; tomatoes; apples; green beans; peas, broccoli; herbs; squash; grapes; flax; barley; wheat; edamame; crop rotations; cover crops; organic no-till; approved fungicides; soil amendments; soil quality; bean leaf beetles; soybean rust; seed coatings; yields; and economics. The reports are sorted by topic, year, and ISU research site.

Iowa State also has an expansive “[Extension Online Store](#),” where numerous publications can be ordered or downloaded. Even though ISU has published many organic outreach publications, there is no tab or sub-heading for “organic.” To find organic publications, readers should enter the word “organic” in the internal search bar, and descriptions of publications will appear.

ISU Extension organic publications include:

- [Growing Organic Vegetables in Iowa](#)
- [Using Organic Agriculture and Sustainable Crops and Livestock in the Local Food System](#)
- [Fundamentals of Organic Agriculture](#)
- [Making the Transition from Conventional to Organic](#)
- [Adapting Crop Share Agreements for Sustainable and Organic Agriculture](#)
- [Organic Apple Production in Iowa](#)
- [Growing Organic Soybeans on CRP](#)
- [Organic Crop Production Enterprise Budgets](#)
- [Soil Quality](#)
- [Weed Management](#)
- [Organic Flax Production in Iowa](#)
- [National Directory of Organic Expertise – 2005](#)

Academic Curricula

Classes taught at ISU include: Organic Agriculture: Theory and Practice, AGRON/HORT/SUSTAG 484/584.

Marshalltown Community College offers an Associate degree and Certificate in [Entrepreneurial & Diversified Ag](#)

Graduate Student Opportunities

Iowa State offers a [Graduate Program in Sustainable Agriculture](#), and offers many opportunities to graduate students who want to conduct research in certified organic production systems.

Outreach Efforts

Iowa State takes the lead in organizing the annual [Iowa Organic Agriculture Conference](#). ISU also hosts [organic field days](#).

[Practical Farmers of Iowa](#) hosts an annual conference, broadcasts [farminars](#), and organizes numerous organic and sustainable ag field days, such as an [organic corn breeding tour](#) and [on-farm organic research workshop](#) in 2013.

Web Resources

[Iowa State Organic Ag](#). This ISU site provides access to research reports; publications; upcoming events; regulations; and resources, such as lists of buyers and input suppliers.

In addition, the [Leopold Center for Sustainable Agriculture](#) at Iowa State has a website featuring 120 summaries of [Scientific Findings About Organic Agriculture](#). The summaries are grouped according to topic and contain links to the original published research.

The Iowa Department of Agriculture and Land Stewardship offers [organic certification services](#) and manages the organic certification [cost share](#) program in Iowa. Past issues of [organic newsletters](#) are posted.

The [Iowa Organic Association](#) is a non-profit group of individuals, companies, organizations, and associations dedicated to the advancement of Iowa's organic production and industry, with a goal of representing all facets and concerns of Iowa's organic farmers, wholesalers, retailers, processors, handlers, educators, researchers, consumers and advocates.

[Practical Farmers of Iowa](#) is a diverse group of about 1500 members whose mission is to “advance profitable, ecologically sound, and community-enhancing approaches to agriculture through farmer-led investigation and information sharing.”

Hands-on Learning

Iowa State operates a 6-acre [Student Organic Farm](#), which is an ISU campus club whose membership includes undergraduate and graduate students, faculty, and Ames community members. Food is provided to ISU dining halls, sold at a farmers market, and donated to food shelves.

Acres Certified Organic

Certified organic acres at Iowa State research farms: 36 acres (Greenfield, Crawfordsville and Ames, IA); acres in transition: 5 acres (Gilbert, IA).

Total acres certified, managed organically, or in transition = 41 acres.

Organic Livestock Research

None.

On-Farm Research

At least 2 faculty members and one graduate student are conducting on-farm research on five organic farms, focused on grain and vegetable production systems. Over the years, ISU's Organic Ag Program has conducted over 30 on-farm organic trials.

Key Contacts

- Dr. Cindy Cambardella, USDA-ARS Soil Scientist, Cindy.Cambardella@ars.usda.gov
- Dr. Craig Chase, ISU Extension Specialist, cchase@iastate.edu

- Dr. Kathleen Delate, ISU Professor of Organic Agronomy and Horticulture (since 1997), kdelate@iastate.edu
- Mary Wiedenhoft, ISU Agronomy, mwiedenh@iastate.edu

KANSAS

Organic Research Projects

[A brief description of KSU organic farming research can be found online.](#)

Specific organic research projects include:

Development of an Instrument to Document Economic Impact of Fruit and Vegetable Growers in Kansas. Cary Rivard. 2014-2015. Funding Kansas Department of Agriculture SCBG.

Improving Shelf Life, Quality and Safety of Locally Grown Vegetables in Kansas. Eleni Pliakoni. 2014-2015. Funding Kansas Department of Agriculture SCBG.

Development of Grafting Technology to Improve Sustainability and Competitiveness of the US Fruiting Vegetable Industry. Cary Rivard. 2014-2016. Funding: NIFA Specialty Crop Research Initiative.

Postharvest Physical Treatments to Reduce Losses of Organic and Other Locally-Grown Produce while Improving Quality and Extending Shelf Life. Eleni Pliakoni. 2014-2018. Funding: NIFA AFRI Food Security Grant.

Exploring early season sweetpotato slip production opportunities utilizing high tunnels. Jason Griffin. 2014-2015. Funding: KSCAAC.

Tomato Grafting: Developing Grower Recommendations for the Great Plains and Enhancing Our Understanding of the "Rhizobiome". Cary Rivard. 2013-2016. Funding: NCR SARE.

New Rootstock Systems for Disease Management and Increased Productivity in Organic Tomato: Understanding Effects on the Rhizobiome, Karen Garrett. 2012-2015, Funding: Ceres Trust.

Soil Microbes in Organic Vegetable Production; New Insights from Pyrosequencing. Part II: The Response of Soil Microbial Communities to Nutrient Management and High Tunnels, Karen Garrett. 2010-2013, Funding: Ceres Trust.

[Soil Microbial Responses to Cover Crop Use](#), Karen Willey, Baldwin City, KS. 2013, Funding: SARE.

[Estimation of Soil N Availability for Tomato Production in High Tunnel vs. Open Field under Organic and Conventional Management](#), May Elfar Altamimi, KSU. 2012, Funding: SARE.

[Soil microbes in organic vegetable production: New insights from pyrosequencing; The response of soil microbial communities to organic and conventional fertilization](#), Karen Garrett. 2009-2011, Funding: Ceres Trust.

[Implementation of novel grafting methods and rootstocks for organic tomato growers in the Midwest](#), Sarah A. Masterson (Cary Rivard Major Professor). 2011, Funding: Ceres Trust Graduate Student Grant and SARE.

[Soil Microbes in Organic Production: Capturing the Active Players](#), Lorena Gomez, (Karen Garrett and Ari Jumpponen, Major Professors), 2010, Funding: Ceres Trust Graduate Student Grant.

[Participatory Plant Breeding and Agroecology to Develop Intermediate Wheatgrass for Sustainable Grain Production](#), Lee DeHaan, The Land Institute. 2010, Funding: SARE.

[Evaluating the suitability of low-trellises and various hop cultivars for small organic farm production in North-East Kansas](#), Jill Elmers. 2010, Funding: SARE.

[Organic Slot farming: a new approach to growing farming and gardening](#), Rachel Jefferson. 2010, Funding: SARE.

Teaching Organic Agriculture at Market through Art and Fun, Evangeline Ellingsworth,. 2010, Funding: SARE.

Sustainable Pest Control For Organic Pumpkins, Kevin Bauman. 2009, Funding: SARE.

Developing web resources for organic production in high tunnels, Kimberly Williams. 2008, Funding: OFRE.

[Kansas City Organic High Tunnel Research Cooperative](#), Stu Shafer, Sandheron Farm. 2005, Funding: SARE.

[Comparing Organic and Conventional Fertilization Methods for Cut Flower Production in Haygrove High Tunnels](#), Katherine Stolp, KSU. 2004, Funding: SARE.

Refereed Publications

Garrett KA, Thomas S, Forbes GA, Hernandez Nopsa J. 2014b. Climate change and plant pathogen invasions. In: L Ziska and J Dukes (Editors), *Invasive Species and Climate Change*. CABI Publishing.

Garrett KA, Esker PD, Sparks AH. 2014a. An introduction to key distributions and models for epidemiology using R. In: K Stevenson and M Jeger (Editors), *Exercises in Plant Disease Epidemiology, 2nd Edition*. Minneapolis, MN, APS Press.

Garrett KA, Forbes GA, Gomez L, Gonzales MA, Gray M, et al. 2013. Cambio climático, enfermedades de las plantas e insectos plaga. In: E Jimenez (Editor), *Cambio climático en los Andes*, La Paz, Bolivia, pp. in press.

Gomez-Montano L, Jumpponen A, Kennelly M, Garrett KA. 2013. Soil microbes in organic vs. conventional vegetable production: Capturing the active players through soil RNA analysis. *Phytopathology* 103:50.

Gomez-Montano L, Jumpponen A, Kennelly M, Garrett KA. 2012. Soil microbes in organic vs. conventional vegetable production. *Phytopathology* 102:46.

- Jarrett KA. 2012. Information networks for plant disease: Commonalities in human management networks and within-plant signaling networks. *European Journal of Plant Pathology* 133:75-88.
- Garrett KA, Jumpponen A, Toomajian C, Gomez-Montano L. 2012. Climate change and plant health: Designing research spillover from plant genomics for understanding the role of microbial communities. *Canadian Journal of Plant Pathology* 34:349-361.
- Garrett KA, Forbes GA, Savary S, Skelsey P, Sparks AH, et al. 2011. Complexity in climate-change impacts: An analytical framework for effects mediated by plant disease. *Plant Pathology* 60:15-30.
- Talavers-Bianchi, M., D. H. Chambers, K. Adhikari, E.E. Carey, E. Chambers IV, 2011. Sensory and chemical properties of organically and conventionally grown pac choi (*Brassica rapa* var. Mei Qing Choi) change little during 18 days of refrigerated storage. *Food Science and Technology*, 44(6):1536- 1545.
- Garrett KA, Jumpponen A, Gomez Montano L. 2010. Emerging plant diseases: What are our best strategies for management? In: EL Kleinman, JA Delborne, KA Cloud-Hansen and J Handelsman (Editors), *Controversies in Science and Technology, Vol. 3, From Evolution to Energy*. Liebert Publishers, New Rochelle, New York, pp. 152-160.
- Talavera-Bianchi, M., E. Chambers IV, E.E. Carey, D.H. Chambers, 2010. Effect of organic production and fertilizer variables on the sensory properties of pac choi (*Brassica rapa* var. Mei Qing Choi) and Tomato (*Solanum lycopersicum* var. Bush Celebrity), *Journal of the Science of Food and Agriculture*, 90(6):981-988.
- Kohake, D.J., L.J. Hagen, E.L. Skidmore, 2010. Wind erodibility of organic soils, *Soil Science Society of America Journal*, 74:250-257.
- Reinstein, S., J.T. Fox, X. Shi, M.J. Alam, D.G. Renter, T.G. Nagaraja, 2009. Prevalence of *Escherichia coli* O157:H7 in organically and naturally raised beef cattle, *Applied and Environmental Microbiology*, 75(16):5421-5423.
- Zhao, X., J.R. Nechols, K.A. Williams, W. Wang, E.E. Carey, 2009. Comparison of phenolic acids in organically and conventionally grown pac choi (*Brassica rapa* L. *Chinensis* group). *Journal of the Science of Food and Agriculture*, 89:940-946.
- Jacob, M.E., J.T. Fox, S. Reinstein, T.G. Nagaraja, 2008. Antimicrobial susceptibility of foodborne pathogens in organic or natural production systems: An overview, *Foodborne Pathogens and Disease*, 5(6):721-730.
- Nelson, N.O., R.R. Janke, 2007. Phosphorus sources and management in organic production systems, *HortTechnology*, 17:442-454.

Extension and Outreach Publications

Sensitive Crop Grown Here (sign), S151 (2008)

[Challenges and Information Needs for Organic Production in Kansas](#), (2006)

Academic Curricula

KSU classes include:

HORT325 – Introduction to Organic Farming

HORT690 – Sustainable Agriculture

Graduate Student Opportunities

An [Urban Food Systems](#) specialization is available within the Master's Degree program in Kansas State's Department of Horticulture, Forestry, and Recreation Resources.

Outreach Efforts

Kansas State University works with Lincoln University, the University of Missouri, the Kansas Rural Center, and Cultivate Kansas City to deliver the *Growing Growers* Farmer Training Program (www.growinggrowers.org). *Growing Growers* entails an apprenticeship, workshop series (14 workshops in 2014), and network of growers through an email listserv (~500 members), website, and facebook page. The *Growing Growers* program is focused on organic production and although it is a partnership organization that relies on active engagement from other organizations, it is administratively and financially housed at Kansas State University. Each of the workshops include a field tour of a local organic farm and currently eighteen host farms works with the program to train apprentices.

The www.hightunnels.org website recently added an “organic” module for organic high tunnel growers and that project was supported by the Organic Farming Research Foundation. In 2014, the website was accessed by nearly 40,000 different computers from around the world, and 5,253 of these visitors accessed the organic page.

The Kansas Rural Center hosts an organic conference annually (<http://kansasruralcenter.org>).

Web Resources

Links to articles and publications on organic certification; organic crop production; organic farming; organic fruit production; organic livestock production; and organic vegetable production are [posted online](#).

<http://www.growinggrowers.org>

<http://hightunnels.org/organic-production-high-tunnels/>

[Kansas Center for Sustainable Agriculture and Alternative Crops – College of Engineering](#)

[Kansas Organic Producers Association](#)

[Kansas Rural Center organic farming resources](#)

[The Land Institute](#)

Hands-on Learning

The **Olathe Horticulture Research and Extension Center** is located near the Kansas City/Lawrence metro area and has a major focus area of conducting research that is relevant to

organic growers. Six of the eight high tunnels are organic and were first certified in 2004. There are similar open-field areas, which were also certified at the same time. These plots include three projects related to research with tomato grafting, soil microbiology, and reducing food losses using tomato and spinach as model crops. They are currently supported by grants from Ceres Trust, NCR-SARE, and NIFA-AFRI. Major efforts are made to deliver the results of organic research in addition to training organic growers through the *Growing Growers* Farmer Training Program, which focuses on organic growers (www.growinggrowers.org).

The **John C. Pair Center**, located outside of Wichita, KS, hosts the certified organic sweet potato slip production facility, which makes it one of a only a few suppliers for certified organic sweet potato slips. Current research includes an examination of the use of high tunnels for early sweet potato slip production and is supported by the Kansas Center for Sustainable Agriculture and Alternative Crops.

The **Willow Lake Student Farm (WLSF)** is located in Manhattan, KS and serves as a teaching farm for undergraduate and graduate students that are located on-campus. Upon its inception, WLSF was certified organic, but is not currently. However, organic practices are used and the farm is a major resource for classes such as Sustainable Agriculture, Urban Agriculture, and Vegetable Production.

Acres Certified Organ

ic

10 acres.

Organic Livestock Research

None.

On-Farm Research

Four faculty members and three graduate students are conducting on-farm research on two certified organic farms and one that uses organic methods, but is not certified. The research focus is organic vegetable production in greenhouses and high tunnels.

Key Contacts

- Kerri Ebert, Coordinator, Kansas Center for Sustainable Agriculture and Alternative Crops (KCSAAC), kebert@k-state.edu
- Dr. Rhonda Janke, Associate Professor of Horticulture, rjanke@ksu.edu
- Dr. Cary Rivard, Assistant Professor, Horticulture, crivard@ksu.edu
- Dr. Eleni Pliakoni, Assistant Professor, Horticulture, epliakoni@ksu.edu
- Dr. Karen Garrett, Professor, Plant Pathology, kgarrett@ksu.edu
- Dr. Gerad Middendorf, Associate Professor of Sociology, middendo@ksu.edu

MICHIGAN

Organic Research Projects

Legume Cover Crop Impacts on Soil Nitrogen Cycling and Soil Fertility on Organic Vegetable Farms. Jennifer Blesh, University of Michigan. 2015-2017, Funding: Ceres Trust.

Farmer-Designed Systems to Reduce Tillage in Organic Vegetables. Anusuya Rangarajan (Cornell); Co-PIs from MSU: Daniel Brainard, Zsofia Szendrei and Vicki Morrone. Other Co-PIs: Eric Gallandt, Mark Hutchinson and Mark Hutton (University of Maine); Bradley Rickard, Margaret McGrath and Becky Wideman (Cornell), 2015-2018, Funding: USDA-OREI.

Combining strip-tillage and zonal cover-cropping for soil and moisture conservation in organic vegetable systems. Dan Brainard and Carolyn Lowry. 2014-2016, Funding: Ceres Trust.

Fostering Complex Soil Food Webs and Building Soil Fertility with Organic Production: Perennial Wheat Phase Two. Sieglinde Snapp. 2013-2016, Funding: Ceres Trust.

On-farm organic soybean variety trials, Dean Baas and Bob Battel. 2012-2017, Funding: Ceres Trust and NCRSARE.

Development and delivery of comprehensive orchard floor management tactics to promote natural pest management and enhanced soil quality. Matthew J. Grieshop. 2014-2016. Funding: Ceres Trust.

Organic management of fire blight in a post-antibiotic era: developing, evaluating, and delivering options for apples grown in humid climates. George Sundin and Matthew J. Grieshop. 2014-2017. Funding: USDA-NIFA Organic Transition.

Effect of cover crops on nitrous oxide emissions, nitrogen availability and carbon accumulation in organic versus conventionally managed systems, Dean Baas, Phil Robertson, Neville Millar and Steve Miller. 2012-2015, Funding: USDA-NIFA Organic Transition.

An integrated approach to optimizing the performance of cereal-legume cover crop mixtures and improving synchrony of N from organic residues, Z. Hayden/M. Ngouajio. 2012-2014, Funding: USDA-NIFA.

Organic dry bean production systems, Karen Renner, Erin Taylor, Jim Kelly, Christy Sprague, Dan Rossman, Christina DiFonzo and Dean Baas. 2010-2015, Funding: USDA-OREI.

[Development and delivery of living pest management for organic greenhouses and local food systems](#), Matthew J. Grieshop. 2011-2014, Funding: Ceres Trust.

Organic management effects on individual species of mycorrhizal fungi and the consequences of plant performance and soil health, Sieglinde Snapp. 2011-2013, Funding: Ceres Trust.

Spatiotemporal pattern of hog foraging in apple orchards when grazed for orchard floor management. Krista Buehrer, Dr. Matthew Grieshop, Faculty Advisor. 2013, Funding: Ceres Trust Graduate Student Grant.

Transforming waste: rearing black soldier flies as a source of compost and entomopathogenic nematodes. Joseph Riddle, Dr. Matthew Grieshop, Faculty Advisor. 2013, Funding: Ceres Trust Graduate Student Grant.

Exploring the combination of biofumigation and anaerobic soil disinfestation for soil quality enhancement in organic vegetable cropping systems. Aaron Yoder, Dr. Mathieu Ngouajio, Faculty Advisor. 2012, Funding: Ceres Trust Graduate Student Grant.

[Control of plum curculio and codling moth using strip cultivation in organic apples](#), William Baughman, Dr. Matthew J. Grieshop, Faculty Advisor. 2012, Funding: Ceres Trust Graduate Student Grant.

Whole Farm Organic Management of BMSB and other Pentatomids through Habitat Manipulation. Anne Nielsen, Matthew J. Grieshop, et. al. 2012-2015. USDA OREI.

Management of Apple Orchard Floors to Minimize Pests and Maximize Beneficials. Matthew J. Grieshop, George Sundin. 2012-2014, Funding: MSU Project GREEN.

Closing the MSU Campus Food Cycle Loop: Cultivating Concepts, Connections and Change. John Biernbaum, Laurie Thorp. 2013-2014, Funding: Office of Campus Sustainability.

Exploring the combination of biofumigation and anaerobic soil disinfestation for soil quality enhancement in organic vegetable cropping systems, A. Yoder, Dr. M. Ngouajio, Major Professor. 2012-2013, Funding: Ceres Trust Graduate Student Grant.

Development and delivery of “living pest management” for organic greenhouses and local food systems. Matthew J. Grieshop, John Biernbaum, Jeanne Himmelien. 2011-2014, Funding: Ceres Trust.

High tunnel organic raspberry production. Ben Gluck and Eric Hanson. Ongoing, Funding: Ceres Trust, USDA-OREI and Internal Sources.

[Combining alternating cover crop strips, living-mulches and strip tillage for weed and nutrient management in organic sweet corn](#), C. Lowry/D. Brainard. 2011-2013, Funding: Ceres Trust and USDA-NC SARE.

Enhancing soil quality, plant health, and disease management in organic production with Brassica cover crops used as biofumigants, M. Ngouajio. 2011-2013, Funding: Ceres Trust.

Mycorrhizal role in organic row crop production long-term experimentation, Sieg Snapp. 2011-2013, Funding: Ceres Trust.

Enhancing soil quality plant health and disease management in organic production with Brassica cover crops used as biofumigants, Mathieu Ngouajio, Jianjun Hao, Vicki Morrone. 2011-2013, Funding: Ceres Trust.

Unraveling the mystery of compost teas used for organic disease and insect pest management, Annemiek Schilder, Matthew Grieshop, Eric Hanson, John Biernbaum. 2011-2013, Funding: Ceres Trust.

[Fostering complex soil food webs and building soil fertility with organic production: the potential of perennial wheat](#), S. Snapp. 2010-2013, Funding: Ceres Trust.

Practical Perennials: Partnering with farmers to develop a new wheat crop, Sieg Snapp, Scott Swinton. 2009-2013, Funding: USDA OREI.

[Organic Potato Variety Trials in Michigan's Upper Peninsula](#), 2013, Funding: SARE.

[Non-Antibiotic Alternatives for Bovine Mastitis Therapy](#), Bo Norby, MSU, 2012, Funding: SARE.

[A Novel Approach for Optimizing the Benefits of Cereal-Legume Cover Crop Mixtures in Vegetable Cropping Systems](#), Z. Hayden/M. Ngouajio. 2009-2012, Funding: SARE.

Evaluation of Plant Composition and Strip Size on the Effectiveness of Native Plant Conservation Strips for Sustainable Enhancement of Beneficial Insect, Brett Blaauw. 2009-2012, Funding: NC-SARE.

Use of Native Plants to Enhance Arthropod Mediated Ecosystem Services, PI – Doug Landis; Collaborators: Megan Woltz, J. Tuell, A. Fiedler, R. Isaacs, M. Gardiner. Funding: USDA NRI.

Native plant conservation strips for sustainable pollination and pest control in fruit crops, Rufus Isaacs. 2008-2012, Funding: NC-SARE.

[Organic production of fruit crops under high tunnels](#), Eric Hanson, Greg Lang, John Biernbaum. 2010-2012, Funding: Ceres Trust.

Holistic Integration of Organic Strategies and High Tunnels for Midwest/Great Lakes Fruit Production, Greg Lang, John Biernbaum, Dan Brainard, Matthew Greishop, Eric Hanson, Rufus Issacs, Vicki Morrone, Annemiek Schilder. 2010-2012, Funding: USDA NIFA.

Summer cover crops for weed suppression and soil quality in organic vegetable production in the Great Lakes region – Multistate with Cornell University, Dan Brainard, Mathieu Ngouajio, Dale Mutch, Vicki Morrone, Carolyn Lowry. 2010-2012, Funding: USDA OREI.

Competency-based Assessment of Liberal Learning Goals through Institutional Experiential Education for Global Sustainability; Assessing learning at the Student Organic Farm and other sites, Geoffrey Habron, Laurie Thorp. 2010-2012, Funding: Fund for the Improvement of Post Secondary Education, U.S. Department of Education.

Fostering complex soil food webs and building soil fertility, Sieg Snapp. 2009-2012, Funding: Ceres Trust.

[Integrating organic apple and pork production to benefit pest management and grower profitability](#), Matt Greishop, David Epstein, Dale Rozeboom, George Sundin. 2009–2012, Funding: Ceres Trust.

Development of a holistic management plan for the apple Flea Weevil, Matthew Grieshop. 2011, Funding: OFRF.

Vermicomposting of Food Residuals from MSU Campus, John Biernbaum, Laurie Thorp. 2010-2011, Funding: Office of Campus Sustainability.

Optimizing mulch and fertilizer use in organic blueberries, Eric Hanson, Annemiek Schilder, Jesse Sadowsky. 2009-2011, Funding: OFRF.

A novel approach for optimizing the benefits of cereal-legume cover crop mixtures in vegetable cropping systems under organic management, Z. Hayden/M. Ngouajio. 2010-2011, Funding: Ceres Trust.

Perennial wheat variety development for organic farmers, Janet Lewis, Sieg Snapp. 2009-2011, Funding: USDA Sust Ag grant to Hamm/MSU.

Long-term ecological research on row crop production at Kellogg Biological Station, PI – P Robertson. 2007-2011, Funding: NSF.

[Potential for Use of Perennial Grasses as Organic Dual-Purpose Forage-Grain Crops in Michigan](#), Sienna Tinsley. 2011, Funding: Ceres Trust.

[The Impact of entomopathogenic nematode applications on mortality of codling moth larvae on the orchard floor](#), Nathaniel J. Walton, (Matthew J. Grieshop, Major Profssor). 2011, Funding: Ceres Trust Graduate Student Grant.

Combining alternating cover strips, living mulches and strip tillage for effective weed and nutrient management in organic sweet corn production, Carolyn J. Lowry. 2011, Funding: Ceres Trust.

Optimizing mulch and fertilizer use in organic blueberries, Eric Hanson. 2008-2011, Funding: OFRE.

[Evaluation of Apple Flea Weevil Dispersal and the Potential of Kaolin-Based Management in Organic Apples](#), John Pote. 2010, Funding: Ceres Trust.

[Potential of Organic Hogs as a Tool for Post-Harvest Orchard Floor Sanitation and Pest Management](#), Krista Buehrer, Dr. Matthew J. Grieshop, Major Professor. 2010, Funding: Ceres Trust Graduate Student Grant.

[Soil Invertebrate Biodiversity Under Contrasting Orchard Management Regimes in Michigan](#), Nathaniel J. Walton, Dr. Matthew J. Grieshop, Major Professor. 2010, Funding: Ceres Trust Graduate Student Grant.

[Improvement of Anthropod Biological Control Systems for Organic Greenhouse Production](#), Emily Pochubay, Dr. Matthew J. Grieshop, Major Professor. 2010, Funding: Ceres Trust Graduate Student Grant.

A Novel Approach for Optimizing the Benefits of Cereal-Legume Cover Crop Mixtures in Vegetable Cropping Systems Under Organic Management, Zachary D. Hayden, Dr. Mathieu Ngouajio, Major Professor. 2010, Funding: Ceres Trust Graduate Student Grant.

Potential of Organic Hogs as a Tool for Post-Harvest Orchard Floor Sanitation and Pest Management, Krista Buehrer, Dr. Matthew J. Grieshop, Major Professor. 2010, Funding: Ceres Trust Graduate Student Grant.

[Meeting the Growing Demand for Organic Hops: Low-Trellis Organic Hop Production in the Great Lakes Region](#), Brian Tennis, New Mission Organics. 2010, Funding: SARE.

Combining Alternative Cover Crop Strips, Living Mulches and Strip Tillage for Effective Weed and Nutrient Management in Organic Sweet Corn Production, Carolyn Lowry. MSU, 2010, Funding: SARE.

Organic weed management in field crops, Christy Sprague. 2008-2010, Funding: SARE.

Building integrated weed management knowledge in organic systems, Karen Renner. 2007-2009, Funding: USDA-CSREES-IOP.

Partnering to Cultivate Organic Agriculture in Michigan and the Midwest, Sieg Snapp, J. Biernbaum. 2005-2009. Funding: USDA-CSREES Organic Transitions.

Identifying new local market opportunities for organic and sustainable veg and fruit farmers, Jim Bingen, Vicki Morrone. 2009, Funding: USDA SCRI.

Adapting organic apple practices for Great Lakes region organic hops production, Matthew Grieshop. 2009, Funding: OFRF.

Integrating bats into organic pest management, Steve Tennes, [Country Mill Farms](#), Charlotte, MI. 2009, Funding: OFRF and SARE.

[Hoophouse and Organic Farming for Ag Lenders](#), Vicki Morrone, MSU. 2009, Funding: SARE.

[Greenhouse and raised bed crop production with organic farm practices with fruit and vegetables production](#), David Beck. 2008, Funding: SARE.

[Determination of the relationship between soil nutrients, mycorrhizae, and plant health in organic blueberry production](#), Jesse Sadowsky, MSU. 2008, Funding: SARE.

How Can We Optimize Flaming for Weed Control in Organic Farming Systems, Tim Frisbie. 2007, Funding: SARE.

[Developing pest management guidelines for organic production of highbush blueberries in the North Central Region](#), Annemiek Schilder, MSU. 2007, Funding: SARE.

Integrated weed management: “One year’s seeding” Karen Renner. 2004-2007, Funding: USDA-NC-SARE.

Training for MSUE from organic farmers, Vicki Morrone. 2007, Funding: Project GREEN.

[Evaluating Corn, Soybean and Wheat Varieties in Organic Farm Systems in Michigan](#), Ivan Morley. 2006, Funding: SARE.

[Improved management of striped cucumber beetle , *Acalymma vittatum* \(F.\) \(Coleoptera: Chrysomelidae\) by using a squash trap crop and a polyculture of cucumber and tomato](#). Matthew Kaiser, MSU. 2006, Funding: SARE.

Community Farmers: The Pathways and Opportunities to Success for New, Innovative Farmers in Michigan, Taylor Reid. 2004, Funding: SARE graduate student grant.

[Sweeping the Orchard Floor as a Housekeeping Practice to Effectively Control the Plum Curculio Insect in Organic Orchards](#), James Koan. 2003, Funding: SARE.

[Establishing Successful Organic Orchards](#), Peter Ways. 2003, Funding: SARE.

Refereed Publications

Hayden, Z.D., M. Ngouajio and D.C. Brainard. 2014. Rye-vetch mixture proportion tradeoffs: Cover crop productivity, nitrogen accumulation, and weed suppression. *Agronomy Journal* 106: 904-914.

Lowry, C.J. and D.C. Brainard. 2014. Zone tillage and cover crop spatial arrangement effects on weed emergence and competition in organic sweet corn production. Abstract no. 334. *Weed Science Society of America Annual Meeting*, Vancouver, Canada, Feb. (Oral)

Robertson, G.P., K. Gross, S. Hamilton, D. Landis, T. Schmidt, S. Snapp and S. Swinton. 2014. Farming for services: An ecological approach to production agriculture. *Bioscience*. 64:404-415.

Kane, D., Snapp, S.S. and A. Davis. Ridge tillage concentrates potentially mineralizable soil N in the crop row, facilitating maize N uptake. *Soil Sci. Soc. Am*, In press.

Buehrer, K.A., and M.J. Grieshop. 2014. Postharvest grazing of hogs in organic fruit orchards for weed, fruit, and insect pest management. *Org. Agr.* 4(3):223-232

Freyer, Bernhard, Jim Bingen. (Eds.). 2014. Re-Thinking Organic in a Changing World. Springer publisher.

Grieshop, M.J., Werling, B., Buehrer, K., Perrone, J., Isaacs, R., and Landis, D. 2013. Big brother is watching: studying insect predation in the age of digital surveillance. *American Entomologist*, 58: 172-182.

Lang, G., E. Hanson, J. Biernbaum, D. Brainard, M. Grieshop, R. Isaacs, A. Montri, V. Morrone, and A. Schilder, D. Conner, and J. Koan. 2013. Holistic integration of organic strategies and high tunnels for Midwest/Great Lakes fruit production. *Acta Hort.* 1001:47-55.

Lee, J.C., Barrantes, L.D., Beers, E.H., Burrack, H.J., Dalton, D.T., Dreves, A.J., Gut, L.J., Hamby, K.A., Haviland, D.R., Isaacs, R., Nielsen, A.L., Richardson, T., Rodriguez-Saona, C.R., Shearer, P.W., Stanley, C.A., Walsh, D.B., Walton, V.M., Yee, W.L., Zalom, F.G., and Bruck, D.J. (In press). Improving trap design for monitoring *Drosophila suzukii* (Diptera: Drosophilidae). *Environmental Entomology*.

Roubos, C.R., Rodriguez-Saona, C., Holdcraft, R., Mason, K.S., and Isaacs, R. 2013. Relative toxicity and residual activity of insecticides used in blueberry pest management: mortality of natural enemies. *Journal of Economic Entomology*.

Van Timmeren, S. and Isaacs, R. 2013. Control of spotted wing *Drosophila*, *Drosophila suzukii*, by specific insecticides and by conventional and organic crop protection programs. *Crop Protection* 54, 126-133.

Bostanian, R., Vincent, C., and Isaacs, R. 2012. [Arthropod Management in Vineyards: Pests, Approaches, and Future Directions](#). Springer. 978-953-51-0050-8.

Brainard, D.C., W.S. Curran, R.R. Bellinder, M. Ngouajio, M.J. VanGessel, M.J. Haar, W.T. Lanini and J.B. Masiunas. 2012. Temperature and relative humidity affect weed response to vinegar and clove oil based herbicides. *Weed Technology* ([Available online](#).)

- Grieshop, Matthew J., Arthur, Frank H., Rogers, Ted. 2012. Organic Approaches and Regulations for Stored Product Pest Management. In *Stored Production Protection*, eds. Tom W. Phillips, David Hagstrum, & G Cuperus, 352. Manhattan, KS.
- Grieshop, Matthew J., Hanson, Eric J., Schilder, Annemiek, Isaacs, Rufus, Mutch, Dale, Garcia-Salazar, Carlos, Longstroth, Mark, Sadowsky, Jesse. 2012. Status update on organic blueberries in Michigan. *International Journal of Fruit Science* 12: 232-235.
- Hayden, Z.D., D.C. Brainard, B. Henshaw, and M. Ngouajio. 2012. Winter annual weed suppression in rye-vetch cover crop mixtures. *Weed Technology* 26: 818-825.
- Hayden Z. D., D. C. Brainard, B. Henshaw, and M. Ngouajio. 2012. Winter Annual Weed Suppression in Rye-Vetch Cover Crop Mixtures. *Weed Technol.* ([Available online.](#))
- Nair A. and M. Ngouajio. 2012. Soil microbial biomass, functional microbial diversity, and nematode community structure as affected by cover crops and compost in an organic vegetable production system. *Applied Soil Ecology* 58:45-55.
- Nielsen, Anne L., Pote, John, Buehrer, Krista, Grieshop, Matthew J. 2012. The reemergence of an old pest, apple flea weevil, *Orchestes pallicornis* (Coleoptera: Curculionidae). *Journal of Integrated Pest Management*.
- Pochubay, Emily A., Grieshop, Matthew J. 2012. Intraguild predation of *Neoseiulus cucumeris* by *Stratiolaelaps miles* and *Atheta coriaria* in greenhouse open rearing systems. *Biological Control*.
- Rodriguez-Saona, C., Blaauw, B. R., and Isaacs, R. 2012. Manipulation of natural enemies in agroecosystems: habitat and semiochemicals for sustainable insect pest control. pp 89-126, In: *Integrated Pest Management and Pest Control – Current and Future Tactics*. Marcelo L. Larramendy and Sonia Soloneski (Eds.), ISBN: ISBN 978-953-51-0050-8
- Taylor, E. C., K. A. Renner, C. L. Sprague. 2012. Organic weed management in field crops with a propane flamer and rotary hoe. *Weed Technology*. 26:793-799.
- Ackroyd J.V. and M. Ngouajio. 2011. Brassicaceae cover crops affect seed germination and seedling establishment in cucurbit crops. *HortTechnology* 21:525-532.
- Brainard, D.C., V. Kumar and R.R. Bellinder. 2011. Grass-legume mixtures and soil fertility affect cover crop performance and weed seed production. *Weed Technology* 25:473-479
- Epstein, David L., Stelinski, Lucasz, Miller, James R., Grieshop, Matthew J., Gut, Larry J. 2011. Effects of reservoir dispenser height on efficacy of mating disruption of codling moth (*Lepidoptera: Tortricidae*) in apple. *Pest Management Science* 67: 975-979.
- Epstein, David L., Miller, James R., Grieshop, Matthew J., Stelinski, Lucasz, Gut, Larry J. 2011. Direct sampling of resting codling moth (*Lepidoptera: Tortricidae*) adults in apple tree canopies and surrounding habitats. *Environmental Entomology* 40: 661-668.
- Freyer, Bernhard, Jim Bingen. 2011. The Transformation to Organic: Insights from Practice Theory. In Matthew Reed, ed., *Organic Food and Agriculture – New Trends and Developments in the Social Sciences*. [InTech](#). Pp. 169-196.

- Nair, A., M. Ngouajio, and J. Biernbaum. 2011. Alfalfa-based organic amendment in peat-compost growing medium for organic tomato transplant production. *HortScience* 46:253-259.
- Grieshop, Matthew J., Brunner, J., Jones, V., Bello, N. 2010. Recapture of codling moth males: influence of lure type and pheromone background. *Journal of Economic Entomology* 103: 1242-1249.
- Grieshop, Matthew J., Flinn, P., Nechols, J. 2010. Effects of intra- and interpatch host density on egg parasitism by three species of *Trichogramma*. *The Journal of Insect Science* 10:99 available online: insectscience.org/10.99
- Miller, James R., McGhee, Peter S., Siegert, Piera Y., Adams, Christopher G., Grieshop, Matthew J., Gut, Larry J. 2010. General principles of attraction and competitive attraction as revealed by large-cage studies of moths responding to sex pheromone. *Proceedings of the National Academy of Sciences* 107: 22-27.
- Snapp, S.S., L. Gentry, and R.R. Harwood. 2010. Management intensity organic- not biodiversity –the driver of ecosystem services in a long-term row crop experiment. *Agriculture Ecosystems and Environment*. 138:242-248.
- Gelfand, I., S. S. Snapp and G.P. Robertson. 2010. Energy efficiency of conventional, organic, and alternative cropping systems at a site in the US Midwest. *Environ. Science and Technology* 44:4006-4011
- Nair, A. and M. Ngouajio. 2010. Integrating row covers and soil amendments for organic cucumber production: Implications on crop growth, yield, and microclimate. *HortScience* 45(4):566-574.
- Teixeira, Luis A., Grieshop, Matthew J., Gut, Larry J. 2010. Effect of pheromone dispenser density on timing and duration of approaches by peachtree borer. *Journal of Chemical Ecology* 36: 1148-1154.
- Bird, George W., Grieshop, Matthew J., Hepperly, Paul, Moyer, Jeff. 2009. Climbing Mt. Organic: An Ecosystem Approach to Pest Management. In *Organic Farming: The Ecological System*, ed. Charles Francis, Madison, WI: American Society of Agronomy.
- Lourdes Martinez, Jim Bingen, David Conner, 2009. “Handlers Perspectives on Sourcing Organic Produce from Michigan and the Great Lakes Region.” *Choices*.
- Lourdes Martinez, David Conner, Jim Bingen. 2009. Great Lakes Organic Produce in Wholesale and Retail Grocery Markets: Opportunities and Challenges from Michigan. *Journal of Food Distribution Research*. 15,1: 118-122
- Drinkwater, L. E., & Snapp, S. S. (2007). Nutrients in agroecosystems: rethinking the management paradigm. *Advances in Agronomy*, 92, 163-186.
- Snapp, S. S., Swinton, S. M., Labarta, R., Mutch, D., Black, J. R., Leep, R., & O’Neil, K. (2005). Evaluating cover crops for benefits, costs and performance within cropping system niches. *Agronomy Journal*, 97(1), 322-332.

- Stelinski, Lukasz L., McGhee, Peter, Grieshop, Matthew J., Brunner, Jay, Gut, Larry J. 2008. Efficacy and mode of action of female-equivalent dispensers of pheromone for mating disruption of codling moth, *Cydia pomonella* (L.). *Agricultural and Forest Entomology* 10: 389-397.
- Grieshop, Matthew J., Flinn, Paul W., Nechols, James R., Campbell, James. 2008. Effects of fine-grain habitat complexity on egg parasitism by three species of *Trichogramma*. *Biological Control* 45: 328-36.
- Reid, T. 2008. Organic Farming. *Encyclopedia of Environmental Ethics and Philosophy*. J. Baird Callicott and Robert Frodeman (eds.). New York: Macmillan Library Reference (Thompson Gale),
- Bingen, Jim, Carol Osborne, Emily Reardon. 2007. *Organic Agriculture in Michigan. 2006 Survey Report*. East Lansing: MSU and MOFFA.
- Grieshop, Matthew J., Flinn, Paul W., Nechols, James R., Schoeller, Matthias. 2007. Host-foraging success of three species of *Trichogramma* in simulated retail environments. *Journal of Economic Entomology* 100: 591-598.
- Hill E.C., M. Ngouajio, and M.G. Nair. 2007. Allelopathic Potential of Hairy Vetch and Cowpea Methanol and Ethyl Acetate Extracts on Weeds and Vegetables. *Weed Technology*. 21:437-444.
- Reid, T. 2007. Walking the Talk with Both Feet on the Earth: A Biography of Maynard Kaufman, Organic Pioneer – Part II. *Michigan Organic Connections*, 13:1, pp. 4-5.
- Grieshop, Matthew J., Flinn, Paul, Nichols, James, Campbell, James. 2006. Effects of shelf architecture and parasitoid release height on biological control of *Plodia interpunctella* (Lepidoptera: Pyralidae) eggs by *Trichogramma deion* (Hymenoptera: Trichogrammatidae). *Journal of Economic Entomology* 99: 2202-2209.
- Grieshop, Matthew J., Flinn, Paul, Nechols, James. 2006. Biological control of the Indian meal moth on finished stored products using egg and larval parasitoids. *Journal of Economic Entomology* 99: 1080-1084
- Hill E.C., M. Ngouajio, and M.G. Nair. 2006. Differential response of weeds and vegetable crops to aqueous extracts of hairy vetch and cowpea. *HortScience* 41(3):695-700.
- Ngouajio M., K. Delate, E. Carey, A.N. Azarenko, J.J. Ferguson, and W.J. Sciarappa. 2006. Curriculum Development for Organic Horticulture: Introduction. *HortTechnology* 16:414-417.
- Reid, T. 2006. Walking the Talk with Both Feet on the Earth: A Biography of Maynard Kaufman, Organic Pioneer – Part I. *Michigan Organic Connections*: 12:4, pp. 7-8.
- Schoeller, Matthias, Flinn, Paul, Grieshop, Matthew J., Zdarkova, E. 2006. Biological Control of the Indianmeal Moth on Finished Stored Products Using Egg and Larval Parasitoids. In *Insect management for food storage and processing, 2nd ed.*, ed. Jerry Heaps, American Association of Cereal Chemists.
- Bingen, Jim, 2005. "The Organic Choice. More Than a Label." *PediatricBasics*. 110 (Spring): 16-24.

Delind, Laura B., Jim Bingen. 2005. "Be Careful What You Wish For: Democratic Challenges and Political Opportunities for the Michigan Organic Community." *Culture & Agriculture*. 27, 2: 131-143.

Extension and Outreach Publications

Organic Raspberry Production in Three-Season High Tunnels. MSUE publication #3235. Eric Hanson, Vicki Morrone, Rufus Issacs. Michigan State University Extension.

- [Engineering Living Pest Management.pdf](#)
- [Influence of Cover Crops on Beans.pdf](#)
- [Integrated Reduced Tillage.pdf](#)
- [2012 Compost tea and impact on disease control.pdf](#)
- [Ecosystem services provided by Perennial grains.pdf](#)
- [Organic Marketing Trends in US for 2012.pdf](#)
- [Role of Cover Crops.pdf](#)
- [Vermicomposting of campus food residuals and waste at the Student Organic Farm](#)
- [Carbon and nutrient cycling and beneficial microorganisms in organic and conventionally managed blueberry soils in Michigan](#)
- [Organic tomato and pumpkin production](#)
- [Michigan organic soybean variety comparison trials](#)
- [Managing soil organic matter and nitrogen in organic field crops: Lessons from a 12 year trial](#)
- [Building Soil for Organic and Sustainable Farms: Where to Start?](#)
- [Advanced Soil Organic Matter Management](#)
- [Building Soils Organically: Is This a Moving Target?](#)
- [How Much Carbon Can be Sequestered by Organic-based Cropping Systems in MI Soils?](#)
- [Organic research conducted by MSU Extension at Kellogg Biological Station](#)
- [Michigan Organic Food & Farming Reporting Session & Poster Contest Abstracts](#)

Organic Farming Principles and Practices

- [Organic Blueberry Research at MSU](#)
- [Ecological Management of Winter Weeds in Pea-Wheat-Corn Rotations](#)
- [Assessing Four Winter Squash Cultivars as Trap Crops to Improve Cucumber Beetle Management in Organic Cucumber Production](#)
- [Transitioning to Certified Organic in Michigan – Where to Start?](#)
- [Integrated weed management: Fine tuning the system](#)

- [The Organic Food Market](#) (2007)
- [The Market for Organic and Fortified Eggs](#) (2004)
- [First World Congress on Organic Food: Proceedings Meeting the Challenges of Safety and Quality for Fruits, Vegetables and Grains](#) (2004)
- [Business Opportunities in Specialty Food Products](#) (2002)

Academic Curricula

The following undergraduate degrees/concentrations are offered:

[Sustainable and Organic Concentration in Horticulture](#)

Courses applicable to organic systems include:

- HRT 251 (3) Organic Farming Principles and Practices
- HRT 253 (1) Compost Production and Use
- CSS 360 (3) Soil Biology
- PLP 405 (3) Introduction to Plant Pathology
- ENT 479 (3) Organic Pest Management
- HRT 253 Compost Production and Use
- HRT 258 Study a Farm
- PLP 405 Plant Pathology
- CSS 302 Principles of Weed Management
- HRT 221 Greenhouse Structures and Management
- HRT 242 Passive Solar Greenhouses for Protected Cultivation
- HRT 243 Organic Transplant Production

MSU also offers an [Undergraduate Specialization in Sustainable Agriculture and Food Systems](#). Courses include:

- HRT/CSS 251 Organic Farming Principles and Practices (3 credits)
- HRT 243 Organic Transplant Production (1)
- HRT 253 Compost Production and Use (1)
- HRT 258 Study a Farm (Organic farming field study) (3)
- CSS 360 Soil Biology (3)
- ENT 479 Organic Pest Management (3)
- CSS 442 Agroecology (3)
- CSS 424 Sustainable Agriculture and Food Systems SAFS Capstone (3)
- ACR 891B and ACR 854 Issues in Organic Agric. & Social Movements in Agric.

[MSU offers a year-round Organic Farm and Organic Farmer Training Program](#) at MSU's [Student Organic Farm](#), funded in part by a \$50,000 endowment for scholarships for future organic farmers from two "Hoophouse Gala" fundraising dinners and silent auctions.

Graduate Student Opportunities

Michigan State offers an [Ecological Food and Farming Systems](#) (EFFS) graduate specialization, as well as numerous opportunities for graduate student research in organic agriculture.

Examples of graduate student research projects include:

- A novel approach for optimizing the benefits of cereal-legume cover crop mixtures in vegetable cropping systems under organic management. Zachary Hayden, 2010-2011.
- Potential of organic hogs as a tool for post-harvest orchard floor sanitation and pest management. Krista Buehrer, 2010-2011.
- Improvement of arthropod biological control systems for organic greenhouse production; Emily Pochubay, 2010-2011.
- Soil invertebrate biodiversity under contrasting orchard management regimes in Michigan; Nathaniel Walton, 2010-2011.
- A Novel Approach for Optimizing the Benefits of Cereal-Legume Cover Crop Mixtures in Vegetable Cropping Systems. Zachary Hayden, 2009-2012.

Outreach Efforts

The [Michigan Organic Reporting Sessions](#) are annual day-long events to share progress and results of MSU organic production and marketing research.

MSU maintains an extensive [calendar of events](#) featuring outreach opportunities around and outside of Michigan.

Serving Michigan's Multicultural Agriculture – Provides outreach related to organic farming, compost, transplants and season extension for farmers learning to grow food for the Covert school system, funded by USDA through Michigan Food and Farming Systems ([MIFFS](#)).

Faculty and staff from MSU help develop and deliver the following: Michigan Organic Listserve; NRCS District Conservationist Organic Training; FSA Education on Organic Systems; Midwest Extension Educators Advanced Organic Farming Workshops; Student Organic Farm Four Season Diversified Organic Farming Workshops (funded by RMA Community Partnership Grant); Annual Michigan Organic Conference and Preconference Organic Reporting Sessions; Annual Great Lakes Fruit and Vegetable Expo Organic Program; and numerous Field Days and Workshops.

MSU faculty have provided multiple presentations in recent years at the Midwest Organic and Sustainable Education Service (MOSES) Conference (e.g., Biernbaum, Grieshop, Montri, Lang, Hanson, Gluck, Morrone, Snapp).

In 2014, Vicki Morrone, MSU, presented an Organic Production Introduction and Advanced Organic vegetable Systems program for the Great Lakes Fruit and Vegetable Expo, presented

“Organic Production and Certification-Choices and Steps” at the Family Farm Conference, and organized a High Tunnel Organic Fruit Production Twilight Meeting and Tour

In 2014, MSU also hosted organic soybean variety plot tours and an organic marketing meeting, which provided an opportunity for buyers to meet with and discuss their market outlook with organic growers.

MSU publishes an organic soybean variety trial results publication. There were 52 varieties evaluated in 2014. The report includes information on yield, % moisture, % oil, % protein, height, maturity date, number of seeds per pound, and white mold disease severity ratings for each variety trialed.

Web Resources

[MSU Organic Farming Exchange](#). Organic vegetable and field crop production information from MSU and beyond. Also available is information on organic certification.

[The Midwest Cover Crops Council](#) (MCCC) facilitates adoption of cover crops throughout the Midwest to improve ecological, economic, and social sustainability.

[MSU’s Michigan Cover Crop Species page](#) offers several publications on different species of cover crops including crimson clover, oil seed radish and medics.

[Cover crops for Michigan](#) provides information on cover crop varieties and management.

[Midwest Cover Crops Council Cover Crop Decision Tools page](#) is the site to use the cover crop selector tool where farmers choose the criteria they are seeking and identify their local and the calculator provides cover crop variety options.

eOrganic/eXtension communities of practice materials for organic farmer soil management developed by Snapp, including the [Managing for Soil Organic Matter page](#).

Webinar presented on November 25th, 2014 by J. Tourtois and M. Grieshop on Harnessing “Micro-Livestock” for on-Farm Biological Control and Nutrient Cycling. <https://connect.msu.edu/p9lm4rvqlig/>

[Soil Ecology and Management](#) explores the [soil ecosystem](#), including the interrelationships of [soil biological](#), chemical and physical processes.

MSU Organic Raspberry High Tunnel Project with Eric Hanson: <https://www.youtube.com/watch?v=4O90sGj8ky8>

MSU Organic Raspberry High Tunnels: Pest Management: https://www.youtube.com/watch?v=Ex2dTcn_Ehc

Constructing Multi-Bay Tunnels for Organic Fruit Production: <https://www.youtube.com/watch?v=xWnI6iIZeVQ>

OREI High Tunnel Organic Fruit: https://www.youtube.com/watch?v=iIIN-26T5fU&list=PLE816E610DF986E58&index=8&feature=plpp_video

[Enhancing Biological Control with Native Plants](#)

[Organic Pest Management](#)

[Pesticide Alternatives Laboratory](#)

[Organic Fruit Production in High Tunnels](#)

[Center for Regional Food Systems at MSU](#)

Kellogg Biological Station [Long-term Ecological Research Program](#)

[The MSU Product Center for Agriculture and Natural Resources](#) (ANR). The center can help develop and commercialize high value, consumer-responsive products and businesses in the agriculture and natural food sectors.

[Enviro-weather](#) is a site to find degree day counts and notices of pest outbreaks in MI.

[Sustainable Agriculture and Food Systems](#) at MSU is a site with sustainable agriculture information including cover crops, nutrient management, soil ecology, economic analysis, integrated pest management, biological control with native plants, and more.

[Alternative Forages and Cover Crops-Michigan State University Extension Field Crops Webinar](#) (2014)

[The Michigan State University Hoopouse](#) website is the place to go for information and upcoming events for hoopouse (high tunnel) construction and production.

[Michigan Organic Food and Farming Alliance](#) brings consumers and farmers together to understand the values of organic and local food systems in Michigan.

Hands-on Learning

The [MSU Student Organic Farm](#) is a 10-acre, certified organic year-round teaching and production farm. The farm also operates an intensive 9-month Organic Farmer Training Program (OFTP) in year-round organic farming focusing on diversified production of vegetables, flowers, fruits and herbs for local markets. [Additional information about the SOF is available online.](#)

A hoopouse has been built on campus adjacent to the Liberty Hyde Bailey Residence Hall to grow certified organic culinary herbs and other crops using compost made from campus food scraps. The program is associated with the [RISE Environmental Studies Program](#) and details are [available at the MSU Department of Horticulture website.](#)

MSU organizes the [Organic Farming Mentor Program](#), which is an opportunity for experienced organic farmers to teach and help those new to the practice.

Acres Certified Organic

21 acres certified organic by GOA at the Kellogg Biological Station Research Farm, Hickory Corners, Michigan.

15 acres certified organic by OEFFA at the Horticulture Teaching and Research Station for the Student Organic Farm. Also includes blueberry research plots, high tunnel raspberry and sweet cherry plots, vermicomposting research and 0.25 acre on MSU Campus.

Total acres certified organic = 36.25 acres.

Organic Livestock Research

Some of the organic fruit research done by M. Grieshop involves livestock, as pigs are used to eat the June drops in the apple orchard and plum curculio larvae die in the gut of the pig.

On-Farm Research

At least six MSU faculty members and seven graduate students are conducting on-farm research on fourteen organic farms, focused on grain, legume, cover crop, fruit, vegetable, high tunnel, and hop production. Organic on-farm research projects are often coordinated with conventional research projects and field days.

Key Contacts

- Dr. Dean Baas, Sr. Research Associate, MSU Extension, baasdean@anr.msu.edu
- Bob Battle, MSUE Organic & Sustainable Field Crop Educator, battelro@msu.edu
- Dr. John Biernbaum, Professor, Horticulture, biernbau@msu.edu
- Dr. George Bird, Professor Emeritus, Entomology, birdg@msu.edu
- Dr. Dan Brainerd, Associate Professor, Horticulture, brainar9@msu.edu
- Dr. Matthew Grieshop, Associate Professor, Integrated Plant Systems Center, grieshop@msu.edu
- Dr. Michael Hamm, Professor, CS Mott Chair, mhamm@msu.edu
- Dr. Eric Hanson, Professor and Extension Specialist, Horticulture, hansone@msu.edu
- Vicki Morrone MSU Organic Vegetable and Field Crop Specialist, Dept. of Community Sustainability, sorrone@msu.edu
- Dr. Mathieu Ngouajio, Associate Professor, Vegetable Crops, ngouajio@msu.edu
- Dr. Phil Robertson, Professor, Dept. of Plant, Soil and Microbial Sciences, robertson@kbs.msu.edu
- Dr. Annemiek Schilder, Associate Professor, Plant Pathology, schilder@msu.edu
- Dr. Sieglinde Snapp, Professor, Dept. of Plant, Soil and Microbial Sciences, snapp@msu.edu
- Dr. Erin Hill (Taylor), Research Assistant, Dept. of Plant, Soil and Microbial Sciences, hiller12@msu.edu

MINNESOTA

Organic Research Projects

Cropping Systems

Toward Effective Microbial Weed Management: Effects of Manure Application and Cover Crop use on Native Soil Microbial Communities and Weed Seed Demise in the Soil Seedbank. Craig Schaeffer, 2015-2018, Funding: Ceres Trust

Understanding the Value of Oilseed Radish and Perennial Cover Crops as Nutrient Sources for Field Crops. Paulo Pagliara, 2015-2018, Funding: Ceres Trust.

Assessing nitrogen contribution and soil biological effects of promising winter annual legume cover crops for Minnesota. Julie Grossman, Nancy Ehlke, Craig Sheaffer, Scott Wells, 2014-2017, Funding: Forever Green.

Blasting the Competition away: Air-Propelled Abrasive Grits for Intra-Row Weed Management in Organic Grain and Vegetable Crops. Frank Forcella, Sam Wortman (University of Illinois), Sharon Clay (SDSU), Dan Humberg (SDSU), 2014-2018, Funding: NIFA-OREI.

Bringing the benefits of legume cover cropping to northern Midwest climates. Julie Grossman, Craig Sheaffer, and Nancy Elke, 2014-2017, Funding: NCR- SARE.

Principles for Transitioning to Organic Farming: e-Learning Materials and Decision Case Studies for Educators. Craig Sheaffer, Jeffrey Gunsolus, Tom Michaels, John Lamb, Michelle Miller (CIAS, University of Wisconsin), 2013-2016, Funding: USDA-NIFA-ORG.

Promoting sustainable biological control of the soybean aphid by examining the effect of biodiversity on releases of the parasitoid wasp *Aphelinus glycinis*. George Heimpel, Julie Peterson, Joe Kaser, James Eckberg, Gregg Johnson, Don Wyse, Carmen Fernholz, Keith Hopper (USDA-ARS), 2013-2016, Funding: NCR-SARE.

Breeding dry edible beans for organic production. Tom Michaels, Craig Sheaffer, Michael Sadowski, 2012-2016, Funding: USDA/NIFA OREI.

Climate and Corn-based Cropping Systems CAP (CSCAP). Jeff Strock, SWROC, 2012-2016. CSCAP is a transdisciplinary partnership among 11 institutions that seeks to increase resilience and adaptability of Midwest agriculture to more volatile weather patterns by identifying farmer practices and policies that increase sustainability while meeting crop demand. Funding: Organic Valley-FAFO to support two organic research sites.

Dual-purpose cover crops and onsite retention of water and nutrients. Frank Forcella, Don Wyse, Jeff Strock, and Russ Gesch, 2014-2017, Funding: Minnesota Department of Agriculture.

Genetic diversity within heirloom dry edible beans. Tom Michaels, Craig Sheaffer, 2012-2016, Funding: USDA/NIFA/OREI.

Metagenomic Exploration of Cover Crop and Amendment Effects on Functional Bacterial Communities in Organic Soil. Craig Sheaffer, 2011-2014, Funding: Ceres Trust.

Non-Chemical Precision Weed Management Based on Air-propelled Abrasive Agricultural Residues. Frank Forcella, Manuel Perez-Ruiz (University of Seville), Jose Maria Urbano (University of Seville), David Slaughter (University of California-Davis), 2014-2016, Funding: Government of Spain.

Optimizing establishment of corn in cover crops and living mulches to maintain yield while reducing nitrate losses, Julie Grossman, John Baker, and Scott Wells. 2014-2017, Minnesota Department of Agriculture.

Edible Grain Legumes for Organic Cropping Systems. Craig Sheaffer, Kathryn Draeger, John Lamb, Tom Michaels, 2009-2015, Funding: Ceres Trust.

Improving Soybean and Dry Bean Varieties and Rhizobia for Organic Systems. Craig Sheaffer, Jim Orf, Tom Michaels, Michael Sadowsky, 2011-2015, Funding: USDA-NIFA.

Organic beans and peas: nutritious and gluten-free local foods. Craig Sheaffer, Kathryn Draeger, John Lamb, Tom Michaels, 2011-2016, Funding: NCR-SARE.

Spring seeding dates for organic peas and lentils. Don Wyse, Adria Fernandez, Craig Sheaffer, 2012-2013, Funding: Minnesota Agricultural Experiment Station.

Winter pea evaluation. Craig Sheaffer, Don Wyse, Adria Fernandez, 2011-2012, Funding: Minnesota Agricultural Experiment Station.

Economics

[Tools for Transition](#): Financial Data Resources and Educational Materials for Farmers Transitioning to Organic Production. Rob King, Gigi DiGiacomo, Richard Joerger, Meg Moynihan, Helene Murray, Dale Nordquist, 2011-2014, Funding: USDA/NIFA/OREI.

Economic Analysis of Organic and Conventional Cropping Systems in Minnesota. Rob King, Jeff Coulter, Tim Delbridge, Craig Sheaffer, Don Wyse, 2011-2013, Funding: Minnesota Agricultural Experiment Station.

Organic Farm Performance in Minnesota Report. Meg Moynihan, Minnesota Department of Agriculture, 2006, 2007, 2008, 2009, 2010, 2011, 2012, 2013. Funding: OFRF AND USDA Risk Management Agency. www.mda.state.mn.us/fbm

Food Safety

Development of Sanitizers for Utilization in Organic Food Processing and Crop Production. Francisco Diez-Gonzalez, Joellen Feirtag, Mastura Akhtar, Hongshun Yang, Stelios Viazis, 2010-2013, Funding: USDA/Integrated Organic Program.

Horticultural Systems

The UMN Department of Horticultural Science, along with the UMN West Central Research and Outreach Center (WCROC), Morris, MN, have completed two years of research on producing day-neutral strawberries using an organic low tunnel production system. There are four grower sites, three of which are on certified organic land; one at the U of MN St. Paul campus, one at the WCROC, and the third at an on-farm site (located off UMN property).

Specific horticultural research projects include:

Co-Developing Research and Extension Objectives for Organic Management of Spotted Wing Drosophila. Mary Rogers and Ashfaq Sial (University of Georgia), 2014-2015, Funding: USDA-OREI.

[SWROC High Tunnel: Improving Soil Health and Increasing Rotation Options for Organic Vegetable Production](#). Paulo Pagliari, 2012-2015, Funding: Ceres Trust.

Improving soil health and microbial activity through zone tillage and innovative cover cropping strategies. Peyton Ginakes and Julie Grossman, 2014-2015, Funding: NCR-SARE Graduate Student Grant Program.

Optimizing Protected Culture Environments for Berry Crops, Mary Rogers, Eric Hanson (MSU), AJ Both (Rutgers), David Conner (UVT), Dennis Decoteau (Penn State), Kathleen Demchak (Penn State), Emily Hoover (UMN), Rufus Isaacs (MSU), Kathleen Kelley (Penn State), William Lamont (Penn State), Lois Levitan (Cornell), Richard Marini (Penn State), Marvin Pritts (Cornell), Annemiek Schiler (MSU) and Becky Sideman (UNH), 2015-2017, Funding: USDA-NIFA Specialty Crop Research Initiative.

Optimizing soil health in season extension environments through innovative cover crop management, Julie grossman, Mary Rogers, and Steve Poppe, 2014-2017, Funding: NRCS Conservation Innovation Grant.

Organic Fruit and Berry Production in High Tunnels in Zones 2 and 3. Terrance Nennich, Karl Foord, Michelle Grabowski, Jim Luby, 2011-2013, Funding: Northwest Minnesota Regional Sustainable Partnership and Northwest Minnesota Foundation.

Organic Soil Fertility in High Tunnels. Terrance Nennich, Jerry Wright, Carl Rosen, 2011-2013, Funding: North West Regional Sustainable Partnership, Northwest Minnesota Foundation.

Producing Strawberries throughout the Growing Season with a Small Environmental Footprint. Steve Poppe, Emily Hoover, Andy Petran, 2012-2014, Funding: USDA, Minnesota Department of Agriculture, Minnesota Specialty Crop Block Grant Program.

SWROC High Tunnel: Extending the season for organic vegetable production. Pauline Nickel, 2009-2012, Funding: Ceres Trust and FAFO.

Livestock Systems

Tackling Lameness on Organic Dairy Farms. Ulrike Silvia Sorge, 2015-2018, Funding: Ceres Trust.

Evaluation of Fodder Systems for Organic Dairy Cattle to Improved Livestock Efficiency. Bradley Heins, 2014-2017, Funding: Ceres Trust.

Strategies to Improve Profitability of Organic Dairy Herds in the Upper Midwest. Brad Heins, Marcia Endres, Roger Moon, Craig Sheaffer, Ulrike Sorge, Rob King, Sharon Weyers, Jim Paulson, Deb Heleba, 2013-2016, Funding: USDA/NIFA/OREI.

Evaluation of different winter housing systems for effects on organic dairy cattle production, health, and well-being. Lucas Sjostrom, Brad Heins, Faculty Advisor. 2013-2014, Funding: Ceres Trust Graduate Student Grant.

Effect of Kelp on Performance and Growth of Group Fed Organic Dairy Calves. Brad Heins, Hugh Chester-Jones, Jim Paulson, 2012-2013, Funding: Minnesota Agricultural Experiment Station.

Effect of Organic Grain Supplementation on Economic, Behavior, and Pest Management Strategies of Organic Dairy Cows. Brad Heins, Marcia Endres, Roger Moon, James Paulson, 2011-2013, Funding: Ceres Trust.

Effects of growth, meat quality, and profitability of organically raised dairy-beef steers. Brad Heins, Elizabeth Bjorklund, Hugh Chester-Jones, 2011-2013. Funding: Minnesota Agricultural Experiment Station and NCR-SARE.

Additional SARE-funded organic research in Minnesota:

[Effect of Growth Meat Quality, and Profitability of Organically Raised Dairy-Beef Steers.](#) Elizabeth Bjorklund, Brad Heins, UMN, 2012, Funding: SARE.

[Organic Beans and Peas: Nutritious and Gluten-free Local Foods.](#) Craig Sheaffer, UMN, 2011, Funding: SARE.

[Small-Scale Oilseed Processing: Evaluating Edible Camelina Oil for its Market Demand and Value-Added Opportunities.](#) Kathleen Batalden Smith, Omega Maiden Oils, 2010. Funding: SARE.

[Profiling Microbial Communities in Soils from Organic, Sustainable, and Conventional Cropping Systems.](#) Adria Fernandez, UMN, 2010, Funding: SARE.

[Reducing the Impact of Soybean Aphid on Organic Soybeans through Multiple Management Tactics.](#) Mark Askegaard, 2009, Funding: SARE.

Growing Blackberries Organically under High Tunnels for Winter Protection and Increased Production. Erik Gundacker, Scenic Valley Farm, 2009, Funding: SARE.

[Build it and they will come: Integrating beneficial beetle habitat with organic growing systems economically.](#) Juan Carlos Cervantes, 2008, Funding: SARE.

[Controlling Western Striped Cucumber Beetles Using Organic Methods: Perimeter Trap Crops and Baited Sticky Traps.](#) Peter Hemberger, 2006, Funding: SARE.

[Organic Dairy Short Course for Ag Professionals.](#) Meg Moynihan, MDA, 2006, Funding: SARE.

[Improved Management of Rye Cover Crops for Organic Soybean Production.](#) Don DeWeerd, 2004, Funding: SARE.

[Microbial Safety of Organic Fruits and Vegetables.](#) Francisco Diez-Gonzalez, UMN, 2003, Funding: SARE.

[Comparing Vesicular-Arbuscular Mycorrhizal Colonization in Conventional versus Organic Strawberry Production Systems.](#) Marjorie Ross, UMN, 2003, Funding: SARE.

Minnesota Department of Agriculture Sustainable Ag Research Grants

Since 1989, the Minnesota Department of Agriculture has offered [Sustainable Agriculture Demonstration Grants](#). These grants support on-farm practices that promote environmental stewardship, conservation of resources, and help to improve profitability and quality of life in rural areas. Results are published annually in [The Greenbook](#).

Examples of organic research projects include:

[Fertilizing with Alfalfa Mulches in Field Crops – Fernholz, Carmen](#), Madison, MN. 2010-2012, Funding: MDA.

[Organic Mushroom Cultivation and Marketing in a Northern Climate – Jacoby, Jill](#), Duluth, MN. 2009-2011, Funding: MDA.

[Growing Blackberries Organically under High Tunnels for Winter Protection and Increased Production – Gundacker, Erik](#), Rosemount, MN. 2009-2011, Funding: MDA.

[Organic Day-neutral Strawberry Production in Southeast Minnesota – Kedem, Sam](#), Hastings, MN. 2008-2010, Funding: MDA.

[Environmentally and Economically Sound Ways to Improve Low Phosphorus Levels in Various Cropping Systems Including Organic with or without Livestock Enterprises – Fernholz, Carmen](#), Madison, MN. 2006-2009, Funding: MDA.

[Greenbook Completed Projects List](#). (1991-2012)

Refereed Publications

The University of Minnesota Reference Library has established a database where published [organic research papers](#) are described and archived, with links to the published papers, which are summarized below:

Akhtar, Mastura; Viazis, Stelios; Diez-Gonzalez, Francisco, 2014. Isolation, identification and characterization of lytic, wide host range bacteriophages from waste effluents against *Salmonella enterica* serovars, [Food Control](#), 2014, 38, 0, 67-74.

Bjorklund, Elizabeth Anna, 2014. [Management and economics of group-fed dairy calves and dairy steers in an organic production system](#), [J.Dairy Sci.](#) (In press).

Bjorklund, E. A., B. J. Heins, A. DiCostanzo, and H. Chester-Jones. 2014. Fatty acid profiles, meat quality, and sensory attributes of organic versus conventional dairy-beef steers. *J. Dairy Sci.*

Bjorklund, E. A., B. J. Heins, A. DiCostanzo, and H. Chester-Jones. 2014. Growth, carcass characteristics, and profitability of organic versus conventional dairy-beef steers. *J. Dairy Sci.*

Philips, C.R.; Rogers, M.A.; and Kuhar, T.P. 2014. Understanding farmscapes and their potential for improving IPM program. *Journal of Integrated Pest Management* 5, 3 1-9.

Sheaffer, Craig C.; Wyse, Donald L.; Moncada, Kristine M.; Martinson, Krishona H. 2014. Companion crops for organic alfalfa establishment. *Agronomy Journal*. 106, 1, 309-314.

Bjorklund, E.A.; Heins, B.J.; Chester-Jones, H., 2013. Whole-milk feeding duration, calf growth, and profitability of group-fed calves in an organic production system, [J.Dairy Sci.](#), 2013, 96, 11, 7363-7370.

Coulter, Jeffrey A.; Delbridge, Timothy A.; King, Robert P.; Allan, Deborah L.; Sheaffer, Craig C., 2013. Productivity, Economics, and Soil Quality in the Minnesota Variable-Input

- Cropping Systems Trial, Plant Management Network, USDA, George Washington University, Washington, D.C.
- Delbridge, Timothy A, 2013. Threshold Effects in Transition to Organic Dairy Production, 150554, *Agricultural and Applied Economics*.
- Delbridge, Timothy A.; Fernholz, Carmen; King, Robert P.; Lazarus, William, 2013. A whole-farm profitability analysis of organic and conventional cropping systems, *Agricultural Systems*, 122, 0, 1-10.
- Kang, D.H.; Gupta, S.; Rosen, C.; Fritz, V.; Singh, A.; Chander, Y.; Murray, H.; Rohwer, C., 2013. Antibiotic uptake by vegetable crops from manure-applied soils, *J.Agric.Food Chem.*, 61, 42, 9992-10001.
- Pelletier, J.E.; Laska, M.N.; Neumark-Sztainer, D.; Story, M., 2013. Positive Attitudes toward Organic, Local, and Sustainable Foods Are Associated with Higher Dietary Quality among Young Adults, *J.Acad.Nutri.Diet.*, 113, 1, 127-132.
- Yang, Hongshun; Feirtag, Joellen; Diez-Gonzalez, Francisco, 2013. Sanitizing effectiveness of commercial “active water” technologies on Escherichia coli O157:H7, Salmonella enterica and Listeria monocytogenes, *Food Control*, 33, 1, 232-238.
- Chen, SY; Sheaffer, CC; Wyse, DL; Nickel, P; Kandel, H, 2012. Plant-parasitic Nematode Communities and Their Associations with Soil Factors in Organically Farmed Fields in Minnesota, *J.Nematol.*, 44, 4, 361, Society of Nematologists.
- Delbridge, T. A., King, R. P., 2012. Conversion to Organic Farm Management: A Dynamic Programming Approach, *Agricultural and Applied Economics Association*.
- Fernandez, A. L., Sheaffer, C. C., Wyse, D. L. and Michaels, T. E., 2012. Yield and Weed Abundance in Early-and Late-Sown Field Pea and Lentil, *Agron.J.*
- Koch, R. L., Porter, P. M., Harbur, M. M., et al., 2012. Response of soybean insects to an autumn-seeded rye cover crop, *Environ.Entomol.*
- Seufert, V., Ramankutty, N. and Foley, J. A., 2012. Comparing the yields of organic and conventional agriculture, *Nature*.
- Stone, A. G., Treadwell, D. D., Riddle, J. A., Formiga, A. K., et al., 2012. eOrganic: The Organic Agriculture Community of Practice for eXtension, *HortTechnology*.
- Yue, C., Hurley, T. and Anderson, N. O., 2012. Heterogeneous consumer preferences for native and invasive plants: Evidence from experimental auctions, *HortScience*.
- Coulter, J. A., Sheaffer, C. C., Haar, M. J., Wyse, D. L. and Orf, J. H., 2011. Soybean cultivar response to planting date and seeding rate under organic management, *Agron.J.*
- Delbridge, T. A., Coulter, J. A., King, R. P., Sheaffer, C. C. and Wyse, D. L., 2011. Economic performance of long-term organic and conventional cropping systems in Minnesota, *Agron.J.*
- Francis, C. A., Jordan, N., Porter, P., et al., 2011. Innovative education in agroecology: Experiential learning for a sustainable agriculture, *Crit.Rev.Plant Sci*.
- Francis, C. A., Porter, P., 2011. Ecology in sustainable agriculture practices and systems, *Crit.Rev.Plant Sci*.

- Lay, D. C., Fulton, R. M., Hester, P. Y., et al., 2011. Hen welfare in different housing systems, *Poult.Sci.*
- Leavitt, M. J., Sheaffer, C. C., Wyse, D. L. and Allan, D. L., 2011. Rolled winter rye and hairy vetch cover crops lower weed density but reduce vegetable yields in no-tillage organic production, *HortScience.*
- Yue, C., Dennis, J. H., Behe, B. K., Hall, C. R., Campbell, B. L. and Lopez, R. G., 2011. Investigating consumer preference for organic, local, or sustainable plants, *HortScience.*
- Yue, C., Tong, C., 2011. Consumer preferences and willingness to pay for existing and new apple varieties: Evidence from apple tasting choice experiments, *HortTechnology.*
- Coulter, J. A., Sheaffer, C. C., Wyse, D. L., et al., 2011. Agronomic performance of cropping systems with contrasting crop rotations and external inputs, *Agron.J.*
- Delbridge, T. A., Coulter, J. A., King, R. P. and Sheaffer, C. C., 2010. A Profitability and Risk Analysis of Organic and High-Input Cropping Systems in Southwestern Minnesota, *Agricultural and Applied Economics Association.*
- Moncada, Kristine M., Sheaffer, Craig C., 2010. Risk Management Guide for Organic Producers, *University of Minnesota.*
- Wortman, S. E., Lindquist, J. L., Haar, M. J. and Francis, C. A., 2010. Increased weed diversity, density and above-ground biomass in long-term organic crop rotations, *Renewable Agriculture and Food Systems.*
- Yue, C., Grebitus, C., Bruhn, M. and Jensen, H. H., 2010. Marketing organic and conventional potatoes in Germany, *Journal of International Food and Agribusiness Marketing.*
- Kandel, H. J., Porter, P. M. and Carr, P. M., 2009. Spring Wheat Cultivar Harrowing Evaluation in Minnesota, *Crop Management.*
- Schurman, R., Munro, W., 2009. Targeting capital: a cultural economy approach to understanding the efficacy of two anti-genetic engineering movements, *American Journal of Sociology.*
- Van Waardhuizen, M. R., Peloquin, C. E. and Kokil, U., 2009. CropConnect: Enabling community supported agriculture, *Conference on Human Factors in Computing Systems – Proceedings.*
- Yue, C., Tong, C., 2009. Organic or local? investigating consumer preference for fresh produce using a choice experiment with real economic incentives, *HortScience.*
- Clapp, C. E., Shenker, M., Hayes, M. H. B., et al., 2008. Microsystems for rapid evaluation of plant growth response to organic amendments, *Soil Sci.*
- Fox, J. T., Reinstein, S., Jacob, M. E. and Nagaraja, T. G., 2008. Niche marketing production practices for beef cattle in the United States and prevalence of foodborne pathogens, *Foodborne Pathogens and Disease.*
- Jacob, J. P., Carter, C. A., 2008. Inclusion of buckwheat in organic broiler diets, *Journal of Applied Poultry Research.*

- Jacob, J. P., Levendoski, N. and Goldstein, W., 2008. Inclusion of high methionine corn in pullet diets, *Journal of Applied Poultry Research*.
- Jacob, J. P., Noll, S. L. and Brannon, J. A., 2008. Comparison of metabolic energy content of organic cereal grains for chickens and turkeys, *Journal of Applied Poultry Research*.
- Kandel, H. J., Porter, P. M., Carr, P. M. and Zwinger, S. F., 2008. Producer participatory spring wheat variety evaluation for organic systems in Minnesota and North Dakota, *Renewable Agriculture and Food Systems*.
- Lorenzana, R. E., Bernardo, R., 2008. Genetic correlation between corn performance in organic and conventional production systems, *Crop Sci*.
- Warnke, S. A., Chen, S., Wyse, D. L., Johnson, G. A. and Porter, P. M., 2008. Effect of rotation crops on hatch, viability and development of *Heterodera glycines*, *Nematology*.
- Mahoney, P. R., Olson, K. D., Porter, P. M., Huggins, D. R., Perillo, C. A. and Crookston, R. K., 2007. Profitability of organic cropping systems in southwestern Minnesota, *Organic Food*.
- Rosen, C. J., Allan, D. L., 2007. Exploring the benefits of organic nutrient sources for crop production and soil quality, *HortTechnology*.
- Ashling, J., Tchida, C., Markhart, A. H. and Porter, P., 2007. Origin of Cornercopia, the University of Minnesota Student Organic Farm, *Journal of Hunger and Environmental Nutrition*.
- Cho, S., Fossler, C. P., Diez-Gonzalez, F., et al., 2007. Antimicrobial susceptibility of shiga toxin-producing *Escherichia coli* isolated from organic dairy farms, conventional dairy farms, and county fairs in Minnesota, *Foodborne Pathogens and Disease*.
- Delserone, L. M., Bernholz, C. D., 2007. Tracking “organic” agricultural research in the United States, 1970-1989: What federal legislative and selected USDA-sponsored documents reveal, *J.Agric.Food Inf*.
- Jacob, J. P., 2007. Nutrient content of organically grown feedstuffs, *Journal of Applied Poultry Research*.
- Mitchell, A. E., Hong, Y. J., Koh, E., et al., 2007. Ten-year comparison of the influence of organic and conventional crop management practices on the content of flavonoids in tomatoes, *J.Agric.Food Chem*.
- Russelle, M. P., Entz, M. H. and Franzluebbers, A. J., 2007. Reconsidering integrated crop-livestock systems in North America, *Agron.J*.
- Mukherjee, A., Speh, D. and Diez-Gonzalez, F., 2007. Association of farm management practices with risk of *Escherichia coli* contamination in pre-harvest produce grown in Minnesota and Wisconsin, *Int.J.Food Microbiol*.
- Oquist, K. A., Strock, J. S. and Mulla, D. J., 2007. Influence of alternative and conventional farming practices on subsurface drainage and water quality, *J.Environ.Qual*.

- Brunetti, G., Plaza, C., Clapp, C. E. and Senesi, N., 2007. Compositional and functional features of humic acids from organic amendments and amended soils in Minnesota, USA, *Soil Biol. Biochem.*
- Carr, P. M., Kandel, H. J., Porter, P. M., Horsley, R. D. and Zwinger, S. F., 2006. Wheat cultivar performance on certified organic fields in Minnesota and North Dakota, *Crop Sci.*
- Chen, S., Wyse, D. L., Johnson, G. A., et al., 2006. Effect of cover crops alfalfa, red clover, and perennial ryegrass on soybean cyst nematode population and soybean and corn yields in Minnesota, *Crop Sci.*
- Cho, S., Bender, J. B., Diez-Gonzalez, F., et al., 2006. Prevalence and characterization of *Escherichia coli* O157 isolates from Minnesota dairy farms and county fairs, *J. Food Protection.*
- Cho, S., Diez-Gonzalez, F., Fossler, C. P., et al., 2006. Prevalence of shiga toxin-encoding bacteria and shiga toxin-producing *Escherichia coli* isolates from dairy farms and county fairs, *Vet. Microbiol.*
- De Bruin, J. L., Jordan, N. R., Porter, P. M. and Huerd, S. C., 2006. Soil microbiota effects on rye growth: Implications for integration of a rye cover crop into temperate cropping systems, *Renewable Agriculture and Food Systems.*
- Halbert, L. W., Kaneene, J. B., Linz, J., et al., 2006. Genetic mechanisms contributing to reduced tetracycline susceptibility of *Campylobacter* isolated from organic and conventional dairy farms in the Midwestern and Northeastern United States, *J. Food Protection.*
- Halbert, L. W., Kaneene, J. B., Ruegg, P. L., et al., 2006. Evaluation of antimicrobial susceptibility patterns in *Campylobacter spp* isolated from dairy cattle and farms managed organically and conventionally in the midwestern and northeastern United States, *J. Am. Vet. Med. Assoc.*
- Markhart, A. H., 2006. Organic educational opportunities at the University of Minnesota: The role of a student-run organic farm, *HortTechnology.*
- Ray, K. A., Warnick, L. D., Mitchell, R. M., et al., 2006. Antimicrobial susceptibility of *Salmonella* from organic and conventional dairy farms, *J. Dairy Sci.*
- Mukherjee, A., Speh, D., Jones, A. T., Buesing, K. M. and Diez-Gonzalez, F., 2006. Longitudinal microbiological survey of fresh produce grown by farmers in the upper Midwest, *J. Food Protection.*
- Schurman, R., Munro, W., 2006. Ideas, thinkers, and social networks: The process of grievance construction in the anti-genetic engineering movement, *Theory and Society.*
- Oquist, K. A., Stroock, J. S. and Mulla, D. J., 2006. Influence of alternative and conventional management practices on soil physical and hydraulic properties, *Vadose Zone Journal.*
- Singer, R. S., Hofacre, C. L., 2006. Potential impacts of antibiotic use in poultry production, *Avian Dis.*
- Singer, R. S., Ward, M. P. and Maldonado, G., 2006. Can landscape ecology untangle the complexity of antibiotic resistance? *Nature Reviews Microbiology.*

- De Bruin, J. L., Porter, P. M. and Jordan, N. R., 2005. Use of a rye cover crop following corn in rotation with soybean in the upper Midwest, *Agron.J.*
- Fossler, C. P., Wells, S. J., Kaneene, J. B., et al., 2005. Herd-level factors associated with isolation of *Salmonella* in a multi-state study of conventional and organic dairy farms. II. *Salmonella* shedding in calves, *Prev.Vet.Med.*
- Fossler, C. P., Wells, S. J., Kaneene, J. B., et al., 2005. Herd-level factors associated with isolation of *Salmonella* in a multi-state study of conventional and organic dairy farms: I. *Salmonella* shedding in cows, *Prev.Vet.Med.*
- Fossler, C. P., Wells, S. J., Kaneene, J. B., et al., 2005. Cattle and environmental sample-level factors associated with the presence of *Salmonella* in a multi-state study of conventional and organic dairy farms, *Prev.Vet.Med.*
- Griggs, J. P., Jacob, J. P., 2005. Alternatives to antibiotics for organic poultry production, *Journal of Applied Poultry Research.*
- Grossman, J. M., Sheaffer, C., Wyse, D. and Graham, P. H., 2005. Characterization of slow-growing root nodule bacteria from *Inga oerstediana* in organic coffee agroecosystems in Chiapas, Mexico, *Appl.Soil Ecol.*
- Kumar, K., Gupta, S. C., Baidoo, S. K., Chander, Y. and Rosen, C. J., 2005. Antibiotic uptake by plants from soil fertilized with animal manure, *J.Environ.Qual.*
- Vatovec, C., Jordan, N. and Huerd, S., 2005. Responsiveness of certain agronomic weed species to arbuscular mycorrhizal fungi, *Renew.Agric.Food Syst.*
- Ferris, H., Venette, R. C. and Scow, K. M., 2004. Soil management to enhance bacterivore and fungivore nematode populations and their nitrogen mineralisation function, *Appl.Soil Ecol.*
- Fossler, C. P., Wells, S. J., Kaneene, J. B., et al., 2004. Prevalence of *Salmonella spp* on conventional and organic dairy farms, *J.Am. Vet.Med.Assoc.*
- Mahoney, P. R., Olson, K. D., Porter, P. M., Huggins, D. R., Perillo, C. A. and Crookston, R. K., 2004. Profitability of organic cropping systems in southwestern Minnesota, *Renewable Agriculture and Food Systems.*
- Mukherjee, A., Speh, D., Dyck, E. and Diez-Gonzalez, F., 2004. Preharvest evaluation of coliforms, *Escherichia coli*, *Salmonella*, and *Escherichia coli* O157: H7 in organic and conventional produce grown by Minnesota farmers, *Journal of Food Protection.*
- Zwald, AG, Ruegg, PL, Kaneene, JB, et al., 2004. Management practices and reported antimicrobial usage on conventional and organic dairy farms, *J.Dairy Sci.*
- Francis, C., Lieblein, G., Gliessman, S., et al., 2003. Agroecology: The ecology of food systems, *J.Sustainable Agric.*
- Grossman, JM., 2003. Exploring farmer knowledge of soil processes in organic coffee systems of Chiapas, Mexico, *Geoderma.*

Porter, P. M., Huggins, D. R., Perillo, C. A., Quiring, S. R. and Crookston, R. K., 2003. Organic and other management strategies with two- and four-year crop rotations in Minnesota, *Agron.J.*

Robinson, R., Smith, C., 2003. Associations between self-reported health conscious consumerism, body-mass index, and attitudes about sustainably produced foods, *Agriculture and Human Values.*

Wheatley, W. P., 2003. The natural and organic pork market: A sustainable niche for small-scale producers? A review and analysis of the evidence, *Am.J.Alternative Agric.*

Robinson, R., Smith, C., Murray, H. and Ennis, J., 2002. Promotion of sustainably produced foods: Customer response in Minnesota grocery stores, *Am.J.Alternative Agric.*

Extension and Outreach Publications

- [ABCs of Organic Certification Webinar](#)
- [An Introduction to Organic Certification Requirements](#)
- [Approved Health Care and Medication Regulations for Organic Dairy and Livestock in the United States](#)
- [Becoming a Certified Organic Dairy](#)
- [Benefits and Challenges of Organic Certification for Research Sites and Facilities](#)
- [Breeder Stock Regulations for Organic Dairy and Livestock in the United States](#)
- [Can I Use This Input on My Organic Farm?](#)
- [Directory of Minnesota Organic Farms 2012-2013 \(MDA\)](#)
- [Farmers' Guide to Organic Contracts \(FLAG\)](#)
- [Flooding and Organic Certification Webinar](#)
- [GMO Contamination Prevention – What Does It Take?](#)
- [Greenbook 2012 \(MDA\)](#)
- [Minnesota Guide to Organic Certification](#)
- [National Organic Program Summary](#)
- [National Organic Program: What Agricultural Professionals Need to Know](#)
- [Organic Certification of Research Sites and Facilities Webinar](#)
- [Organic Certification of Vegetable Operations](#)
- [Organic Certification Resources](#)
- [Organic Dairy Certification: Why, How, and What?](#)
- [Organic Farming Financial Benchmarks Webinar by eOrganic](#)
- Organic Farm Performance in Minnesota – 2011 (MDA)
- [Organic Food and Agriculture Research – 2011](#)
- [Organic Production in High Tunnels](#)

- [Organic System Plan Overview](#)
- [Profiles in Sustainable Agriculture](#)
- [Requirements for Organic Dairy and Livestock in the United States](#)
- [Requirements for Organic Poultry Production](#)
- [Risk Management Guide for Organic Producers](#)
- [Safety Assessment of Genetically Engineered Foods: US Policy & Current Science](#)
- Status of Organic In Minnesota – 2010 (MDA)
- [SWROC High Tunnel: First Season Review and Lessons](#)
- [Extending the Season for Organic Vegetable Production: Year Two Report](#)
- [What is Organic Farming?](#)
- [What is Organic Food and Why Should I Care?](#)
- [What Makes a Farm Organic?](#)
- [Why Eat Organic](#)

Additional organic extension and outreach publications are listed on the UMN Organic Ecology [Publications](#) page. The Minnesota Department of Agriculture has published additional [reports and fact sheets](#) on organic production, certification and marketing.

Academic Curricula

The UMN offers two undergraduate majors that give students an opportunity to focus on organic food production: Food Systems and Plant Science. The Food Science major includes a track on ‘Organic and Local Food Production.’ The UMN offers two undergraduate minors that give students in other majors a chance to explore aspects of organic food and agriculture: [Sustainable Agriculture](#) and Sustainability Studies. The University also offers a graduate minor in [Sustainable Agricultural Systems](#).

Current courses include:

- AGRO 4888 – Issues in Sustainable Agriculture
- BBE 3201 – Sustainability of Food Systems: A Life Cycle Approach
- HCOL 3803H – Can We Feed the World Without Destroying It?
- HORT 2031 – Organic Horticulture and Sustainable Food Systems
- HORT 3131/5131 – Student Organic Farm Planning, Growing and Marketing
- HORT 4000 – International Experiences in Horticultural Science: Successful School Gardens
- HORT 5031– Organic Viticulture and Fruit Production
- HORT 5032 – Organic Vegetable Production

In addition to the course listed above, the University of Minnesota-Duluth offers a [Sustainable Food Systems Online Noncredit Certificate](#).

Minnesota State – Fergus Falls offers a degree in [Sustainable Food Production](#).

Graduate Student Opportunities

The UMN offers many graduate student organic research opportunities in agronomy, animal science, applied economics, horticulture, and soils and climate, depending on the interests of the grad students and their advisors. As part of the sustainable ag graduate minor, the following courses are required:

- SAGR 8010. Colloquium in Sustainable Agriculture
- SAGR 8020. Field Experience in Sustainable Agriculture
- AGRO/ENT 5321. Ecology of Agricultural Systems

Numerous [elective graduate courses](#) are also offered.

Outreach Efforts

The UMN SWROC hosts annual [Organic Field Days](#) near Lamberton, MN. The SWROC also hosts [Season Extension Days](#), focused on organic high tunnel production.

The [WCROC Organic Dairy Day](#) was first held in 2012. It is planned to be an annual event.

The UMN Center for Farm Financial Management and the UMN College of Food, Agricultural and Natural Resource Sciences partner with the Minnesota Department of Agriculture and the Minnesota State Colleges and Universities to provide scholarships to organic and transitioning farmers to enroll in [Farm Business Management](#) courses.

The [Minnesota Institute for Sustainable Agriculture](#) (MISA) brings together the diverse interests of the agricultural community with interests from across the University in a cooperative effort to develop and promote sustainable agriculture in Minnesota and beyond. MISA sponsors the SUSTAG and Healthy Foods Debate listserves.

The [Minnesota Organic Advisory Task Force](#) advises the Commissioner of Agriculture and the University of Minnesota on policies and programs that will improve organic agriculture in Minnesota, including how available resources can most effectively be used for outreach, education, research, and technical assistance that meet the needs of Minnesota's organic agriculture community.

Minnesota Department of Agriculture operates the [Sustainable Agriculture Demonstration Grant Program](#), under which competitive grants for up to \$25,000 are awarded to individuals or groups for on-farm sustainable agriculture research or demonstration projects in Minnesota. Research reports are published in the annual [Greenbooks](#). MDA also organizes the annual [Minnesota Organic Farming Conference](#) and has developed a "[Steps to Success: Organic Farmers](#)" self-assessment tool.

The Minnesota Organic Network is a listserv financed and managed by the MDA to promote discussion and information sharing about organic agriculture in Minnesota. The subscription link is <https://webmail.mnet.state.mn.us/mailman/listinfo/organic-network>

The [Sustainable Agriculture Project](#) at the University of Minnesota, Duluth formed in 2009 to institute education, research, and community engagement around local food systems and

food security in the western Lake Superior region. A number of sustainable agriculture [courses and workshops](#) are offered.

Web Resources

- [Elwell Agroecology Farm](#)
- [Farmers' Guide to Organic Contracts \(FLAG\)](#)
- [Minnesota Institute for Sustainable Agriculture](#)
- [Minnesota Memorandum of Understanding on Organic Agriculture](#)
- [Risk Management Guide for Organic Producers](#)
- [Tools for Transition](#)
- UMN - Organic Food and Agriculture
- [UMN Organic Dairying](#)
- [UMN Organic Ecology](#)
- [UMN Library RefShare](#) (organic research publications)
- [UMN Student Organic Farm](#)
- [Video – UMN WCROC Organic Dairy](#)
- [Video – What Is Organic?](#)
- [Minnesota Department of Agriculture Organic Program](#)

Hands-on Learning

The Student Organic Farm, [Cornercopia](#), has 2.4 acres of certified organic land in the heart of the St. Paul campus field plots. Cornercopia is an organic farm that provides students hands-on whole farm learning opportunities, food for the local community and a place for community building, multi-disciplinary education, research and outreach. Cornercopia grows over 80 different fruit, vegetable, flower, herb and nut crops all of which are marketed on campus. Cornercopia hosts student and faculty research projects through the Johnson Research Internship, the Undergraduate Research Opportunities Program and as requested.

Faculty and staff from the UMN take an active role in the annual [Minnesota Organic Conference](#), which is organized by the Minnesota Department of Agriculture.

Acres Certified Organic

At the Southwest Research and Outreach Center (SWROC) near Lamberton, MN, there are 120 acres of certified organic land used for multiple organic research projects. In addition, at the SWROC, there are:

1. 40 acres in non-certified organic and non-organic plots, the Long-term Variable Input Crop Management Systems (VICMS) trial initiated in 1989;
2. Three 30 x 48 foot high tunnel hoop houses designed for advanced extended season certified organic vegetable production research and demonstration; and

3. Several studies funded by USDA and CERES on advanced organic production practices including alternatives to corn and soybean, Canada thistle control, sweet sorghum, brassica and winter rye cover crops, weed control in flax, spring and winter peas, lentils, alfalfa mulch, popcorn, dry beans, alfalfa management. (Some of these also involve farm cooperators.)

At the West Central Research and Outreach Center (WCROC) near Morris, MN, there are 297 acres of certified organic cropland and 356 acres of certified organic pasture. The total certified organic crop and pastureland at the WCROC is 653 acres.

Rosemount Research and Outreach Center (South of St. Paul, MN) has 154 acres of cropland in transition that should be certified organic in 2015. In 2014 another 79 acres was put into transition and this should be certified organic in 2017. This cropland is in an alfalfa-corn-wheat rotation.

On the St. Paul campus, there are 2.4 acres certified organic and an additional 1.5 acres began transition in 2014.

Total UMN acres certified, managed organically, or in transition = 1009.9 acres.

Organic Livestock Research

At the UMN WCROC, there are 110 certified organic cows and 130 conventional cows. (Calves from both herds are raised organically.) Genetic composition of the organic herd is 40% Holstein and 60% crossbreds consisting of Holstein, Jersey, Swedish Red, Montbeliarde, and Normande.

On-Farm Research

In addition to research conducted on certified organic land and animals at five UMN research stations and campuses, at least eight faculty and thirteen graduate students conducted on-farm research on at least twelve organic farms in 2014. Research is focused on fruit, grain, legume, forage and dairy production.

Key Contacts

- Dr. Francisco Diez-Gonzalez, Professor and Head, Food Science and Nutrition, fdiez@umn.edu
- Carmen Fernholz, Organic Research Coordinator, SWROC, fernholz@umn.edu
- Dr. Frank Forcella, Agronomy and Plant Genetics/USDA-ARS, frank.forcella@ars.usda.gov
- [Dr. Julie Grossman, Assistant Professor, Horticultural Science, jgross@umn.edu](mailto:jgross@umn.edu)
- Dr. Bradley Heins, Assistant Professor, Animal Science, hein0106@umn.edu
- Dr. Rob King, Professor, Applied Economics, rking@umn.edu
- Dr. Tom Michaels, Professor, Horticultural Science, michaels@umn.edu
- Dr. Helene Murray, Director, MISA, murra021@umn.edu
- Dr. Paulo Pagliari, Assistant Professor, Soil, Water and Climate, pagli005@umn.edu

- [Dr. Mary Rogers, Assistant Professor, Horticultural Science, roge0168@umn.edu](mailto:roge0168@umn.edu)
- Dr. Craig Sheaffer, Professor, Agronomy and Plant Genetics, sheaf001@umn.edu
- Dr. Don Wyse, Professor, Agronomy and Plant Genetics, wyses001@umn.edu

MISSOURI

Overview of Organic Research and Outreach

A core group of researchers and extension educators at Missouri University (MU) have begun to actively seek funding for organic research; to conduct train-the-trainer workshops in organic production; to engage Missouri's organic farming community; and to provide outreach and networking opportunities for organic growers. Organic research is conducted primarily at the Bradford Research Center and is spearheaded by Kerry Clark, organic research associate and Tim Reinbott, farm superintendent. Campus researchers involved in organics are Dr. Bob Kremer in soil science and Dr. Reid Smeda in weed science. In addition to the research listed below, Dr. Mary Hendrickson provides educational opportunities for students in the Department of Rural Sociology Sustainable Ag Program. A new 20-acre organic student farm will be opening in 2015 on the Columbia campus and will be managed by Leslie Touzeau, who was formerly the organic vegetable research specialist at the Bradford Research Center.

Organic research and outreach at Lincoln University (LU) takes place primarily at the Busby Research and Integrated Farm located in Jefferson City, Missouri's capital. Busby Farm is a 280-acre farm that has been certified for organic production through the Organic National and International Organic Certifiers. Lincoln University has committed this farm for organic and integrated systems research. Currently, organic research is focused on large and small ruminant livestock, vegetables, small fruits, biomass, various types of composting, integrated pest management, soils, grazing, and forage production/utilization. A solar-powered watering system provides the water for the livestock, vegetables, and orchard production. The primary goal of the Busby Farm is to integrate the research components and existing infrastructure through a holistic management system that integrates individual components of research and production systems to establish an organic management system that is self-sufficient and sustainable.

Current and recent organic research projects:

Organic Weed Management Systems for Missouri, MU: Kerry Clark, Reid Smeda, Tim Reinbott, 2015-2019, Funding: USDA-NIFA-OREI.

Improving the Profitability of Small Farms in Missouri by Reducing Inputs through the Integration of Farmscaping and Small Ruminants for Insect Pest and Weed Control, Jaime Piñero, Lincoln University, 2014-2016, Funding: Ceres Trust.

Evaluation of Soil Quality in Vegetables Planted in Plastic Mulch vs. No-Till in Polyculture Cover Crop, MU: Tim Reinbott, Leslie Touzeau, 2012-2015, Funding: Ceres Trust.

Invasive Insect Pests Threatening Specialty Crops in Missouri: Monitoring, Organic Management, and Farmer's Education, Jaime Piñero, Lincoln University. 2013-2014, Funding: Missouri Department of Agriculture Specialty Crops Block Grant.

Optimizing Trap Cropping Systems for Key Insect Pests and Enhancing Beneficial Arthropods in Cucurbit Crops, Jaime Piñero, Lincoln University. 2013-2015, Funding: Ceres Trust.

Behaviorally-Based Approaches to Manage Spotted Wing Drosophila, a Significant Pest of Fruit Crops, in Missouri: Demonstrating the Value of IPM, Jaime Piñero, Lincoln University. 2013-2014. Funding: MO SARE.

Organic Anthelmintics in Sheep, Kimberly Cash, Lincoln University, James Caldwell, Faculty Advisor, 2014, Funding: Ceres Trust.

System Strategies for Weed Control and Soil Building during the Transition Years to Organic Production, Kerry Clark, Tim Reinbott, MU. 2011-2014, Funding: Ceres Trust.

Identification of Factors Affecting Carbon Sequestration and Nitrous Oxide Emission in Three Organic Cropping Systems, Kerry Clark, Timothy Reinbott, Robert Kremer, Newell Kitchen, Debi Kelly, MU. 2011-2014, Funding: USDA-NIFA.

[Chickens and Trap Crops – An Integration of Sustainable Approaches to Insect Pest Control in Vegetable Production](#), Gary Wenig, Rocky Creek Valley Farm, Rayville, MO, 2013.

Funding: SARE, with technical support provided by the Lincoln University IPM Program.

[Formulating a Beneficial Organic Chicken Feed to Produce Soy-Free and Corn-Free Eggs](#), Jeri Villarreal, Villarreal Family Farm, LLC. 2012, Funding: SARE.

Comparative Analysis of Unpasteurized Organic Milk vs. Organic Fish Emulsion and Kelp as an Organic Fertilizer for Livestock Forages, Tom Colonna, Organian Farms LLC. 2012, Funding: SARE.

[Soil Microbial Response to Seven Different Organic Transition Strategies](#), Kerry Clark, MU. 2012. Funding: SARE.

[Educating from Seed To Market: An Organic Farming Apprenticeship Program in St. Louis, Missouri](#), Molly Rockamann. 2009, Funding: SARE.

[Potential of Heritage Wheat Varieties for Use on Organic Farms: A Variety Trial and Market Survey](#), Carrie Read. 2008, Funding: SARE.

[Demonstrating Organic Wild Crop Utilization and Certification as a Profitable Model for Enhancing Overall Farm Sustainability in the Missouri Ozarks](#), Penny Frazier. 2007, Funding: SARE.

[Designing a Small-Scale Organic Agaricus Mushroom Production System to Provide Additional Income to Family Farms](#), Bob Semyck. 2006, Funding: SARE.

[Organic Integrated Pest Management in High Tunnel Vegetable, Small Fruit, and Flower Production](#), James Quinn, MU. 2004, Funding: SARE.

[Fulfilling a Market Niche, Organically](#), Drew Kimmell, Missouri Northern Pecan Growers LLC, 2003, Funding: SARE.

Winter Rye Cover Crop in Organic Soybean Production in NE MO, Kelly Nelson, Reid Smeda, Randall Smoot. 2002-2003, Funding: Internal and Missouri Soybean Merchandising Council.

Refereed Publications

Piñero, J.C., Souder, S.K., I. Smith, T.R., Fox, A.J., and Vargas, R. 2014. Ammonium Acetate Enhances the Attractiveness of a Variety of Protein-Based Baits to Female Mediterranean Fruit Fly, *Ceratitidis capitata* (Diptera: Tephritidae). Submitted to *Journal of Economic Entomology*.

Tewari, S., Leskey, T.C., Nielsen, A.L., Piñero, J.C., and Rodriguez-Saona, C.R. 2014. Use of pheromones in insect pest management, with special attention to weevil pheromones. In: *Integrated Pest Management: Current Concepts and Ecological Perspectives*, pp. 141-168. D.P. Abrol (Ed.). Elsevier Inc.

Vargas, R.I., Leblanc, L., Piñero, J.C., and Hoffman, K.M. 2014. Male Annihilation, Past, Present, and Future, pp. 493-511. In: T. Shelly, N. Epsky, E. Jang, J. Reyes-Flores, and R.I. Vargas (Eds.). *Trapping and the Detection, Control, and Regulation of Tephritid Fruit Flies*. Springer.

Piñero, J.C. Enkerlin, W., and Epsky, N.D. 2014. Recent Developments and Applications of Bait Stations for Integrated Pest Management of Tephritid Fruit Flies, pp. 457-492. In: T. Shelly, N. Epsky, E. Jang, J. Reyes-Flores, and R.I. Vargas (Eds.). *Trapping and the Detection, Control, and Regulation of Tephritid Fruit Flies*. Springer.

Díaz-Fleischer, F., Piñero, J.C., and Shelly, T. 2014. Interactions between tephritid fruit fly physiological state and stimuli from baits and traps: Looking for the Pied Piper of Hamelin to lure pestiferous fruit flies, pp. 145-172. In: T. Shelly, N. Epsky, E. Jang, J. Reyes-Flores, and R.I. Vargas (Eds.). *Trapping and the Detection, Control, and Regulation of Tephritid Fruit Flies*. Springer.

Piñero, J.C., Souder, S.K., and Vargas, R.I. 2013. Residual attractiveness of a spinosad-containing insecticidal bait aged under variable conditions to wild female *Bactrocera dorsalis* and *B. cucurbitae* (Diptera: Tephritidae). *Florida Entomologist* 96: 1077-1083.

Wright, S.E., Leskey, T.C., Jacome, I., Piñero, J.C., and Prokopy, R.J. 2012. Integration of Insecticidal, Phagostimulatory, and Visual Elements of an Attract and Kill System for Apple Maggot Fly (Diptera: Tephritidae). *Journal of Economic Entomology* 105: 1548-1556.

Kremer, R.J. and R.D. Kussman. 2011. Soil quality in a pecan-kura clover alley cropping system in the Midwestern USA. *Agroforestry Systems*.

Nelson, K.A., R.J. Smeda, and R.L. Smoot. 2011. [Spring-interseeded winter rye seeding rates influence weed control and organic soybean yield](#). *Int. J. Agron.*

Pengthamkeerati, P., P.P. Motavalli, and R.J. Kremer. 2011. Soil microbial activity and functional diversity changed by compaction, poultry litter and cropping in a claypan soil. *Appl. Soil Ecol.* 48:71-80.

Pengthamkeerati, P., P.P. Motavalli, and R.J. Kremer. 2011. Soil microbial biomass nitrogen and β -glucosaminidase activity response to surface compaction and poultry-litter application in a claypan soil. *Appl. Soil Ecol.* 51:79-86.

Piñero, J.C., Souder, S.K., Gomez, L.E., Mau, R.F.L., and Vargas, R.I. 2011. Response of female Mediterranean fruit fly, *Ceratitidis capitata* (Wiedemann), (Diptera: Tephritidae) to a

spinosad bait / polymer matrix mixture with extended residual effect in Hawaii. *Journal of Economic Entomology* 104: 1856-1863.

Piñero, J.C., Mau, R.F.L., and Vargas, R.I. 2011. A comparative assessment of the response of three fruit fly species (Diptera: Tephritidae) to a spinosad-based bait: Effect of ammonium acetate, female age, and protein hunger. *Bulletin of Entomological Research* 101: 373-381.

Vargas, R.I., Piñero, J.C., Jang, E.B., Mau, R.F.L., Stark, J.D., Gomez, L., Stoltman, L., and Mafra-Neto, A. 2010. Response of Melon Fly (Diptera: Tephritidae) to Weathered SPLAT-Spinosad-Cue-Lure. *Journal of Economic Entomology* 103: 1594-1602.

Piñero, J.C., Mau, R.F.L., and Vargas, R.I. 2010. [Comparison of rain-fast bait stations versus foliar bait sprays for control of oriental fruit fly](#), *Bactrocera dorsalis* (Hendel), in papaya orchards in Hawaii. *Journal of Insect Science* 10:157.

Earlywine, D.T., R.J. Smeda, T.C. Teuton, C.E. Sams and X. Xiong. 2010. Evaluation of oriental mustard (*Brassica juncea* L. Czern.) seed meal for weed suppression in turf. *Weed Technol.* 24:440-445.

Vargas, R.I., Piñero, J.C., Jacome, I., Revis, H.C. and Prokopy, R.J. 2009. Effectiveness of GF-120 Fruit Fly Bait spray against different ages of melon fly (Diptera: Tephritidae) females when applied to border crops of various widths. *Proceedings of the Hawaiian Entomological Society* 41: 15-23.

Piñero, J.C., Mau, R.F.L., McQuate, G.T., and Vargas, R.I. 2009. Novel bait stations for attract-and-kill of pestiferous fruit flies. *Entomologia Experimentalis et Applicata* 133: 208-216.

Piñero, J.C., Mau, R.F.L. and Vargas, R.I. 2009. Managing oriental fruit fly, *Bactrocera dorsalis* (Diptera: Tephritidae), using spinosad-based protein bait sprays and sanitation in papaya orchards in Hawaii. *Journal of Economic Entomology* 102: 1123-1132.

Kremer, R. J. and M. Ben-Hammouda. 2009. Allelopathic Plants: 19. *Hordeum vulgare* L. *Allelopathy Journal* 24:225-242.

Kremer, R.J. and J. Li. 2003. Developing weed-suppressive soils through improved soil quality management. *Soil Till. Res.* 72:193-202.

Extension and Outreach Publications

Wilson, J.T. and Piñero, J.C. 2015. The Basics of Organic Insect Pest Management. Lincoln University Cooperative Extension IPM program Fact Sheet.

- Growing and Marketing Elderberries in Missouri
- [Making and Using Compost](#)
- [Natural Lawn Care](#)
- [Organic Vegetable Gardening Techniques](#)
- [The Berry Basket](#)
- [Weeding With Geese](#)

Wilson, J.T. and Piñero, J.C. 2014. The Japanese beetle. Lincoln University Cooperative Extension IPM program Fact Sheet. LUCE FS#18-D-2014 07/10/2014.

Trap Cropping: A simple, effective, and inexpensive Integrated Pest Management strategy to manage squash bugs and cucumber beetles in cucurbit crops in small farms. Piñero, J.C. and Wilson, J.T. 2013. *Small Farm Today* 164: 6-8.

Research and Extension Highlights of the New Integrated Pest Management Program at Lincoln University, Piñero, J.C. 2013. pp. 240-244. In: *Proceedings of the 6th National Small Farm Conference: Promoting the Successes of Small Farmers and Ranchers*, September 18 - 20, 2012, Memphis, TN, Tennessee State University, the University of Tennessee, and the U.S. Department of Agriculture.

Reducing Heat Stress and Insect Pressure in Crops using Kaolin Clay (Surround WP). Piñero, J.C. 2012. *The Broadcaster* (Bi-Monthly Periodical of the Midwest Organic and Sustainable Education Service – MOSES) Vol: 20, Number 2, pages 6-7.

Academic Curricula

MU offers a Bachelors of Science in Agriculture with [Emphasis in Sustainable Agriculture](#). This curriculum requires courses in Soils, Agronomy, Community Development, and Sustainable Economics, including:

- AFNR 2215: Introduction to the Theory and Practices of Sustainable Agriculture
- AFNR 3215: Community Food Systems
- SOIL 2100: Introduction to Soil
- AG EC 3241: Ethics in Agriculture
- BIOCHM 2112: Biotechnology in Society
- PLNT SC 1125: People Plants and the Environment
- PLNT SC 2110: Plant Growth and Culture
- PLNT SC 2075: Environmental Horticulture
- AN SCI 2165: Introduction to Ruminant Livestock Production
- AN SCI 2175: Introduction to Monogastric Production

Graduate Student and Post-Doctoral Opportunities

Graduate students are involved in organic research projects in MU's Department of Soil and Atmospheric Science with Dr. Robert Kremer and Dr. Stephen Anderson and in Plant Science with Dr. Reid Smeda. Graduate student projects with an agronomic emphasis are completed at the Bradford Research Center. There are currently two PhD students and two MS students in organic farming research.

There are also graduate student opportunities in organic research in Ag Econ with Dr. Ray Massey and in Rural Sociology with Dr. Mary Hendrickson.

Dr. Jaime Piñero from LU currently has one graduate student conducting research on use of lures to improve the effectiveness of trap cropping in cucurbits in organic systems, and a

second graduate student will be investigating, with support from Ceres Trust, weed and insect pest management through the use of small ruminants and farmscaping in organic systems. One post-Doctoral fellow in Sustainable Pest Management Systems is currently conducting research at the LU Busby Organic farm concerning use of insectary plants to enhance biological control, as part of a Ceres Trust grant.

Starting in the summer of 2015, LU will start offering a new MS degree program in Integrated Agricultural Systems. This program intends to explore agriculture from a different perspective, one that integrates animal, plant, and aquaculture production with management of natural resources such as nutrients, soil, and water. Students who major in agriculture and agribusiness are encouraged to enroll in this degree program. The new MS degree program in Integrated Agricultural Systems is designed to produce graduates with the skills needed to succeed and be leaders in a century that will bring significant changes to agriculture. This program will produce graduates with production, consultancy, research, and service skills adaptable to addressing a variety of issues in modern agriculture: fuel efficiency, nutrient retention and cycling, organic and low input production, water, energy, and soil conservation, local and direct marketing, etc.

Outreach Efforts

In 2014, LU hosted the Second Vegetable and Integrated Pest Management Festival, held at George Washington Carver Farm, Jefferson City, MO (August 14, 2014).

In 2014, LU organized the Second Alternative Agriculture Field Day at Lincoln University's Organic and Integrated Research Alan T. Busby Farm, Jefferson City, MO (June 4, 2014).

In 2014, MU conducted their second organic row crop production workshop and field day at the Bradford Research Center. Timothy Reinbott presented research data and conclusions at the 2014 MOSES Organic Conference in La Cross, Wisconsin and at the Missouri Organic Association Conference in Springfield, MO.

In 2014, Kerry Clark conducted 16 farmer workshops on soil health that included information on organic practices. She also spoke on soil and organic practices at the Great Plains Vegetable Conference and the National Small Farm Trade Show and Conference in Mexico, MO.

In 2014, the LU IPM program organized two organic farm walks with farmer cooperators (as part of Ceres Trust project): Bear Creek Farm (Aug. 8, 2014) and Happy Hollow Farm (Aug. 26, 2014).

In 2014, LU staff participated at the MOSES Organic Conference in La Cross, Wisconsin and at the Missouri Organic Association Conference in Springfield, MO. The following posters were presented: "Piñero, J.C., and Wilson, J.C., Trap Cropping: A Simple, Effective and Inexpensive organic IPM approach to manage cucumber beetles and squash bugs in cucurbit crops", "Bishop, N.A., Byers, P.L., Nichols, F.E., and Piñero, J.C., Season Extension: Enjoying Wider Profit Margins by Using Sustainable Techniques to Expand the Growing Season on Small Farms in Southwest Missouri".

In 2014, Phillip Boydston (LU Small Farm Program) and Jacob Wilson (LU IPM program) gave a presentation at the National Small Farm Trade Show and Conference in Mexico, MO titled “Integrating Cover Crops into Farming Systems”.

In 2014, Dr. Jaime Piñero and Jacob Wilson attended the Annual Meeting of the Entomological Society of America and presented a poster titled “Trap cropping: A simple, effective, and inexpensive organic IPM approach to manage cucumber beetles and squash bugs in cucurbit crops.”

In 2013, LU hosted the First Vegetable and Integrated Pest Management Festival, held at George Washington Carver Farm.

In 2013, LU also organized the First Alternative Agriculture Field Day at Lincoln University’s Organic and Integrated Research Alan T. Busby Farm, on June 3, 2013.

In 2013 and 2014, MU and LU researchers talked on organic research findings at the [Missouri Organic Association Annual Conference](#) and conducted tests at the conference for active soil carbon from soil samples submitted by organic producers.

Dr. Jaime Piñero, Lincoln U, gave a presentation at the 2013 National Small Farm Trade Show and Conference in Columbia, Missouri on “Trap Cropping for Effective Pest Management of Key Insect Pests.”

Dr. Jaime Piñero conducted an In-Service-Education Workshop on “Sustainable Management of Soil-Borne Diseases and Weeds” in June 2013 for Extension professionals from Univ. Missouri Extension, Lincoln University, NRCS and the MO Department of Agriculture.

Dr. Piñero gave a presentation on organic production at the 2013 Midwest Refugee Farmers Conference held in Kansas City, KS.

Dr. Piñero gave four presentations at the 2013 Great Plains Growers Conference, held in St. Joseph, MO. Topics: (1) An Introduction to Integrated Pest Management; (2) Determining Economic Thresholds for Pesticide Applications; (3) Organic Research and Extension at Lincoln University: Farmer input; and (4) Update- Brown Marmorated Stink Bug/Spotted Wing Drosophila/ Japanese Beetle. Lincoln U faculty co-authored a presentation (Organic Management of Japanese Beetles by J. Wilson and J. Piñero) and a poster (Getting benefits out of a bad bug: On-farm composting of Japanese beetles, by HY Johnson, J. Wilson, P. Byers, and J. Piñero).

September-November, 2012, approximately 5000 schoolchildren were given tours at Bradford Research Center, including information on organic agriculture.

September 2012, Advanced Soil Health Train-the-Trainer Workshop for over 75 NRCS and Extension educators – discussion of MU organic research and methods of combining cover crops, no-till and organic agriculture.

August 2012. Missouri Beginning Farmer Program Workshop on Integrated Pest Management with an Emphasis on Organic Practices. Two-day workshop with farm tour that attracted 20 participants. Workshop conducted at Lincoln University’s Urban Impact Center in Kansas City.

August 2012. Missouri Beginning Farmer Program Workshop on Integrated Pest Management with an Emphasis on Organic Practices. Two-day workshop with farm tour that attracted 20 participants. Workshop conducted at University of Missouri's Southwest Research Center, co-organized by the Lincoln University IPM Program

August 2012, State Soil Scientists Work Planning Meeting-Included an informational talk on organic research at MU.

July 2012. Missouri Beginning Farmer Program Workshop on Integrated Pest Management with an Emphasis on Organic Practices. Two-day workshop with farm tour that attracted 20 participants. Workshop conducted at Lincoln University's Carver Farm and co-organized by the Lincoln University IPM Program.

July 2012. Missouri Beginning Farmer Program Workshop on Integrated Pest Management with an Emphasis on Organic Practices. Two-day workshop with farm tour that attracted 10 participants. Workshop conducted at Warren County Extension Center, co-organized by the Lincoln University IPM Program

July 2012, Crop Injury and Diagnosis Clinic – Included an informational talk on organic research and cover crops.

April 2012. Missouri Beginning Farmer Program Webinars (webinars held for farmers presented by farmers). Held 3 webinars on Organic Agriculture by Liz Graznak, Happy Hollow Farm.

March 2012, MU Extension Cover Crop Focus Team meeting including NRCS and producers at MU Bradford Research Center for over 30 people. Included tours of cover crops and roller crimper demonstration.

February 2012, Missouri Organic Association Conference, Tim Reinbott led a discussion on organic research at MU.

November 2011. Missouri Beginning Farmer Program Workshop on Introduction to Organic Vegetable Production. Two-day workshop with farm tour that attracted 20 participants (workshop over-filled). Workshop conducted at the Jefferson County Extension Center.

September 2011, Organic Farming Systems, Part II Train-the-Trainer for over 65 NRCS, MU Extension and Lincoln University Extension at MU.

June 2011. Missouri Beginning Farmer Program Workshop on Organic Production. Two-day workshop with farm tour that attracted 30 participants (workshop over-filled). Workshop conducted at Bradford Research and Extension Center.

May 2011. Missouri Beginning Farmer Program Webinars (webinars held for farmers presented by researcher). Held 2 webinars on Introduction to Soil Management for Sustainable Farmers by Joel Gruver, Western Illinois University.

September 2010, Organic Farming Systems, Part I Train-the-Trainer for over 55 NRCS, MU Extension and Lincoln University Extension at MU.

Web Resources

- [Ag Bulletin Board Organic Agriculture](#)

- [Bradford Research and Extension Center](#)
- [Center for Agroforestry at the University of Missouri](#)
- [Columbia Center for Urban Agriculture](#)
- <http://www.lincolnu.edu/web/programs-and-projects/ipm>
- [Missouri Alternatives Center](#)
- [Missouri Beginning Farming](#)
- [Missouri Organic Association](#)
- [Missouri Organics – Missouri Department of Agriculture](#)
- [Missouri State University – Mountain Grove](#)
- [MU Southwest Center Agricultural Experiment Station](#)
- MU hosts the Missouri Organic Association listserv newsletter [Ag Opportunities](#)
- [Organic Gardening in St. Louis](#)
- Organic Research at MU [Greenley Research Center](#)
- [SARE at MU](#)

Hands-on Learning

In 2015, the University of Missouri will be opening a student farm based at the University South Farm in Columbia. Organic practices will be utilized at this farm and the land will be converted to organic certification over the next three years. The University of Missouri has an agricultural research farm in Mt. Vernon, MO, dedicated to innovative practices in sustainable agriculture, where students enrolled in the sustainable ag emphasis program can conduct research.

MU's Tigers for Community Agriculture, a project of one of the largest student groups on campus, Sustain Mizzou, offers three ways to be involved in hands-on production, some of which use organic practices: 1) Child Development Laboratory garden located on USDA-ARS plots at MU, where students work with pre-school children in a garden education program; 2) Student plots at Bradford Research and Extension Center, where students have organized production of cool-season vegetable crops for sale to Campus Dining and the University Club and experimented with organic techniques next to conventional (yet sustainable) techniques; and 3) Tiger Pantry community garden, where students have dedicated a plot from the Columbia Center for Urban Agriculture (CCUA) to production for the student-run food pantry on campus. CCUA promotes organic and sustainable production techniques to urban farmers and community gardeners within the city of Columbia.

Students have the option of interning with CCUA and commercial organic farms as a capstone project for their BS in Sustainable Agriculture. Most current students opt for an internship rather than a capstone project. In addition, MU operates a study abroad program with E.A.R.T.H University in Costa Rica. At least three sustainable agriculture majors/minors have completed coursework in organic agriculture at E.A.R.T.H.

Acres Certified Organic

Currently there are 10 acres certified organic at Bradford Research Center and another 20 acres in transition at the University South Farm.

The Lincoln University Busby Research and Integrated Farm is a 280-acre farm that has been certified for organic production through the Organic National and International Organic Certifiers.

Total research acres certified, managed organically, in transition, or planned at MU and Lincoln U = 310 acres.

Organic Livestock Research

The organic study on sheep in MU's animal science department is utilizing 15 animals. At Lincoln U's Alan T. Busby Farm, research is underway on using small ruminants for insect pest and weed control.

On-Farm Research

Four faculty members and three graduate students are conducting on-farm research on four organic farms in Missouri, focusing on grain, legume and vegetable research. MU and LU have previously allowed farmers to guide what occurs on their farms, but a new project will be implemented with very specific treatments. There are several organic farmers in the state who will be included in future projects.

Key Contacts

- Kerry Clark, Organic Research Associate, University of Missouri Bradford Research Center, clarkk@missouri.edu
- Christopher Boeckmann, Organic Production Manager – Busby Research Farm, Lincoln University Cooperative Extension, BoeckmannC@LincolnU.edu
- Dr. Mary Hendrickson, Extension Associate Professor, HendricksonM@missouri.edu
- Dr. Jaime Piñero, Assistant Professor & State Integrated Pest Management Specialist, Lincoln University, PineroJ@lincolnu.edu
- Timothy M. Reinbott, Superintendent, Bradford Research & Extension Center, ReinbottT@missouri.edu
- Cindy DeOrnellis, Organic Research Specialist, Lincoln University Alan T. Busby Farm, DeOrnellisC@lincolnu.edu
- Leslie Touzeau, Manager of MU Student Farm, touzeaul@missouri.edu.

NEBRASKA

Organic Research Projects

The general areas where the University of Nebraska – Lincoln (UNL) conducts organic research include:

Nutrient management – Determine the effects of organic soil amendments, and interaction between general fertility levels and integrated weed control; assess nutrient balance on organic farms; raise knowledge in organic community of exported nutrients. Some research is nearing completion, with publishing the results continuing. Active research is ongoing with comparisons of manure-based and cover crop-based nutrient sources in long-term four-year rotations of principal Nebraska field crops.

Weed management – Evaluate an integrated approach for weed control using mechanical methods and flame weeding. Some experiments are near completion. Long-term rotation trials include weed monitoring to evaluate crop sequence impacts on weed populations and methods of informing weed management practices.

Cover crops – Several studies are being conducted on organic and conventional farms. Use of the crimper to control spring cover crop growth is on-going. A new comprehensive series of experiments on single species and cover crop mixtures in four locations will complement the organic experiments with valuable data on weed management and nutrients provided by cover crop mixtures.

Organic small grains breeding and systems development – Breed cultivars optimal to organic production for disease and pest resistance, response to fertilizers, and end-use quality.

Antioxidant production in organic small grains – Determine levels of antioxidant levels among wheat cultivars, and organic environments. This work is nearly complete, with publishing the results continuing.

Biodiversity conservation on working organic farms – Quantify the effect of organic management of breeding bird populations and institute long-term ecological monitoring. All current faculty involved in this project will be retired by July 2015 or at other institutions, while new monitoring of ecological services including soil health will be central to a new Long-Term Experiment Hatch project now in review.

Healthy Farm Index – Assessment of biodiversity indicators and land use patterns – Deliver a tool to organic farmers for farm assessment and structured decision-making. Current work is nearly complete, with publishing of a NebGuide and interactive worksheet, and new and coordinated measurements across locations. Innovative biodiversity indices will be developed as part of a new team Hatch project and may be expanded to other universities.

On-farm/farmer research capability – Provide guidance, encouragement, and technical support for organic farmers and research groups in Nebraska. This activity is diminished with the retirement of the Organic Farming Extension Educator. Nebraska Educators involved with SARE will carry on this work, with support from interested faculty (Shapiro, Lindquist, Knezevic, Francis and others) and increased farmer involvement is anticipated in a new LTE Hatch project.

Student Organic Farm at UNL – The ‘Bugeater Farm’ was initiated in 2013 with land and field support of the Department of Agronomy and Horticulture, where a group of 20 students grow vegetables and conduct adaptive research on East Campus of UNL. In 2014 a CSA was established with 13 shares, and plans are to extend this initiative.

Specific organic research projects include:

Selecting and Suppressing Triticale Cultivars for Organic No-till Rotations in Nebraska, P. Stephen Baenziger, 2015-2017, Funding: Ceres Trust.

Cover Crop Strategies to Build Soil Organic Matter, Thereby Enhancing Soil Biology, Water Retention and Weed Control in Organic Cropping Systems of the Western Corn Belt, Rhae Drijber, 2015-2017, Funding: Ceres Trust.

Development of Cultural Practices to Use a Roller-Crimper in Cropping Systems for Eastern Nebraska, Charles Shapiro. 2011-2015, Funding: Ceres Trust.

[Diverse Cover Crop Strategies for Improved Yield and Weed Suppression in Organic Cropping Systems for the Western Corn Belt](#), John L. Lindquist. 2011-2014, Funding: Ceres Trust.

Investigating Nitrogen Use Efficiency for Winter Wheat Quality in Organic Rotations in Nebraska, P. Stephen Baenziger. 2011-2014, Funding: Ceres Trust.

[Ecologically sustainable farms and landscapes in Nebraska: An Agricultural Systems Approach](#), C. Francis and collaborators, 1975-present, Ongoing funding: NIFA Hatch Project NEB 22-337

Bridging resources in agriculture, energy, health and nutrition; Hochunks developing a sustainable tomorrow, Quinn, B. K.; Campbell, C. L. (Little Priest Tribal College, Winnebago, NE). 2010-2013, Funding: USDA-NIFA.

Ecologically sustainable farms and landscapes in Nebraska: an agricultural systems approach. Funding: NIFA/Hatch Project NEB-22-337.

Sustainable Agriculture Teaching Materials for Voc-Ag High School Students: C.A. Francis. 2010-2014, Funding: SARE.

Building Capacity to Conserve the Bell's Vireo in Nebraska's Agroecosystems. J.E. Quinn 2011-2013 Nebraska Bird Partnership

Impacts of organic agriculture on wild bird populations. J. E. Quinn, J. R. Brandle, R. J. Johnson. Funding: USDA

[Cover Crops – Mulching Cover Crop Mixtures to Increase Weed Suppression, Soil Nitrogen Availability, Soil Moisture and Grain Yield](#). Sam E. Wortman, John L. Lindquist, Rhae A. Drijber, Mark L. Bernards and Charles A. Francis. 2011-2014, Funding: Ceres Trust.

[Healthy Farm Index](#) – Tools to assess agricultural sustainability, J. E. Quinn, J. R. Brandle, R. J. Johnson, 2011-2013, Funding: USDA.

[Cover Crop Mixture Functional Diversity and its Benefits on Biomass Production, Soil Fertility, Soil Moisture, Weed Suppression, Biodiversity, Economic Return, and Performance Stability](#), Angela Tran, UNL. 2013, Funding: SARE.

[Flaming: Potential tool for weed management](#). 2012, Funding: USDA and The Propane Education & Research Council (PERC).

Improving Organic Farming Systems and Assessing their Environmental Impacts across Agroecoregions, Elizabeth Sarno, others. 2009-2012, Funding: USDA-OREI.

[Small Grains](#) – Developing small grains cultivars and systems optimally suited for organic production, Baenziger, P. S.; Shapiro, C. A.; Lyon, D. J.; Knezevic, S.; Russell, W. K.; Hein, G. L.; Wegulo, S. N.; Flores, R. A.; Schlegel, V. L.; Wehling, R. L. 2007-2011, Funding: USDA-NIFA.

[Organic Conservation Program Training for NRCS and Extension, Kathie Starkweather, Center for Rural Affairs. 2009. Funding: SARE.](#)

[Improving Organic Systems](#) – Improving Organic Systems Across Nebraska Agroecosystems. 2005-2010, Funding: USDA-NIFA.

Communicating the importance and challenges organic certification. J.E. Quinn 2009. Funding: OCIA Research & Education.

Assessing the health of Nebraska’s organic farmers by measuring farmer satisfaction. J.E. Quinn 2008. Funding: OCIA Research & Education.

[Soil fertility and weed management in long-term conventional and organic crop rotations](#), Charles Francis, UNL. 2008. Funding: SARE.

[Growing Organic Strawberries with the Help of Fabric](#), Libby Fulton. 2008, Funding: SARE. Advantages and disadvantages on an organic corn crop from 25 tons of cattle manure per acre, Robert Hrnchir. 2007, Funding: SARE.

[Training for Organic Farming and Ranching in the Great Plains, Charles Francis, UNL, 2006, Funding: SARE.](#) Workshops in Nebraska, Kansas, South Dakota, and North Dakota: two workshops each year for two years.

[Organic Grape Production](#), Tim Nissen. 2003, Funding: SARE.

[Yellow Dent Organic Hybrid Seed Corn](#), Michael Jasa. 2002, Funding: SARE.

Refereed Publications, Abstracts, Posters

Francis, C., B. Johnson, and J. Van Wart. 2014. How to Regenerate Rural Community and Ecoservices: Reversing the Tragedy of the Commons. *Agron. J.* 106(1):1-5.

Koehler-Cole, K. 2014. The effects of clover undersown into winter wheat on the yields and soil nitrate concentrations in an organic soybean-winter wheat-corn rotation. *Agronomy Abstracts*. 209-2.

Lv, Y., C. Francis, P. Wu, X. Chen, and X. Zhao. 2014. Maize–soybean intercropping interactions above and below ground. *Crop Sci.* 54(3):914-922.
doi:10.2135/cropsci2013.06.0403

Quinn, J.E., J. Brandle, R. Johnson. 2014. Identifying opportunities for conservation embedded in cropland anthromes. *Landscape Ecology*. 29(10):1811-1819.

Wortmann, C.S., E. A. Sarno, C.A. Shapiro, K. Stevens, R.A. Drijber, and E. S. Jeske. 2013. Interrelationships of soil properties in organic farming systems. *Agronomy Abstracts* 187-2. Poster 917. American Society of Agronomy.

Sarno, E.A., C.A. Shapiro, and D. Glett. 2013. Benefits of cover crops and green manures in a long-term organic cropping system. *Agronomy Abstracts* 299-2. American Society of Agronomy.

- Francis, C.A., editor. 2009. Organic Farming: the Ecological System. *Agronomy Monograph* No. 54. American Society of Agronomy, Madison, Wisconsin. 353 p.
- Francis, C.A. 2013. Organic farming. In: *Reference Module in Earth Systems and Environmental Sciences*, S.A. Elias, editor. Elsevier Publ. Co., Waltham, Massachusetts, USA. Doi: 10.1016/B978-0-12-409548-9.05237-4 [11 September 2013]
- Francis, C.A. 2013. Crop rotations. In: *Reference Module in Earth Systems and Environmental Sciences*, S. A. Elias, Editor. Elsevier Publ. Co., Waltham, Massachusetts, USA. p. 318-322.
- Francis, C., M. Miller, M. Anderson, N. Creamer, M. Wander, J. Park, T. Green, and B. McCown. 2013. [Food webs and food sovereignty: research agenda for sustainability](http://dx.doi.org/10.5304/jafscd.2013.034.010). *J. Agric. Food Sci. Commun. Devel.* <http://dx.doi.org/10.5304/jafscd.2013.034.010>
- Koehler-Cole, K. and J.R. Brandle. 2013. Clover green manure performance and subsequent corn yields. *Agronomy Abstracts*. 187-11.
- Koehler-Cole, K., J. Shi and J.R. Brandle. 2013. Organic wheat-clover intercrop effects on soil nitrate levels and subsequent corn yields. Ecological Society of America Annual Meeting. PS 29-147.
- Miller, M.M., M. Anderson, C.A. Francis, C. Kruger, C. Barford, J. Park, and B. McCown. 2013. [Critical research needs for successful adaptation of food systems to climate change](http://dx.doi.org/10.5304/jafscd.2013.034.016). *J. Agric. Food Sci. Commun. Devel.* <http://dx.doi.org/10.5304/jafscd.2013.034.016>
- Francis, C., A. Lawseth, A. English, P. Hesje, A. McCann, J. Jamieson, W. Wallen, G. Lieblein, and T.A. Breland. 2013. Adding values through experiential education in agroecology: experiences of Canadian MSc students. *Int. J. Agric. Food Res.* [Canada]. 2(2): 7-17.
- Wortman, S., C. Francis, T. Galusha, C. Hoagland, J. Van Wart, S. Baenziger, T. Hoegemeyer, and M. Johnson. 2013. Breeding Cultivars for Organic Farming: Maize, Soybean, and Wheat Genotype by System Interactions in Eastern Nebraska. *Agroecol. Sustain. Food Sys.* 37(8): 915-932.
- Shi, Jianru. 2013. Decomposition rates and nutrient release of different cover crops in organic farm systems. MS Thesis. University of Nebraska.
- Quinn, J.E, Giese, J., Oden, A., Brandle, J. 2013. Conservation of Bell's Vireo in Managed Ecosystems. Poster presented at Nebraska Natural Legacy Conference.
- Quinn, J.E. 2013. Identifying conservation opportunities for species of conservation concern in managed ecosystems. Poster presented at 2013 Annual meeting of the Ecological Society of America.
- Quinn, J.E., A. Oden, J. Brandle. 2013. The influence of different cover types on American Robin nest success in organic agroecosystems. *Sustainability*. 5:3502-3512.
- Wortman, S. E., C. A. Francis, M. A. Bernards, E. E. Blankenship and J. L. Lindquist. 2013. Mechanical termination of diverse cover crop mixtures for improved weed suppression in organic cropping systems. *Weed Science* 61:162-170.

Koehler-Cole, K. and J.R. Brandle. 2012. Intercropping clover and winter wheat: Effects on grain yield, soil nitrogen content, and weed pressure in an organic wheat-corn-soybean rotation. *Agronomy Abstracts*. 237-2.

Koehler-Cole, K., J.R. Brandle, C.A. Francis and E.E. Blankenship. 2012. A survey of public preferences for rural amenities in Lincoln, Nebraska. Ecological Society of America Annual Meeting. PS 11-133.

Low, David, 2012, [Mechanical termination of diverse cover crop mixtures for improved weed suppression in organic cropping systems. WeedsNews3611](#)

Lyon, D.J. and G.W. Hergert. Nitrogen fertility in semiarid dryland wheat production is challenging for beginning organic farmers. *Renewable Agriculture and Food Systems* 29: 42-47/ First published online 10/23/2012 doi:10.1017/S1742170512000324.

Quinn, J.E., J. Brandle, and R. Johnson. 2012. The effects of land sparing and wildlife-friendly practices on grassland bird abundance within organic farmlands. *Agriculture Ecosystems, & Environment*. 161:10-16.

Quinn, J.E., J. Brandle, and R. Johnson. 2013. A farm-scale biodiversity and ecosystem services assessment tool: The Healthy Farm Index. *International Journal of Agricultural Sustainability*. 11(2):176-192.

Quinn, J.E. 2012. [A shared vision for biodiversity conservation and agriculture. Renewable Agriculture and Food Systems](#). 28(1):93-96.

Wortman, S. E., C. A. Francis, M. L. Bernards, R. A. Drijber, and J. L. Lindquist. 2012. Optimizing cover crop benefits with diverse mixtures and an alternative termination method. *Agron. J.* 104:1425-1435.

Wortman, S. E., T. D. Galusha, S.C. Mason, and C.A. Francis. 2012. Soil Fertility and Crop Yield in Long-Term Organic and Conventional Crop Rotations in Eastern Nebraska. *Renewable Agriculture and Food Systems*. 27(3):200-216.

Wortman, S.E., C.A. Francis, and J.L. Lindquist. 2012. Cover crop mixtures for the western corn belt: Opportunities for increased productivity and stability. *Agron. J.* 104(3):699-705.

Brubaker, Corey, Elizabeth Sarno, Sam Wortman, and Karla Jenkins. 2012. Cooperative Effort to Promote Cover Crop Usage in Nebraska. *Agronomy Abstracts*. 375-21.

Francis, C., T. Hanson, A. Fox, P. Hesje, H. Nelson, A. Lawseth, and A. English. 2012. Farmland conversion to non-agricultural uses in U.S. and Canada: current impacts and concerns for the future. *Intl. J. Agric. Sustainability* 10(1):8-24.

Johnson, R.J., Jedlicka, J.A., Quinn, J.E., Brandle, J.R. 2011. [Global perspectives on birds in agricultural landscapes](#). Pages 55-140 in: Campbell WB, Ortiz SL (editors) Issues in agroecology; present status and future prospectus, volume 1, *Integrating Agriculture, Conservation and Ecotourism: Examples from the Field*. Springer ([Abstract and figures](#))

Ulloa, S. M., Datta, A., Bruening, C., Neilson, B., Miller, J., Gogos, G., Knezevic, S. Z. 2011. Weed control & crop tolerance to propane flaming as influenced by the time of day. *Crop Protection* 13:1-7.

- Quinn, J.E., J. Brandle, R. Johnson, and A. Tyre. 2011. Accounting for detectability in the use and application of indicator species: A case study with birds. *Ecological Indicators* 11:1413-1418.
- Quinn, J.E., J.R. Brandle, and R.J. Johnson. 2011. Avian conservation in temperate agroecosystems: consideration of spatial scale and management outcomes. Paper presented at the AFO/COS/WOS Joint Meeting Kearney, NE.
- Quinn, J.E., J.R. Brandle, and R.J. Johnson. 2011. Communicating the complexity of biodiversity associated with agroecosystems. Poster presented at the AESS Annual Meeting. Burlington, VT.
- Ahrens, D., R. Zbasnik, R. Little, P.S. Baenziger, T. Regassa, and V. Schlegel. 2011. Effects of different Nebraska agro-eco environments on the polyphenols present in organically grown wheat cultivars. 2011 MOSES Conference, LaCrosse, WI.
- Santra, D., Richard Little, Peter Baenziger, Teshome Regassa, Ibrahim Salah, Meng Wang, Devin Rose, Lan Xu, Charles Shapiro, Michael Mainz, and Drew Lyon. 2011. Developing small grains cultivars and systems optimally suited for organic production. *Agronomy Abstracts*. 91-11.
- Sarno, Elizabeth, Charles Shapiro, Charles Wortmann, James Brandle, Ron Johnson, Drew Lyon, John Quinn, Dipak Santra, Richard Ferguson, Gary W. Hergert, Stevan Knezevic, George Gogos, Robert Wright, Charles Francis, Laurie Hodges, Peter Baenziger, Richard Little, Christopher Bruening, Vicki Schlegel, Teshome Regassa, Stephen Wegulo, Sam Wortman, David Glett, Katja Koehler-Cole and David Baltensperger. 2011. Development of the University of Nebraska Organic Farming Research Program. *Agronomy Abstracts*. 183-2.
- Francis, C.A., N. Jordan, P. Porter, T.A. Breland, G. Lieblein, L. Salomonsson, N. Sriskandarajah, M. Wiedenhoef, R. DeHaan, I. Braden, and V. Langer. 2011. Innovative education in agroecology: experiential learning for a sustainable agriculture. *CRC Critical Reviews in Plant Science* 30(1&2):226-237.
- Francis, C.A., and P. Porter. 2011. Ecology in sustainable agriculture practices and systems. *CRC Critical Reviews in Plant Science* 30(1&2):64-73.
- Sarno, Elizabeth, Charles Wortmann, Charles Shapiro, James Schneider, Douglas Anderson, and Mark Hinze. 2011. On-farm farmer research for organic production in Nebraska. *Agronomy Abstracts*. 188-18.
- Baenziger P.S., I. Salah, R. S. Little, D. K. Santra, T. Regassa, M. Y. Wang. 2011. Structuring an efficient organic wheat breeding program. *Sustainability*. 3(8):1190-1206.
- Ahrens, D., V. Schlegel, R. Zbasnik, R. Little, P.S. Baenziger, R. Regassa. 2010. Effects of different Nebraska agri-eco environments on the polyphenols and their antioxidant capabilities of organically grown wheat. Poster presented at the seminar Undergraduate Creative Activities and Research Experiences (UCARE). University of Nebraska-Lincoln.
- Bruening C. A., G. Gogos, S.M. Ulloa, S. Z. Knezevic. 2010. Performance advantages of flaming hood. *Weed Research*.

- Bruening C. A., G. Gogos, S.M. Ulloa, S. Z. Knezevic. 2010. Field performance of flaming hood vs open torch. *Weed Research*.
- Quinn J. E. 2010. Assessment and communication of the value of biodiversity. PhD Dissertation, University of Nebraska-Lincoln, USA.
- Quinn, J.E., J.R. Brandle, and R.J. Johnson. 2010. Avian response to land use and land cover patterns associated with organic farm systems. Poster presented at the COS/AOU/SCO Joint Meeting San Diego, CA.
- Wortman, S.E., J.L. Lindquist, M.J. Haar, and C.A. Francis. 2010. Increased weed diversity, density and above-ground biomass in long-term organic crop rotations. *Renewable Agri. & Food Systems J.* 25(4):281-295.
- Francis, C.A. (2010) Conventional research on controversial issues: an exercise in futility? *Renewable Agric. Food Sys. Journal* 25(1):3-7.
- Østergaard, E., G. Lieblein, T.A. Breland, and C. Francis (2010). Students learning agroecology: phenomenon-based education for responsible action. *Journal of Agricultural Education and Extension* (Wageningen). 16(1):23-37.
- Francis, C., and J. Doran. 2010., 'Food for Life' – Looking beyond the Horizon. Editorial, *Renewable Agric. Food Sys. Journal* 25(1):1-2.
- Shapiro, C. A., et al. 2010. Organic farming in Nebraska: establishing organic research for the organic farming community. Presented at the Crop Production Clinics throughout Nebraska. In the *Proceedings of the Crop Production Clinics*, pp. 183-185. University of Nebraska-Lincoln.
- Ulloa S. M., A. Datta, S. Z. Knezevic, C. A. Bruening, G. Gogos, T. J. Arkebauer. 2010. Time of day impacts the level of weed control and crop tolerance to propane flaming. *Weed Science*.
- Ulloa, S. M., A. Datta, C. Bruening, B. Neilson, J. Miller, G. Gogos, S. Z. Knezevic. 2010. Maize response to broadcast flaming at different growth stages: Effects on growth, yield and yield components. *European Journal of Agronomy*. 10.1016/j.eja.2010.09.002.
- Ulloa, S. M., A. Datta, S. Z. Knezevic. 2010. Tolerance of selected weed species to broadcast flaming at different growth stages. *Crop Protection* doi: 10.1016/j.cropro.2010.07.017.
- Ulloa, S. M., A. Datta, S. D. Cavalieri, M. Lesnik, S. Z. Knezevic. 2010. Popcorn (*Zea mays* L. var. *everta*) yield and yield components as influenced by the timing of broadcast flaming. *Crop Protection* doi: 10.1016/j.cropro.2010.08.011.
- Ulloa, S. M., A. Datta, G. Malidza, R. Leskovsek, S. Z. Knezevic. 2010. Yield and yield components of soybean [*Glycine max* (L.) Merr.] are influenced by the timing of broadcast flaming. *Field Crops Research* doi: 10.1016/j.fcr.2010.08.006.
- Ulloa, S. M., A. Datta, S. Z. Knezevic. 2010. Growth stage influenced sorghum response to broadcast flaming: Effects on yield and its components. *Agronomy Journal*. doi: 10.2134.agronj201.

- Ulloa, S. M., A. Datta, G. Malidza, R. Leskovsek, S. Z. Knezevic. 2010. Timing and propane dose of broadcast flaming to control weed population influenced yield of sweet maize (*Zea mays* L. var. *rugosa*). *Field Crops Research* doi: 10.1016/j.fcr.2010.06.007.
- Ulloa, S. M., A. Datta, S. Z. Knezevic. 2010. Growth stage impacts tolerance of winter wheat (*Triticum aestivum* L.) to broadcast flaming. *Crop Protection* 29:1130-1135.
- Ulloa, S. M., A. Datta, S. Z. Knezevic. 2010. Growth stage influenced differential response of foxtail and pigweed species to broadcast flaming. *Weed Technology* doi: 10.1614/WT-D-10-00005.1.
- Bruening, C., Neilson, B.D., Gogos, G., Ulloa, S.M., Knezevic, S.Z., Stepanovic, S.V. 2010. Effects of flaming and cultivation on weed control and crop injury in soybean. *Proceedings of the North Central Weed Science Society Conference*, Lexington, KY, 65:31.
- Ulloa, S.M., Datta, A., Knezevic, S.Z. 2010. The timing of broadcast flaming influenced soybean yield. *Proceedings of the North Central Weed Science Society Conference*, Lexington, KY, 65:82.
- Bruening, C., Neilson, B.D., Gogos, G., Ulloa, S.M., Knezevic, S.Z., Stepanovic, S.V. 2010. Effects of Flaming and Cultivation on Weed Control and Crop Injury in Corn. *Proceedings of the North Central Weed Science Society Conference*, Lexington, KY, 65:100.
- Glett, David, Charles Shapiro, Stevan Knezevic, Elizabeth Sarno, Michael Mainz, and Lynn Junck. 2010. Soybean and corn growth as influenced by methods for controlling previous cover crop, including winter kill, flaming, disking, and crimping. *Agr. Abstracts*. 188-4.
- Gogos, G., Bruening, C., Neilson, B.D., Ulloa, S.M., Knezevic, S.Z. 2010. Development and performance comparison of weed flaming equipment. *Proceedings of the North Central Weed Science Society Conference*, Lexington, KY, 65:191.
- Ulloa, S.M., Datta, A., Knezevic, S.Z. 2010. Growth stage influenced sorghum response to broadcast flaming. *Proceedings of the North Central Weed Science Society Conference*, Lexington, KY, 65:15.
- Shapiro, C. A., Richard B. Ferguson, Gary W. Hergert, Tim M. Shaver, Charles S. Wortmann, 2010. Organic farming in Nebraska: Establishing organic research for the organic farming community, *Crop Production Clinics Proceedings*.
- Francis, C. A. et al [Science-Based Organic Farming](#). 2006-2010 (updated annually).
- Hoagland, L.¹, Hodges, L.², Helmers, G.A.³, Brandle, J.R.⁴, and Francis, C.A.⁵ 2009. Labor availability in an integrated agricultural system. *J. Sustain. Agric.* 34:532-548
- Brandle, J.R., R.J. Johnson, J.E. Quinn. 2009. The role of agroforestry practices in a healthy farm. In *Proceedings of the 11th North American Agroforestry Conference of the Association for Temperate Agroforestry*. Columbia, MO.
- Bruening C. A., G. Gogos, S.M. Ulloa, S. Z. Knezevic. 2009. Performance advantages of a flaming hood. In *Proceedings of the North Central Weed Science Society Conference*, Kansas City, Missouri, 64:30.

- Bruening C. A., G. Gogos, R. Leskovsek, S.M. Ulloa, S. Z. Knezevic. 2009. Field performance of flaming hood vs. open torch. In *Proceedings of the North Central Weed Science Society Conference*, Kansas City, Missouri, 64:105.
- Knezevic, S.Z., C.M. Costa, S.M. Ulloa and A. Datta. 2009. Response of corn (*Zea mays* L.) types to broadcast flaming. *Proceedings of the 8th European Weed Research Society Workshop on Physical and Cultural Weed Control*. Zaragoza, Spain, pp. 92-97.
- Knezevic, S.Z., A. Datta and S.M. Ulloa. 2009. Growth state impacts tolerance to broadcast flaming in agronomic crops. *Proceedings of the 8th European Weed Research Society Workshop on Physical and Cultural Weed Control*. Zaragoza, Spain, pp. 86-91.
- Knezevic, S.Z., A. Datta and S.M. Ulloa. 2009. Tolerance of selected weed species to broadcast flaming at difference growth stages. *Proceedings of the 8th European Weed Research Society Workshop on Physical and Cultural Weed Control*. Zaragoza, Spain, pp. 98-103.
- Knezevic, S.Z., J.F. Neto, S.M. Ulloa and A. Datta. 2009. Winter wheat (*Triticum aestivum* L.) tolerance to broadcast flaming. *Proceedings of the 8th European Weed Research Society Workshop on Physical and Cultural Weed Control*. Pages 104-109. Zaragoza, Spain, pp. 104-110.
- Quinn, J.E., J.R. Brandle, E. Sarno, and R.J. Johnson. 2009. The Healthy Farm Index. Poster presented at ASA-CSSA-SSSA Annual Meeting. Pittsburgh, PA.
- Quinn, J.E., J.R. Brandle, and R.J. Johnson. 2009. Development of a Healthy Farm Index to assess ecological, economic, and social function on organic and sustainable farms in Nebraska's four agroecoregions. Pp. 156-170 In: Franzluebbbers, A.J., ed. 2009. *Farming with Grass: Achieving Sustainable Mixed Agricultural Landscapes*. Ankeny, IA: *Soil and Water Conservation Society*.
- Quinn, J.E., J.R. Brandle, R.J. Johnson. 2009. Application of the Healthy Farm Index. Paper presented at the international meeting for Farming Systems Design 2009. Monterey CA.
- Quinn, J.E., R.J. Johnson, J.R. Brandle. 2009. Biotic interactions in organic farm systems. In the *Proceedings of the 11th North American Agroforestry Conference of the Association for Temperate Agroforestry*. Columbia, MO.
- Quinn, J.E., J.R. Brandle, R.J. Johnson. 2009. Monitoring long-term patterns of farmland bird communities in Nebraska. Poster presented at the Midwest Ecology and Evolution Conference. Lincoln, NE.
- Regassa, T. H., R.N. Klein, B. Anderson, P.S. Baenziger, and J. Krall. 2009. University of Nebraska XLS, PDF and HTML Winter Wheat Variety Trial Results. ([Wheat Book in PDF format](#)).
- Ulloa S. M., A. Datta, S. Z. Knezevic, C. A. Bruening, G. Gogos, T. J. Arkebauer. 2009. Response of selected crop and weed species to propane flaming as influenced by leaf water content. In *Proceedings of the North Central Weed Science Society Conference*, Kansas City, Missouri, 64:31.

- Ulloa, S. M., A. Datta, S. Z. Knezevic, G. Malidza, R. Leskovsek. 2009. Tolerance of sweet corn to broadcast flaming at different growth stages. In *Proceedings of the North Central Weed Science Society Conference*, Kansas City, Missouri, 64:51.
- Ulloa, S. M., A. Datta, S. Z. Knezevic, C. A. Bruening, G. Gogos, G. Malidza, R. Leskovsek. 2009. Field corn tolerance to broadcast flaming. In *Proceedings of the North Central Weed Science Society Conference*, Kansas City, Missouri, USA, 64:112.
- Wright, R., T. DeVries, & J. Kalisch. 2009. [Beneficial Insects I, Extension Circular 1578](#), University of Nebraska Extension.
- Wright, R., T. DeVries, & J. Kalisch. 2009. [Beneficial Insects II, Extension Circular 1579](#), University of Nebraska Extension.
- Fernando, K.M.C., G. Lieblein, C. Francis, and L. Weerakoon. 2009. Development of sustainable ecological vegetable production systems in Matara district, Sri Lanka: an intervention approach. *Tropical Agric. Res.* 20:279-289.
- Wezel, A., S. Bellon, T. Dore, C. Francis, D. Vallod, and C. David.. 2009. Agroecology as a science, a movement or a practice. *Agronomy for Sustainable Development* 29(4):503-516.
- Ahnström, J., J. Höckert, H.L. Bergeå, C.A. Francis, P. Skelton, and L. Hallgren. 2008. Farmers and nature conservation: what is known about attitudes, context factors and actions affecting conservation? *Renewable Agric Food Systems.* 24(1):38-47.
- Quinn, J.E., J.R. Brandle, and R.J. Johnson. 2008. Development of a healthy farm index to measure ecological, economic, and social function on organic and sustainable farms in Nebraska. Invited speaker at SWCS Farming with Grass conference. Oklahoma City, Oklahoma.
- Quinn, J.E. 2008. Bird conservation on Nebraska Farmland. *Nebraska Sustainable Agriculture Society Newsletter* 116:4-5.
- Johnson, R.J., J.E. Quinn, J.R. Brandle, and R.F. Baldwin. 2008. [An index of farm health reflecting food production, biodiversity, and ecosystem services](#). Poster presented at National Conference on Science, Policy, and the Environment, Washington D. C. (Abstract).
- Knezevic, S.Z., A. Datta and S.M. Ulloa. 2008. Response of pigweed and foxtail species to broadcast flaming. In *Proceedings of the North Central Weed Science Society Conference*, Indianapolis, Indiana, 63:39.
- Domingues, A.C., S.M. Ulloa, A. Datta and S. Knezevic. 2008. [Weed response to broadcast flaming](#). *Review of Undergraduate Research in Agricultural and Life Sciences*.
- Leskovsek, R. 2008. Weed flaming: an engineering approach. In *Proceedings of the North Central Weed Science Society Conference*, Indianapolis, Indiana, 63:175.
- Shapiro, C. A.; J.R. Brandle, R. J. Wright, D.J. Lyon, S. Z. Knezevic, C.A. Francis, and E. A. Sarno. 2008. Organic farming in Nebraska: establishing organic research for the organic farming Community. In *Proceedings of the 38th NC Ext-Industry Soil Fertility Conf.* Vol 24. Nov. 12-13, 2008. Des Moines, IA pp. 35-38.

Taylor E., S. Z. Knezevic, S. M. Ulloa. 2008. Flaming for weed management. In: *Integrated weed management: fine tuning the system* (Eds. E. Taylor, K. Renner, and C. Sprague), pp. 65–74. Michigan State University, East Lansing, Michigan.

Teixeira, H. Z., S. M. Ulloa, A. Datta, S. Z. Knezevic. 2008. [Corn \(*Zea mays*\) and soybean \(*Glycine max*\) tolerance to broadcast flaming](#). *Review of Undergraduate Research in Agricultural and Life Sciences*.

Ulloa, S. M., A. Datta, S. Z. Knezevic. 2008. Winter wheat tolerance to broadcast flaming. In *Proceedings of the North Central Weed Science Society Conference*, Indianapolis, Indiana, USA, 63:109.

Ulloa, S. M., C. Costa, A. Datta, C. Bruening, G. Gogos, and S. Z. Knezevic. 2008. Response of corn types to broadcast flaming. In *Proceedings of the North Central Weed Science Society Conference*, Indianapolis, Indiana, 63:20.

Knezevic, S. Z. and S. M. Ulloa. 2007. Flaming: potential new tool for weed control in organically grown agronomic crops. *Journal of Agricultural Sciences* 52:95-104.

Knezevic, S. Z., L. Dana, J.E. Scott, S. M. Ulloa. 2007. Building a research flamer. In *Proceedings of the North Central Weed Science Society Conference*, St Louis, Missouri, 62:32.

Knezevic, S. Z., S. M. Ulloa. 2007. Weed tolerance to flaming. In *Proceedings of the North Central Weed Science Society Conference*, St Louis, Missouri, 62:9.

Knezevic, S. Z., Ulloa, S. M. 2007. Crop tolerance to flaming. In *Proceedings of the North Central Weed Science Society Conference*, St Louis, Missouri, 62:138.

Quinn, J.E., J.R. Brandle, and R.J. Johnson. 2007. Avian Abundance and Diversity in Organic Agricultural Landscapes: An Ecological Indicator for a Healthy Farm Index. Poster presented at the University Of Nebraska School Of Natural Resources Research Colloquium. Lincoln, Nebraska.

Quinn, J.E., J.R. Brandle, R.J. Johnson. 2007. Avian Abundance and Diversity in Organic Agricultural Landscapes: An Ecological Indicator for a Healthy Farm Index. Poster presented at the University of Nebraska School of Natural Resources Research Colloquium. Lincoln, Nebraska.

Extension and Outreach Publications

- [Buyers for Organic Products](#)
- [Buying Organic: Resources for Consumers in Nebraska](#)
- [Certification Process for Organic Production](#)
- [Developing an Individual Farm Organic System Plan](#)
- [How can I market my Organic Products?](#)
- [Long-Term Rotation Experiment Evaluates Organic and Conventional Cropping](#)
- [Multifunctional Rural Landscapes](#)
- [Organic Gardening: Market and Home](#)

- [Organic Resources: Support, Education, Research](#)
- Organic Winter Wheat Variety Characteristics and Performance Summaries
- Organic Winter Wheat Variety Trial and Quality Test Results
- [Science-Based Organic Farming 2008: Toward Local and Secure Food Systems](#)
- Selecting Winter Wheat Cultivars for Organic Production
- [Service Manuals & Training Guides for using a Flamer for weed control](#)
- [Systems in Nebraska](#) (webinar)
- [The Contribution of Organic Farmland to Great Plains Bird Conservation](#)
- [Transitioning to Organic Farming—Nebguide G2145](#)
- [University of Nebraska–Lincoln Organic Farming Research](#)

Academic Curricula

UNL offers an [Organic Systems Option](#) for Agronomy and Horticulture undergraduate majors. Classes directly related to organic production include:

- AGRO/HORT 439/839 Organic Farming & Food Systems, Spring Semester, 3 credits; invited speakers include specialists in organic certification, organic farmers, and academics with practical experience in hoop houses, vegetable production, and marketing; field trip to local organic farm.
- AGRO/HORT/NRES 435/835 Agroecology, Spring Semester, 3 credits; agroecology is the ecology of food systems, and a systems-oriented course that deals with production, economics, environmental impacts, and social viability of alternative farming systems, including organic systems as one key option for Nebraska farmers.
- AGRO/HORT 496, 1-6 credits: Internships in agriculture and food systems and this allows students to gain academic credits while conducting a structured work and learning experience on farms, including organic farms.

UNL also offers a five-part mini-course series called “[Science-based Organic Farming](#),” with the following classes:

- Overview of Organic Farming
- Organic Farming Systems
- Current Issues in Organic Farming
- Organic Vegetable Production
- Marketing Organic Products

Graduate Student Opportunities

The programs described in the UNL [Graduate Areas of Study](#) show no listings for organic or sustainable agriculture graduate degrees. However, organic-related graduate student opportunities may be arranged, depending on the interests of the grad students and their advisors. Examples of current and recent research on organic systems include: cover crop

mixtures in three-year crop rotation; soil fertility aspects of long-term animal based and legumes based four-year rotations; flame weeding alternatives for row crops; breeding cultivars for organic systems; and weed management in organic systems.

Outreach Efforts

In recent years, UNL Extension has organized and/or participated in a number of organic outreach events, including:

[Breeding and growing organic wheat for bread](#) (2006-2012)

[The Rural Advantage/Healthy Farms Conference](#)

[Western Sustainable Ag Crops and Livestock Conference](#) (2006-2012)

Birding on the Farm tours at Grain Place Foods, Common Good, and Sunset Farms.

Why organic. A short documentary film. Available at <http://hfi.unl.edu/jq/films.shtml>
Grain Place Foods in Marquette, NE, has a farm tour in July and the UNL-OWG has been invited to speak every year. (2006-2014)

[Nebraska Sustainable Agriculture Society \(NSAS\) Healthy Farms conference](#)

Summer organic farm tours with Bruno/Abie cooperating farmers – demo flamer, crop rotations, cover crops, livestock etc.

Listservs: Organic Research Group (farmers/researchers), Cover Crop Research (organic and conventional farmers/researchers), Organic (researchers and collaborators) and the NSAS (general public, farmers)

Web Resources

- [Avian Ecology](#)
- [Center for Applied Rural Innovations](#)
- [Center for Rural Affairs](#)
- [CropWatch Organic](#)
- [Healthy Farm Index](#)
- [Nebraska Sustainable Agriculture Society](#)
- [OCIA International](#)
- [Sensitive Crop Locator](#)
- [UNL Organic Working Group](#)
- [Weed Flaming](#)
- [eOrganic Webinar: Organic Farming Systems Research at the University of Nebraska](#), Mar 26, 2013.

Hands-on Learning

NL does not have a student organic farm at this time, but undergrads and graduate students can conduct research at one of the certified organic research farms. UNL conducts workshops and farm tours to work directly with farmers on organic budgets, using the Healthy Farm Index to evaluate their farms. In addition, a group of 20 students is growing vegetables and doing adaptive research on East Campus of UNL.

Acres Certified Organic

Organic crop research is being conducted on certified organic land in three of the four Nebraska ecoregions (Western High Plains, Central Great Plains, Nebraska Sandhills, Western Corn Belt) at four agricultural field laboratories across the state:

- ARDC, Mead – 51 acres
- Haskell Ag Lab, Concord – 33.8 acres
- South Central Ag Lab, Clay Center – 21.7 acres
- High Plains Ag Lab, Sidney – 73.3 acres

Total acres certified, managed organically, or in transition = 180 acres.

Organic Livestock Research

None of the university farms are able to have a livestock component at this time. On-farm research projects are being planned to look at fly control in pasture situations for beef cattle.

On-Farm Research

Five faculty members and one graduate student are conducting on-farm research on five organic farms and one organic farm coop. Research focuses on grains, legumes, forages and greenhouse/high tunnel production. In addition, UNL has four organically certified sites, but one has lapsed its certification; another one will probably lapse in 2015; and a third will have the faculty in charge retire in 2015, with continuation unknown. A fourth site is actively managed, but the PI there will retire within five years. When those sites were active, they all engaged local organic farmers for advice and as sites for research. There is growing interest in developing rural infrastructure. Nebraska has a newly formed Rural Institute, but it has not yet engaged the popular interest, opportunity and support for organic agriculture in Nebraska.

Key Contacts

- Dr. P. Stephen Baenziger, Professor, Agronomy, pbaenziger1@unl.edu
- [Dr. Brandle, Professor, School of Natural Resources, jbrandle1@unl.edu](#)
- Dr. Chuck Francis, Professor, Agronomy, cfrancis2@unl.edu
- Dr. Laurie Hodges, Associate Professor, Agronomy and Horticulture, lhodges1@unl.edu
- Dr. Stevan Knezevic, Professor, Northeast Research and Extension Center, sknezevic2@unl.edu

- Dr. John L. Lindquist, Professor and Plant Ecologist, UNL, jlindquist1@unl.edu
- [Richard Little, Organic Wheat Breeding, rlittle2@unl.edu](#)
- Elizabeth A. Sarno, Organic Farming Systems Educator, retired
- Vicki Schlegel, Professor of Food Science, vschlegel3@unl.edu
- Dr. Charles Shapiro, Professor, Agronomy and Horticulture, cshapiro@unl.edu

NORTH DAKOTA

Organic Research Projects

[The Entrepreneurial Center for Horticulture](#) (ECH) at Dakota College at Bottineau conducts organic variety trials in its demonstration fields and in its high tunnels. In addition, the ECH partners with four farms across North Dakota, two of which are certified organic, to provide locations for field tours and producer workshops and for collection of data regarding organic production methods and varieties. The information from these farms is passed on to students and clients as a part of their mentoring and education.

In 2014, the ECH participated in organic variety trial research in cooperation with the Northern Plains Sustainable Agriculture Farm Breeding Club. The faculty of the ECH also provided food safety training to farmers, of which 3 were certified organic and 3 were in transition to certification. The ECH was awarded an APUC grant in 2012 to study the effect of compost tea made from kitchen scraps donated by the college's dining services on the fertility and growth of vegetables in the high tunnels. The final report has not yet been submitted but it is hoped that this method of organic fertility management will increase the soil health in high tunnels for many producers and be a sustainable input.

Current and recent organic research includes:

New Buckwheat Varieties for Greater Sustainability. Anne Ongstad, Rick Mittleider, Wayne Mittleider. This is a multiyear assessment and seed increase of two buckwheat varieties from Ukraine under organic management. 2013-2015, Funding: SARE Farmer Rancher Grant.

Value-added Einkorn for Organic Production in the Great Plains Region. Dr. Frank Kutka, Northern Plains Sustainable Agriculture Society Farm Breeding Club. 2014-2016. Funding: Ceres Trust.

Value-added Grains for Local and Regional Food Systems. Mark Sorrells (PC), Brian Baker, Mike Davis, Elizabeth Dyck, Frank Kutka, Kate Mendenhall, Rebecca Robertson, Greg Roth, June Russell, Alex Stone, Steve Zwinger. This is a multi-year investigation of organically managed einkorn, emmer, and spelt, including variety screens, seed increase, management studies, and field days in North Dakota. 2012-2015, Funding: USDA-NIFA OREI.

Organic Farming: The Search for Agricultural Sustainability in the northern Great Plains (ND 06258), Patrick M. Carr (PI), 2007-2013. This project guided organic farming research directed out of the NDSU Dickinson Research Extension Center from 2007 through 2013. A new organic project being developed by Dr. Carr will guide organic farming research at the center from 2014 through 2018. Funded research at the center includes:

- Tillage and AMF Inoculant Impacts on Organic Vegetable Production in the Upper Great Plains. G. Gramig (PI), and P.M. Carr (Co-PI), 2015-2018 Funding: Ceres Trust Organic Research Initiative.
- Targeted grazing as a keystone ecological process to reduce tillage intensity and terminate cover crops. Environmental, ecological, and economical assessment of reintegrating animal and crop production in dryland organic systems. F. Menalled (PC), P. Hatfield, P. Carr, P. Miller, D. Weaver, M. Burrows, R. Engel, A. Bekkerman, J. Boles, Z. Miller, R. Quinn, L. Burkle, K. O'Neill, G. Gramig, and K. Ringwall (Co-PIs). Funding: USDA-NIFA OREI.
- Increasing Varietal Suitability and Availability of Cowpea and Forage Radish Cover Crop Seed for Northern Climates. K. Stroh (PC), S. Zwinger, T. Podoll, P. Carr, P. Sexton, E. Silva, J. Fuhrer, and E. Steigelmeier (Co-PIs). 2009, Funding: USDA-SARE.
- [Organic crop variety selection for Great Plains States in the North Central Region.](#) P.M. Carr (P.I.), G. Gramig, D. Hines, F. Kutka, Y. Lawley, K. McPhee, and S. Zwinger (Co-PIs). Funding: Ceres Trust Organic Research Initiative
- Cover crop selection and use in organic no-till farming. P.M. Carr (P.I.), K. Delate (Co-PI), M. Haar (Co-PI), and E. Silva (Co-PI). Funding: USDA-SARE.
- Developing carbon-positive organic systems through reduced tillage and cover crop-intensive crop rotation schemes. K. Delate (P.I), C. Cambardella, P. Carr, M. Haar, J. Moyer, D. Mutch, E. Silva, S. Weyers (Co-PI). 2008-2012, Funding: USDA-CSREES-IOP.
- Variety screening for organic vegetable production. E.M. Silva (P.I.) and P.M. Carr (Co-PI). 2008, Funding: Organic Valley – Farmers Advocating for Organic.

Optimizing sorghum-sudan/forage soybean cover crop populations and screening sorghum varieties for organic cover crop performance, forage, and seed production in the Northern Great Plains region. Ray Berry, David Podoll, and Richard Gross. 2010-2012. Funding: SARE Farmer Rancher Grant.

[Multi-Species Cover Crops Control Weeds and Improve Fertility in Organic No-Till Fields.](#) Linda Grotberg, Prairie Farm Pilot Project. 2010, Funding: SARE.

[Screening Open-Pollinated Vegetable Varieties Bred and Released In North Dakota for Suitability to Organic Production Systems and Local Markets.](#) Marvin Baker, North Star Farms. 2009, Funding: SARE.

Reducing the Impact of Soybean Aphid on Organic Soybeans through Multiple Management Tactics. Mark Askegaard, 2009. Funding: SARE.

[Organic No-Till- The Ultimate Cropping System For Soil Health and Farm Sustainability.](#) Linda Grotberg. 2008, Funding: SARE.

Building Organic Soil Health with Green Manure and Cover Crops, Pat Frank. 2008, Funding: SARE.

[Is It Possible? Can We Have Organic Sustainable Agriculture with Minimal Tillage while Soil Building and Producing High Quality Forage for Grass-Fed Beef.](#) Anne Ongstad, Whitman Ranch. 2007, Funding: SARE.

[Prairie Farm Pilot Project – Transitioning from Conventional to Organic Farming,](#) Richard Grotberg, 2006, Funding: SARE.

[Organic Education: Increasing Opportunities for Farmers and Processors.](#) Britt Jacobson, FARRMS. 2006, Funding: SARE.

[Bringing Small-Grain Variety Development and Selection onto Organic Farms,](#) Patrick Carr, NDSU. 2002, Funding: SARE.

Refereed Publications

Carr, P.M., R.D. Horsley, J.J. Gunderson, T.J. Winch, and G.B. Martin. 2014. Weed growth and crop performance following hairy vetch, rye, and wheat cover crops in a cool semiarid region. *Organic Agriculture* Published online (doi: 10.1007/s13165-013-0057-8); journal volume/page number(s) assigned in 2014.

Carr, P.M., G.G. Gramig, and M.A. Liebig. 2013. Impacts of organic zero tillage systems on crops, weeds, and soil quality. Online. *Sustainability* 5: 3172-3201

Erin Elizabeth Burns, Deirdre Anne Prischmann-Voldseth, and Greta Gramig. 2013. Integrated Management of Canada Thistle (*Cirsium arvense*) With Insect Biological Control and Plant Competition Under Variable Soil Nutrients. *Invasive Plant Science and Management* 6:512-520

Carr, P.M., K. Delate, X. Zhao, C.A. Cambardella, J.R. Heckman, and P.L. Carr. 2012. [Organic farming: Impacts on soil, food, and human health.](#) p. 241-258. In E.C. Brevik and L. Burgess (ed.) *Soils and Human Health*. Taylor and Francis Group, CRC Press, Boca Raton, FL Prischmann-Voldseth, D., G. Gramig, and E. Burns. 2012. Home on the range: establishment of a Canada thistle biocontrol agent. *Rangelands*.

Carr, P.M., R.L. Anderson, Y.F. Lawley, P.R. Miller, and S.F. Zwinger. 2012. [Organic zero-till in the northern U.S. Great Plains region: Opportunities and obstacles.](#) *Renewable Agriculture and Food Systems* 27:12-20.

Carr, P.M., P. Mäder, and N.G. Creamer. 2012. Editorial. [Overview and comparison of conservation tillage practices and organic farming in Europe and North America.](#) *Renewable Agriculture and Food Systems* 27:2-6.

Kandel, H.J., P.M. Porter, and P.M. Carr. 2009. Spring wheat cultivar harrowing evaluation in Minnesota. *Crop Management* doi:10.1994/CM-2009-0612-02-RS.

Kandel, H.J., P.M. Porter, P.M. Carr, and S.F. Zwinger. 2008. [Producer participatory spring wheat variety evaluation for organic systems in Minnesota and North Dakota.](#) *J. Renewable Agric. Food Sys.* 23:228-234.

Extension and Outreach Publications

- [Long-Term Organic and Tillage Study \(LOTS\)](#)
- [NPSAS Farmer-Breeder Club Report](#)
- [Organic Crop Cultivar Selection for Great Plains States in the North Central Region](#)
- [Organic Farming Gaining Ground But Beware](#)
- [Organic Farming, Is It for Me?](#)
- [Organic Farming: The Search for Agricultural Sustainability in the Northern Great Plains](#)
- [Organic Gardening 101](#)
- [Organic Gardening Tips](#)
- [Organic No Till Using the Cover Crop Roller](#)
- [Projected 2010 Organic Crop Budgets South Central North Dakota.](#)
- [Projected 2007 Organic Crop Budgets South Central North Dakota.](#)
- [Status of Organic Agriculture in North Dakota – 2005](#)
- [Suggested Best Practices for the Coexistence of Organic, Biotech and Conventional Crop Production Systems](#)
- [2008 Evaluation of Seed Source in Organic Potato Production](#)
- [2012 Trial Results – Emmer – Organic – Carrington](#)
- [NPSAS Farm Breeding Club](#)
- [Ancient Grains Webinar, 2013](#)
- [Value-Added Organic Grains ND 2012 Update](#)
- [Breeding “Organic Ready” Corn](#)
- [NDSU Organic Research](#)
- [Deep Mulch, No-Till, Organic Garden at Prairie Road Organic](#)
- [Boehm Farm Tour](#)
- [Organic Farming](#)

Academic Curricula

The Entrepreneurial Center for Horticulture (ECH) at Dakota College at Bottineau recently had an AAS and Certificate program approved in sustainable vegetable production. A 1-credit course entitled Organic Certification and Farm Plans is offered, along with courses on compost production and use as well as cover crops and weed management. The Entrepreneurial Center also offers several Good Agricultural Practices and Food Safety workshops; sustainable farming methods suitable for crops managed organically are presented at these workshops. During 2013, workshops were held at Valley City, Bottineau, and Medina, ND.

Graduate Student Opportunities

Dr. Greta Gramig will be mentoring two new NDSU M.S. students, Samantha Hogstad and Thor Selland, beginning in 2015. Both students will be conducting research pertinent to weed management in organic crop production systems.

Outreach Efforts

The Dickinson Research Extension Center has hosted two organic field days – one in [2009](#) and one in [2012](#). Both were well attended (>200 at the 2009 event and >80 at the 2012 event). The Carrington field day had an organic farming morning tour offering as part of their field day in both 2012 and 2013, which also was well attended.

Selected presentations by Dr. Pat Carr include:

Presentations focused on cover crops when working with organic farmers in 2012.

In-service organic production training to new Extension Educators in 2012.

Using ecological principles to manage weeds in organic farming systems at Dickinson Research Extension Center and Carrington Research Extension Center in 2012.

Organic Agronomic Research at the DREC, Field day for Montana County Extension Agents, 2012, Dickinson.

State of Organic Research and Education at NDSU, and What Have We Dreamed?, Carrington Research Extension Center annual field day, 17 July, 2012, Carrington.

Our Goal is OZ: Organic Zero-Till, Dickinson Research Extension Center annual field day, 11 July, 2012, Dickinson

Organic No-till and Cover Crop Cocktails: What do we know and what is there left to learn? Annual education session, OCIA ND Chapter 2 meeting, Bismarck Public Library, February 18, 2012, Bismarck.

Variety Selection for Organic Environments. Northern Plains Sustainable Agriculture Society 2012 Healthy Soil – Healthy You Winter Conference, January 2012, Aberdeen.

Organic No-Till: What's Been Learned and Where are We Headed? Northern Plains Sustainable Agriculture Society 2012 Healthy Soil – Healthy You Winter Conference.

Two symposia at the 2010 American Society of Agronomy's international meeting – one on organic no-till and one on organic grain production. Papers presented during the organic no-till symposium subsequently were published in the winter issue (volume 27) of *Renewable Agriculture and Food Systems*.

Zero-till (OZ) in Organic Production. How to avoid tilling the soil without chemicals, Sustainable U., December 2010, Bismarck, ND.

The Real Dirt on Soil Health and Organic Farming, Soil Health/Soil Biology Training for the Northern Great Plains, Pierre, SD, Mitchell, SD, Carrington, ND, and Bismarck, ND.

Organic Production Systems in the Northern Great Plains: Challenges and Opportunities, North Dakota Soil and Water Summit, July 2010, Carrington, ND.

Organic Zero-Till in the Great Plains, FARRMS Organic Production NRCS Workshop, July (Fargo), August (Bismarck), and August (Minot), 2010.

Organic No-Till: Experiences from North Dakota to Wisconsin, 9th Annual Iowa Organic Conference, December 2009, Ames, IA.

Organic farming research in North Dakota, AERO Summer Farm Tour, Quinn Farm, Big Sandy, MT, July 2009.

Organic farming research at NDSU, Inaugural North Dakota State University Organic Farming Field Day, Dickinson Research Extension Center, North Dakota, July 2009.

How to ZT and organic farm on the Great Plains, Manitoba Ag Days, January 2009, Brandon, Manitoba.

Organic weed control systems in crops and rangeland, North Dakota Weed Control Association Annual Meeting, February 2009, Mandan, ND.

Cover crops research, 25th Annual Western Dakota Crops Day, December 2008, Hettinger, ND.

No-Till Organic Farming: Fact or Fiction? Department of Plant Sciences Seminar, North Dakota State University, Fargo, ND, December 2008.

Roller/crimper demonstration, Forage Beef and Cover Crop Workshop, September 2008, DREC ranch location.

Rolling and crimping cover crops, Kentucky SCD Tour Group, September 2008, DREC ranch location.

Organic No-Till Roller/Crimper Demonstration, Organic Field Day, July 2008, University of Minnesota Southwest Research and Outreach Center, Lamberton, MN.

Killing Cover Crops with the Roller Crimper, Summer Field Tour, 2008, Dickinson.

Emerging Organic No-Till Strategies, FARRMS No-Till Workshop, March 2008, Medina.

Organic No-Till in North Dakota: Opportunities and Challenges, New York Certified Organic Discussion, February 2008, IVN Classroom, DREC.

Why Organic Farming? Extension Service Pre-Conference Training, Winter Annual Conference, Northern Plains Sustainable Agriculture Society, 2008, Mandan, ND.

Organic Farming Research and Ley Farming, 24th annual Western Dakota Crops Day, 2007, Hettinger, ND.

Perspectives in Sustainable Agriculture, Sustainable Agriculture Seminar, 2007, North Central Research Extension Center, Minot.

Organic Farming: Search for Agricultural Sustainability in the Buffalo Commons. Invited Scientist seminar, USDA-ARS North Central Soil Conservation Research Laboratory, Morris, MN. 2007.

Web Resources

- [Carrington Research Extension Center](#)
- [Dickinson Research Extension Center](#)
- [Dickinson Research and Extension Center Organic Field Day 2012 video](#)
- The [NDSU Library](#) provides access to books, journals, databases, websites, organizations and more on organic agriculture.
- [North Dakota Department of Agriculture Organic Farming](#)
- [North Dakota Organic Advisory Board](#)
- [North Dakota Organic Online Directory](#)
- [Northern Plains Sustainable Agriculture Society](#)
- [NPSAS Farmer-Breeder Club](#)
- [Tool to Connect ND Organic Producers and Buyers](#)

Hands-on Learning

The Entrepreneurial Center for Horticulture (ECH) at Dakota College at Bottineau has an onsite CSA. Plans are for the CSA to function as a student organic farm that provides hands-on learning for summer interns and for those enrolled in the Sustainable Vegetable Production program.

Acres Certified Organic

26 acres at the NDSU [Dickinson Research Extension Center](#) and 4 acres at the NDSU [Carrington Research Extension Center](#) are certified organic (through ICS and OCIA); additional land is rented on certified organic farms, as needed. A little over 0.10 acres are certified organic at the [Entrepreneurial Center for Horticulture](#) (ECH) at Dakota College at Bottineau with an additional 0.42 in transition. Near Fargo, at the NDSU Absaraka Horticultural Research Farm, 3 acres are currently being transitioned to organic, and will be certified organic in July 2015 (via ICS).

Total acres certified, managed organically, or in transition = 33.52 acres.

Organic Livestock Research

None at this time.

On-Farm Research

One faculty member and two summer interns conduct on-farm organic variety trials in cooperation with the Farm Breeders Club, NPSAS and a SARE grant. The Entrepreneurial Center for Horticulture (ECH) at Dakota College at Bottineau conducts organic variety trials in its demonstration fields and in its high tunnels. In addition, the ECH partners with four farms across North Dakota, two of which are certified organic, to provide locations for field tours and producer workshops and for collection of data regarding organic production methods and varieties.

Key Contacts

- Brad Brummond, NDSU Ext. Agent/Walsh County, bradley.brummond@ndsu.edu
- Dr. Patrick Carr, Research Professor, DREC, Patrick.Carr.1@ndsu.edu
- Dr. Greta Gramig, Assistant Professor, Weed Science, Greta.Gramig@ndsu.edu
- Dr. Kevin McPhee, Professor, Plant Sciences, Kevin.McPhee@ndsu.edu
- Steve Zwinger, Research Specialist, CREC, Steve.Zwinger@ndsu.edu
- Holly Rose Mawby, Entrepreneurial Center for Horticulture – Dakota College at Bottineau, hollyrose.mawby@dakotacollege.edu

OHIO

Organic Research Projects

Founded in 1998 as an interdisciplinary research and extension team at the Ohio Agricultural Research and Development Center (OARDC), the Organic Food and Farming Education Research (OFFER) program has grown in parallel with the organic sector. An external advisory committee meets twice annually with the Director to discuss programming and stakeholder issues, and they serve as resources to connect researchers to growers and others in the organic industry. The OFFER group's [web site](#) provides an overview of the mission and research of program members.

Currently, the Ohio State University's College of Food, Agriculture, and Environmental Sciences employs over forty faculty who are involved in organic research, education, and extension activities. Included in the [current OFFER members](#) are faculty from every Department in the College as well as the Glenn School of Public Policy. These faculty members work on research projects funded by a variety of sources, including AFRI, NIFA's OREI and ORG programs, SARE, as well as Ceres Trust. Several members have also received OFRF funding in the past.

OFFER faculty are currently engaged in a number of funded research projects, most of which are listed [on OFFER's website](#). Details of these projects can be gleaned from the USDA's CRIS and REEport systems. The focus and emphasis of OFFER research programs are responsive to the needs of growers but constrained by funding priorities of the different agencies and stakeholders. As a rule, few of the OFFER faculty work exclusively on organic research, however, all are committed to the same sustainability and environmental principles that are at the core of the organic movement.

Going forward, the program plans to catalog all past projects and related outputs as a permanent record of its accomplishments. For now, the internal reporting systems at OSU and the CRIS and SARE systems were used to assemble the following information.

Current and recent organic farming related research projects include:

Agronomic/Field Crops

Practiced by Farmers but Untested by Scientists: Uniting Both in Participatory Research and Education to Explain the Effects of Soil Balancing. Doohan D, Kleinhenz M, Culman S, Sundermer A, 2014-2018, Funding: NIFA OREI

Suppression of Escherichia coli O157:H7 by Ohio specialty crop soils Williams M, LeJeune, J, 2013-2014, Funding: Ohio Department of Agriculture.

Organic biofertilizer amendment trials. McSpadden Gardener, B, 2013-2014, Funding: OARDC.

Organic oat variety trials. McSpadden Gardener, B. Sneller, C, 2013-2014, Funding: OARDC.

Organic corn variety trials. McSpadden Gardener B., Sundemeier, A.S, 2013-2104, Funding: OARDC and Organic Valley.

Providing scientific support for organic agriculture, Phelan, P. L., Doohan, D. J., and Loerch, S. C. 2012-2015, Funding: USDA-NIFA.

Assessing, modeling, and maximizing ecosystem services in long-term organic and transitioning farming systems, Grewal, P. S., Islam, K. R., McCoy, E. L., Kumarappan, S., and Sundermeier, A. 2012-2015, Funding: USDA-NIFA Organic Transitions.

Maximizing ecosystem services of the soil food web in organic farming systems, Parwinder S. Grewal. 2011-2014, Funding: Ceres Trust.

Strengthening public corn breeding to ensure organic farmers' access to elite cultivars, Scott, P. (ARS), 2010-2014, Funding: USDA-NIFA.

Ecosystem based weed management: giant ragweed in the corn belt, Regnier, E. E., Stoltenberg, D., and Mahoney, K. 2010-2013, Funding: USDA-NIFA-AFRI.

Optimizing organic soil fertility management to improve the crop health and baking functionality of organic Midwestern spelt, Larry Phelan. 2009-2012, Funding: Ceres Trust.

Environmental sustainability of organic farming systems: on-farm, experimental, and watershed assessments, Shipitalo, M., Stinner, D., and Bonta, J. (ARS). 2010-2011, Funding: USDA-OREI Planning Grant.

[Guiding CRP Landowners into Sustainable Organic Production in the North Central Region](#), Ernest Martin. 2008, Funding: SARE.

[Sustainable Concrete Post Construction for Fencing and Trellising of Organic Crops](#), Steve Pearce. 2007, Funding: SARE.

[Growing Organics: Integrating Science, Farmer Indigenous Knowledge, and Experience in Expanding Organic Production in Ohio](#), Mike Anderson, OEFFA. 2007, Funding: SARE.

[Evaluating Corn Varieties in Pure and Mixed Stands for Organic Crop Production across Three States in the Corn Belt](#), Peter Thomison, OSU. 2006, Funding: SARE.

[Weed Management in Organic Conservation Tillage/No Tillage](#), John Cardina, OSU. 2004, Funding: SARE.

Vegetable & Fruit Crops

Integrating perimeter trap crops and row covers into cucurbit-crop farming systems Welty C, Gardiner M. Miller SA, Funding: USDA-AFRI; Univ of IA subcontract.

Integrating perimeter trap crops and row covers into organic farming systems. Welty, C., Gardiner, M. and Miller, S. A, 2013-2015, Funding: NCR-SARE/Iowa State University.

Developing Downy Mildew and Powdery Mildew Management Strategies for Organic Cucurbit Production. Miller, S.A., and Baysal-Gurel, F. PA, 2013, Funding: Vegetable Marketing and Research Program – PA Vegetable Growers Association.

Developing strategies for organic cucurbit disease management. Miller, S.A., and Baysal-Gurel, F. 2013, Funding: Ohio Vegetable and Small Fruit Research & Development Program (OVSFRDP).

Evaluation of fungicides and biorational products for control of powdery mildew in greenhouse tomato production. Miller, S.A., and Baysal-Gurel, F. 2013, Funding: Ohio Vegetable and Small Fruit Research & Development Program (OVSFRDP).

Enhancing productivity and soilborne disease control in intensive organic vegetable production with mixed-species green manures, [McSpadden Gardener, B. B.](#), [Miller, S. A.](#), [Kleinhenz, M.](#), [Everts, K.](#), [Meyer, S.](#), [Norton, G.](#), [Parmeter, C.](#), and Smart, C. 2009-2013, Funding: USDA NIFA-Organic Research Extension Initiative.

Renewable mulches for integrated weed management in small-scale crop production, [Regnier, E. E.](#), [Harrison, S. K.](#), [Metzger, J. D.](#), and Bennett, M. A. 2009-2012, Funding: USDA-NIFA.

Mental models and participatory research to redesign extension programming for organic weed management, [Doohan, D. J.](#), [Ernst, S.](#), [Wilson, R.](#), [Stinner, D.](#), [Parker, J.](#), [Tucker, M.](#), [Gibson, K.](#), [Smith, R.](#), [Gallandt, E.](#), and Riemens, M. 2009-2013, Funding: USDA NIFA-Organic Research Extension Initiative.

[Developing cultural practices for organically grown medicinal plants](#), John Cardina. 2008-2011, Funding: Ceres Trust.

[Developing Organic Management to Restore Soil Quality for Food Production in Degraded Urban Soils](#), Joshua Beniston, (Rattan Lai, Major Professor). 2010, Funding: Ceres Trust Graduate Student Grant.

[Organic Control of Fungus in Vineyards, Eliminating Chemical Sprays](#), Steve Pearce. 2006, Funding: SARE.

[Organic Production and Marketing of Forest Medicinals: Building and Supporting a Learning Community Among Growers](#), Dennis Hosack, Rural Action. 2005, Funding: SARE.

[Organic Food Trail](#), Tim Patrick. 2004, Funding: SARE.

[Variety Evaluation, Selection and Management for Organics Vegetable Systems](#), Matthew Kleinhenz, OSU. 2003, Funding: SARE.

Livestock

Whole farm approach incorporating pasture raised organic poultry and a novel cereal grain (naked oats) into an organic rotation, [Lilburn, M. S.](#), [Phelan, L.](#), [Batte, M.](#), and Mariola, M. 2011-2015, Funding: USDA NIFA-Organic Research Extension Initiative.

Impact of organic animal production systems on water quality and quantity in Ohio – an integrated research, extension and education program, [Loerch, S. C.](#), [Moore, R.](#), [Taylor, R.](#), [Stinner, D.](#), [McCutcheon, J.](#), [Bonta, J.](#), and [Owens, L.](#) 2009-2103, Funding: USDA-NIFA-IOWQP.

Effect of intrauterine dextrose on dairy cows with clinical metritis in organic dairy herds. Schuenemann, G.M and G.M. Maquivar. 2012-2013. USDA – Animal Health/FF.

Impact of alternative endometritis therapy on fertility of lactating dairy cows, [Schuenemann, G.](#), [Daniels, J.](#), and Pinto, C. 2009-2010, Funding: USDA – Animal Health/FF.

[Comparing Antimicrobial Usage in Commercially-Raised and Organically-Raised Chickens and Turkeys and the Development of Antimicrobial Resistance in *Campylobacter jejuni*](#), Taradon Luangtongkum, OSU. 2003, Funding; SARE.

Marketing & Economics

Contemporary Organic Policy: Implications for Food and Ingredient Markets and Trade. Neal H. Hooker and Katherine Boys., 2015-2018, Funding: USDA-AFRI.

Organic food marketing: panacea or problem? [Haab, T. C.](#) and [Hooker, N. H.](#) 2008-2012, Funding: NRI Competitive Grant.

[US Organic Food and Beverage Innovations: Trends 2009-2010](#). (DiMarcello, Nicholas and Neal H. Hooker). 2011. *HSB Working Paper*. 11-1. Funding: Internal – Saint Joseph’s University Haub School of Business.

Assessing the communication needs of Ohio’s organic farmers, Agunga, R. A., Igodan, C. 2004-2010, Funding: USDA-NIFA.

Paths of transition: strategies for peri-urban organic farmers, Kleinhenz, M. D.; Mcspadden, B. G.; Cardina, J.; Miller, S. A.; Batte, M.; Grewal, P.; Stinner, D., 2002-2007, Funding: USDA-NIFA

Revitalizing small and midsized farms: organic research, education, and extension, Miller, S. A.; Stinner, D. H.; Moore, R.; Cardina, J.; Hoy, C. 2000-2005, Funding: USDA-NIFA.

Soils

Developing a soil active organic matter test for organic growers. Culman, S. 2014-2016. Funding: Ceres Trust.

Increasing the services of soil invertebrates in agroecosystems, C.W. Hoy & P. S. Grewal. 2009-2012, Funding: USDA-NIFA.

Maximizing ecosystem services of the soil food web in organic farming systems, P. S. Grewal and R. R. Islam. 2012-2014, Funding: Ceres Trust.

Transition strategies that control perennial weeds and build soil, Cardina, J.; Felix, J.; Doohan, D.; Stinner, D.; Batte, M. 2006-2009, Funding: USDA-NIFA.

Biological buffering and pest management in organic farming systems: the central role of organic matter, Stinner, D.; Phelan, P. L. 2003-2008, Funding: USDA-NIFA.

Carbon sequestration and carbon and nitrogen cycling processes in organic agricultural ecosystems, Stinner, D.; Hatcher, P. G. 2002-2006, Funding: USDA-NIFA.

Refereed Publications

OFFER researchers publish a variety of articles, many of which are not specific to organic agriculture. Examples of recent organic-related publications include:

Shanahan, Christopher J. and Neal H. Hooker. 2015. A Balancing Act: Disproportionate Sampling of Organic Foods. (In press) *Journal of Food Products Marketing*. 19 pp

Summers CF, Park S, Dunn AR, Rong X, Everts K, Meyer SLF, Rupprecht SM, Kleinhenz MD, McSpadden Gardener B, and CD Smart. 2014. Single season effects of mixed-species cover crops on tomato health in multi-state field trials. *Applied Soil Ecology*. Vol. 77: 51-58

Summers CF, Park S, Dunn AR, Rong X, Everts KL, Kleinhenz MD, McSpadden Gardener B, and CD Smart. 2014. Fungal and oomycete pathogen detection in the rhizosphere of organic tomatoes grown in cover crop-treated soils. *Applied Soil Ecology*. Vol. 80: 44-50.

Lillard, P., Parker, J., and Sundermeier, A., 2013. Recommendations for establishing extension program-ming for organic farmers. *Journal of Extension* 51:6TOT1 <http://www.joe.org/joe/2013december/tt1.php>

Baysal-Gurel, F., Gardiner, M., Welty, C., and Miller S.A., 2013. Evaluation of row covers for the control of foliar diseases of muskmelon, 2012. *Plant Disease Management Reports*: doi:10.1094/PDMR07:V120.

Baysal-Gurel, F., Gardiner, M., Welty, C., and Miller S.A., 2013. Management of bacterial wilt in muskmelon with perimeter trap cropping, 2012. *Plant Disease Management Reports*: doi:10.1094/PDMR07:V121.

Baysal-Gurel, F., Miller, S.A., 2013. Management of powdery mildew in greenhouse tomato production with biorational products and fungicides. 4th International Symposium on Tomato Diseases and the 28th U.S. Annual Tomato Disease Workshop. June 24-27th, 2013. *Acta Hort.* (ISHS).

Baysal-Gurel, F., Gardiner, M., Welty, C., and Miller, S.A. 2012. Evaluation of row covers for the control of bacterial wilt and foliar diseases of muskmelon, 2011. *Plant Disease Management Reports*: doi:10.1094/PDMR06: V161.

Baysal Gurel, F., B McSpadden Gardener, B., and Miller, S.A. 2012. [Soil-borne disease management in organic vegetable production](#). *eOrganic* 7581.

DeLeon, Lauren and Neal H. Hooker. 2012. [Trends in US Organic Food and Drink Product Introductions](#). *John Glenn School of Public Affairs Working Paper*. November. 13 pp

- Grewal, P.S. 2012. Entomopathogenic nematodes as tools in integrated pest management. In: *Integrated Pest Management: Principles and Practice* (D. P. Abrol, Ed.), CABI Publishing, Wallingford, UK, 162-236.
- Grewal, P.S. 2012. From IPM to ecosystem management: the case of urban lawn. In: *Integrated Pest Management: Principles and Practice* (D. P. Abrol, Ed.), CABI Publishing, Wallingford, UK, 450-488.
- Grewal, S.S. and Grewal, P.S. 2012. Can cities become self-reliant in food? *Cities* 29, 1-11.
- Shanahan, Christopher J. and Neal H. Hooker. 2012. Emerging Spatial Dependencies within US Organic Supply Chains. *Journal of Food Products Marketing*. 18(5): pp 426-450.
- Yadav, P., Duckworth, K. & Grewal, P.S. 2012. Habitat structure influences below ground biocontrol services: A comparison between urban gardens and vacant lots. *Landscape and Urban Planning* 104, 238-244.
- Briar, S.S., Miller, S.A., Stinner, D., Kleinhenz, M.D., & Grewal, P.S. 2011. Effect of different organic transition strategies for peri-urban vegetable production on soil properties, nematode community, and tomato yield. *Appl. Soil Ecol.* 47, 84-91.
- Chang, Ching-Hsing, Neal H. Hooker, Eugene Jones and Abdoul Sam. 2011. Organic and Conventional Milk Purchase Behaviors in Central Ohio. *Agribusiness: An International Journal*. 27(3): pp 311-326.
- Baysal-Gurel, F. and Miller, S. A. 2010. [Disease Management in Organic Lettuce Production](#). *eOrganic*
- Baysal-Gurel, F. and Miller, S. A. 2010. [Early Blight Management for Organic Tomato Production](#). *eOrganic*4961.
- Cao, C., Raudales, R., Park, S., and McSpadden Gardener, B.B. 2010. [Biopesticide controls of plant diseases: Resources and products for organic farmers in Ohio](#). *Ohioline Fact Sheet SAG-18-10*.
- Park, S., Cao, C., and McSpadden Gardener, B.B. 2010. [Inoculants and soil amendments for organic growers](#). *Ohioline Fact Sheet SAG-17-10*.
- Van Camp, Debra, Pauline Ie, Noah Muwanika, Neal H. Hooker and Yael Vodovotz. 2010. The Paradox of Organic Ingredients. *Food Technology*. November: pp. 20-29
- Phelan, P. L. 2009. Ecology-based agriculture and the next green revolution: Is modern agriculture exempt from the laws of ecology?, pp. 97-135, in *Sustainable Agroecosystem Management: Integrating Ecology, Economics, and Society*, P. J. Bohlen and G. House, eds, CRC Press, Boca Raton, FL.
- Baysal, F., McSpadden-Gardener, B., Cardina, J., Kleinhenz, M., Miller, S.A. 2009. Effect of Field Management Practices on Disease Development, Soil Chemistry and Yield in Organic Tomatoes. *Acta Hort.* (ISHS) 808:113-116.
- Baysal, F., Benitez, M.S., Kleinhenz, M.D., Miller, S.A., and McSpadden Gardener, B.B. 2008. Effects of farm organic transition on soilborne disease suppression. *Phytopathology* 98: 562-570.

Baysal, F., Benitez, M.-S., Kleinhenz, M., Miller, S.A. and McSpadden Gardener, B.B. 2008. Field management effects on damping-off and early season vigor of crops in a transitional organic cropping system. *Phytopathology* 98:562-570.

Benitez, M.-S., Baysal Tustas, F., Rotenberg, D., Kleinhenz, M.D., Miller, S.A., and McSpadden Gardener, B. 2007. Multiple statistical approaches of community fingerprint data reveal bacterial populations associated with general disease suppression arising from the application of different organic field management strategies. *Soil Biology and Biochemistry* 39: 2289-2301.

Briar, Shabeg S.; Grewal, Parwinder S.; Somasekhar, Nethi; Stinner, D.; Miller, Sally A. 2007. Soil nematode community, organic matter, microbial biomass and nitrogen dynamics in field plots transitioning from conventional to organic management. *Applied Soil Ecology* 37: 256-266.

Phelan, P. L. 2004. Connecting belowground and aboveground food webs: The role of organic matter in biological buffering, pp.199-225, in *Soil Organic Matter Management in Sustainable Agriculture*. F. Magdoff and R. R. Weil, eds. CRC Press, Boca Raton, FL.

Extension and Outreach Publications

The Extension programs at The Ohio State University serve diverse constituencies, including transitioning and certified organic growers. OFFER researchers provide multiple presentations to growers on organic research projects during the year through their regular outreach programming, often giving handouts as part of their presentations. [Ohioline](#) (the main outlet for Extension materials in Ohio) lists publications for organic farmers by entering “organic farming” or “organic agriculture” as [search](#) terms. These include bulletins and fact sheets on a wide variety of topics. Examples include:

- [Armyworm in Organic Corn](#)
- [Biopesticide Controls of Plant Diseases: Resources and Products for Organic Farmers in Ohio](#)
- [Enhancing Wildlife Habitat on Farmlands](#)
- [Inoculants and Soil Amendments for Organic Growers](#)
- [Managing Downy Mildew in Organic and Conventional Vine Crops](#)
- [Microbial Biopesticides for the Control of Plant Diseases in Organic Farming](#)
- [Ohio Organic Producers: Final Survey Results](#)
- [The Organic Certification Process for Crops](#)
- [Sustainable Agriculture Fact Sheet Index](#) (numerous fact sheets)
- [Disease Management in Organic Lettuce Production](#). eOrganic article.
- [Early Blight Management for Organic Tomato Production](#).
- [Soil-borne Disease Management in Organic Vegetable Production](#).
- [Sustainable Agriculture Resources](#)

Academic Curricula

There is a [Sustainable Agriculture](#) major at OSU's [Agricultural Technical Institute](#) (an Associates degree granting program), which includes an Organic farming course, and there is an effort to establish a new undergraduate degree in Sustainable Agriculture with a minor in Organic agriculture, but this is not yet in place.

Currently the agriculture curriculum at The Ohio State University is organized largely by specialty, and these are largely defined within Departments. Sustainability is a major theme that is emphasized throughout the curriculum, and discussions of organic agriculture take place in the curriculum of all CFAES majors. However, there are not specific “organic farming” courses at OSU. Topics related to organic disease and pest management, for example, are taught within courses on disease and pest management more broadly.

Graduate Student Opportunities

Graduate research programs largely mirror departments within the [College of Food, Agriculture, and Environmental Sciences](#), though the Environmental Graduate Studies program is trans-collegiate. OFFER researchers and their graduate students typically conduct their work within the context of their disciplinary Department, but are often engaged in interdisciplinary research related to organic agriculture as indicated by the mix of principal investigators on the projects listed above.

Outreach Efforts

Field days have been presented at the OARDC's Wooster and Findlay locations on an annual basis. Research extension personnel have been involved in programming specific to organic researchers at multiple locations on an annual basis. Partnerships with the Ohio Ecological Food and Farming Association (Ohio's main organic certifier and organic stakeholder organization) have led to multiple presentations by OSU faculty at [OEFFA's annual Organic Farming Conference](#), as well as sponsored workshops and training sessions. In total, approximately two dozen presentations are given annually that focus specifically on organic farming issues around the state. Additionally, OFFER researchers have made a concerted effort to distribute their expertise to a national (and international) audience through materials posted to eOrganic. Locally, OFFER is now sponsoring twice-yearly programs in Wooster and Columbus on varying topics to further connect researchers and stakeholders.

Specific examples of organic-focused outreach presentations in 2014 include:

McSpadden Gardener. Organic Inputs-Options and opportunities for Improving Crop Health & Productivity: Webinar. The Ohio State University College of Food Agricultural and Environmental Sciences, *Plant Pathology*. Nov 2014

Debenport, Gillis, McSpadden Gardener. Plant Science Day Open House for K-12 students: What is Organic? The Ohio State University - OARDC, *Plant Pathology*. Oct 2014.

McSpadden Gardener. Organic Farming and Research at the OARDC. The Ohio State University - OARDC, *Plant Pathology*. Aug 2014.

Gillis, McSpadden Gardener. 2014 Organic Crop and Poultry Field Day: Biofertilizers. The Ohio State University - OARDC, *Plant Pathology*. Jun 2014.

Reid G, McSpadden Gardener. 2014 Organic Crop and Poultry Field Day: Oat and Corn Variety Trials. The Ohio State University - OARDC, *Plant Pathology*. Jun 2014.

McSpadden Gardener, Gillis, Debenport, Rotondo. OFFER Spring Symposium: Microbial Biofertilizers and Biopesticide Inputs for Organic Producers. The Ohio State University - OARDC, *Plant Pathology*. Apr 2014.

Miller, Sally A. GPN Plant Health Management Conference: New Biocontrol Concepts and Products for Disease Management. The Ohio State University, *Plant Pathology*. Oct 2014 (Fall Semesters) (Extension).

Web Resources

[The OFFER program maintains a web site](#) with links for researchers and farmers. Several OFFER faculty members are active members in the [eOrganic](#) community of practice. OFFER personnel (e.g. Francis, McSpadden Gardener, Miller, Zwicke) have led several webinars on eOrganic, and written fact sheets have been posted to that web site. OFFER views eOrganic as a major outlet for extension and educational materials.

Additional web resources about organic production in Ohio include:

- [Ohio Ecological Food and Farm Association](#)
- [Small Farm New Farm Internet Resources](#)

Hands-on Learning

Information on the OSU student farm can be found at [the Student Farm Website](#) as well as [on Facebook](#). [Internship and employment](#) opportunities are offered. Inquiries can be directed to Mark Bennett, (ph 614-292-3864), who supervises student farm activities.

Acres Certified Organic

OSU operates more than 50 acres of certified organic research land on four research farms (Fry Farm/Wooster; West and East Badger Farms/Apple Creek; and Hirzel Farm/Findlay). An additional 10 acres of land are in transition. These farms are able to handle both agronomic and horticultural crops (particularly field vegetables). Recent research has also involved use for sheep and chicken pasturing with certain rotations.

Total acres certified, managed organically, or in transition = 60 acres.

Organic Livestock Research

Currently funded research projects involve organic sheep grazing (Francis Fluharty), poultry (Mark Lilburn), dairy management (Steve Loerch) and dairy cow health management (Gustavo Schueneman). Animals are managed organically on station and some projects involve working directly on-farm with producers. More information can be obtained on these projects from the principal investigators listed above.

On-Farm Research

Because of the emphasis on sustainability in a broad sense, many projects that involve on-farm research include both certified as well as non-certified operations. No central reporting is currently active on this point at OSU, but at least four different projects involved at least some on-farm research in 2014. In 2014, there were several OSU faculty members, graduate students and post docs interacting with farmers on various projects, many of which involved both organic and non-organic farms. Research topics include grains, legumes, forages, vegetables, greenhouses/high tunnels, dairy and poultry. On-farm research is substantial, but not yet coordinated with stakeholder organizations to maximize efficiency and impact. A planned organic growers research network would go a long way to improving that.

Key Contacts

- Dr. Brian McSpadden Gardener, Professor, Director, Organic Food & Farming Education & Research, mcspadding-garden.1@osu.edu
- Dr. Steven Culman, Soil Science Program, culman.2@osu.edu
- Dr. Doug Doohan, Professor, Hort. & Crop Sciences, doohan.1@osu.edu
- Dr. Neal Hooker, Professor, Public Affairs, hooker.27@osu.edu
- Dr. Casey Hoy, Professor, Agroecosystems Management Program, hoy.1@osu.edu
- Dr. Mary Gardiner, Associate Professor, Entomology gardiner.29@osu.edu
- Dr. Matt Kleinhenz, Associate Professor, Hort. & Crop Science, kleinhenz.1@osu.edu
- Dr. Michael Lilburn, Professor, Animal Sciences Lilburn.1@osu.edu
- Dr. Sally A. Miller, Professor, Plant Pathology, miller.769@osu.edu
- Dr. P. Larry Phelan, Professor, Entomology, phelan.2@osu.edu
- Dr. Gustavo Schueneman. Assistant Professor, Veterinary Medicine, Gustavo.Schuenemann@cvm.osu.edu
- Alan Sundermeir, OSU Extension, sundermeier.5@osu.edu
- Dr. Yael Vodovotz, Professor, Food Science, vodovotz.1@osu.edu

SOUTH DAKOTA

Organic Research Projects

South Dakota State University (SDSU) has conducted trials evaluating winter wheat varieties for ability to compete with weeds in organic systems. Trials were also conducted looking at flame weeding in research station and on-farm environments for corn and soybean production. Additional research has looked at a new tool that shoots a stream of abrasive particles (e.g. lime or corn cob grit) in the crop row to destroy weed seedlings.

Specific research projects include:

High Quality Forage Blends. Ishwary Acharya, South Dakota State University, David Casper, Faculty Advisor. 2014-2015, Funding: Ceres Trust Graduate Student Grant.

[Sustainable organic tribal bison production system](#), Scott Fausti, SDSU Economics Dept., Flandreau Santee Sioux tribe. 2012, Funding: USDA-OREI.

Optimizing sorghum-sudan/forage soybean cover crop populations and screening sorghum varieties for organic cover crop performance, forage, and seed production in the Northern Great Plains region. Ray Berry. 2010, Funding: SARE.

Corn breeding and sustainability, Wicks, Z. W., SDSU, 2003-2008, Funding: USDA-NIFA.

[Strengthening Grazing Success Through Genetics with Flax in an Organic Environment](#), Angela Jackson-Pride. 2005, Funding: SARE.

Agriculture: Natural resources outreach education program, Melvin, M. (Oglala Lakota College, Kyle, SD). 2001-2005, Funding: USDA-NIFA.

Refereed Publications

Karki, D., J.A. Hall, N.D. Mueller, and P.J. Sexton. 2014. Evaluation of winter wheat genotypes for weed competitiveness and yield under organic production management. *Crop Management* (doi:10.2134/CM-2013-0026-RS).

Extension and Outreach Publications

SDSU Extension publications on organic production include:

- [Organic Agriculture Addressed by SDSU IPM Program](#)
- [Organic Beef Production Costs](#) (ppt)
- [Organic Fruit and Vegetable Producers Are Eligible for Certification Reimbursement](#)
- [Organic Production: Practices and Prevalence](#)
- [What Does “Organic” Mean to a SD Fruit or Vegetable Grower?](#)

Most of SDSU Extension’s publications, applicable to organic production, focus on Integrated Pest Management. [Those found at the SDSU website](#) include:

- [Can Fire Be Used to Control Saltcedar in Northern Grasslands?](#)
- [Do fire and grazing management provide opportunities for saltcedar invasion by allowing increased establishment from seed?](#)
- [Managing Change in Crop Production: Integrated Pest Management](#)
- [Managing Change in Crop Production: Integrated Pest Management Thresholds](#)
- [Managing Change in Crop Production: Management Consultants](#)
- [Biocontrol Insects of Canada Thistle in the Northern Great Plains](#)
- [A Guide to the Common Native and Exotic Thistles of South Dakota](#)
- [I.P.M. Strategies for Grasshopper Control in South Dakota](#)

- [Biocontrol of Noxious Weeds in South Dakota](#)
- [Managing Leafy Spurge Flea Beetle Releases in South Dakota](#)
- [Leafy Spurge Flea Beetle Collection Recommendations](#)
- [Saltcedar: An Environmental Threat](#)
- [Yellow and Dalmation Toadflax](#)
- [Purple Loosestrife and Invasive European Common Reed: Threats to South Dakota's Wetlands and Waterways](#)

Academic Curricula

Kimberly James offers a vegetable production course that includes an organic component. SDSU has an Agroecology course that is taught in the Plant Science Department – this is not specifically organic, but tries to take an ecological view on crop production.

Graduate Student Opportunities

SDSU offers an Agroecology specialization in the Masters in Plant Science program.

Outreach Efforts

SDSU has a summer field day focusing on organic production at Beresford in August, and hosts a [conference](#) for organic and local food producers. The 2-day conference, organized by SDSU faculty and staff, has tracks on organic crop, livestock, and vegetable production.

In addition, SDSU Extension provided a half-day [CSA Mini-School](#) after the 2012 organic conference, and designed and delivered a [webinar series](#) for people interested in establishing school gardens.

There was an [SDSU Southeast Research Farm Organic Plot Tour](#) in 2011, 2012 and 2013.

In 2010, SDSU Extension, along with USDA-IPM/SARE & SDSU-IPM, held a 2-day event, the “[Western Corn Belt Conference for Organic Farmers](#)” in Sioux Falls.

Web Resources

A web search for “[organic farming](#)” at SDSU’s [Hilton M. Briggs Library](#) yields numerous relevant books on file.

[iGrow](#) is the platform used by SDSU Extension to provide web-based program and content delivery.

The South Dakota Department of Agriculture manages the [organic certification cost share program](#) in SD.

SDSU faculty and staff are involved in the [Dakota Local Food Network](#).

Hands-on Learning

There is presently no student organic farm, but graduate students are likely to conduct research on certified organic land at the Southeast Research Farm in Beresford, SD.

Acres Certified Organic

SDSU received certification for an organic research plot in 2012. It is a 4-acre block at the SDSU Southeast Research Farm in Beresford.

Total acres certified, managed organically, or in transition = 4 acres.

Organic Livestock Research

SDSU is conducting organic bison research in cooperation with Flandreau Santee Sioux tribe and Flandreau Indian School.

On-Farm Research

None reported specific to organic production.

Key Contacts

- Rhoda Burrows, SDSU Extension Rapid City, rhoda.burrows@sdstate.edu
- Darrell Deneke, SDSU IPM Coordinator, Darrell.Deneke@sdstate.edu
- Dr. Scott Fausti, Professor, Economics, scott.fausti@sdstate.edu
- Kimberly James, Instructor, Plant Science, kimberly.james@sdstate.edu
- Dr. Peter Sexton, Associate Professor, Sustainable Cropping Systems, Plant Science, Peter.Sexton@sdstate.edu
- Dr. Julie Walker, Associate Professor/Extension Beef Specialist, Julie.Walker@sdstate.edu
- Christina Zdorovtsov, Community Development Field Specialist, SDSU Extension, Christina.Zdorovtsov@sdstate.edu

WISCONSIN

Organic Research Projects

Biochemical Pathway Changes in Pigs Fed GMO Products. Warren Porter, UW-Madison, Department of Zoology, 2015-2017, Funding: Ceres Trust.

Breeding and Testing Corn for Organic Farmers that Combines High N Efficiency, Superior Nutritional Value, and Cross Incompatibility. Walter Goldstein, Mandaamin Institute, 2015-2017, Funding: Ceres Trust.

Northern Organic Vegetable Improvement Collaborative II. Erin Silva and Bill Tracy, 2014-2018, Funding: USDA Organic Research and Extension Initiative.

Assessing Genotype By Environment (G X E) Interaction And Heritability Of Vegetable Crops In Organic Versus Conventional Production Systems. Erin Silva (UW), Jim Myers (Oregon State) and Phillip Simon (UW), 2014-2018, Funding: USDA-NIFA-AFRI Foundational Program.

Alternative Methods for Identifying Optimal Diversification Strategies for Multi-Crop Vegetable Farms. B. Barham, Erin Silva and John Hendrickson, 2014-2016, Funding: Hatch grant.

An Experiential Curriculum to Teach Assessment of Dairy Production, Crops Production, and Integrated Livestock Production Systems Sustainability. Wattiaux, M., E.M. Silva, and A. Morales, 2014-2015, Funding: UW Office of Sustainability.

Optimal Diversification Strategies for Multi-Crop Vegetable Farms in the Upper Midwest. Barham, B., E. Silva, P. Mitchell, and J. Hendrickson, 2014-2017, Funding: USDA-NIFA.

Labor efficiency and mechanization to enhance the profitability of Wisconsin fresh market vegetable farms. Brockel, C., E. Silva, and J. Hendrickson. 2013-2015, Funding: USDA Specialty Crop Block Grant.

Participatory Variety Trials for Flavor, Quality and Agronomic Performance to Increase Direct-Market Opportunities and On-Farm Trialing Capacity for Organic Growers. Grace Healy, UW-Madison, Julie Dawson, Faculty Advisor. 2014-2015, Funding: Ceres Trust Graduate Student Grant.

Chef-farmer-plant breeder collaborative for flavor in organic vegetables. Julie Dawson, 2014-present, Funding: UW Madison Department of Horticulture, CALS and CIAS graduate student grant.

Strategies for effectively using genetic resources in cultivar development for local food systems. Julie Dawson, UW-Madison, 2014-present, Funding: USDA-Hatch

Tomato variety trials for flavor, quality and agronomic performance, to increase high-value direct marketing opportunities for farmers and on-farm trialing capacity. Julie Dawson and Erin Silva, 2014-present, Funding: North Central SARE.

Practical approach to controlling foliar pathogens in organic tomato production through participatory breeding and integrated pest management. Lori Hoagland (Purdue), Micaela Colley (OSA), Jeanine Davis (NCState), Julie Dawson (UW-Madison), Dan Egel (Purdue), Sanjan Gu (NC A&T), Tesfaye Mengiste (Purdue), and Jim Myers (Oregon State), 2014-2017, Funding: USDA-NIFA-OREI.

Open Source Carrots. Claire Luby, UW-Madison, Irwin Goldman, Faculty Advisor, 2014-2015, Funding: Ceres Trust Graduate Student Grant.

Soil carbon and microbial community dynamics in organic cash grain rotations under intensified cover cropping and reduced tillage. Gregg Sanford (UW-Madison Department of Agronomy). 2013-16, Funding: Ceres Trust.

Increasing the sustainability of organic potato production through improved soil, water and weed management and targeted breeding: a participatory approach. Ruth Genger (UW-Madison Department of Plant Pathology). 2013-2016, Funding: Ceres Trust.

Collaborative Release of an Organic Open-Pollinated Sweet Corn (*Zea mays* L.) Variety. Adrienne C. Shelton and William F. Tracy, 2014, Funding: OFRF and USDA OREI (as part of NOVIC).

Reducing Production And Financial Risk Of Organic Forage And Pasture Producers In The Upper Midwest. Erin Silva, 2013-2014, Funding: USDA-Risk Management Education Program.

Use of Mob Grazing and other control options for controlling Canada thistle and alleviating losses in forage quality, quantity and utilization. Anders Gurda, UW-Madison, Mark Renz, Faculty Advisor, 2013-2014, Funding: Ceres Trust Graduate Student Grant.

High tunnel effects on organic production and nutrient management of raspberries (*Rubus idaeus*, L.). Jesse Dahir-Kahel and Rebecca Harbut (UW-Madison Department of Horticulture).

Integrating crop resistance, pathogen ecology and organically-approved fungicides for vegetable crop disease control. Amanda Gevens (UW-Madison Dept. of Plant Pathology). Ongoing, Funding: Wisconsin Potato and Vegetable Growers Association, Wisconsin Fresh Market Vegetable Growers Association, USDA Hatch and USDA NIFA.

Snap bean (*Phaseolus vulgaris* L.) breeding for enhanced nitrogen-use efficiency. Benjamin W. Hughey and James Nienhuis (UW-Madison Department of Horticulture). 2010-2015, Funding: USDA NIFA.

Participatory breeding of open-pollinated varieties of sweet corn for organic production in Wisconsin. Tessa Peters and William F. Tracy (UW-Madison Department of Agronomy). 2013-14, Funding: Ceres Trust Graduate Student Grant.

Recurrent selection for improvement of two open-pollinated sweet corn (*Zea mays* L.) populations. Adrienne C. Shelton and William F. Tracy (UW-Madison Dept of Agronomy). 2008-2013, Funding: OFRF and USDA OREI (as part of NOVIC).

Fertility management of organic sweet corn production on sandy soils. Jaimie West and Matthew D. Ruark (UW-Madison Dept of Soil Science), Jed Colquhoun and Erin M. Silva (UW-Madison Dept of Agronomy) and A.J. Bussan (UW-Madison Dept of Horticulture). 2010-2013, Funding: USDA Hatch.

Weed management in organic potato production. Ruth K. Genger, Doug I. Rouse and A.O. Charkowski (UW-Madison Dept of Plant Pathology). Ongoing, Funding: Internal.

Improving soil health through cover crop based no-till organic vegetable production. Anne Pfeiffer and Jed Colquhoun (UW-Madison Dept of Horticulture), Eric Bietila (UW-Madison Agroecology Master's Program), Erin Silva (UW-Madison Dept of Agronomy), and Amy Charkowski (UW-Madison Plant Pathology). 2012-2014, Funding: USDA AFRI, SARE and Ceres Trust.

Integrating living mulches as a cover cropping strategy for small-scale organic vegetable production. Anne Pfeiffer and Jed Colquhoun (UW-Madison Dept of Horticulture) and Erin Silva (UW-Madison Dept of Agronomy). 2012-2014, Funding: USDA AFRI.

Increasing varietal suitability and availability of cowpea and oilseed radish cover crop seed for northern climates. Erin Silva (UW-Madison Dept of Agronomy). 2012-2015, Funding: SARE.

Seed and Plant Breeding for Wisconsin's Organic Vegetable Sector: Understanding Farmers' Needs and Practices. Alexandra Lyon (UW Nelson Institute for Environmental Studies), Erin Silva (UW Madison Dept of Agronomy), and Michael Bell (UW Madison Dept of Community and Environment Sociology). 2011-2013, Funding: Ceres Trust.

Improving Soil Health Through No-Till Vegetable Production. Anne Pfeiffer, Erin Silva, Faculty Advisor. 2013-14, Funding: Ceres Trust Graduate Student Grant.

Investigation of GMO vs. Organic Diet Effects on Metabolome Profiles in Dairy Cows by NMR Spectroscopy. Ebru Selin Selen, Warren Porter, Faculty Advisor. 2013-14, Funding: Ceres Trust Graduate Student Grant.

[Carrot improvement for organic agriculture with added grower and consumer value](#), Philipp Simon, Erin Silva, Jed Colquhoun (in collaboration with Organic Seed Alliance, University of California, Purdue University and Washington State University). 2012-2016, Funding: USDA-OREI.

Quantifying Relationships Between Soil Quality, Soil Fertility, and Pasture Management and the Productivity of Organic Dairy Pastures and Milk Production, Mark Renz. 2012-2015, Funding: Ceres Trust.

Optimizing No-Till Organic Production to Improve Soil Health and Management of Late-Season Weeds, Erin Silva. 2012-2015, Funding: Ceres Trust.

Cover cropping strategies for small scale, urban organic farms. Erin Silva, Jed Colquhoun, and Anne Pfeiffer. 2011-2015, Funding: USDA-NIFA.

[Crop plant nutrition and insect response in organic field crop production: linking farmer observation to university research and extension](#). Eileen Cullen, Kevin Shelley, Robin Mittenthal, Paul Whitaker. 2010-2014, Funding: USDA-OREI.

[Strategies of pasture supplementation on organic and conventional grazing dairies: assessment of economic, production and environmental outcomes](#), Victor Cabrera, David Combs, Rhonda Gildersleeve, Michel Wattiaux. 2010-2014, Funding: USDA-NIFA-OREI.

Organic and sustainable experiential learning for beginning farmers, Joe Pedretti, (MOSES). 2011-2014, Funding: USDA-NIFA.

[Sustainable Organic Agriculture – A Menominee Legacy](#), Kowalkowski, B., [College of Menominee Nation](#), Keshena, WI. 2012-2014, Funding: USDA NIFA.

[Diversity Prospecting for an Open Source Plant Breeding Framework](#), Claire Luby, UW-Madison. 2013, Funding: SARE.

[Quality Conventional and Organic Malting Barley Production in Wisconsin](#). 2013, Funding: SARE.

[Nitrogen Fertility and Weed Management Interactions in Organic Processing Vegetable Production Systems](#), Bussan, A. J.; Ruark, M. D.; Colquhoun, J.; Silva, E. M., UW-Madison. 2010-2013, Funding: USDA NIFA.

Northern organic vegetable improvement cooperative (NOVIC), Erin Silva and William F. Tracy, 2009-2013, Funding: USDA-OREI.

Evaluation of organically approved fungicides for vegetable crops, Josh Posner, Jon Baldock, John Hall. 2012-2013, Funding: USDA Hatch Formula Fund and Internal Sources.

Evaluation of organically approved pesticides for organic vegetable crops, Russell Groves. 2012-2013, Funding: Internal Sources.

On-farm research with organic graziers, Janet Hedtcke, Josh Posner, Altfred Krusenbaum, Ken Nordlund, Gary Frank, Bob Van De Boom, UW. 1990-2013, Funding: W.K. Kellogg Foundation; SARE; USDA-ARS; and USDA-Dairy Forage Research Center.

Organic and conventional production systems in the long-term Wisconsin Integrated Cropping Systems Trials: productivity, profitability and environmental impact, Janet Hedtcke, Dwight Mueller, Darwin Frye, Jean-Paul Chavas,.1990-2013, Funding: W.K. Kellogg Foundation; SARE; USDA-ARS; and USDA-Dairy Forage Research Center.

Increasing Varietal Suitability and Availability of Cowpea and Forage Radish Cover Crop Seed for Northern Climates, Erin Silva. 2012, Funding: SARE.

Weed and Fertility Interactions in Organic Vegetable Crops, A.J. Bussan, Matt Ruark, Jed Colquhoun, Erin Silva. 2012, Funding: UW Hatch Grant.

Developing farm financial knowledge of beginning and sustainable farmers, Padgham, J. L. (MOSES). 2009-2012, Funding: USDA-NIFA.

Veggie Compa\$\$: Whole farm planning for enhanced profitability of Midwestern organic vegetable growers, Erin Silva, Paul Mitchell, John Hendrickson. 2009-2012, Funding: Ceres Trust.

Developing carbon-positive organic systems through reduced tillage and cover crop-intensive crop rotation schemes, Erin Silva (in collaboration with Iowa State, University of Minnesota, Michigan State and North Dakota State). 2008-2012, Funding: USDA-IOP.

Identifying Potato Varieties with Increased Levels of Mature Plant Resistance to Potato Virus Y for Improved Organic Seed Potato Production, Chen Zhang, (Russell Groves, Major Professor). 2012, Funding: Ceres Trust Graduate Student Grant.

Reducing risk associated with organic snap bean production in Wisconsin, James Nienhuis. 2011-2012, Funding: OFRF and Internal Sources.

[Organic certified seed potato production in the Midwest](#), Amy Charkowski, Ruth Genger, Doug Rouse, Russell Groves, Shelley Jansky. 2009-2012, Funding: USDA-NIFA.

Development of tools and methods for non-invasively tracing the effects of conventional agricultural inputs and determine chemical fingerprints due to metabolic effects of GM alfalfa that could alter the health and productivity of dairy cows. Warren Porter, UW Dept of Zoology. 2011, Funding: FAFO.

Fertility strategies for hoop house-grown organic raspberries, Rebecca Harbut, Jesse Dahir-Kanehl. 2012, Funding: UW College of Agricultural and Life Sciences Annual Fund.

Impact of organic management on dairy animal health and well-being, Pamela Ruegg, Linda Tikofsky, Ynte Schukken (Cornell University); Mike Gamroth (Oregon State University). 2008-2013, Funding: USDA-NIFA.

Safer, Non-Selective Weed Control For Organic Growers And Home Consumers, R. D. Coleman, Summerdale, Inc., Verona, WI. 2008-2013, Funding: USDA NIFA.

Utilizing phylloplanins for the control of fungal and oomycete pathogens in organic potato farming. Amy O. Charkowski. 2011, Funding: Ceres Trust.

Organic seed potato production and participatory breeding, Amy O. Charkowski. 2011-2012, Funding: Ceres Trust.

[Organic Agriculture Program](#), Jaworski, D. M., [Northeast Wisconsin Technical College](#). 2008-2012, Funding: USDA NIFA.

[Identifying Heirloom and Specialty Varieties Resistant to Silver Scurf Disease for Organic Potato Production](#), Chadradhar Mattupalli. 2011, Funding: Ceres Trust.

[Relationships between corn plants and nitrogen fixing bacteria on an organic farm](#), Carrie K Young, Ph.D., Research Director, Michael Fields Agricultural Institute. 2010-2012, Funding: Ceres Trust.

[Benefits of Increasing Grazing Height on Weed Suppression in Management Intensive Rotational Grazing Systems in Wisconsin](#), Marie Schmidt, (Mark Renz, Major Professor). 2010, Funding: Ceres Trust Graduate Student Grant.

[Determination of perceptions and use of organic seed and varieties by Midwestern organic vegetable growers](#), Alexandra Lyon, (Erin Silva, Major Professor). 2010, Funding: Ceres Trust Graduate Student Grant.

Reducing risk associated with organic snap bean production in Wisconsin, James Nienhuis. 2010, Funding: OFRF.

Develop a quantitative assessment to measure the health and genetic consequences of pesticide exposure, Warren Porter, UW-Zoology. 2010, Funding: FAFO.

[Developing High Quality Corn for Sustainable Farmers in the Northern Corn Belt](#), Pollak L M; Goldstein W, Micheal Fields Agricultural Institute. 2008-2010, Funding: USDA ARS.

[Relationship between organic fertility management, plant nutrition, and insect response](#), Robin Mitterthal, UW. 2009, Funding: SARE.

Cover crop selection and use in organic no-till farming, Erin Silva. 2009, Funding: SARE.

Midwest Breeding Project Aims for Cold-Tolerant Sweet Corn, William F. Tracy. 2008, Funding: OFRF.

Identify growth traits and field performance of vegetables grown in certified organic conditions, Erin Silva. 2008, Funding: FAFO.

Midwest Study Highlights Viability of Organic Certified Potato Seed Production, Amy Charkowski. 2008, Funding: OFRF.

Research the production of certified seed potatoes in the Midwest and how to control diseases in organic production, UW-Madison. 2008, Funding: FAFO.

[The Viability of Growing Organic Medicinal Herbs as Alternative Cash Crops for Wisconsin Farmers](#), Brian Fontaine. 2007, Funding: SARE.

[Soil Fertility Strategies on Organic Vegetable Farms](#), John Hendrickson, UW. 2005-2009, Funding: SARE.

[Establishing a Wisconsin Hatchery to Produce and Sell Organically Raised Pastured Poultry Chicks](#), Julia Maro. 2004, Funding: SARE.

[Developing the Upper Mississippi River Valley's Untapped Resource- Organic Maple Syrup](#), Eric Meyer, Organic Maple Cooperative. 2004, Funding: SARE.

[Socioeconomic Analysis of Organic, Grass-Based & Conventional Dairy Farmers in Wisconsin with Case Study in Amish Stewardship Practices in the Kickapoo Valley](#), Caroline Brock, UW. 2004, Funding: SARE.

[Microbial Inoculant Treatments as an Alternative Spray for Disease Control that Reduces the Toxicity and Use of Copper in Organic and Sustainable Viticulture](#), Patricia Iubelt, Maple Ridge Vineyards. 2003, Funding: SARE.

[The Use of Movable High Tunnels in the Organic Production of Strawberries, Potatoes, and Raspberries](#), Daniel Mielke. 2002, Funding: SARE.

Relationships between corn plants and nitrogen fixing bacteria on an organic farm. Carrie Young, (Michael Fields Agricultural Institute). 2009-2012, Funding: Ceres Trust.

Developing high quality corn for sustainable farmers in the northern corn belt, Pollak L M; Goldstein W. (Michael Fields Agricultural Institute). 2008-2010, Funding: USDA.

Dr. Jason Mills at St. Norbert College in De Pere, WI, is conducting research on the impact of organic farms on biodiversity of wild areas.

Organic Valley, LaFarge WI, operates the [Farmers Advocating for Organics](#) (FAFO) grant program, which is open to applicants seeking funding for projects or programs that are oriented towards protecting, safeguarding, and advancing organic agriculture and organic marketplace through research, advocacy and/or education.

Refereed Publications

Examples of organic-related articles by UW faculty include:

Viesselmann, L.M., B. D. DeVries, H.G. Dodson, and W.F. Tracy. 2014. Recurrent selection for seedling growth in sweet corn (*Zea mays* L.) in cool temperatures. *Crop Science* 2014 54: 3: 1033-1040

Costa, S., Zepeda, L, and Sirieix, L. 2014. "Exploring the social value of organic food: A qualitative study in France" *Int'l Journal of Consumer Studies* (38) no 3, 228-237.

Seidl Johnson, A.C., Jordan, S.A., Gevens, A.J. 2014. Efficacy of organic and conventional fungicides and impact of application timing on control of tomato late blight caused by US-22, US-23, and US-24 isolates of *Phytophthora infestans*. *Plant Disease*. First Look doi.org/10.1094/PDIS-04-14-0427-RE.

Seidl Johnson, A.C., Jordan, S.A., Gevens, A.J. 2014. Novel resistance in heirloom tomatoes and effectiveness of resistance in hybrids to *Phytophthora infestans* US-22, US-23, and US-24 clonal lineages. *Plant Disease* 98:761-765.

- Dutreuil, M., M. Wattiaux, C. A. Hardie, and V. E. Cabrera. 2014. Feeding strategies and manure management for cost effective mitigation of greenhouse gas emissions from dairy farms in Wisconsin. *Journal of Dairy Science* 97:5904-5917.
- Hardie, C., M. Wattiaux, M. Dutreuil, R. Gildersleeve, N. Keuler, and V. E. Cabrera. 2014. Feeding strategies on certified organic dairy farms in Wisconsin and their impact on milk production and income over feed costs. *Journal of Dairy Science* 97:4612-4623.
- Mattupalli, C., R. K. Genger, A. O. Charkowski. 2013. Evaluating incidence of *Helminthosporium solani* and *Colletotrichum coccodes* on asymptomatic organic potatoes and screening potato lines for resistance to silver scurf. *Amer. J. Potato Res.* 90:369-377.
- Rice, R.R. and W.F. Tracy. 2013 Combining ability and acceptability of temperate sweet corn Inbreds Derived from Exotic Germplasm. *Journal Amer. Soc. Hort. Sci.* (accepted)
- Shelton, A.C. and W.F. Tracy. 2013 Genetic Variation and Phenotypic Response of 15 Sweet Corn (*Zea mays* L.) Hybrids to Population Density. *Sustainability* 5:2442- 2456; doi:10.3390/su5062442
- Zystro, J.P., N. de Leon, and W.F. Tracy. 2012. Analysis of Traits Related to Weed Competitiveness in Sweet Corn (*Zea mays* L.) *Sustainability* 4:543-560; doi:10.3390/su4040543
- Renz, M. J. and M. Schmidt (In press) The effects of increasing grazing height on establishment of common weeds in rotationally grazed pastures. *Weed Science*.
- Silva, Erin and Geraldine Muller. 2012. Creating a Collaborative, Hands-on Program to Teach High School Students Organic Farming: A Case-Study Partnership of a Land-Grant University and a Public School. *HortTechnology*.
- Silva, Erin. 2012. Management of five fall-sown cover crops for organic no-till production in the upper Midwest. *Renewable Agriculture and Food Systems*.
- Mattupalli, C., R. K. Genger, and A. O. Charkowski. 2012. *Helminthosporium solani* and *Colletotrichum coccodes* co-occurrence in organically grown asymptomatic and symptomatic potatoes. *Plant Disease*.
- Reilly, K., E. Cullen, T. Lola-Luz, D. Stone, J. Valverde, M. Gaffney, N. Brunton, J. Grant and BS Griffiths. 2012. Effect of organic, conventional and mixed cultivation practices on soil microbial community structure and nematode abundance in a cultivated onion crop. *Journal of the Science of Food and Agriculture*.
- Cullen, E.M. and K.M. Holm. 2012. Aligning insect IPM programs with a cropping systems perspective: Cover crops and cultural pest control in Wisconsin organic corn and soybean. *Journal of Sustainable Agriculture*.
- Schmidt, N.P., M.E. O'Neal, P.F. Anderson, D. Lagos, D. Voegtlin, W. Baily, P. Caragea, E. Cullen, C. DiFonzo, K. Elliott, C. Gratton, D. Johnson, C.H. Krupke, B. McCornack, R. O'Neil, D.W. Ragsdale, K.J. Tilmon and J. Whitworth. 2012. Spatial distribution of *Aphis glycines* (Hemiptera: Aphididae): A summary of the suction trap network. *Journal of Economic Entomology* 105:259-271.

- Barham, Bradford L., Mercedes Callenes, Seth Gitter, Jessa Lewis, and Jeremy Weber. 2011. Fair Trade/Organic Coffee, Rural Livelihoods, and the 'Agrarian Question': Southern Mexican Coffee Farmers in Transition, *World Development* 39(1):134-145.
- Greenway, G, J Guenther & R Genger. 2011. Cost of producing organic fresh potatoes and seed potatoes in the Midwest. University of Idaho AE Series 2011-04.
- Genger, R., E. Mueller, R. Groves, S. Jansky, D. Rouse and A. Charkowski, 2011. Production of healthy seed potatoes on organic farms. Poster presentation at MOSES Organic Farming Conference, February 24-26, 2011 La Crosse WI.
- Mueller, E., R. Genger, A. Charkowski, and R. Groves, 2011. The effect of mixed cropping systems on winged aphid dispersal and Potato virus Y spread in organic potato crops. Poster presentation at MOSES Organic Farming Conference, February 24-26, 2011. La Crosse WI.
- Charkowski, A., R. Genger, R. Groves, E. Mueller, J. Guenther, 2011. Production of healthy seed potatoes on organic farms. *Phytopathology* 101:S31. Annual Meeting, American Phytopathological Society, Aug 6-11, 2011. Honolulu HI.
- Cullen, E.M. 2010. Extension specialist roles in communities of interest and place: An example from the agriculture-wildlife interface. *Journal of Extension* 48(1): 1FEA2.
- O'Neal, M., K. Johnson, E. Hodgson, D. Ragsdale, I. MacRae, B. Potter, C. DiFonzo, K. Tilmon, E. Cullen, P. Glogoza and B.P. McCornack. 2010. Comment on "Soybean Aphid Population Dynamics, Soybean Yield Loss, and Development Stage-Specific Economic Injury Levels" by M.A. Catangui, E.A. Beckendorf, and W.E. Riedell. *Agronomy Journal* 101: 1080-1092 (2009). *Agronomy Journal* 102: 55-56.
- Chavas, J-P, Posner, J and Hedtcke, J L, 2009. Organic and Conventional Production Systems in the Wisconsin Integrated Cropping Systems Trial: II. Economic and Risk Analysis 1993–2006. *Agron. J.* 101:288-295.
- Hsieh, M., P. Mitchell, K. Stiegert. 2009. "Potato Demand in an Increasingly Organic Marketplace" *Agribusiness: An International Journal* 25(3):369-394.
- Posner, J. L., Frank, G. G., Nordlund, K.V., and R. T. Schuler, 2009. A Constant Goal, Changing Tactics: The Krusenbaum Dairy Farm (1996-2005). *Journal of Renewal Agriculture and Food Systems* 24(1); 8-18.
- Ruark, M.D., S.M. Brouder, and R.F. Turco. 2009. Dissolved organic carbon losses from tile drained agroecosystems. *J. Environ. Qual.* 38:1205-1215.
- Ruegg, P.L., 2009. Management of Mastitis on Organic and Conventional Dairy Farms. *Journal of Animal Science.* 87:43-55.
- Cullen, E.M., J.K. Stute, K.L. Raymond and H.H. Boyd. 2008. Farmers' perspectives on IPM field scouting during a period of pest range expansion: a case study of variant western corn rootworm (Coleoptera: Chrysomelidae) in Wisconsin. *American Entomologist* 54:170-178.
- Kraiss, H. and E.M. Cullen. 2008. Insect growth regulator effects of azadirachtin and neem oil on survivorship, development and fecundity of *Aphis glycines* (Homoptera: Aphididae) and its predator, *Harmonia axyridis* (Coleoptera: Coccinellidae). *Pest Management Science* 64:660-668.

- Kraiss, H. and E.M. Cullen. 2008. Efficacy and non-target effects of reduced-risk insecticides on *Aphis glycines* (Hemiptera: Aphididae) and its biological control agent, *Harmonia axyridis* (Coleoptera: Coccinellidae). *Journal of Economic Entomology* 101:391-398.
- Copas, M. E., A. J. Bussan, M. J. Drilias, and A. O. Charkowski. 2008. Influence of compaction and subsoil tillage on soil conditions and pink eye. *Am. Potato J.* 85:342-352.
- Cho, S., C.P. Fossler, F. Diez-Gonzalez, S. J. Wells, C. W. Hedberg, J. B. Kaneene, P. L. Ruegg, L. D. Warnick, and J. B. Bender. 2007. Antimicrobial susceptibility of shiga toxin-producing *Escherichia coli* isolated from organic dairy farms, conventional dairy farms, and county fairs in Minnesota. *Foodborne Path* 4:178-186.
- Pol M, and P. L. Ruegg. 2007. Treatment practices and quantification of antimicrobial usage in conventional and organic dairy farms in Wisconsin. *J Dairy Sci* 90:249-261.
- Pedersen, P., C. Grau, E. Cullen, N. Koval and J. Hill. 2007. Potential for integrated management of soybean virus disease. *Plant Disease* 91:1255-1259.
- Ragsdale, D. W., B. P. McCornack, R. C. Venette, B. D. Potter, I. V. MacRae, E. W. Hodgson, M. E. O'Neal, K. D. Johnson, R. J. O'Neil, C. D. Difonzo, T. E. Hunt, P. A. Glogoza, and E. M. Cullen. 2007. Economic threshold for soybean aphid (Hemiptera: Aphididae). *Journal of Economic Entomology* 100:1258-1267.
- Hodgson, E.W., B.P. McCornack, K.A. Koch, D.W. Ragsdale, K.D. Johnson, M.E. O'Neal, E.M. Cullen, H.J. Kraiss, C.D. DiFonzo and L.M. Behnken. 2007. Field validation of speed scouting for soybean aphid. *Crop Management* [online], doi:10.1094/CM-2007-0511-01-RS.
- Ray KA, LD Warnick, R Mitchell, JB Kaneene, PL Ruegg, SJ Wells, CP Fossler, Halbert LW, and K May. 2006. Antimicrobial susceptibility of *Salmonella* from organic and conventional dairy farms. *Journal of Dairy Science* 89: 2038-2050.
- Halbert LW, JB Kaneene, PL Ruegg, LD Warnick, SJ Wells, Mansfield LS, CP Fossler, AM Campbell and AM Geiger-Zwald. 2006. Evaluation of antimicrobial susceptibility patterns in *Campylobacter* spp isolated from dairy cattle and farms managed organically and conventionally in the Midwestern and northeastern United States. *J Am. Vet. Med. Assoc.* Apr 1;228(7):1074-81.
- Cullen, E.M. and F.G. Zalom. 2006. *Euschistus conspersus* female morphology and attraction to methyl (2E, 4Z)-decadienoate pheromone-baited traps in processing tomatoes. *Entomologia Experimentalis et Applicata* 119:163-173.
- Halbert LW, JB Kaneene, Linz J, Mansfield LS, D Wilson , PL Ruegg, LD Warnick, SJ Wells, CP Fossler, AM Campbell and AM Geiger-Zwald. 2005. Genetic mechanisms contributing to reduced tetracycline susceptibility of *Campylobacter* isolated from organic and conventional dairy farms in the Midwestern and Northeastern United States. *Food Prot.* 2006 Mar;69(3):482-488.
- Cullen, E.M. and F.G. Zalom. 2005. Relationship between *Euschistus conspersus* (Hem., Pentatomidae) pheromone trap catch and canopy shake samples in processing tomatoes. *Journal of Applied Entomology* 129:505-514.

Fossler CP, SJ Wells, JB Kaneene, PL Ruegg, LD Warnick, JB Bender, LE Eberly, SM Godden and LW Halbert. 2005. Herd-level factors associated with isolation of *Salmonella* in a multi-state study of conventional and organic dairy farms. I. *Salmonella* shedding in cows. *Prev. Vet Med.* 70:257-277.

Fossler CP, SJ Wells, JB Kaneene, PL Ruegg, LD Warnick, JB Bender, LE Eberly, SM Godden, and LW Halbert. 2005. Herd-level factors associated with isolation of *Salmonella* in a multi-state study of conventional and organic dairy farms. II. *Salmonella* shedding in calves. *Prev. Vet Med.* 70:279-291.

Fossler CP, SJ Wells, JB Kaneene, PL Ruegg, LD Warnick, LE Eberly, SM Godden, LW Halbert, AM Campbell, CA Bolin and AM Geiger-Zwald. 2005. Cattle and environmental sample-level factors associated with the presence of *Salmonella* in a multi-state study of conventional and organic dairy farms. *Prev Vet Med* 67:39-53.

Millar J.G., H.L. McBrien, H.-Y. Ho, R.E. Rice, E. Cullen, F.G. Zalom, and A. Uokl. 2002. Pentatomid bug pheromones in IPM: possible applications and limitations. *Bulletin of the International Organization of Biological Control, Pheromone Working Group* 25:1-11.

McBrien, H.L., J.G. Millar, R.E. Rice, J.S. McElfresh, E. Cullen, and F.G. Zalom. 2002. Sex attractant pheromone of the redshouldered stink bug *Thyanta pallidovirens*: A pheromone blend with multiple redundant components. *Journal of Chemical Ecology* 28:1785-1806.

Extension and Outreach Publications

- Characteristics of organic, grazing, and conventional dairy farms in the state of Wisconsin (tool)
- [Animal Health Regulations for Organic Dairy Herds](#) (video)
- [Becoming a Certified Organic Producer](#)
- [Biological Control of Insects and Mites: An Introduction to Beneficial Natural Enemies and Their Use in Pest Management](#)
- [Direct Marketing: What is Organic Agriculture?](#)
- [Economic Impact of the Organic Sector in Wisconsin and Beyond](#)
- [Influence of Preharvest Factors on Postharvest Quality](#)
- [Insect IPM in Organic Field Crops: Seedcorn Maggot](#)
- [Integrated Pest Management in Organic Field Crops Webinar](#)
- [Mid-scale food value chains case study: Organic Valley \(Research Brief #80\)](#)
- [Organic Agriculture in Wisconsin: 2012 Status Report](#)
- [Overview of Organic Cranberry Production](#)
- [Perceptions of Disease by Organic Dairy Producers – Preliminary Results of a Multistate Study](#)
- [Respiration and Ethylene and their Relationship to Postharvest Handling](#)
- [Scaling Up: Meeting the Demand for Local Food](#)

- [Toward a Sustainable Agriculture](#), a curriculum for high school students and teachers
- [Treatment of Disease by Organic Dairy Farmers – Preliminary Results of a Multistate Study](#)
- [Use of Veterinarian on Organic Dairy Farms – Preliminary Results of a Multistate Study](#)
- [Veggie Compass: Whole Farm Profit Management Webinar](#)
- [Wisconsin College and University Programs and Projects in Sustainable Agriculture](#) (2009)

The UW-Madison Department of Agronomy conducts field trials of organic and conventional corn varieties annually at several locations around the state. Results are posted at: <http://corn.agronomy.wisc.edu/HT/>

Academic Curricula

UW-Madison does not offer an organic or sustainable agriculture undergraduate [major](#). Organic courses offered include: Agroecology I: The farm as a socio-environmental endeavor (3 cr.); Agroecology II: Agriculture's social contract (3 cr.); Hort 410 Colloquium in Organic Agriculture (1 cr.); and Plant Path 375 Organic and Urban Production (3 cr). Other classes have been offered on a more irregular basis.

UW-Madison is creating a spring course (Organic and Urban Agriculture) for students under the Sustainability Initiatives in Research and Education grant (Charkowski, Silva, Colquhoun, Bell, Ventura, and Bussan).

“Food systems, Sustainability and Climate Change” is a new course offered in 2015 by UW-Madison focusing on a comparative case study of carbon footprint of organic vs. conventional milk production in Wisconsin.

UW-River Falls offers a [sustainable agriculture minor](#) within its BS degree in Crop and Soil Science. New courses developed for the program address environmental sustainability, organic agriculture, rural sociology, integrated pest management, sustainable agriculture law and sustainable animal production.

Northeast Wisconsin Technical College, Green Bay, offers an eight-credit [certificate program in organic agriculture](#). In addition, the college provides non-degree professional development opportunities in sustainable agriculture and local, organic and sustainable foods. NWTC offers the most comprehensive collection of organic production courses of any institution reviewed for this report – [Organic & Sustainable Agriculture and Food Courses 2012](#).

UW-Marathon County has offered an interdisciplinary course on “Social and Scientific Aspects of Organic Agriculture” on campus and via compressed video at UW Fox Valley in Menasha.

Madison Area Technical College (MATC) has offered a stand-alone, 3-credit organic farming course taught by an organic farmer and a PhD candidate studying sustainable agriculture.

[Toward a Sustainable Agriculture](#) is a free high-school curriculum developed by the UW Center for Integrated Agriculture Systems that addresses the social, environmental and

economic impacts of agriculture. The curriculum provides a critical analysis of agricultural and food systems, and helps students understand new concepts through hands-on examples.

Graduate Student Opportunities

The UW [Agroecology](#) Master's Program, while not specifically organic, stresses organic concepts; has trained [grad students](#) in organic projects; and posts announcements of upcoming Masters student [seminars](#).

The UW Horticulture Department has a Masters Degree in Horticulture with emphasis in [Organic Sustainable Production](#).

Graduate students are often engaged in the organic-focused research of individual PI's or teams of PI's.

Graduate students from UW initiated the planning of the first annual [Student Organic Seed Symposium](#) (in part sponsored by Ceres Trust, Seed Matters, and Vitalis Seed).

Outreach Efforts

The UW [Center for Integrated Agriculture Systems](#) (CIAS) has a strong commitment to organic agriculture. While not solely focused on issues of the organic ag community, CIAS places a strong focus on serving the organic ag sector, through presence at conferences, development of outreach materials, organizing organic activities at UW, and spearheading grant opportunities.

CIAS has compiled a series of very detailed "[Values-Based Food Supply Chain Case Studies](#)," many of which focus on organic operations.

A UW-Madison scientist, Erin Silva, in her role as chair of the Organic Working Group of the American Society of Horticultural Science, led the planning of a daylong symposium at the 2014 ASHS Annual Conference, "A Decade of Progress in Organic Agriculture Science, Teaching, and Extension," with financial support from FAFO and SARE.

[Annual UW Agroecology Plays](#) (flyer)

[Fertility Strategies for Organic Vegetables—Wisconsin](#)

[GrassWorks Grazing Conference](#)

[Loving of the Land Agroecology Benefit Concert](#) (poster)

[Michael Bell Interview: Agroecology program distinctive](#) (podcast)

[Midwest CSA Conference](#)

[The Organic Apple Grower Hour](#)

[The Organic Farming Conference](#) (MOSES)

[UW Organic Field Day](#)

NOVIC Variety Trial Field Days and Plant Breeding/Seed Saving Workshops

In 2015, UW-Madison will host the Student Organic Seed Symposium, which is run and organized by students and focuses on organic seed issues.

Web Resources

- [Center for Integrated Agricultural Systems](#)
- [Consumer's Guide to Organic Food](#)
- [Driftwatch](#)
- [Growing Power, Inc.](#)
- [Herd Health and Well Being](#)
- [Local Food Resources in Western Wisconsin](#)
- [Michael Fields Agricultural Institute](#)
- [Midwest Organic and Sustainable Education Services](#)
- [Organic Certification Cost-Share Program](#)
- [Organic Potato Project](#)
- [Organic Valley](#)
- [Project C.O.W.](#)
- [SavorWisconsin.com](#)
- [Wisconsin Organic Advisory Council](#)
- [Wisconsin Organic Farm & Business Directory](#)

Hands-on Learning

FH King Students for Sustainable Agriculture manage a [non-certified organic student farm](#). FH King has [paid internships](#) at the student organic farm. And it has [hands-on workshops for students](#).

UW-Madison offers an Organic [Study abroad](#) opportunity, [online at this page](#).

UW-Madison is creating a summer internship “cohort” for students involved in sustainable agriculture, including organic, under the Sustainability Initiatives in Research and Education grant (Charkowski, Silva, Colquhoun, Bell, Ventura, and Bussan).

[UW Fox Valley](#)'s experiential learning opportunities involve students in local and organic food events and resource preparation, community garden projects, and school food and waste management.

The [UW-Stevens Point Global Environmental Management](#) (GEM) program on Sustainable Agriculture and Forestry offers a “Farmer Incubator” class, which provides opportunities for students to learn through farm visits, internships, and hands-on projects, as well as classroom learning. UW-SP students run an organic garden as well as a student-administered café (cps café) on campus that focuses on using organic/local sources.

Milwaukee's [Growing Power](#) provides hands-on training, on-the-ground demonstration, and outreach and technical assistance through the development of Community Food Systems.

Acres Certified Organic

UW-Spooner Agricultural Research Station (ARS) – 20 acres in transition

UW-Arlington ARS – 22 acres certified organic, 70 acres in transition, and 17 acres organically managed as part of a long-term research trial

UW-West Madison – 10 acres certified organic, will transition 10 more

UW-Hancock – 14 acres organically managed

Total acres certified, managed organically, and in transition = 163 acres.

Organic Livestock Research

All organic livestock research conducted by the UW has been on-farm, with the UW having no certified organic animals at this time.

On-Farm Research

UW-Madison operates a robust on-farm research program, where participatory research is emphasized. At least five faculty members and numerous graduate students are conducting research at 35 organic farms focused on grain, legume, forage, vegetable, and dairy production.

Key Contacts

- Dr. A. J. Bussan, Professor, Horticulture, ajbussan@wisc.edu
- Dr. Victor Cabrera, Assistant Professor, Dairy Science, vcabrera@wisc.edu
- Dr. Amy Charkowski, Associate Professor, Plant Pathology, amyc@plantpath.wisc.edu
- Dr. Jed Colquhoun, Professor, Horticulture, colquhoun@wisc.edu
- Dr. Julie Dawson, Assistant Professor, Horticulture, dawson@hort.wisc.edu
- Dr. Amanda Gevens, Assistant Professor, Plant Pathology, gevens@wisc.edu
- Dr. Rhonda Gildersleeve, UW-Extension Grazing Specialist, rhonda.gildersleeve@ces.uwex.edu
- Dr. Russell Groves, Associate Professor/Extension Specialist, Entomology, groves@entomology.wisc.edu
- Dr. Rebecca Harbut, Assistant Professor, Horticulture, harbut@wisc.edu
- Janet Hedtcke, Research Support, Agronomy, jlrieste@facstaff.wisc.edu
- Dr. Mark Renz, Assistant Professor, Agronomy, mrenz@wisc.edu
- Dr. Matt Ruark, Assistant Professor, Soil Science, mdruark@wisc.edu
- Dr. Pamela Ruegg, DVM, MPVM, Professor, Dairy Science, plruegg@facstaff.wisc.edu
- Dr. Erin Silva, Assistant Professor, Plant Pathology, emsilva@wisc.edu
- Dr. Philipp Simon, Professor, Horticulture, USDA-ARS, philipp.simon@ars.usda.gov
- Dr. Bill Tracy, Professor, Agronomy, wfracy@wisc.edu

Appendix: Author's Observations and Comments

The amount of organic research being conducted; the amount of land and animals used for organic research; the number of organic courses, field days, workshops, and conferences; and the number of peer-reviewed articles, extension publications and web resources all contribute to the growth of organic agriculture in the North Central Region. However, there are still research gaps, including, but not limited to:

- Organic livestock systems, focused on integrated soil/crop/livestock relationships, multi-species systems, and outdoor access;
- Organic poultry production, including alternatives to DL-methionine;
- Role of soil health in plant and animal disease prevention;
- Composting and natural resource recycling;
- Organic seed and livestock breeding programs;
- Impacts of genetically engineered crops and products on organic production systems, and effective methods to prevent contamination;
- Pesticide impacts on organic production, ecosystems, and human health;
- Use of organic practices to protect ground- and surface-water quality;
- Irrigation water quality, quantity and conservation for organic production;
- Efficacy of NOP-approved crop and livestock inputs;
- Alternatives to antibiotics for management of fire blight in apples and pears;
- Climate change mitigation and adaptation, including the impacts of drought, flood and extreme weather events;
- Use of perennials in organic systems;
- Pollinator protection, biodiversity enhancement and natural resource conservation in organic systems;
- Sustainable energy systems for organic farms and processing facilities;
- Organic food processing innovations focused on organic products produced in the North Central Region;
- Development of organic forms of allowed non-organic ingredients;
- Nutritional content of organic crops and foods;
- Connections between agricultural practices and public health; and
- Successful strategies to facilitate organic transition by existing conventional farmers; beginning farmers; and immigrant populations.

Once again, the author observed that organic programs are well supported and coordinated at some institutions in the North Central Region, while others lack sufficient institutional support. At the most functional universities, faculty from multiple disciplines, including agronomy, horticulture, soil science, animal science, veterinary medicine, economics, and

food science, collaborate on organic research projects. To a lesser extent, faculty from agricultural engineering, natural resource sciences, rangeland management, and public health are involved.

Exemplary institutions have robust organic outreach programs, with dedicated staff, stakeholder advisory bodies, on-farm research programs, qualified research technicians, engaged, supportive administrators, and multi-state research projects.

Many opportunities exist to expand existing collaborations--within universities and Extension; with other universities and colleges in the region; with non-governmental organizations and state departments of agriculture; and with and between federal agencies, including the Agricultural Research Service (ARS), Natural Resource Conservation Service (NRCS), Risk Management Agency (RMA), Economic Research Service (ERS), National Ag Library (NAL), and National Organic Program (NOP).

The innovations in research, outreach, information delivery, administration, and multi-disciplinary cooperation at institutions with exemplary organic programs, as evidenced in this report, may be seen as models for researchers and administrators to improve the systems and practices at their institutions.

This report may also serve as a resource in the development of an interactive regional, or national, Organic Agriculture Library, where descriptions of organic research projects; research findings; refereed articles; Extension publications; outreach activities; researchers; web sites; and other resources are catalogued and made available to the public.

Jim Riddle
Organic Independents, LLP
February 2015



www.cerestrust.org