



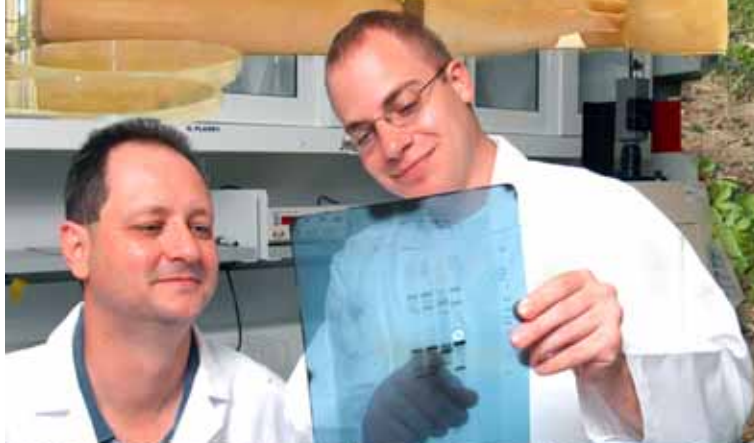
AGROHORT

AGRONOMY AND HORTICULTURE

GROWING PEOPLE FIRST

SUMMER 2004

UNIVERSITY OF
Nebraska
Lincoln



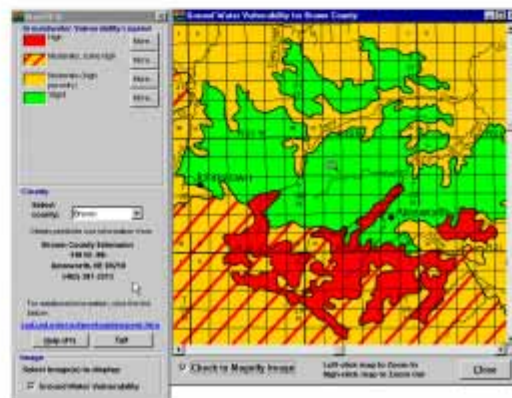
AN ANNUAL PUBLICATION OF THE DEPARTMENT OF AGRONOMY AND HORTICULTURE

Department of Agronomy and Horticulture Mission Statement

Our mission is to advance the knowledge, theory, and application of plant and soil science and landscape design to improve the quality of life for citizens of Nebraska and the world.

Our mission is accomplished through:

A commitment to undergraduate and graduate education;
An effective balance between basic and applied research on topics with the greatest potential for impact in the plant and soil sciences;
Outreach education programs that facilitate adoption of new technologies and landscape design to meet the needs of stakeholder groups and Nebraska citizens.



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FROM THE DEPARTMENT *Head*

Kenneth G. Cassman, Head

"After serving eight and a half years at the helm—from 1996-2000 as Head of the Agronomy Department, and from 2001 to 2004 as Head of the Department of Agronomy and Horticulture—I believe it is time for a change of leadership and will return to the faculty as of August 1."

After serving eight and a half years at the helm—from 1996-2000 as Head of the Agronomy Department, and from 2001 to 2004 as Head of the Department of Agronomy and Horticulture—I believe it is time for a change of leadership and will return to the faculty as of August 1. Lowell Moser has agreed to serve as the Interim Head during a transition period that will include a national/international recruitment for a new Head. Dr. Moser is a Sunkist Fiesta Bowl Distinguished Professor and has been a UNL faculty member since 1970. He brings substantial administrative expertise to the task having served once before as Interim Head of the Agronomy Department (1988-1989) and as President of both the Crop Science Society of America (1997-98) and the American Society of Agronomy (2004). We are very fortunate to have such outstanding leadership expertise within our ranks, and I am confident the transition will go smoothly.

While it is the end of my tenure as Head, it is a new beginning for both the department and me. This transition represents an opportunity for me to renew my efforts in research and education with a focus on key issues confronting agriculture at state, national, and international levels. For the department, it is an opportunity to recruit new leadership in a period of renewal as the economy returns to full strength and resources for higher education become more plentiful. Perhaps most encouraging is the fact that state tax receipts have come in well above projections for the past five months, and there will be a budget surplus for the first time in many years.

Serving as Head has been an extremely rewarding experience because of the high quality and commitment of our faculty, staff, and students. Despite the recent cycles of budget cuts, the department remains strong and continues to make important contributions to student education, scientific knowledge, and economic development in Nebraska.

Looking back over the past 8.5 years provides a vantage point that allows one to take stock of our department's major milestones and achievements, and I would like to share some of them with you.

- Our faculty have made significant strides towards a vision of "digital agronomy" that can fully exploit emerging science and information technologies to improve crop production practices, increase profitability, and protect

environmental quality. As part of this effort, computer-based decision-support tools and simulation models have been developed and released for use by farmers, crop consultants, and industry professionals.

WEEDSOFT is now widely used to improve weed management decisions, and it has become the standard for a large regional collaboration with weed scientists from other major universities. Geospatial tools utilizing geographic information systems (GIS) were developed to help evaluate spatial variation in soils and climate for greater precision in use of inputs to match crop requirements in time and space. A recently released corn simulation model, called Hybrid-Maize, will help farmers identify optimal combinations of hybrid, planting date, planting density, nutrient management, and irrigation. These advances give our crop producers and

agricultural industries a competitive edge in an increasingly global economy while also addressing society's concerns about conservation of natural resources.

- Several new crops and turfgrasses were developed to help diversify our agricultural systems. Faculty at the Panhandle Research and Extension Center have developed chicory and turfgrass seed production as high-value crop alternatives for irrigated land in western Nebraska. New buffalograss varieties developed by our turfgrass breeding program are being grown by Nebraska producers and exported to states throughout the western USA, while an

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Head, from page 4

active vitaculture program has led to rapid expansion of grape acreage, which is now supporting the development of local wineries.

- The department became a major player in UNL's Plant Science Initiative, an investment that has strengthened our scientific capacity in molecular genetics, genomics, and plant transformation. When coupled with our traditional strength in conventional breeding, our department is now one of the few in the country with the capability to identify genes of agronomic importance, incorporate these genes into agronomically fit germplasm through plant transformation, and to develop finished transgenic varieties that can be released for commercial use. A number of exciting prospects are on the horizon that will result in new crop varieties with improved nutritional traits and greater end-use value for Nebraska farmers.

- A novel distance education program was established to meet the educational needs of progressive producers, extension educators, high school science teachers, and professionals in industry and government agencies. Meeting the educational needs of such a diverse group presents a unique challenge for curriculum development. Some groups require introductory materials while others need advanced curriculum; some seek formal graduate academic credits to apply towards a distance Master of Agriculture degree program, others require continuing education credits for professional certification, while still others simply wish to stay current about scientific advances in their area of interest. Many of these professionals are place-bound, unable to attend academic courses or extension workshops delivered by traditional methods. Flexibility of packaging web-based materials into on-line lessons and one-unit course modules has enabled the needs of this broad-based audience to be met effectively with limited resources. One output from this program is the Library of Crop Technology: (<http://croptechnology.unl.edu>), developed by Don Lee and Deana Namuth, which received the 2004 National Excellence in College and University Distance Education Award from the American Distance Education Consortium.

- Grant income has more than doubled in the past five years as a result of faculty efforts to maintain program quality and outputs in the face of declining state-appropriations for research, teaching, and extension efforts at UNL. In addition to grant support from commodity boards and industry, our faculty have met with increasing success at attracting grant dollars from competitive federal programs sponsored by the USDA, National Science Foundation, Environmental Protection Agency, and the Department of Energy.

- Our faculty has become more diverse as we strive to meet UNL diversity targets while ensuring that we attract and hire the best available talent. Having a faculty with reasonable gender balance and that is representative of the changing demographics in Nebraska and the USA is

critical to providing students with a broad spectrum of perspectives and experiences.

Perhaps the largest single challenge of the past 8.5 years was the merger between the separate departments of Agronomy and Horticulture to create our current department, which is by far the largest academic department at UNL. I am pleased to announce that the result has been mostly favorable thanks to the good faith efforts of our faculty, staff, and clientele. I am especially proud of the fact that our key Nebraska stakeholders representing the crop commodity boards, agribusinesses, and the turfgrass and horticulture industries have remained loyal supporters and appear to be very happy with the outcome.

The one challenge that looms large as we look to the future is the need to increase student numbers in our undergraduate majors. Unfortunately, enrollments in the Agronomy major have decreased from 140 students at its recent peak in 1997 to about 80 students today. Likewise, the number of Horticulture majors has declined by about 10% in the past two years (currently 157 students). What is most discouraging is that the job market for our Agronomy majors is very strong and we do not have enough students to fill them. Given the budget uncertainties, it is imperative that we substantially increase student numbers or face a decrease in faculty positions. At present, we have five open faculty positions that have been on hold for the past two years pending improved state budgets and increased student numbers. I therefore ask all our alumni and friends to send us the names and contact addresses of potential students and we will follow up vigorously to recruit them. I know of no other undergraduate majors with greater faculty commitment to students, opportunities for scholarships, and satisfying work experience during one's college career. And, upon graduation, there are well-paid jobs in a multitude of career paths with fabulous opportunities for contributing to economic development and protection of environmental quality in Nebraska and the world at large. I have no doubt that we can meet this challenge with a concerted effort at student recruitment and innovative approaches to communicate the excitement and opportunities of a career in the plant and soil sciences.

In closing, when I shut the door to the Head's office at the end of the day on Friday July 30, I will leave feeling privileged to have served as the Head of Agronomy and Horticulture. I am especially grateful for the tremendous support of our faculty, staff, students, and clientele during the past 8.5 years, and for our enthusiastic alumni and friends, who remain committed to the department and its mission.

I will return to the faculty knowing that the department is in excellent condition and excited about its future. Please join me in welcoming Dr. Moser as the Interim Head, and in actively supporting the new Head once she or he is hired.



Finding a genetic key

Geneticist unlocking key to male sterility in plants

by Gillian Klucas, Fall 2003 Research Nebraska

In the agricultural plant world, male sterility often is a good thing. Male sterile plants don't produce pollen. That makes it easier to breed improved hybrids that yield and perform better, and to produce hybrid seed more economically. Sterility also helps ease concerns that genetically modified crops will spread their enhanced genetic characteristics, such as herbicide resistance, to wild plants.

Scientists have long tried to develop male sterile plants through a variety of techniques, from tapping natural mutations to inducing sterility through radiation and chemical methods. However, sources of male sterility are nonexistent in some crops, such as soybeans, or limited in others, such as corn. And this characteristic can be unstable -- some types of sterile plants can revert to fertility, which causes problems for growers.

Sally Mackenzie, a University of Nebraska-Lincoln plant geneticist, thinks she's found a genetic key to sterility. It promises to work for a wide range of crops and horticultural products.

Scientists have long known that, in nature, changes in the cells' mitochondrial DNA cause the sterility mutation. Mackenzie and her team followed that genetic trail to recreate the mutation in the lab.

They found a gene in the cell's nucleus that controls genetic changes in the mitochondria, which are the cell's energy producers and also contain DNA. By inserting foreign DNA into this gene, they turned it off, observed changes in the mitochondria and pinpointed which change



Photos by Brett Hampton, IANR

Sally Mackenzie, a plant geneticist in the University of Nebraska's Institute of Agriculture and Natural Resources, thinks she's found a genetic key to sterility. It promises to work for a wide range of crops and horticultural products.

"The really cool thing about this is that once I induce a male sterile, it's stable," Mackenzie said. After removing the foreign DNA that caused the original genetic change, the plant remains sterile. But by eliminating the foreign DNA, the plant is no longer considered transgenic.

"That's the beauty of it," she says, "Nobody has to have any qualms about using GMO technology."



Above: Plant Geneticist Sally Mackenzie inspects an Arabidopsis plant in the lab.

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Geneticist, from page 6

actually triggers male sterility.

They tracked down the gene in *Arabidopsis*, which they use as a model plant because its genetic code is known, but their findings have broad potential. Because all plants carry this gene that affects the mitochondria, these NU Institute of Agriculture and Natural Resources scientists can use their technique to trigger male sterility in others.

Mackenzie now is growing transgenic soybeans and tomatoes to search for additional male steriles.

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Agriculture would benefit if this method of inducing male sterility proves successful. Mackenzie wants consumers to benefit, too.

She's applying her findings to develop a sterile, seedless green bean that vegetable buyers should appreciate. Without seeds, the pod is tenderer and more easily digestible. Sterility also tricks the plant into producing three times the number of pods, increasing yields.

While genetically modified crops have helped reduce the need for agricultural pesticides, consumers have yet to benefit directly, she said.

"If we hit the market with our male steriles and, at the same time, come up with our new seedless bean," said Mackenzie, "I think the consumer is going to say, 'this is nice engineering'."

Researchers hope to work with an agribusiness to make sterile males commercially available in a variety of crops. The university has filed for a provisional patent on their technique.

Mackenzie also is looking toward human diseases.

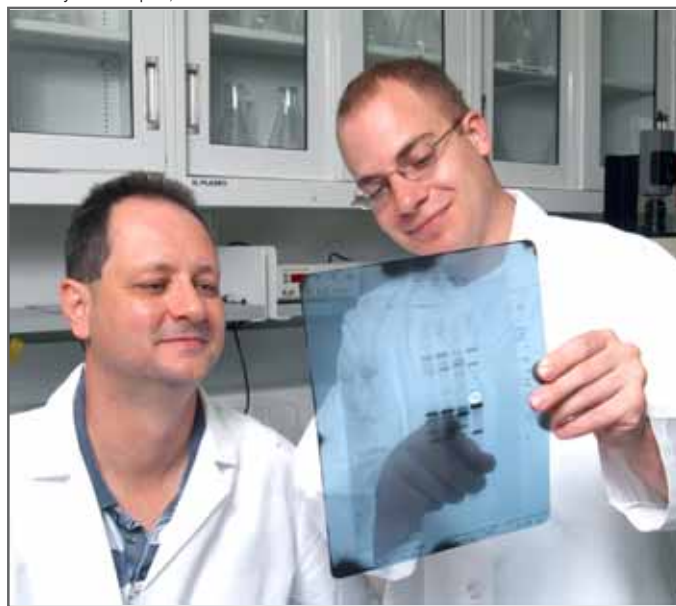
"The recombination that we're looking at in plant mitochondria may actually occur in us as well," she said.

Diseases such as diabetes, Parkinson's and heart conditions may stem from mitochondrial defects that affect one in 8,000 people. As she did in *Arabidopsis*, Mackenzie is looking for a similar gene in humans that causes mitochondrial changes. If she finds it, researchers could use the same transgenic technique to recreate the genetic defects in mice, a discovery that could launch new explorations in medicine.

Earlier this year, the Nebraska team reported some of its findings in the Proceedings of the National Academy of Sciences.

The National Science Foundation and U.S. Department of Energy helped fund this research, which is conducted in cooperation with IANR's Agricultural Research Division.

Photos by Brett Hampton, IANR



Graduate students Ricardo Abdelnoor (left) and Ryan Yule examine DNA patterns, looking for genetic changes in *Arabidopsis* cells. For this research, the team switched off a key gene, observed resulting cell changes and identified the specific change that triggers male sterility.

Researchers hope to work with an agribusiness to make sterile males commercially available in a variety of crops. NU has filed for a provisional patent on their technique.

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Above: Abdelnoor loads DNA samples for testing to detect changes.



WeedSOFT program helps farmers get tough with seeds

by Sandi S. Alswager, Fall 2003 Research Nebraska

Nearly everything crop consultant Mark Hinze needs to help his customers manage weeds wisely is on a laptop computer in his truck. A consultant for PCM Consulting in Grand Island, Neb., Hinze is among at least 560 people in six states who tap into years of agricultural research each time they fire up WeedSOFT, a decision support computer program for weed management.

It's the brainchild of University of Nebraska weed scientists looking to help farmers better manage weeds. Since the first version in 1992, the Institute of Agriculture and Natural Resources team has improved and expanded it nearly every year. It has evolved into a comprehensive decision-support system available for seven crops that's being adopted across the region.

WeedSOFT puts the latest research by weed scientists at NU and across the nation in the hands of growers and crop advisors, said Alex Martin, an IANR weed scientist.

"Research is being applied to make better decisions," Martin said. "Several dimensions of the program are supported by NU research. It's the basis for this easily used decision-making tool."

For example, the program's yield loss assessment is based on IANR studies examining how row spacing, weed emergence timing, weed species, weed density and other factors affect crop yield. Building research results into WeedSOFT helps transfer scientific findings to the field.

WeedSOFT takes the guesswork out of weed management and offers economic, environmental and regulatory information for specific crops and weed problems, Martin said. Users plug in information about their

conditions and the program offers individualized recommendations, including net return from a treatment vs. losses resulting from no treatment. They also can see the environmental consequences of different approaches.

"In a sense, the software puts a team of weed management experts at the fingertips of many crop consultants, extension educators and growers," Martin said.

Hinze said agriculture needs such decision support tools.

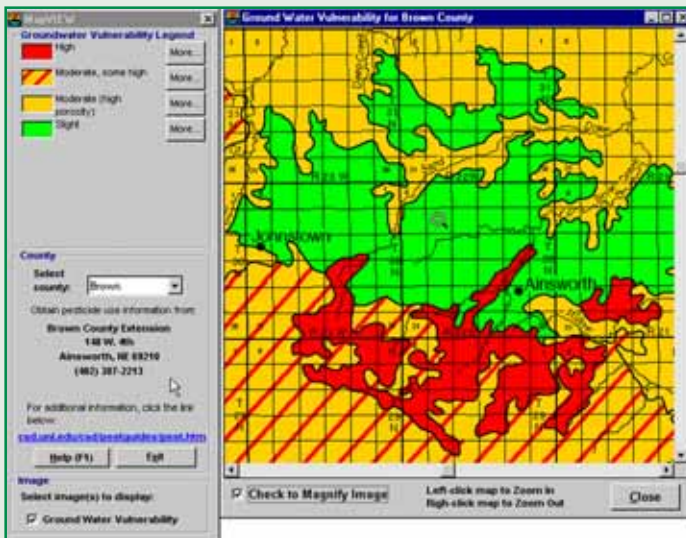
"It is easy to use and offers unbiased information," he said. "WeedSOFT doesn't care what kind of chemical you use or where you purchase it from. WeedSOFT is a well-rounded program and its worth its weight in gold."

Herbicides account for more than 90 percent of all pesticides used on major U.S. crops so decision aids for weed management are especially important. More informed decisions help farmers cut costs and herbicide use.

"The bottom line is the producer and the environment," Hinze said. "(Growers) think it's super. They like it because it's another diagnostic tool."

NU researchers work with university and USDA scientists elsewhere to expand WeedSOFT's capabilities, promote its wider use and customize it for different states. As of 2003, Cooperative Extension educators, crop consultants and farmers in Indiana, Illinois, Kansas, Michigan, Missouri, Nebraska and Wisconsin use state-specific versions. Other states are testing the software.

WeedSOFT improves users' bottom lines, Martin said. A recent six-state survey found the software accounts for about \$13 million annually in reduced costs and increased



WeedSOFT, a comprehensive weed management computer program, features a variety of resources to aid decision-making. Features include (above left) a vision library of the region's common weeds. Nebraska versions of the software include digitized county maps (above right) that display different sites' vulnerability to groundwater contamination with herbicides.

Photos by Brett Hampton, IANR

Turn to WeedSOFT, page 9



IANR Weed Scientist Alex Martin, one of the researchers who developed WeedSOFT software, checks weeds-crop competition in an NU research plot with the help of the software on his laptop. Years of research results are built into the program, which helps put those finds to work in the field.

earnings for users.

"You make one wrong application out in the field and it not only costs you the chemicals, which vary in price from \$5 to \$30 per acre, but if you use the wrong one you still have the job to do," Hinze said.

The software also aids IANR research, Martin said. For example, scientists used it to point out the need for research on how moisture conditions and crop row spacing influence weed competition.

WeedSOFT, which costs \$195, soon will incorporate Global Positioning Satellite technology to map weed infestations within fields. This will allow farmers to target specific problem areas instead of treating whole fields with a "one-size-fits-all approach," Martin said.

Grants from USDA and the North Central Regional IPM Project help fund this IANR Agricultural Research Division research.

Turf Stars at Super Bowl

Crop Science Society of America, January 2004

When you watched this year's Super Bowl, did you notice the turf? The brightly-colored Bermuda grass beneath the football players' feet, called Princess 77, was developed by New Mexico State University Professor and ASA/SSSA Emeritus Member Arden Baltensperger.

The grass, which uses less water and retains color better than other Bermuda grasses, is the first fine-textured hybrid Bermuda variety to be available in a seeded form. It was patented in 1997 by the university. Some 100,000 square feet of the Arizona-grown Princess 77 grass was used as a turf foundation in Super Bowl XXXVIII, which was played on January 25 at Houston's Reliant Stadium.

"It's a good, tough, uniform grass that can take very heavy traffic," said Baltensperger in a press release.

Bernhard Leinauer, a turfgrass specialist with NMSU's Cooperative Extension Service, says the Princess 77 grass was developed for regions where temperatures regularly top 100 degrees and rain is limited. He says before Baltensperger's turf research, common Bermuda grass had a negative image, primarily due to its coarse, weedy appearance. He says he is trying to push the Princess 77 grass to residents of drought-ridden areas because the grass uses 30% less water than other grasses.

NMSU officials say the Princess 77 grass is used on sports fields and golf courses in 65 countries.

—Source: New Mexico State University



New Mexico State University Professor and ASA/SSSA Emeritus Member Arden Baltensperger.

NEWS FROM ALUMNI

Note: We need your help with this section. Out of 150 requests for information we received only six responses. Many thanks to those of you who did respond.

Charles W. Stuber (B.S. 1952, M.S. 1961) "retired" in 1998 from the USDA-ARS with 39 years of federal service. He still maintains an office on the North Carolina State University campus where he is a professor (emeritus) in Genetics and Crop Science.

Last November, he completed his term as past president of the American Society of Agronomy. (He was president in 2002.) For the past four years, he has been coordinating a project for the American Seed Trade Association in which empirical data is being obtained and evaluated to help the seed trade determine what is an "Essential Derived Variety" in corn. He is still doing some writing, reviewing grant proposals, and some other professional activities which keep him busy.

Steve Roberts (M.S. 1957) was born near Chadron, Nebraska, and graduated from Chadron High School. After receiving a B.S. degree from Chadron State Teacher's College, and serving in the military, he taught in North Platte, Nebraska for a year. He attended the University of Nebraska where he received an M.S. degree in Agronomy in 1957.

Following his degree, he was hired by Washington State University as a technician in 1966. He then took a position at Oregon State University where he ran the Soil Testing Lab and taught graduate courses in soils.

In 1970, he returned to Prosser, Washington, to become a research soil scientist and remained there until the time of his retirement in 1996. He was the author or co-author of more than 100 articles in agricultural bulletins and peer-reviewed journals. Steve passed away 29 November 2003. *(Submitted by Patricia Roberts.)*

Ulverd Alexander (M.S. 1963) left the University of Nebraska's Northeast Station-Concord in February of 1969 (35 years ago). He and his family spent two years with the Near East Foundation on a USAID contract in Kisumu, Kenya, East Africa. His job, as rural development advisor, consisted of training agricultural extension field staff and developing agricultural development programs in two provinces of Kenya.

They returned to the USA in March of 1971. He was employed by the University of Missouri as area extension agronomist, with headquarters in Kennett, Missouri. Major agronomic crops consisted of cotton, soybeans and wheat.

In September of 1982, he was employed by Texas A&M University as extension agronomy specialist. The headquarters were at the Research and Extension Center in Vernon, Texas. His major responsibilities consisted of working with county extension agents in development of agronomic programs in a 21-county area. The major crop responsibilities included cotton and wheat.

Both his wife, Jean, and he retired in January of 1992. She retired from public school teaching in Vernon, while he retired as professor and extension agronomist, emeritus, for Texas A&M University.

Ulverd and Jean have three children, James, Margaret and John, and six grandchildren. All of their children were born in Nebraska. James is currently an electronics engineer with Cryovac Corporation in Wichita Falls, Texas. Margaret is a juvenile corrections officer in Kennett, Missouri. John is a Ph.D. senior chemist with Valeant Pharmaceutical Research Corporation in Costa Mesa, California.

The Alexanders are still in very good health "for a couple of old folks." They travel and try to enjoy life and report that it has been a great life.

Marvin L. Wesley (B.S. 1965) was born and raised near Cedar Bluffs, Nebraska. He received the B.S. degree from the University of Nebraska, graduating summa cum laude. He continued his studies at the University of Wisconsin where he received a master's and doctoral degree in soil science.

From 1970 to 1973, Dr. Wesley served with the army attaining the rank of captain where he worked on scientific studies involving the environment. In 1973, he accepted a position as an assistant meteorologist at Argonne, the U.S. Department of Energy facility operated by the University of Chicago. In his 30-year tenure at Argonne, he held several important positions, including head of the atmospheric section, and most recently, senior meteorologist. He did extensive research aimed at finding solutions to such environmental problems as air pollution and global warming. He authored more than 150 published research articles.

A member of many national and international professional groups, Dr. Wesley earned the University of Chicago Distinguished Performance Award, the Argonne Excep-



*Ulverd Alexander, then: 1976
and
now: December 2003*

Turn to Alumni, page 11

tional Performance Award, and the Editor's Award for the Journal of Applied Meteorology. He was an editor for the Journal of Applied Meteorology, chairman of the Technical Advisory Committee of the National Institute of Global Environmental Change and the chief scientist of the Energy Department's atmospheric chemistry program.

Marvin L. Wesley passed away 20 January 2003.

(Submitted by Meridel Wesley.)

Leonard A. Johnsen, Jr. (B.S. 1970, M.S. 1972) was a county extension agent in Webster County from 1973 to 1978. From 1978 to 1984, he farmed on his family farm in Gage County. After 1984, Leonard owned a crop-production service called Crop Tech, based in Thayer County. He also raised Maine-Anjou cattle for nearly 30 years. He passed away in January, 2004. *(Submitted by Sue Johnsen.)*

Edward J. Deibert (Ph.D. 1976), a native of Bison, South Dakota, received his B.S. (1965) and M.S. (1967) from South Dakota State University. Subsequently he was employed at the Kansas State University Branch Experiment Station at Garden City, Kansas. He was also employed by the Soil Conservation Service in various locations across South Dakota.

Dr. Deibert recently retired from North Dakota University after 26 years of service in the Soil Science Department. He joined NDSU after receiving his Ph.D. degree in 1976 from the University of Nebraska. His NDSU work included teaching courses in soil management and conservation. His research emphasis was in the area of soil and water management that focused on conservation tillage systems. He also conducted soil fertility and fertilizer placement studies with small grain, sunflower, canola, soybeans, dry beans, field pea and alternative crops. Ed has been a member of the Soil Science Society of America, American Society of Agronomy, and the Soil and Water Conservation Society. He is the author or co-author of over 100 publications, available at: <http://www.soilsci.ndsu.nodak.edu/Deibert/deibert.html#publications>

He and his wife, Sharon, who was employed at the University of Nebraska, intend to remain in the Fargo, North Dakota, area.

Clint Turnbull (B.S. 1997) was featured in an article in the Lincoln Journal Star (Lincoln, Nebraska). Clint received his degree in Agronomy in 1997 and transferred to Iowa State University for graduate work. In February, 2003, he joined the National Guard and was called to active duty in Iraq.

The article relates to his success in growing sweet corn in Iraq. With his farm background and some information and seed from Tom Hoegemeyer, another Nebraska alumnus and supporter, he decided to plant sweet corn. Observing Iraqi farmers' success with garden vegetables, he fashioned an irrigation system. In his free time he nurtured the corn and finally ended up with 350 ears of

sweet corn he served to 150 members of his unit. *(Submitted by Bob Sorensen)*

William R. Kehr, 89 died November 1, 2003, in Surprise, Arizona. He was born July 21, in Blue Earth, Minnesota.

After receiving his B.S. degree from the University of Minnesota, he served four years as a naval officer in the South Pacific. He married Marie Sterner and they were blessed with three children and five grandchildren.

After receiving his M.S. degree from Kansas State, and his Ph.D. degree from the University of Minnesota, he served as head corn breeder for Del Monte before joining USDA at the University of Nebraska as research scientist and professor.

Dr. Kehr mentored numerous graduate students from around the world. He held membership in many professional societies and is the recipient of many awards including Fellow of both ASA and CSSA (1965) and Fellow of the American Association for the Advancement of Science. He is listed in Who's Who in the World, Technology Today, and Leading Consultants in Technology. The author or co-author of over 200 publications, he also did much domestic and foreign consulting. *(Adapted from CSA News, May 2004)*



New Post Doctoral Research Associates

Dr. Fanming Kong, from China, and **Dr. Indra Sandal**, from India, are working with Dr. Thomas Clemente on leading independent scholarly research activities in the area of gene expression in transgenic soybeans and wheat.



Research Associates and Visiting Scientists Who Have Departed

Dr. Abid Mahmood, who worked with Dr. Stephen Baenziger on wheat biotechnology, has returned to Pakistan.

Dr. Frederico Durães returned to Brazil, after working with Dr. John Shanahan, USDA-ARS, on Chlorophyll fluorescence in corn.

Dr. Junfang Lin, China, who worked with Dr. Thomas Clemente to conduct research activities in the area of gene expression in transgenic soybeans has left the department.



Legumes boost quality in brome grass pastures

by Daniel R. Moser, Fall 2003 Research Nebraska

Summer can offer slim pickings for hungry beef cattle in eastern Nebraska, as the smooth brome grass that dominates the pastures they graze wears thin. University of Nebraska researchers are exploring ways to diversify those pastures to provide more nutritious, reliable fare through the summer.

Researchers are seeking the right mix of vegetation to supplement brome grass and the best grazing system to take full advantage of pastures throughout the season.

Smooth brome, which has become dominant in eastern Nebraska pastures over the past 100 years, provides plentiful, high quality forage during the critical spring calving season and often again in the fall. But it suffers a "summer slump in quantity and quality," said Range Scientist Walter Schacht. That leads to a decline in cattle performance.

Institute of Agriculture and Natural Resources research focused on interseeding three legumes — alfalfa, birdsfoot trefoil and kura clover — into the brome grass in NU test pastures. Researchers compared cattle performance on these interseeded pastures with performance on regular pasture. Results were encouraging, said Forage Scientist Bruce Anderson.

"The legumes managed to boost productivity, feed availability and the quality of the grazing forage in those pastures from July through September," Anderson said.

Legumes helped improve beef gains by 25 to 40 pounds per acre. "We figure 45-50 cents additional net income for each extra pound," Anderson said. "While that isn't earth-shattering, we're still talking about \$10 to \$20 an acre of additional income."

Unlike brome, legumes don't require fertilizing once they are established, which cuts costs.

Unfortunately, it's difficult to plant and establish legumes in existing brome grass. Research is continuing to improve the effectiveness of interseeding. Meantime, researchers are finding promise in using native warm-season grasses such as indiangrass, big bluestem and switchgrass to complement brome grass.

One key: finding a grazing system that makes the best possible use of both cool- and warm-season grasses.

"Historically, we've promoted a simple grazing system that says graze the cool-season grass in spring, the warm-season grass in the summer and back to the cool-season grass in the fall," Anderson said.

Research has found, though, that it's better for the pastureland and, ultimately, the cattle, to use a rotational approach that gives grasses time to recover from the grazing. NU researchers developed an early-season grazing strategy for warm-season tallgrasses that

Photo by Brett Hampton, IANR



Range Scientist Walter Schacht checks some birdsfoot trefoil growing in a smooth brome grass pasture in June. Brome is the dominant grass in eastern Nebraska pastures.

improves the efficiency of their use through the growing season.

Cattle begin spring grazing brome grass and move in mid- to late May to briefly graze the warm-season grasses that are just greening up. Then, it's back to the smooth brome for several weeks, finishing the spring growth of the brome and allowing the warm-season grasses to regrow so they can provide feed for the rest of the summer. Then it's back to brome in the fall.

Early grazing on warm-season grasses helps slow their rapid growth and make them leafier and more nutritious later.

Also, scientists are developing improved range grass varieties. Ken Vogel, a USDA-Agricultural Research Service geneticist in UNL's Department of Agronomy and Horticulture, has developed a couple of big bluestem varieties that show signs of improving animals' performance during summer. A new switchgrass variety — Trailblazer — has proved more digestible than earlier varieties.

This NU research already is paying dividends. Anderson and others documented about a \$7 million economic benefit among 1,600 graziers who participated in a series of NU Cooperative Extension workshops based on IANR research. Those producers manage about 700,000 acres and 142,000 cattle.

"This is basic fine tuning that can be achieved through good management and a minimum amount of high-cost inputs," Schacht said.

The NU Foundation's Sampson Endowment helps fund this research.

CORN FROM THE COMPUTER

NU's growth model predicts your maximum corn yield potential. Use it as a management tool...

by Paul McCabe, reprinted with permission from Nebraska Farmer, February 2004

You never forget those exceptional years of bin-busting corn yields. But were they the very best, or the maximum possible yields, for your farm? University of Nebraska researchers have the tool to help you uncover the highest yield potential: the Hybrid Maize Computer Simulation Model. Available later this month for downloading to your computer, it is the ultimate in yield forecasting.

"The key factors in determining yield potential of irrigated corn are temperature, solar radiation, hybrid (growing degree days), population and planting date," explains Achim Dobermann, a soil scientist.

He believes the computer growth model, useable also for dryland, will be successful because the real-time and historic weather data it needs are readily available across Nebraska. The state's weather network, hosted by NU's High Plains Regional Climate Center, consists of about 20 years of weather data at 50 sites statewide.

"We have one of the best online weather statistics networks in the country. As long as you're within 50 miles of a site, you're fine for simulating the yield potential for your farm."

In a validation test last summer near Lincoln, Dobermann's model predicted a corn silking date of July 23 and a yield of 287.2 bushels an acre. The actual results were a July 22 silking and 285.3 bushels per acre. In a test at Scandia, Kan., irrigated corn yielded 251 bushels an acre, compared to 252 simulated with the model.

Here's an oversimplified explanation on how it works: You feed into the model your nearest local weather information, planting date, hybrid GDDs from emergence to maturity, and population. GDDs are available in company seed catalogs. To come up with the highest potential, the model assumes no water or nitrogen stress.

Assuming no limits on water is easier, of course, with irrigation than under dryland. But the model will also generate a yield potential under water-limiting circumstances, such as dryland or limits on irrigation water availability. In that case, it also measures rainfall data or typical dates and amounts of irrigation, he says.

HOW TO USE IT

One application of the model is the use of historical weather data to better understand your average longterm yield potential and how it varies among years. With that information, you can try to maximize yield potential by comparing different hybrids and planting dates. You can then ask a number of questions, including:

- What is the average yield potential at my site, and how much does it vary from year to year?

- Can I plant a longer-season hybrid at my site, and what extra gain could that bring?
- When should I plant it to squeeze out more yield?
- Would I gain by planting at a higher density?

IN-SEASON DECISIONS

Using the model as an in-season management tool is another option. You or your crop consultant, at weekly intervals, could download historic weather data for a specific week during the season as well as all previously recorded years, Dobermann says. The model will provide an updated prediction of how actual growth compares to a normal year and what yield ranges can be expected.

"You get an idea at points during the growing season if your crop is above or below the growth model projection and then make some management decisions," he says.

For instance, under pivot irrigation, if the crop is ahead of the average yield potential as of early July, you may decide to apply extra units of nitrogen or additional water to take advantage of the crop's faster pace. On the other hand, if corn is behind the model's projections in July or August, you may want to hold off on the additional nitrogen or cut back on late-season irrigation.

Jerry Mulliken, a crop consultant from Nickerson, used the model in 2003 to help one client increase yields. On a farm near Bellwood, the model told Mulliken and his client on Aug. 10 that they could expect 280 bushels, vs. the long-term average of 260 bushels. That prompted them to make a shot of nitrogen through the pivot to take advantage of that forecast.

He thinks the model can be very beneficial, especially as an in-season management tool.



Achim Dobermann says you can make in-season management decisions using his soon-to-be-released corn yield simulation model.

Turn to Corn, page 19

Turning corn to ethanol makes energy sense

by Vicki Miller, Spring 2003 Research Nebraska

Gary Godding/Brett Hampton, IANR

Dan Walters thinks ethanol gets a bad wrap energywise and he's got numbers to prove it. Grain-based ethanol is a cleaner-burning, renewable alternative to fossil fuels. But critics cite studies showing ethanol production uses more energy than it produces.

"The problem is that's all old data," said Walters, a University of Nebraska-Lincoln soil scientist. Such studies are based on figures from the late 1980s and early 1990s, yet much has changed in agriculture and ethanol production in the past decade.

"If you're making public policy, we need modern data that reflects the energy efficiencies of current or future farming and ethanol processing," he said. To calculate a modern energy balance for ethanol, Walters gathered and assessed current information on all the fossil fuel needed to grow and transport corn and to convert it to ethanol, blend it with gasoline and get it to the pump.

Today's ethanol has a positive energy balance, he found. It provides more energy than is used to produce it. Walters calculated the energy output to energy input ratio for converting irrigated corn to ethanol is 1.3-to-1 and 1.4-to-1 for dryland corn.

"We're about 30 percent ahead" energywise, the Institute of Agriculture and Natural Resources scientist said.

Advances in ethanol conversion and plant efficiency are part of the equation, he said. In 2002, a bushel of corn produced 2.7 gallons of ethanol, up from 2.5 gallons in 1990. Ethanol byproducts such as livestock feeds enhance efficiency because energy would be needed to produce these products if they weren't made during ethanol conversion.

On the crop production side, nitrogen is the largest energy factor, accounting for 30 percent to 50 percent of all energy needed to raise corn, Walters said. Nitrogen efficiency has improved immensely over the past 20 years, and continues improving by an average .013 bushels of grain per pound of nitrogen annually.

Improvements in seed genetics, water use, crop management and production equipment also help boost efficiency.

"These efficiencies rely on normal best management practices and judicious nitrogen use to optimize, not maximize, productivity," he said. Much of Walters' production data comes from 160-acre fields in the university's ongoing carbon sequestration research, but he said national averages are similar.

"I'm confident we're still in positive energy balance," he said.

Irrigation requires extra energy but compensates by boosting yields and nitrogen efficiency, Walters said.

"That bodes very well for Nebraska," he said, where irrigation is widely used and 23 percent of the corn crop is sold for ethanol. "We can compete with rainfed corn growing states for ethanol production."

Walters calculated the ethanol energy balance while working on broader energy use and carbon assessments for the carbon sequestration project. More than half of corn's carbon is in grain, but scientists don't factor it in long-term carbon storage because grain's carbon recycles back to the atmosphere as feed or food in a year or so.

But converting grain to ethanol helps offset carbon emissions from fossil fuels, Walters said.

Ethanol, from page 14

Typically, 10 percent ethanol is blended with conventional unleaded gasoline to produce E-10 Unleaded.

"When we put gasoline in our car, we're using carbon that has been stored for millions of years," Walters explained. "When we put E-10 in the tank, carbon dioxide emissions are 10 percent less than someone who burns straight fossil fuel because ethanol is a biofuel. It's made with carbon from the atmosphere that's recycled through the corn plant.

"He predicts ethanol's energy equation will continue improving along with farming and processing efficiencies.

"That picture getw better and better."

A U.S. Department of Energy grant hepls fund NU's carbon sequestration research. ♦

New Landscape Design Lab To Greet Returning Students

by Kim Todd

After decades of use, the Keim Hall design studio (room 226) is in the process of receiving a complete upgrade. Both Richard Sutton and Kim Todd, who teach the core landscape design and management classes in the studio, can attest to the need to renovate this classroom, which has not been upgraded for many decades. This renovation will completely refurbish the heating and cooling system; floor, walls, and ceiling coverings; furnishings; drafting tables; and storage cabinets. A state-of-the-art multi-media delivery systems will be installed. The studio's new layout will accommodate 24 students at new drafting stations and provide three additional computer stations and a large work counter for production of drawings and design documents. The front of the room will become a well-lit presentation space with tackable wall surfaces spanning the wall. Ceiling-mounted multi-media equipment will allow faculty and students to make landscape design presentations using a variety of formats. A new card-swipe door entry system will give students expanded access to the studio during non-work hours, and encourage greater use of the space and sharing of ideas and information. Landscape Graphics, Landscape Appreciation, Landscape Construction, and the three-course Landscape Design series will be taught in the studio.

The project was made possible by a combination of funds from the department, the CASNR dean's office, and the Tillotson Endowment for a total cost of about \$110,000. Needless to say we are very pleased with the prospect of having a newly renovated classroom that will create an atmosphere that will better support creative teaching and learning for horticulture students in the Landscape Design and Management option. ♦

Agronomy Grad Now Dean at Purdue

by Lori McGinnis, March 2004 The Leading Object



Above, Vic Lechtenberg

Vic Lechtenberg planned to be a high school teacher until a UNL agronomy professor encouraged him to get a doctorate degree. "He convinced me it was as much fun teaching college kids as high school kids," said Lechtenberg, a 1967 UNL agricultural education/agronomy graduate who is now the School of Agriculture dean at Purdue University in West Lafayette, Indiana. Lechtenberg credits agronomy professor William Colville with encouraging him to get his Ph.D. It was the middle of his senior year at UNL and he was doing student teaching. "It was something I never thought of," he said. "He was energetic and a good adviser to students." Lechtenberg took the suggestion, and got his Ph.D. from Purdue in 1971. He then served on Purdue's agronomy faculty and in the Office of Agricultural Research until being named associate dean in 1989. He became dean in 1994.

The former Butte resident maintains his Nebraska roots. He and his six siblings, all UNL graduates in the fields of agriculture or education, recently created a scholarship in the name of their parents for their 60th wedding anniversary. The Lawrence and Mildred Lechtenberg Scholarship Fund will benefit a College of Agricultural Sciences and Natural Resources agricultural or education student from Boyd County. ♦

Survey gives department a clearer mission

Adapted from a UNL Scarlet feature article, February 26, 2004



Above: Mission Statement display located in the front lobby of Plant Science

At the request of the University of Nebraska's Board of Regents, an employee climate survey was conducted in Spring 2002 by the Gallup Organization. The following are excerpts of an interview conducted by the Scarlet (UNL's weekly newspaper publication), and Agronomy and Horticulture's Ken Cassman, professor and head of the department, who answered questions about the department's efforts. This interview resulted in a feature story on the cover of the February 26, 2004 Scarlet publication.

(The story was the first in a regular feature lineup spotlighting the ways in which results from the 2002 Gallup survey have been used to make positive changes in departments across campuses.)

The question addressed from the Gallup survey: "The mission or purpose of my organization makes me feel my job is important."

Why was this question addressed? "Although our neighborhood score for this question was equivalent to the

UNL and IANR average, we felt that as an applied science department we should have ranked much higher with regard to buy-in for our mission. We also felt a new mission statement was needed because of the merger of Agronomy and Horticulture."

What was the action taken? "We created a new mission statement by creating an ad hoc faculty committee, which developed a draft mission statement that was shared with faculty and staff for comment and finalized. We also created a new Mission Statement display (pictured above) to highlight our new mission. This display is located at the main entrance to the Plant Science Building."

How has the survey and its results benefited your department? "I believe the effort to develop a new mission statement has helped morale in the department by creating a mandate that is more inclusive for the broad range of research, teaching, and extension education that reflects the diversity in our recently merged department."

STUDENTS IN WEED SCIENCE

by Aaron Waltz

At the Syngenta Technical Center for the weeds contest. L to R: Travis Gustafson, Barbara Von Seggern, Aaron Waltz, Brady Kappler, Ryan Goss, Pete Clark, Jeff Krumm, Julie Abendroth



The North Central Collegiate Weed Science Contest was held at the Syngenta Northern Region Technical Center near Champaign, Illinois on July 17, 2003. Graduate student participants included Julie Abendroth, Pete Clark, Ryan Goss, Travis Gustafson, and Jeff Krumm. Barbara Von Seggern participated as an undergraduate student. Also attending the contest were Brady Kappler and Aaron Waltz (coaches), and Kevin Horky (technician). The group put in many hours of studying and practice and did well. Jeff Krumm received first place in the Problem Solving event. Julie Abendroth won the Herbicide Identification event and earned the second place Overall Graduate Student Award. The trip and contest were a memorable experience for all.



Above: Weeds contest winners Julie Abendroth and Jeff Krumm

Louisville, Kentucky was the site for the 58th annual meeting of the North Central Weed Science Society during early December 2003. Graduate students presenting their research in paper and/or poster form were Julie Abendroth and Aaron Waltz. Graduate Students also presented at the annual meeting of the Weed Science Society of America in Kansas City, Missouri the second week of February, 2004. Those presenting included Julie Abendroth, Lori Abendroth, Travis Gustafson, Shawn Hock, Aaron Waltz, and Janyce Woodard. The meetings were a time of professional presentation, networking, and relaxation for all involved. It has been another busy and productive year for the weed science students.

Pictured right: Enjoying the John Deere Pavillion in Moline, Illinois L to R: Julie Abendroth, Ryan Goss, Kevin Horky, Pete Clark, Aaron Waltz, Jeff Krumm, Travis Gustafson, Barbara Von Seggern



RANGE Management CLUB NEWS

Jessica Warner, 2003-2004 secretary

Greetings from the UNL Range Management Club! Once again, we had a very busy year. The 2002-2003 officers were Justin Linder, president, Nick Haack, vice president, Tim Roggasch, treasurer, Jessica Warner, secretary, and Elisha Greely, public relations. Again this year, Dr. Walter Schacht was our faithful and reliable advisor, who was available and willing to help at all times.

Our first meeting was the annual fall picnic with the Agronomy Club, which was held at Peter Pan Park in Lincoln, Nebraska. The purpose of this meeting was to bring past members together and increase club membership by inviting new students. Our club met twice a month in the East Campus Union throughout the school year. Program speakers this year included Eric Mousel and Bryce Bauer. One Sunday in September, several members and Dr. Schacht traveled to Northeast Nebraska where we visited several grazing dairies. This was quite an experience for several members, because they were not familiar with dairies at all. For our last meeting, we went out for supper at the Lonestar Steak House in Lincoln, Nebraska.

In the fall we participated in the Crazy Auction that was held at the annual meeting of the Nebraska section, Society for Range Management (SRM) in Kearney, Nebraska. We were able to raise money for supporting our club's trip to the National SRM meeting in Salt Lake City, Utah. The section meeting was a very interesting and rewarding time as the members were able to interact with professionals from across the state and range students from Chadron State College.

During December, the club held its first chili feed. This was quite an experience for everyone. The guys had to help out in the kitchen and learn how to cook. Although we did not raise much money, we did gain valuable experience for next year's chili feed.

The spring semester found everyone continuing preparation and studying for the student competitions at the National SRM meeting in late January. We had members that participated in the Range Plant Identification Contest, the Undergraduate Range Management Exam (better known to everyone as URME), and the Undergraduate Public Speaking Contest. The URME Team competed against teams from twenty other North American universities and colleges and finished in the top half. It is commendable that we placed this well considering our range program is one of the smallest in the nation — which really says a lot about our instructors! Both Tim Roggasch and Michael Gillilan placed in the top twenty of 150 students who took the test. Justin Linder, Nick Haack and Kort Kemp participated in the public speaking contest. They all placed in the top half of the competition. Kort Kemp, Tim Roggasch, and Michael Gillilan participated in the range plant identification contest and did very well too. Jessica Warner ran for an office at the SRM student conclave luncheon and was elected to be the 2004 reporter. Her duties require her to



Front L to R: Jessica Warner, Melissa Thompson, Justin Linder, Kort Kemp; Back L to R: Nick Haack, Tim Roggesch, Dr. Walter Schacht, Michael Gillilan. Not present: Elisha Greely, Chris Skrdla, Rodney Lamb, Gabe Schnuelle, Dan Towey, Dody Lashley.

write and distribute quarterly newsletters to the SRM students. These newsletters consist of officer reports and articles from the many colleges and universities that participate in the SRM meeting.

Other highlights of the spring semester were the Natural Resource Career Expo night and the pancake feed. This year, the Natural Resources Career Expo Night was held in late March and sponsored by the Wildlife Club, the Soil and Water Resource Club, and the Range Management Club. We had a very good turn out of professionals and students. The professionals were able to give students suggestions on applying for jobs, descriptions of their jobs, and many other helpful pointers that the students can use in the future. The pancake feed was a joint effort with the Soil and Water Resource Club. The clubs raised funds for next year's activities and were able to polish their pancake flipping skills. We also had a booth at the East Campus Union on various occasions to help inform high school students of academic programs and student clubs, especially the Range Club, that are offered at UNL.

Our final event of the year was the annual Agronomy and Range Club banquet held at Knoll's County Club on April 9. The purpose of the banquet is to recognize graduating seniors, install new officers, recognize club members and review our accomplishments of the year. We would like to thank Kim Stine for being out speaker at this year's banquet. She did an exceptional job and challenged everyone to think about their goals and objectives as they prepare for their upcoming careers.

The Range Management Club would like to thank all of our speakers that we had this year, all of the business and individuals that donated items for our Crazy Auction, and the many other individuals that helped make this year such a great success. We would also like to extend a special thanks to Dr. Walter Schacht, who was our advisor and our coach again for the URME competition, and to Dr. Susan Tunnel, who was the coach for the Plant ID team and helped Dr. Schacht with the URME preparations.

MARKET AID

The in-season component has a marketing advantage, Dobermann says. "The model could tell you in early August, for instance, that you're 20 bushels an acre ahead of the normal yield. By being reasonably certain before harvest how much more production you'll have available to sell, the model can make marketing decisions easier.

"So far, testing shows that final yields can be predicted with reasonable accuracy by early- to mid-August or about four to six weeks before corn reaches black-layer stage," he says.

Finally, after you have harvested the actual yield, take time to review planting date, when the crop reached maturity, when you irrigated and how much water was applied.

"You can see what went wrong and how weather affected growth and soil moisture. Where, perhaps, did I miss a critical irrigation? You can adjust next season."

YIELD GAP

The growth model is part of NU's on-going research on high-yield corn, begun in 1999 on a site near Lincoln.

"If we want to stay competitive in the long run, we must learn how to consistently grow corn at 80% of the true yield potential," Dobermann adds.

That can be done in an environmentally friendly matter, in part because higher-yielding corn uses nitrogen more efficiently.

Today, Nebraska's statewide corn yields average only about 150 bushels an acre. He and NU colleagues think true yield potential for eastern and central Nebraska is closer to 270 to 300 bushels.

In the study's first four years, researchers grew 245 to 265 bushels consistently, regardless of the large weather variability from 1999 to 2002. In 2003, based on model simulations, they switched to a full-season hybrid and planted later to use more of the available growing season. That resulted in a 285-bushel yield.

The research team examined several existing corn growth computer models, but found that each underesti-

2003 was an outstanding year ... if you irrigated

Nebraska's statewide corn yields averaged 145 bushels per acre in 2003, irrigated and dryland production combined.

The record statewide average of 147 bushels occurred in 2001. The 145-bushel average in 2003 ties for second. Dryland corn suffered from drought in most regions, except for parts of northeast Nebraska, so the irrigated crop drove the overall average, says Scott Keller of Nebraska Agricultural Statistics Service, Lincoln.

Reports from the field point to tremendous irrigated corn yields. Throughout the major irrigated regions, yields of 230 to 250 bushels were not uncommon. (Because of budget cuts, NASS no longer produces separate statewide averages for irrigated and dryland crops.)

Despite a hot summer, nighttime temperatures during the August-to-early-September grain-fill period were relatively cool, says Achim Dobermann, NU soil scientist. Another advantage, he says, was the absence of too many days over 100 degrees — compared to 2002.

Improved overall water use efficiency of hybrids in recent years is yet another factor.

Many irrigators probably reached 80% of their maximum true yield potential in 2003, Dobermann says. "That won't happen every year, but it shows the potential for making corn production in Nebraska more efficient and competitive."

mated yields in top yield environments such as in Nebraska.

As a result, they developed their own model by taking components from two existing models and adding information from the Nebraska research project.

Haishun Yang, NU soil and crop modeler, did much of the model and software development.

Eventually, a nitrogen component, allowing evaluation of different nitrogen rates and applications, will be added to the model.

Another useful piece of information that will eventually come out of the project is a map of yield potential and optimum planting dates for Nebraska, based on climate and research data.

After the user manual is finished and reviewed, the model will be available through a yet-to-be created Web site as an Extension Circular.

"There will probably be no or only a small fee to download it because we wish that many farmers and consultants in Nebraska will use such tools in the future," Dobermann says.

"If you would lift me up you must be on higher ground."
— Ralph Waldo Emerson

Simulated attainable corn yields in different regions of Nebraska

Region	Planting date	GDD(F)	Irrigate corn (bu/acre) at 30,000 plants/acre		Dryland corn (bu/acre) at 25,000 plants/acre	
			Mean	Common range	Mean	Common range
Southeast and East	May 5	2,650	245	230-270	195	155-215
Central	May 6	2,600	250	235-270	170	135-215
South Central	May 3	2,650	255	240-275	190	145-215
Southwest	May 8	2,550	235	220-260	115	80-155
Northeast	May 9	2,550	240	220-260	170	135-200
North Central	May 10	2,400	220	200-245	120	90-140
Northwest	May 7	2,250	205	195-225	85	65-105

Simulations based on weather data collected during the past 20 years at multiple locations in each district (High Plains Climate Center on line database). Assumes currently widespread cropping practices (planting date, hybrid maturity, plant density) as reported by NASS. University of Nebraska-Lincoln.

Probing ways to increase carbon storage in soil

by Vicki Miller, Spring 2004 Research Nebraska

From roots to atmosphere, IANR scientists are probing the intricate interplay of factors that influence how carbon cycles through crops and soil. They're exploring how to store more carbon in cropland to reduce steadily growing concentrations of atmospheric carbon dioxide, a leading greenhouse gas. The United States produces a quarter of the world's carbon dioxide emissions.

The team's state-of-the-art field research facility at NU's Agricultural Research and Development Center near Mead, Neb., continually monitors how much carbon dioxide enters and leaves 480 acres of irrigated and dryland fields. This is the only place in the world measuring these fluxes in an agricultural system.

Preliminary results from this ongoing interdisciplinary research are promising.

"We see tremendous potential to increase carbon in agricultural soils," said Agronomist Ken Cassman, co-leader of this research with Micrometeorologist Shashi Verma. It's estimated that storing more carbon in cropland could offset at least 8 percent of U.S. carbon dioxide emissions. Increasing soil carbon through reduced tillage and other practices also improves soil quality and reduces erosion.

Scientists are working on farming practices that maximize carbon storage, water and fertilizer efficiencies and yields to improve the crop production's overall energy balance.

"We're finding you can increase productivity and energy efficiency at the same time," Cassman said. Scientists also are devising accurate, inexpensive tools to measure relatively small changes in amounts of stored soil carbon. Such measurements will be vital if farmers someday are paid to sequester carbon.

"Carbon sequestration in our agricultural soils is a win-win situation for society, the environment and farmers," Verma said.

"The public wants assurances that our food and renewable energy are being produced in a manner that contributes to environmental and economic goals and greater energy self-sufficiency," Cassman said. This research helps address those concerns.

The Department of Energy funds this research.



"Every human has four endowments—self awareness, conscience, independent will and creative imagination. These give us the ultimate human freedom... The power to choose, to respond, to change."

—Stephen R. Covey



Photo by Brett Hampton, IANR

George Burba (above), a research specialist working on the university's carbon sequestration project, checks monitoring equipment in a cornfield.

"We're finding you can increase productivity and energy efficiency at the same time," Cassman said. Scientists also are devising accurate, inexpensive tools to measure relatively small changes in amounts of stored soil carbon. Such measurements will be vital if farmers someday are paid to sequester carbon.

"Carbon sequestration in our agricultural soils is a win-win situation for society, the environment and farmers," Verma said.

"You have to put in many, many, many tiny efforts that nobody sees or appreciates before you achieve anything worthwhile."

—Brian Tracy

IN *Memoriam*

Warren W. Sahs

Article courtesy University of Nebraska Scarlet



1920-2003

Warren W. Sahs, emeritus professor of agronomy and horticulture, died December 13, 2003. He was 82 years old. Sahs was born in Carroll, Nebraska, and was a captain in the U.S. Army 269th Field Artillery, 84th Infantry Division. He received five Battle Star Citations and served under Gen. George Patton in the Battle of the Bulge, D-Day plus 1, from February 1943 to March 1946.

He received his bachelor's (1938), master's (1943) and doctoral (1970) degrees from the University of Nebraska. He began work at the university as manager of the Foundation Seed Division in 1949. He was assistant director of operations of the University of Nebraska Agricultural Research Division and was superintendent of the Agricultural Research and Development Center near Mead. He retired from the university in 1991.

Sahs was a member of the Center for Rural Affairs, the American Society of Agronomy, and was a university representative on the Nebraska Wheat Board. He was the first university land-grant person to be on the board of directors for the Institute of Alternative Agriculture and was the North American representative of the International Federation of Organic Agriculture Movement.

He received the Soil Conservation Society of America Award, a Distinguished Service Award from the Crop Improvement Association, Agriculture Aksarben Award, the Safe Food Trailblazer Award, and the Nebraska Agricultural Business Award.

Dr. Sahs is survived by his wife, Anna; two daughters and sons-in-law; one son; five grandchildren; one great-grandson; one brother; two sisters; and one sister-in-law.

Agronomy and Horticulture Graduate Student Association News

by Doug Felter, president

The Agronomy and Horticulture Graduate Student Association (AHGSA) serves as a representative body for graduate students in the Department of Agronomy and Horticulture.

The organization serves as a means to foster interaction between students and as a voice to the department concerning graduate issues. The goal of the association is to enhance social, academic, and professional development through our activities and involvement.

Many activities have taken place over the past year. AHGSA hosted a new graduate student orientation at the beginning of the fall and spring semesters. This provided a venue for incoming students to become acquainted with the club and its members, and also with personnel in the department. Faculty and staff were present to discuss their responsibilities and involvement concerning graduate students. The orientation was followed by an AHGSA meeting.

In the fall semester, members toured James Arthur Vineyards in Raymond, Nebraska. This tour was very educational and gave members the chance to learn a little bit about viticulture and winemaking. During the spring semester a hot dog lunch was held. Members grilled hot dogs in the Keim Hall courtyard and collected food donations for the Lincoln Food Bank. This provided an opportunity for faculty, staff, and students to interact while helping out the community in the process.

New officers for the upcoming year were recently elected. Doug Felter (Crop Physiology and Production) was elected as president, Paul Hodgen (Soil and Water Science) as vice-president, and Leah Sandall (Plant Breeding and Genetics) as secretary/treasurer. Dr. Stephen Baenziger (Plant Breeding and Genetics) and Dr. Roch Gaussoin (Horticulture) will once again serve as club advisors.

The previous year was a good one and we are looking forward to an even better one next year. Thanks go out to everyone who helped make the past year such a success.

Bahman Eghball

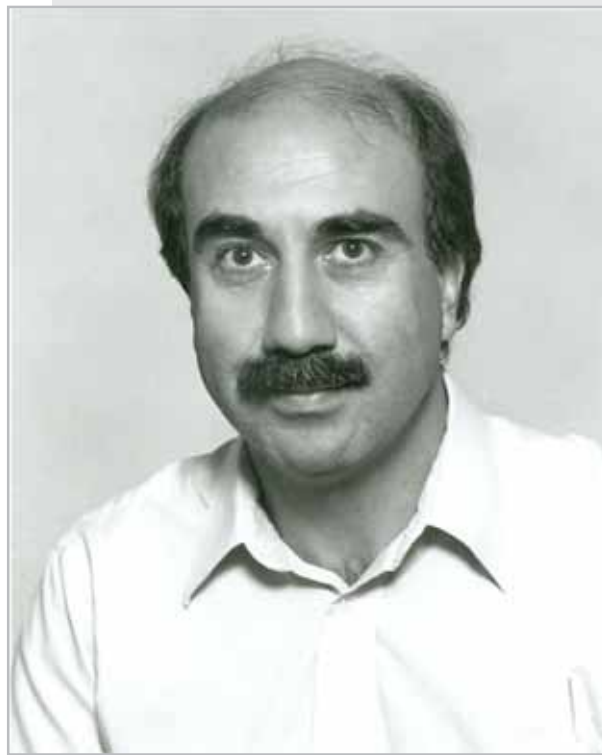
by Wally Wilhelm

Dr. Bahman Eghball, Soil Scientist with the Soil and Water Conservation Research Unit (SWCRU), Lincoln, Nebraska, died in a swimming accident at Lake McConaughy, near Ogallala, Nebraska, during a family vacation on Monday, July 26, 2004. Bahman is survived by his wife, Dr. Patti Boehner, and two sons, Ashkon (10) and Pedrom (6).

Dr. Eghball was born and raised in Iran and received a BS degree in general agriculture from Hamadan Agricultural College in Hamadan, Iran. After immigrating to the US, he received an MS in Plant and Soil Science from Southern Illinois University, Carbondale, IL, in 1982 and a PhD from the University of Nebraska (UNL) in Soil Science in 1987. After becoming a US citizen, Bahman began his professional career as a post-doctoral research associate with the UNL Department of Agronomy. He worked through the academic ranks to Associate Professor of Agronomy in 2000 supporting his research and salary with grant funds. During this time much of his work on management of N in manure was aligned with activities of the SWCRU. In June 2000, he was hired as a Soil Scientist with the SWCRU; a position he held at the time of his death.

Though Dr. Eghball's career was short, he achieved much. His areas of expertise included nutrients cycling in manure, the process of composting, P and N environmental issues, and soil-plant-N-P interactions. He pioneered use of fractal analysis to statistically compare patterns and distributions of plant and soil characteristics and evaluate the time-and space-dependent nature of the variation in these characteristics. He studied and developed management practices that effectively used C, N, and P in manure while limiting the negative environmental effects of manure application. As a part of the effort to understand nutrient (N) availability from manure, Dr. Eghball developed an *in situ* resin-based method to access N mineralization in field studies. He statistically evaluated factors in the P Risk Assessment Index demonstrating the importance of erosion in the loss of P from cropland.

In addition to heading a very productive research program, Bahman was very active in other professional activities. He was regularly tapped to review manuscripts and grant proposals. He was an active member of the American Society of Agronomy, Soil Science Society of America and Soil and Water Conservation Society of America. He served as Associate Editor for *Agronomy Journal* since 2001. Dr. Eghball was Chair Division A5 (Environmental Quality) for the American Society of Agronomy and was recently elected Fellow of the American Society of Agronomy.



Bahman Eghball

October 1, 1955 — July 26, 2004

Though Dr. Eghball's career was short, he achieved much. His areas of expertise included

- nutrients cycling in manure,
- the process of composting,
- P and N environmental issues, and
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"I attempt an arduous task; but there is no worth in that which is not a difficult achievement."

—Ovid



Photos by Seng Yee Wong/graphic arrangement by Carola Strauss



Hort Club News

by Ryan A. Pekarek, president 2004-2005

The UNL Horticulture Club has been as active as ever with group activities, trips, and sales to learn skills valuable to all types of horticulturalists. Bi-monthly meetings are held to keep members up-to-date on activities, job offerings, and group projects. Beginning long before the academic year begins, members are busy ordering and planting the annual poinsettia crop. This specialty crop teaches members many aspects of horticulture, including growth and marketing. Also, in the fall the club holds a picnic to help get new members acquainted with the officers and previous members. Over fall break the club will take a three day trip. Recently, the club visited Chicago and St. Louis.

Just after the first of the year, planting begins for the Garden Expo which is held during dead week. This event involves selection of crops, seeding, transplanting, pest management, marketing and sales. It is a great way for students in all aspects of horticulture to come together. This event not only brings Lincoln's citizens to East Campus, but patrons from towns and cities all over Nebraska.

Several new events were tried this year. Roses were sold for Valentine's Day on both campuses. Oxalis bulbs were raised to help celebrate St. Patrick's Day. Both of these events were successful and will be repeated in the upcoming year. This fall, a new dance will be held in conjunction with the newly-formed Diversified Ag Club. This will allow the Hort Club to use its resources and experiences to give much needed support to this new and exciting club. ♦



Agronomy Club News

by Cole Anderson, 2004-2005 president

The 2003-2004 school year was a very fun year for the UNL Agronomy Club. The club members participated in fund raising, social events, listened to various speakers from the agriculture industry, and attended the regional and national club meetings. The officers for the year were Chase Sauder, president; Ashley Colglazier, vice-president; Derek Drost, treasurer; Mike Flyr, assistant treasurer; Cole Anderson, recording secretary; Kevin Keller, correspondence secretary; and Keith Tighe, historian.

The club participated in the selling of Nebraska Unlimited cards, a discount card for fast food and social places in Lincoln.

We kicked off the year with a barbeque at Peter Pan Park to welcome back the old members and give prospective members a chance to meet with faculty, club officers, members, and advisors. The event attracted a good turnout and really gave us a great start for the year.

The bi-weekly meetings included a wide variety of speakers who presented what their job entails. Our speakers included the following: John Hansen, president of Nebraska Farmers Union; Cheryl Moncure, Agronomy and Horticulture Department; Keith Olsen, president of the Nebraska Farm Bureau; Dr. Kenneth Cassman, Agronomy and Horticulture department head; Todd Sneller, director of the Nebraska Ethanol Board; and Dr. Leroy Svec, manager of York Pioneer Hi-Bred International Research Center. These speakers presented many ideas about the future of agriculture and many of the job opportunities in their specific area of agronomy.

The national American Society of Agronomy meetings were held in Denver, Colorado in November. Chase Sauder, Derek Drost and Kevin Keller attended and Kevin Keller represented our club in the speech contest. They had the opportunity to go on several tours of agriculture industries in Colorado.

On March 23 Derek Drost, Cole Anderson, Kevin Keller, Keith Tighe, and Karl Brauer attended the regional meetings in Lansing, Michigan. The students once again had the opportunity to go on tours that demonstrated the diversity in Michigan's agriculture.

The club also hosted a bowling party at the East Campus Lanes and Games. We also redesigned our T-shirts and they are now available for purchase. The officers for the 2004-2005 year are Cole Anderson, president; Kevin Keller, vice-president; Keith Tighe, treasurer; Mike Flyr, assistant treasurer; John Krohn, recording secretary; Daniel Ohlsen, correspondence secretary; and Karl Brauer, historian.

The Agronomy Club is very proud of its accomplishments throughout the year. The new year is fast approaching and we are very excited for the new ideas and events we are planning for 2004-2005!

Photo by Brett Hampton, IANR



The beauty of Nebraska sunsets and windmills.

Alumni Association Undergoes Structural Change

The College of Agricultural Sciences and Natural Resources Alumni Association (CASNRAA), once open only to CASNR alumni, is welcoming anyone interested in helping promote the college.

Membership was expanded after the University of Nebraska-Lincoln reduced the budget for the University of Nebraska Alumni Association. This resulted in discontinued funding for the Nebraska Alumni Association Constituent Society program, of which CASNRAA was a member, said President Roger Bissell.

The mission of CASNRAA is to cultivate and enhance the network of CASNR alumni, as well as current and prospective students. CASNRAA is now recognized by the College as its official alumni association.

Membership dues support the College and its alumni through:

- Publication and distribution of The Sower and Class Acts twice a year.
- Alumni Awards that recognize service and achievement.
- Co-sponsoring the pre-commencement celebration for CASNR graduates and
- their families.
- Assisting with recruitment events and activities.

Annual memberships are \$20 for an individual and \$25 for a family. You do not need to be a CASNR graduate to join. A membership form can be found at casnr.unl.edu under "alumni" and then "membership form". For more information, contact Billie Lefholtz, (402) 472-7909, or blefholtzl@unl.edu. We hope you will join up!

Successful UNL soil judging team hosts 2004 regional contest in Norfolk



University of Nebraska East Campus students practice for the team portion of the contest in Missouri in Fall 2003.

The University of Nebraska-Lincoln soil judging team will look to continue its success in regional competition, in which it has finished first and second the past two years, and improve its performance at the national level, as UNL hosts the regional contest in September in the area around Norfolk. North Central Community College will provide a base for the contest, explained the team's coach, School of Natural Resources soil scientist Bill Zanner.

In addition to UNL, schools participating will be Iowa State University, Kansas State University, the University of Missouri, Southwest Missouri State University, the University of South Dakota and the University of Minnesota.

"Two team members graduated this year, and with the contest close by, we will be looking for additional students interested in becoming part of this successful and worthwhile activity," Zanner explained.

In a soil-judging contest, students enter pits dug to reveal the soil profile and describe soil structures and features. They then describe the landscape setting, classify the soil and evaluate the site for potential land uses. Scores are determined by how close the students and teams can come to descriptions made by the local soil scientists.

UNL team members for 2003-2004 were Zach Rigg, Jason Pohlmann, David Bray, Paula Funderburk, Tyler Smith, Grant Jackson, and Heath Vogt.

Soil judging competition is not only fun and intellectually rewarding, it builds friendship and camaraderie and can enhance a student's career prospects, Zanner said. For example, two former UNL soil judges, Zach Rigg and Neil Dominy, now work for the U.S. Natural Resources Conservation Service (NRCS; formerly Soil Conservation Service) in Missouri and Nebraska, and one, Grant Jackson, is a summer intern with the NRCS in Omaha, he noted.

Zanner is organizing this year's regional contest with the help of the NRCS state office. The five-day contest will include three days when students visit practice pits to become familiar with the region's soils and a day for the contest, with

three pits judged individually and two as teams. Awards will be given out Friday morning at a group breakfast.

Students will also get a chance to visit Ashfall Fossil Beds State Historical Park, a famous natural history site where ancient rhinos and other animals were buried in the debris from a volcanic eruption, the fossils of which are now visible due to in-place excavation.

Evening entertainment will include a group dinner with a talk by Bob Diffendahl, professor of geology emeritus with the Conservation and Survey Division, a subunit of the SNR. He will show slides presenting the Earth science noted by the Lewis and Clark expedition in Nebraska and offer modern explanations for what the Corps of Discovery saw.

The University of Nebraska soil judging team traveled to Bloomington, Ill., this April to participate in the National Soil Survey Contest, sponsored by the American Society of Agronomy and hosted by Illinois State University. They qualified for the national contest for the second straight year by placing second to the host team, the University of Missouri, at the North Central Regional Contest in Columbia in fall 2003.

"Unfortunately, we were not able to repeat our successful showing for the national contest, finishing in the middle of the pack," Zanner explained. The University of Wisconsin at Platteville finished first.

The team was supported by donations from the state office of the NRCS, Ward Laboratories in Kearney, the Nebraska Independent Crop Consultants Association, the Nebraska Society of Professional Soil Scientists, the office of the College of Agricultural Sciences and Natural Resources Dean Steve Waller, the Institute of Agriculture and Natural Resources, the departments of Agronomy and Horticulture, Biological Systems Engineering, and the School of Natural Resources.

Dr. Zanner is currently recruiting new students to join the soil judging team. You may contact him for more information about joining or its upcoming competition at bzanner2@unl.edu or (402) 472-0674. ♦

"Nebraska-whatever..."

Soil judging team members from left to right: Tyler Smith and Paula Funderburk.



FACULTY AWARDS RECOGNITIONS

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

Achim Dobermann received the Education and Researcher of the Year Award for 2003 from the Nebraska Agri-Business Association, Inc.

Robert N. Klein received a Senior Faculty Award for Teaching Excellence and the Nebraska Cooperative Extension Association Specialist Section Distinguished Service Award.

Donald J. Lee (13th year), **James L. Stubbendieck** (7th year), and **Kim W. Todd** (3rd year) were recipients of the Teaching Council/Parents Association Recognition Award.

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

John P. Markwell received a Senior Faculty Award for Teaching Excellence.

Stephen C. Mason received a Senior Faculty Holling Family Award for Teaching Excellence, and the Gama Sigma Delta Excellence in Teaching Award.

Martin A. Massengale was elected Chair, USDA National Agricultural Research, Extension, Education, and Economics Advisory Board, and received the "Brothers of the Century" award presented by the Alpha Gamma Rho Fraternity.

Paul E. Read was elected Vice President of the American Society for Horticultural Science, and Secretary of the Viticulture and Small Fruits Working Group. He will automatically succeed to the President position of ASHS next year.

Patrick E. Reece, Walter H. Schacht, and Jerry D. Volesky received the Cow-Calf and Forage Systems in the Nebraska Sandhills Team Award.

James S. Schepers, USDA-ARS, received the Soil Science Society of America Professional Service Award.

James E. Specht received a Charles Bessey Professor and Professor of Agronomy and Horticulture.

Daniel T. Walters received a CASNR Distinguished Teaching Award.

Wallace W. Wilhelm, USDA-ARS, was named Fellow of the Crop Science Society of America.

Robert G. Wilson received a Meritorious Service Award from the American Society of Sugar Beet Technologists.

The **Carbon Sequestration Team** received the IANR Team Award.

Leon Chesnin, Charles Gardner, Herman Gorz (USDA-ARS), **Donald Hanway, Sr., David McGill, Dale Swartzendruber, and James Williams** were recognized as 50+ -Year Members in ASA, CSSA, and/or SSSA, at the annual meetings in November.

PROMOTION AND TENURE



Timothy Arkebauer
Crop Environmental Physiologist
Assistant Professor 11/1/89 - 6/30/95
Associate Professor
with Tenure 7/1/95 - 6/30/04
Professor 7/1/04 - present



Stevan Knezevic
Integrated Weed Management Specialist
Assistant Professor 10/1/98 - 6/30/04
Associate Professor
with Tenure 7/1/04 - present



Achim Dobermann
Soil Fertility/Integrated Nutrient
Management Specialist
Associate Professor 2/1/00 - 6/30/04
Granted Tenure 7/1/03
Professor 7/1/04

B.S. Agronomy and Horticulture Graduates

AUGUST 2003

Ryan M. Albers, Omaha, NE
Rhoda L. Beutler, Hay Springs, NE *
Jason T. Cooper, North Platte, NE
Theodore L. Kohtz, Dannebrog, NE
Nathan A. Oehlrich, Richland, NE

DECEMBER 2003

Emily J. Anderson, Grand Island, NE
Dustin A. Bailey, Gibbon, NE
Trenton W. Erickson, Kearney, NE
Robbyn D. Goertzen, Beatrice, NE
Erik W. Haglund, Wakefield, NE
Justin M. Hoebeleinrich, Fordyce, NE
Jason D. Jakob, Rockville, NE
Theresa L. Lefferdink James, Hickman, NE
Kip E. Jeffries, Waverly, NE
Paul R. Kiekhaefer, Falls City, NE
Phillip K. Kowalski, Loup City, NE
Ryan J. Krenk, Pleasant Dale, NE
Ryan J. Meister, Rising City, NE
Brian L. Monke, Arlington, NE
Matthew J. Morrissey, Lincoln, NE
Anthony R. Moseman, Oakland, NE
Jason S. Penke, Craig, NE
Shawn L. Speidel, Lincoln, NE **
Soren R. St. Denis, Lincoln, NE
Sean D.W. Sutherland, Worthington, OH
Barbara L. Von Seggern, Scribner, NE
Travis L. Wegner, Wolbach, NE
Seng Y. Wong, Malaysia, NE
Thaddeus L. Ziemba, Silver Creek, NE

MAY 2004

Thomas S. Ahern, Omaha, NE
Robert P. Armstrong, Minden, NE
Joseph A. Billesbach, Hastings, NE
Lindsay J. Brown, Norfolk, NE
Nicholas S. Christensen, Beresford, SD
Adam L. Clausen, Grand Island, NE
Ashley M. Colglazier, Venango, NE *
Kristina A. Folken, Schuyler, NE
Ryan D. Franzluebbbers, Dodge, NE
Andrea M. Griesen, Lincoln, NE
Abby J. Hird, Litchfield, NE **
Jennifer H. Jensen, Stanton, NE
Joshua A. Johnson, Minden, NE
Justin C. Johnson, Columbus, NE
Patrick J. Koenig, Clearwater, NE
Justin L. Linder, Blue Springs, NE
Kim Y. Miller, Aurora, NE
Robert A. Mulliken, Nickerson, NE
Joshua L. Noble, Platteville, WI
Justin N. Nuss, Sutton, NE
Patrick D. Palmer, Papillion, NE
Matthew L. Pelster, Elgin, NE
Zachary D. Rigg, Mt. Sterling, IL
Chase W. Sauder, Big Springs, NE
Boe B. Stutzman, Beaver Crossing, NE
Jeremy E. Vlcek, Omaha, NE
Bryce C. Zeller, Broken Bow, NE

* with Distinction

** with High Distinction

M.S. and Ph.D. Agronomy and Horticulture Graduates

AUGUST 2003—M.S.

Julian Marco Chaky, M.S., Pennsylvania
Advised by J.E. Specht
Advanced backcross QTL analysis in a mating between Glycine max and Glycine soja.

Songul Severmutlu, M.S., Turkey
Advised by T.P. Riordan and R.C. Shearman
Overseeding buffalograss with fine-leaved fescues for improved turfgrass performance.

Brescia Ribeiro Marcondes Terra, M.S., Brazil
Advised by J.L. Lindquist and A.R. Martin
Effects of velvetleaf on corn yield following exposure to sublethal doses of three postemergence herbicides.

AUGUST 2003—Ph.D.

Muharrem Dilbirligi, Ph.D., Turkey
Advised by K.S. Gill and P.S. Baenziger
En masse cloning of expressed disease resistance genes of wheat (Triticum aestivum) using RNA differential display via degenerate primers and data mining methods.

Sanjun Gu, Ph.D., China
Advised by P.E. Read
Rootstock and mounding effect on growth and cold hardiness of "Gewürztraminer" (Vitis vinifera) and bud dormancy of "Lacrosse" and "Chambourcin" (Vitis spp.) grapevines.

Oranuch Leelaporn, Ph.D., Thailand
Advised by P.E. Staswick
Analysis of the acid phosphatase activity of soybean vegetative storage protein.

DECEMBER 2003—M.S.

Jeff Andrew Fassett, M.S., Colorado
Advised by J. Stubbendieck
Seed production, herbage yield, and quality of Carex filifolia.

Robert Franklin Heyduck, M.S., Texas
Advised by D.D. Baltensperger and L.A. Nelson
Assessing the phenotypic stability of waxy proso in the high plains.

Kimberly Dawn Pavelka, M.S., Nebraska
Advised by J.L. Lindquist
Biomass partitioning to the root versus the shoot in corn and velvetleaf.

Renee Ann Ritchie, M.S., Nebraska
Advised by D.J. Lee and J.E. Specht
High protein soybean plant introductions: selective genotyping to detect soybean protein QTL

Marty Ryan Schmer, M.S., Nebraska
Advised by L.E. Moser and K.P. Vogel
Field scale evaluation of establishment year stands on switchgrass biomass production in the northern plains, USA.

Turn to Graduates, page 28

Graduates, from page 27

DECEMBER 2003—Ph.D.

Ryan Michael Goss, Ph.D., Ohio

Advised by R.E. Gaussoin

The potential of glyphosate resistance in common turfgrass weeds and associated management problems.

Boingotlo Sebolai, Ph.D., Botswana

Advised by D.B. Marx

Comparison of un-replicated check plot designs.

David M. Thomas, Ph.D., Kansas

Advised by E.T. Paparozzi

Investigating ammonium toxicity in chrysanthemums.

Federico Alberto Vartorelli, Ph.D., Argentina

Advised by G.L. Graef

Recurrent selection for increased seed protein content in soybean.

MAY 2004—M.S.

Lori Jean Abendroth, M.S., Nebraska

Advised by R.W. Elmore, F.W. Roeth, and L.A. Nelson

Nodulation and physiological response to glyphosate in glyphosate resistant soybean.

Bryce Dennis Bauer, M.S., Nebraska

Advised by J.D. Volesky and W.H. Schacht

Yield and forage quality of cool-and warm-season plant communities on subirrigated meadows.

Dean David Brame, M.S., Nebraska

Advised by R.F. Spalding

Influence of grassed buffers on agrichemical movement to ground water.

Patrick Michael O'Neill, M.S., Nebraska

Advised by R.M. Caldwell and J.F. Shanahan

Use of chlorophyll fluorescence to characterize water and nitrogen stress among corn hybrids.

MAY 2004—Ph.D.

Fufa Hundera Birru, Ph.D., Ethiopia

Advised by P.S. Baenziger

Improvement trends, phenotypic and molecular diversity among hard red winter wheat cultivars in Nebraska.

Teshome Husseno Regassa, Ph.D., Ethiopia

Advised by J.W. Maranville and E.T. Paparozzi

The effect of water and nitrogen on the response of sorghum cultivars with contrasting nitrogen use efficiency.



Agronomy and Horticulture Scholarships for Academic Year 2004-2005

UNDERGRADUATE

Bayer Environmental Science Scholarship

Thomas T. Ogee, Jr. (2003-2004)

Michael E. Sheely (2003-2004)

Henry M. Beachell Academic Student Support Fund - Most Active Agronomy Club Member

Daniel P. Olsen

Henry M. Beachell Academic Student Support Fund - Incoming Freshmen

Cole A. Anderson (renewed)

Joshua J. Cool (renewed)

Ralph A. Elliott Memorial Scholarship

Whitney R. Kumm

Federated Garden Clubs of Nebraska Scholarship

Jeffrey M. Hoover

Elizabeth M. Keep

Melanie E. Kouma

Girardin Family Student Support Scholarship

Paul R. Schroeder

Thomas H. Goodding Memorial Scholarship

Keith F. Tighe

Franklin D. Keim Memorial Scholarship

Derek R. Drost

Nathan D. Mueller

Henry J. Kroese Production Scholarship

Karl N. Brauer

Elton Lux Memorial Scholarship

Michelle L. Dipple

Jill R. Misar

Jessica D. Ritter

Kenneth Miller Memorial Scholarship

Michael E. Sheely

Turn to Scholarships, page 29

Scholarships, from page 28

Dick Monson Agronomy Award and Scholarship
Kevin N. Keller

Nebraska Golf Course Superintendents Association Scholarship

Chelsea L. Gehring (2003-2004)
Todd M. Jarecke (2003-2004)

Nebraska Seedsman Scholarship

Derek R. Drost (2003-2004)
John C. Krohn (2003-2004)

Nebraska Turfgrass Foundation Scholarship
Thomas T. Ogee, Jr. (2003-2004)

Northern Nut Tree Research Scholarship
Ryan A. Pekarek

Robert H. Olson Memorial Scholarship
Michael J. Burgert

Professor J. C. Russel Memorial Fund
Steve W. Fleer
John C. Krohn

Servi-Tech Scholarship
Nathan D. Mueller (2003-2004)

Dale and Marian Brainard Smith Scholarship
Daniel P. Olsen

Stock Seed Farms - Lawrence C. Newell Scholarship
Elisha R. Greeley

John C. Swinbank Memorial Agronomy Scholarship Fund
Kevin N. Keeler

Clara S. Tillotson Memorial Scholarship for Incoming Freshmen and Transfer Students

Drew L. Anderson (renewed)
Leslie R. Burchell (renewed)
Elizabeth M. Keep (renewed)
Melanie E. Kouma (renewed)
LeAnne L. Kriete (renewed)
Nicole M. Leiser (renewed)
Paul D. Nelson (renewed)
Ryan A. Pekarek (renewed)
Jennifer S. Timm (renewed)
Susan E. Weber (renewed)

Trans-Mississippi Golf Association Turf Scholarship
Chelsea L. Gehring (2003-2004)
Michael E. Sheely (2003-2004)

Orville A. Vogel Scholarship
Kevin D. Boyd

Wylie R. Ward Scholarship
Jeffrey A. McBride

Keith Weidler Memorial Scholarship
Justin M. Thomas (2003-2004)

Wayne C. Whitney Memorial Scholarship
Chelsey M. Wasem

Dr. and Mrs. C. C. Wiggans Memorial Scholarship
Ryan A. Pekarek

GRADUATE

Henry M. Beachell Academic Support Fund Fellowship
Malissa Underwood (2003-2004), M.S.,
Range & Forage
Osman Gulsen (2003-2004), Ph.D.,
Range & Forage

Mary and Charles C. Cooper/Emma I. Sharpless Fellowship
Ty McClellan (2004-2005), M.S., Horticulture
Naga Kaye Mady (2003-2004), M.S.,
Crop Physiology & Production

John McDonald Fellowship
J. Andrés Quincke (2004-2005), Ph.D.,
Soil & Water

Milton Mohr Fellowship – Center for Biotechnology
Veronica Ciganda (2004-2005), Ph.D.,
Soil & Water
Osman Gulsen (2004-2005), Ph.D.,
Range & Forage

Gerald O. Mott Meritorious Graduate Student Award In Crop Science
Fufa Birru (2004), Ph.D.,
Plant Breeding & Genetics

J. Fielding Reed PPI Fellowship
J. Andrés Quincke (2004), Ph.D., Soil & Water

Arthur William Sampson Fellowship
Johan Marquardt (2004-2005), M.S.,
Range & Forage

Soil Fertility Conference Graduate Student Travel Award
Susana Grigera (2004)



CONTRIBUTIONS

The AGRONOMY and HORTICULTURE Department is dedicated to providing quality educational opportunities and leadership to students and clientele with diversity in training and experience. These areas include crop breeding and genetics, molecular genetics, crop production and physiology, forage and range management, soil and water sciences, weed science, vegetable crops, floriculture and ornamental crops, and turfgrass management. Please help us in continuing to provide this opportunity by contributing to one of these funds:

For AGRONOMY Programs

Agronomy Discretionary Fund #2146

This fund was developed to provide a flexible source of funding to enrich and enhance our Agronomy programs in the College of Agricultural and Natural Resources. They allow us to bring in distinguished national and international scientists for guest lecturers, to put on our annual Agronomy and Horticulture Highlights program, and contribute to faculty and staff professional development opportunities. These enhancements help to ensure that our teaching, research, and extension programs remain at the cutting edge of science and are responsive to the needs of our students and stakeholders.

Agronomy Research Fund #1472

This fund provides support for Agronomy activities including special equipment, faculty development, student program support and funds for specialized research endeavors. These funds provide a mechanism to help build program capacity in crop and soil sciences that support the development of profitable and environmentally sound agricultural systems.

Thomas H. Goodding Memorial Scholarship Fund #2847

Dr. Thomas H. Goodding was one of the truly outstanding teachers in the College of Agriculture and the Department of Agronomy in particular. The teaching laboratory located in 280 Plant Science Hall has been dedicated as the Goodding Learning Center in his honor. The dedication plaque reads "A master teacher who stimulated students with the desire to learn, developed in them the ability to direct their lives toward high achievement and conveyed deep personal interest and concern for individual students entrusted to him for education during his 40 years of service to the people of Nebraska." This memorial fund supports undergraduate scholarships for outstanding students.

For HORTICULTURE Programs

Endowment for Environmental Horticulture #4714

Horticultural plants having a positive environmental impact are an important part of research for enhancing people's lives and the quality of life. This fund is specifically set up for programs that will enhance the education and research in environmental horticulture sciences. It can be used, but not limited to, support for equipment, student assistance, operational items, and specialized research endeavors. It is a mechanism that can be used to attract research grant support in this important area of protecting the environment and natural resources.

Horticulture Discretionary Fund #3233

This fund provides support for activities specifically for floriculture and ornamental crops, vegetable crops, and turf and grass management. It provides a mechanism to fund various research activities that can help build program capacity in the areas of vegetable crop production and physiology and genetic improvement of crops.

Festival of Color Urban Landscape Program #5251

This fund helps support the development of various extension programs concentrating on integrated landscape management and design. These events offer participants an opportunity to see and learn about the latest concepts in landscape design, plant materials, home gardening and turfgrass management. Both students and faculty are involved in preparing demonstrations and educational activities for many of the events that are supported by this fund. Some of the events that this fund has helped support are Festival of Color, Landscape Connections and Residential Landscape Design Workshops.

Contributions should be made payable to:

**University of Nebraska Foundation
1111 Lincoln Mall, Suite 200
P. O. Box 82555
Lincoln, NE 68501-2555**

Indicate your area of interest by writing the fund number on the memo line of your check.
Your support and donations are greatly appreciated.

CONTRIBUTIONS



NAME _____

ADDRESS _____

CITY _____ STATE _____

ZIP _____ PHONE _____

Indicate your interest by marking the fund of your choice and return the form with your donation. Your support and donations are greatly appreciated.

- ☐ **Agronomy Research Fund #1472**
- ☐ **Agronomy Discretionary Fund #2146**
- ☐ **Thomas H. Goodding Memorial
Scholarship Fund #2847**
- ☐ **Endowment for Environmental
Horticulture #4714**
- ☐ **Horticulture Discretionary Fund #3233**
- ☐ **Festival of Color Urban
Landscape Program #5251**

If you have questions regarding other giving opportunities, please contact Dr. Kenneth Cassman, Department Head, 402-472-1555, or Bethany Throener at the University of Nebraska Foundation, 402-472-2151.

Contributions should be made payable to:

University of Nebraska Foundation
1111 Lincoln Mall, Suite 200
P. O. Box 82555
Lincoln, NE 68501-2555

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Department of Agronomy and Horticulture
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Lincoln, NE 68583-0915

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Do you know of Agronomy and Horticulture alumni, students
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