Agricultural Research Division 119th Annual Report 2005
Agricultural Research Division scientists improve the quality of life for Nebraskans across the state. They make important contributions to the state’s agriculture, food industries, environment, the well-being of families and community development. Research occurs in fields, feedlots, the natural environment, homes, yards, gardens, and cities and towns. ARD scientists provide new knowledge and seek answers to Nebraskans’ problems and concerns.
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For more information about the Agricultural Research Division and its research, contact Gary Cunningham, ARD dean and director, University of Nebraska–Lincoln, 207 Ag Hall, P.O. Box 830704, Lincoln, NE 68583-0704; phone: (402) 472-2045; or visit the ARD Web site at http://ard.unl.edu

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Our Mission

The mission of the Agricultural Research Division in the Institute of Agriculture and Natural Resources at the University of Nebraska-Lincoln is to conduct problem-solving and fundamental research that addresses priority issues facing Nebraska’s agricultural and food industries; provides the knowledge base essential for managing our natural resources; promotes family well-being and community development; and educates future scientists through hands-on experiences.
The 119th Annual Report of the University of Nebraska–Lincoln Agricultural Research Division (ARD) is provided to inform stakeholders about the accomplishments of ARD faculty and to document progress being made to serve agriculture, agribusiness, natural resources, and human resources. This report documents accomplishments in FY 2005 that serve Nebraskans by developing new knowledge and technologies to improve profitability, better manage natural resources, enhance environmental quality, and improve the quality of life.

In addition to research accomplishments and impacts, this report includes a listing of faculty, research projects, faculty and student awards and honors, research outputs and the ARD financial report for the period July 1, 2004, to June 30, 2005. This report was compiled in accordance with the intent of the law of the State of Nebraska that established the Nebraska Agricultural Experiment Station on March 31, 1887.

The Research Highlights section outlines some of the significant accomplishments of our faculty. Some of the accomplishments include:

• Health-conscious parents who feed their young children the same low-fat diet they consume for better health may inadvertently deprive their children of vitamin E, an important nutrient for growing bodies.
• UNL has developed commercial turf buffalograsses tolerant to low mowing height and resistant to drought.
• Understanding the physiological mechanisms of aphid damage holds promise of developing better resistant cultivars.
• Undergrads collaborate on ARD research.
• Process for developing replacement heifers to lighter-than-traditional weight reduces costs and does not hurt reproductive performance.
• Ozone effectively decontaminates soils containing explosives residues.
• Transgenic soybean rich in omega-3 fatty acid provides important nutritional benefits and potential value-added markets.
• Proof that refined soy oil is safe for allergic consumers is good news for the soybean industry and food processors, as well as consumers.
• Research is developing a better understanding of education barriers for rural immigrants.
• Silvopasturing studies are aimed at developing programs that effectively combine trees, forage plants or crops with livestock production.

The above items are only a few of the many important research findings by ARD scientists. ARD research is serving both science and society, and making a difference in the economy of the state and the lives of Nebraskans.

Z B Mayo
Interim Dean and Director
Agricultural Research Division
The Agricultural Research Division is the only public entity in Nebraska charged with conducting agricultural research. It is part of a national network of state agricultural experiment stations located in Land Grant Universities across the United States. In 1973, the state legislature passed LB 149, which established the Institute of Agriculture and Natural Resources. The Agricultural Research Division was created as one of IANR’s six divisions. The state legislation also expanded the federal mandate for agricultural research conducted by the Nebraska experiment station to include research in natural resources, human resources and family sciences. The ARD research portfolio represents a scientific investment in Nebraska’s future. ARD research not only solves today’s problems, it also defines tomorrow’s opportunities.

New tool aids crop decisions when water restricted

Nebraska irrigators facing limited water supplies have a new tool to help them make better-informed cropping decisions.

The Water Optimizer, a decision-support computer program developed by IANR researchers, became available to farmers in 2005.

A biological systems engineer and an agricultural economist designed the tool in response to continued drought, water limits and policies that restrict water use in parts of Nebraska.

Water Optimizer helps farmers maximize their profits by helping them sort out how best to use their limited irrigation water. They can evaluate whether it would be most profitable to grow different crops, irrigate fewer acres, apply less water to existing crops or go to dryland farming.

The tool evaluates single fields for several crop options. Irrigated crops include: corn, soybeans, sorghum, wheat, alfalfa, edible beans and sunflowers. Dryland crops include: corn, soybeans, sorghum, sunflowers, alfalfa and wheat in continuous summer fallow and ecowallow rotations.

Growers load information such as the amount of water available, soil type, irrigation system type and fuel type for irrigation into a spreadsheet. They also enter their production costs, irrigation costs, crop prices and crop type.

The program uses this individualized information to calculate the crops that will be most profitable with the given costs and available water.

The program lets growers weigh and compare different options on a computer screen. By running “what if” scenarios, they can see the relative payoffs of different choices.

Other potential uses of the program include comparing management strategies such as profit-maximizing deficit irrigation, fixed crop rotations, single- and multi-year full irrigation strategies, or Environmental Quality Incentives Program or Conservation Reserve Enhancement Program leasing.

The Water Optimizer tool is available on the Web at http://extension-water.unl.edu/ or on a DVD/CD set.

Quantifying impact of attack on nation’s grain marketing

A terrorist attack on the nation’s grain marketing infrastructure could mean major losses in U.S. grain exports.

That’s the conclusion of a UNL agricultural economist who analyzed the impact of grain handling disruptions at the Port of New Orleans, which handles up to three-quarters of U.S. corn exports. This work is part of ongoing multi-state research quantifying economic ramifications of a terrorist attack on the nation’s grain marketing system.

The IANR study found that a moderate to medium disruption at this critical port would result in a $600 million to $900 million annual loss in export value.

Researchers developed a database to project economic impacts of terrorist attack scenarios that reduced the Port of New Orleans’ corn export volume by 10 percent, 15 percent and 25 percent for a year. Analysis was based on three-year average cash corn prices and grain movements from 1997 through 1999.

The database showed no change in the U.S. export market from the 10 percent reduction; a 15 percent disruption would cut U.S. corn export sales by 1 percent.

The real change came with a 25 percent loss export volume at New Orleans. That conservatively would cost the United States $600 million per year in lost exports.

Researchers found reductions beyond 25 percent would require a major change in world corn markets. The United States is the world’s leading corn exporter. Ultimately, global demand for corn probably couldn’t be met if U.S. exports dropped more than 25 percent.

This research provides information for national security officials who must plan for possible terrorist events. Findings also offered insights into the potential...
economic losses caused by Hurricane Katrina’s disruption of grain exports at port.

Soy oil findings help shape food allergen labeling laws

UNL soybean oil research is influencing food allergen labeling laws here and abroad.

An international study by IANR food scientists confirmed that highly refined soybean oil does not cause reactions in people who are allergic to soybeans. Soy-allergic people don’t react because refined oil contains only minuscule amounts of protein, the culprit in allergic reactions. Findings do not apply to cold- or expeller-pressed soy oil, which contains more protein and may cause reactions.

The study has drawn interest internationally from allergic consumers, food manufacturers and farmers as well as regulators because soybeans are a common allergen and soy oil is used extensively in foods worldwide.

Scientists in the university’s Food Allergy Research and Resource Program shared their findings with policy-makers, congressional staffers, industry and the leading consumer group for allergic consumers.

The Nebraska findings played a role in European Union food allergen labeling decisions in 2005 as well as the U.S. Food Allergen Labeling and Consumer Protection Act of 2004, which Congress passed to protect allergic consumers.

Highly refined soybean oil was among the soy components that the European Union temporarily exempted from food allergen labeling regulations. Industry included UNL’s findings in a successful request for a three-year temporary exemption.

Earlier, U.S. regulators exempted highly refined vegetable oils derived from known allergens, such as soybeans or peanuts, from the new federal food allergen labeling law that takes effect in 2006. Nebraska’s research contributed to the scientific evidence for that decision.

As a result, ingredient labels on foods containing soy oil need not explicitly list soy oil. Instead, labels can read “soybean, canola or safflower oil.” These decisions help preserve soybean growers’ widest possible access to the world’s markets.

Feedlot heat stress research saves producers millions

Widespread adoption of IANR-developed strategies for reducing heat stress in feedlot cattle is saving the region’s cattle industry millions annually in cattle deaths and performance losses.

In the past decade, at least five summer heat waves killed feedlot cattle and reduced feedlot cattle performance in Nebraska. During this time, extensive research by animal scientists at the university’s Northeast Research and Extension Center/Haskell Agricultural Laboratory at Concord expanded understanding of the nature of heat waves’ impact on cattle. Scientists developed management strategies that reduce heat stress in cattle and an extensive UNL Extension education effort helped producers adopt these preventive measures.

In the 2005 heat wave alone, this effort saved the region’s cattle industry between $10 million and $27 million, thanks to widespread adoption of these IANR-developed strategies. This estimate of economic impact is based on information collected about the heat waves’ severity and the number of cattle on feed at the time.

This analysis showed a steady decline in the percentage of feedlot cattle that died during the most severe heat waves of 1995, 1999 and 2005. Cattle deaths as a percent of those on feed dropped from 2.32 percent in 1995 to 1.25 percent in 1999 and to 0.61 percent in 2005. The 1995 heat wave was slightly more severe and occurred before research results were available. Death and performance losses declined as more producers adopted prevention strategies during the decade.

The 1.71 percent decline in death loss between the 1995 and 2005 heat waves represents a savings of more than $27 million. The 0.64 percent decline in death loss between 1999 and 2005 heat waves of similar magnitude represents more than $10 million in savings.

Field trials providing info to combat soybean rust

Soybean rust is a major new disease worry for growers nationwide. UNL plant pathologists are studying this threat to ensure Nebraska farmers have information and resources to combat rust if it strikes the state.

Thirteen field trials across Nebraska during the 2005 growing season examined various aspects of fungicide application and efficacy. Researchers also are studying how planting and maturity dates and soybean varieties influence the disease. IANR plant pathologists will use these preliminary results and future field trials to devise an integrated soybean rust management program for Nebraska growers.

IANR’s product performance trials examined fungicide application timing, techniques and rates as well as chemigation, the application of fungicide through center pivot irrigation systems. Since soybean rust hadn’t made its way to Nebraska, researchers evaluated and treated another common foliar disease of soybean, brown spot, to collect data.

Findings will provide practical, science-based information growers and companies can use to decide whether chemigation is a good way to apply foliar fungicides to treat soybean rust. They’re also looking at the economic feasibility of different treatments.

If soybean rust develops in Nebraska, scientists don’t think it will require treatment every year. That’s why it’s important to understand the role planting and maturity dates and different varieties play in disease control. This information will help researchers devise an integrated manage-
Cattle grazing influences bird nesting in Sandhills

When it comes to bird-nesting success in Nebraska’s Sandhills, the number of cattle grazing a pasture can be more important than the type of grazing system being used, UNL School of Natural Resources research found.

In the three-year study of cattle’s impact on bird nesting, wildlife ecologists compared different grazing schemes – season-long and short- and medium-length rotations – to determine which provide the bird habitat. Findings are providing insights about how best to manage grazing to optimize benefits for cattle and birds.

Scientists initially thought rotational grazing would give birds the best chance at nesting success because cattle would be in a given area for a short time before being moved elsewhere. Rotations would allow vegetation to regrow to varying heights, creating more habitat diversity.

However, this IANR study found stocking rates – the number of cattle introduced into any grazing system – most strongly influence grazing intensity and nesting success.

Stocking rates can vary widely within the same type of grazing system as ranchers make decisions within their own ranch. Scientists say that may explain why they didn’t see big differences in nesting success among different systems.

Nesting was most productive regardless of the grazing regime when land had a chance to rest. Management-intensive pastures didn’t always have more bird species. While it might seem that pastures grazed season-long would have fewer species and less nesting success, this IANR study found that no one system favored high species diversity.

Findings indicate a mix of grazing approaches within a region would provide the greatest habitat diversity. Scientists now are focusing on small-scale changes within pastures to determine how grazing pressures within different systems affect birds.

Initiative increases UNL expertise in water research

Water is one of Nebraska’s leading resources. A new initiative is strengthening UNL scientists’ ability to explore and understand this vital resource and positioning UNL as a water research and education leader.

The Water Resources Research Initiative aims to enhance and expand UNL’s water research by promoting greater collaboration between scientists with diverse water expertise and bolstering the university’s water research capacity. Launched in late 2003, the initiative already is beginning to pay off. This effort includes numerous departments and colleges. IANR researchers play key roles in this effort.

UNL has formed collaborative teams of scientists with diverse expertise, hired additional researchers in key areas, developed comprehensive research proposals and is increasing cooperation with water-focused federal and state agencies. In 2005, the initiative was named one of 11 Programs of Excellence at UNL.

Seven new researchers were hired in 2005 to strengthen UNL’s hand in water law, water quality, water chemistry, water economics, surface and river ecology and climate modeling. They complement the university’s traditional strengths in groundwater hydrology, water quality, drought mitigation, climate change, irrigation, remote sensing and geographic information systems.

The initiative is helping scientists better compete for federal funds to address issues such as contaminated soil, groundwater and surface water as well as launch an economic study of drought-depressed Lake McConaughy and participate in the Platte River Cooperative Hydrology Study. Graduate and undergraduate water, policy and law programs also are expanding to help train tomorrow’s water scientists and policy-makers.

This multi-disciplinary focus is enabling UNL scientists to tackle complex water-related issues facing Nebraskans and provide information needed for wise water management. In an era of increasing concern about and competition for water, their findings also will benefit the Great Plains and the nation.

Demand growing for IANR’s improved buffalograsses

Demand for UNL’s water-thrifty turf-type buffalograsses is increasing nationwide as people look for more sustainable turf options.

IANR-developed turf buffalograsses are showing up in lawns, golf courses, roadways and parks coast to coast. Demand is greatest in water-short areas such as the West; interest is increasing in eastern states and even abroad.

These improved buffalograsses are the result of long-running IANR research to provide environmentally friendlier turf. Buffalograss requires up to 50 percent less water than Kentucky bluegrass, far less mowing and fertilization, and grows in poor soils.

Thanks to careful breeding and selection, Nebraska’s turf buffalograsses retain their prairie ancestors’ toughness, but with looks suited for lawns. Improved buffalograsses generally are denser, darker green and keep their
color longer than traditional buffalograss.

Since 1990, nine turf buffalograsses developed by IANR turf scientists have been commercialized for sale to the public or the turf industry. Private companies in Nebraska and elsewhere grow and sell these improved buffalograsses as seed, sod or plugs under licensing agreements with the university. Royalties from buffalograss sales have earned the university about $1.1 million since 1990. Royalties help fund ongoing research.

IANR turf scientists were among the first to examine buffalograsses’ turf potential. Before Nebraska’s research began in 1984, turf nationwide research focused on non-native grasses; buffalograss was primarily considered pasture grass. Today, UNL is the nation’s leader in turf buffalograss research.

**Lighter weight replacement heifers can cut feed costs**

Feed is the single biggest cost in cow-calf operations. New UNL research indicates producers can save on feed by developing replacement heifers to lighter than traditional weights.

Typically, ranchers equate lighter weight replacement heifers with poor pregnancy rates and calving difficulty. However, IANR animal science research shows replacement heifers can be developed to a lighter-than-traditional weight without hurting reproductive performance.

The study found no problems in developing spring-born heifers to 53 percent of mature breeding weight compared with 58 percent. Traditionally, ranchers develop replacement heifers to 60 percent or 65 percent of mature weight. This lighter approach significantly reduces costs for developing heifers from fall weaning until the following summer’s breeding season.

Feeding heifers to 53 percent of mature weight costs about $22 per head less during the development period than feeding to traditional replacement weights. In a 500-cow operation with 15 percent of heifers replaced annually, that represents a $1,650 annual savings.

In this three-year study at the university’s Gudmundsen Sandhills Laboratory near Whitman, heifers reached 53 percent or 58 percent of the weight of a mature 1,200-pound cow at the beginning of the breeding season. The two weight groups had similar average calf birth dates, weights and calving difficulties.

There also was no difference between the two weight groups in the percentage of cows that successfully rebred for their critical second pregnancy. Researchers tracked lighter heifers through their fourth pregnancy and found no problems. The heifers remained at lighter than traditional weights as mature cows.

**Undergrads and scientists team on research efforts**

Some undergraduates get hands-on research experience working with IANR scientists on studies that tackle issues important to Nebraskans.

UNL’s Agricultural Research Division’s Honors Student Research program funds selected research by undergraduates who work closely with IANR researchers. The students’ studies let them apply their classroom learning to real-world scientific problems and experience discovery firsthand. Scientists say students’ findings contribute to ongoing research programs. For example:

**Beef producers and the environment should benefit from an animal science student’s study of phosphorus levels in cattle bones.**

Scientists know relatively little about the fate of antibiotics in soil. To find out, IANR agricultural scientists teamed with a USDA Agricultural Research Service researcher at UNL and others on field studies at the West Central Research and Extension Center at North Platte.

Manure from confined cattle fed the recommended dose of oxytetracycline, an antibiotic commonly used in rations, was applied to irrigated corn plots at UNL recommended or twice the
recommended rates. Scientists sampled soil at different depths and tested water from the bottom of 8-foot sealed columns of soil, called lysimeters.

Traces of oxytetracycline were detected in topsoil for 17 months after manure application. Levels decreased over time and the antibiotic was undetectable after 18 months. Two years of testing found no oxytetracycline in water collected 8 feet under test plots.

Manured plots contained significantly more tetracycline-resistant bacteria in topsoil than commercially fertilized plots for five months after application. Levels declined over time with no difference than commercially fertilized plots after five months. Further study is needed to determine whether the increase in resistant bacteria originates in the manure or develops in natural soil bacteria.

This research provided one of the first overviews of what happens when manure is applied to irrigated cropland. IANR scientists conducted field studies at the university’s West Central Research and Extension Center at North Platte. Agronomist David Tarkalson draws a water sample from an irrigated corn test plot.

Soil around former bomb-making plants often is contaminated with toxic compounds that can pollute groundwater and public drinking water. Conventional soil clean up methods are expensive.

An IANR soil environmental chemist and graduate student found ozone effectively cleans carbon-based explosives residues, such as RDX and TNT, from soil. Injecting ozone into soil as a fumigant turns the contaminants into harmless carbon dioxide. Lab tests on soil from a Texas bomb plant site show ozone can be 100 percent effective at eliminating carbon-based residues.

Scientists are perfecting their technique for use with existing technology and equipment to pump ozone through the soil on a large scale.

Ozone injection should be simpler and less expensive than conventional soil clean-up methods that involve digging up, removing and incinerating soil.

### Many preschool children short on key vitamins

Getting enough key vitamins is important to good health, especially for young children whose bodies are growing. Low-fat diets that many adults favor may leave children short on key fat-soluble vitamins, IANR research indicates.

A UNL nutrition scientist reached that conclusion after studying preschool-age children in four Lincoln, Neb., day care centers. She launched her study to evaluate the National Academy of Sciences’ dietary recommendation for vitamin E in children. She found these recommendations are appropriate.

The researcher is expanding her study to include more children, especially in rural areas.

### New Sandhills facilities will aid IANR research

Buildings completed in 2005 at UNL research facilities in the Sandhills significantly expand IANR research and educational capabilities.

The 9,100-square-foot Wagonhammer Education Center, dedicated in August at the Gudmundsen Sandhills Laboratory near Whitman, accommodates 300 people plus research and teaching space for faculty and graduate students. The main auditorium, named the Ray Bohy Conference Room, commemorates Bohy’s 30
years’ service to the university and IANR.

Two gifts — the first in 2001 from Elaine Wolf of Albion and her husband, James, who died in 2002, the other from Bohy — made the center possible. The Wolf family owns Wagonhammer Cattle Co.

Gudmundsen is the site of a variety of range, beef, soils, entomology, ecology, geology, hydrology and wildlife research. The center will enhance research and extension efforts.

The new Barta Brothers Ranch Research Facility near Long Pine is a two-story, 4,800-square-foot building. It will aid research by providing a meeting room for up to 30 people and dormitory space for researchers working at the ranch.

The building, including a full kitchen and living room, makes research at the ranch easier for scientists who previously had to travel 30 miles to the nearest hotel. It has four bedrooms upstairs to accommodate 12 people with room for an additional bedroom downstairs that could accommodate four others.

The ranch is named after brothers Clifford and James Barta who gave their 6,000-acre ranch to the University of Nebraska Foundation in 1996. The brothers also provided an estate gift to establish the Barta Brothers Fund, a permanent endowment for ongoing support of agriculture research.

Long-term research is the focus at Barta Brothers, including grazing systems, integrated resource management and Sandhills biodiversity. The ranch is also the site for demonstrating best management practices.

Research provides info to help turn crops into fuel

Producing ethanol and biodiesel from Nebraska corn and soybeans provides renewable fuel for Nebraskans and expands markets for the state’s corn and soybeans.

UNL agricultural research is providing scientific, technical and economic information to help turn Nebraska’s crops into biofuels. For example:

IANR researchers analyzed diverse aspects of Nebraska’s ethanol production—from feedlot and corn price economics to the impact of ethanol expansion on the state’s agriculture and Nebraska’s comparative advantage in ethanol production. They reported their findings at a legislative briefing. Their analysis shows Nebraska’s ethanol production costs are about the same as in Iowa but are 5 percent to 6 percent lower than in Illinois and Indiana. Nebraska’s cattle feeding industry contributes to this advantage by providing a ready market for ethanol byproducts.

A study by the university’s Industrial Agricultural Products Center helped pinpoint the best soy biodiesel and ethanol blends for combining with petroleum diesel to create biodiesel when using both renewable fuels. This research showed the optimal combination is 20 percent soy biodiesel, 4 percent ethanol and 76 percent petroleum diesel.

IANR animal scientists’ ongoing research on feeding ethanol byproducts to cattle is paying off for cattle producers and ethanol plants alike. Their earlier work demonstrated the feasibility, benefits and economic advantages of feeding byproducts wet instead of dry. It’s estimated that feeding wet byproducts saves cattle feeders $10 to $20 per head. Selling byproducts wet instead of dry also reduces ethanol production costs about 5 percent.

Other IANR biofuels-related research includes quantifying modern ethanol’s positive energy balance, evaluating the economic benefits of ethanol production, genetically engineering soybeans to enhance their biofuels use and exploring the feasibility of producing biodiesel in Nebraska.

Soybeans packed with beneficial omega-3 in the works

Wild salmon, tuna and sardines are among the foods rich in omega-3 fatty acid, which is touted for its role in preventing heart disease, cancer and other ailments. However, many Americans don’t get enough of this beneficial fat in their diets.

IANR plant scientists are working to create soybeans rich in omega-3. It’s part of broader research to modify soybean DNA and produce beans with enhanced nutritional or other characteristics.

They aim to develop soybeans high in omega-3 that could be fed to farm-raised fish or poultry to boost the amount of this important fatty acid in their meat. Consumers who eat the meat from fish or animals fed these enriched soybeans could improve their nutrition without changing their eating habits.

Researchers have already identified genes from other plants, inserted these genes in soybean cells and produced plants high in gamma-linolenic acid and stearidonic acid, the building blocks for omega-3. Next they hope to transfer genes from a harmless plant fungus into cells from these soybeans to induce production of omega-3.

They also are field testing the new genetically modified soybeans to ensure they yield well before proceeding to that next, more difficult step. It’s likely to take about a decade to develop soybeans high in omega-3 for commercial use. These specialty beans also could bring a premium for growers.
Probing clues to reproductive development

There’s mounting scientific evidence that what happens during fetal development affects fertility in adult humans and animals. Genetic, environmental, nutritional and other factors influence reproductive potential.

While scientists know how some of the genes function, they don’t have a good overall picture of everything involved. A UNL animal scientist is working on a piece of this complex puzzle.

She’s examining how vascular, or blood vessel, development influences overall development of the testicles and ovaries. This is basic research but understanding the genetic underpinnings of gonadal development eventually could lead to therapies for infertility.

Findings so far indicate blood vessel formation plays a significant role in overall gonadal development. IANR researchers are focusing on a gene that produces a hormone, vascular endothelial growth factor, or VEGF.

When IANR researchers inhibited the hormone’s ability to communicate with cells, they blocked formation of blood vessels in what would become testicles. This also blocked development of the structures necessary to make sperm.

This research showed that cells that make up the blood vessels migrate from adjacent tissue to the developing testes to form blood cells. Researchers also found VEGF in precursor and mature sperm cells, which indicates the hormone has a role in sperm development beyond blood vessel formation.

Reproductive problems are a growing concern. For example, 40 percent of adult men in industrialized countries have below normal sperm counts and the incidence of testicular cancer in men under age 20 is increasing at an alarming rate.

This work should aid a broader scientific effort to understand and someday treat the underlying causes of fertility problems.

Exploring subsurface drip irrigation’s potential

Going underground with irrigation could help farmers in water-short areas make the most of every drop.

Subsurface drip irrigation, or SDI, is the most water-thrifty system available but little is known about whether it’s practical or feasible for Nebraska growers. New IANR research should answer these and other questions in the coming years.

Preliminary results point to major water savings without sacrificing yields.

IANR researchers installed subsurface drip systems at the South Central Agricultural Laboratory near Clay Center in 2004, the Panhandle Research and Extension Center at Scottsbluff in 2003, and at the West Central Research and Extension Center at North Platte in 2003 and 2005. Findings will provide information on SDI’s potential with central and western Nebraska soils, crops and farming practices.

SDI delivers water to the crop root zone drop by drop through plastic tubing buried 12-15 inches below the soil surface, virtually eliminating water loss on the soil surface. It also should boost nitrogen efficiency by spoon-feeding fertilizer to crops as needed.

IANR researchers are studying crop water use, performance and yields response, water savings and nitrogen use efficiency. They also want to examine weed-crop competition for water, insect management, economic implications and how different crops and varieties respond.

First-year results from 2004 at Clay Center found similar yields for corn that received 10.3 inches, 7.7 inches and 5 inches of water through SDI. Yields were 225, 225 and 210 bushels per acre, respectively. This indicates using SDI could reduce water needs without hurting yields.

Future research also needs to address rodent damage to the plastic pipes, system maintenance and the economic feasibility of switching to SDI.

Entomologists’ findings could cut aphid damage

Aphid is the most damaging crop pest worldwide but exactly how they harm plants has remained a puzzle. IANR entomologists are piecing together answers that could lead to better control.

Aphid damage causes plants to yellow. Scientists long thought aphids produced a toxin that damaged plant chloroplasts, where photosynthesis happens. But no toxin had been found.

IANR entomologists closely studied aphid-infested plants over time and before the tell-tale yellowing that signals aphid damage. This early inspection revealed abnormalities before visible signs of injury emerged and provided unseen other clues.

They also used fluorometry, which measures plants’ energy status. The combination of early inspection and fluorometry revealed that aphids block energy from leaving the chloroplasts. It is a build up of molecules excited by this energy – not a toxin – that eventually chews up the cells and causes visible damage.

The discovery seems to hold true for most types of aphids. It points to the potential for a single solution to reduce losses across a variety of crops and aphid species.

While most plants are damaged by aphids, some are resistant. IANR entomologists now are exploring genes they believe have key roles in protecting resistant plants from aphid damage. If they pinpoint these protective genes and show they are more active in resistant plants during aphid infestations, the genes could be used to develop crops that survive aphid damage.

Creating plants that withstand aphids is a better solution than killing the insects. Over time, insects can develop resistance to chemical controls. Allowing aphids to feed on but not kill the plant maintains a natural balance.
Glimpses at ARD Research

◆ IANR scientists were among the most-cited worldwide in agricultural research over the last decade, according to a report that tracks the research that captures the interest of scientists globally. The ISI Essential Science Indicators Report, 1994-2004, indexed nearly 9,000 articles by UNL's agricultural sciences researchers. Nearly 9,000 articles are cited by institutions worldwide in agricultural sciences articles published by 298 government institutions and large universities. UNL ranked eighth among U.S. universities, 10th among universities worldwide and 16th among all institutions. This report is an indication of the high quality of IANR research and its value to expanding scientific knowledge worldwide.

◆ A new test that quickly detects traces of soy flour is helping food processors better protect consumers with food allergies. It's the latest of several food allergen rapid detection tests developed by IANR food scientists. All are commercially available to the food industry through a university licensing agreement with Neogen, a Michigan company. The UNL team earlier devised tests for peanuts, milk, eggs, almonds and wheat gluten. A test for hazelnuts could be commercialized in the next year. Tests give processors a quick, reliable way to detect traces of an allergenic food on equipment or in foods processed on shared equipment. People with food allergies are safer thanks to these tests, which give processors the tools to check for allergen contamination so it doesn't reach consumers.

◆ Inaccurate seed placement takes a big bite out of yields at harvest. UNL biological systems engineers are working to improve planter accuracy by identifying the most important factors in putting seeds in just the right spot. They found that seed tubes play a key role and that wear on sugar beet planter seed tubes can significantly change seed placement. This research also indicates seed coatings can affect seed placement. Some coatings make the seed smoother while others don't affect the texture. This work is helping sugar beet growers fine-tune planters' accuracy.

◆ Rural immigrants furthering their education while working face many challenges. College of Education and Human Sciences researchers hope to improve the chances of success by identifying what helps or hinders rural immigrants' educational pursuits. This study of bilingual Latinos in Northeast Nebraska pursuing online classes at UNL showed significant family or community support and access to child care are keys to success. Participants with more support and those who were more integrated into their communities reported less stress and depression. These results and further research should help provide better services for rural immigrants and women seeking an education.

◆ The latest generation of decorative millets from UNL plant breeding efforts will debut in garden centers in 2006. The two newcomers – showy hybrids of pearl millet – are named Jester and Purple Baron. Ball Horticultural, a plant and seed wholesaler, will sell seed and young plants to the commercial greenhouse industry under a university licensing agreement. Both come from similar breeding lines as Purple Majesty, UNL's popular decorative millet that now grows in gardens worldwide.

◆ Government policies designed to encourage soil conservation also contain components that sometimes may lead to noncompliance, IANR agricultural economics research shows. While most producers comply, costs associated with soil conservation programs have led some producers to collect payments without complying. Under current policy, penalties for noncompliance equal the government payment, creating economic incentives for producers to falsely claim government payments. This research showed the extent of noncompliance and the level of conservation practices adoption depend on the size of the government payment, costs associated with adoption of practices, and level of government oversight and enforcement. Noncompliance can be completely deterred if the expected penalty exceeds costs of program adoption.

◆ Combining trees for harvest with grass for grazing could help producers make the most of the land and resources. An IANR range scientist and a plant stress physiologist are examining how different forage grasses perform under different amounts of shade from green ash and scotch pines. Their findings should help producers interested in silvopasturing, which combines trees, grasses or crops with livestock grazing.

◆ Hot, humid weather during the breeding season hurts beef cow reproduction, IANR research shows. In general, scientists found that conception rates drop 1 percent for each 1 degree Fahrenheit that breeding season temperatures are above normal. In Nebraska, a major beef producing state with roughly 2 million cows, a 1 percent drop in conception amounts to $12 million in lost income for cow-calf producers if weaned calves bring $600. Findings point to potentially significant consequences for producers if global warming increases average temperatures. This study, the first to quantify the relationship between environmental conditions and beef cow reproduction under typical pasture breeding conditions, shed light on this largely hidden production cost.

◆ Child care, transportation and health care are just a few things rural women worry about regardless of income. As part of a national study on welfare reform and rural women, IANR family scientists studied 42 rural Nebraska women of all incomes. They found that while 80 percent of the women reported being employed, many go in and out of the work force because of transportation and child care issues. This College of Education and Human Sciences research will provide information to help policy-makers better understand rural needs.
The impact and quality of ARD research can be assessed in many ways. One measure of excellence is the recognition researchers’ work receives from peers and from those who benefit from the research. A number of ARD faculty members are widely recognized as leaders in their disciplines, and a number received international, national, regional and/or state honors. Many ARD faculty also serve as officers or directors in their professional societies and state, regional, national and international organizations. Some are editors and associate editors of professional journals. We applaud their efforts in furthering the knowledge and professionalism of their disciplines.

### Agricultural Economics

Konstantinos Giannakas was an expert consultant on Domestic Support Measures at the United Nations’ Food and Agriculture Organization (FAO) in Rome, Italy, and was appointed Associate Editor, *American Journal of Agricultural Economics.*

Gary Lynne was a member of the Carbon Sequestration Team that received the IANR Team Award and was an invited review panel member for the National Science Foundation.

### Agronomy and Horticulture

Kenneth G. Cassman received the International Fertilizer Association’s International Crop Nutrition Award.

Achim R. Dobermann received the Fellow Award from the American Society of Agronomy.

John Doran received the Distinguished Service Award from the Soil Science Society of America.

Jerry Eastin received the Sorghum Industry Award from the Nebraska Grain Sorghum Producers Association and the Nebraska Grain Sorghum Board.

Bahman Eghball received the Agronomy Fellow Award from the American Society of Agronomy.

Richard B. Ferguson received the Water Guardian of the Year Award from the Nebraska Agri-Business Association, Inc.

Dale Flowerday received the Dr. Ray Starosta Award of Excellence and was named Nebraska’s Certified Crop Adviser of the Year.

Sally A. Mackenzie was named Fellow of the American Association for the Advancement of Science.

Martha Mamo received the IANR Dinsdale Family Faculty Award.

Martin Massengale was inducted into the new USDA Cooperative State Research, Education and Extension Service Hall of Fame; was reappointed by the U.S. Secretary of Agriculture to a third term on the Agricultural Research, Extension, Education and Economics Advisory Board; and received the “Brothers of the Century” award from Alpha Gamma Rho Fraternity.

Patrick E. Reece, Walter H. Schacht, and Jerry Volesky were members of Cow-Calf and Forage Systems in the Nebraska Sandhills research team that received the IANR Team Award.

James E. Specht received a Charles Bessey Professorship.

Gary Varvel received the ASA Fellow Award.

The Carbon Sequestration Team received the IANR Team Award. Agronomy and Horticulture Department team members include Brigid Amos, Tim Arkebauer, Kenneth G. Cassman, Achim Dobermann, Daniel Ginting, Daniel Walters, and Haishun Yang.

### Animal Science

Michael Brummi received the Excellence in Research Award from the Nebraska Chapter of Gamma Sigma Delta.

Chris Calkins was a member of the research team that received the Prize for Meat Science and Technology from the International Meat Secretariat and received the Omtvedt Innovation Award from the Institute of Agriculture and Natural Resources.

Terry Klopfenstein received the Secretary’s Honor Award from the U.S. Department of Agriculture, was named a Distinguished Honorary Member of the Mexican Association of Animal Production, and received the College of Food, Agricultural and Environmental Sciences Distinguished Alumni Award from The Ohio State University.

Robert Koch was a member of the research team named to *BEEF* magazine’s Top 40 who have contributed to building today’s beef industry.

Larry Cundiff was a member of the research team named to *BEEF* magazine’s Top 40 who have contributed to building today’s beef industry.

Andrea Cupp received the Junior Faculty Excellence in Research Award from the Agricultural Research Division.

Charles Hibberd received the Award of Merit from the Nebraska Chapter of Gamma Sigma Delta.

Thomas Jenkins received the Pioneer Award from the Beef Improvement Federation.

Rodger Johnson received the Omtvedt Innovation Award from the Institute of Agriculture and Natural Resources.

Steven Jones was a member of the research team that received the Prize for Meat Science and Technology from the International Meat Secretariat and received the Omtvedt Innovation Award from the Institute of Agriculture and Natural Resources.

Larry Cundiff was a member of the research team named to *BEEF* magazine’s Top 40 who have contributed to building today’s beef industry.
Terry Mader received the Wendell Burgher Beef Industry Award/Professorship from the Institute of Agriculture and Natural Resources and was named an Honorary Professor in the School of Animal Studies at the University of Queensland, Australia.

Merlyn Nielsen was elected secretary-treasurer of the Midwest Section of the American Society of Animal Science.

Ivan Rush received the Prime Promoter Award from the Nebraska Beef Council.

Sheila Scheideler received the Omtvedt Innovation Award from the Institute of Agriculture and Natural Resources.

Dale Van Vleck was named the A.B. Chapman Lecturer in Animal Breeding and Genetics at the University of Wisconsin-Madison.

**Biochemistry**

Ruma Banerjee received the George Holmes University Professor award from the University of Nebraska-Lincoln.

Donald Becker received the Junior Faculty for Excellence in Research award from the Agricultural Research Division.

Raymond Chollet was elected AAAS Fellow/Sections of Biological Sciences and Agriculture at its national meeting.

John Markwell received the Holling Family Award for Teaching Excellence from the Holling Family and the Excellence in Education Award from the Beta Theta Pi Fraternity.

Robert Spreitzer received the Charles Bessey Professor award from the University of Nebraska.

**Biological Systems Engineering**

Derrel Martin was a member of the Carbon Sequestration Program team that received the Team Award from the Institute of Agriculture and Natural Resources.

Wayne Woldt received a Blue Ribbon Award from the American Society of Agricultural Engineers for Educational Aids.

**Entomology**

Tiffany M. Heng-Moss received the Omtvedt Innovation Award from the Institute of Agriculture and Natural Resources.

Leon G. Higley received a BCE Educational Project Award for the ESCAPE Website at the North Central Branch Entomological Society of America meeting.

Shripat T. Kamble was presented the C.V. Riley Achievement Award at the North Central Branch Entomological Society of America meeting.

Z B Mayo is Chairperson of the Academic Rights and Responsibilities Committee.

Brett C. Ratcliffe is serving as Secretary of the Coleopterists Society.

Robert J. Wright was elected to the Academic Senate and served as the Entomological Society of America Poster Chair.

**Food Science and Technology**

Sue Hefle received the Fellow Award from the American Academy of Allergy, Asthma, and Immunology and the Fellow Award from the Institute of Food Technologists.

David S. Jackson received the Best Paper Award from the Tortilla Industry Association.

**School of Natural Resources**

Tala Awada received the award of Fellow and Member of the Board of Governors, Center for Great Plains Studies, University of Nebraska–Lincoln.
James W. Merchant was honored with the MidAmerica GIS Consortium (MAGIC) Lifetime Achievement Award at the Ninth Biennial MidAmerica GIS Symposium.

Shashi B. Verma was a member of the Carbon Sequestration Program team that received the Team Award from the Institute of Agriculture and Natural Resources; co-authored a journal article that received the Norbert Gerbier-Mumm International Award (World Meteorological Organization) for the Paper of the Year and was selected as a Fellow of the American Society of Agronomy.

Veterinary and Biomedical Sciences

Dicky Dee Griffin received the American Association of Bovine Practitioner’s Award of Excellence from the Veterinary and Biomedical Sciences Department.

Marjorie Lou received an Adjunct Professorship from China Medical University, Shenyang, China, and received the Kwan-Biao Distinguished Professorship from Zhejiang University, Hangzhou, China. She has also received a Certification of Recognition for Contributions to Students from the University of Nebraska–Lincoln.

Family and Consumer Sciences

Rochelle Dalla received the Award for Young Achievers from the College of Education and Life Sciences at the University of Arizona.

Northeast Research and Extension Center

Mike Brumm received the Research Award from the University of Nebraska chapter of Gamma Sigma Delta.

Thomas Hunt received the National Entomological Society of America Special Project Award, a Board Certified Entomologists team award.

Terry Mader received the Wendell Burgher Industry Professorship and was named Honorary Professor in the School of Animal Studies, University of Queensland, Brisbane Australia.

Panhandle Research and Extension Center

David Baltensperger received the Outstanding Achievement Award from the Nebraska Wheat Growers Association.

Linda Boeckner received the Extension Award from the Nebraska Chapter of Gamma Sigma Delta.

Charles A. Hibberd received the Award of Merit from the Nebraska Chapter of Gamma Sigma Delta.

H. Doak Nickerson received the Honor Award from the Nebraska Chapter of the Soil and Water Conservation Society and the Master Angler Award from the Nebraska Game and Parks Commission.

ARD Dean and Director Darrell Nelson (left) presents a Junior Faculty Excellence in Research Award to Donald Becker, Department of Biochemistry.

Ivan G. Rush received the Prime Beef Promoter in Nebraska Award from the Nebraska Beef Council.

Dean Yonts received the Water Guardian Award from the Mid-America Croplife Association.

West Central Research and Extension Center

Dale Lindgren received the Honorary Membership Award from the Nebraska Nursery and Landscape Association; a Certificate of Appreciation for 25 years as a cooperator from the NC-7 Regional Ornamental Plant Trials; and Distinguished Service Award from the Nebraska Cooperative Extension Association Specialist Section.
One of the primary missions of the ARD research program is to develop the scientists of tomorrow. We are committed to providing exceptional graduate students with the opportunity to work with and learn from our research faculty.

ARD is among the national leaders in research in food production and processing, natural resources management and family sciences. Approximately 813 graduate students are pursuing advanced degrees with ARD faculty. The quality of our graduate students is reflected in the recognition they receive.

### Agricultural Economics

- **Brahim Bouras** received the Dr. James B. Hassler Award for Outstanding Research by a Graduate Student, Department of Agricultural Economics.
- **Kyriakos Drivas** received the Outstanding M.S. Student Award from the Department of Agricultural Economics.
- **Scott Nedved** received the Outstanding MBA Agribusiness Student Award.
- **Gibson Nene** received the CAFIO, Department of Agricultural Economics Graduate Student Research Travel Award.
- **Dimitrios Panagioutou** received the CAFIO, Department of Agricultural Economics Graduate Student Research Travel Award.

- **Alejandro Plastina** received the Outstanding Ph.D. Student Award from the Department of Agricultural Economics, University of Nebraska–Lincoln; CAFIO, Department of Agricultural Economics, Graduate Student Research Travel Award; and the Graduate Student Organization, Department of Agricultural Economics Fellow Graduate Student Award.
- **Cody Wietzenkamp** received the SAMBA, University of Nebraska Fellow Graduate Student Award.

### Agronomy and Horticulture

- **Arlene Adviento-Borbe** received the Moseman Fellowship from the Agricultural Research Division.
- **Keri Andersen** received the STARS Fellowship from Graduate Studies.
- **Fufa Birru** received the Gerald O. Mott Meritorious Graduate Student Award in Crop Science.

- **Neal Bryan** received the Othmer Fellowship from Graduate Studies.
- **Julian Chaky** received the Chancellor’s Doctoral Fellowship from Graduate Studies.
- **Veronica Ciganda** received the Milton Mohr Fellowship from the Center for Biotechnology.
- **Douglas Felter** received the Henry M. Beachell Fellowship from the Department of Agronomy and Horticulture.
- **M. Susana Grigera** received the Widaman Trust Distinguished Graduate Assistant Award from the Agricultural Research Division.

### Animal Science

- **Jared Bates** received a Charles C. Cooper/Emma I. Sharpless Fellowship from the College of Agricultural Sciences and Natural Resources.
- **Eric Behlke** received a Graduate Recruiting Fellowship from the College of Graduate Studies.
- **Joshua Benton** received a William G. Whitmore Travel Grant from the Agricultural Research Division.
- **Rebecca Bott** received the 1st Place Award in the M.S. Graduate Student Paper Competition at the Annual Meeting of the Midwest Section of the American Society of Animal Science, the 1st Place Award in the Graduate Student Paper Competition of the Nebraska Physiological Society Annual Meeting, a Milton E. Mohr Fellowship from the Center for Biotechnology, and the John W. McDonald Fellowship from the College of Graduate Studies.
**Virgil Bremer** received a Mary and Charles C. Cooper/Emma I. Sharpless Fellowship from the College of Agricultural Sciences and Natural Resources.

**Brad Creamer** received the Folsom Distinguished Master’s Thesis Award from the University of Nebraska-Lincoln.

**Oscar Esquivel** received a V.H. Arthaud Travel Award from the Animal Science Department and a William G. Whitmore Travel Grant from the Agricultural Research Division.

**Danilo Franco** received an Award of Excellence for his poster at the Southern Poultry Science Society meeting.

**Bobbi Geisert** received a William G. Whitmore Travel Grant from the Agricultural Research Division.

**Kristin Gustad** received a Graduate Recruiting Fellowship from the College of Graduate Studies.

**Kimberly Hargrave** received the Maude Hammond Fling Fellowship from the College of Graduate Studies, a William G. Whitmore Travel Grant from the Agricultural Research Division, and a V.H. Arthaud Travel Award from the Animal Science Department.

**Mohammad Jalal** received an Award of Excellence for his poster presentation at the Southern Poultry Science Society meeting.

**Jennie James** received a Chancellor’s Fellowship from the College of Graduate Studies and a Fellowship from the Institute of Food Technologists.

**Pablo Loza** received the 4th Place Award in the Graduate Student Paper Competition at the Plains Nutrition Conference and a V.H. Arthaud Travel Award from the Animal Science Department.

**Matt Luebbe** received a William G. Whitmore Travel Grant from the Agricultural Research Division.

**Jessica Meisinger** was elected the Midwest Representative of the Student Board of Directors of the American Meat Science Association.

**David Monsalve** received the Victor Henningsten, Sr. Graduate Student Fellowship from the Food Science and Technology Department and a William G. Whitmore Travel Grant from the Agricultural Research Division.

**Roman Moreno** received the Ned S. and Esther B. Raun International Graduate Fellowship from the Animal Science Department.

**Sarah Morris** received a William G. Whitmore Travel Grant from the Agricultural Research Division.

**Don Moss** received a Travel Award to attend the Reciprocal Meat Conference from the American Meat Science Association.

**Robert Peterson** received the 2nd Place Award in the Ph.D. Graduate Student Paper Competition at the Annual Meeting of the Midwest Section of the American Society of Animal Science and received the 3rd Place Award in the Graduate Student Paper Competition at the Plains Nutrition Conference.

**Stephanie Quinn** received a Graduate Recruiting Fellowship from the College of Graduate Studies.

**Juliai Rahajeng** received a William G. Whitmore Travel Grant from the Agricultural Research Division.

**Angel Rios-Utrera** received the Ned S. and Esther B. Raun International Graduate Fellowship from the Animal Science Department, the Frank Baker Memorial Essay Contest from the Beef Improvement Federation, and a William G. Whitmore Travel Grant from the Agricultural Research Division.

**Ana Ruiz** received a William G. Whitmore Travel Grant from the Agricultural Research Division.

**Kristi Sayer** received a William G. Whitmore Travel Grant from the Agricultural Research Division.

**Jason Scheffler** received a Bukey Fellowship from the College of Graduate Studies.

**Aaron Stalker** received the John Hallman Memorial Award from the Animal Science Department and a William G. Whitmore Travel Grant from the Agricultural Research Division.

**Robin Ten Broeck** received a Graduate Recruiting Fellowship from the College of Graduate Studies.

**April Tepfer** received a Graduate Recruiting Fellowship from the College of Graduate Studies.

**Biochemistry**

**David Adle** received the Milton Mohr Graduate Student Fellowship from the Center for Biotechnology and the Hazel V. Emley Fellowship from the Office of Graduate Studies.

**Carmen Ghersiam** received the Holling Family Award for Teaching Excellence from the College of Agricultural Sciences and Natural Resources.

**Melissa Lucas** received the Othmer Fellowship from the Office of Graduate Studies.

**Peter Madzelan** received the RBC Fellowship from the Redox Biology Center.

**Elizabeth Pierce** received the RBC Fellowship from the Redox Biology Center.

**Anna Prudova** received an assistantship from the American Heart Association.

**Devis Sinani** received an assistantship from The Nutricia Research Foundation in the Netherlands.

**Dan Su** received the Widaman Trust Graduate Assistant Award from the Agricultural Research Division.

**Olga Vitvitskaia** received the Chancellor’s Fellowship from the Office of Graduate Studies.

**Biological Systems Engineering**

**Alejandro Amezquita** received the V. Duane Rath Foundation Graduate Research Fellowship from the International Association of Food Industry Suppliers.
Justin Cermak received the Melville H. Cohee Student Leader Conservation Scholarship from the Soil and Water Conservation Society.

Junjie Guan received the Bill and Rita Stout Outstanding International Graduate Student Award and a John and Louise Skala Fellowship Award from the Agricultural Research Division.

Ajay Kumar received a John and Louise Skala Fellowship Award from the Agricultural Research Division.

Balaji Sethuranasamyraja received a Widaman Trust Distinguished Graduate Assistant Award from the Agricultural Research Division.

Entomology

Nicholas Aliano received a Hazel V. Emley Fellowship from the Office of Graduate Studies, a Ward A. and Helen W. Combs Scholarship from the Entomology Department, and a travel grant from the School of Biological Sciences’ Initiative for Ecology and Evolutionary Analysis.

William Allgeier received a David and Anna Larrick Student Travel Award from the Agricultural Research Division, and an Elvis Dickason Memorial Fund Travel Award from the Bruner Club Executive Committee, and served as the Entomological Society of America Student Affairs Committee Chair.

Wyatt Anderson received a Ward A. and Helen W. Combs Scholarship from the Entomology Department, the Graduate Student Teaching Award of Merit from the North American Colleges and Teachers of Agriculture (NACTA) and the Entomology Department, and 1st Place in the B.S./M.S. Student Oral Presentations Competition at the North Central Branch Entomological Society of America Meeting.

Laura Campbell received the Mabel J. Reichenbach Fellowship from the Office of Graduate Studies and a Myron H. Swenk Memorial Fund Travel Award from the Bruner Club Executive Committee.

Pete Clark received a Milton E. Mohr Fellowship from the Center for Biotechnology and a Myron H. Swenk Memorial Fund Travel Award from the Bruner Club Executive Committee.

André Crespo received a Mary and Charles C. Cooper/Emma I. Sharpless Fellowship from the College of Agricultural Sciences and Natural Resources.

Thomas Eickhoff received a David and Anna Larrick Student Travel Award from the Agricultural Research Division, an Elvis Dickason Memorial Fund Travel Award from the Bruner Club Executive Committee, and served as the Entomological Society of America Student Affairs Committee Chair.

Lisa Franzen received a John Borrlson Fellowship from the Office of Graduate Studies, 2nd Place in the M.S. Student Poster Competition at the National Entomological Society of America Meeting, a Myron H. Swenk Memorial Fund Travel Award from the Bruner Club Executive Committee, and won the Biological and Agricultural Sciences Division of the Sigma Xi Student Research Poster Competition.

Shauna Hawkins received a Myron H. Swenk Memorial Fund Travel Award from the Bruner Club Executive Committee, a travel grant from the School of Biological Sciences’ Initiative for Ecology and Evolutionary Analysis, a David and Anna Larrick Student Travel Award from the Agricultural Research Division, and an Ernst Myer Travel Grant from the Museum of Comparative Zoology at Harvard.

Timothy Huntington received a John W. McDonald Fellowship from the Office of Graduate Studies, 1st Place in the B.S./M.S. Student Oral Presentations competition at the North Central Branch Entomological Society of America Meeting, and a Myron H. Swenk Memorial Fund Travel Award from the Bruner Club Executive Committee.

Jeffrey Krumm received a Widaman Trust Distinguished Graduate Assistant Award from the Agricultural Research Division and a Myron H. Swenk Memorial Fund Travel Award from the Bruner Club Executive Committee.

Diana Londoño received a Myron H. Swenk Memorial Fund Travel Award from the Bruner Club Executive Committee.

Paula Macedo received a John Borrlson Fellowship from the Office of Graduate Studies and a Myron H. Swenk Memorial Fund Travel Award from the Bruner Club Executive Committee.

Sasi Maliphan received a Widaman Trust Distinguished Graduate Assistant Award from the Agricultural Research Division and a Myron H. Swenk Memorial Fund Travel Award from the Bruner Club Executive Committee.

Matthew Paulsen received a research grant from the Center for Great Plains Studies and a research grant and a travel award from the School of Biological Sciences’ Initiative for Ecology and Evolutionary Analysis.

Eliseu Pereira received a fellowship from the Coordination for the Improvement of Higher Education Personnel of the Brazilian Ministry of Education and 1st Place in the Ph.D. Student Poster Competition at the North Central Branch Entomological Society of America Meeting.
Obdulia Segura-Leon received 2nd Place in the Ph.D. Student Poster Competition at the National Entomological Society of America Meeting and a Myron H. Swenk Memorial Fund Travel Award from the Bruner Club Executive Committee.

Neil Spomer received a Myron H. Swenk Memorial Fund Travel Award from the Bruner Club Executive Committee, a Fred Clute Memorial Scholarship, and 1st Place in the B.S./M.S. Student Poster Competition at the North Central Branch Entomological Society of America Meeting.

Food Science and Technology

Alejandro Amezquita received the V. Duane Rath Foundation Graduate Research Fellowship from the International Association of Food Industry Suppliers.

Veterinary and Biomedical Sciences

Somashekarappa Nanjappa received the Milton E. Mohr Scholarship from the Center for Biotechnology.

Dhammika Navarthna received the Charles C. Cooper/Emma I. Sharpless Fellowship from the College of Agricultural Sciences and Natural Resources and the Agricultural Research Division and the William G. Whitmore Memorial Research Travel Fund from the Agricultural Research Division.

Aruna Ambagala received the Graduate Student Research Assistant Award from the Office of the Dean of Graduate Studies and the Best Seminar Award for the Ph.D. Program from the Department of Veterinary and Biomedical Sciences.

Somashekarappa Nanjappa received the Milton E. Mohr Scholarship from the Center for Biotechnology.

Family and Consumer Sciences

Lisa Garcia received the Larson Minority Fellowship from the College of Education and Human Sciences.

Northeast Research and Extension Center

Justin Cermak received the Melville H. Cohee Student Leader Conservation Scholarship from the Soil and Water Conservation Society.

Jeff Krumm was awarded the Entomology Department Dow AgroSciences Internship.

Rebecca Graham received the Mildred F. Thompson Fellowship from the College of Education and Human Sciences.

Bea Harris received the Graduate Teaching Assistant Award from the College of Education and Human Sciences.

Genc Janaqi received the Dorothea Pond Dunham Fellowship from the College of Education and Human Sciences.

Angela Meza received the Dorothea Pond Dunham Fellowship from the College of Education and Human Sciences.

Nicole Prusa received the Dorothea Pond Dunham Fellowship from the College of Education and Human Sciences.

West Central Research and Extension Center

Aaron Stalker received the John and Louise Skala Fellowship award from the Agricultural Research Division, the John Hallman Memorial Award from the Department of Animal Science and the Colorado Nutrition Roundtable Graduate Student Poster Competition.
The purpose of this program is to allow outstanding University Honors Program students to conduct research under the direction of a faculty mentor. The program is open to junior and senior Honors Program participants proposing to work with a faculty member who has an ARD appointment. A subcommittee of the ARD Advisory Council selects awardees based on the quality of the proposal. Proposals are authored by the students with guidance from the proposed project mentors.

Agricultural Economics

Chandra Ruff received an Honors Award for “Promoting sustainable development: An analysis of the timber industries in Brazil and Indonesia using the Solow growth model,” from the Agricultural Research Division. (E.W. Peterson, Advisor)

Ryan Pekarek received an Honors Award for “A Study in the Ability of Forcing Technology to Disинфest Corylus spp. Hybrid Explants” from the Agricultural Research Division. (P. Read, Advisor)

Animal Science

Melissa Senf received an Honors Award for “Analysis of Behavior of Squirrel Monkeys in Single vs Mixed Species Exhibits at Henry Doorly Zoo” from the Agricultural Research Division. (M.M. Beck, Advisor)

Joshua Thoendel received an Honors Award for “Analysis of Post-Translational Modifications in Ribulose-1, 5-Biphosphate Carboxylase/Oxygenase via Biochemical and Genetic Methods” from the Agricultural Research Division. (R. Spreitzer, Advisor)

Biological Systems Engineering

Hajira Ahmad received an Honors Award for “Acoustic Coupling Media for Ultrasonic Investigation of Teeth” from the Agricultural Research Division. (G.R. Bashford, Advisor)

Biochemistry

Brady Brabec received an Honors Award for “Characterization of Basic Residues Near the Active Site in CO Dehydrogenase” from the Agricultural Research Division. (R. Banerjee, Advisor)

Jesse Cox received an Honors Award for “Understanding the Function and Role of MCTR2, A Mammalian Copper Transporter” from the Agricultural Research Division. (J. Lee, Advisor)

Veterinary and Biomedical Sciences

Holly Samson received an Honors Award for her Undergraduate Research Project from the Agricultural Research Division.

Nathan Heidbrink received an Outstanding NU Pre-Vet Club Student Organization Member Award from the Agricultural Research Division.

Amy Messinger received an Outstanding NU Pre-Vet Club Student Organization Member Award from the Agricultural Research Division.
ARD faculty involved in plant breeding and genetics research make important contributions to the improvement and development of agricultural and horticultural crops.

Public breeding programs such as ARD’s are essential to the continued enhancement of plant germplasm. These programs provide the resources and flexibility to pursue long-term breeding programs in crops that may not have a current commercial interest. They also can address genetic, cultural and management interactions characteristic of today’s agriculture, as well as the future’s.

Germplasm releases provide improved genetic material that is integrated into private and public plant breeding programs. Other releases occur as new cultivars (varieties), which are increased through the Foundation Seed Division and then provided to seed companies for production of certified seed. The following releases were made in 2004-05.

### Agronomy and Horticulture Department

#### Crop: Grain Sorghum (Sorghum bicolor (L.) Moench)

#### Germplasm Release: Germplasm N584 – N591

#### Scientists: I.M. Dweikat, J.F. Rajewski, J.D. Eastin, and F.Z. Garcia

#### Released by: Nebraska Agricultural Experiment Station, University of Nebraska, the Wyoming Agriculture Experiment Station, University of Wyoming, and the United States Department of Agriculture, Agricultural Research Service

#### Characteristics: Eight large seeded grain sorghum germplasms were developed to produce large seeded food grade hybrid parent lines adapted to Midwest USA region. These germplasms resulted from crosses made using genetic male steriles ($ms3ms3$) and emasculated 2-way and 3-way crosses made in the 2000 spring greenhouse between Nebraska Seed Size Cycle 5 (NSSC5) population selections and large seed size tropical introductions and conversion lines IS 9987, IS 2389, PI 571344, NSL 83547, and SC 425. NSSC5 is a Nebraska broad genetic base, full season, food grade, random mating population containing B and R reaction for A1 cytoplasmic male sterility and contains the nuclear male sterility gene $ms3$. In general these germplasms are average to short in height and medium to late in maturity. When grown at Lincoln in 2003, seed size ranged from 41-59 g/1000 seed, which was 30-88% larger than RTx430. Grain color is white, cream yellow, or yellow endosperm. Seven germplasms have tan plant reaction and one has purple plant color. Tillering habit is upright for all the germplasms except N586, which has angled tiller habit and recurved peduncles. All the eight germplasms are photoperiod insensitive. Insect and disease resistance of these germplasms has not been determined.

#### Crop: Grain Pearl Millet (Pennisetum glaucum spp. monodii)

#### Germplasm Release: Germplasm Line NPM-8

#### Scientists: J.F. Rajewski, D.J. Andrews, and I.M. Dweikat

#### Released by: The Institute of Agriculture and Natural Resources, University of Nebraska–Lincoln

#### Characteristics: NPM-8 provides an adapted germplasm source from which dwarf lines with long panicles can be derived for use in the A$_1$ and A$_4$ cms systems as R$_1$-lines (male parents) or A$_1^r$-lines (kernels parents) for producing medium maturing dwarf grain hybrids. NPM-8 was derived from the Nigerian Dwarf Composite (NCD2) germplasm by selection of dwarf phenotypes adapted to eastern Nebraska conditions and primarily represents pooled diversity from Nigerian and West African long panicle landraces converted to a dwarf plant background. NPM-8 is a dwarf, medium maturing, tillering germplasm that averages between 98-123 cm height at maturity. It flowers between 57 and 66 days after early June to early July plantings at Mead, and has a 5-10 day range between first plants flowering and average flowering dates for the germplasm. Grain yields
from 1620 to 2910 kg/ha have been record-
ed. Hybrids with 3 seed parents showed heterosis levels of 40 to 158% among 3 planting dates, with a best hybrid yield of 4709 kg/ha. Kernels of NPM-8 are gray in color, variable in shape with a size range of 4.8-11.3 g/1000. Panicles vary from 24-45 cm length and 1.7-2.5 cm diameter and have good exertion. Insect and disease re-
action of NPM-8 has not been determined.

**Crop:** Corn (Zea mays L.)

**Germplasm Release:** 12 Maize Populations NB[S1]1_8, NB[S1]2_8, NB[S1]3_8, NB[RFS]1_8, NB[RFS]2_8, NB[RFS]3_8, NS[S1]1_8, NS[S1]2_8, NS[S1]3_8, NS[RFS]1_8, NS[RFS]2_8, NS[RFS]3_8

**Scientists:** The late W.A. Compton, M. Aguilar-
Sanmiguel, D. Galusha, K. Hill, B. Johnson, S. Kaeppler, and W. Russell

**Released by:** The Institute of Agriculture and Natural Resources, University of Nebraska–Lincoln

**Characteristics:** All 12 populations were developed from a long-term selection study that was initi-
ated and conducted by the late William A. Compton. Evaluations of these cycle 8 populations were conducted as part of three thesis research projects. Each popu-
lation was developed from a selection study initiated in 1968. There were two base populations, NB_0 and NS_0. Each population was independently improved by two methods of selection, per se testing of S1 families [S1] and testing of reciproc-
al full-sib families [RFS]. In addition, for each base population and selection method, there were three independent replicates. This resulted in 12 populations at each cycle of selection; eight cycles were completed. The selection criterion for all the populations was a multiplicative index that equaled grain yield at 15.5% moisture x (100 - % lodged plants) x (100 - % plants with dropped ears). Across replicates, both methods of selection resulted in significant changes of both grain yield and index values in the crosses between the reciprocal populations and in the first generation selfed of each population but not in the populations per se. These 12 populations are the only known populations developed from replicated selection experiments of a cultivated crop or domesticated animal species. As such, they are a valuable genetic resource for the study of the effects of genetic drift and selection.

**Crop:** Barley (Hordeum vulgare L.)

**Variety Release:** P-713 Winter Feed Barley

**Scientists:** P.S. Baenziger, B. Behrens, K. Kim, J. McNeil, L. Oberthur, T. Berke

**Released by:** The Nebraska Agricultural Experiment Station, University of Nebraska–Lincoln

**Characteristics:** P-713 was previously tested at NE95713. P-713 is an F_3-derived line that was selected in the F_4 generation on the basis of its maturity, plant height, straw strength, and winter hardiness. It was released on the basis of its superior winter hardiness, straw strength, and grain yield under rainfed conditions. It has rough awns, and its covered kernels are amber, have long rachilla hairs and a yellowish aleurone. The flag leaf is twisted in the late boot stage. The plant has a prostrate growth habit. It is green in color with green auricles. The spike is medium lax and medium in length. In 17 trials grown in Nebraska (1998-2003), P-713 yielded 4290 lbs/a (4810 kg/ha). P-713 is moderately resistant to powdery mildew (incited by Erysiphe graminis DC. f. sp. Hordei Em. Marchal and to barley yellow dwarf virus (BYDV) and is moderately susceptible to leaf rust (incited by Puccinia hordei G. Otth) and net blotch (incited by Pyrenophora teres f. sp. teres Drechs.). P-713 is best adapted to dryland production in Nebraska and the southern Great Plains.

**Crop:** Barley (Hordeum vulgare L.)

**Variety Release:** ‘Burton’ Spring Feed Barley

**Scientists:** P. Bregitzer and D. Mornhinweg

**Released by:** United States Department of Agriculture, Idaho Agricultural Experiment Station, University of Idaho, Colorado Agricultural Experiment Station, Colorado State University, Nebraska Agricultural Ex-
periment Station, University of Nebraska, New Mexico Agricultural Experiment Station, New Mexico State University

**Characteristics:** ‘Burton’ (P.I. 634714) is a Russian wheat aphid-resistant two-rowed spring feed barley variety and has the pedigree
Baronesse/3/Crystal/2/Klages*3/Pl 366450. Burton is a spring, 2-rowed, hulled barley with a semi-lax spike that nods at maturity. Awns are long and rough. Rachilla hairs are long. Hairs on glumes are banded and glume awns are rough. Hulls are wrinkled, with prominent, barbless lateral veins. Kernels have a transverse crease at the base. Aleurone is white. Comparisons to Baronesse over 31 location years in the absence of significant Russian wheat aphid infestations show Burton to be similar with respect to maturity, height, yield, test weight, and percentage plump kernels; it has shown superior resistance to lodging. Burton is highly resistant to damage caused by Russian wheat aphid feeding. The mechanism of resistance is tolerance. The proposed name is after Bob Burton (deceased, USDA-ARS), who was instrumental in organizing and implementing the USDA-ARS Russian wheat aphid research program.

Crop: Hard White Winter Wheat (Triticum aestivum L.)

Variety Name: ‘Antelope’


Released by: United States Department of Agriculture, Nebraska Agricultural Experiment Station, University of Nebraska, Wyoming Agricultural Experiment Station, University of Wyoming

Characteristics: ‘Antelope’ was derived from the cross ‘Pronhorn’/‘Arlin’ in 1993. It is white awned and white-glumed. Grain samples were classified as hard white, with color characteristics acceptable for this class. Antelope contains approximately 0.1% hard red grain and also contains tall off-types at a frequency of approximately 0.5%. Sprouting tolerance is less than that of Nuplains; hence, it is recommended for cultivation only west of the 100th meridian. Antelope has a short coleoptile. It reaches heading 1-2 days earlier than Arapahoe. Antelope carries an unknown leaf rust (Puccinia recondita Roberge ex Desmaz) resistance gene, but is susceptible to current prevalent races. Antelope is susceptible to wheat streak mosaic virus, wheat soilborne mosaic virus, Russian wheat aphid (Diuraphia noxia Mordvilko) and Hessian fly (Mayetiola destructor Say). It has been rated in field screens as tolerant to barley yellow dwarf virus. Antelope has shown exceptional productivity under irrigated trials in western Nebraska, eastern Wyoming and eastern Colorado. Milling and baking properties were determined by the Nebraska Wheat Quality Laboratory and by the USDA-ARS Grain Marketing and Production Research in Manhattan, KS. Chinese raw noodle making properties were evaluated by the Wheat Marketing Center in Portland, OR.

Crop: Hard White Winter Wheat (Triticum aestivum L.)

Variety Name: ‘Arrowsmith’


Released by: United States Department of Agriculture, Nebraska Agricultural Experiment Station, University of Nebraska, Wyoming Agricultural Experiment Station, University of Wyoming

Characteristics: ‘Arrowsmith’ was derived from the cross KS87809-10/‘Arapahoe’ in 1993. It is awned and white-glumed. Grain samples were classified as hard white, with color characteristics acceptable for this class. Arrowsmith contains less than 0.1% hard red grain and also contains tall off-types at a frequency of approximately 0.5%. Sprouting tolerance is less than that of Nuplains; hence, it is recommended for cultivation only west of the 100th meridian. Arrowsmith has a medium coleoptile, similar to Arapahoe. Heading dates and winter hardiness are similar to Arapahoe, and winter survival is adequate for cultivation in Nebraska and similar environments. Arrowsmith is postulated to carry Lr21 leaf rust (Puccinia recondita Roberge ex Desmaz) resistance gene, but is susceptible to current prevalent races. Arrowsmith was scored moderately resistant to natural outbreaks of stripe rust (Puccinia striformis Westend) in Nebraska in 2001 and 2003. Arrowsmith is susceptible to wheat streak mosaic virus, wheat soil-
borne mosaic virus, Russian wheat aphid (Diuraphia noxia Mordviko) and Hessian fly (Mayetiola destructor Say) but has been rated as tolerant to field outbreaks of barley yellow dwarf virus. Arrow-smith primarily is adapted to dryland sites in western Nebraska and eastern Wyoming. Milling and baking properties were determined by the Nebraska Wheat Quality Laboratory and by the USDA-ARS Grain Marketing and Production Research in Manhattan, KS. Chinese raw noodle making properties were evaluated by the Wheat Marketing Center in Portland, OR.

**Crop:** Winter Triticale (X. Triticosecale rimpau Wittm.)

**Variety Name:** NE426GT

**Scientists:** P.S. Baenziger, J. Jannink, and L.R. Gibson

**Released by:** Nebraska Agricultural Experiment Station, University of Nebraska, and the Iowa Agricultural Experiment Station, Iowa State University

**Characteristics:** NE426GT is a grain and fall forage winter triticale (X. Triticosecale rimpau Wittm.) cultivar. It is an F₃-derived F₄ line that was selected in 1995 for its high grain yield potential. NE426GT is an awned, white-glumed cultivar whose primary use will be as an annual grain or forage crop. Field appearance is most similar to Newcale. Kernels are red colored, elliptical, large, and slightly wrinkled. The main advantages of NE426GT when compared to most other grain and forage triticale cultivars, within its area of adaptation, is its very high grain yield coupled with its relatively high fall forage yield. As such, it will be used as a feed grain triticale and as a component of forage triticale blends. NE426GT is moderately resistant to the currently prevalent races of stem rust (caused by Puccinia graminis Pers.: Pers.sp. tritici Eriks & E. Henn; most likely containing Sr31) and leaf rust (caused by P. triticina Eriks.). It is moderately resistant to wheat streak mosaic virus. Ergot (Claviceps purpurea (Fr:Fr)Tul.) has not been found in the cultivar when the disease was present in other triticales under similar growing conditions. It is released primarily for its superior grain production and fall forage production in rainfed winter cereal production systems in Nebraska and Iowa and surrounding areas with a similar climate.

**Crop:** Sweetclover [Melilotus alba Desr.]

**Genetic Stocks:** 49 white-flowered sweet clover and one yellow-flowered sweet clover

**Scientists:** H. Gorz and F. Haskins

**Released by:** United States Department of Agriculture, and the Agricultural Research Division, Institute of Agriculture and Natural Resources, University of Nebraska

**Characteristics:** The forty-nine M. alba genetic stocks include a set of 16 lines, N30 through N45, which represent all possible homozygous combinations of four allelic pairs, Y/y, C/c, Cu/cu, and B/b. The development of these 16 lines involved both annual and biennial forms of M. alba. Both forms may be present in these lines. Lines N46 through N49 and N741, N743, N745, and N747 are two sets of four lines, each set representing all possible homozygous combinations of the CU/cu (coumarin content) and B/b alleles (β-glucosidase activity) alleles. N46 through N49 are annuals. N741, N743, N745 and N747 are biennial lines. N50 through N53 are biennial lines representing all possible homozygous combinations of the Y/y and C/c allelic pairs. N54 and N55 are biennial lines that are homozygous for susceptibility and resistance, respectively, to stem canker disease caused by Ascochyta caulicolae (Laub.). U389 is an annual line that was derived from a single plant of the introduction PI 165554. All other U-numbered lines were developed following treatment of U389 seed with ethyl methanesulfonate. These U-numbered lines are: U362, U363, U367, U369 - U374, U390 - U394, U396 - U398, and U500. One yellow-flowered sweet clover, N56, a biennial strain of M. officinalis, combines finestem growth habit and low coumarin content of M. alba with the large-seeded
trait and early maturity of *M. officinalis*. Considerable time was devoted to identifying and increasing seed for release of these sweetclover lines with potential value in genetic and biochemical studies as well as in improvement programs.

**Crop:** Big Bluestem [*Andropogon gerardii Vitman*]

**Cultivar Name:** Bonanza

**Scientists:** K.P. Vogel, R.B. Mitchell, T.J. Klopfenstein, and B.E. Anderson

**Released by:** United States Department of Agriculture, and the Agricultural Research Division, Institute of Agriculture and Natural Resources, University of Nebraska

**Characteristics:** Bonanza big bluestem [*Andropogon gerardii Vitman*] is a cultivar that is adapted in the Great Plains and Midwest, USA, to the southern half of USDA Plant Hardiness Zone 4 and Plant Hardiness Zone 5. It produces forage with high *in vitro* dry matter digestibility that results in improved animal gains when utilized by beef cattle in well-managed grazing systems in regions where it is adapted. Bonanza was developed by three generations of breeding for improved forage yield and forage digestibility as measured by IVDMD. The base population was the cultivar Pawnee, which was released in 1963. The breeding phase of the research was initiated in 1977. Each breeding generation took approximately five years. After the third breeding generation was completed, seed was increased for use in small plot evaluation trials and a replicated grazing trial. Bonanza is a stable, improved, random mating population and will be maintained and increased accordingly.

**Crop:** Big Bluestem [*Andropogon gerardii Vitman*]

**Cultivar Name:** Goldmine

**Scientists:** K.P. Vogel, R.B. Mitchell, T.J. Klopfenstein, and B.E. Anderson

**Released by:** United States Department of Agriculture, and the Agricultural Research Division, Institute of Agriculture and Natural Resources, University of Nebraska

**Characteristics:** Goldmine big bluestem [*Andropogon gerardii Vitman*] is a cultivar that is adapted in the Great Plains and Midwest, USA, to the southern half of USDA Plant Hardiness Zone 5 and Plant Hardiness Zone 6. It produces forage with moderately improved *in vitro* dry matter digestibility (IVDMD) and improved forage yields in some environments that results in improved animal gains when utilized by beef cattle in well-managed grazing systems in regions where it is adapted. Goldmine was developed by three generations of breeding for improved forage yield and forage digestibility as measured by IVDMD. The base population was the cultivar Kaw, which was released in 1950. The breeding phase of the research was initiated in 1977 and consisted of three generations of breeding using a modified restricted, recurrent selection breeding system in which forage yield and forage IVDMD were the main selection criteria. Each breeding generation took approximately five years. After the third breeding generation was completed, seed was increased for use in small plot evaluation trials and a replicated grazing trial. Goldmine is a stable, improved, random mating population and will be maintained and increased accordingly.

### West Central District Variety and Germplasm Releases:

**Crop:** Pinto Dry Edible Bean (*Phaseolus vulgaris* L.)

**Variety Name or Germplasm Nomenclature:** ABCP-8

**Scientists:** N. Mutlu, J.R. Steadman, A.K. Vidaver, D.T. Lindgren, J. Reiser, P.N. Miklas, M.A. Pastor-Corrales

**Released by:** Nebraska Agricultural Experiment Station, University of Nebraska–Lincoln; United States Department of Agriculture, Agricultural Research Service, Washington, DC

**Characteristics:** This line combines the common bacterial blight resistance from XAN 159 with that of great northern Montana No. 5. It also possesses the *UR-3* gene for resistance to common bean rust and the *bc-1* gene for BCMV and BCMNV. Seed size is 30 grams/100 seeds. It yielded 117% and
148% of the yield for ‘Chase’ in Nebraska (2001 and 2003, respectively). It has a semi-prostrate growth habit.

**Crop:** Pinto Dry Edible Bean (*Phaseolus vulgaris* L.)

**Variety Name or Germplasm Nomenclature:** ABCP-15

**Scientists:** N. Mutlu, J.R. Steadman, A.K. Vidaver, D.T. Lindgren, J. Reiser, P.N. Miklas, M.A. Pastor-Corrales

**Released by:** Nebraska Agricultural Experiment Station, University of Nebraska-Lincoln; United States Department of Agriculture, Agricultural Research Service, Washington, DC

**Characteristics:** This line combines the common bacterial blight resistance from XAN 159 with that of great northern Montana No. 5. It also possesses the UR-3 gene for resistance to common bean rust and the bc-1^2^ gene for BCMV and BCMNV. This line has slightly larger seeds, 34 grams/100 seeds, than ‘Chase’. It yields slightly less than ‘Chase’. ABCP-15 exhibits slightly less resistance to common bacterial blight than ABCP-8.

**Crop:** Pinto Dry Edible Bean (*Phaseolus vulgaris* L.)

**Variety Name or Germplasm Nomenclature:** ABCP-17

**Scientists:** N. Mutlu, J.R. Steadman, A.K. Vidaver, D.T. Lindgren, J. Reiser, P.N. Miklas, M.A. Pastor-Corrales

**Released by:** Nebraska Agricultural Experiment Station, University of Nebraska-Lincoln; United States Department of Agriculture, Agricultural Research Service, Washington, DC

**Characteristics:** This line combines the common bacterial blight resistance from XAN 159 with that of great northern Montana No. 5. It also possesses the UR-3 gene for resistance to common bean rust and the bc-1^2^ gene for BCMV and BCMNV. ABCP-17 has similar size seed to ‘Chase’ but yielded slightly less than ‘Chase’ in 2001 and 2003. It has a semi-prostrate growth. Common blight infection was 12% in the field and 9% in the greenhouse.

**Crop:** Great Northern Dry Edible Bean (*Phaseolus vulgaris* L.)

**Variety Name or Germplasm Nomenclature:** BMN-RMR-8

**Scientists:** J.R. Stavely, M.A. Pastor-Corrales, J.D. Kelly, J. Steadman, D.P. Coyne, D.T. Lindgren

**Released by:** United States Department of Agriculture, Agricultural Research Service, Washington, DC; Michigan Agricultural Experiment Station, East Lansing, Michigan; University of Nebraska-Lincoln, Agricultural Research Division

**Characteristics:** This is a rust and mosaic resistant, high yielding, upright short vine, type II, white seeded, great northern dry bean germplasm line. Under field conditions, it is an erect plant with moderately early maturity, high yield, good pod-to-ground clearance. Seed size averages 33.9 grams/100 seeds.

**Crop:** Great Northern Dry Edible Bean (*Phaseolus vulgaris* L.)

**Variety Name or Germplasm Nomenclature:** BMN-RMR-9

**Scientists:** J.R. Stavely, M.A. Pastor-Corrales, J.D. Kelly, J. Steadman, D.P. Coyne, D.T. Lindgren

**Released by:** United States Department of Agriculture, Agricultural Research Service, Washington, DC; Michigan Agricultural Experiment Station, East Lansing, Michigan; University of Nebraska-Lincoln, Agricultural Research Division

**Characteristics:** This is a rust and mosaic resistant, high yielding, upright short vine, type II, white seeded, great northern dry bean germplasm line. Under field conditions, it is an erect plant with moderately early maturity, high yield, good pod-to-ground clearance. Seed size averages 34.3 grams/100 seeds.
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<tr>
<th>Crop:</th>
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<tbody>
<tr>
<td><strong>Variety Name or Germplasm Nomenclature:</strong></td>
<td>BMN-RMR-10</td>
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<tr>
<td><strong>Scientists:</strong></td>
<td>J.R. Stavely, M.A. Pastor-Corrales, J.D. Kelly, J. Steadman, D.P. Coyne, D.T. Lindgren</td>
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<td><strong>Characteristics:</strong></td>
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<td><strong>Scientists:</strong></td>
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<td><strong>Characteristics:</strong></td>
<td>This is a rust and mosaic resistant, high yielding, upright short vine, type II, white seeded, great northern dry bean germplasm line. Under field conditions, it is an erect plant with moderately early maturity, high yield, good pod-to-ground clearance. Seed size averages 36.7 grams/100 seeds.</td>
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<td><strong>Scientists:</strong></td>
<td>J.R. Stavely, M.A. Pastor-Corrales, J.D. Kelly, J. Steadman, D.P. Coyne, D.T. Lindgren</td>
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<td><strong>Characteristics:</strong></td>
<td>This is a rust and mosaic resistant, high yielding, upright short vine, type II, white seeded, great northern dry bean germplasm line. Under field conditions, it is an erect plant with moderately early maturity, high yield, good pod-to-ground clearance. Seed size averages 35.7 grams/100 seeds.</td>
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<td><strong>Scientists:</strong></td>
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Copyright and patent protection is an important parameter in research. It is especially important for discoveries and innovations that have a potential commercial application. Therefore, from time to time, the ARD (and the University) may determine that the public good is best served with regard to technology transfer by entering into an agreement with a public or private institution that provides the institution with proprietary interests in specific research. The research of ARD scientists often can lead to a patent. Most of the patents that have been awarded to ARD scientists have been for equipment developments and specialized processes. These patents often are licensed by private industry, with royalties being reinvested in future ARD research. The following patent was awarded in 2004-05.

**Biological Systems Engineering**

**Patent**

*Patent Title:* Flash Artifact Suppression in Two-Dimensional Ultrasound Imaging

*Patent Number:* 6,760,486 (USA)

*Scientists:* G.R. Bashford (University of Nebraska–Lincoln, Agricultural Research Division), Richard Chiao (scientist with GE Medical Systems), Mark Feilen (software engineer with GE Medical Systems), and Cynthia Owen (sonographer at Baptist Medical Center, Memphis, Tennessee)

*Description:* Flash artifacts in ultrasound flow images are suppressed to achieve enhanced flow discrimination. Flash artifacts typically occur as regions of elevated signal strength (brightness or equivalent color) within an image. A flash suppression algorithm includes the steps of estimating the flash within an image and then suppressing the estimated flash. The mechanism for flash suppression is spatial filtering.
ARD is one of five divisions within the Institute of Agriculture and Natural Resources (IANR) at the University of Nebraska. IANR was established by the Nebraska legislature in 1973 and has its headquarters on the University of Nebraska–Lincoln East Campus. The University of Nebraska system has four campuses: University of Nebraska–Lincoln, University of Nebraska Medical Center, University of Nebraska at Omaha and the University of Nebraska at Kearney. The University of Nebraska system is governed by an elected Board of Regents and administered by a system and campus administration.

Administrative Personnel (June 2005)

University of Nebraska Board of Regents

Randolph Ferlic, Omaha
Chuck Hassebrook, Lyons
Howard Hawks, Omaha
David Hergert, Scottsbluff
Jim McClurg, Lincoln
Drew Miller, Papillion
Ken Schroeder, Kearney
Charles S. Wilson, Lincoln

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UNMC — Nicholas Behrendt
UNO — Elizabeth Kraemer
UNL — Omaid Zabih
UNK — Brad Bohn

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Harvey S. Perlman, Chancellor, University of Nebraska–Lincoln
John C. Owens, Harlan Vice Chancellor, Institute of Agriculture and Natural Resources and Vice President, University of Nebraska

Agricultural Research Division

Darrell W. Nelson, Dean and Director
Z B Mayo, Interim Associate Dean and Associate Director
Alan E. Baquet, Interim Associate Dean and Associate Director
Marjorie J. Kostelnik, Assistant Director, Human Resources and Family Sciences
Dora Dill, Administrative Technician
Nelvie Lienemann, Staff Assistant
Diane Mohrhoff, Project Assistant
Karen Jackson, Programming Assistant

1Left position to become Department Head of Agricultural Economics
Organizational Chart

Institute of Agriculture and Natural Resources
University of Nebraska-Lincoln
June 2005

Harlan Vice Chancellor
John C. Owens

Associate Vice Chancellor
Alan Baquet

Assistant Vice Chancellor
Finance and Personnel
Alan R. Moeller

Dean
Agricultural Research Division
Darrell W. Nelson*

Dean
College of Agricultural Sciences and Natural Resources
Steve Waller

Dean
College of Human Resources and Family Sciences (IANR Research and Extension)
Marjorie J. Kostelnik

Dean
Cooperative Extension Division
Elbert Dickey**

*Director, Nebraska Agricultural Experiment Station
**Director, University of Nebraska Cooperative Extension
Administrative Units Reporting to Agricultural Research Division
Institute of Agriculture and Natural Resources
The University of Nebraska–Lincoln
June 2004

Agricultural/Natural Resources Units

Agricultural Economics
Dick Clark, Interim Head1
Alan Baquet, Head2

Agricultural Leadership, Education and Communication
Susan Fritz, Head

Agronomy and Horticulture
Kenneth Cassman, Head1
Lowell Moser, Interim Head2

Animal Science
Donald Beermann, Head

Biochemistry
Donald Weeks

Biological Systems Engineering
Derrel Martin, Interim Head1
Ron Yoder, Head2

Entomology
Z B Mayo, Head1
Fred Baxendale, Interim Head2

Food Science and Technology
Steve Taylor, Head1
David Jackson, Interim Head2

Plant Pathology
Anne Vidaver, Head

School of Natural Resources
Mark Kuzila, Director

Statistics
Walter Stroup, Chair

Veterinary and Biomedical Sciences
Jack Schmitz, Head1
Rod Moxley, Interim Head2

Human Resources and Family Sciences Department

Family and Consumer Sciences
Julie Johnson, Chair

Nutritional Science and Dietetics
Marilynn Schnepf, Chair

Textiles, Clothing and Design
Carol Thayer, Chair1
Michael James, Acting Chair2

Off-Campus Research Centers

Agricultural Research and Development Center
Ithaca—Daniel Duncan, Director

Northeast Research and Extension Center
Concord—John Witkowski, Director

Panhandle Research and Extension Center
Scottsbluff—Charles Hibberd, Director

Southeast Research and Extension Center
Lincoln—Susan Williams, Director

West Central Research and Extension Center
North Platte—Don Adams, Interim Director

Interdisciplinary Centers

Biotechnology Center
Michael Fromm, Director

Food Processing Center
Steve Taylor, Director

Center for Grassland Studies
Martin Massengale, Director

Great Plains Regional Center for Global Environmental Change
Shashi Verma, Director

Industrial Agricultural Products Center
Milford Hanna, Director

Center for Applied Rural Innovation
Alan Baquet, Director2

Water Center
Kyle Hoagland, Director
Mike Jess, Acting Director

IANR Communications and Information Technology
Brenda Caine, Director

1Ended appointment during 2004-2005
2Began appointment during 2004-2005
Research by Agricultural Research Division researchers is conducted across the state. Sites include:

- Agricultural Research and Development Center — Ithaca
- Barta Brothers Ranch — Long Pine
- Dalbey-Halleck Farm — Virginia
- Gudmundsen Sandhills Laboratory — Whitman
- Haskell Agricultural Laboratory — Concord
- High Plains Agricultural Laboratory — Sidney
- Horning Forestry Farm — Plattsmouth
- Northeast Research and Extension Center — Norfolk
- Panhandle Research and Extension Center — Scottsbluff
- Sioux County Range — Mitchell
- South Central Agricultural Laboratory, Great Plains Veterinary Educational Center, and the U.S. Meat Animal Research Center (USDA) — Clay Center
- Southeast Research and Extension Center — Lincoln
- West Central Research and Extension Center — North Platte
Approximately 264 faculty members have research appointments in ARD. Most have joint appointments, with teaching or extension responsibilities as well. Some faculty have responsibilities other than ARD research (rsch), extension (ext) or teaching (tch). Administrative appointments, as well as appointments with centers and other UNL units or with the USDA Agricultural Research Service (other), also are noted here.

ARD programs depend on many linkages and cooperative arrangements in order to make the most effective use of limited resources and to address problems of mutual interest. The USDA Agricultural Research Service (ARS) has about 25 scientists located on the UNL campus. Historically there has been a very close working relationship among these scientists, all holding adjunct faculty status, and UNL faculty. Four departments contain ARS scientists: the Departments of Agronomy and Horticulture, Entomology, Plant Pathology and Biological Systems Engineering. ARS scientists are noted as USDA in the other category.

UNL scientists also cooperate closely with many ARS faculty at the Roman L. Hruska Meat Animal Research Center (MARC) at Clay Center, Nebraska. There are about 60 scientists at the MARC facility, many of whom also hold UNL faculty status in the Department of Animal Science. MARC scientists are noted as USDA in the other category.

Another federal facility located on campus is the U.S. Forest Service National Agroforestry Center. USFS scientists also work closely with UNL faculty and hold adjunct faculty status. The Department of Entomology has adjunct faculty noted as USDA in the other category.

The USDA Natural Resources Conservation Service has personnel located in UNL facilities at the West Central Research and Extension Center, North Platte. The NRCS professional personnel there as well as those at the federal center, Lincoln, work closely with ARD faculty on a number of natural resources-related activities.

The Department of Animal Science has a unique relationship with its industry supporters. Several industry representatives also hold adjunct appointments in the department and are noted as industry in the other category.

The percentages listed represent the proportion of a faculty member’s time assigned to each function. The primary research responsibility is identified for each. All ARD off-campus personnel who are located at Centers are associated with an on-campus department as well [Department/(Area of Responsibility)]. Faculty rank and assignment percentages are based on the fiscal year 2004-2005 departmental budgets.
### Agricultural/Natural Resources Units

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¹ Jong-Tseng Yen is an Adjunct Faculty.
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⁴ Hwa-Young Kim is a Research Assistant Professor.
⁵ John P. Markwell is a Professor.
⁶ Sergey V. Novoselov is a Research Assistant Professor.
⁷ Stephen W. Ragsdale is a Professor.
⁸ Ashraf Raza is an Assistant Professor.
⁹ Gautam Sarath is an Adjunct Faculty.
¹⁰ Javier Seravalli is an Assistant Professor.
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¹² Robert Spreitzer is a Professor.
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¹⁴ Charles Wood is a Professor.
## Biological Systems Engineering

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2. Began research appointment during 2004-2005
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<td>Agronomy/Horticulture (Dry Bean Breeding)</td>
</tr>
<tr>
<td>Robert G. Wilson</td>
<td>Professor</td>
<td>0.50</td>
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<td>Agronomy/Horticulture (Weed Science)</td>
</tr>
<tr>
<td>C. Dean Yonts</td>
<td>Associate Professor</td>
<td>0.50</td>
<td>0.50</td>
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<td>Biological Systems Engineering (Irrigation)</td>
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#### West Central Research and Extension Center

<table>
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<th>Ext</th>
<th>Tch</th>
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<tr>
<td>Don C. Adams</td>
<td>Professor</td>
<td>0.50</td>
<td>0.50</td>
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<td>Interim Director, Animal Science (Range Cattle Nutrition)</td>
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<tr>
<td>John B. Campbell</td>
<td>Professor</td>
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<td>Rick N. Funston</td>
<td>Assistant Professor</td>
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<td>Dale T. Lindgren</td>
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<tr>
<td>Gail A. Wicks¹</td>
<td>Professor</td>
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<td>Agronomy and Horticulture (Ecofarming/Weeds)</td>
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### Interdisciplinary Activities

#### Water Center

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<tr>
<td>Kyle D. Hoagland</td>
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<tr>
<td>J. Michael Jess</td>
<td>Lecturer</td>
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#### Plant Science Initiative

<table>
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<tr>
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<tr>
<td>Sally Mackenzie</td>
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<td>Director, Plant Genomics</td>
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<tr>
<td>James R. Alfano</td>
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<td>Han H. Asard</td>
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<td>Steven Harris</td>
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<td>Julie M. Stone</td>
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#### Agricultural Research Division

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<tr>
<td>Darrell W. Nelson¹</td>
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<tr>
<td>Majorie J. Kostelnik</td>
<td>Professor</td>
<td>0.12</td>
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<tr>
<td>Nancy Betts¹</td>
<td>Professor</td>
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#### Biotechnology Center

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<th>Name</th>
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<tr>
<td>Michael Fromm</td>
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<td>Thomas Clemente</td>
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#### Center for Applied Rural Innovation

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<tr>
<th>Name</th>
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<tr>
<td>John Allen III¹</td>
<td></td>
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<td>Rural Society</td>
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#### Industrial Agricultural Products Center

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<tbody>
<tr>
<td>Milford Hanna</td>
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#### Center for Grassland Studies

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<tbody>
<tr>
<td>Martin Massengale</td>
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<td></td>
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<td>0.75</td>
<td>Director</td>
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</table>

¹Ended research appointment during 2004-2005
²Began research appointment during 2004-2005
The Agricultural Research Division hosted 51 visiting scientists and 30 research associates to the campus in 2004-2005. ARD research is complemented and enhanced by these collaborating scientists—it is through the sharing of knowledge and expertise that the field of science is advanced.

### Agronomy and Horticulture

<table>
<thead>
<tr>
<th>Visiting Scientist</th>
<th>State/Country</th>
<th>Expertise/Discipline</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ugur Bilgili</td>
<td>Turkey</td>
<td>Buffalograss and line-leaved fescues research</td>
</tr>
<tr>
<td>Willie Chishimba</td>
<td>Zambia</td>
<td>Tissue culture in potatoes</td>
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<tr>
<td>Seong-Soo Kang</td>
<td>Korea</td>
<td>Monitoring crop stresses, especially nitrogen</td>
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<tr>
<td>Tewodros Mesfin</td>
<td>Ethiopia</td>
<td>Occasional tillage and starter fertilizer</td>
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### Animal Science

<table>
<thead>
<tr>
<th>Visiting Scientist</th>
<th>State/Country</th>
<th>Expertise/Discipline</th>
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<tbody>
<tr>
<td>Maria Lundesjö Ahnström</td>
<td>Sweden</td>
<td>Meats</td>
</tr>
<tr>
<td>Gloria Munoz</td>
<td>Spain</td>
<td>Animal genetics</td>
</tr>
<tr>
<td>Hans Stein</td>
<td>South Dakota/USA</td>
<td>Protein and amino acid nutrition</td>
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<tr>
<td>Mikaela Vuorisalmi</td>
<td>Finland</td>
<td>Animal genetics</td>
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### Biological Systems Engineering

<table>
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<th>Visiting Scientist</th>
<th>State/Country</th>
<th>Expertise/Discipline</th>
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<tbody>
<tr>
<td>Joseph Mpagalile</td>
<td>Tanzania</td>
<td>Solar-powered, small-scale vegetable oil extraction system</td>
</tr>
<tr>
<td>Cezar de Mello Mesquita</td>
<td>Brazil</td>
<td>Soybean harvesting/reducing field losses</td>
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### Entomology

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<th>Visiting Scientist</th>
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<tbody>
<tr>
<td>Muhammad F. Chaudhury</td>
<td>Texas/USA</td>
<td>Insect physiology</td>
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<tr>
<td>Youngjin Park</td>
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<td>Insect physiology</td>
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### Plant Pathology

<table>
<thead>
<tr>
<th>Visiting Scientist</th>
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<th>Expertise/Discipline</th>
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</thead>
<tbody>
<tr>
<td>David Carter</td>
<td>Kansas/USA</td>
<td>Molecular assessment</td>
</tr>
<tr>
<td>Cafer Eken</td>
<td>Turkey</td>
<td>Mycology and plant pathology</td>
</tr>
<tr>
<td>Graciela Godoy-Lutz</td>
<td>Dominican Republic</td>
<td>Plant pathology</td>
</tr>
<tr>
<td>Sebastien Graziani</td>
<td>France</td>
<td>Chlorella viruses</td>
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<tr>
<td>Ji-Young Min</td>
<td>Korea</td>
<td>Gene silencing</td>
</tr>
<tr>
<td>Miki Kusano</td>
<td>Japan</td>
<td>Plant tissue culture</td>
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<tr>
<td>Govindappa Melappa</td>
<td>India</td>
<td>Genetic engineering</td>
</tr>
<tr>
<td>Ji-Young Min</td>
<td>Korea</td>
<td>Fungal biochemistry</td>
</tr>
<tr>
<td>Hyoun-Hyang Park</td>
<td>South Korea</td>
<td>Plant molecular biology</td>
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School of Natural Resources

Visiting Scientist: Koichi Toyama
State/Country: Japan
Expertise/Discipline: Plant transformation

Visiting Scientist: Paola Valbuzzi
State/Country: Italy
Expertise/Discipline: Chlorella viruses

Visiting Scientist: Russell Bigley
State/Country: Colorado/USA
Expertise/Discipline: Climate impacts, economic drought impacts in the West

Visiting Scientist: Xi Chen
State/Country: China
Expertise/Discipline: Hydrology

Visiting Scientist: Hyo Seop Cho
State/Country: Korea
Expertise/Discipline: Engineering technology

Visiting Scientist: Martin Dubrovsky
State/Country: Czech Republic
Expertise/Discipline: Atmospheric physics

Visiting Scientists: Scott A. Field
State/Country: Australia
Expertise/Discipline: Terrestrial ecology/ecological monitoring

Visiting Scientist: Jenny Grigg
State/Country: Australia
Expertise/Discipline: Cooperatives for community/economic development

Visiting Scientist: Fengqin Jiang
State/Country: China
Expertise/Discipline: Environmental ecology

Visiting Scientist: Jang-Eok Kim
State/Country: Republic of Korea
Expertise/Discipline: Environmental chemistry

Visiting Scientist: Je Han Kim
State/Country: Korea
Expertise/Discipline: Civil engineering

Visiting Scientist: Jong Sung Kim
State/Country: Republic of Korea
Expertise/Discipline: Environmental chemistry

Visiting Scientist: Grace Koshida
State/Country: Canada
Expertise/Discipline: Drought impacts, high-impact weather events

Visiting Scientist: Joo Heon Lee
State/Country: Korea
Expertise/Discipline: Civil engineering

Visiting Scientist: David Maidment
State/Country: Texas/USA
Expertise/Discipline: GIS in water resources, surface water hydrology

Visiting Scientist: Hyun Jin Park
State/Country: Korea
Expertise/Discipline: Hydraulic engineering

Visiting Scientist: Keith Paustian
State/Country: Colorado/USA
Expertise/Discipline: Soil and crop science

Visiting Scientist: Miroslav Trnka
State/Country: Czech Republic
Expertise/Discipline: Agricultural meteorology

Visiting Scientist: Xi Chen
State/Country: China
Expertise/Discipline: Hydrology

Visiting Scientist: Hyo Seop Cho
State/Country: Korea
Expertise/Discipline: Engineering technology

Visiting Scientist: Martin Dubrovsky
State/Country: Czech Republic
Expertise/Discipline: Atmospheric physics

Visiting Scientists: Scott A. Field
State/Country: Australia
Expertise/Discipline: Terrestrial ecology/ecological monitoring

Visiting Scientist: Jenny Grigg
State/Country: Australia
Expertise/Discipline: Cooperatives for community/economic development

Visiting Scientist: Fengqin Jiang
State/Country: China
Expertise/Discipline: Environmental ecology

Visiting Scientist: Jang-Eok Kim
State/Country: Republic of Korea
Expertise/Discipline: Environmental chemistry

Visiting Scientist: Je Han Kim
State/Country: Korea
Expertise/Discipline: Civil engineering

Visiting Scientist: Jong Sung Kim
State/Country: Republic of Korea
Expertise/Discipline: Environmental chemistry

Visiting Scientist: Grace Koshida
State/Country: Canada
Expertise/Discipline: Drought impacts, high-impact weather events

Visiting Scientist: Joo Heon Lee
State/Country: Korea
Expertise/Discipline: Civil engineering

Veterinary and Biomedical Sciences

Visiting Scientists: Ayala Livneh
State/Country: Israel
Expertise/Discipline: Mycobacterium paratuberculosis

Visiting Scientists: Sebastian Aguirre
State/Country: Argentina
Expertise/Discipline: Porcine reproductive respiratory syndrome virus (PRRSV)

Visiting Scientists: Marcelo de Lima
State/Country: Brazil
Expertise/Discipline: Veterinary virology

Visiting Scientists: Esther Alvarez Garcia
State/Country: Spain
Expertise/Discipline: Porcine respiratory and reproductive syndrome

Visiting Scientists: Stefan Löfgren
State/Country: Sweden
Expertise/Discipline: Effects of ultraviolet radiation on ocular tissues

Family and Consumer Sciences

Visiting Scientist: Iftakar Hassan
State/Country: Pakistan
Expertise/Discipline: Reference to gender, rural development, clinical psychology, distance learning
Textiles, Clothing and Design

Visiting Scientist: Janet Evenson  
State/Country: Illinois/USA  
Expertise/Discipline: Textile science

Visiting Scientist: Wenlong Zhou  
State/Country: China  
Expertise/Discipline: Textile engineering

Visiting Scientist: Daesik Yun  
State/Country: South Korea  
Expertise/Discipline: Textile chemistry

Visiting Scientist: Abdus Salam  
State/Country: Bangladesh  
Expertise/Discipline: Textile chemistry

Panhandle Research  
and Extension Center

Visiting Scientist: Carl Childers  
State/Country: Florida/USA  
Expertise/Discipline: Eriophyid mite study techniques
Each faculty member with an ARD appointment has a federally-approved research project. A number of faculty have multiple projects. There are 309 research projects that were active for all or part of the 2004-2005 fiscal year in agriculture, natural resources and family sciences. Projects are generally three to five years in duration. Faculty also are part of a national network of Agricultural Experiment Station scientists located at Land Grant Universities across the United States. ARD researchers currently are involved with about 52 multi-state research projects in which they conduct cooperative research with scientists at other universities, addressing problems of regional and national importance. They also participate in approximately 49 multi-state research committees, which serve to exchange information and coordinate cooperative research activities among institutions.

Research projects are listed by departments. An asterisk (*) indicates that the project was discontinued in fiscal year 2004-2005.

You will note codes following the project number. The codes reveal the type of project.

<table>
<thead>
<tr>
<th>Type</th>
<th>Funding Source</th>
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<tr>
<td>Regional Research (multi-state)</td>
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<tr>
<td>State</td>
<td>State Funds</td>
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<tr>
<td>McIntire-Stennis</td>
<td>Federal Funds</td>
<td>ms</td>
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<td>Special Grant</td>
<td>Federal, State, Public and Private</td>
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<td>Competitive Grant</td>
<td>Federal Funds/USDA</td>
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<tr>
<td>Animal Health</td>
<td>Federal Funds</td>
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<td>Cooperative Agreement</td>
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</tr>
<tr>
<td>Other Grant</td>
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</tr>
</tbody>
</table>

Hatch: research on all aspects of agriculture, including soil and water conservation and use; plant and animal production, protection, and health; processing, distributing, marketing, and utilization of food and agricultural products; forestry, including range products, multiple use of forest and rangelands, and urban forestry; aquaculture; family sciences, including human nutrition and family life; and rural and community development.

Regional Research (multi-state): research in agriculture, natural resources and family sciences with regional importance and Nebraska application. Research is a collaborative effort with scientists from other land grant institutions and federal agencies.

State: research on all aspects of agriculture, natural resources, family sciences, and rural development that is supported entirely by state funds.

McIntire-Stennis: research relating to: 1) reforestation and management of land for the production of timber and other related products of the forest; 2) management of forest and related watersheds to improve conditions of water flow and to protect resources against floods and erosion; 3) management of forest and related rangeland for production of forage for domestic livestock and game and improvement of food and habitat for wildlife; 4) management of forest lands for outdoor recreation; 5) protection of forest land and resources against fire, insects, diseases, or other destructive agents; 6) utilization of wood and other forest products; 7) development of sound policies for the management of forest lands and the harvesting and marketing of forest products; and 8) such other studies as may be necessary to obtain the fullest and most effective use of forest resources.

Special Grants: targeted research projects to address special needs for family sciences, agriculture, and the management of natural resources for Nebraska.

Competitive Grants: includes research in USDA national priority areas.

Animal Health: research to promote the general welfare through improved health and productivity of domestic livestock, poultry, aquatic animals, and other income-producing animals that are essential to the nation’s food supply and the welfare of producers and consumers of animal products.

Cooperative Agreement: Funds from USDA agencies other than CSREES.

Agricultural/ Natural Resources Units

Agricultural Economics

10-132 ha
Agricultural water management technologies, institutions and policies affecting economic viability and environmental quality (R.J. Supalla)

10-138 ha
Measurement of competitiveness of U.S. beef, soybean, wheat, and corn production (L.E. Fulginiti)

10-139 ha
Rural sustainability: the relationship between community structure, agricultural structure and social class (J.C. Allen)

10-141 ha
Legal aspects of Nebraska agricultural and natural resources policy (J.D. Aiken)

10-145 ha
Finding motivations and mechanisms for profitable conservation (G.D. Lynne)

10-146 ha
Enforcement issues and efficiency in the agri-food marketing system: genetic modification, organic agriculture, and government intervention (K. Giannakas)

10-148 hm
Impact analysis and decision strategies for agricultural research (R.K. Perrin)

10-149 ha
Enhancing public understanding of the U.S. beef market through industrial organization research and education (A.M. Azzam)

10-150 ha
Economic analysis of Nebraska cropping systems (G.A. Helmers)

10-151 ha
Economic impacts of changes in trade arrangements, bio-terrorism threats and renewable fuels requirements on U.S. grain and oilseed sector (D.M. Conley)
Agronomy and Horticulture

12-002 ha Genetics, breeding and evaluation of winter small grains crops for Nebraska (P.S. Baenziger, B.E. Beecher)

12-026 ha Sustainable farms, landscapes and rural communities in Nebraska: an agricultural systems team approach (C.A. Francis)

12-272* ha Germination, growth, and development of selected perennial forage grasses (L.E. Moser)

12-274 ha Physiological bases of environmental constraints on plant growth and productivity (T.J. Arkebauer)

12-275* hm NC-213, Marketing and delivery of quality cereals and oilseeds (B. Beecher)

12-277* ha Quantitative genetics with focus on corn breeding and corn germplasm improvement (W.K. Russell)

12-278* ha Dynamic nitrogen management strategies for optimizing maize yield and N use efficiency (D.T. Walters)

12-279* cg The genetic basis of agronomic traits controlled by chromosome 3A in wheat (P.S. Baenziger, K. Gill, K. Eskridge)

12-281 ha Enhancing crop diversity by understanding genotype by environment interactions (L.A. Nelson)

12-282 ha Grazing land response to seasonal grazing strategies (W.H. Schacht)

12-283 ha Utilizing biotechnology for sorghum and pearl millet improvement (I.M. Dweikat)

12-286 og Application of geospatial and precision technologies (A. Dobermann, R.M. Caldwell, V.I. Adamchuk, R.B. Ferguson)

12-288 ha Identification and analysis of jasmonic acid signal transduction components in plants (P.E. Staswick)

12-289 ha Precise nutrient management in corn-based systems (A.R. Dobermann)

12-290 ha Relationship of organic phosphorus bioavailability and PH to plant growth, phosphorus uptake, and mycorrhizal establishment (M. Mamo)

Agricultural Leadership, Education and Communication

24-034 st Predictors of leader and follower behavior and the impact of leadership development interventions and programs (J.E. Barbuto Jr., S.M. Fritz)

24-035 st Surveying and characterizing distance education interventions in Nebraska rural communities (J.W. King)

24-036 st Relationship of servant leadership to other leadership theories and role in explaining follower behavior and organizational effectiveness in NE (D.W. Wheeler)

24-034 st Predictors of leader and follower behavior and the impact of leadership development interventions and programs (J.E. Barbuto Jr., S.M. Fritz)

24-035 st Surveying and characterizing distance education interventions in Nebraska rural communities (J.W. King)

24-036 st Relationship of servant leadership to other leadership theories and role in explaining follower behavior and organizational effectiveness in NE (D.W. Wheeler)
Animal Science

13-055* hm NE-127, Biophysical models for poultry production systems (M.M. Beck)

13-110 hm NC-131, Molecular mechanisms regulating skeletal muscle growth and differentiation (S.J. Jones)

13-115 ha Evaluation of cow/calf weaning management systems to improve economic efficiency (R.J. Rasby)

13-130 ha Physiological and nutritional aspects of improving reproduction in dairy cattle (L.L. Larson)

13-144* ha Utilization of phosphorus in cool- and warm-season grass hay by ruminants (D.R. Brink)

13-146* ha Factors affecting calcium utilization in the avian and egg shell quality (S.E. Scheideler)

13-150* ha Control of luteinizing hormone secretion in male sheep (R.J. Kittok)

13-151* ah Estrogen-calciu relationships during onset of metabolic bone disease in the aging hen (M.M. Beck)

13-153 ha Measuring and improving the quality, consistency, and uniformity of traits that influence meat value (C.R. Calkins, R.W. Mandigo)

13-154 ah Role of paracrine growth factors in bovine ovarian follicular development (A.S. Cupp)

13-156 hm W-112, Reproductive performance in domestic ruminants (A.S. Cupp)

13-157 hm NC-1119, Management system to improve the economic and environmental sustainability of dairy enterprises (H.D. Jose, T. Klopfenstein)

13-158 hm S-1008, Genetic selection and cross-breeding to enhance reproduction and survival of dairy cattle (J.F. Keown)

13-159 ha Transcriptional regulation of the porcine gonadotropin releasing hormone (GnRH) receptor gene (B.R. White)

13-161 ha Genetic variation in feed energy utilization (M.K. Nielsen)


13-163 ha Improving profitability and sustainability of beef feedlot production through nutrient management and corn milling co-product utilization (G.E. Erickson)

13-164 ha Alternative growing-finishing beef systems (T.J. Klopfenstein)

13-165* st Role of hyaluronan during the ovulatory process in the beef cow (A.S. Cupp, M.A. Simpson)

13-166 ah Transcriptional regulation of the porcine GnrH receptor gene (B.R. White)

13-167 ha A genetic approach to uncovering mammalian genes important in sepsis induced multiple organ failure (J.S. Weber)


13-169* ah Evaluating heat stress effects on reproduction in laying hens (M.M. Beck, R.J. Kittok)

13-170 ha Expression analysis of GnRH stimulated pituitary genes in lines of swine divergent for ovulation rate (B.R. White)

13-171 hm NE-1022, Poultry production systems: Optimization of production and welfare using physiological, behavioral and physical assessments (M. Beck)

13-172 ah Metabolic bone disease in laying hens: Etiology and genomics (M. Beck)

13-173 ha Management systems to increase profit potential in the cow-calf enterprise using forages and grain co-products (R. Rasby)

13-174 ha Impact of animal welfare guidelines for laying hen cage space allowance on laying hen in a cage system (S. Scheideler)

13-175* st Impact of bioin supplementation on early embryonic development (B. White, J. Zempleni)

13-176 ha Physiological responses of growing calves to stable fly bites (D. Brink)

31-006* sg Integrated crop/livestock/agroforestry research for sustainable systems in Nebraska (T.J. Klopfenstein, J.R. Brandle, C.A. Francis, D.T. Walters)

Biochemistry

15-090* ah Metabolism and energy (R.J. Spreitzer)

15-090* ah Metabolism and energy (R.J. Spreitzer)

15-091 ah Strategies for developing herbicide-tolerant crops (D.P. Weeks)

15-092* st Plant Proteomics (J.P. Markwell, R. Cerny, S. Madhavan, G. Sarath, M.G. Zeece)

15-096 cg Rubisco selection and correction (R.J. Spreitzer)

15-098 ha Genetic modification of chloroplast rubisco (R.J. Spreitzer)

15-099 st Engineering plants for increased photosynthetic efficiency: introduction of the CO2 concentration mechanism from C4 plants into C3 plants (D.P. Weeks, T. Clemente)

15-100 hm NC-1142, Regulation of photosynthetic processes (R. Chollet, J. Markwell, R.J. Spreitzer)
| 15-101 ha | Variation C metabolism in plants: biochemical and physiological characterization of cytochromes b561 (H. Asard) |
| 15-102 ha | Transcriptional regulation of programmed cell death (PCD) in plant development and response to pathogens (J.M. Stone) |
| 15-103 ha | Biochemistry of anaerobic CO₂ fixation and chlorophenol metabolism (S.W. Ragsdale) |
| 15-104 ha | Regulation of the multifunctional proline utilization A (Put A) flavoprotein and proline metabolism in bacteria (D.F. Becker) |
| 15-105 ha | Directed evolution of plant foredehydrogenase (J.P. Markwell) |
| 15-106 st | Role of hyaluronan matrix in prostate cancer progression (M.A. Simpson) |
| 15-107 ha | Evolution of animal lentiviruses/HIV (C. Wood) |
| 15-108 ha | Regulatory mechanisms of glutathione metabolic enzymes (J. Barycki) |
| 15-109 ha | Mammalian copper transporters and systemic copper homeostasis (J. Lee) |

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| 11-001 st | Evaluation of performance of new tractors (L.L. Bashford) |
| 11-044 rr | Improvement of thermal and alternative processes for food (M.A. Hanna) |
| 11-112* ha | Hydrologic modeling and engineering for enhancement of vegetative riparian buffers (D.E. Eisenhauer) |
| 11-115 ha | Improved anaerobic lagoon design and management for odor control (D.D. Schulte) |

### Entomology

| 17-054 ha | Biochemistry and physiology of lipids, prostaglandins and related eicosanoids in insects (D.W. Stanley) |
| 17-062 ha | Arthropods associated with buffalo grass and other turfgrasses in Nebraska (F.P. Baxendale) |
| 17-071 ha | Development of resistance management techniques for corn insect pests in Nebraska (B.D. Siegfried) |
| 17-077* hm | NC-226, Development of pest management strategies for forage alfalfa persistence (L.G. Higley, T.E. Hunt) |
| 17-078 ha | Plant resistance to sap-feeding insects (T.M. Heng-Moss) |
| 17-079 hm | Dynamic soybean pest management for evolving agricultural technologies and cropping systems (L.G. Higley, T.E. Hunt) |
| 17-080 ha | Mechanisms and management of arthropod injury to plants (L.G. Higley) |
| 17-081 ha | Conservation of insect predators of alfalfa insect pests using harvest management, vegetative landscape features, and artificial honeydew (S.D. Danielson) |
| 17-082 ha | Management of subterranean termites in urban/rural environments (S.T. Kamble) |
| 17-083 st | Synchronizing habitat enhancement practices with predator mobility for control of alfalfa insect pests (S.D. Danielson, J.R. Brandle, T.E. Hunt, E.E. Blankenship) |
| 17-084 ha | Host-plant resistance, insect-plant interactions, and insect genetics (J.E. Foster) |
| 17-085* ha | Differential gene expression of barley in response to aphid injury (T.M. Heng-Moss, L.G. Higley, G. Sarath) |

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| 16-044 hm | NC-131, Molecular mechanisms regulating skeletal muscle growth and differentiation (M.G. Zeece) |
| 16-051 ha | Starch technology: Production, characterization, and utilization (D.S. Jackson) |
| 16-082 hm | NC 213, Management of grain quality and security in world markets (D.S. Jackson) |
| 16-083 hm | NC 213, Marketing and delivery of quality cereals and oilseeds (L.B. Bullerman) |
| 16-086* ha | Genetics and physiology of lactic acid bacteria (R.W. Hutkins) |
| 16-090 hm | S-295, Enhancing food safety through control of foodborne disease agents (C.L. Weller) |
| 16-094* og | Second Governor’s conference on ensuring meat safety E. coli 0157:H7 progress and challenges (R.W. Hutkins, A.K. Benson, R.A. Moxley) |
| 16-095 cg | HACCP training and research to assist meat processors with process deviations for lethality and stabilization (H. Thippareddi, D.E. Burson) |
| 16-096 cg | Population genomics of Listeria monocytogenes (A.K. Benson, M. Wiedmann) |
Plant Pathology

21-022* hm Biocontrol of soil and residue-borne plant pathogens (G.Y. Yuen)

21-058* hm Persistence of Heterodera glycines and other regionally important nematodes (T.O. Powers)

21-064 hm NC-129, Fusarium mycotoxins in cereal grains (M.B. Dickman)

21-069 ha Characterization of wheat leaf rust virulence in Nebraska and its implication for breeding for resistance (J.E. Watkins)

21-070 ha Mitigation of diseases of dry edible bean and stem rot of soybean by managed plant resistance (J.R. Steadman)

21-073* ha Environmental effects on plant host-parasite interactions (J.E. Fartridge)

21-074* st Broad-spectrum virus resistance in transgenic plants (A. Mitra)

21-075* ha Application of PCR based approaches for nematode identification and epidemiology (T.O. Powers)

21-076 ha Pathogenic determinants of phytopathogenic fungi (M.B. Dickman)

21-078* cg Secretion properties of the type III secretion system of Pseudomonas syringae (J.R. Alfano)

21-079 ha Characterization of soybean diseases in Nebraska and development of plant disease management strategies in soybean and landscape plants (L.J. Giesler)

21-081 ha Characterization and use of bacterial endophytes from cereals (A.K. Vidaver)

21-082* ha Detection and properties of Nebraska plant viruses with emphasis on soybean viruses (L.C. Lane)

21-083 ha Biological control of grass and cereal diseases in Nebraska (G.Y. Yuen)

21-084* cg Utilization of direct repeat induced gene silencing in plant functional genomics (A. Mitra)

21-085 ha The fungal response to genotoxic stress (S.D. Harris)

21-086 cg Chaperones of the type III protein secretion system of Pseudomonas syringae tomato DC 3000 (J.R. Alfano)

21-087* hm NC-504, Soybean rust: A new pest of soybean production (I.J. Giesler)

21-088 st The type 111 protein secretion system of Pseudomonas syringae tomato DC 3000 (J.R. Alfano)

21-089 ha Development of allergen free wheat using gene silencing (A. Mitra, S. Baenziger, T. Powers)

21-090 hm W-1186, Genetic variability in the cyst and root-knot nematodes (T.O. Powers)

21-091 ha Characterization of large algal viruses and their genes (J.L. VanEtten)

21-100 st Evaluation of airborne remote sensing and the advanced vegetation index suite for crop disease detection: The case of dry bean rust (J.R. Steadman)

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21-102 ha Development of direct repeat induced gene (A. Mitra)

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48-027* ha Microbial management of plant diseases in sustainable production systems: microbial diversity habitat receptivity and pathogen populations (J.P. Stack)

School of Natural Resources

27-003 ha Exchange of carbon dioxide and other atmospheric trace gases in vegetated ecosystems (S.B. Verma)

27-007 ha Drought: response and policy implications (D.A. Wilhite, M.J. Hayes)

27-012 hm NRSP-3, The national atmospheric deposition program (NADP) (S.B. Verma)

40-002 ha Remediating organic contaminants in soil and water through natural and accelerated destruction (S.D. Comfort)

40-005* ha Ecology of pallid sturgeon and associated fishes in the Platte River, Nebraska (E.J. Peters)

40-006* ms Linking special forest products, markets and sustainable agroforestry systems (S.J. Josiah, J.R. Brandle)

40-007 ms Ecosystem consequences of woody species establishment in the Great Plains (D.A. Wedin)

40-008* ha Interannual and interdecadal variation of precipitation and temperature in Nebraska and surrounding states (Q. Hu)

40-011 ms Windbreak shelter effects (J.R. Brandle, L. Hodges, S.J. Josiah)

40-013 ha Rapid estimation of soil hydraulic properties (J.M. Skopp)

40-017 ms Impacts of Pinus ponderosa establishment on ecosystem functions in the Sandhills of Nebraska (T.N. Awada and D. Wedin)

40-018 ha Agrochemicals in Nebraska groundwater: occurrence, trends, and health associations (M. Exner-Spalding)

40-019 ha Evaluation and remediation of chemically compromised soil environments (P.J. Shea)

40-020 ha Development of an optimal conjunctive use plan during irrigation seasons for a Nebraska river valley (Xun Chen)

40-021* ms Epidemiology and control of pine wilt in Nebraska (M.O. Harrell)
40-023 ha Determining time of recharge (AGE) of groundwater resources in Nebraska using water chemistry and environmental isotopes (F.E. Harvey)

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40-025 st Remote sensing of the biophysical characteristics of agricultural vegetation (R.C. Rundquist, A. Gitelson)

40-026 ha Landscape-level mechanisms influencing population dynamics of birds (L.A. Powell)

40-027 ha Radiative transfer in vegetative canopies with emphasis on canopy structure (E.A. Walter-Shea)

40-028 ha Improving the simulation of winter wheat (Triticum aestivum L.) responses to the environment (A. Weiss)

40-029* ha Drought effects on bird dispersal transmission in Nebraska wetlands (L.A. Powell)

40-030* sg Developing drought mitigation and preparedness technologies for the U.S. (D. Wilhite)


40-032 hm NC-1005, Landscape ecology of white tailed deer in agroforest ecosystems: A cooperative approach to support management (S.E. Hygnstrom)

40-033 cg Drought monitoring, planning, and mitigation (D. Wilhite)

40-034 ha Characterization of land cover for improved numerical weather prediction modeling (J. Merchant, G. Henebry)

40-035 hm NC-1018, Impact of climate and soils on crop selection and management (K. Hubbard, S. Hu)

40-036 og Drought monitoring planning and mitigation (D. Wilhite)

40-037 ha Identification of the triggering mechanisms of increased flood risk in the lower Missouri River (J. Szilagyi)

40-038 ha Decision-making for wildlife under severe uncertainty (A. Tyre)

40-039 ha Integrating biological diversity into managed land-use systems (R. Johnson)

40-040 ha Multidecadal alteration of sources affecting interannual summer rainfall variations in the central U.S. (S. Hu)

40-041 st Evolution, biomechanics and function in the teeth, jaws and skulls of insectivorous mammals (P. Freeman)

Statistics

23-001 st Applications of statistics to research in agriculture (D.B. Marx, W.W. Stroup, A.M. Parkhurst, K.M. Eskridge)

23-003 hm W-173, Stress factors of farm animals and their effects on performance (A.M. Parkhurst)

Veterinary and Biomedical Sciences

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14-059 st Veterinary diagnostic lab system: Veterinary and animal care facility (J.A. Schmitz, A.R. Doster)

14-103 ah Pathogenic mechanisms of bacterial respiratory pathogens (J.D. Cirillo)

14-108 ah Molecular genetic analysis of Mycobacterium paratuberculosis and related mycobacterial pathogens (R.G. Barletta)

14-109 ha Epidemiology of Escherichia coli 0157:H7 and salmonella in feedlot beef cattle (D.R. Smith, R.A. Moxley, T.J. Klopfenstein)

14-111 hm Porcine reproductive and respiratory syndrome (PRRRS) (F.A. Osorio, A. Pattnaik, R. Johnson, J. Weber)

14-117* cg Role of A/E proteins in E. coli 0157: H7 intestinal colonization of adult cattle (R.A. Moxley)

14-118 ah Pathobiology of porcine colonic spirochetosis caused by Brachyspira pilosicoli (G.E. Duhamel)

14-119 cg Functional genomic analysis of bovine viral diarrhea (R.O. Donis)

14-120 cg Mapping of Mannheimia (pasteurella) haemolytica leukotoxin binding site(s) on bovine CD18 (S. Srikumaran)

14-121 hm NC-107, Evolving pathogens, targeted sequences, and strategies for control of bovine respiratory disease (S. Srikumaran)

14-122 cg Functional analysis of bICPO, a bovine herpesvirus 1 gene that is a promiscuous trans-activator (C.J. Jones, Y. Zhang)

14-123 cg Develop pre-harvest version of the USDA-FSIS fast antibiotic screening test and antibiotic residue avoidance education (D.D. Griffin)

14-124* cg Immunity against porcine reproductive and respiratory syndrome virus infections (F.A. Osorio, O.J. Lopez)


14-126 ah Pathogenesis of bovine viral diarrhea virus and bovine respiratory syncytial virus infections (C.L. Kelling)

14-127 cg Intervention strategies to reduce Escherichia coli 0157:H7 in beef feedyards (D.R. Smith, G.E. Erickson, R.A. Moxley, T.J. Klopfenstein, S. Hinkley)

14-128 cg Regulation of the latency reactivation cycle by the bovine herpesvirus (BHV-1) latency related gene (C.J. Jones, A.R. Doster)

14-129 cg Molecular analysis of a mycobacterium paratuberculosis colony-morphology attenuated mutant (R.G. Barletta)

14-130 ah Regulation of the latency reactivation cycle by the bovine herpesvirus 1 (BHV-1) latency related (LR) gene (C.J. Jones)

14-131 st Veterinary field disease research program (D.R. Smith)

14-132 ha Examination of attenuation and virulence determinants of porcine reproductive and respiratory syndrome virus (A. Pattnaik, F. Osorio)

14-133 cg Analyses of virulence and attenuation determinants of porcine reproductive and respiratory syndrome virus using reverse genetics approach (A. Pattnaik, F. Osorio)

14-134 ah Influence of exoenzymes on virulence and colonization of the porcine intestine by Escherichia coli (R. Moxley)

14-135 ha Tricarboxylic acid cycle mediated regulation of staphylococcus aureus virulence factors (G. Somerville)

14-137 st Genetic basis of resistance to foodborne bacterial pathogen (G. Duhamel, J. Weber)

14-138 cg Functional analysis of bICPO, the major transcriptional regulatory gene of bovine herpesvirus (C.J. Jones)

14-139 ah Use of an eGFP-expressing strain of FRRSU for the study of viral pathogenesis and tropins (F. Osorio, A. Pattnaik)
### Human Resources and Family Sciences Departments

#### Family and Consumer Sciences

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<td>92-056</td>
<td>Dietary quality and BMI and the influence of the parent-child relationship and ethnicity of young children on these variables (K.L. Stanek-Kroghstrand)</td>
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### Nutritional Science and Dietetics

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### Off-Campus Research Centers

### Northeast Research and Extension Center

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<td>44-058</td>
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- **43-066** ha
  - Selection, development and propagation of native herbaceous landscape plants (D.T. Lindgren)

- **43-067** ha
  - Improving fertilizer management and recommendations for precision agriculture (G.W. Hergert)

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  - Environmental impact of land application of animal manure as fertilizer for irrigated corn (J.O. Payero, S. Ensley, G.W. Hergert)

- **43-069** ha
  - Improving irrigation management to conserve water resources in west central Nebraska (J.O. Payero)

- **43-070** ha
  - Soil nutrient and manure management for crop production in west central Nebraska (D.D. Tarkalson)

- **43-071** ha
  - Enhancing reproductive efficiency in beef cattle (R.N. Funsten)

- **43-072** ha
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  - Center for Grassland Studies (M.A. Massengale)

- **33-002** hm
  - NC-1020, Beef cattle grazing systems that improve production and profitability while minimizing risk and environment impacts (T. Klopfenstein)

- **33-003** hm
  - NC-1021, Nitrogen cycling, loading and use efficiency in forage-based livestock (W. Schacht, T. Klopfenstein)

### Food Processing Center

- **19-003** st
  - Development and evaluation of food products, processes and markets (S.L. Taylor)

- **19-013** sg
  - Midwest Advanced Food Manufacturing Alliance (S.L. Taylor)

- **19-015** sg
  - Midwest Advanced Food Manufacturing Alliance (S.L. Taylor)

- **19-016** sg
  - Midwest Advanced Food Manufacturing Alliance (S.L. Taylor)

- **19-017** sg
  - Alliance for Food Protection (S. Hefle)

### Sustainable Agriculture Research and Education (SARE) Program

- **32-007** sg
  - North Central Region Sustainable Agriculture Research and Education Program (W. Wilcke)

- **32-008** sg
  - North Central Region Sustainable Agriculture Research and Education Program (W. Wilcke)

- **32-009** og
  - Soil science and forest health management research-natural resources facility (D. Vanderholm)

- **32-010** sg
  - FY02 NCR SARE Plan of Work (W. Wilcke)

- **32-011** sg
  - North Central Region Sustainable Agriculture Research and Education Program (W. Wilcke)

- **32-012** sg
  - North Central Region Sustainable Agriculture Research and Education Program (W. Wilcke)
While serving the needs of Nebraska’s agricultural producers, agribusinesses, industries, communities and citizens, the ARD places a high priority on being accountable for its resources and documenting impacts of its programs. As in all research institutions, ARD scientists are charged to actively disseminate results of research in scientific journals and technical publications. The division sets optimistic, but reachable, annual goals for scientific publication, theses and dissertations, and other measures of research output. In each of the last six years the goals have been exceeded.

Publications in refereed (peer reviewed) scientific journals represent professional acknowledgment of the value of a research finding to the discipline. ARD scientists have published in a number of different scientific journals during 2004-05. Faculty also have written books, edited books or contributed chapters for books.

Another major contribution of the ARD research faculty is the education of graduate students pursuing a Master of Science (M.S.) or Doctor of Philosophy (Ph.D.) degree. One responsibility of a graduate degree is the completion of a thesis (M.S.) or a dissertation (Ph.D.)

Publications in refereed journals, books, book chapters, refereed proceedings, theses and disserta-

## Journals in which faculty have published during 2005

### Agricultural Economics

AgBio Forum
AgBioForum
Agribusiness: An International Journal
Agricultural Economics
American Journal of Agricultural Economics
Applied Engineering in Agriculture
Ecological Economics
Information Economics and Policy
Journal of Agricultural and Resource Economics
Journal of Productivity Analysis
Nebraska Law Review

### Agricultural Leadership, Education and Communication

Journal of Agricultural Education
Journal of Leadership Education
Psychological Reports

### Agronomy and Horticulture

Agricultural and Forest Meteorology
Agricultural Systems
Agroforestry Systems
Agronomy Journal
Biochemica et Biophysica Acta
Canadian Journal of Plant Sciences
Cereal Chemistry
Climate Research
Crop Science
Ecological Modeling
Environmental and Experimental Botany
Euphytica
Field Crops Research
Genome
HortScience
International Journal of Systematic and Evolutionary Microbiology
Journal of Dairy Science
Journal of Economic Entomology
Journal of Environmental Quality
Journal of Nutrition
Journal of Plant Nutrition
Journal of Range Management
National Academy of Science
Physiological and Molecular Plant Pathology
Planta
Plant Cell
Poultry Science
Precision Agriculture
Rangeland Ecology Management
Scientia Horticulturae
Soil Science Society of America Journal
Theoretical and Applied Genetics
Transactions of the American Society of Agricultural Engineering
Weed Science
Weed Technology

**Animal Science**
Animal Reproduction Science
Applied and Environmental Microbiology
Applied Animal Behaviour Science
Australian Journal of Agricultural Research
Crop Science
Dairy Science
Epidemiology Infection
European Journal of Nutrition
Genetics
Genetics and Molecular Research
Journal of Animal Science
Journal of Dairy Science
Journal of Environmental Quality
Livestock Production Science
Mammalian Genome
Obesity Research
Poultry Science
Statistical Applications in Genetics and Molecular Biology
Tecnica Pecuaria en Mexico
The Professional Animal Scientist
Vaccine

**Biochemistry**
Applied Environmental Microbiology
Biochemical and Biophysical Research Communications
Biochemistry
Journal of Biological Chemistry
Journal of Experimental Botany
Journal of Medical Microbiology
Physiologia Plantarum
Planta
Poultry Science

**Biological Systems Engineering**
Agronomy Journal
Applied Engineering in Agriculture
Carbohydrate Polymers
Cereal Chemistry
Computers and Electronics in Agriculture
Energy and Fuels
Engineering in Agriculture
Food Science and Biotechnology
Industrial Crops and Products
Journal of American Oil Chemists Society
Journal of Applied Polymer Science
Journal of Environmental Quality

**Entomology**
Agronomy Journal
Brasilia
Comparative Biochemistry and Physiology
Journal of Economic Entomology
Journal of Entomological Science
Journal of Medical Microbiology
Journal of Pest Management Science
Journal of Invertebrate Pathology
Chemosphere
Genome
Medical and Veterinary Entomology
Naturwissenschaften
Parasitology International
Pesticide Biochemistry and Physiology
Scarabs
The Florida Entomologist
Zootaxa

**Food Science and Technology**
Applied and Environmental Microbiology
Biochimica et Biophysica Acta
Carbohydrate Polymers
Cereal Chemistry
Clinical and Experimental Allergy
Current Microbiology
Energy and Fuels
Food Science and Biotechnology
Industrial Crops and Products
International Journal of Agriculture and Biology
Journal of AOAC International
Journal of Agricultural and Food Chemistry
Journal of Allergy and Clinical Immunology
Journal of the American Oil Chemists’ Society
Journal of Applied Polymer Science
Journal of Bacteriology
Journal of Food Process Engineering
Journal of Food Protection
Journal of Food Science
Journal of Polymers and the Environment
Planta
Starke
Transactions of the American Society of Agricultural Engineers
Plant Pathology
Agronomy Journal
Annual Review Phytopathology
Archives of Virology
Biological Control
Biotechnology Letters
Canadian Journal of Plant Science
Cellular Microbiology
Crop Science
InfoMusa
Gene
Genome
Journal of Agriculture and Biology
Journal of Agriculture of the University of Puerto Rico
Journal of Bacteriology
Journal of Biological Chemistry
Journal of General Virology
Journal of Nematology
Microbial Ecology
Molecular Microbiology
Molecular Plant-Microbe Interaction
National Academy of Science USA
Nucleic Acids Research
Physiological and Molecular Plant Pathology
Phytopathology
Plant Disease
Plant Journal
Plant Physiology
Virology

IEEE Geoscience and Remote Sensing Letters
International Journal of Climatology
Journal of Agricultural Biology
Journal of Applied Meteorology
Journal of the American Water Resource Association
Journal of Atmospheric and Oceanic Technology
Journal of Climate
Journal of Environmental Quality
Journal of Insect Behavior
Journal of HortTechnology
Journal of Hydrology
Journal of Hydrometeorology
Journal of Kansas Entomological Society
Journal of Plant Physiology
Journal of Sustainable Agriculture
International Journal of Climatology
Langmuir
Natural Hazards Review
North American Agroforestry Systems
Revista Brasileira de Agrometeorologia
Theoretical and Applied Climatology
Wildlife Society Bulletin

School of Natural Resources
Agricultural and Forest Meteorology
Agroforestry Systems
Agronomy Journal
American Meteorological Society
Annals of Forest Science
Canadian Journal of Forest Research
Chemosphere
Climate Research
Computers and Electronics in Agriculture
Condor
Conservation Biology
Crop Science
Ecological Modelling
Ecology
Environmental and Experimental Botany
Environmental Pollution
International Journal of Agricultural Biology
Field Crops Research
Geophysical Research Letters
Ground Water
HortScience

Statistics
Agriculture, Ecosystems and Environment
Crop Science
Dairy Science
Euphytica
HortScience
International Journal of Biometeorology
Journal of Animal Science
Journal of Econmic Entomology
Journal of Food Science
Journal of Medical Microbiology
Journal of Polymers
Journal of the Kansas Entomological Society
Journal of Virological Methods
Plant Disease
Statistical Applications in Genetics and Molecular Biology
Wildlife Society Bulletin

Veterinary and Biomedical Sciences
American Journal of Respiratory Cell and Molecular Biology
Annual Review of Microbiology
Applied and Environmental Microbiology
Biomedica
Epidemiology and Infection
Eukaryotic Cell
Experimental Eye Research
Food Animal Practice
Foodborne Pathogens and Disease
Infections and Immunity
Investigative Ophthalmology and Visual Science
Journal of Clinical Microbiology
Journal of Medical Microbiology
Journal of Veterinary Diagnostic Investigation
Journal of Virological Methods
Vaccine
Veterinary Immunology Immunopathology

Human Resources and Family Sciences Departments

Family and Consumer Sciences
College Student Journal
Contemporary Family Therapy
Complexity of Family Life Among Low Income and Working Poor
Gender and Society
Journal of Family and Economic Issues
Strengths and Challenges
The American Journal of Family Therapy

Nutrition and Health Sciences
Ecology of Food and Nutrition
European Journal of Biochemistry
Food Science Central
Journal of the American Dietetic Association
Journal of Food Science
Journal of Nutrition
Journal of Nutritional Biochemistry
Journal of Nutrition Education and Behavior
Nutrition in Clinical Care
Nutrition Research
Today’s Dietitian

Off-Campus Research Centers

Northeast Research and Extension Center
Agronomy Journal
Applied Engineering in Agriculture
Australian Journal of Agriculture Research
International Journal of Biometerology
Journal of Animal Science
Weed Technology

Panhandle Research and Extension Center
Crop Science
Journal of Agricultural and Resource Economics
Journal of Animal Science
Journal of Rangeland Ecology and Management
Journal of Sugar Beet Research
Plant Health Progress
Professional Animal Scientist
Rangeland Ecology and Management
Review of Agricultural Economics
Weed Science
Weed Technology

West Central Research and Extension Center
Agronomy Journal
Applied Engineering in Agriculture
Communications in Soil and Plant Analysis
Journal of Animal Science
Journal of Environmental Quality
Journal of Range Management
HortScience
The Professional Animal Scientist

Textiles, Clothing and Design
American Association of Textile Chemist and Colorist Review
Coloration Technology
Family and Consumer Sciences Research Journal
Journal of Applied Polymer Science
Journal of Textile Institute
Journal Articles


Book Chapters


Research Bulletin


Referred Proceedings


M.S. Theses


McCabe, L.G. 2004. Strategic and risk hedging in a Cournot duopoly with forward input contracts. (A.M. Azzam and A. Yiannaka, Advisors)

Veyssiére, L. 2004. Strategic labeling and trade of GMOs. (K. Giannakas, Advisor)

Agricultural Leadership, Education and Communication

Journal Articles


A survey of gender-related motivation studies: Subordinate status, roles and stereotyping. 
Journal of Leadership Education. www.fhsu.edu/jole/issues/JOLE_3_2.pdf. (J. Series No. 14437)

Machiavellianism’s association with sources of motivation and downward influence strategies. 
Psychological Reports 94:933-943. (J. Series No. 14480)

A review of gender and full-range leadership and suggestions for future research. Journal of Leadership Education. www.fhsu.edu/jole/issues/JOLE_3_2.pdf. (J. Series No. 14440)

The effects of LMX and differential treatment on work unit commitment: Distinguishing between neutralizing and moderating effects. Psychological Reports 94: 495-500. (J. Series No. 13828)

**Referred Proceedings**


**Ph.D. Dissertations**

Testing the relationship between emotional intelligence and full-range leadership as moderated by cognitive style and self-concept. (J.E. Barbuto, Advisor)

Motivation as an antecedent to positive environmental behaviors of agricultural leaders. (J.E. Barbuto and C.A. Francis, Advisors)


Registration of N-Si-6, N-Si-7, N-Si8 foxtail millet germplasms. Crop Science 44:1030. (J. Series No. 14031)

Molecular characterization of buffalograss germplasm using sequence-related amplified polymorphism markers. Theoretical and Applied Genetics 108:328-334. (J. Series No. 14046)

Latitudinal adaptation of switchgrass populations. Crop Science 44:293-408. (J. Series No. 14184)

Leaching and sorption of nitrogen and phosphorus by crop residue. Transactions of the American Society of Agricultural Engineers 47:113-118. (J. Series No. 13806)

A critical assessment of the system for rice intensification (SRI). Agricultural Systems 79:261-281. (J. Series No. 14080)

Residual effects of manure and compost applications on corn production and soil properties. Agronomy Journal 96:442-447. (J. Series No. 14066)

Greening of agriculture for long-term sustainability. Agronomy Journal 96:1211-1215. (J. Series No. 14448)

Nitrogen rate and mowing height effects on turf-type buffalograss. Crop Science 44:1615-1621. (J. Series No. 14054)

Expression of the tobacco β-1,3-glucanase gene, PR-2d, following induction of SAR with Peronospora tabacina. Physiological and Molecular Plant Pathology 65:285-296. (J. Series No. 14464)

Phytotoxicity of clippings from creeping bentgrass treated with glyphosate. Weed Technology 18:575-579. (J. Series No. 14169)

Genotypic and environmental modification of Asian noodle quality of hard winter wheats. Cereal Chemistry 81:19-25. (J. Series No. 13973)

Registration of three partial waxy winter wheats. Crop Science 44:2273-2274. (J. Series No. 14472)

Registration of N96L9970 greenbug resistant wheat. Crop Science 44:1492-1493. (J. Series No. 13911)

Registration of N95L11881 and 92L9521 strong gluten 1BL.1RS wheat germplasm lines. Crop Science 44:1490-1491. (J. Series No. 13912)

Registration of nineteen waxy spring wheats. Crop Science 44:1491-1492. (J. Series No. 13913)

Selection environments for maize in the U.S. western high plains. Crop Science 44:1519-1526. (J. Series No. 14127)


Western immunoblotting in avian shell gland sample immunoblotting methods. Poultry Science 83:230-233. (J. Series No. 13754)

Direct calorimetric analysis of turfgrass sod for storage life assessment. Scientia Horticultrae 102:1-10. (J. Series No. 14063)

Weed management in glyphosate resistant soybean: Weed emergence patterns in relation to glyphosate treatment timing. Weed Technology 8:277-283. (J. Series No. 13919)


Growth and yield of snap beans (Phaseolus vulgaris L.) as affected by wind protection and microclimate changes due to shelterbelts and planting date. HortScience 39:996-1004. (J. Series No. 13169)

Linking microbial-scale findings to farm-scale outcomes. Precision Agriculture 5:311-327. (J. Series No. 13605)

Economic evaluation of glyphosate-resistant and conventional sugar beet. Weed Technology 18:388-396. (J. Series No. 14086)

Transferability of SSR markers among wheat, rye, and triticale. Theoretical and Applied Genetics 108:1147-1150. (J. Series No. 14243)

A single amino acid substitution in soybean VSP increases its acid phosphatase activity nearly 20-fold. Planta 219:1071-1079. (J. Series No. 14443)

Dietary supplementation with high-selenium soy protein reduces pulmonary metastasis of melanoma cells in mice. Journal of Nutrition 134:1536-1540. (J. Series No. 14572)

The use of microsatellite markers for the detection of genetic similarity among winter bread wheat lines for chromosome 3A. Theoretical and Applied Genetics 109:1494-1503. (J. Series No. 14561)

Yield components of pearl millet and grain sorghum across environments in the Central Great Plains. Crop Science 44:2138-2145. (J. Series No. 14192)


Linkage mapping of powdery mildew and greenbug resistance genes on recombinant 1R from ‘Amigo’ and ‘Kavkaz’ wheat-rye translocations of chromosome 1RS.1AS. Genome 47:292-298. (J. Series No. 14042)

WeedSOFT*: A weed management decision support system. Weed Science 52:115-112. (J. Series No. 13868)


Nitrogen mineralization from hemic acid fractions in lowland rice soils depends on degree of humification. Soil Science Society of America Journal 68:1278-1284. (J. Series No. 14003)

Comparison of brown midrib-6 and 18 forage sorghum with conventional sorghum and corn silage in diets for lactating dairy cows. Journal of Dairy Science 87:637-644. (J. Series No. 14240)

Rapid iodine staining techniques for identifying the waxy phenotype in sorghum grain and waxy genotype in sorghum pollen. Crop Science 44:764-767. (J. Series No. 14242)

Rice yields decline with higher night temperature from global warming. Proceedings of the National Academy of Science of the United State of America 101:9971-9975. (J. Series No. 14658)
Book Chapters


Birru, F.H. 2004. Improvement trends, phenotypic and molecular diversity among hard red winter wheat cultivars in Nebraska. (P.S. Baenziger, Advisor)


Dhungana, P. 2004. Structural equation modeling of Genotype x environment interaction. (K.M. Eskridge, Advisor)


Trout, S.K. 2004. Motivation as an antecedent to positive environmental behaviors of agricultural leaders. (J.E. Barbuto and C.A. Francis, Advisors)

Animal Science

Journal Articles


Research Bulletin


Referred Proceeding


Book


Book Chapters


M.S. Theses


Baumert, J.L. 2004. The effects of phosphate type and potassium lactate level on quality characteristics of enhanced beef steaks. (R.W. Mandigo, Advisor)


Collagen utilization in whole muscle beef roasts. (R.W. Mandigo, Advisor)

Ph.D. Dissertations


Biochemistry

Journal Articles


M.S. Theses


**Biological Systems Engineering**

**Journal Articles**


Sensing soil mechanical resistance profile with an instrumented deep tillage implement. Transactions of the American Society of Agricultural Engineers 47:1913-1919. (J. Series No. 14296)


Leaching and sorption of nitrogen and phosphorus by crop residue. Transactions of the American Society of Agricultural Engineers 47:113-118. (J. Series No. 13806)

Residual effects of manure and compost applications on corn production and soil properties. Agronomy Journal 96:442-447. (J. Series No. 14066)

Soybean thrashing mechanism development and testing. Transactions of the American Society of Agricultural Engineers 47:599-605. (J. Series No. 13549)


Effects of extruder die nozzle dimensions on expansion and micrographic characteristics of acetylated starch. Stärke 56:108-117. (J. Series No. 14457)


Predicting tractor fuel consumption. Applied Engineering in Agriculture 20:553-561. (J. Series No. 14185)

Extruded foams from corn starch acetal and native corn starch. Carbohydrate Polymers 5:2329-2339. (J. Series No. 14568)


Direct calorimetric analysis of turf grass sod for storage life assessment. Scientia Horticulturae 102:1-10. (J. Series No. 14063)


Changes in composition and thermal transition temperatures of grain sorghum wax during storage. Industrial Crops and Products 19:125-132. (J. Series No. 13986)

Policosanol contents and composition of grain sorghum kernels and dried distillers grains. Cereal Chemistry 81:345-349. (J. Series No. 14045)

Evaluating livestock systems environmental performance with whole-farm nutrient balance. Journal of Environmental Quality 34:149-155. (J. Series No. 14651)


Digital camera operation and fuzzy logic classification of plant, soil, and residue color images. Engineering in Agriculture 20:519-529. (J. Series No. 13731)

Effects of soy protein coating on shell strength and quality of shell eggs. Food Science and Technology 13:455-459. (J. Series No. 14530)

Properties of cross-linked starch produced in a single-screw extruder with and without a mixing element. Journal of Food Process Engineering 27:47-63. (J. Series No. 14631)


Synthesis and characterization of starch acetate with high degree of substitution. Cereal Chemistry 81:735-740. (J. Series No. 14810)

Extrusion of starch acetate with mixed blowing agents. Stärke 56:484-494. (J. Series No. 14274)

**Ph.D. Theses**

Gene-nutrient interactions in Homocysteine metabolism. Regulation of human methionine Synthase by B12. (R. Banerjee, Advisor)

Phylogenetic Engineering of Ribulose 1,5-Bisphosphate Carboxylase/Oxygenase Large-Subunit Loop 6 in Chlamydomonas Reinhardtii. (R. Spreitzer, Advisor)

**Referred Proceedings**


Precision farming: challenges and future directions. (CD). In: T. Fischer, N. Turner, J. Angus, L. McIntyre, M. Robertson, A. Borrell, and D. Lloyd (eds.), New Architectures, and Implementations XIV. Denver, CO.

Polar, non-polar and mixed blowing agents. Stärke 31:57-63. (D. Lloyd, H. Mikkonen, C. Vogel, and H. Zarsky, eds.)."


Ph.D. Dissertations

Population profiles of stable flies from eastern Nebraska and the impact of weather variables on their seasonal trends. (J.B. Campbell and P.J. Scholl, Advisors)

Phylogenetic analysis of the scarab family Hybosoridae and monographic revision of the New World. (M.L. Jameson and B.C. Ratcliffe, Advisors)

Food Science and Technology

Journal Articles


Regulation of transcription of compatible solute transporters by the general stress factor, σD, in Listeria monocytogenes. Journal of Bacteriology 186:794-802. (J. Series No. 14326)

Measurements of fitness and competition in commensal Escherichia coli and E. coli O157: H7 strains. Applied and Environmental Microbiology 70:6466-6472. (J. Series No. 14659)


Macrostructural characteristics of starch acetate extruded with natural fibers. Transaction of the American Society of Agricultural Engineers 47:205-212. (J. Series No. 13990)


Extruded foams from corn starch acetate and native corn starch starch. Carbohydrate Polymers 5:2329-2339. (J. Series No. 14568)


Ph.D. Dissertations

Amexiquita, A. 2004. Development of an integrated model for heat transfer and dynamic growth of Clostridium perfringens during the cooling of cooked boneless ham. (C.L. Weller, Advisor)


Plant Pathology

Journal Articles


Chlorella virus PBCV-1 encodes
N.V. Grishin, A.E. Pegg, B.A. Stanley,
K.G. Hubbard, G.Y. Yuen, and
J.R. Alfano, A. Collmer, and
Shan, L., H.-S. Oh, M. Guo, J. Zhou,
J.R. Alfano, A. Collmer, and
Shulski, M.D., E. Walter-Shea,
Penetration of photosynthetically
respiring fluorescent
78

Pretreatment of wheat with virulent
Pseudomonas syringae pv. tomato
DC3000 encodes a type III chaperone and a cognate effector. Molecular
Plant-Microbe Interaction 17:447-455. (J. Series No. 14246)

Shulski, M.D., E. Walter-Shea,
K.G. Hubbard, G.Y. Yuen, and
Penetration of photosynthetically
active and ultraviolet radiation into alfalfa and tall fescue canopies.
Agronomy Journal 96:1562-1571. (J. Series No. 12734)

Complete nucleotide sequence of oat necrotic mosaic virus: A distinct
(J. Series No. 14183)

Functional replacement of wheat streak mosaic virus HC-Pro with the
corresponding cistron from a diverse array of viruses in the family Potyviridae. Virology 323:257-267. (J. Series No. 14463)

Takegami, J.C., J.S. Beaver,
G. Godoy-Lutz, R. Echavez-Badel
Inheritance of wheat blight resistance in common bean. Journal of Agriculture of the University of Puerto Rico 88:45-54.
(J. Series No. 14138)

Vuong, T.D., D.D. Hoffman,
B.W. Diers, J.K. Miller, J.R. Steadman,
(J. Series No. 14109)

Wehling, J., M. Guo, Z.Q. Fu, and
The Pseudomonas syringae
HopPtoV protein is secreted in
culture and translocated into plant cells via the type III protein
(J. Series No. 14446)

Book Chapters
Alfano, J.R., S.T. Chancey,
A. Espinosa, Z.Q. Fu, M. Guo,
M. Hanks, Y. Jamir, J. Wehling, and
Pseudomonas syringae type III
secretion: chaperones, translo-
cators, and effectors that sup-

Berger, P.H., M.J. Adams,
O.W. Barnett, A.A. Brutn,
J. Hammond, J.H. Hill, R.L. Jordan,
S. Kashiyazaki, E. Rybicki,
N. Spence, D.C. Stenger, S.T. Ohki,
I. Uyeda, A. van Zaayen,
Family Potyviridae, p 1-25. In:
C.M. Fauquet, M.A. Mayo,
J. Maniloff, U. Desselberger, and
L.A. Ball (eds.), The Interna-

Collmer, A., J.R. Alfano, C.R. Buell,
S. Cartinhour, A.K. Chatterjee,
T.P. Delaney, S.G. Lazarowitz,
G.B. Martin, D.J. Schneider, and
Pseudomonas syringae: Functional
genomics and plant pathogenicity, p.105-108. In: I. Tikhonovich,
B. Lugtenberg, and N. Provorov (eds.), Biology of Plant-Microbe Interactions, Vol. 4. ISMIPM, St. Petersburg, Russia.

Programmed cell death in plants

Wheat streak mosaic virus, p.

Harris, S.D. 2004.
Mitosis in filamentous fungi, p.
38-53. In: F. Meinhardt and J.


Moroni, A., J.L. Van Etten, and

Nematodes, p. 1-6. In: D. Hillel,
C. Rosenzweig, D. Powlsan,

pathology. Annual Reviews, Palo Alto, CA.

Rabenstein, F., J. Schubert, F. Ehrig,
Rye grass mosaic virus, p.

Rabenstein, F., J. Schubert,

Rabenstein, F., D.C. Stenger, and
Genus Titimovirus, p. 398-402.

Rabenstein, F., D.C. Stenger, and
R. French. 2004b.
Hordeum mosaic virus, p. 474-476.

Foxtail mosaic virus, p. 765-766.
Ph.D. Dissertations


School of Natural Resources

Journal Articles


Wehling, J. 2004. Characterization of effectors from the type III protein secretion system of Pseudomonas syringae pv. tomato DC3000. (J.R. Alfano, Advisor)


M.S. Thesis


Statistics

Journal Articles


Heitability of the resistance to potato leafhopper in dry beans. HortScience 39(7):1578-1580. (J. Series No. 13736)


Refereed Proceedings


Ph.D. Dissertations

Dhungana, Prabhakar. 2004. Structural equation modeling of genotype x environment interaction. (K.M. Eskridge, Advisor)


Veterinary and Biomedical Sciences

Journal Articles


Bannantine, J.P., R.G. Barletta, J.R. Stabel, M.L. Paustian, and V. Kapur. 2004. Application of the genome sequence to address concerns that Mycobacterium avium subspecies paratuberculosis is a foodborne pathogen. Foodborne Pathogens and Disease 1:3-15. (J. Series No. 14348)


Wroughton, Jacqueline. 2004. Analysis of direct mail marketing for Acton, Inc. (K.M. Eskridge, Advisor)


M.S. Theses

Justice, S. 2004. Establish RhD specific Epstein-Barr virus transformed lymphoblastoid B-cell lines, which will be used to determine whether or not Fc-mediated B-cell suppression is involved in the immune suppression induced by treatment with anti-RhD. (D. Wylie, Advisor)

Ellis, R. 2004. Changes in physical, reproductive, and behavioral characteristics of yearling beef bulls during a natural mating season. (G.P. Rupp, Advisor)


Ph.D. Dissertations

Ambagala, A. 2004. Interference with major histocompatibility complex class I Pathway by animal α-herpesviruses. (S. Srikumaran, Advisor)


Matulka, L.A. 2004. Effects of bovine respiratory syncytial virus or bovine viral diarrhea virus infection and N-acetyl cysteine supplementation on intracellular glutathione levels, proliferation and interferon-gamma transcription by bovine peripheral blood mononuclear cells and natural killer cells. (D.R. Brink and C.L. Kelling, Advisors)


Toplift, C. 2004. Influence of the 5’ untranslated region internal ribosomal entry site and the Npro coding region on translational efficiency of bovine viral diarrhea virus genotype 2 isolates varying in virulence. (C.L. Kelling, Advisor)

Yan, L. 2004. Phagocyte-pathogen interactions. (J.D. Cirillo, Advisor)

College of Human Resources and Family Sciences

Family and Consumer Sciences

Journal Articles


Book

Book Chapters

M.S. Theses

Fox, M.A. 2004. Nutrition knowledge, behavior and attitude of NCAA Division I track and field athletes. (T.P. Carr, Advisor)


Ph.D. Dissertations


Leon, M. 2004. Verification of adenosine triphosphate (ATP) bioluminescence on plastic food-contact surfaces. (J.A. Albrecht, Advisor)

Lora, K. 2004. Vitamin B-6 status of a group of 4-8 year old children of Latino immigrants in rural Nebraska. (J.A. Driskell, Advisor)

Martin, T.J. 2004. Consumer acceptance of irradiated foods and willingness to purchase irradiated foods. (J.A. Albrecht, Advisor)

Nunn, M.D. 2004. The effects of various cooking methods on the sensory qualities and carotenoid retention in selected vegetables. (J.A. Driskell, Advisor)


Nutrition and Health Sciences

Ph.D. Dissertations


Leon, M. 2004. Verification of adenosine triphosphate (ATP) bioluminescence on plastic food-contact surfaces. (J.A. Albrecht, Advisor)

Lora, K. 2004. Vitamin B-6 status of a group of 4-8 year old children of Latino immigrants in rural Nebraska. (J.A. Driskell, Advisor)

Nutrition Knowledge and Behavior:
Book Chapters


Few differences found in the typical eating and physical activity habits of lower and upper level university students. Journal of The American Dietetic Association 105:798-801. (J. Series No. 14527)

adults consuming omega-3 fatty acid-enriched eggs or standard eggs. Nutrition Research 24:731-739. (J. Series No. 14346)


Book


Book Chapters


M.S. Theses

Gerace, P.A. 2004. The impact of a college health course on the dietary habits of college students. (T.P. Carr, Advisor)


Drewel, B.T. 2004. Less than adequate vitamin E status was observed in a group of preschool boys and girls of varying ethnicities. (J.A. Driskell, Advisor)

Engelmeyer, J.R. 2004. Folate and homocysteine status of women aged 20-60 years. (J.A. Albrecht, Advisor)

Fox, M.A. 2004. Nutrition knowledge, behavior and attitude of NCAA Division I track and field athletes. (T.P. Carr, Advisor)

Gerace, P.A. 2004. The impact of a college health course on the dietary habits of college students. (T.P. Carr, Advisor)

Leon, M. 2004. Verification of adenosine tri-phosphate (ATP) bioluminescence on plastic food-contact surfaces. (J.A. Driskell, Advisor)

Lora, K. 2004. Vitamin B-6 status of a group of 4-8 year old children of Latino immigrants in rural Nebraska. (J.A. Driskell, Advisor)

Martin, T.J. 2004. Consumer acceptance of irradiated foods and willingness to purchase irradiated foods. (J.A. Albrecht, Advisor)

Nunn, M.D. 2004. The effects of various cooking methods on the sensory qualities and carotenoid retention in selected vegetables. (J.A. Driskell, Advisor)


Yarbayeva, S. 2004. Folate content of cooked legumes measured by microbiological and HPLC methods and iron content of legumes of Tajikistan. (J.A. Albrecht, Advisor)

Ph.D. Dissertations

Al-Nunmair, K. 2004. Comparison of the intake of omega-3 fatty acids and its relation to the incidence of non fatal myocardial infarction in two samples from different geographical locations in Saudi Arabia. (N.M. Lewis, Advisor)

Hakel-Smith, N.A. 2004. Evaluation of nutrition practitioners’ documentation for evidence of the nutrition care process in two nutritionally high risk patient populations. (N.M. Lewis, Advisor)

Gerace, P.A. 2004. The impact of a college health course on the dietary habits of college students. (T.P. Carr, Advisor)


Textiles, Clothing and Design

Journal Articles


**Refereed Proceedings**


**M.S. Theses**


**Off-Campus Research Centers**

**Northeast Research and Extension Center**

**Journal Articles**


**Research Bulletin**


**Refereed Proceedings**


**M.S. Theses**


Panhandle Research and Extension Center

Journal Articles


Referred Proceedings


Book Chapters


Research Bulletin


**M.S. Thesis**


**West Central Research and Extension Center**

**Journal Articles**


**Research Bulletin**


**Refereed Proceeding**


**M.S. Thesis**


**Ph.D. Dissertations**


AR D receives funding from federal formula funds, industry grants, federal grants and state appropriations. During fiscal year 2004-2005, faculty with ARD appointments obtained grant and contract funds that totaled $46,527,606. This amount represents 35.8% percent of all research grant and contract funds received by UNL. The extramural funds coming to ARD faculty to address problems of importance to Nebraska have a significant direct impact on the state’s economy.

<table>
<thead>
<tr>
<th>Federal Formula Funds:</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Hatch Formula</td>
<td>$2,284,736</td>
</tr>
<tr>
<td>Regional Research</td>
<td>$878,693</td>
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<tr>
<td>McIntire-Stennis</td>
<td>$174,720</td>
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<tr>
<td>Animal Health</td>
<td>$149,363</td>
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<tr>
<td><strong>Total Federal Formula Funds</strong></td>
<td><strong>$3,487,512</strong></td>
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</table>

State-Appropriated Funds .................................$33,381,998

Nebraska Research Initiative Funds ............ $2,958,470

Contracts and Grants:

<table>
<thead>
<tr>
<th>Contracts and Grants:</th>
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</thead>
<tbody>
<tr>
<td>USDA Cooperative Agreements</td>
<td>$1,327,668</td>
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<tr>
<td>USDA Special and Competitive Grants</td>
<td>$5,639,827</td>
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<tr>
<td>Federal Grants - (NSF, NIH, USEPA, AID, DOE)</td>
<td>$12,183,884</td>
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<tr>
<td>Industry Grants</td>
<td>$9,582,891</td>
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<tr>
<td><strong>Total Grants and Contracts</strong></td>
<td><strong>$28,734,270</strong></td>
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</tbody>
</table>

Product Sales ..............................................$11,402,414

Total Expenditures .......................................... $79,964,664
## Agricultural Research Division
Research Investments by Category and Funding Source FY 2005

<table>
<thead>
<tr>
<th>Expenditure Category</th>
<th>State Appropriated and Hatch Funds</th>
<th>Federal Grants</th>
<th>Industry Grants</th>
<th>Revolving Funds</th>
<th>All Funds</th>
</tr>
</thead>
<tbody>
<tr>
<td>Salaries, Wages and Benefits</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>% of total within source</td>
</tr>
<tr>
<td>Administrative/Faculty</td>
<td>40.4</td>
<td>9.4</td>
<td>7.4</td>
<td>3.4</td>
<td>22.6</td>
</tr>
<tr>
<td>Managerial/Professional</td>
<td>12.5</td>
<td>7.0</td>
<td>8.7</td>
<td>8.0</td>
<td>9.9</td>
</tr>
<tr>
<td>Office/Service</td>
<td>9.9</td>
<td>3.6</td>
<td>8.2</td>
<td>16.1</td>
<td>9.1</td>
</tr>
<tr>
<td>Hourly Wages</td>
<td>0.4</td>
<td>1.7</td>
<td>3.6</td>
<td>3.5</td>
<td>1.7</td>
</tr>
<tr>
<td>GRA Stipends</td>
<td>4.9</td>
<td>13.0</td>
<td>10.9</td>
<td>1.9</td>
<td>7.3</td>
</tr>
<tr>
<td>Benefits</td>
<td>15.0</td>
<td>7.8</td>
<td>8.5</td>
<td>7.9</td>
<td>11.3</td>
</tr>
<tr>
<td>Subtotal:</td>
<td>83.1</td>
<td>42.5</td>
<td>47.2</td>
<td>40.9</td>
<td>61.8</td>
</tr>
<tr>
<td>Operating</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Supplies and Expenses</td>
<td>9.6</td>
<td>52.6</td>
<td>43.5</td>
<td>46.5</td>
<td>30.4</td>
</tr>
<tr>
<td>Travel</td>
<td>0.7</td>
<td>2.4</td>
<td>5.1</td>
<td>3.4</td>
<td>2.1</td>
</tr>
<tr>
<td>Equipment</td>
<td>6.7</td>
<td>2.5</td>
<td>4.1</td>
<td>9.2</td>
<td>5.7</td>
</tr>
<tr>
<td>Subtotal:</td>
<td>16.9</td>
<td>57.5</td>
<td>52.8</td>
<td>59.1</td>
<td>38.2</td>
</tr>
<tr>
<td>Total:</td>
<td>100.0</td>
<td>100.0</td>
<td>100.0</td>
<td>100.0</td>
<td>100.0</td>
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</table>
### Agricultural Research Division
#### Selected Research Program Information

<table>
<thead>
<tr>
<th>Category</th>
<th>FY 2003</th>
<th>FY 2004</th>
<th>FY 2005</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Project Information:</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Projects at beginning of year</td>
<td>386</td>
<td>371</td>
<td>330</td>
</tr>
<tr>
<td>Projects terminating</td>
<td>74</td>
<td>81</td>
<td>41</td>
</tr>
<tr>
<td>Projects revised</td>
<td>10</td>
<td>13</td>
<td>3</td>
</tr>
<tr>
<td>New projects</td>
<td>59</td>
<td>40</td>
<td>20</td>
</tr>
<tr>
<td>Projects at the end of the year</td>
<td>371</td>
<td>330</td>
<td>309</td>
</tr>
<tr>
<td><strong>Faculty full-time equivalents (FTE)</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>124.5</td>
<td>126.5⁴</td>
<td>131.9⁵</td>
<td></td>
</tr>
<tr>
<td><strong>Expenditures for budgeted research faculty:</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Federal formula and state approp., $/FTE³</td>
<td>$287,964</td>
<td>$297,557</td>
<td>$301,956</td>
</tr>
<tr>
<td>Grant and contracts, $/FTE</td>
<td>$186,794</td>
<td>$211,728</td>
<td>$217,849</td>
</tr>
<tr>
<td>Product sales, $/FTE</td>
<td>$ 76,562</td>
<td>$ 76,147</td>
<td>$ 86,447</td>
</tr>
<tr>
<td><strong>Outputs from research programs⁴:</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Refereed journal articles</td>
<td>311</td>
<td>304</td>
<td>401</td>
</tr>
<tr>
<td>Research bulletins</td>
<td>0</td>
<td>3</td>
<td>5</td>
</tr>
<tr>
<td>Books and book chapters</td>
<td>38</td>
<td>69</td>
<td>88</td>
</tr>
<tr>
<td>M.S. and Ph.D. theses</td>
<td>108</td>
<td>120</td>
<td>145</td>
</tr>
<tr>
<td>Cultivars and germplasm released</td>
<td>35</td>
<td>15</td>
<td>30</td>
</tr>
<tr>
<td>Patents obtained</td>
<td>3</td>
<td>2</td>
<td>1</td>
</tr>
</tbody>
</table>

¹Includes research FTE in Plant Science Initiative.
²Includes former Conservation and Survey faculty transferred to ARD appropriated account.
³Includes cost of administration and expenditures from the Nebraska Research Initiative by ARD-affiliated faculty.
⁴A large number of abstracts, technical reports, and other non-refereed articles also are published by faculty each year.