

Sustainable Agriculture

Volume 8, Issue 12 – December 2000

New research shows green manure crops enhance natural disease control in soils

New research results from the 2000 growing season show that green manure crops—buckwheat, oats and sorghum-sudangrass— significantly reduced root disease in alfalfa. The green manure crops enhanced the natural disease-suppressive activity of the soil microorganisms, according to Linda Kinkel, University of Minnesota plant pathologist.

In the first two years of the trials, Kinkel and colleagues focused on identifying green manure crops that could enrich the activity of natural soil antagonists. During the third year—the 2000 growing season—they initiated studies on disease control potential of the best green manures. They found significant control of Phytophthora root rot in alfalfa preceded by a single planting of green manure crops. Buckwheat, oats and sorghum-sudangrass crosses all enhanced the soil's natural disease control activity and provided significant disease control.

“Not all green manure crops enhance natural antagonists of soil pathogens,” Kinkel says. “Of 13 green manure crops we've studied, some do nothing to enhance soil antagonists.” So although crop rotations that include green manures help reduce soil pathogen levels and prevent disease build-up, they don't necessarily enhance natural disease suppression activity. Kinkel says oats, buckwheat, canola and sorghum-sudangrass have been the most successful crops for enhancing activity of natural soil antagonists to control pathogens.

Much of Kinkel's work has involved diseases of potatoes, and she hopes to help develop cropping systems that growers can use to control potato diseases with little or no use of fungicides. “Many potato growers already use green manure crops,” Kinkel says. “Using green manure crops should increase profits, since they involve no added costs.

“In the longer term, we'd like to develop three- to five-year cropping systems involving green manures and crops such as potatoes, corn, green beans and alfalfa, where the green manures would enhance natural disease control. These integrated cropping systems could provide broad-based disease control for all crops.”

“Some inoculative biological controls work incredibly well,” Kinkel says. “But many fail completely for reasons that are difficult to discern.” She may be reached at (612) 625-0277, e-mail lindak@puccini.cdl.umn.edu.

Plan ahead for producer grant applications

Producers may apply for grants of up to \$5,000 for individuals and \$15,000 for groups of three or more interested in investigating any sustainable practice or concept. The competitive grants are available through USDA's Sustainable Agriculture Research and Education (SARE) program in the North Central Region.

The grants are intended for research, demonstrations or educational programs about profitable, environmentally sound, socially responsible agricultural systems. Additional funding specifically earmarked for agroforestry projects is also available as a result of a National Agroforestry Center initiative.

The national SARE program began with the 1985 Farm Bill. Since 1992, more than 330 producer projects in 12 North Central states have received over \$1.6 million. Projects have included reducing off-farm inputs, testing technologies, improving water quality, educating young people or consumers about agriculture, managing weeds and pests, recycling wastes and creating viable markets for sustainable products.

Applications are available beginning Feb. 1, 2001 and are due March 30, 2001. Funds will be available in mid-fall for the 2002 crop production system. Call (402) 472-7081 or e-mail ncrsare@unl.edu for an application. You can also find the application at www.sare.org/ncrsare.

AURI has funding for pesticide reduction program

Grants of up to \$40,000 are available for projects that reduce pesticide use on Minnesota farms. The funding is available through the Agricultural Utilization Research Institute's (AURI) Pesticide Reduction Options program. Under the program, about \$200,000 is available from the Minnesota Legislature's pesticide regulatory account.

Eligible applicants are Minnesota organizations with farmer or grower members and non-profit status within section 501 or 509. Examples include commodity groups, cooperatives, farm organizations, grower associations and sustainable agriculture organizations. Others from the public and private sector are eligible to participate as cooperating organizations, principal investigators or co-investigators.

For more information, contact Edward Wene of AURI at (218) 281-9014. Proposals are due Jan. 31, 2001.

Applications due Dec. 15 for MDA sustainable agriculture grants

Applications are due Dec. 15, 2000 for sustainable agriculture grants from the Minnesota Department of Agriculture's Sustainable Agriculture program. (Note: this is a change from the Dec. 21 date in our November 2000 issue). For more information, contact Linda Bougie at (651) 296-7673, e-mail Linda.Bougie@state.mn.us.

Headship position at Waseca still open

Closing date for the headship position at the University of Minnesota Southern Research and Outreach Center in Waseca has been extended to Feb. 15, 2001. This is a chief administrative officer position and requires a Ph.D. in agricultural science or an M.S./M.B.A. with agricultural leadership experience. Contact Burle Gengenbach at (612) 625-8761, e-mail burle@umn.edu.

Bulletin outlines how to use ecological principles to control pests on your farm

Here are some highlights from the bulletin, "A Whole-Farm Approach to Managing Pests," from the Sustainable Agriculture Network (SAN).

- “The laws of nature demand that we look at the whole system,” says John Teasdale, USDA Agricultural Research Service at Beltsville, Md. “To control any individual organism, one needs to understand how it relates to the ecosystem in which it operates.” Teasdale has used cover and smother crops to control weeds. Corn grown in hairy vetch allowed 83 percent fewer annual grass weeds than corn grown in unmulched soil, according to research conducted at Beltsville.
- Reacting to complex pest problems with one tool eventually fails since it doesn’t consider problems as symptoms of a system whose intricate natural controls have collapsed. “No matter whether that single tactic is chemical, biological or physical, if it kills 99 percent of a pest population, the few surviving pests will find a way to avoid it or resist it,” says Doug Landis, Michigan State University scientist.
- Organisms find ways to adapt to new environments or toxic materials. Over the years, a succession of chemical “big hammers” has reaped unintended environmental impacts, unnecessary human safety risk, unwanted expense, unwelcome problems with secondary pests and unnerving surges in pest problems.

The 20-page publication is available from SAN. Call (802) 656-0484, or check it out at www.sare.org/san/htdocs/pubs/.

Groundwater in sandy areas is vulnerable to agrichemicals

Groundwater in the sand plains of Minnesota is extremely vulnerable to damage from agricultural chemicals. But with careful management, the sandy soils can be cropped intensively without polluting groundwater.

However, the catch comes when the highest potential profits for farmers favor a cropping system that poses the most significant threat to water quality. That’s what a University of Minnesota economic analysis by Mary E. Renwick and co-workers in the U of M Water Resources Center showed.

Five years of detailed crop production and water quality data for three farming systems were analyzed. The farming systems were:

- Field corn/soybean annual rotation under ridge tillage and split nitrogen and banded herbicide applications.
- Sweet corn/potato annual rotation under a conventional full-width tillage with split nitrogen applications and banded herbicide applications for sweet corn and broadcast applications for potatoes.
- Field corn under continuous, conventional full-width tillage and split nitrogen application with broadcast herbicide applications.

Study results showed:

- No atrazine was detected in the corn/soybean ridge tillage system and atrazine metabolites were detected only occasionally. These detections were less frequent for the corn/soybean ridge tillage system compared to both the conventional full-width tillage continuous corn and sweet corn/potato systems.
- Grain yields for corn were higher for the corn/soybean rotation than under the continuous corn system.

- Nitrate-N concentrations in the upper one-meter saturated zone were least below a corn/soybean rotation and greatest beneath the sweet corn/potato rotation.
- When best management practices were used on the irrigated sandy soils, nitrate-N concentrations did not increase in the ground water table.

These results suggest that ridge tillage corn/soybean production provides a viable and more environmentally benign alternative to a full-width continuous corn production system, Renwick and co-workers wrote in their report.

However, the economic analysis suggests that the sweet corn/potato production system is potentially most profitable. Renwick says, “The sweet corn/potato rotation that poses the most significant threat to ground water quality yields the largest potential profits.

“This is a disturbing finding,” Renwick says. ”Producers may be reluctant to adopt the environmentally benign practices unless they have economic incentives or mandates to do so.” Renwick may be reached at (612) 625-9798, renwi001@umn.edu.

Collaborative marketing can be key to survival, success

Getting a larger share of the consumer dollar is tough business—especially if you go it alone. But the keys to survival and success for many farm families may be cooperation and collective action in marketing.

Many Minnesota farm groups are working together on marketing. A publication from the Minnesota Institute for Sustainable Agriculture (MISA) gives examples of 10 of them. The publication, “Collaborative Marketing—A Roadmap and Resource Guide for Farmers,” BU-7539, also lists these advantages of cooperating with others, compared to acting on your own:

- It may be difficult to maintain the steady flow of high-quality product required to establish a consistent presence in the marketplace.
- You may not be able to take advantage of size economies in processing, transportation and advertising.
- It’s hard for a family to run a farming operation and devote the time required to develop the specialized skills and personal contacts needed for successful marketing.
- And, if you sell your products in a market where there are only a few large buyers, you may not have the market power needed to bargain for a fair price by yourself.

You can check the publication out on the Internet at www.extension.umn.edu/distribution/businessmanagement/DF7539.html. You can also purchase it through the Distribution Center, University of Minnesota Extension Service. Call 800-876-8636 and ask for number 7539. Or, order by e-mail: shopext@umn.edu.

Calendar of events, 2000-2001

These events are sponsored by numerous organizations. More information is available on MISA’s website: www.misa.umn.edu.

Dec. 9 **Pastured/Free Range Poultry Workshop**, Southwest Research and Outreach Center, Lamberton. Time: 9:30-3. Call (507) 752-7372.

Jan. 31-Feb. 1 **Minnesota Grazing Conference**, Jackpot Junction, Morton. Call Doug or Janet Gunnink, (507) 237-5162, dgunnink@prairie.lakes.com

Feb. 1-3 **Upper Midwest Regional Fruit and Vegetable Growers Conference** , St. Cloud Civic Center. Call (763) 434-0400.

Feb. 8-9 **Minnesota Organic Conference** , St. Cloud Civic Center. Call Doug or Janet Gunnink, (507) 237-5162, dgunnink@prairie.lakes.com

Feb. 23 **The Practice of Restoring Native Ecosystems**, Bunker Hills Regional Park, Andover, Minn. Sponsors include the National Arbor Day Foundation. Call (888) 448-7337, or check the Internet at www.arborday.org.

About this newsletter...

For the past year we've been funded by the Minnesota Extension Service and the Minnesota Institute for Sustainable Agriculture (MISA) with support from the Minnesota Department of Agriculture.

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Our mission statement: To help bring people together to influence the future of agriculture and rural communities to achieve socially, environmentally and economically sustainable farms and communities.