Organic Research and Outreach in the North Central Region

February 2014

Organic Research and Outreach in the North Central Region – 2014

Forward

There are nearly 2000 acres of university land being used for organic research in the North Central Region1 (NCR). As markets for organic products continue 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.

Prior to the 2002 implementation of the 1990 Organic Foods Production Act, land grant universities had been slow to embrace organic agriculture and provide support in their 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 followup 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.

The Ceres Trust report, "Organic Research and Outreach in the North Central Region - 2014," documents the growth in organic research, extension 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 education efforts of nonprofit organizations; and other relevant information.

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 complied 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 produced with environmentally-sound methods; and to the consumers who support organic food and farming and help make this progress possible.

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

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Acknowledgements

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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 in the early stages of development, others have well-developed, 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.

Organized alphabetically by state, the report has each state's chapter hyperlinked from the state's name in the Table of Contents and in the "highlights" section of the Executive Summary. In descending chronological order, the report contains brief descriptions of recent and current 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. 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.

Executive Summary

This report finds that 1,986.48 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 now 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.

Specific highlights of this report include:

Illinois The University of Illinois has conducted quite a bit of 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.

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, and Ball State and Goshen College have sustainable ag classes. Purdue now has a website with research and resources applicable to organic livestock production.

Iowa Iowa State University continues to operate a well-established, 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 and cooperate with ISU's organic research and outreach programs.

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2 To go directly to the chapter report for each state, click on the name of the state at the beginning of that state's paragraph in the Executive Summary.

Kansas There has been some forward movement in organic research activities at Kansas State University, led by 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 have focused on soil microbes and tomato grafting. To date, KSU has not organized any organic farming conferences or annual field days.

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 day-long 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 nearly 1050 acres used for organic research, 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 and Lincoln University, the only 1890 land grant university in the North Central Region. The University of Missouri has not historically been a leader in organic farming research, but, in recent years, MU has launched several new organic research projects. In addition, MU has conducted numerous outreach events focused on organic production. Organic research and outreach at Lincoln University takes place primarily at the Busby Research and Integrated Farm, a 280-acre farm used for organic and integrated systems research. Faculty from Lincoln University are actively engaged in Extension outreach for minority farming communities in Missouri.

Nebraska Organic crop research is conducted on certified organic land in three of Nebraska's four eco-regions. Unique areas of inquiry at the University of Nebraska-Lincoln include: biodiversity conservation on working organic farms; organic management impacts on breeding bird populations; and flame weeding. The UNL has developed a Healthy Farm Index for long-term, ecological monitoring of biodiversity indicators and land use patterns. UNL faculty and staff are actively engaged with organic producers and organizations throughout Nebraska.

North Dakota The overall theme for organic research at North Dakota State University is "The Search for Agricultural Sustainability in the Northern Great Plains." Quite a bit of 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 and other organic producers 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, with plans for flame weeding trials. SDSU faculty 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 producers with tracks on organic crop, livestock, and vegetable production.

Wisconsin Wisconsin is home to robust, multi-disciplinary organic research, education, and outreach, led by faculty from the University of Wisconsin-Madison. Quite a bit of 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.

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Illinois

Organic Research Projects

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

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: The 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: The 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 posted at: http://www.wiu.edu/cbt/agriculture/farms/organic/research.php

Refereed Publications

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. In press.

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. In press.

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. Online publication: http://dx.doi.org/10.5304/jafscd.2013.034.010.

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 proceeding snap pea. HortTechnology 14(3):349-355.

Extension and Outreach Publications

Extension organic content is maintained as part of the Small Farms Educators Page - http://web.extension.illinois.edu/smallfarm/cat138_3952.html

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

Ellen Phillips, Extension Educator, Local Food Systems and Small Farms, Cook County Unit, ephillps@illinois.edu

Michelle Wander from the U of IL has written numerous Extension publications on soil management in organic systems, posted at: http://www.extension.org/organic_production

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 an "Agroecology" concentration within the Crop Sciences major and a "Specialty Crops" concentration in Horticulture 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.

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 Agriculure 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.
http://agroecologyandsustainableagriculture.org/asap-scholars-program/

Outreach Efforts

U of IL 2013 Agroecology and Sustainable Agriculture's Earth Day Symposium - Understanding and Addressing the GE Crop Critique

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.

2014 Small Farms Winter Webinar Series will include 4 sessions (out of 12) covering organic themes. http://web.extension.illinois.edu/lms/extnews/i8770_144.html

The U of IL Department of Crop Sciences organizes an Organic Gardening Day.

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 http://agroecologyandsustainableagriculture.org/
- U of IL Extension Small Farms Program http://web.extension.illinois.edu/smallfarm/organic.html
- U of IL Library Sustainability/Organic Agriculture Resources - http://www.library.illinois.edu/funkaces/links/linkslist.php?Parent=717Category=7FamilyFarmed.org
- Organic content maintained as part of the Small Farms Educators Page http://web.extension.illinois.edu/smallfarm/ http://web.extension.illinois.edu/smallfarm/cat138_3952.html
- Growing Home
- Illinois Natural History Survey
- Illinois Organic Growers Association - http://illinoisorganicgrowers.org/
- Illinois Stewardship Alliance
- The Land Connection
- Wander Soil Ecology Lab

Hands-on Learning

The Illinois Sustainable Student Farm is in the second year of transition to certified organic production on at least half of the six acres.
http://thefarm.illinois.edu/

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 ten acres on the campus research farm to long-term certified organic production, in addition to three acres at the Illinois Sustainable Student Farm.

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 = 93 acres.

Organic Livestock Research

None.

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- Dr. Michelle Wander, Professor, U of IL, mwander@illinois.edu
- Dr. Sam Wortman, Assistant Professor, U of IL, swortman@illinois.edu

Indiana

Organic Research Projects

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

Farmer, J., Chancellor, C., Robinson, J. West, S., and Weddell, S. (In press). Agrileisure: Farmers' Markets, CSAs, and the privilege in eating local. Journal of Leisure Research.

Hoagland, L., Navazio, J., Cerruti, N., Maynard, L., Kaplan, I., Gibson, K (in press). Breeding regionally adapted fresh-market tomato varieties for organic production systems in the Midwestern U.S (In press). 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: https://www.ifama.org/events/conferences/2012/cmsdocs/Symposium/PDF%20Symposium%20Papers/538_Paper.pdf.

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., Sirrine, 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 includes a day-long pre-conference workshop on "Growing Organic," that will cover many questions fruit and vegetable growers have about growing organically. The topics of organic certification, pests, and soil management will be 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 listserve 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 https://ag.purdue.edu/Extension/smallfarms/Pages/default.aspx
- 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.
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 (http://www.indiana.edu/~sustain/programs/campus-garden-initiative/index.php and http://www.indiana.edu/~sustain/programs/campus-garden-initiative/edible-campus-initiative.php) promote interactive, edible campus gardening spaces that utilize organic growing practices. In addition, SPROUTS (https://twitter.com/SPR0UTS) 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.

Key Contacts

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- Dr. Liz Maynard, Clinical Assistant Professor and Extension Specialist, Purdue, emaynard@purdue.edu

Iowa

Iowa State University Organic Research Projects

Improving Organic No-Till Systems for Enhanced Soil Quality and Weed Management in Organic Vegetable and Grain/Forage Systems, Kathleen Delate, 2012-2015, Funding: The 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), 2009-2010, 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.

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.

Extramural Research Projects

Constraints to Profitability of Small Grains in Iowa and the Upper Midwest, Amber Anderson, Iowa Organic Association. 2014-2017, Funding: The 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: The 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.

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.

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 Wiedenhoeft, 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

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. http://www.water.iastate.edu/sites/www.water.iastate.edu/files/iowawatercenter/bookDraft_20120222.pdf

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: http://scisoc.confex.com/scisoc/2012am/webprogram/Paper75770.html.

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: http://scisoc.confex.com/scisoc/2012am/webprogram/Paper73223.html.

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. Wiedenhoeft, 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. Wiedenhoeft. 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.

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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: http://www.orgprints.org/12441/.

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 Psyttalia 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 andL. 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 www.plantmanagementnetwork.org/pub/cm/research/postcrp/

Extension and Outreach Publications

Iowa State has an extensive collection of organic research reports posted at: http://extension.agron.iastate.edu/organicag/rr.html 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. In 2008, ISU Extension developed and delivered a distance education course on transitioning to organic production.

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.

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
- Dr. Mark Gleason, ISU Extension Plant Pathologist, mgleason@iastate.edu

Kansas

Organic Research Projects

Brief description of KSU organic farming research can be found at: http://www.k-state.edu/fungi/Projects/Organic.html

Specific organic research projects include:

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

Implementation of novel grafting methods and rootstocks for organic tomato growers in the Midwest, Sarah A. Masterson. 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: OFRF.

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)
- Economic Issues with Value-Enhanced Corn, MF2430 (1999)
- Green Manure Crops, EP11 (1999)
- Economic Issues with Specialty Crops, MF2427 (1999)
- Economic Issues with Organic or Natural Beef, MF2432 (1999)
- Organic Certification, MF2344 (1998)

Academic Curricula

KSU cloasses 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

To date, KSU has not hosted an organic farming conference or organized annual organic field days.

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 at: http://www.kansassustainableag.org/Library/O.htm

Kansas Center for Sustainable Agriculture and Alternative Crops – College of Engineering: http://kcsaac.engg.ksu.edu/

Kansas Organic Producers Association: http://www.kansasruralcenter.org/kop.htm

Kansas Rural Center organic farming resources: http://www.kansasruralcenter.org/eqip.html

The Land Institute

Hands-on Learning

Willow Lake Student Farm, operated by Department of Horticulture, Forestry Rec. Resources, is not certified organic, but managed sustainably and staffed by students; faculty advisor is Dr. Rhonda Janke.

Acres Certified Organic

1 acre.

Organic Livestock Research

None.

Key Contacts

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

Michigan

Organic Research Projects

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

Fostering Complex Soil Food Webs and Building Soil Fertility with Organic Production: Perennial Wheat Phase Two. Sieglinde Snap. 2013-2016, Funding: The Ceres Trust.
On-farm organic soybean variety trials, Dean Baas and Dan Rossman. 2012-2017, Funding: The 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: The 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. 2012-2014, 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. 2010-2014, Funding: USDA-OREI.

Development and delivery of living pest management for organic greenhouses and local food systems, Matthew J. Grieshop. 2011-2014, Funding: The 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: The 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 GREEEN.

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: The Ceres Trust.

High tunnel organic raspberry production. Ben Gluck and Eric Hanson. Ongoing, Funding: The 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: The 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: The Ceres Trust.

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

Fostering complex soil food webs and building soil fertility with organic production: the potential of perennial wheat, S. Snapp. 2010-2013, Funding: The 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 Pennisula, 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: The 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: The 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: The 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: The 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: The 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: The Ceres Trust.

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

Evaluation of Apple Flea Weevil Dispersal and the Potential of Kaolin-Based Management in Organic Apples, John Pote. 2010, Funding: The 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 GREEEN.

Evaluating Corn, Soybean and Wheat Varieties in Organic Farm Systems in Michigan, Ivan Morley. 2006, Funding: SARE.

Improved management of striped cucumber beetle , Acalymma vittaum (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

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.

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 at http://www.wssajournals.org/doi/pdf/10.1614/WT-D-12-00073.1).

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 at http://wssajournals.org/doi/pdf/10.1614/WT-D-12-00084.1).

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, Lucaz, 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, Lucaz, 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: Intechweb.org. (www.intechopen.com). 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. Snappand 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.

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Extension and Outreach Publications

- 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 recent 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).

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.

http://www.covercrops.msu.edu/species/index.html 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. http://www.mccc.msu.edu/selectorINTRO.html 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: http://www.extension.org/pages/61075/managing-for-soil-organic-matter

Soil Ecology and Management explores the soil ecosystem, including the interrelationships of soil biological, chemical and physical processes.

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 Hoophouse 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 at http://www.hrt.msu.edu/john-biernbaum/pg4

A hoophouse 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 (http://rise.natsci.msu.edu/) and details are available at www.hrt.msu.edu/john-biernbaum/pg4

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.

Key Contacts

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Minnesota

Organic Research Projects

Cropping Systems

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, 2012-2106, 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.

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

Evaluating Alfalfa Mulch as a Nitrogen Source for Corn Production. Deborah Allan, Laura Fernandez, Craig Sheaffer, 2011-2014, Funding: The Ceres Trust.

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

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

Alternative crops after Corn and Soybeans, including Amaranth, Buckwheat, Dry Bean, Field Pea, Flax, Spring Wheat, Sorghum and Sunflower. Craig Sheaffer, Don Wyse, 2013, Funding: USDA.

Annual legumes to supply nitrogen. Craig Sheaffer, Deborah Allan, John Lamb, 2013, Funding: USDA.

Integrating Host-Plant Resistance and Insecticides for Sustainable Soybean Aphid Management, Anthony Hanson, UMN. 2013, Funding: SARE.

Assessing Nitrogen and Carbon Pools in a Perennial Biomass Alley Cropping System in Minnesota U.S.A., Joshua Gamble, UMN. 2013, Funding: SARE.

Cutting management of alfalfa to enhance N contributions. Craig Sheaffer, Deborah Allan, John Lamb, 2013, Funding: USDA.

Development and Demonstration of a New Method of Physical Weed Control – "propelled abrasive grit management" (PAGMan) implement and system for mechanical control of weed seedlings in row crops. Brief video available at; http://www.ars.usda.gov/Services/docs.htm?docid=22766. Frank Forcella, Dan Humburg, Sharon Clay, 2010-2013, Funding: NC-SARE.

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

Interseeding cover crops in soybeans. Craig Sheaffer, Don Wyse, 2013, Funding: USDA.

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

Radish cover crops. Don Wyse, Marian Geiske, Beverly Durgan, 2012-2013, Funding: Minnesota Agricultural Experiment Station.

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

Weed management in transplanted vegetables with rolled winter rye. Craig Sheaffer, Matt Leavitt, Don Wyse, 2011-2102, Funding: Minnesota Agricultural Experiment Station.

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

Dry field beans for local foods. Tom Michaels, Craig Sheaffer, John Lamb, 2009-2012, Funding: The Ceres Trust.

Efficacy of buckwheat intercropping in organic soybeans for management of the soybean aphid. Thelma Heidel, (David Ragsdale, Major Professor), 2010, Funding: Ceres Trust Graduate Student Grant.

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

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

Evaluation of Potato Breeding Lines under Organic Growing Conditions. Christian Thill, Hugh Duffner, 2012-2013, Funding: Northern Plains Potato Growers Association.

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.

Antibiotic Uptake by Vegetable Crops from Manure-Applied Soils. Satish Gupta, Dong Hee Kang, Carl Rosen, Vincent Fritz, Ashok Singh, Yogesh Chander, Helene Murray, 2011-2012, Funding: NCR-SARE.

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: The Ceres Trust and FAFO.

Quantifying Outgassing from Plastics Used in High or Low Tunnel Systems. Andrew J. Petran, (Albet Markhart, Major Professor), 2011, Funding: Ceres Trust Graduate Student Grant.

Livestock Systems

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

Effects of growth, meat qualtiy, 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.

Cheese Rustlers On-Farm Organic Creamery, Jane Doe, St. Paul, MN. 2013, Funding: SARE.

Effect of whole milk feeding duration with group fed calves on growth, health, and behavior of organic dairy calves. Elizabeth A. Bjorklund, Brad Heins, Faculty Advisor, 2011, Funding: Ceres Trust Graduate Student Grant.

Integrated organic dairy research and extension planning. Heins, B.; Endres, M. I.; Raeth-Knight, M., 2009-2011, Funding: USDA-NIFA.

Biological and Cultural Fly Control Options for Organic Dairies. Jessica Starcevich, (Roger Moon, Major Professor), 2010, Funding: Ceres Trust Graduate Student Grant.

Track and research changes in mammary health and fertility in a transitioning dairy herd. Brad Heins, 2008-2009, Funding: FAFO.

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. (In press).

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. (In press).

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.

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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
- HORT 2031 – Organic Food: How to Grow It, Where to Buy It, Can it Feed the World?
- 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 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 pasture land 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 will be 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.

Total UMN acres certified, managed organically, or in transition = 1048.4 acres.

Organic Livestock Research

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

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Missouri

Organic Research Projects

Two Land Grant Universities are fully involved with organic research and outreach in Missouri: University of Missouri and Lincoln University, the only 1890 land grant university in the North Central Region.

The University of Missouri has not formerly been a leader in organic farming research, but an effort is currently underway to change that. A core group of researchers and extension educators at 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. In addition to the research listed below, Dr. Mary Hendrickson provides educational opportunities for students in the Department of Rural Sociology Sustainable Ag Program.

Organic research and outreach at Lincoln University takes place primarily at the Busby Research and Integrated Farm located in Jefferson City, the 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 allow for an improved holistic organic-based management system that is more self-sufficient and sustainable.

Current and recent organic research includes:

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: The Ceres Trust.

Evaluation of Soil Quality in Vegetables Planted in Plastic Mulch vs. No-Till in Polyculture Cover Crop, Tim Reinbott, 2012-2015, Funding: The 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 Anthropods in Cucurbit Crops, Jaime Piñero, Lincoln University. 2013-2015, Funding: The 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.

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

Identification of Factors Affecting Carbon Sequestration and Nitrous Oxide Emission in Three Organic Cropping Systems, Timothy Reinbott, Kerry Clark, 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., 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. doi:10.1155/2011/571973.

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.

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Piñero, J.C., Souder, S.K., Gomez, L.E., Mau, R.F.L., and Vargas, R.I. 2011. Response of female Mediterranean fruit fly, Ceratitis 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, available online: insectscience.org/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

Growing and Marketing Elderberries in Missouri

Making and Using Compost

Natural Lawn Care

Organic Vegetable Gardening Techniques

The Berry Basket

Weeding With Geese

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 Opportunities

Graduate students are involved in organic research projects in the Department of Soil and Atmospheric Science with Dr. Robert Kremer and Dr. Newell Kitchen. Graduate student projects with an agronomic emphasis are completed at the Bradford Research Center.

There are currently two PhD students and one MS student 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.

MU has been seeking funding for two graduate student opportunities with Dr. Reid Smeda, in weed science. Dr. Smeda has conducted research in the past on weed control in organic agriculture.

Dr. Jaime Piñero from Lincoln University 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 The Ceres Trust, weed and insect pest management through the use of small ruminants and farmscaping in organic systems.

Outreach Efforts

In 2014, MU will again conduct an organic row crop production workshop at the Bradford Research Center and at the farm of a cooperating organic grain producer.

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

Lincoln University 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, MU and Lincoln U 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 Managmenet 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 Manageemnet 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

Managmenet 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

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.

Otherwise, MU does not offer any direct hands-on learning opportunity such as a fully developed student farm. However, 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 5 acres certified organic at Bradford Research Center and another 10 acres in transition. There are future plans to make an additional 15 acres organic.

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.

Key Contacts

- Christopher Boeckmann, Organic Production Manager – Busby Research Farm, Lincoln University Cooperative Extension, BoeckmannC@LincolnU.edu
- Dr. Mary Hendrickson, Extension Associate Professor, HendricksonM@missouri.edu
- Debi Kelly, Missouri Alternatives Center – Missouri State Sustainable Agriculture Co-Coordinator, KellyD@missouri.edu
- Dr. Jaime Piñero, Assistant Professor State IPM Specialist, Lincoln University, PineroJ@lincolnu.edu
- Dr. Timothy M. Reinbott, Superintendent, Bradford Research Extension Center, ReinbottT@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.

Weed management - Evaluate an integrated approach for weed control using mechanical methods and flame weeding.

Cover crops - Determine optimum selection of mixture, timing of planting, economics, incorporation methods, effects on crop yields, benefits to increase soil nutrient levels, organic matter, carbon, water-holding capacity, erosion prevention and microbial activity, increase species biodiversity, habitat for beneficial insects, and weed suppression.

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.

Biodiversity conservation on working organic farms - Quantify the effect of organic management of breeding bird populations, and institute long-term ecological monitoring.

Healthy Farm Index assessment of biodiversity indicators and land use patterns - Deliver a tool to organic farmers for farm assessment and structured decision making.

On-farm/farmer research capability - Provide guidance, encouragement, and technical support for organic farmers and research groups in Nebraska.

Student Organic Farm at UNL - Initiated in 2013 with land and field support of the Department of Agronomy and Horticulture, a group of 20 students is growing vegetables and doing adaptive research on East Campus of UNL.

Specific organic research projects include:

Development of Cultural Practices to Use a Roller-Crimper in Cropping systems for Eastern Nebraska, Charles Shapiro. 2011-2014, Funding: The 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: The Ceres Trust.

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

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.

Avian Ecology – Impacts of organic agriculture on wild bird populations. J. E. Quinn, J. R. Brandle, R. J. Johnson. Funding: USDA-IOP.

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: The Ceres Trust.

Healthy Farm Index – Tools to assess agricultural sustainability. 2011-2013, Funding: USDA.

Cover Crop Mixture Functional Diversity and its Benefits on Biomass Production, Soil Fertility, Soil Moisture, Weed Surpression, 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.

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

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Wortmann, C.S., E. A. Sarno, C.A. Shapiro, K. Stevens, R.A. Drijber, and E. S. Jeske. 2013. Interelationships 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.

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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.

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

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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. Available online at http://digitalcommons.unl.edu/rurals/vol3/iss1/1

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Extension and Outreach Publications

- Breeding for Organic Systems – Organic wheat variety trial results
- 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
- Systems in Nebraska (webinar)
- Multifunctional Rural Landscapes
- Organic Resources: Support, Education, Research
- Organic Gardening: Market and Home
- Science-Based Organic Farming 2008: Toward Local and Secure Food Systems
- Service Manuals Training Guides for using a Flamer for weed control
- The Contribution of Organic Farmland to Great Plains Bird Conservation
- Transitioning to Organic Farming
- 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: 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.

Grain Place Foods in Marquette, NE, has a farm tour in July and the UNL-OWG has been invited to speak every year. (2006-2013)

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

UNL 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 – 33.81 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 = 179.81 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.

Key Contacts

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- Dr. Stevan Knezevic, Professor, Northeast Research and Extension Center, sknezevic2@unl.edu
- Dr. John L. Lindquist, Professor and Plant Ecologist, UNL, jlindquist1@unl.edu
- Elizabeth A. Sarno, Organic Farming Systems Educator, retired
- Dr. Charles Shapiro, Professor, Agronomy and Horticulture, cshapiro@unl.edu
  North Dakota

North Dakota

Organic Research Projects

Current and recent organic research includes:

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.

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.

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: The 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 guides organic farming research directed out of the NDSU Dickinson Research Extension Center from 2007 through 2013. Funded research under this project umbrella includes:

- 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: The Ceres Trust.
- 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 (in press)

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 (http://npsas.org/about-us/farm-breeding-club.html)
- Ancient Grains Webinar, 2013 (http://www.youtube.com/watch?v=C5yX5UtnxEk)
- Value-Added Organic Grains ND 2012 Update (http://www.youtube.com/watch?v=R_2AsmGlOLI)
- Breeding “Organic Ready” Corn (http://www.youtube.com/watch?v=yln91Ur9kY0)
- NDSU Organic Research (http://www.youtube.com/watch?v=_85jvlQnc_A)
- Deep Mulch, No-Till, Organic Garden at Prairie Road Organic (http://www.youtube.com/watch?v=2brHfHPusac)
- Boehm Farm Tour (http://www.youtube.com/watch?v=ZotQ3xdiHRU)
- Organic Farming (http://www.youtube.com/watch?v=ESKCEdhCe6Q)

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 is directing an M.S. student (Aman Amand) on a pea competition study with field experiments in certified organic fields. Drs. Kevin McPhee and Patrick Carr are members on the graduate committee, along with others.

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:

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.

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.

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 does have 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.

Total acres certified, managed organically, or in transition = 30.52 acres.

Organic Livestock Research

None at this time.

Key Contacts

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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 (see http://oardc.osu.edu/offer/pageview/Staff_and_Partners.htm), are members of 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 the 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 at http://oardc.osu.edu/offer/pageview/Research.htm. 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 that support them. As a rule, few of the OFFER faculty work exclusively on organic research topics, however, all are committed to the same sustainability and environmental principles that are at the core of the organic movement.

Going forward, the program has 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

Organic biofertilizer amendment trials. McSpadden Gardener, B. 2013-2014. Funding: OARDC.

Organic oat variety trials. McSpadden Gardener, B. Sneller, C. 2013. Funding: OARDC

Organic corn variety trials. McSpadden Gardener B. Sundemeier, A.S. 2013. 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: The 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: The 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 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: The 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

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. Available online: http://www.sju.edu/academics/hsb/resources/workingpapers/ 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: TShe 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: The 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:

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) (in press).

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. http://www.extension.org/pages/64951/soilborne-disease-management-in-organic-vegetable-production

DeLeon, Lauren and Neal H. Hooker. 2012. Trends in US Organic Food and Drink Product Introductions. John Glenn School of Public Affairs Working Paper. Available online: http://glenn.osu.edu/research/workingpapers 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 http://www.extension.org/article/30849.

Baysal-Gurel, F. and Miller, S. A. 2010. Early Blight Management for Organic Tomato Production. http://www.extension.org/article/29878. eOrganic4961.

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. Available online at: http://ohioline.osu.edu/sag-fact/pdf/0018.pdf

Park, S., Cao, C., and McSpadden Gardener, B.B. 2010. Inoculants and soil amendments for organic growers. Ohioline Fact Sheet SAG-17-10. Available online at: http://ohioline.osu.edu/sag-fact/pdf/0017.pdf

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 - http://www.extension.org/article/30849.
- Early Blight Management for Organic Tomato Production. http://www.extension.org/article/29878.
- Soil-borne Disease Management in Organic Vegetable Production. http://www.extension.org/pages/64951/soilborne-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 (http://cfaes.osu.edu), 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.

An "Organic Livestock Symposium" was held at OSU Columbus on March 18, 2013. Speakers from academia and industry discussed key challenges and successful approaches to managing health and welfare of animals in the organic livestock sector.

A symposium on the "Future Directions for Organic Agriculture Research" was held at OSU Wooster on November 1, 2012. Speakers from OTA, OFRF, PASA, and OEFFA were included.

Web Resources

The OFFER program maintains a web site (http://oardc.osu.edu/offer/pageview/Home.htm) 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 http://studentfarm.wordpress.com as well as on Facebook https://www.facebook.com/ohiostatestudentfarm. 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.

Key Contacts

- Dr. Brian McSpadden Gardener, Professor, Director, Organic Food Farming Education Research, mcspadden-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. 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
  Complete list of OFFER Research Extension Personnel

South Dakota

Organic Research Projects

SDSU conducted trials evaluating winter wheat varieties for ability to compete with weeds. Trials were conducted looking at flame weeding in research station and on-farm environments for corn and soybean production. Work was also conducted looking at a new tool that shoots a stream of abrasive particles (e.g. lime) in the crop row to destroy weed seedlings.

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.Strengthing 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

None found specific to organic production.

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 http://www.sdstate.edu/ps/extension/ipm/ipm-pubs.cfm 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 producers in Sioux Falls in the first week of December. The 2-day conference, organized by SDSU faculty and staff, has tracks on organic crop, livestock, and vegetable production. SDSU has done both the last three years and intends to make them annual events.

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.

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

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: The 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: The Ceres Trust.

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 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: The Ceres Trust.

Use of Mob Grazing and other control options for controlling Canada thistle and alleviating losses in forage quality, quantity and utilization. Anders Gurda, Mark Renz, Faculty Advisor. 2013-14, Funding: Ceres Trust Graduate Student Grant.

Improving Soil Health Through No-Till Vegetable Production. Anne Pheiffer, 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; The Ceres Trust.

Optimizing No-Till Organic Production to Improve Soil Health and Management of Late-Season Weeds, Erin Silva. 2012-2015, Funding: The 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 (in collaboration with North Dakota State University, the Organic Seed Alliance and USDA). 2009-2013, Funding: USDA-OREI.

Evaluation of organically approved fungicides for vegetable crops, Amanda Gevens, 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, Altfrid 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: The 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: The Ceres Trust.

Organic seed potato production and participatory breeding, Amy O. Charkowski. 2011-2012, Funding: The 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 Scarf Disease for Organic Potato Production, Chadradhar Mattupalli. 2011, Funding: The 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: The 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 Mittenthal, 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: The 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 of 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:

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.

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., Mercedez 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.

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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. Guenthner, 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.

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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.

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Kraiss, H. and E.M. Cullen. 2008. Insect growth regulator effects of azadirachtin and neem oil on survivorship, development and fecundity of Aphis glycines (Hemiptera: Aphididae) and its predator, Harmonia axyridis (Coleoptera: Coccinellidae). Pest Management Science 64:660-668.

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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.

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Extension and Outreach Publications

- 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)

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: Agricultures 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).

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 The Ceres Trust, Seed Matters, and Vitalis Seed) https://sites.google.com/site/studentorganicseedsymposium/.

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 day-long symposium at the 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

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: http://www.fhkingstudentfarm.com/what-we-do/the-garden

FH King has paid internships at the student organic farm:
http://www.fhkingstudentfarm.com/get-involved/internship-program

And it has hands-on workshops for students:
http://www.fhkingstudentfarm.com/get-involved/lead-a-workshop

UW-Madison offers an Organic Study abroad opportunity:
http://www.studyabroad.wisc.edu/programs/program.asp?program_id=301

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.

Key Contacts

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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 continue to increase 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 for all species;
- 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;
- 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.

The author observed that organic programs appear well supported and coordinated at some institutions in the North Central Region, while others lack sufficient institutional support. At the most functional land grant 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
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