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2003

### Endeavors 2002-03

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# ENDEAVORS

Highlights of University of Nebraska-Lincoln Agricultural Research Division research

2002-03

## *ARD scientists target issues important to all Nebraskans*

Welcome to the 2002-03 issue of Endeavors, which briefly highlights some of the diverse, exciting and innovative research under way in the University of Nebraska's Agricultural Research Division (ARD).

ARD is part of NU's Institute of Agriculture and Natural Resources and has a unique role as the primary agricultural research component of the university system. It is the only public entity in Nebraska responsible for conducting agricultural research, and it links the Cornhusker state to a nationwide network of agricultural research at land-grant universities.

We take this responsibility very seriously, targeting issues important to Nebraskans.

Our scientists work on both problem-solving and fundamental research that provides new technology and knowledge to improve Nebraska's agricultural and food industries, our families, communities and businesses, and our environment, natural resources and quality of life.

Most of our scientists also teach students or educate Nebraskans through Cooperative Extension. This helps ensure that we effectively share the discoveries, knowledge and advancements made through agricultural research with citizens statewide and our students.

Payoffs from ARD research include new and improved crops, new and safer foods and better nutrition; healthy, productive livestock; more efficient, environmentally sound production methods and technologies; higher-value uses for agricultural commodities; and information that helps strengthen families and communities.

This publication features a sampling of some of our current research projects. If you'd like to learn more, contact Darrell Nelson, ARD dean and director, 207 Ag Hall, P.O. Box 830704, University of Nebraska, Lincoln, Neb., 68583-0704; phone, (402) 472-2045; e-mail [dnelson1@unl.edu](mailto:dnelson1@unl.edu). Or check out ARD's Web site at: <http://ard.unl.edu>.

## New beef products rooted in IANR research

The flat iron steak and other new beef cuts that are grabbing attention at restaurants and meat counters nationwide have scientific roots in Nebraska research.

In the largest study of its kind, IANR meat scientists teamed with University of Florida colleagues to analyze muscles in the beef chuck and round to identify which might be better used. They found untapped potential in several muscles usually used for ground beef or roasts.

This research provided the scientific foundation for new beef products developed by the National Cattlemen's Beef Association (NCBA) and the meat industry. Scientists identified the potential of numerous undervalued muscles and called industry attention to possible new higher value uses. These findings are changing industry thinking about how best to cut and use some muscles.

Researchers' close collaboration with the

NCBA, the Nebraska Beef Council and the meat industry helped assure research findings got into industry's hands where they could be translated into new beef products for the marketplace.

The flat iron steak is the best known outcome of this research and the NCBA's broader effort to introduce new Beef Value Cuts. This new steak comes from the top blade or shoulder muscle of the chuck and is tasty and exceptionally tender.

These new products offer economical new beef cuts for cost-conscious consumers and boost beef carcass value. The flat iron steak, for example, costs less than traditional steaks. However, it brings more than twice as much as roasts and ground beef made from the top blade muscle. The value of the beef chuck and round relative to the rest of the carcass has increased since this research was completed.



*IANR research provided the scientific foundation for the flat iron steak, which is among the promising new beef products. It comes from the top shoulder of the chuck, which traditionally is used for roasts or ground beef.*

## Food industry mergers mostly create higher prices for consumers

**F**ood industry consolidation has mostly led to higher prices, IANR agricultural economic research found.

Industrial consolidation typically means less competition and lower costs for the remaining bigger companies. In some sectors, consumers have shared in these savings. That's not the case in the food industry.

An IANR agricultural economist found that concentration in the food processing industry has resulted in higher consumer prices in most sectors. The Nebraska economist and University of Connecticut colleagues

examined two key aspects of industrial concentration: market power and increased efficiency.

As an industry consolidates, surviving companies gain market power, which allows them to charge more for products because there are fewer competitors.

The other theory is that industrial concentration makes industry more efficient, able to produce at lower costs and potentially leads to lower, or at least stable, consumer prices.

Researchers found that the impact of consolidation on prices depends on which factor dominates: the market power an industry gains or resulting cost efficiencies.

IANR research found that rising concentration boosted market power for 28 of the 33 food processing industries. It also led to lower production costs in 14 and higher costs in nine. Production costs remained roughly the same in the other 10.

The overall impact on food prices: up in 24 sectors, down in four, unchanged in the rest.

Results suggest that although concentration led to lower costs in most cases, the market power effect more than dominated the cost-efficiency effect associated with rising concentration, resulting in higher food prices in most industries.



*Consolidation usually affects food prices.*

## Inhibitors might help cut livestock methane

**T**he environment and cattle producers both could benefit from Nebraska scientists' efforts to reduce the amount of methane cattle produce.

Methane is the second most abundant greenhouse gas. The world's agricultural livestock produce about 17 percent of atmospheric methane. It's a byproduct of digestion in cattle and other ruminants.

It's also a waste of feed and energy. As much as 15 percent of digestible energy in cattle feed is lost as methane gas. If cattle produced less methane, it could significantly reduce the amount of feed they need.

UNL researchers think they've found a way to reduce the methane cattle produce during digestion and enhance the organic acids cattle use for energy. If this basic research pans out, it eventually could mean less atmospheric methane, less feed required and lower feed costs for producers.

A biochemist, chemist and animal scientist team to design and test chemical compounds that block methane production by inhibiting a key enzyme. They've found four classes of compounds that inhibit the enzyme in the lab. They're further testing the most promising and they still must be tested in cattle.

The university is patenting the team's novel methane inhibitors and the concept. Researchers are working with a Nebraska-based private company to explore commercializing a cattle feed additive designed to

improve feed efficiency by reducing methane.

Ultimately, the environment could be the big winner. One of the researchers estimated that reducing methane produced by livestock by 50 percent could significantly reduce global warming.

*Biochemist Steve Ragsdale pours liquid nitrogen into a high resolution spectrometer his team uses to study potential methane-blocking enzymes.*

## Child care a big concern for rural women

**T**he availability of child care is a big worry for rural women.

That's among the early findings of a three-year study on welfare reform and rural women.

NU family scientists are examining the lifestyles of 42 rural Nebraska women as part of a regional study. Nebraska's study includes women of all income levels while the regional study includes only women eligible to receive food stamps. Nebraska's more inclusive approach lets researchers compare women in the same community to learn how income influences their lives. They've found that rural women share many similar concerns and joys regardless of income.

Researchers are interviewing and

surveying participants annually about the child care, transportation and medical services in their communities as well as their jobs, incomes, expenses and spending habits.

Child care is a major concern. Many women work nights so they can share child care responsibilities with a spouse or partner, or rely on family and friends for child care, researchers found.

There's also a great need for quality transportation because many rural Nebraska women drive 20 miles or more for shopping or medical care.

Most women are satisfied with their communities. Many believe small towns provide safe environments for children and foster strong family ties and friends.



## Team tests strategies to reduce *E. coli*

**B**eneficial bacteria might help reduce dreaded *E. coli* 0157:H7 in feedlot cattle.

IANR research shows that selected strains of *Lactobacillus acidophilus*, a bacteria commonly used in yogurt, are promising as feed additives to reduce 0157:H7's prevalence. This research is part of ongoing IANR efforts to identify specific strategies producers can use to limit *E. coli* in feedlot cattle before they enter packing plants.

The idea is that *Lactobacillus* gets ingested with rations and travels to the cattle's intestines where it kills *E. coli*. If further studies prove it's effective, producers might add *Lactobacillus* to feed to reduce *E. coli* in feeder cattle.

In a large 2001 IANR feedlot study, *Lactobacillus* reduced *E. coli* in manure 61

percent, compared with cattle that didn't receive the additive. *Lactobacillus* proved somewhat less effective in summer 2002 feedlot trials although IANR scientists say it still has potential as an *E. coli* reduction tool.

In the 2002 trials, the team tested the effectiveness of an experimental vaccine developed by Canadian scientists as well as the *Lactobacillus*. Early results indicate a combination of the vaccine and a *Lactobacillus* feed additive was most effective. The combination's effect was cumulative.

Because 0157:H7 is common in feedlots, eliminating it isn't likely. Reducing its prevalence at key times, such as before slaughter, is more realistic.

IANR scientists are sharing their results with the experimental vaccine's Canadian developers.

## Variety selection key to sugarbeet production

**S**electing the right variety is crucial to successful sugarbeet production in Nebraska's Panhandle, a comprehensive IANR study shows.

Sugarbeets have long been a major Panhandle crop. However, production and profitability dropped during the mid-1990s, partly because growers unknowingly planted varieties susceptible to regional insects and diseases. Shrinking yields were particularly worrisome because sugarbeets are expensive to grow compared with corn or soybeans.

Agricultural scientists at NU's Panhandle Research and Extension Center launched a comprehensive study to provide answers to this pressing problem.

They conducted large-scale sugarbeet variety trials and other studies in farmers' fields at 21 sites in Nebraska, Wyoming and Colorado. Working with a task force of growers, seed companies and others in the industry, they studied a broad range of sugarbeet production issues including planting, seedling emergence and different varieties' response to irrigation, herbicides, insects and diseases.

This effort produced information about varieties, insects, diseases and management practices that growers are using to improve beet production.

Researchers found that selecting the



*Sugarbeets are a major crop in the Nebraska Panhandle. Research answered questions about how to improve production.*

proper beet variety is key to producing high quality beets and dealing with production problems such as weather, disease, insects or irrigation.

Among other findings, the team showed that root aphids were far more damaging than previously thought. Thanks partly to this work and how different varieties respond to the root aphid, almost all sugarbeet varieties now have some resistance to root aphids.

Sugarbeet yields increased an average of 3 tons per acre and 8,000 Panhandle acres have returned to sugarbeet production since the research started in 1997. Sugar content also has increased, which means growers earn more for their beets.

## Decorative millet earns All-America Selections Gold award

**I**ANR millet breeders typically work on improved forage and grain varieties. But a decorative version of pearl millet they developed because of its unusual purple leaves is likely to make a splash in gardens nationwide after earning a prestigious award.

The decorative purple millet, called Purple Majesty, was named an All-America Selections Gold Medal award winner for 2003. It's an unusually attractive hybrid of pearl millet, which is commonly called cattail or bullrush millet.

Purple Majesty features showy purple leaves with a red midrib, or stripe, down the center of the leaves. Its long, narrow seedhead has attractive bristles good for floral arrangements. At maturity, this annual plant is 4 to 5 feet tall and 2 to 3 feet in diameter. It's suited to sunny, well-drained sites in climates from southern Canada to the southern United States.

Purple Majesty topped the floral class in All-American Selections trials and earned the organization's prestigious Gold Medal for its exceptional garden performance. The Gold Medal award is reserved for plant breeding breakthroughs. It's awarded rarely, typically only once or twice a decade. AAS is a nonprofit organization that has conducted independent plant trials since 1932.

Ball Horticultural Products Co., a plant wholesaler, is marketing NU's Purple Majesty to the nursery industry through a university licensing agreement. NU will receive royalties on sales.



*Purple Majesty*

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Web site at

<http://ard.unl.edu>

## Test makes cooking oil quality check fast, easy

**F**ood processors know the freshest oil makes the best food products.

Cooking oil starts to go bad long before a noticeable odor sets in so companies frequently test oil freshness. The current commercial testing method uses chloroform, which is expensive to use and hard to dispose of.

There's lots of interest in methods that eliminate the use of hazardous chemicals so the Nebraska team studied more efficient, environmentally friendlier ways to check oil quality.



*Cooking oil is poured into a cuvette so it can be tested with a near-infrared spectrometer.*

The result is a new technique that quickly and accurately measures oil quality using only light.

They found that near-infrared spectroscopy, a technique widely used in the grain industry, is effective for

checking oil freshness. Near-infrared spectroscopy uses light wavelengths just beyond the visible range for a variety of measurements.

Oil goes bad when oxygen attacks its fatty acids in a process called oxidation, during which oil begins to take on a rancid odor and flavor. But the first oxidation step creates an odorless peroxide, which companies measure to determine how much oil has begun oxidation.

The Nebraska team found that by exposing oil to near-infrared light and measuring how much light is absorbed, they could measure oil's peroxide value, or ultimately the oil's freshness. The method eliminates chloroform and is faster and easier.

IANR researchers say it will be up to equipment manufacturers to market the technique to customers.

## Team developing lake classification system for assessing water quality in agricultural areas

**A**griculture is the dominant influence on Nebraska's lakes and reservoirs.

NU scientists are studying the interaction of agriculture and surface water to develop a model lake classification system suitable for agricultural regions nationwide.

Results so far indicate most Nebraska lakes and reservoirs are so heavily influenced by agriculture that water quality varies little between lakes. Samples from more than 250 lakes and reservoirs statewide show that, except for groundwater-fed Sandhills lakes, most fall into this ag-dominated ecology category.

The team is working on methods to distinguish water quality differences among seemingly similar lakes. They'll combine current and historic information to create computer models to estimate water conditions before Euro-American settlement. They'll also develop a software program that ranks lakes according to water quality.

Ultimately, they hope their model system will provide the U.S. Environmental Protection Agency with better tools for assessing, protecting and improving water quality in lakes and reservoirs in agricultural areas.

Monitoring water quality remotely is a



*Tadd Barrow, a water resources specialist, uses a Secchi disk to measure water clarity on a lake near Beatrice.*

major element of this research.

IANR remote-sensing specialists are developing "spectral signatures" of the lakes using equipment that measures blue-green algae concentrations by reflected light patterns. The extent of blue-green algae blooms help indicate a lake's nutrient levels and water quality.

When perfected, these measurements could be made from an airplane or satellite.

## Protein supplement improves heifer rebreeding

**G**etting heifers ready to rebreed after their first calf is a major, potentially costly concern for ranchers. Normally, fewer than 85 percent of heifers successfully rebreed after their first calf.

A two-year study on a commercial Sandhills ranch showed that increasing metabolizable protein intake during a heifer's first pregnancy boosts rebreeding rates to as much as 95 percent.

IANR animal scientists compared metabolizable protein with conventional crude protein supplementation. Cattle need two protein types, one for the animal and one for rumen microbes. Metabolizable protein supplies both.

The metabolizable protein system doesn't

require added labor but costs about \$3 more per cow. Researchers wanted to know whether the increased cost made economic sense.

This research showed that it does.

Rebreeding rates for heifers fed metabolizable protein typically increased between 4 percent and 10 percent, compared with those receiving crude protein.

That improvement in rebreeding success represents an average \$20 per head savings with the metabolizable protein supplementation. For a small family ranch of 50 heifers, that's \$1,000 saved annually.

Researchers say the economics of this study are especially solid because they are based on data from a commercial ranch.



# An integrated approach to tough, healthy turf

**F**inding ways to provide quality turf using less water, chemicals and other inputs is a hallmark of IANR's turfgrass science team.

Turf scientists, plant pathologists, entomologists, biological systems engineers and others collaborate on everything from basic research to applied problems. Nebraska's integrated approach is nationally recognized. It provides information to help manage turf in more environmentally sound and economically effective ways.

The program probably is best known for developing improved turf-type buffalograsses that need about half the water, chemicals and maintenance of conventional turfgrasses. IANR's research also has helped reduce water and pesticide use on golf courses and changed industry thinking about fertilization and other management practices.

For example, IANR research on dollar spot helped reduce the amount of pesticides

used on golf fairways. An IANR plant pathologist identified better ways to control dollar spot, one of the most damaging, costly and widely treated turf diseases. Golf courses have been able to treat for it every 21 days instead of every seven to 10 days and maintain turf quality.

Current research on golf green grow-in procedures also may change traditional thinking about how to get greens playable as quickly as possible.

Turf scientists compared conventional accelerated grow-in practices that require heavy fertilization and lots of water with a seemingly slower, more controlled approach.

They found that slow and steady is best. Accelerated grow-in requires twice as much water and fertilizer, but the controlled approach gets greens ready for play at least three or four weeks faster and encourages healthier roots that withstand disease, heat and other stresses.



*Chicory roots are now processed at the nation's first chicory processing plant.*

## Chicory industry emerging from Panhandle research

**A** new industry based on chicory is emerging in Nebraska's Panhandle, which now boosts the nation's only chicory processing plant.

Chicory's development as a new Nebraska crop is based largely on research by agricultural scientists at NU's Panhandle Research and Extension Center at Scottsbluff. Since 1995, IANR researchers and extension specialists have studied chicory's potential.

Chicory is a root crop that is used as a pet food ingredient. It's widely grown in Europe, but not in the United States.

IANR research determined how best to plant, tend and harvest chicory. It showed it could be profitably grown in the region and found that western Nebraska can produce chicory that meets or exceeds the best grown in Europe. The IANR team worked with area farmers and businesses to help establish a fledgling chicory industry.

In fall 2001, U.S. Chicory, a private company, opened a chicory processing plant, the first in the Americas. The plant processed 950 acres of chicory grown by four farmers and IANR researchers in 2001 and again in 2002.

The \$2 million plant employed 25-30 people when it opened. Employment is expected to grow to 50 to 75 people when the plant reaches capacity within four years. Panhandle chicory production is expected to increase to 5,000 acres by 2003 with the potential for 10,000 acres by 2005. Yields average 19 tons of root per acre and bring about \$55 per ton. If 10,000 acres were planted, growers would gross about \$10 million.

## Textile scientist's work helps establish national sun-protective clothing standards

**T**hose carefree days of unprotected fun in the sun are history. And for good reason: the sun's rays can be killers.

Today's consumers are looking for ways to protect themselves when they're in the sun, either with sunscreen or clothing. That's why consumers need assurances that clothing marketed for sun protection actually blocks harmful ultraviolet radiation. For people who have skin cancer or are undergoing radiation or chemotherapy, adequate sun protection can be a life-or-death matter.

An IANR textile scientist's extensive research on fabrics' UV-protective properties has provided information for clothing makers. Her results helped lay groundwork for national standards for sun-protective clothing.

This College of Human Resources and Family Sciences researcher has been a leader on national committees that developed standards for testing and labeling UV-protective clothing. For example, these committees developed a standard for labeling UV-protective clothing with a UPF number



*Textile Scientist Patricia Crews measures the Ultraviolet Protection Factor of a knitted fabric being considered for sun-protective clothing.*

ranging from 15 to 50+. Like an SPF number of sunscreen, the higher a UPF, the longer a person can stay in the sun before skin under the fabric becomes red.

Thanks partly to this Nebraska textile scientist's work, standards for sun-protective clothing were finalized in 2000. Standardized testing and labeling should help consumers make better-informed decisions and assure that protective clothing delivers the UV protection it promises.

## Case studies part of project to ID higher-value markets

Tapping alternative markets can improve profits for some small farmers and ranchers. But the success of a new venture often hinges on solid marketing information up-front.

IANR researchers are heading a four-state project that is identifying untapped, higher-value markets to help boost small farm and ranch profitability and providing information to make these ideas work. The USDA-funded North Central Initiative for Small Farm Profitability aims to improve the profitability, efficiency and competitiveness of small Midwestern farms and ranches. Launched in 1999, the project includes researchers from Nebraska, Iowa, Missouri and Wisconsin.

The project includes providing information about alternative markets, including valuable marketing research, case studies of successful businesses and a model for entering the market. Organizers also work with 32 producer clusters that help guide research. These groups of farmers and ranchers share an interest in innovative alternatives to traditional agriculture.

Recently completed IANR case studies identified untapped markets. For example, a survey of more than 500 households in the four states highlighted the potential for selling locally grown food to grocery stores, restaurants and consumers.

Other studies detailed the profit potential for farmers who produce specialty cheeses or supply locally grown wheat and barley to craft breweries.

These studies provide market research traditionally available only to bigger businesses and at high cost. It gives producers solid numbers demonstrating consumer interest that they can use to encourage grocers and restaurants to carry local products.

## Team explores how best to maximize corn yields

Nebraska's corn yields are probably only about half of their full biological potential, given their genetics and the state's soils and climate.

IANR agronomists want to push those yield limits. They're studying the most cost-effective, environmentally sound ways to maximize yields for the state's leading crop. Understanding the biological underpinnings of yield and developing more precise management techniques should help farmers boost yields, stay competitive, protect the environment and meet projected world demand for corn.

They're examining a multitude of yield-influencing factors including soil fertility, carbon sequestration, nitrate leaching and soil microbial function. They're conducting similar research on soybeans.



No light penetrates the dense canopy of a high-yield corn test plot as IANR Soil Scientist Achim Dobermann checks an ear.

They want to learn how to consistently grow corn at 70 percent to 80 percent of true yield potential. Statewide corn yields average about 150 bushels per acre.

Researchers think true yield potential for eastern and central Nebraska is closer to 300 bushels per acre. During the study's first three years, the highest yields were consistently 250 to 260 bushels per acre in drip-irrigated plots.

The team is creating a map of yield potential and optimum planting dates for Nebraska using climate and research data. This map will show producers how planting date and hybrid choice influence yield potential by region. In coming years, scientists will combine yield results with findings from an IANR soil fertility project to revise corn nutrient management recommendations, emphasizing efficiency for elevated yields.

Researchers also hope to create better crop-growth models, including planting dates, crop densities and nutrient requirements, to help farmers maximize yields. Existing models underpredict yields in better growing environments such as Nebraska.

Underestimating yields also underestimates the amount of carbon that may remain in the soil. That could cost farmers money if the government someday pays farmers to store carbon on their land.

## Carrot chips could help combat vision problems

Vitamin A deficiency is a leading cause of blindness among children in developing countries and also can lead to severe illness and death.

IANR nutrition scientists hope their new carrot chips someday will help combat vitamin A deficiency and its devastating effects.

They developed tasty deep-fried carrot chips that look like bright orange potato chips and are packed with vitamin A. While the chips' high fat content isn't desirable in

the United States, it's acceptable in developing countries where many people don't consume enough calories.

An Indonesian graduate student who helped develop the chips has returned home and hopes to get carrot chips produced locally and incorporated into the nation's school lunch program.

The team also developed a lower-fat version of the chips and hopes to explore its potential as a snack in developed countries.



## Center pivots key in water management

Careful nitrogen management and the right technology can help farmers protect groundwater from excessive nitrate contamination, which is a concern for private and municipal drinking water wells.

Center pivot irrigation systems are a key part of that water management equation, a six-year NU study found.

An IANR team compared nitrate-nitrogen levels in shallow groundwater under test fields irrigated with surge, conventional furrow irrigation or center pivots.

This research found that nitrate levels were consistently lower under center pivot-irrigated fields. These findings are especially significant in Nebraska, which has more than 7 million irrigated acres, two-thirds of which are irrigated with center pivots.

Compared with the furrow-irrigated field,

the surge-irrigated field received 60 percent less water and 31 percent less nitrogen, while the center pivot field used 66 percent less water and 37 percent less nitrogen. Although the surge-irrigated field received almost as much water as the pivot field, surge didn't limit nitrate contamination nearly as well.

Researchers found that the best way to limit nitrate leaching into groundwater is by controlling water use and spoon-feeding nitrogen fertilizer to crops through a center pivot.

This research showed that center pivots combined with careful management can help keep groundwater nitrate levels at or near 10 parts per million, the federal maximum for drinking water, without significantly compromising crop yields.

## Keeping pigs in same pen beats mixing, sorting

Contrary to popular belief, staying put is best for feeder pigs in a wean-to-finish operation. For producers, this saves time and might improve profits.

Variations in pig weight can increase the time needed to get pens of pigs to market weight and can hurt sale prices. To combat this problem, many producers overstock pens at weaning, remove the lightest pigs from a pen about three weeks later and remix them with other lightweight pigs in hopes of enhancing performance.

Research by an IANR animal scientist at the Northeast Research and Extension Center showed it's

best to leave the pigs in the same pens.

He found that moving and remixing lightweight pigs doesn't improve performance or decrease variation in pig weight at slaughter.

Results show that even though a pig may be smaller than the rest of the pigs in the pen, pigs are better off staying with their penmates. Removing and mixing also had no effect on daily gain, feed intake or carcass characteristics.



Mike Brumm, an animal scientist, checks a pen of feeder pigs. His research shows that leaving pigs in the same pen instead of sorting and mixing lightweight pigs in a wean-to-finish operation is better for them.

Slaughter weights show removing and mixing doesn't decrease weight variation at slaughter. The greatest weight differences were among pigs from the removed and mixed pens. Pigs from the removed and mixed pens were at both ends of the weight distribution curve while no pigs in unsorted pens were among the lightest weight categories.

Sorting pigs closer to market weight yielded similar results.

## Technology might improve access to counseling

Technology might bridge miles that can make it difficult for rural residents to access mental health counseling.

In parts of Nebraska, an hour-long counseling session requires a day-long trip, particularly if the therapist's office is three or more hours away. Travel time, plus gas and meals, may make counseling too expensive or impractical for some rural residents.

An IANR family scientist is studying the potential of using two-way video technology to make counseling more accessible.

He and graduate students at the Family Resource Center in NU's College of Human Resources and Family Sciences are conducting a pilot study of long-distance counseling's feasibility.

In communicating via technology, whether it's the Internet, television or telephone, some factors critical to successful counseling, such as non-verbal communication, can be lost. Researchers want to know whether the therapeutic relationship can be preserved while using technology.

They want to determine the key ingredients needed for the successful delivery of counseling services via technology.

Researchers are working with clients in western Nebraska's Arthur County. Under faculty supervision, graduate students in marriage and family therapy provide counseling. Counselors travel to Arthur County and meet face-to-face with clients early in the process.

A two-way video link via satellite connects the counselor in Lincoln with clients, who come to the Arthur County High School's distance education room for the sessions. Clients say that having access to counseling compensates for less in-person contact with a therapist.



# glimpses at ARD research

● Most livestock waste lagoons in a two-year study weren't polluting groundwater. IANR water scientists monitored 16 swine, dairy and beef cattle waste lagoons at 13 Nebraska sites to identify indicators of waste lagoon seepage and potential impacts on groundwater quality. Ten of the 12 active lagoon sites sampled didn't appear to pollute nearby groundwater. While these results are encouraging, the water scientist who led the project cautioned that individual lagoons' potential impact on groundwater quality varies, depending on many site variables and how they are operated and maintained.

● Bean pod mottle virus can hurt soybean yields, quality and, ultimately, growers' earnings. There's no cure so an IANR entomologist and a plant pathologist have teamed up to develop prevention techniques. It's part of a larger regional study. Their research is laying the groundwork for management recommendations, which they hope to develop within two years. Spring populations of bean leaf beetle spread the virus. This research shows that applying insecticidal seed coatings to protect seedlings from beetles and delaying planting help reduce or limit spring beetle populations in soybeans.

● An IANR family scientist is working on better ways to approach sex education and help teens make decisions about sex. He surveyed 102 high-achieving Nebraska high school seniors to learn how teens make decisions about sex and factors that might influence sexual abstinence. Results show that family environment strongly influences teen sexual behavior. Teens were more likely to be abstinent if they: believed premarital sex was wrong or inappropriate; had strong religious faith and were involved in organized religion; had parents, siblings and close friends with conservative attitudes about premarital sexual behaviors; and had a warm, supportive relationship with both parents. Of the 102 teens, 58 were abstinent while 43 were sexually active; 85 percent said abstinence had few, if any, disadvantages.

● Most rural Nebraskans consider community involvement important to their town's future and the vast majority donated time and money to community projects in the past year, the 2002 Nebraska Rural Poll showed. However, few people plan to leave assets to their community in their wills and nearly 50 percent aren't sure. The IANR rural sociologist who heads the annual poll said the large number of undecided respondents represents a chance to educate rural people about how best to keep their wealth at work locally while caring for their families. The poll, conducted by the university's Center for Applied Rural Innovation, has surveyed rural Nebraskans perceptions and views since 1995. It tracks trends and provides information on rural perspectives for community leaders, policy-makers and lawmakers.

● Crop diversity helps encourage beneficial lady beetles, commonly called lady bugs, to stick around all season long munching aphids and other crop pests, an IANR entomologist's research shows. This study examined which types of lady beetles frequent particular crops and when. This information should help make better use of lady beetles for biological pest control. Researchers found that lady beetles can help control pests throughout the growing season in corn, grain sorghum, winter wheat, alfalfa and other crops that mature at different times if they are growing close to each other so lady beetles have a continuous food supply.

● Chickpeas are increasingly popular with both American consumers and Nebraska Panhandle farmers. Panhandle chickpea plantings jumped from 1,000 acres in 2000 to 10,000 acres in 2002. IANR scientists at NU's Panhandle Research and Extension Center at Scottsbluff have studied chickpea production for more than a decade. Their findings are providing best management strategies for producing them under Nebraska conditions. IANR's production information is especially useful since chickpeas are new to the region so growers

have little experience growing them. Researchers say chickpeas could provide a new Panhandle specialty crop and help meet increasing demand for the legume.

● The color purple is bad news for wetlands. Purple loosestrife, a noxious weed, chokes out native plants and ruins wildlife habitat in wetlands and waterways. An IANR weed scientist at NU's Northeast Research and Extension Center is studying how best to control this destructive invader with integrated controls, including mowing, discing, biocontrols and herbicides. He works with county weed superintendents to gather and assess information to find the best integrated approach for combating loosestrife. It's unlikely loosestrife can be eliminated but this research should help identify ways to reduce it.

● NE422T, the first forage triticale variety released by NU, offers outstanding forage yields and new crop rotation options. Triticale is typically grown from grain. However, forage triticales such as NE422T look like tall, lush wheat plants. It's typically planted in early September and harvested for forage in June. Cattle also can graze it. The NU release offers superior forage production in dryland conditions statewide. Under irrigation, producers could plant it after corn or soybean harvest in fall, harvest the forage in the spring and then plant a summer annual crop. This could diversify crop rotations and help producers comply with winter ground cover requirements. Seed is available from NUPride Genetics, a cooperative subgroup of the Nebraska Crop Improvement Association.

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