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ARD News April 2006

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Comments from the Dean

Dear Colleagues:

Here in the ARD office we recently finished our annual *Plan of Work Report of Accomplishment* to USDA's Cooperative State Research, Education, and Extension Service. In it we describe some of ARD scientists' accomplishments, illustrating across a broad range of science the very real value this land-grant university provides the people of Nebraska. For instance:

Nebraska-developed hard red winter wheat varieties are planted on about 62 percent of the state's wheat acres. These improved varieties have helped boost Nebraska's annual yields by 9.5 million bushels since the 1960s, and are worth roughly \$30 to \$35 million annually to Nebraska producers, based on increased yield alone.

Yield improvement in these varieties means Nebraska wheat growers can feed nearly 3.8 million more people a year than they did on the same acreage in the 1960s. Our wheat breeders are collaborating with scientists in 17 states on research to implement new Marker Assisted Selection technologies to improve U.S. wheat quality and disease resistance.

We have scientists exploring a wide range of biofuels-related research to help expand Nebraska's role in this growing industry. With growing interest in the fate of antibiotics in the environment, we have scientists researching what happens to antibiotic residues in manure when it's applied to irrigated cropland.

One of our nutrition researchers has combined stearic acid from beef tallow with plant sterols from soybeans to create a cholesterol-lowering compound that in animal studies lowered LDL about 70 percent, compared with 10 percent for commercially available plant-based food additives.

Our research with northeast Nebraska bilingual Latinos pursuing online UNL classes found significant family or community support and access to child care are keys to success. More comprehensive information on education barriers is needed.

So much exciting ARD research is occurring all across Nebraska. It's a pleasure to be able to tell my former colleagues at CSREES about even a small part of it.

Gary L. Cunningham
Dean and Director

Layman Awards

IANR faculty submitted 19 proposals for funding by the Layman Trust. A subcommittee of the ARD Advisory Council carefully evaluated each proposal and ranked the submissions in relation to quality of science and the potential impact of the proposed research.

The primary aim of the Layman Awards is to provide seed money to enhance the possibility of obtaining external support for the research project. Only untenured faculty or tenured faculty who have not yet received an external grant are eligible for the program.

Eight of the nineteen proposals submitted to the Vice Chancellor for Research were funded:

John Weber, Animal Science Department
"Determining the Role of the Foxo3a Gene in the Response to Sepsis"
Total Amount Received: \$10,000
Funding Period: May 1, 2006 - April 30, 2007

Suat Irmak, Biological Systems Engineering
"Irrigation Management Strategies to Make Maximum Use of Available Irrigation Water Under Limited Water Conditions"
Total Amount Received: \$10,000
Funding Period: May 1, 2006 - April 30, 2007

Maria de Guzman, Family and Consumer Sciences
"The Social Support Networks of Latino Adolescents in Nebraska: Understanding Paths to Positive Outcomes"
Total Amount Received: \$9,789
Funding Period: May 1, 2006 - April 30, 2007

Ji-Young Lee, Nutrition and Health Sciences
"Regulation of ATP-binding Cassette Transporter A1 by Fatty Acids"
Total Amount Received: \$9,970
Funding Period: May 1, 2006 - April 30, 2007

Tamra Jackson, Plant Pathology
"Evaluation of Mycotoxin Concentrations in Ethanol Distillers Grain"
Total Amount Received: \$9,840
Funding Period: May 1, 2006 - April 30, 2007

Paul Hanson, School of Natural Resources
"Evaluating the Effects of Climate Change on Flood Magnitudes in the Central Great Plains: A Case Study from Two Nebraska Streams"

Total Amount Received: \$10,000

Funding Period: May 1, 2006 - April 30, 2007

Mark Pegg, School of Natural Resources
"Establishment of Sustained Asian Carp Production in the Missouri River"

Total Amount Received: \$9,490

Funding Period: May 1, 2006 - April 30, 2007

Aris Holz, School of Natural Resources
"Determining Toxic Algal Bloom Frequency in Nebraska Lakes"

Total Amount Received: \$9,982

Funding Period: May 1, 2006 - April 30, 2007

New or Revised Projects January and February 2006

NEB 12-310 NC-1026, Characterize weed population dynamics for improved long-term weed management decision making

Investigator: John Lindquist, Agronomy and Horticulture
Status: Multistate project effective Oct. 1, 2005, through Sept. 30, 2010

NEB 12-311 Improved understanding of crop yield potential and irrigation tactics for water-limited irrigation systems

Investigator: Ken Cassman, Agronomy and Horticulture
Status: Hatch project effective Feb. 1, 2006, through Jan. 31, 2011

NEB 21-103 W-1150, Exotic germplasm conversion and breeding common bean (*Phaseolus Vulgaris* L.) for resistance to abiotic and biotic stresses and for enhanced nutritional value

Investigator: James Steadman, Plant Pathology
Status: Multistate project effective Oct. 1, 2005, through Sept. 30, 2010

NEB 40-044 Trees, shrubs, grasses and the Nebraska Sandhills: Experimental ecohydrology and belowground ecology

Investigator: David Wedin, School of Natural Resources
Status: McIntire-Stennis project effective Jan. 1, 2006, through Dec. 31, 2010

Proposals Submitted for Federal Grants January and February 2006

The following is a listing of proposals that were submitted during January and February 2006 by faculty for federal grant programs. While not all grants will be funded, we are appreciative of the faculty members' outstanding efforts in submitting proposals to the various agencies.

John Foster – USDA-ARS – Developing transgenic methods for use in studying screwworm genetics – \$9,000

Milford Hanna – NRI – Oxidatively and thermal stable, polymerization resistant industrial lubricants from chemically modified soybean oil and its methyl esters – \$373,180

Steven Harris – NSF – Regulation of formin function in filamentous fungi – \$525,102

Steven Thomas – NSF – DEB Ecosystems – \$354,289

Yiqi Yang, Narendra Reddy, and Ying Li – NRI – Cross-linked protein fibers from the processing byproducts of corn, wheat and soybeans – \$205,433

Harshavardhan Thippareddi – National Integrated Food Safety Initiative – Development and implementation of voluntary HACCP in the feed industry: Phase II – \$119,895

Lijun Wang, Milford Hanna, and Curtis L. Weller – NRI – Investigation of an integrated fluidized bed gasifier and fuel cell system for combined heat and power generation from distillers grain in ethanol plants – \$329,150

Milford Hanna, Yiqi Yang, and Yi Xiang Xu – NRI – Process development and characterization of starch-based nanocomposites with enhanced functional properties and biodegradability – \$274,360

Sally Mackenzie and Mike Fromm – NRI – Training graduate students in plant breeding using crop drought tolerance improvement as a model – \$600,000

Janos Zempleni, Judith Christman, John West, and Bhavana Dave – NIH – Epigenetic effects of biotin on activation of endogenous viral sequences – \$401,500

Milford A. Hanna – NRI – Process development and characterization for highly substituted starch acetate – \$483,260

Julie Albrecht – NRI – Does misting increase the microbial load on retail produce? – \$599,882

Erkan Istanbuluoglu and Suat Irmak – NSF – Collaborative research: A geomorphological climax hypothesis in water limited ecosystems: Evidence from drainage basin sequences with patterned vegetation and soils – \$198,628

Daniel Walters, Madhavan Soundararajan, Timothy Arkebauer, and Shashi Verma – NRI – Separating soil-respired carbon into autotrophic and heterotrophic sources in irrigated and rainfed maize-based agroecosystems – \$209,138

Milford Hanna and Yi Xiang Xu – NRI – Two-phase coaxial jet electrophydrodynamic encapsulation of bioactive compounds into core-shell/sheath nano-structures – \$340,370

Venkataramana Sridhar – NRI – Watershed vulnerability assessment and sensitivity analysis through fecal indicator bacteria monitoring and modeling – \$400,000

David Marx – USDA-ARS – Optimization of designs for non-replicated germplasm screening nurseries – \$145,000

Michael Fromm, Steve Ladunga, and James Van Etten – NIH – Partnership for secondary science research: Phase I and II – \$1,341,322

Paul Hanson – NSF – Stream power and sediment supply as controls on fluvial terrace formation, Central Rocky Mountains – \$151,715

Robert Powers, Greg Somerville, and James Takacs – NIH – Targeting (Fe-S) cluster assembly to treat biofilm infectious disease: Feasibility – \$368,843

Donald Becker – NSF – Acquisition of a Beckman XL-I analytical ultracentrifuge – \$312,286

Xun-Hong Chen – NASA – Integrating NASA EOS data capability with groundwater modeling in characterizing stream-vegetation-aquifer interactions in the Platte River Basin, Nebraska – \$236,142

Adonna Fleming, Rachel Simpson, and Margaret Mering – USGS – 2006 CAP-Category 1 UNL Libraries' Cooperative program to provide metadata support to the Nebraska GIS community – \$20,000

Sally Mackenzie and Alan Christensen – NIH – Influence of translation initiation on cellular protein targeting – \$1,825,000

Nancy Miller – NRI – Building research collaborations to enhance rural economic development – \$10,000

Randolph Cantrell, Cheryl Burkhart-Kriesel, and Bruce Johnson – NRI – Relocation to the buffalo commons: Using a marketing approach to understand residential decisions among migrants to Nebraska's panhandle – \$220,387

Gary Yuen – USDA-ARS – Biological strategies to control fusarium head blight – \$28,001

Etsuko Moriyama and Hideaki Moriyama – NIH – Functional evolution of G-protein coupled receptors in drosophila and fungi – \$530,958

Julie Johnson – Higher Education Challenge Grant – Distance education and institutional collaboration as a path to a master's degree and teacher certification in family and consumer science – \$499,421

Tom Clemente – NRI – Characterization and modification of the isoflavonoid biosynthetic pathways in legumes – \$86,400

Marjorie F. Lou and Kuiyi Xing – NIH – The role of arachidonic acid in growth factor signaling in lens epithelial cells – \$1,022,000

Blair Siegfried – USAID BBI Program – Post-commercialization monitoring of the Asian corn borer *Ostrinia furnicalis* resistance to Bt corn in the Philippines and the impact of pollen dispersal on non-target Lepidoptera – \$84,032

Robert Spreitzer – NRI – Rubisco Phylogenetic Engineering – \$400,000

Donald Becker – NIH – Role of proline metabolism in redox homeostasis and apoptosis – \$1,799,837

P. Stephen Baenziger – NRI – Developing a BAC-based physical map of wheat – \$45,000

Gary Hein – USDA-IPM – Improved management of Russian wheat aphid in barley by integration of biological-cultural controls with aphid-resistant cultivars – \$122,940

John Lindquist, Gary Yuen, and Rhae Drijver – NRI – Contribution of fusarium lateritium to weed suppressive soils and weed abundance – \$366,186

Ayse Irmak, Derrel Martin, Suat Irmak, George Meyer, Donald Rundquist, Shashi Verma, and Qi Hu – USGS – Improved quantification of evapotranspiration at watershed scale by using hydrological models, satellite data and field experimentation – \$248,880

Julie Stone and Mark Wilson – NSF – Functional and biochemical analyses of DJ-1-like proteins in plants and photosynthetic protists – \$458,369

Xun-Hong Chen, Kenneth Hubbard, and Xiaomao Lin – USGS 104(g) – Estimation of groundwater recharge from an integrated hydrologic monitoring system – \$113,808

Clinton Jones – NIH – Does the HSV-1 latency associated transcript (LAT) encode a protein? – \$401,500

Steven Thomas – NSF – FIBR: Linking genes to ecosystems: How do ecological and evolutionary processes interact in nature – \$307,189

Chris Calkins – USDA – Consumer demand for Nebraska source-verified beef – \$65,937

Yiqi Yang, Narendra Reddy, and David Karst – EPA – Potential risks of nanoscale materials in textiles - removal from textiles and transport into blood vessels – \$195,888

Viacheslav Adamchuk – NSF ITEST – Robotics and GPS/GIS in 4-H: Workplace skills for the 21st century – \$859,220

James Alfano – NIH – Suppression of innate immunity by an ADP ribosyltransferase type III effector – \$1,799,015

Andrea Cupp, John Weber, and Brett White – NIH – Role of VEGF in testies morphogenesis – \$1,138,869

Janos Zempleni – NSF – Identification of novel biotinylation sites in Drosophila – \$85,438

Grants and Contracts Received for January and February 2006

Agricultural Economics:

Derrell Mark – Ruth P. Gard Fund for Excellence \$10,000.00

Agricultural Research and Development Center:

Daniel Duncan – August N. Christenson ARDC Executive Sub-Fund \$50,000.00

Agronomy and Horticulture:

Ismail Dweikat – Charles B. and Katherine W. Baker Endowment \$12,000.00

Roch Gaussoin – U.S. Golf Association \$30,000.00

Daniel Ginting and Martha Mamo – Nebraska Department of Environmental Quality \$15,817.00

Martha Mamo – Alan and Irene Williams Endowment \$15,000.00

Roy Spalding – Nebraska Department of Agriculture \$25,000.00

Roy Spalding and Mary Exner – Nebraska Ethanol Board \$20,000.00

James Specht – United Soybean Board \$44,199.00

Miscellaneous Grants under \$10,000 \$25,047.00

Animal Science:

Chris Calkins – National Cattlemen's Beef Association \$20,026.00

Galen Erickson – Pioneer Hi-Bred International, Inc. \$40,194.00

Sheila Scheideler – USDA-CSREES \$15,000.00

Miscellaneous Grants under \$10,000 \$24,249.00

Biochemistry:

Ruma Banerjee – NIH \$246,077.00

Tom Clemente – NSF \$81,447.00

Vadim Gladyshev – NIH \$247,788.00

Don Weeks – Consortium for Plant Biotechnology Research, Inc. \$116,000.00

Miscellaneous Grants under \$10,000 \$6,000.00

Biological Systems Engineering:

Rick Koelsch – National Pork Board, Environmental Research \$40,000.00

Entomology:

John Foster – USDA-ARS \$9,000.00

John Foster – USDA-ARS \$26,000.00

Food Science and Technology:

Susan Hefle and Steve Taylor – Brewing Food and Beverage Industry Supplies Association \$417,610.00
Miscellaneous Grants under \$10,000 \$8,401.00

Panhandle Research and Extension Center:

Miscellaneous Grants under \$10,000 \$77,770.00

Plant Pathology:

James Van Etten – NIH \$150,000.00
Miscellaneous Grants under \$10,000 \$2,950.00

School of Natural Resources:

Craig Allen – Nebraska Game and Parks \$49,140.00

Craig Allen – Nebraska Game and Parks \$77,433.00

Daniel Ginting – Lower Platte South Natural Resource District \$15,817.00

Anatoly Gitelson and Donald Rundquist – NASA \$85,000.00

Geoffrey M. Henebry – NASA \$24,000.00

John Holz and Kyle Hoagland – Nebraska Department of Environmental Quality \$47,045.00

Steve Hu, Roger Bruning, Lisa Marie Pytlik Zilling,

Ken Hubbard, and Gary Lynne – NOAA \$94,420.00

Ken Hubbard – NOAA/OGP/OAR/DOC \$18,000.00

Peter Skelton – Alan and Irene Williams Endowment \$15,000.00

James L. Stubbendieck – Platte River Crane Maintenance Trust, Inc. \$100,000.00

Miscellaneous Grants under \$10,000 \$7,500.00

Statistics:

Erin Blankenship and Walter Stroup – Beohringer Ingelheim Pharmaceuticals \$27,168.00

Kent Eskridge – Nebraska Health and Human Services \$9,950.00

Veterinary and Biomedical Sciences:

Asit Pattnaik and Fernando A. Osorio – National Pork Board \$83,000.00

David Steffen – Nebraska Game and Parks Commission \$125,000.00

West Central Research and Extension Center:

Miscellaneous Grants under \$10,000 \$3,800.00

Total **\$2,557,848.00**