Small grains, big benefits

IN THIS ISSUE:
- Water quality
- Nutrition education
- New Extension faculty
IN THIS ISSUE

Master Gardeners Inside front cover
make a difference
Small grains, big benefits 2
Widening the focus on water 4
Making the healthy choice 6
the easy choice
Protecting tomatoes from disease 7
Cover crops 7
New faculty are driven to discover 8

4-H Science of Agriculture Back cover

SUMMER 2016

COVER: Extension conducts research and delivers education in Greater Minnesota communities. Collaborating with farmers, such as those growing wheat and other small grains, is one example. Pictured: Jochum Wiersma, Extension small grains specialist (left) with Ron Pominje and Ruth Hoefs, farmers in LeSueur County.

From the Dean
Discovering Extension in every county

This year, we are bringing greater awareness to the many ways Extension reaches all corners of Minnesota. In 2016, I will visit all our regional offices and as many counties as possible.

It is always so inspiring to spend time in Greater Minnesota—to see our work, meet with our staff and partners, and find more ways to highlight Extension’s education, research and impact.

During these trips, I am visiting with Extension employees in the regional offices, meeting with donors and partners, attending local program events and conducting some media interviews along the way. I hope to see you during my travels!

This issue of Source highlights just some of Extension’s work in Minnesota. In addition to meeting our new faculty, you can learn more about Extension’s research on farms, water quality efforts, nutrition education, tomato disease resources, Master Gardener programs, and 4-H Science of Agriculture.

From Kittson to Houston, Rock to Cook, Traverse to Chisago, Roseau to Faribault—and all 79 counties in between, we’re proud to share the many ways that Extension connects with communities, partners and the University to address issues that matter most.

Sincerely,
Bev Durgan

CREDITS

Executive Editor: Aimee Viniard-Weideman
Managing Editor: Catherine Dehdashti
Writers: Eve Daniels, Catherine Dehdashti, Wendy Huckaby, Dan Mackaman, Allison Sandve, Aimee Viniard-Weideman
Designer: ECKES design
Photography: John Dresel, Catherine Dehdashti, Diane DeWitte, Jill Sackett Eberhart, David Hansen, Steve Niedorf, Cory Ryan, Allison Sandve, Dylan VanBoxtel, Aimee Viniard-Weideman, Big Stock Photo.
SMALL GRAINS, BIG BENEFITS

Farmers participate in research with scientists and educators who know their world.

Ruth Hoefs and Ron Pomije’s farmstead straddles the line between two townships in Le Sueur County. “Some of their crops and animals are in Lexington, and some are in Derrynane,” says Diane DeWitte, a University of Minnesota Extension agriculture educator based in the area. Their farm is also at the crossroads of extension research and education. They are in their sixth year of participating in trials meant to bring more wheat back to southern Minnesota after decades of farmers avoiding it due to low yields and disease problems. The study is one of over 100 Extension applied crop research projects taking place in Greater Minnesota.

Not only can wheat come back stronger to some areas, but so can other small grains—oats, rye and barley, says Jochum Wiersma, the Extension small grains specialist conducting research on the Hoefs-Pomije farm as well as on farms in Benson and Kimball, with funding support from the Minnesota Wheat Research and Promotion Council.

Why conduct research on Minnesota farms?

“The research we’re doing on farms complements that conducted on University research plots by providing a real farm-business environment,” says Wiersma. “It gives farmers a voice.”

“We want a diverse landscape on our farm, but it has to be worth it economically to grow more than corn and soybeans. So we get into a lot of back and forth discussions to figure that out,” says Pomije. “Our farmers in southern Minnesota want to learn how we can improve small grain crops outside of where they have more typically been grown in northwest Minnesota,” says DeWitte. “Many farmers in our region have not grown wheat and other small grains for over 20 years.”

The goal is to bring research to the farm and have it applied—or adopted—quickly for further study; whether that be new varieties or new production practices. “It makes things a lot less abstract,” says Wiersma.

Research on real working farms brings in the agricultural community to see it in authentic environments. “Seeing is believing,” says David Nicolai, Extension crops educator. “Other farmers, crop consultants and seed salespeople—they come to learn from Extension and the farmer about their experiences. Then those people turn around and share new information with others in the community.”

Breeding improvements

Jim Anderson, a professor and wheat breeder in the University’s Department of Agronomy and Plant Genetics, consults closely with Wiersma on variety selection for the trials. “Our expanded work with Jochum Wiersma resulted in our ability to process data from twice as many plots as before,” says Anderson. “We’re learning more about yield, quality, diseases and more. And we can now shorten the time it takes to evaluate and develop new varieties.”

Agricultural groups complement the role that individual farmers play in the research trials. For example, data is available for analysis within hours of harvest because of technology onboard the farm equipment that the Minnesota Wheat Research and Promotion Council is providing for the trials. Wiersma resulted in our ability to process data from twice as many plots as before, says Anderson. “We’re learning more about yield, quality, diseases and more. And we can now shorten the time it takes to evaluate and develop new varieties.”

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Small grains and forage crops on fields that at other times grow corn or soybeans can improve soil health, reduce erosion, and potentially even reduce the need to fertilize the corn and soybeans. Wheat uses less water too, so it lets the soil recharge for a season, and that helps the corn grow there later.

The scoop on small grains

Wheat, barley, oats and rye are all cool-season grasses, but advances are making them competitive again in the southern part of the state,” says Wiersma. “It isn’t an economic and environmental fit for everybody to grow these crops, but for those who are serious about it, Extension provides the research foundation for success.”

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“We had our best wheat crop the last two years, and that was based on the varieties we selected and how we managed, all based on the data from the Extension project,” says Pomije. “And it feels good to us to know we are contributing to University research and education.”

Giving new crops a chance

Pomije and Hoefs started out growing small grains to “mix it up” a bit. Alternating crops on a field from one year to the next (“called rotating”) has a lot of benefits. Growing small grains and forage crops on fields that at other times grow corn or soybeans can improve soil health, reduce erosion, and potentially even reduce the need to fertilize the corn and soybeans. Wheat uses less water too, so it lets the soil recharge for a season, and that helps the corn grown there later.

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“I wouldn’t mind getting into that,” says Pomije, who may try to grow barley next.

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Widening the focus on water
Water issues require integrated Extension research, education and community engagement

If you throw a stone anywhere in Minnesota, you’re bound to make a splash. We’re surrounded by nearly 12,000 lakes and 70,000 miles of rivers and streams. Minnesota has a total water surface area of around 13 million acres, almost as large an area as all of the state’s corn and soybean acres in any given year. Minnesota has more wetland acres than any state except Alaska.

While all of this water makes for some excellent scenery, our economy depends on it too. From fishing and boating to parks, our water resources support a thriving tourism industry. In 2014, travel and tourism generated $13.6 billion in gross sales for Minnesota. Then there is the economic impact of agriculture, which also depends on water.

Managing these resources while meeting our needs presents a host of issues. Fortunately, the University of Minnesota is home to some of the world’s most advanced water research.

“Because of the extraordinary water resources we have in Minnesota, geographically we’re like a living laboratory,” says Jeffrey Peterson, director of the University’s Water Resources Center, a partnership between Extension and the College of Food, Agricultural and Natural Resource Sciences. “We’ve developed the capacity to address a whole range of water-related issues in many different fields of study.”

As the University’s connection to Greater Minnesota, as well as urban and suburban communities, Extension provides ongoing research and education on water resources to partners across the state.

www.extension.umn.edu/environment/water

Extension efforts provide a variety of opportunities to ensure our water remains healthy, safe, clean and abundant.

Starting at home
Water use in home landscapes accounts for nearly one-third of residential water use, totaling nearly 9 billion gallons per day. Lawns are the single largest irrigated area in the U.S. Excessive watering impacts both availability and quality of drinking water. Extension tackles these challenges by conducting research and education on drought-tolerant, low-maintenance grasses. In addition, the Water Wisely educational campaign launched in spring 2016 teaches ways to better care for lawns, gardens and trees. And a recent grant from the Metropolitan Council is funding a new study of lawn irrigation practices and systems. 

Making greens greener
Parks and golf course managers can make changes, such as turf selection and timing of treatments, fertilizer and watering, that make golf courses a better ecological fit near bodies of water. Through educational partnerships, such as the Great Lakes School of Turfgrass Science and the Minnesota Golf Course Superintendents Association Environmental Stewardship Program, Extension researchers share the science-based principles needed to effectively manage turf for parks, recreation and sports.

Stopping invaders
Minnesota’s lakes, streams and shorelines are increasingly threatened by aquatic invasive species, endangering ecosystems, communities, fishing and tourism. We have few ways to address these threats, but new research is bringing progress. One strategy resulting from Extension’s partnership with Minnesota Aquatic Invasive Species Research Center (MAISRC) uses “ecological niche modeling” tools to help predict the spread of species. Computer models analyze pathways of spread and where species will survive. Another strategy with Extension and MAISRC is the Aquatic Invasive Species Detector volunteer program, which will begin training volunteers in fall 2016. Another strategy with Extension and MAISRC is the Aquatic Invasive Species Detector volunteer program, which will begin training volunteers in fall 2016.

Balancing nitrogen use
Nitrogen is the nutrient most often deficient for Minnesota crop production. But applications that exceed crop needs can result in excess nitrogen moving to ground and surface water in the form of nitrates. Through Nitrogen Smart, a new educational program made possible through a joint effort of Extension, the Minnesota Corn Growers Association and the Minnesota Agricultural Water Resources Center, agricultural producers learn to maximize return on their fertilizer investment while minimizing impacts on natural resources.

Informing aquaculture
Regional interest in aquaponics—growing fish and plants in water together for food, and growing algae for livestock feed and fuel—has been on the rise for years. But until recently, fledgling aquaponics businesses did not have a basis for how to ensure the safety of the food they produced. In response, University and Extension faculty and educators developed an aquaponics program. It includes an undergraduate course, research projects, continuing education opportunities and industry partnerships.

Responding to climate challenges
Climate matters to Minnesota. Transportation, agriculture and recreational infrastructures are based on it. Extension helps Minnesotans respond to challenges caused by changing weather patterns, such as flood and drought extremes. Extension’s Regional Sustainable Development Partnerships recently held climate change adaptation conversations in communities across Greater Minnesota, with support from the Steger Foundation and an Environmental and Natural Resource Trust Fund grant. Mark Sieley, Extension climatologist, led conversations about innovations and strategies at the household, farmland and community level to adapt to a changing environment.

Engaging communities
Water can be controversial, but carefully navigated controversy can lead to resourceful decision making. Extension’s leadership and civic engagement education provides training for state agency staff, watershed managers, and Soil and Water Conservation District leaders to help them ask good questions, clarify issues and identify options before they decide on collective actions. As a result, more voices are heard and better decisions are made when they are informed by diverse community perspectives.
Making the healthy choice 
the easy choice

Extension SNAP-Ed creates greater impact through partnerships

When clients visit the ECHO Food Shelf in Mankato, they enter a place subtly structured to help them make nutritious choices.

Some of what clients encounter is visual—an appealing setting where fresh fruits and vegetables are displayed prominently, for instance. Other features are practical. Text messages encourage clients to pick up produce while it’s fresh. Volunteers use “healthy nudging”—helpful encouragement and preparation tips that promote vegetables and whole-grain foods, without any “shoulds” or judgment.

All result from a partnership between ECHO and the University of Minnesota Extension’s Supplemental Nutrition Assistance Program-Education (SNAP-Ed). SNAP-Ed previously known as food stamps, helps low-income individuals and families buy food. Recipients include the elderly, families and veterans, many of whom are employed. Nearly one-third of households receiving SNAP food assistance have to visit a food pantry to keep themselves fed, according to the United States Department of Agriculture (USDA). SNAP-Ed results in clients making healthy nutritional choices wherever they are. Both SNAP and SNAP-Ed are funded by the USDA.

Rachel Jones, Extension SNAP-Ed educator, leads Mankato-area programs that equip volunteers with approaches to “nudge” clients toward healthy choices. “We want to make healthy choices the easiest choices,” she says.

Deisy De Leon Esqueda, director at ECHO, says it makes a difference when Jones teaches volunteers just how to do that. “Our volunteers have contact with many families walking through the door every day,” says De Leon Esqueda. “For every volunteer trained by Extension, we reach many more clients with messages about how to be healthier, while treating them with respect and dignity.”

“With innovations such as the texting program we helped create, as well as volunteer education, we can extend our reach to more people,” says Kelly Kunkel, Extension health and nutrition educator.

The ECHO-Extension collaboration corresponds with the USDA’s new SNAP-Ed guidelines, which move beyond Extension’s historic emphasis on direct education to creating changes that foster consumption of food that’s healthy, affordable and accessible, says Tish Olson, director of Extension family development programs. Olson and colleagues are working with obesity researchers in the University of Minnesota School of Public Health and elsewhere to study the effectiveness of their efforts.

Extension leaders began reframing statewide SNAP-Ed programs in 2015 to align with the USDA’s expanded direction. Providing education and research-based information to groups that work directly with SNAP recipients enables Extension to have a lasting influence on the wide scope of issues that impact nutrition.

In 2015, Extension SNAP-Ed and 281 partners helped nearly 40,000 people make healthy food choices.

Protecting tomatoes from disease

To meet the demand for fresh, local fruits and vegetables in Minnesota, many growers use high tunnels to protect their crops from weather extremes and extend the growing season. Unfortunately, the environment within a high tunnel can allow more plant diseases to thrive.

Angela Orshinsky, Extension plant pathologist, studies diseases in a wide variety of horticultural crops.

One result, a new guide titled “High Tunnel Tomato Diseases: A guide to identification and management,” is now helping growers raise a healthy crop.

Cover crops—alfalfa, radishes, turnips, and more—have historically been grown after corn or other crops that are harvested in the fall, or anytime the ground is bare. For several years now, an increasing number of farmers have embraced cover crops as a way to anchor the soil so it won’t erode and wash away and to prevent weeds.

It isn’t always easy to grow cover crops in cold climates. New research is helping farmers determine what to grow, when to plant and what the full range of benefits includes.

Jill Sackett Eberhart, a University of Minnesota Extension crops educator, says research activity accelerated in Southeast Minnesota with participation from watershed managers. Besides preventing erosion, it appeared that the organic matter dying plants add to the soil helps a field absorb heavy rains without the water escaping to the nearest watershed.

But research was lacking, so Scotty Wells, an Extension agronomist and assistant professor, began carrying out replicated trials on multiple farms. Learning tours were also part of the strategy.

“Cover crops help,” says Dean Thomas, a watershed manager in Fillmore County. “It’s not the only thing that helps, but Scotty’s been sharing the data and it’s really caught people’s attention.”

“The advice I’ve been taking is to keep a living root in the soil as close to year-round as I can,” says Jerry Ackermann, a participating farmer in Jackson County. The Ackermanns have been concerned about pollution problems in nearby Heron Lake and want to make sure they are doing their part to help.

Jerry and Nancy Ackermann have been involved with other Extension research projects, including a major research project with Jeff Coulter, Extension corn agronomist, and Liz Stahl, Extension crops educator based in Worthington. That study found that growing alfalfa reduces the need for nitrogen fertilizer for corn grown in the same field the year following an alfalfa crop.

“Of all the years of itty-bitty cover crop projects have led to where we are now,” says Eberhart. “The farmers who have collaborated on the research have certainly had some hassle factors to deal with, but they’ve also seen some of their own ideas put to the test and made a part of this whole new body of knowledge.”
New Extension faculty are driven to discover "How families communicate and interact about their finances can transform their economic well-being," says Joyce Serido, Extension family finance specialist and associate professor in CEHD.

Serido’s research findings are informing Extension programs that provide education for low-income families. A pilot program in 2015 and 2016 is helping families understand different types of college financial aid and manage expenditures proactively to reduce potential for high levels of post-college debt. “My long-term research goal is to explore the connection between parenting practices and financial behaviors among low-income and diverse youth,” she says.

Jeffrey Peterson, Extension economist and director of the University’s Water Resources Center, says, "Our goal is to bring together different groups of people with different areas of expertise, to collaborate, encourage conversation and listen." Peterson believes the effort of faculty engaged in water-related science, policy and economic research. "One of the biggest challenges we face today is protecting the quality and supply of our water resources," says Jeffrey Peterson, Extension economist and director of the University’s Water Resources Center. The center, a partnership between Extension and CFANS,provides objective, science-based information to help farmers, communities and governments make informed decisions that impact water quality. Peterson coordinates the efforts of faculty engaged in water-related science, policy and economic research.

Joyce Serido: Engaging families to become financially capable

"Forest are one of our best tools to reduce carbon dioxide emissions," says Matt Russell, Extension specialist and assistant professor in CFANS.

Russell uses the power of technology to help landowners and natural resource professionals better manage forests. He recently partnered with the USDA Forest Service to create the Forest Carbon Xplorer, an app that uses forest inventory data to show how much carbon a forest can absorb.

Dan Larkin: Protecting our lakes, rivers and streams

Dan Larkin and his team work to prevent the spread of aquatic invasive plant species. Larkin is an Extension specialist in the Minnesota Aquatic Invasive Species Research Center and assistant professor in CFANS.

“We want to support healthy lakes that benefit biodiversity, recreation, tourism, and the other goods and services that we value so highly,” says Larkin. “We are taking a multi-pronged approach to understand what is driving the spread of these species, limit and control those species, and turn back damage that has been done.”

MATT RUSSELL: Developing technology to help forests thrive

Jennifer McGuire: Addressing family issues with information, compassion

Jennifer McGuire, Extension specialist in family relations and an associate professor in CEHD, is closing gaps for those who have not been well served by parenting education. Thrice include same-sex couples, such as those going through a divorce or breakup who still need to co-parent in ways that are healthy for their children.

McGuire is also a pioneer in research on the needs of transgender children. “Bullying is a common but harmful reaction toward gender and sexual diversity. "This past year, Minnesota can teach the world how to make sustainable decisions," says Russell. "The forest industry contributes 60,000 jobs and over $1 billion to Minnesota’s economy."

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When University of Minnesota Extension 4-H challenged Minnesota youth to come up with science-based solutions to agriculture-related issues, the youth took “science-based” to heart.

A Meeker County 4-H team, for example, developed a 3-D printed ear tag that will allow farmers to electronically track and monitor their livestock using GPS technology. “We thought it would be helpful to be able to monitor livestock from a phone or computer,” says Andrew Massmann, age 16. “A family we know lives four hours away from one of their pastures.” Their mentor is Erik Hildebrand, a biologist from the Minnesota Department of Natural Resources who tracks Minnesota’s moose population.

4-H Science of Agriculture teams work with adult mentors to identify their issue and develop solutions. They practice presenting their results at spring regional events before moving on to a June statewide event at the University of Minnesota.

Minnesota agriculture leaders are excited about the 4-H challenge, becoming expert mentors and providing financial contributions for grants and scholarships.

“Minnesota is facing a shortage of ‘ag literate’ professionals,” says Adam Birr, Minnesota Corn Growers Association executive director. “This program gives kids a wonderful hands-on experience digging into issues facing agriculture. By working with local ag professionals, they also get exposed to possible future careers at businesses in their communities.”

z.umn.edu/4HScienceofAg

2016 PARTNERS, THANK YOU!

Minnesota Corn Growers Association, AgStar, Pentair, American Crystal Sugar, Jennie-O Turkey, Rahr Corp., Minnesota Farm Bureau and Minnesota Farmers Union

Extension 4-H Science of Agriculture youth in Meeker County are developing a 3-D printed ear tag to monitor livestock using GPS technology. Watch a video about their experience at z.umn.edu/15zb.