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Abstract
During the last decade, organic food sales have tripled in the United States, leading many Iowa producers to investigate organic farming. The USDA National Agriculture Statistics Service (NASS) stated that Iowa’s 467 organic farms had $60.7 million in sales in 2011, which led to a ranking of fifth place in the nation in the number of certified organic farms.

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During the last decade, organic food sales have tripled in the United States, leading many Iowa producers to investigate organic farming. The USDA National Agriculture Statistics Service (NASS) stated that Iowa’s 467 organic farms had $60.7 million in sales in 2011, which led to a ranking of fifth place in the nation in the number of certified organic farms.

Organic cropping systems can provide similar or greater yields, higher soil quality and greater economic returns than a conventional corn-soybean rotation, according to research conducted by Kathleen Delate, professor of Agronomy and Horticulture at Iowa State University. Delate has gathered data from a 13-year, side-by-side comparison experiment at Neely-Kinyon Research and Demonstration Farm. The research was published April 30 in the *Crop Management* journal.

Crop Management, a peer-reviewed journal of the Crop Science Society of America and The Plant Management Network, published research presented at the “USDA Organic Farming Systems Research Conference,” which took place in March 2011 at George Washington University in Washington, D.C.

In addition to Delate, USDA Chief Scientist and Under Secretary for Research, Education and Economics Catherine Woteki presented her insight and encouragement for organic systems as having significant potential for addressing the agricultural challenges of our time. Between 2002 and 2010, USDA contributed over $275 million to more than 2,400 organic research projects, five of which were coordinated by Delate and addressed critical issues from organic management of soybean rust to organic no-tillage systems.

Iowa State University’s Long-Term Agroecological Research (LTAR) experiment began in 1998 with support from the Leopold Center for Sustainable Agriculture. It is one of the longest running replicated comparisons of organic and conventional systems in the country. Cropping systems at LTAR were designed based on local organic farmer input and practices. They compare the following crop rotations, using identical crop varieties, with each crop in each rotation repeated four times every year: conventional corn-soybean (two year), organic corn-soybean-oat/alfalfa (three year), and organic corn-soybean-oat/alfalfa-alfalfa (four year).

The corn yields in the organic C-S-O/A-A rotation averaged 99 percent of the average conventional corn yield, compared to 92 percent in the C-S-O/A rotation. Organic soybean yields were 5 percent and 4 percent greater in the C-S-O/A and the C-S-O/A-A rotation, respectively, than conventional soybean yields.

Organic oat and alfalfa yields, at 103 bu/acre and 4.4 tons/acre, respectively, exceeded county averages of 73 bu/acre and 3.3 tons/acre. Similar plant protection occurred in organic crops, without the use of petrochemicals, compared to conventional crops maintained with synthetic pesticides. Delate said they used a systems approach, based on multiple practices, including...
allelopathy and rotation, to manage weeds in the organic plots.

Co-author Cynthia Cambardella, USDA-ARS soil scientist (Ames, IA), found that soil organic carbon, total nitrogen, and extractable K and Ca were 5.7 percent, 9.5 percent, 14.2 percent and 10.8 percent higher in organic soils, respectively. Soil properties related to biologically active organic matter were up to 40 percent higher in organic soils. These results suggest that organic farming can foster greater efficiency in nutrient use and higher potential for sequestrating carbon.

Co-author Craig Chase, Leopold Center for Sustainable Agriculture, calculated that the economic returns to land and management in 2010 were $510/acre in the organic C-S-O/A-A rotation compared to $351/acre in the C-S rotation and, throughout 13 years of the LTAR study, organic systems returned roughly $200 per acre more than conventional crops. Organic crops fetch a premium price in the market based on high consumer demand and, with the elimination of the need for expensive inputs like herbicides and synthetic fertilizers, economic returns will continue to rise. To sell a product as organic, the crop must be raised on land that has received no synthetic chemicals for three years prior to harvest.

Further information about other organic research or to learn more about how to become certified, visit the ISU Organic Agriculture webpage.

**Farming practices at the LTAR site**

The conventional rotation in the LTAR experiment receives synthetic nitrogen amendments, herbicides and insecticides according to Iowa State University recommended rates. Skilled management has been an adequate replacement for synthetic chemicals in organic plots.

The organic corn plots receive local compost made from a mixture of straw and manure. Delate said they use a whole suite of practices to manage weeds in the organic plots, including timely tillage and longer crop rotations. Allelopathic chemicals from rye and alfalfa help keep weed populations under control, as does growing an alfalfa cover crop in winter, which provides cover for beneficial insects and animals. Organic corn and soybean plots receive an average of two rotary-hoeings and two row cultivations per season for weed management. To compensate for seedling losses that may occur during tillage, higher seeding rates are used.

A 30-foot buffer separates the organic and conventional plots to avoid any cross-contamination. The U.S. Department of Agriculture’s National Organic Program’s accredited agency, Iowa Department of Agriculture and Land Stewardship, certifies the organic plots annually. Crops are mechanically harvested with combines and hay rakers/balers.

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