

ORGANIC FARMING IN NEBRASKA: ESTABLISHING ORGANIC RESEARCH FOR THE ORGANIC FARMING COMMUNITY

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Abstract

Four sites in Nebraska were developed to have land available to conduct research on certified organic land. All sites will be certified organic by the end of 2008. The goal of the project is to conduct research relevant to the organic farming community and not to compare organic systems with conventional systems. Research is being conducted on the use of flaming to control weeds, winter wheat variety development and selection for the organic market, variety testing of organic winter wheat, proso millet, corn and soybean varieties, use of organic nitrogen sources to improve protein content of wheat, and utilizing cover crops after wheat harvest. In addition to current research, these organic lands are available to other research projects whose focus is to develop production systems to help organic farmers.

Introduction

Organic agriculture has a way of exciting passions and getting people all worked up. The reasons for this are probably many. The discussions usually proceed by making claims and counter claims about which system is better, safer, more environmentally sound, productive, and efficient. The Nebraska Organic Project has chosen to sidestep this discussion and focus on conducting research with the goal of helping organic farmers and the organic food processing industry. With the demand for organic produce increasing and the infrastructure more consistent, more Nebraska farmers were considering converting to organic production. The constraints of farming organically provide unique challenges and opportunities, many of which would benefit from research. Starting in 2005 the Nebraska Organic Project, funded by a USDA-CSREES grant, set out to establish four organic field sites across the state to provide an environment under which specialists from a number of disciplines could conduct research designed to answer questions that arise on organic farms.

Approach

This paper is not the usual research report, or summary of research. We will tell the story of how we are accomplishing our goal of conducting organic research for the organic farming community. The project started out as an infrastructure development project to certify a total of about 165 acres at four University of Nebraska – Lincoln field research sites.

Across the Great Plains and High Plains a great deal of research capacity has been developed on crop production systems. In Nebraska we have taken an ecological perspective to this research, developing research and extension centers in various agro-ecozones across the state to meet the needs of producers. Nebraska is a geographically and climatically diverse state. Rainfall ranges from more than 33 inches in the southeast to less than 16 inches in the west. Elevation ranges from less than a thousand feet above sea-level in the southeast to more than a mile high in the

west. Growing season, diurnal temperature variation, and heat unit accumulation are as variable. With this in mind several locations across the state have been developed as research and extension centers to produce adaptive research for each agroecozone. These research and extension centers have placed the bulk of their emphasis on non-organic production systems.

Development of research capacity in organic crop production, management and breeding in order to make organic production systems across a broad set of ecosystems more successful is the overriding goal. By locating the organic farms as part of established research centers, a large group of crop researchers can participate at many levels of involvement. The goal was to integrate organic systems as one part of many research, teaching and extension efforts at each site. While the primary efforts will be appropriate to each ecozone, we have several overarching objectives. They include 1.) Develop improved weed control strategies for organic production systems, 2.) Evaluate positive and negative effects of alternative crops and cropping sequences in organic production systems, 3.) Evaluate varieties for ecozone adaptation in organic production systems, 4.) Develop nutrient management strategies for organic producers, 5.) Develop selection criteria, screening techniques and improved germplasm for organic systems, 6.) Improve the evaluation program of available certified organic products across the state including bio-stimulants, disease and insect control treatments, 7.) Improve on farm testing procedures utilized by organic producers, 8.) Develop improved education and extension programs to facilitate adaptation of research results.

The structure of the project includes citizen advisory groups for each location, and an overall advisory group made up of representatives from each site. The advisory groups are made up of organic farmers, people from organic businesses, and representatives of other farm related groups. Being able to document that research objectives are based on the input of end users (stakeholders) is increasingly important for several USDA competitive grant programs. Each group helps plan the rotations and gives oversight to the people who are actually doing the farming. This has led to unique plans at each site.

Research

At South Central Agricultural Laboratory, Clay Center. This 17 acre irrigated site will utilize a 7 year rotation among corn, soybeans, wheat and alfalfa. Small plot research (variety/hybrid evaluation, pest management, cover crops) will be integrated into the 7 blocks of rotated crops.

Agricultural Research and Development Center – Mead. Forty-five acres will be available when the conversion is complete, all of which are protected by mature shelterbelts. Farm rotation: corn, soybeans and winter wheat rotation, with clovers and dairy manure as plow-down.

Haskell Agricultural Laboratory – Concord. Twenty-five acres of farm ground in oats/alfalfa, corn, soybeans, and oats/clovers were planted and harvested. Ideally, cattle will be fall grazed for approximately four weeks to clean up residue and to utilize forage in terraces. Weed flaming studies are being conducted to develop response curves for propane [based on usage rate (gal/acre)] needed for safe and economical weed control. Research on cover crops and winter wheat fertilization are on-going.

High Plains Agricultural Laboratory – Sidney. Seventy-six acres of land is National Organic Program (NOP) certified by the Organic Crop Improvement Association (OCIA) International. This was the 1st site certified organic in the fall of 2007. The crop rotation is a stacked rotation of winter wheat-proso millet-dry pea as green manure for plow down followed by winter wheat-sunflower-summer fallow with composted beef manure applied in the winter of the summer fallow year.

Healthy Farm Index Project. Statewide. The ultimate goal of this project is to provide a practical and integrated assessment tool to farmers, policy makers, and other interested parties to facilitate the enhancement and restoration of biodiversity and ecosystem services on working farms. To better ensure the continuation of sustainable food production, the Healthy Farm Index will guide the optimization of ecosystem services by modeling the trade-offs in ecosystem function that result from different land use and land cover patterns in mixed farm systems. Initial data generated will provide recommendations to organic and sustainable farmers on conserving on-farm biodiversity, diversity essential to sustainable production and enhanced ecosystem services.

Twenty-seven organic farms within the state's four agroecozones are being sampled by measuring avian, vegetation, and insect diversity. Land-use and land-cover classes are being delineated to facilitate analysis of potential relationships between land use and land cover and avian abundance and diversity. Field level vegetation patterns are being analyzed for a finer scale analysis of relationship between vegetation and avian and insect diversity. Socio-economic parameters will be collected in 2008/2009 as part of a continuing effort in support of organic agricultural systems at the University of Nebraska-Lincoln.

Updates on these projects and other information is available at the UNL organic website: <http://organic.unl.edu>

Learning to farm organically

The short answer to the question, “How do I certify my land?” is that each field needs to be free of non-approved chemicals for three years. The process is complicated and time consuming, especially when there are conventional acres and organic acres on the same farm, like at a field research laboratory. Every field operation has to be documented and the cleanliness of the tractor, implement, and any inputs recorded. While researchers and technicians are used to record keeping, these requirements are stringent, but vital to the certification and ability to trace back all products to specific fields.

In order to make work easier and timelier, separate equipment makes more sense when possible. At the Haskell Agricultural Laboratory they built a special concrete wash area, just to clean off field equipment. Separate grain handling and storage facilities also make more sense.

More importantly, learning how to ‘farm organically’ has been the greatest challenge. Not using chemicals, especially for weed control, means that more attention to early season conditions is a requirement. Weather conditions and soil conditions can make timely rotary hoeing and cultivation difficult. As a research project, our challenge has been to find, recruit and retain motivated technicians who can learn the system. Because this project is grant funded, technical

help is not permanent and without a long-term interest in the project it is difficult to keep continuity of skills at each site. Where the grant money is used to supplement long-term employees the results are much quicker farming skill acquisition.

Other agronomic issues such as fertility and pests need to be managed over several years by use of rotations and supplemental manure additions. The transition from conventional corn/soybean row crops to a longer more diverse rotation takes time to reach a new equilibrium. We are concerned that unless addressed, there will be a depletion of nutrients over time.

To balance the increased management required to produce organic grains, the price received per bushel of grain can be substantially more than for conventional crops. As with conventional grains, marketing skills will determine just how much of a premium will be made. The challenge for a producer is to find a market for any crops during the three year transition period where they can not get the organic premium, yet they have the hard work of farming with out inputs.

Current Research

There are two research projects that are on-going that have been funded after the beginning of the Nebraska Organic Project. They were funded because of the on-going work in organics and the presence of organic land in the process of being certified. Both are focused on research that is aimed at solving organic production problems.

Weed flaming. Dr. Stevan Knezevic is leading an effort to develop the use of propane flammers to selectively kill weeds in crops. He has a PhD student and several undergraduate researchers developing dose response curves to propane at various stages of growth for crops and weeds. This project has been well received by the organic community and is supported by the propane industry.

Winter Wheat cropping systems. Led by Dr. Stephen Baenziger, University of Nebraska – Lincoln wheat breeder, the goal of this project, funded by a USDA-CSREES grant is to develop winter wheat varieties suitable for organic production and processing and investigate ways to make winter wheat fit better into the cropping systems of eastern Nebraska. The organic farming community is not so much interested in yield as quality, and the organic grain processors have their own specifications. Depending on use, protein levels are critical. The difficulty of including winter wheat in eastern Nebraska is to get the row crop harvested so that winter wheat can be planted in a timely manner, and then deciding how to use the land productively between winter wheat harvest and the following row crop.

Summary

Organic farming has many challenges that are unique to its production constraints. Instead of discussing whether these constraints are legitimate, the Nebraska Organic Project is working under the National Organic Program protocols to certify land at four research stations in order to conduct research to address problems associated with organic production. These management issues are not different than conventional agriculture; pests, nutrition, marketing, and cultural practices.

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