



2002 Annual Highlights

NDSU Extension Service ■ North Dakota Agricultural Experiment Station

NDSU
North Dakota State University

You've seen those stories

about farmers taking time to help an ailing neighbor harvest his crops. In your own neighborhood you've probably pitched in to help an elderly neighbor, donate hay for a drought-stricken rancher, raise money for a sick child or clean out a flood-damaged basement.

You know it's not about the crops. Or money. Or fame. It's about people. Your neighbors. Your friends. Your fellow citizens. It's in our nature to help people and make their lives better.

That's what the work of the NDSU Extension Service and the North Dakota Agricultural Experiment Station is about, too. People. People in your family. Your neighborhood. Your community and your world.

Our history is filled with groundbreaking advances that have helped families, communities and businesses. We've improved crops and livestock, helped farmers and businesses earn more profit, and helped families educate their children and cope with stress and disaster.

We listen to you to learn what you need. You meet with us at field days and seminars, and in e-mail exchanges. When our advisory boards and panels meet, we pay attention and take notes. There is high-speed Internet access at most county extension offices, and two-way video conferencing capabilities are growing. That technology is bringing our full complement of research and outreach specialists closer to the people they serve than ever before.

Our faculty and staff work closely with people across the region. They're dedicated to making life better here and to helping you and your neighbors succeed. The Extension Service has 53 field offices in North Dakota. There are eight research extension centers in the state where researchers solve local problems and demonstrate new ideas under local conditions. We're your local researchers, developers and life-long educators. Simply put: we're here to help.

Yes, our work is about crops and cattle, food and the environment, parenting and life skills. But mostly, it's about people.

This report is a sampling of the efforts by faculty and staff of the NDSU Extension Service and the North Dakota Agricultural Experiment Station. We hope it gives you a flavor of our work and glimpse of how we work with people across the region.

Greening the Plains



Dale Herman's job requires patience. Lots of patience. Herman is an NDSU research horticulturist and teacher. He's been with the university for 31 years, specializing in research of hardy woody plants of the Northern Plains.

"My goal is to release one new variety for each year of service here at NDSU," Herman says. "But it takes a

lot of research and patience. With this type of research, you don't always know how many years of testing are required, especially in a Plains environment where you have cold climate hardiness concerns, deficient moisture stress, and variable soil and pH conditions."

NDSU recently released the Prairie Dream Paper Birch (*Betula papyrifera* 'Varen'). Seeds from this native tree were collected in the Killdeer Mountains in 1973. Seedling trees were planted in the NDSU Research Arboretum in 1975.

"Our goal was to find a more environmentally adapted, stress tolerant Paper Birch for landscape planting," Herman says. "After 27 years, we've come up with a tree that has a distinct white, peeling bark and dark green leaves that turn a golden yellow in the fall. It has a high resistance to bronze birch borer since none of the trees

have been attacked. Meanwhile, many of the birch trees in our large collection are dead or dying from borers."

Hopefully, trees will be available in 2003 from nurseries. A potential borer-resistant Asian White Birch is also being released.

The work of Herman and other researchers has changed the way landscapers and homeowners do their planting. "The days are gone when people would plant five plants across the front of the house," says Eric Baker of Baker Nursery Gardens in Fargo. "There are so many new plants that allow customers a variety of options. Hosta is a good example. This year, we had over 100 cultivars of Hosta (plantain lily) available."

More cities are requiring developers to add landscaping and green space, according to Baker. "In Fargo, for example, new stores have parking lot buffers using plants and trees. We'll really see the benefits and beauty in 20 to 30 years as the trees become mature. Some suburbs of Chicago started years ago, and it's amazing to see the rich beauty of the trees and plants in mall settings."

Researchers have long developed new varieties that fit the environment and are disease and insect resistant. "Today, it's much more than that," says Herman. "Consumers also want trees, shrubs and plants that add color, including foliage, flowers, fruits or autumn hues, and texture." Baker agrees. "Today's consumer is very educated and often comes to our nursery looking for a specific cultivar. Usually, all I have to say is that the cultivar was developed in North Dakota, and it becomes an easy sale."

The main NDSU Research Arboretum is located near Absaraka, and woody plants are evaluated in statewide trials at NDSU research extension centers in Minot, Dickinson, Carrington and Langdon. "We also collaborate with urban foresters in Grand Forks, Fargo and Bismarck, as well as the North Central Regional Plant Introduction Station in Ames, Iowa, which includes 15 other states in our evaluation process," Herman says. He also collaborates closely with large wholesale production nurseries, which propagate his new introductions.

Herman has traveled to other countries looking for hardy woody plants that would be suitable for our region.

So consumers can make informed choices, results of his research are available through NDSU and extension horticulturists and agents. He also gives presentations at conferences and participates in the Master Gardener program. He will provide a list of NDSU introductions to all who contact him.

While Herman won't say which introduction is his favorite, his research work is being noticed. "Almost every year, he leads a discussion at our North Dakota Nursery and Greenhouse conference," Baker says. "His patience in doing research certainly has provided us with more choices, which is good for consumers."

For more information: Dale Herman, 701-231-8477, dale.herman@ndsu.nodak.edu

New Plants

The Northern Plains are greener, thanks to Dale Herman and his colleagues at NDSU. They've released 25 new woody plants for homeowners and landscapers in the last 31 years that have been exhaustively tested for performance under local conditions. Recent releases:

- **Copper Curls™ Pekin Lilac - *Syringa pekinensis* 'SunDak'**
Selected for its showy coppery-orange peeling bark and large, attractive white flower panicles.
- **Northern Acclaim™ Thornless Honeylocust - *Gleditsia triacanthos* var. *inermis* 'Harve'** A medium-large tree with greater winter hardiness than currently available cultivars. It is thornless and seedless.
- **Prairie Statesman™ Swiss Stone Pine - *Pinus cembra* 'Herman'** A very elegant, stately pine for use as a specimen tree. Very winter hardy. This selection will not be available immediately.
- **Prairie Dream™ Paper Birch - *Betula papyrifera* 'Varen'**
A stress-tolerant selection with snow-white exfoliating bark. Excellent grown single or multi-trunked.
- **Prairie Vision™ Asian White Birch - *Betula platyphylla* 'VerDale'** Native to western China. Bark is white with blackish markings. Its broad leaves are golden yellow in fall. Very winter hardy.
- **Prairie Horizon™ Manchurian Alder - *Alnus hirsuta* 'Harbin'**
The most drought-tolerant alder in NDSU trials. Rapid-growing, medium-sized with dark green leaves.



Eric Baker

The work of researchers has changed the way landscapers and homeowners do their planting.



Safeguarding Health

West Nile virus. Anthrax. Rabies. Scours. They're all in a day's work for the NDSU Veterinary Diagnostic Laboratory. That's where the region's livestock producers and veterinarians look for help when they have health concerns related to their livestock.

Don Safratovich, a veterinarian at the Hettinger Veterinary Clinic, consults with the NDSU Veterinary Diagnostic Laboratory about three times a week. "They do an excellent job for us," he says. The drought in southern North Dakota has watering holes and dugouts at low levels with water of questionable quality. "We've sent a lot of water samples to the diagnostic lab this summer. We get a good turnaround from them so we can get results back out to ranchers."

"That's our job," explains Neil Dyer, director of the laboratory. "Everything from a bump off a dog to a blood sample to a whole cow may come in the door." Recent work has included water and feed samples, and samples from zoo animals, companion animals and livestock. Cases related to cow-calf production, however, predominate.

For the past five years, the laboratory has seen about 10,000 cases a year. Most come from veterinarians around the region. Along with water tests, specialists check for vomitoxin in scab-infected grain, high levels of nitrate that can accumulate in plants during drought conditions and mold-produced toxins from stored feeds. They detect the toxins and make recommendations for how to best use the contaminated feeds.

"Our laboratory has established a reputation for high-quality work in toxicology. We're able to give our livestock producers a few more options for dealing with those kinds of problems," Dyer says.

Disease Threat Strikes Close

"We've made substantial progress in eliminating scrapie from our flock," says Bert Moore, a sheep researcher who oversees sheep used for NDSU research. So much progress, in fact, that a quarantine instituted in March that could have lasted for a number of years will be lifted sooner.

NDSU used a relatively new genetic test to identify sheep resistant to the disease. Except for those to be used specifically for research, susceptible sheep were eliminated. The process has reduced sheep numbers in the flock near Fargo and at the Hettinger Research Extension Center by more than half to about 1,200.

In cooperation with the USDA, NDSU may develop a research project to learn more about the disease and to demonstrate how to eliminate it from flocks. "We were handed a lemon and we want to make lemonade for producers from it," Moore says.

The emergence of the West Nile virus in North Dakota added to the laboratory's work. "We were thinking it might be possible for it to reach North Dakota this year. We sent some of our staff to training in conducting the serum test for horses, and we purchased the materials to do the tests," Dyer says. The laboratory diagnosed more than 98 percent of the horses confirmed with the disease in North Dakota.

NDSU Extension Service agents and specialists also work closely with the laboratory to share information and alert the public to livestock and human health risks. Agents have provided public education on the West Nile virus. "They worked with media to create an awareness of the disease, what it is and what it could do," explains Gerald Sturn, extension district director for southwestern North Dakota. The agents also collected dead birds and sent them to the North Dakota Department of Health for testing.

The lab works closely with the health department because the number of infected animals is reflective of the risk to humans. That's similar to other diseases like rabies or anthrax with which the laboratory commonly deals. That relationship is likely to get closer.

"Sept. 11 of last year changed everything: from how we handle samples to plans for responding to a bioterrorism threat," Dyer says. Plans call for the laboratory to serve as an overflow facility for the Department of Health in the event of a large-scale public health emergency. The laboratory also plans to upgrade some of its facilities to deal with organisms that are more virulent and dangerous to humans. "Those activities won't be a big part of our effort, but it improves our ability to serve the state," Dyer says.

The laboratory also benefits from and contributes to NDSU's academic programs. Dyer and some of the other five faculty members in the laboratory teach classes. "Having the student population here forces you to do a better job of staying current. We have other faculty members to collaborate with, and we benefit from the research that goes on," he says. "Students benefit because we use real-world cases in class. They're not always dealing with theory, but actual cases and tissues that we've seen in the lab."

That mutually beneficial relationship will be particularly evident in the doctoral program in molecular pathogenesis offered by NDSU for the first time in the spring of 2003. The program will give students background in studying the most basic biological functions and structures of bacteria, viruses and other pathogens that threaten animal health and food safety.

For more information: Neil Dyer, 701-231-7521, neil.dyer@ndsu.nodak.edu



Don Safratovich

The laboratory is where the region's livestock producers and veterinarians look for help.



Irrigating Western North Dakota



Klint, Verland and David Hartsoch

For David and Monica Hartsoch, irrigation changed their lives. “Absolutely, without a doubt,” Monica says. The Hartsoch’s farm lies in the Nesson Valley east of Williston. “We have an aquifer that flows under the valley and soil that is suitable for irrigation,” David says.

David’s father Verland, at age 82, is still active in farm-

ing. “He just stacked about 100 hay bales so they could be moved,” David says. “My son Klint is also active in our operation. We started irrigating back in 1981 with one pivot but now have four pivots, counting the one Klint just installed. Irrigation seemed like the answer we needed to raise our own cattle feed.”

In a joint venture, a 160-acre research site is being established in the valley. The research is being conducted by the NDSU Research Extension Center in Williston, and the Montana State University Eastern Agricultural Research Center and the USDA Northern Plains Agricultural Research Laboratory, both located in Sidney, Mont.

“Between us, we can deliver applied and basic research on any crop grown here. We can cover production, management and technology,” says Jerry Bergman, director of the NDSU and Montana State University centers.

Researchers are working with producers and other organizations to increase the use of irrigation. “Irrigation gives us options as to what crops are grown in the region,” Bergman says. “As the use of irrigation grows, it also provides us with opportunities to look at value-added possibilities.”

The Hartsochs have irrigated small grains, potatoes, sugarbeets, beans, sudan grass, millet and alfalfa. “We’re excited about alfalfa because of the new alfalfa processing plant in Tioga,” David says. The plant will process the alfalfa into double compressed bales or cubes that will be sent to markets throughout the country and to Pacific Rim countries.

“I think we’re going to see more emphasis placed on alfalfa because of the new plant,” says Chet Hill, NDSU Extension Service value-added agriculture specialist in Williston. “If we can get the price up around \$75 a ton and averages somewhere in the six-ton range, it will be our most profitable crop.

“We’ll have educational opportunities in alfalfa management, planting, harvesting and finding the best quality product that the plant in Tioga is requesting. That will be in addition to all the other irrigation and dryland research we do.”

That other research has meant a lot to Monica Hartsoch. Monica and her partners started raising vegetables using the

corners of the irrigation system. Pipe was trenched in so the vegetables could be watered. “We tapped into the expertise of Ron Smith, NDSU horticulturist; the irrigation specialist in Carrington; and the Extension Service in Williston,” she says.

They sold their products at a roadside market. “We had around 100 people lined up every Saturday morning. We did that for about three years before we went to growing commercially.”

They developed a homemade ranch dressing that customers could use to taste-test vegetables at the roadside market. “People really liked it and wanted to buy the dressing,” according to Monica. “From there, we moved on to soup mixes and other products under the Thunderbird brand name.”

As sales increased, they needed to find a commercial kitchen to increase production, which meant a possible large investment. “We visited the Williston Research Extension Center and noticed the kitchen in the Ernie French Center,” Monica says. “It was an ideal setup for us. We used the facility for almost a year before we outgrew it.” Monica now works out of a facility in Ray.

The Ernie French Center, named for the former WREC superintendent, was recently built as a regional agricultural technology transfer facility.

Monica and her partners no longer raise their own vegetables so they can keep up with increasing sales of their other products.

Increasing indeed. Thunderbird products are now sold in eight states. The company produces five soup mixes, two quick breads, and 11 dips and rubs. “We try to use North Dakota products as much as we can,” Monica says. “Our lentils come from Ray, the barley from Grand Forks and the pasta from Carrington.”

For more information: Jerry Bergman, 701-774-4315, expwill@ndsuxext.nodak.edu

The Western Malting Barley Program

Most current varieties of malting barley and recommended production practices were developed for eastern North Dakota, but the quality of barley grown there has been severely impacted for nine years by *Fusarium* head blight.

The 2001 North Dakota Legislature directed the North Dakota Agricultural Experiment Station to spend up to \$288,000 for research on developing malting barley for western North Dakota.

Research at the NDSU research extension centers at Dickinson, Hettinger and Williston, and at the main station in Fargo focuses on:

- Developing six-rowed and two-rowed malting barley varieties for dryland and irrigated production.
- Developing management strategies for producing malting barley under dryland and irrigated production conditions.
- Identifying barley diseases that could threaten the barley crop.



Monica Hartsoch and Mary Schmidt

Thunderbird products are now sold
in eight states.



Diagnostics for Dairying

Jack and Kathy Spah are concerned about the North Dakota Dairy Diagnostic Program's effect on their farm near Tuttle. "It takes a lot longer to get the milking done now that the cows are producing so much milk," Jack explains.

Then he readily admits that "it's not such a bad problem."

The Spahs joined the program with a different perspective than most other participants. "We were looking for a way to get out of dairying," Kathy explains. A team of experts helped them look for ways to boost income and liquidate their dairy herd. The team included a farm records specialist, a dairy nutritionist, the field representative from Cass Clay Creamery and Craig Kleven, the NDSU extension agent in Kidder County.

"We realized that dairy is what's paying the bills and keeping us going," Kathy says. Since those initial meetings about a year ago, the Spahs have boosted milk production from their 50 cows by an average of 15 to 20 percent. Plans to liquidate the dairy herd are on hold.

That kind of improvement is not uncommon, says J.W. Schroeder, extension dairy specialist and director of the program.

The dairy industry is second in gross receipts from animal agriculture in North Dakota. But a declining agriculture economy, aging producers and technology were taking a toll. Dairy cow numbers dropped 3 to 17 percent annually during the last decade. The state's creameries were running far below capacity.

"While the state was talking about value-added industry, one such industry, the dairy industry, was very much at risk," Schroeder says.

With support from the North Dakota Department of Agriculture, a 1997 North Dakota Dairy Summit addressed those concerns. A task force formed there developed the Dairy Diagnostic Program in 1998 and asked the NDSU Extension Service to design and implement it.

The task force included producers, service and support industries, power utilities, processors, regulatory agencies and individuals in public service. "These were all segments of North Dakota communities that had a vested interest in seeing dairying survive and thrive," Schroeder says.

Tom Risdal, a farm management consultant who coordinates the program, says producers are hesitant to sign up despite the program's proven track record. "It takes an admission that you could do things better. Everyone thinks this is a great program for their neighbors." There have been 51 producers enrolled in the program.

"You have to be open-minded and willing to try new things," Jack admits. The Spahs say the team helped them with issues from feeding issues, buying and selling feed, pasturing and grazing, to installing automatic door openers in the milking parlor to alleviate chronic back and shoulder pain for both of them.

The program gives dairy producers access to a broad range of expertise. "The producers take the lead. We'll help them bring anyone on board who can help them with their goals," Schoeder says.

NDSU's involvement also gives producers access to resources of extension and research staff. Even though extension agent Kleven doesn't bring much dairy expertise, he offers advice on grazing, crop production and marketing, all components important to farm business success.

Although not directly linked to the Dairy Diagnostic Program, NDSU researchers support the region's dairy industry. Nutritionist Chung Park developed a widely adopted feeding regimen that enhances heifer growth and udder development. The strategy boosts lifetime milk production by up to 15 percent. Park and Schroeder are now studying how the regimen might improve heifer and cow health. The information the scientists learned about mammary cell development also may provide clues to combating human breast cancer.

Additional research focuses on feeding oilseeds such as canola and sunflower to lactating cows. Boosting conjugated linolenic acid (CLA) in milk by feeding oilseeds could give it anti-cancer properties.

"That kind of research helps set the stage for dairy's future in the state," Schroeder says. "The Dairy Diagnostic Program helps producers improve their operations right now, and they are the foundation that the future will be built on."

For more information: J.W. Schroeder, 701-231-7663, jschroed@ndsuxt.nodak.edu

Adding Value to Animal Agriculture

NDSU experts are helping the state's livestock industry find ways to add value to livestock products, putting more dollars into the region's economy.

At the NDSU Hettinger Research Extension Center, small groups of cattle are being accepted into a trial feedlot. Results will show producers how their cattle might perform in a custom backgrounding environment.

The NDSU Extension Service and the N.D. Department of Agriculture sponsored a two-day summit in January focusing on value-added animal agriculture for livestock producers, economic developers and financial lenders from across the state.

Researchers found that potato-processing waste in finishing cattle diets can cut production costs depending on the price of corn. Scientists also found that bread byproducts are 110 to 125 percent of the feed value of corn. They've also studied sugar beet pulp, wheat midds, corn gluten meal and pasta waste to give livestock producers new low-cost feed options and provide information on the potential for finishing livestock in the state.



Jack and Kathy Spah

You have to be open-minded
and willing to try new things.



4-H'ers for Life



To say the Ziegler family has a romance with the North Dakota 4-H program might be an overstatement. But not by much.

Larry and Barbara Ziegler, then Barbara Haugen, were crowned 4-H king and queen of the 1961 McLean County Fair. Larry, a member of the Flickertail Farmers Club, endured the midway rides to

impress Barbara, a member of the Nimble Fingers Club, during their first date the next evening.

More than 40 years later, Barbara still loves midway rides. Larry still dislikes them. They're both still stalwart supporters of 4-H and have passed their love of 4-H to their children. Daughter Karen Skjold is a 4-H leader and her children Khale (12) and Clair (10) are in 4-H. Son Steve was crowned 4-H king. He lives in Hazen with his wife, Dawn, whom he met at a state 4-H conference. Daughter Deb, of Minot, was McLean County 4-H Princess and an active 4-H'er.

"It was strictly rural clubs back then," Larry notes. "We had lots of livestock and agriculture-related projects." Larry now serves as president of the McLean County Fair. "We had as many projects this year as we've ever had, but they are much more diverse. Everything from photography to rocketry."

That diversity is reflected in the activities of Khale and Clair. Karen's children are in a club in Grand Forks. Last year, the club had a focus on different sports. This year, the group is planning a fishing trip with parents.

Keeping parents involved is a challenge, Karen notes. "If the kids are going to get anything out of 4-H, parents have to be involved," Barbara says. She and Larry served as 4-H leaders for years. Larry was leader of his former club for more than 20 years.

"Lots of clubs have failed, and now we have one club where there were eight or 10 clubs. The population in the country is aging. There just is not the number of kids there used to be," Larry said.

"And we are not the 4-H we used to be," says Brad Cogdill, state 4-H director. "We're still reaching youth through local clubs, but we also reach them through after-school programming and school enrichment programs. We also do training and development activities for people involved with youth."

Examples of school enrichment programs include an embryology project to enhance science in the classroom, food safety programs, and character education, teamwork and conflict resolution curricula for teachers.

The national 4-H centennial this year was more forward-looking than nostalgic. Activities focused on community service. County, state and national "conversations" with youth were held to assess their needs. From North Dakota, several themes emerged:

- Communities and organizations need to develop programs that promote cooperation among business, schools, communities and youth groups.
- Youth organizations need to explore mentoring programs that develop partnerships between individuals that build trust, respect and tolerance.
- Extracurricular activities such as 4-H, Scouts, special interest clubs, etc. need to be embraced by schools to provide the best opportunity for youth success.
- Communities need to involve youth in their decision-making processes to encourage youth to take pride and responsibility in their communities.

"We'll be developing new programming as a result of those discussions," Cogdill says. "They give us some great direction for moving into 4-H's second century."

One thing that hasn't and won't change is 4-H's family focus. "Many families have parents and brothers and sisters involved in 4-H programs. That has not changed," Cogdill says. "We're stressing the importance of family activities with today's busy lifestyles. Families are looking for opportunities to spend time together."

That's something Karen and her family appreciate. Her grandmother was a 4-H leader, making her children the fourth generation of her family to be involved in 4-H. "We're not going to do cows in our club. We've gone to rockets, computers and electronics, and we also touch on writing and careers. I'm very grateful that 4-H has kept up with the times."

For more information: Brad Cogdill, 701-231-7253, bcogdill@ndsuxext.nodak.edu

100 Years Young

Nationally, 4-H celebrated its centennial in 2002. North Dakota 4-H marked the milestone with strong participation. More than 6,100 youth belong to organized 4-H clubs, and more than 42,000 youth participate in extension 4-H programs in North Dakota, including school enrichment and special interest short-term programs.



About 5,100 volunteers work with youth in North Dakota 4-H programs.

The estimated total value of time and expenses of North Dakota 4-H volunteers annually is more than \$1 million.

Garfield celebrates the N.D. Conversation for Youth.

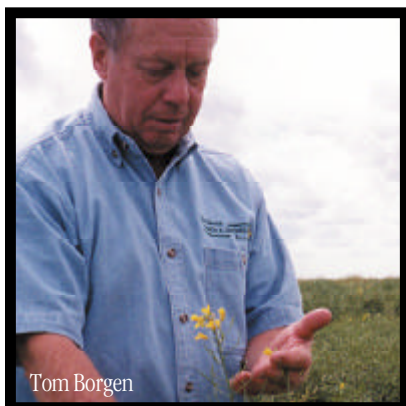


Jeff Skjold, Karen Skjold, Larry Ziegler, Barb Ziegler and Deb Rasmuson
Front: Khale Skjold, Clair Skjold and Ethan Rasmuson

One thing that hasn't changed and won't change
is 4-H's family focus.



Expanding New and Alternative Crops



Tom Borgen

When Tom and Nola Borgen moved back to the farm in 1981, Nola's father was already growing canola. "It was a good rotation and the money was there, but there were some difficulties," says Tom, who farms near Langdon.

The Borgen family is one of many that grows new and alternative crops. "We grow approximately 50 crops in North

Dakota, but only 10 to 12 are what we call major crops," says Burton Johnson, assistant professor in the NDSU plant sciences department. "A large number of crops grown in the state are considered new or alternative crops, and that's not even counting vegetables."

Experiment Station researchers in Fargo and at NDSU research extension centers, and NDSU Extension Service specialists are working with new and alternative crops. "Our research is related to identifying practices that will improve production and profit," Johnson says. "The practices need to be cost effective. Ultimately, they have to be beneficial to the producer."

Producers growing new or alternative crops face many obstacles. "Seeding, swathing, even the delivery of our product were hurdles," Borgen says. "In the early 1980s, we had to truck our canola into Canada, which meant dealing with export and import papers. I started hauling for other growers and also doing all the paperwork at the border. I guess I was eliminating the middle man."

U.S. elevators began accepting canola as the number of planted acres increased, according to Borgen. "So marketing isn't really as big an issue as it once was."

The use of canola as a cooking oil and in processed foods has risen steadily and so has the number of planted acres. North Dakota producers planted 18,000 acres to canola in 1991. This year, producers planted more than 1,350,000 acres. "What once was an alternative has now become a major crop," Borgen says. "It is estimated that consumption of canola oil will surpass corn and cottonseed oils, becoming second only to soybean oil."

Lentil acreage, while not growing as rapidly as canola acreage, is also increasing. In 1998, the first year the North Dakota Agricultural Statistics Service tracked production, 22,000 acres were planted. This year, lentil growers planted an estimated 50,000 acres.

Mike Youngs and his father started raising lentils in the late '70s or early '80s on their farm near Roseglen. "A company from Canada came to visit the farm looking for growers to try a few acres," Youngs says. "We have been planting lentils ever since."

Youngs, like Borgen, says alternative crops are a good fit in rotation with small grains. "Anything that fits our rotation that also

is a good cash crop is looked at pretty seriously. We've made money on lentils every year except for one. Lentils and some other crops are what have kept me on the farm for the past 15 years."

Youngs says research at NDSU research extension centers near Minot and Carrington on lentil varieties and herbicide testing has been helpful. NDSU plant pathologist Art Lamey (now retired) also visited the Youngs farm to study disease problems.

"With new crops, adaptation is a real issue," Johnson says. "Will new crops produce seed during the short North Dakota growing season? Other agronomic deficiencies might be poor stand establishment and low yield. It's important to have a concerted research effort to identify problems and find solutions. In many cases, there isn't a lot of money to support new crop improvements."

Insurability is also an issue, according to Johnson. "If it's a new crop or has entered alternative status, it may or may not be insurable. It's another piece of the puzzle."

Starting small, doing research and becoming involved are issues Borgen, Youngs and Johnson all agree on. "It's important that growers contact researchers to find out what varieties are available," Borgen says. They also need to look at moisture needs, tillage practices, and weed and disease problems, and determine the market needs."

Youngs is an original board member of the North Dakota Dry Pea and Lentil Association. Borgen is president of Northern Canola Growers and a board member of the U.S. Canola Association while Nola Borgen serves on the North Dakota Oilseed Council.

"New and alternative crops offer some exciting possibilities," Johnson says. "Who knows? Some of the new crops we're studying now may become important alternative crops in 10 to 25 years."

For more information: Burton Johnson, 701-231-8895, burton.johnson@ndsu.nodak.edu

New Crops? With funding from the USDA Cooperative State Research, Education and Extension Service, Burton Johnson is studying 11 new crops for their North Dakota potential. They are:

- **Echium**, an oilseed with high levels of healthy omega-3 and omega-6 fatty acids.
- **Cuphea**, an oilseed that could replace palm or coconut oil.
- **Niger**, an annual oilseed grown in Ethiopia and India for edible oil.
- **Vernonia**, an oilseed. Its oil could replace petroleum products in paints, pesticides and solvents.
- **Cumin**, valued for seeds used as a spice and oil used in foods and cosmetics.
- **Chia**, an oilseed high in unsaturated omega-3 fatty acids and natural antioxidants. Yes, it's the seed used to make Chia Pets.
- **Chan**, used as a food by pre-Columbian people in Central America and high in omega-3 fatty acids.
- **Fiber flax**, used to make fine linen cloth.
- **Sunnhemp**, grown for its fiber which makes durable twine, rope, rug yarn and paper.
- **Kenaf**, a fast-growing annual grown for its fiber.
- **Teff**, a small-seeded cereal crop.



Mike Youngs

Lentils and some other crops are what have kept me on the farm for the past 15 years.



Keeping Business Healthy

Bringing a new business to town in North Dakota is cause for celebration. But it's keeping businesses and helping them expand that gets the best economic development results, says Kathy Tweeten, NDSU community economic development specialist.

"Businesses we worked with said to us, 'No one's ever come to us before and asked us what our concerns are and what we need,'" says Bobbi Kukla, Dunn County treasurer and a participant in the North Dakota Business Retention and Expansion Program.

Tweeten, a certified instructor and consultant in the program, says it is designed to help local communities identify strengths and weaknesses, and address both. The national program is implemented in North Dakota by the NDSU Extension Service. "The goal is to support local businesses. Studies show that 40 to 80 percent of all new net jobs are created from existing businesses," she says.

The Dunn County program began in 2000 with a survey of businesses in the county. The project was the first undertaken by the fledgling Dunn County Job Development Authority.

Kukla and Linda Kittilson, city auditor of Dunn Center, were members of the authority's board of directors and helped implement the Business Retention and Expansion Program. They were among the local volunteers who visited each of the participating businesses to develop a picture of their concerns and problems.

"The visitation program is really a needs assessment of the existing businesses. It provides the process and structure for the rest of the program. It helps us formulate responses to issues and concerns," Tweeten says.

"The businesses were all very willing to have us in and express their concerns as well as their opportunities," Kittilson says.

Those volunteer visitors identified businesses that needed immediate assistance and scheduled follow-ups to address those needs, Kittilson says. Other needs, like technology training, were more general among businesses. Members of a countywide youth organization assembled by the Job Development Authority provided the training.

"We had youth teaching our business leaders the latest in technology. We were one of the first communities in the state to take that approach," Kittilson says. More than 80 people have taken technology training.

Results from surveys and the business visits were analyzed and organized by agricultural economist Larry Leistritz. Leistritz has built a career at NDSU assessing the economic impact of factors as diverse as the Conservation Reserve Program, Fusarium head blight, alternative crops, potato processing and hospitals. In his Dunn County report, he identified key issues. The local task force outlined an action plan to respond.

"Without the Extension Service, we would not have had access to that expertise and resources," Kittilson says. She says the project wouldn't have gotten off the ground without Tweeten and NDSU extension agent David Twist. "Our Job Development Authority was just getting started, and this was its first project. We would never have been able to accomplish it on our own without their help in coordinating and providing direction." Recently, Twist arranged for the NDSU College of Business Administration to bring a professor to the area to work with business managers to improve their skills.

Kukla says the program has helped drive several economic development happenings in the county. Local leaders are working with a power company to explore potential for wind generation. Local businesses are taking a more serious look at tourism. One community, Dodge, was named North Dakota City of the Year for 2002.

"The project got everybody rallied around economic development," Kukla says. In the past, she says, communities in the region focused on their own issues and problems, often at the expense of neighboring communities. "We still compete to some degree, but now it's gotten to where we're all working together.

"We still have problems, but we've learned some things that allow us to help our businesses and make real progress," she says.

For more information: Kathy Tweeten, 701-328-5134, ktweeten@ndsuent.nodak.edu

Helping Businesses Help Themselves

Since 1995, the NDSU Extension Service has implemented the Business Retention and Expansion Program in 13 areas. They are:

Adams County
Bowman County
Burke County
Burleigh and Morton Counties
Cavalier County
Devils Lake area
Dickey County
Dunn County
Golden Valley County
Hettinger County
McLean County
Mountrail County
Pembina County



Bobbi Kukla and Linda Kittilson

We still have problems, but we've learned some things
that allow us to help our businesses.



Briefly...

Program highlights from the NDSU Extension Service and North Dakota Agricultural Experiment Station

Drought response



As drought took hold in North Dakota this past year, NDSU geared up its response. Drought seminars across the region featured NDSU Extension staff addressing nutritional needs of livestock, use of alternative feeds, water quality concerns, nitrate poisoning and financial management. Economists developed spreadsheets to help producers evaluate management options. Staff continue to work with nurses, counselors, clergy and other professionals who interact with producers and their families to provide information on detecting depression and explain the availability of low-cost health insurance and other resources. FeedList, an NDSU web site that brings together buyers and sellers of feedstuffs, was expanded to help producers find feed for their livestock. The site had nearly 14,000 hits between May and October.

Meanwhile, range specialists are studying the quality and nutrient content of hay from CRP and other alternative sources to provide guidelines for producers. Research on alternative feeds, annual forages and the use of co-product feeds is helping producers find low-cost alternatives to traditional feeds. Although yields in NDSU research plots were down as well, the information they yield will be important. With test plots at NDSU research extension centers and producers' fields across the state, climatic extremes like drought and excess rain can point out strengths and weaknesses of new varieties or management techniques.

Disease forecasting and research aids producers



North Dakota producers stay one step ahead of crop diseases or insect problems by using a disease forecasting system developed at NDSU. Computer models use data from the North Dakota Agricultural Weather Network to determine whether the previous 24-hour period was suitable for infection. Producers can monitor the system through a phone call or the Web to determine if spraying is necessary.

New applications will benefit more growers. Research has been supported by crop improvement associations and grower associations. For example, the Northern Canola Growers Association, the Minnesota Canola Council and the Canola Council of Canada have teamed up to provide growers with the Sclerotinia Disease Forecasting System. Information is also available for potato, corn, dry beans, wheat, barley, sugar beets, soybean, sunflower and alfalfa growers.

NDSU specialists recognize that no single tool will solve crop disease problems, so they continue to look for innovative approaches. The most effective defense against disease is resistant crop varieties like NDSU's Alsen hard red spring wheat. Alsen is the first hard red spring wheat variety which combines high quality and good agronomic characteristics with resistance to scab. Plant scientists estimate Alsen's impact on North Dakota could be \$100 million annually in improved yields. Since its release in 2000, Alsen has become the North Dakota's most-planted wheat variety accounting for more than 30 percent of the state's spring wheat acreage.

Developing rural leadership



What keeps some North Dakota communities viable? Leaders.

People who get the ball rolling on projects, build enthusiasm, organize community goal setting and help citizens work toward those goals.

NDSU's new Rural Leadership Program will develop the leadership capacity of North Dakota citizens. About 25 people will be selected for the first 18- to 24-month program that will probably begin in fall 2003. After learning about various aspects of leadership through seminars across the state, they'll be able to apply leadership to economic development, social challenges and other issues to build vibrant, growing rural communities.

The Rural Leadership Program is a university-wide initiative partially funded by NDSU President's Office. The NDSU Extension Service is providing leadership in initiating the program which will eventually involve faculty and staff from departments across the university.

Boning up on biosecurity



NDSU faculty have long battled naturally occurring threats to agriculture, food systems and the ag economy. But after Sept. 11, 2001, the increased potential for deliberate use of pathogens has added more urgency to their work.

- With West Nile Virus, foot-and-mouth disease and Bovine Spongiform Encephalopathy (BSE, "Mad Cow Disease") in the news, the Veterinary Diagnostic Lab is enhancing its ability to identify, diagnose and contain a disease as rapidly as possible. NDSU has applied for federal funds to upgrade its laboratories; provide biosafety training for extension agents, border guards, veterinarians and producers; purchase technology for real-time transmissions from field necropsies; and conduct research on the movement of animals in open range.
- The Plant Diagnostic Lab receives virtual plant samples via computer, thanks to microscopes and digital cameras in some Extension offices across the state. Plant pathologists in the region are connected more and networking nationally to identify plant disease outbreaks.
- The Great Plains Institute of Food Safety encompasses several disciplines and produces graduates (from minor to doctorate) who are alert to possible threats, versed in solutions and capable of communicating with colleagues and the public.
- Research in several departments is helping improve the safety and security of the food supply from farm to fork whether the culprit is natural or deliberate.



Biodiesel heats up



On a swing across the state this summer, NDSU agricultural engineer Vern Hofman demonstrated the potential of biodiesel to producers. Hofman has studied the fuel's impact on diesel engines and says the fuel provides almost as much power and may lubricate better than standard diesel fuel saving wear on injector pumps and other engine components. Biodiesel's primary benefit over petroleum diesel fuel is that it significantly reduces emissions. Hofman says biodiesel tends to gel faster than petroleum diesel in cold weather, but blending with petroleum diesel or additives can address that problem. Soybeans grown in North Dakota could more than replace diesel fuel used on farms in the state. "It's going to provide an excellent new market," he says.

NDSU efforts will expand as federal dollars become available for research on biofuels such as biodiesel, biomass and other renewable fuels.

Adding value to livestock



About 18 percent of agriculture-related revenue in North Dakota is derived from livestock. NDSU faculty are working to boost that number. NDSU efforts include:

- Improvements in feedlot facilities at NDSU's Carrington Research Extension Center will enhance accuracy and efficiency as researchers develop improved diets for feedlot beef and bison using crops and agricultural processing by-products.
- Extension specialists helped the Dakota Lamb Growers Cooperative develop specifications for "Dakota Lean Lamb" and "Natural Lamb." Customers have been upscale supermarket chains, natural food outlets and food service companies.
- NDSU scientists found that field peas could be incorporated into pig diets without compromising performance. Extension staff are working with producers in several counties to develop new hog production facilities.
- Demonstrations on producers' farms and ranches by NDSU livestock specialists are introducing new technologies and practices. Many feature innovations in recordkeeping and measurements of forage quality, water quality and other factors to improve management. A Logan County producer says measuring forage quality during grazing saved on supplements.
- In cooperation with the beef industry, NDSU Extension certified more than 1,400 operations in the Beef Quality Assurance program since 1999. Those producers market more than 20 percent of the state's calves.

Processing facility on drawing board



NDSU is exploring the development of a small-scale meat processing

facility that will help segments of the North Dakota livestock industry add value to meat produced here and keep more of the value in North Dakota.

Several efforts in the state attempted to help producers capture more value from their products by integrating livestock production with processing. Planners will take lessons from those efforts and combine them in a new facility. NDSU faculty anticipate that the facility will be built in cooperation with a business partner and be modeled after successful small-scale facilities that focus on product and worker safety, low costs and high productivity.

The facility will allow researchers to improve sire selection, breeding programs and feedlot management by looking at meat quality and value under various strategies. Additionally, the facility would provide data for the development of commercial plants, including optimum plant size, payment formulas, test marketing and brand identification.

In the longer term, researchers would study innovations, such as robotics, that could reduce labor costs or improve safety. They could also study packaging and marketing innovations and new technology, such as video imaging and lasers, that could improve product safety and quality. Scientists may also develop new products or practices that make meat safer, more convenient, and a better value for retailers and consumers. Classroom and laboratory facilities will be included in the facility.

Protecting markets while exploring new technology



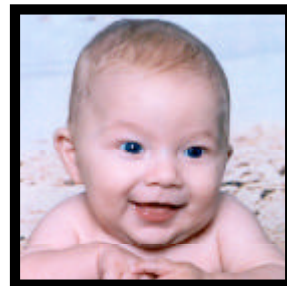
Finding out how sustainable and biotech agriculture can coexist will be

the focus of a study by NDSU, the Northern Plains Sustainable Agriculture Society, Monsanto and International Certification Services, Inc., an organization that certifies organic crops.

The focus is to ensure that if biotech wheat is commercialized, it won't jeopardize other crop production and marketing systems used in North Dakota. The experts involved are identifying and developing best management practices (BMPs) so producers and grain marketers can avoid cross-mixing of grain.

Representatives from the various industries are meeting quarterly to define the issues, recommend solutions and develop a BMP handbook. In phase two, the handbook will be given to stakeholders who will work with farmers and others to educate and implement the BMPs.

This year, NDSU researchers began evaluating Roundup Ready hard red spring wheat at its Langdon Research Extension Center and Dalrymple Research Site near Casselton. Also, the economic, ethical and social aspects of biotechnology are being studied by researchers at NDSU and eight other universities in five states. The Cankdeska Cikana Community College in Fort Totten is also involved in the project. The work is partially funded by the USDA's Sustainable Agriculture Research and Education program.



Folic acid education effort to prevent birth defects



With support from the March of Dimes, NDSU Extension is launching

a statewide educational effort to increase women's knowledge of the importance of folic acid in preventing neural tube defects. "With extension educators in every county, the Extension Service is in a unique position to implement this project," says Julie Garden-Robinson, food and nutrition specialist and member of the North Dakota Folic Acid Task Force. The effort is based on a pilot project conducted at NDSU, Minnesota State University – Moorhead and Concordia University in Moorhead.

Each year in the United States, 2,500 to 3,000 infants are born with neural tube defects. The U.S. Health and Human Services has set a goal to reduce the number of new NTD cases to three per 10,000 live births in the United States. The rate in North Dakota is 5 cases per 10,000 live births. Research shows that folic acid intake prior to pregnancy and throughout the first trimester can prevent 50 to 70 percent of neural tube defects.

Cooperating on ruminant opportunities



NDSU is joining with South Dakota State University, the University of Wyoming and Montana State University to find ways to boost the livestock industry in the region where the four states meet.

"We're looking at a fairly sparsely populated region with good resources for livestock production," notes Tim Faller, director of NDSU's Hettinger Research Extension Center. "We will be looking for ways to build on that traditional strength to spur economic development." Researchers and Extension specialists from the four states will work together to develop, implement and analyze livestock marketing and management strategies. A particular focus will be improved integration of crop and livestock production and marketing.

"A fair amount of this work is already under way," Faller says. "This project will pull those pieces together and provide a focus on this region. The ultimate goal is to provide viable economic gains for both agricultural producers and businesses."

The consortium is being led by the deans of agriculture at the four universities. The project was spurred by their discussions of how the states could work more closely on common issues in this semi-arid area of the Northern Great Plains.

Improving risk management skills



With support from the North Dakota Legislature, 43 marketing clubs were formed to help producers learn how to manage price risk associated with the commodities they produce. The marketing clubs have been coordinated through the North Dakota Farm Business Management Education Program and NDSU.

Each club conducts at least 24 hours of educational programming per year and has between 10 and 25 members. NDSU crops economist George Flaskerud and NDSU livestock economist Tim Petry provide educational support for the clubs. They provide training for Extension agents and farm business instructors who facilitate local clubs. Flaskerud and Petry have been using videoconferencing via the Internet to provide instruction to some of the clubs. The technology allows Petry and Flaskerud to reach more clubs while limiting travel time and expense.

Members of one club made transactions that gained them a total of more than \$125,000. Most participants say the greatest benefit from the clubs is increased confidence in making management decisions.

Reaching out electronically



One of NDSU's strengths is collaboration—the ability to get people with diverse expertise together to focus on problems and opportunities. The state's high-speed Internet network is enhancing that effort.

Six of NDSU's eight research extension centers are connected as are almost all county Extension offices. Currently six of the centers, eight extension offices and five campus locations have videoconferencing capabilities via the network. Some uses of the technology so far:

- Networked microscopes can provide up-close viewing of insects and diseased plants for teaching or for advice from diagnostic experts.
- Animal and range science graduate seminars are broadcast to research extension centers every Friday.
- Meetings, workshops, in-service training sessions and continuing education courses are frequently facilitated by NDSU staff.
- Learning centers are evolving at NDSU research extension centers near Hettinger, Langdon, Minot and Williston. The focus is to bring wide-ranging educational resources to local communities.
- NDSU's pesticide applicator training and certification program and educational programs in organic agriculture will use the technology to reach producers and tap into expertise in surrounding states.
- Videoconferencing is frequently used to cross state lines, allowing NDSU staff and others to collaborate with colleagues around the nation.



Patricia Jensen, Jim Venette, Sharon Anderson and Ken Grafton

Thank you for reading about the work of the faculty and staff of the N.D. Agricultural Experiment Station and the NDSU Extension Service. Many other projects are under way. Often those projects involve cooperation with other universities, agencies, businesses and individuals, but they all have the same focus – helping North Dakotans and their neighbors around the globe.

If you would like more information on the programs featured on these pages, contact the faculty and staff listed at the end of each article. If you would like more information about our other programs or have other questions, comments or suggestions, please contact any one of us.

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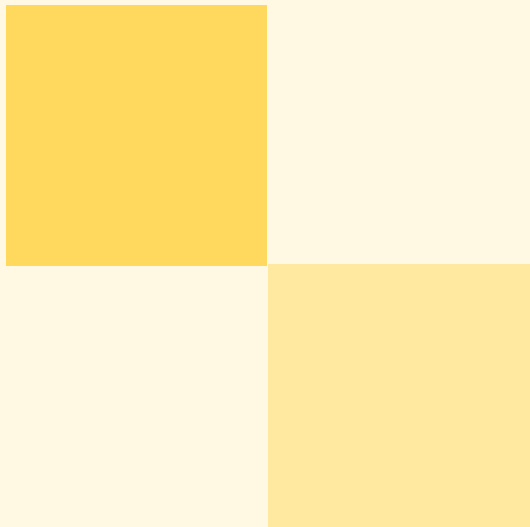
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