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ARD News August 1995

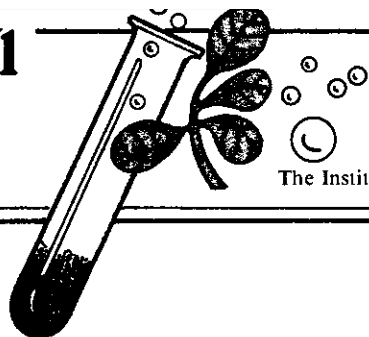
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August 1995

Volume 30, Number 1

COMMENTS FROM THE DEAN

Dear Colleagues:

A number of developments have taken place this summer that will have an impact on USDA research and education programs for many years to come. Included are: (1) appointments of a new Secretary of Agriculture and Under Secretary for Research, Education and Economics and pending appointments of new Administrators for ARS, ERS and CSREES; (2) drafting of a new Research and Education Title for the 1995 Farm Bill; (3) implementation of the Government Performance and Results Act (GPRA), legislation that will impose new accountability measures on everyone; (4) new studies of USDA-funded programs in Land Grant Universities by the House Agriculture Committee and the Under Secretary for Research, Education and Economics in addition to ongoing studies sponsored by the Kellogg Foundation and the National Research Council; and (5) proposed decreases in funding for CSREES, ARS and ERS in the FY 1996 USDA budget.

In part, these developments reflect concerns about our programs that have attracted attention of federal decision makers. Some of the perceptions about research programs are: faculty act as "volunteers" and research topics of interest to them rather than focus on needs of clientele; faculty are more interested in obtaining "credit" than in solving problems and are not willing to work in an interdisciplinary manner; the "system" is not accountable to taxpayers, and the proportion of research costs paid by taxpayers is too high and the percent paid for by industry is too low.

Some federal research agencies under attack in the U.S. and other industrialized countries are beginning to realize that their own research interests have taken precedence over meeting their nations' social and economic concerns. This has been described as "science in the self-interest, not the national interest". This approach to science will no longer be accepted or supported by the public and decision makers.

The perceptions described above reflect a major paradigm shift from the time when research and education programs enjoyed the esteem of almost everyone. I believe that during the past decade agricultural research programs have experienced declining respect because their relevance and usefulness are suspect by some and, as a consequence, we have lost an important measure of public trust. These shifts have taken place as a result of changing attitudes of the public, structural changes in agriculture, and our ineffec-

tiveness in communicating the impacts of research programs to taxpayers and decision makers.

There are some points of light in the somewhat gloomy situation we face.

Administrators have recognized the problem and are spending much more time in explaining program accomplishments to decision makers and clientele. Budget cuts for agricultural research will likely be lower than for research programs in other agencies such as USEPA, USGS, USAID, and NBS.

A new \$500 million applied research and education program entitled the "Agricultural Competitiveness Initiative" (ACI) is finding some favor in Congress. The ACI seeks to provide funding that will enhance competitiveness and profitability of U.S. producers as commodity programs are downsized. Faculty and administrators are more open to change, including better alignment of research programs to clientele needs, increased emphasis on interdisciplinary projects, and a reassessment of the faculty rewards system. Although Regent Miller has been critical of University of Nebraska research, he has held up IANR research programs as those that meet clientele needs and enhance economic activity in the state.

We are in a time of rapid technological and political change. Faculty no longer have the luxury of doing good science and not interacting with the real world. We are called upon to be more accountable and must be willing to do our part to explain the impact of our programs to taxpayers. We have an outstanding story to tell — we must relate it with clarity and enthusiasm! Everyone must be a part of the effort.

*Darrell W. Nelson
Dean and Director*

HAZARDOUS MATERIALS TRAINING COURSE

A Hazardous Materials Training Course is offered the first Wednesday and Thursday of every month at 1:30 - 3 p.m. at the Hazardous Materials Center. Register by calling the Hazardous Materials Program at 472-4925.

Course topics include: Chancellor's Guideline for the Use of Hazardous Materials, labeling requirements, Environmental Protection Agency inspections, compatibility guidelines, and NFPA rating guidelines and chemical inventories. Please ensure that all new employees and graduate students who may work with hazardous materials attend this training course as soon as possible after arrival on campus.



It is the policy of the University of Nebraska-Lincoln Institute of Agriculture and Natural Resources not to discriminate on the basis of sex, age, handicap, race, color, religion, marital status, veteran's status, national or ethnic origin or sexual orientation.



Supervisors are responsible for providing laboratory-specific training for all new employees and graduate students. This training will encompass laboratory safety procedures and characteristics of all chemicals that the employee will be exposed to in the course of their work. The Material Safety Data Sheets for each chemical provide the basic information for this part of the training.

THE CULTURE OF CREDIT

“Credit is a bottomless pit — there’s never enough for most people,” states Harvard University Geneticist Philip Leder in an article entitled “The Culture of Credit” published in the June 23, 1995 issue of *Science*. This article points out that personal ego is not the only reason credit is important in science.

During times of tight budgets and increasing numbers of competitors, credit for discoveries can make the difference in obtaining grants, getting manuscripts accepted in leading journals, and attracting graduate students and postdoctoral scientists. The culture of credit has some serious downsides, including diminished collaboration, unwillingness to share credit with those contributing to the discoveries, and, in extreme cases, scientific misconduct.

ARD attempts to avoid most of the problems associated with “credit” by recognizing the contributions of all authors on scientific papers, not giving special credit to sole author or first author articles, and encouraging interdisciplinary research. We believe that credit eventually will accrue to those who make a contribution to the discovery irrespective of where their name appears in the authorship list. The greatest credit will come from clientele who make use of our new knowledge to solve problems.

We encourage project leaders to provide appropriate credit to all employees who contributed to the success of the research activity, including support staff.

PLANTS AND INTELLECTUAL PROPERTY

One of the major outputs from UNL-IANR research faculty is the development of new plant varieties, inbred lines, populations, germplasm, biotechnology products, genes and others. Recent articles in this newsletter have described the protection and commercialization of other types of intellectual property, such as inventions, through patents and licensing.

Improved plants and genes also fall into the category of intellectual property with economic value and there are a number of policies and legal means to protect this property. This is a very complex area due to the existence of several methods of protecting and managing new plant products.

Historically, improved plant materials from public research programs have been made available to commercial interests and the public, as well as to other researchers, for little or no cost. The work was done for the public good, with public funds, and the philosophy was to make them available to the public at the lowest cost possible.

Tighter university budgets, heightened university interest in marketing intellectual property, and greater accountability in realizing a value from new developments that are made available by licensing is changing this picture significantly. Universities and sponsors want to recover

research investments and to realize income to pay for new research.

Nowhere has this change been more complex than in the area of plants and related plant materials.

Among the first critical decisions is what type of plant material can be protected, i.e., *how* it can be protected, and whether it *should* be protected. In many cases, improved plant materials never will reach the public and be used unless the property is protected. Commercial interests will not use the plant material and make it available to the public through normal commercial channels unless their interests and commercialization investments have some protection from competitors.

For the remainder of the article, plants and associated materials will be referred to broadly as plants. There are five general types of legal categories for plant protection currently available in the United States.

1. Trade Secret Law
2. Contract Law
3. Plant Patent for Asexually Reproduced Plants (1930 Plant Patent Act)
4. Plant Variety Protection
5. Utility Patents

Trade secrets are appropriate for protecting unique breeding methods or laboratory techniques that are never divulged to the public. This is not often used by universities, but can be a factor in some contracts and agreements and may be a way for universities to protect and market intellectual property, even plants.

Contract law can relate to a number of plant-related areas. These include employment agreements with provisions to protect trade secrets and other information. It also can include licenses and restrictive use agreements.

Under U.S. Patent Law, breeders who develop new and distinct *asexually propagated plants* can obtain a plant patent and legally prevent others from selling the plants for a period of 17 years. Examples of types of plants from Nebraska research programs for which plant patents would use the protection method include ornamental roses, asexually reproduced turf varieties, etc. Plant patents fall under the general patent rules and regulations of the University of Nebraska-Lincoln and the Board of Regents and the patent process, licensing, and royalty collection and distribution policies are the same as for any other invention or development that is patentable.

The other type of patent applicable to this area is the *Utility Patent*. This is a rapidly growing category that provides protection to any new and useful manufacture, or composition of matter or any new and useful improvement thereof. In the plant area, this can include proteins, genes, DNA or RNA segments, plants, plant varieties, plant parts (e.g. seeds, pollen, fruit and flowers), hybrids, and processes of producing any of these items. The protection period is 17 years.

With the advent of biotechnology and genetic engineering, the number of patent applications in this area has increased rapidly. Developments such as herbicide-resistant field crops, methods for inserting foreign DNA into plants, and methods for regeneration are examples of plant-related utility patents. Similar to plant patents, utility patents fall

under the general Board of Regents and the University Patent Policy and Procedures.

Another form of protection is the *Plant Variety Protection Act*, the original version of which was passed by Congress in 1970. This legislation extended patent-like protection to sexually reproduced plants, including horticulture plants and field crops.

In 1994, Congress amended the Plant Variety Protection Act to make it more consistent with current international variety protection laws. One provision was to tighten the regulations related to the "farmer exemption" allowing producers to save seed from PVPA protected crops for their own use but preventing them from selling it to other farmers for planting purposes.

The PVPA allows protected varieties to be used as germplasm for research purposes. This is an important provision to allow germplasm to be exchanged and used for crop development that will have general benefit to the public. This is not the case for utility patents that do not automatically allow use of patented materials. For these, a written agreement containing a "research clause" is recommended with the patent holder.

For many years, the state agricultural experiment stations have had a seed policy that serves as a guideline for germplasm and seed policies of the individual state agricultural experiment stations. The most recent policy was adopted Oct. 18, 1989 and was prepared by the Seed Policy Subcommittee of the Experiment Station Committee on Organization and Policy (ESCOP). This policy points out that the decisions to protect germplasm via Plant Variety Protection (PVP) or patent is a decision of each individual agricultural experiment station. The free exchange of germplasm for research and breeding purposes between institutions has existed historically. Potential commercial value and changes in philosophies now threaten continuation of such free exchange.

It is important to maintain free exchange of germplasm and information as well as multi-location regional testing of germplasm and varieties from different institutions. There is a risk that newly emerging policies and practices of some universities could restrict research access to potentially useful germplasm and impede plant development that would have general benefit to the public.

The Agricultural Research Division (ARD), IANR, operates under guidelines contained in "A Policy on the Release of Improved Plant Varieties, Clones, and Breeding Materials," which was approved in 1994. The general policy is consistent with the ESCOP policy described in the previous paragraph. Under this policy, a Crop Variety Release Committee will review a breeder's proposal and recommend if a variety or germplasm developed by ARD faculty should be released. Decisions to protect under PVPA or by patent are made on each release with input by the plant breeders, Crop Variety Release Committee, and, in some cases, by potential licensees.

For field crop varieties, these are normally produced and sold without royalty by certified seed growers using foundation seed from the Nebraska Foundation Seed Division and with seed certification by the Nebraska Crop Improvement Association. This differs from the horticultural seed area, in which protected varieties often must be released on an

exclusive or limited basis in order to ensure commercialization. This often will include provision for royalties.

Royalties are subject to the same Board of Regents policies as royalty from any other patented invention within the University of Nebraska system.

Historically, income to plant breeding programs from exclusive or non-exclusive licensing of varieties or germplasm has not been an important source of income. This situation is changing at many universities. Concerns about these changes relate to the impact of the licensing of intellectual property or research priorities of the institutions and individual researchers. On the other hand, public accountability insists that universities manage intellectual property in a way to encourage rapid commercial development, but also protect the public interest.

The complexity of intellectual property rights as they relate to plants makes this a significant challenge for the future. If we expect to continue receiving long-term public investments in plant breeding and germplasm improvement, we need to have policies consistent with the public interest that also provide incentives and do not inhibit effective research programs. This will be a continued subject of debate in the coming years.

IANR INTERDISCIPLINARY RESEARCH GRANTS PROGRAM

Twenty-three Interdisciplinary Research Proposals were submitted and two proposals were selected to be funded for 1995-1996. Four continuation projects also will be funded, contingent upon satisfactory progress. New Interdisciplinary Research Proposals were awarded to the following:

Pat Shea, Steve Comfort, Garald Horst, Rhae Drijber, William Powers, T. Zhang

Integration of Abiotic Treatments with Plant-Based Strategies for Remediating Soil Contaminated with Organonitrogen Compounds.

Rick Koelsch, Michael Brumm, Ray Massey, Jack Nienaber, Ivan Rush, Dan Walters

Whole Farm Nutrient Budgeting for Livestock Systems.

The following continuing grants have been evaluated and will continue for 1995-1996:

Synergism between Bacteroides spp. and Serpuline hyodysenteriae in swine dysentery: A model of inflammatory bowel disease modulation by anaerobic bacteria. — G. E. Duhamel

Insect and mechanical damage control during shipping by insecticide infusion and modified atmospheric packing. — Durward Smith

New seedbed preparation technology for improved sugarbeet emergency. — John A. Smith

How does the fungal toxin, fumonisin, induce carcinogenesis? — Clinton Jones

Impact of pesticide residues in composted lawn waste on vegetable crops. — Pat J. Shea

**UNIVERSITY OF NEBRASKA AGRICULTURAL
RESEARCH AND DEVELOPMENT CENTER
RESEARCH AND EDUCATION BUILDING
SYMPOSIUM/DEDICATION**

The ARDC will host a regional symposium in conjunction with the dedication of the new 23,000 square foot Research and Education Building. The symposium is titled "Agriculture and People...Building a Shared Environment." The symposium will begin at noon Oct. 9 and run through noon Oct. 10. The dedication ceremony will begin following the symposium on the afternoon of Oct. 10.

The symposium will focus on managing animal waste resources for minimal impact on the environment, integrated production systems management, and the interface of agriculture, natural resources and the environment. Featured symposium speakers are scheduled to include Dan Fox, Cornell University, and Terry Klopfenstein, University of Nebraska.

Duane Acker, who formerly served as Assistant Secretary USDA, Assistant Administrator USAID, President of Kansas State University, and IANR Vice Chancellor, is the scheduled keynote speaker for the Research and Education Building dedication.

For more information, please contact:

Daniel J. Duncan
Director, UN — ARDC
Rt. #1, Box 63A
Ithaca, NE 68033-9731

**WIDAMAN TRUST DISTINGUISHED
GRADUATE ASSISTANT AWARD**

The Widaman Trust was established in 1975 through a generous gift provided to the University of Nebraska Foundation by Ms. Blanch Widaman. Ms. Widaman asked that the income from the trust be used by UNL for basic research in agriculture, and that the funds support people rather than purchase supplies and/or equipment. She suggested that the money be used for scholarships or fellowships for graduate students conducting basic research in agriculture.

The criteria established for the Widaman Trust Distinguished Graduate Assistant Award specifies that only 5 percent of the graduate students in a department can receive the recognition and that the awardees must demonstrate outstanding scholarship and excellence in research. We congratulate the following graduate students for receiving the Widaman Trust Distinguished Graduate Student Award for 1995-1996:

Name: **Karol E. Peters**
Thesis area: Reproductive Physiology
Department: Animal Science
Advisor: James E. Kinder

Name: **Robert A. McCoy**
Thesis area: Ruminant Nutrition
Department: Animal Science
Advisor: Rick Stock

Name: **Christi M. Calhoun**
Thesis area: Meat Science
Department: Animal Science
Advisor: Roger W. Mandigo

Name: **Johanna A. Dieleman**
Thesis area: Weed Ecology
Department: Agronomy Department
Advisor: David Mortensen

Name: **Thomas R. Trehwitt**
Thesis area: Engineering
Department: Biological Systems Engineering
Advisor: Dennis Schulte

Name: **Venkat Kumar Pedibhtola**
Thesis area: Insect Biochemistry and Physiology
Department: Entomology Department
Advisor: David Stanley-Samuelson

Name: **Paula Cristina Gouveia**
Thesis area: Entomology
Department: Entomology
Advisor: Blair Siegfried

Name: **Jason J. Hlywka**
Thesis area: Food Science/Toxicology
Department: Food Science and Technology
Advisor: Lloyd B. Bullerman

Name: **Gina M. Truesdell**
Thesis area: Genetics, Cellular and Molecular Biology
Department: Plant Pathology
Advisor: Marty Dickman

Name: **Negendra R. Hegde**
Thesis area: Veterinary and Biomedical Sciences
Department: Veterinary and Biomedical Sciences
Advisor: S. Srikumaran

**HARDIN DISTINGUISHED GRADUATE
FELLOWSHIP FOR 1995-1996**

The recipient of the Hardin Distinguished Graduate Fellowship for 1995-1996 is **John LeRoy Lindquist** from the Agronomy Department. The fellowship is made possible by an endowment established at the University of Nebraska Foundation by former University of Nebraska Chancellor Clifford Hardin to support outstanding graduate students doing research in plant physiology.

John Lindquist is completing his Ph.D. in plant stress physiology associated with an ecophysiology approach to understanding maize tolerance and weed suppressive ability. His research project focuses specifically on the physiology and morphology of maize that will allow it to be more tolerant or suppressive to weed competition, a major stress in crop production. Dr. Dave Mortensen is his advisor.

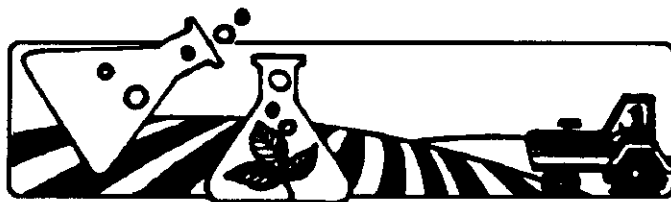
**NOMINATIONS SOUGHT FOR JUNIOR FACULTY
EXCELLENCE IN RESEARCH AWARD**

The Agricultural Research Division is seeking nominations for the Junior Faculty Excellence in Research Award. Given to eight individuals since 1991, the award is designed to acknowledge outstanding research activity by tenure-track ARD faculty with five years or less of service.

Any ARD faculty member or unit administrator can nominate. Selection criteria include publications of UNL-

based research results, external funding activity and peer recognition. Award winners will receive a \$3,000 grant for professional development and research-related activities, along with a recognition plaque and reception.

The deadline is **Sept. 8, 1995**. Additional information can be obtained from unit administrators or by contacting Dora Dill at 472-7082.



GRANTS AND CONTRACTS RECEIVED JUNE AND JULY, 1995

Agricultural Meteorology	
Hubbard, K. — USDA/Global Environmental Change Education National Initiative	\$ 56,700
Verma, S. — NASA	10,000
Agronomy	
Johnson, B. — Pioneer Hi-Bred International	48,800
Kaeppler, S., Arumuganathan, K., Kaeppler, H. — USDA/CREES	145,000
Miscellaneous grants under \$5,000 each	54,148
Animal Science	
Grotjan, E., Kinder, J. — Pfizer Seed Grant Program	15,000
Mandigo, R. — National Live Stock and Meat Board	43,200
Scheideler, S. — M. G. Waldbaum Company	111,600
Scheideler, S., Pendleton, E. — American Ostrich Association	16,515
Stock, R. — M. G. Waldbaum Co.	22,500
Miscellaneous grants under \$5,000 each	8,945
Biochemistry	
Golbeck, J. — NSF	100,000
O'Leary, M. — NIH	166,190
Biological Systems Engineering	
Meyer, G. — University of Florida	9,000
Biometry	
Marx, D. — NSF	7,380
Center for Rural Revitalization	
Cordes, S. — Nebraska Department of Economic Development	15,000
Entomology	
Stanley-Samuelson, D. — USDA/ARS	8,000
Miscellaneous grants under \$5,000 each	32,000
Food Processing Center	
Miscellaneous grants under \$5,000 each	4,000
Food Science and Technology	
Bullerman, L. — Ohio State	15,000
Jackson, D. — Ohio State	15,000
Miscellaneous grants under \$5,000 each	1,442
Forestry, Fisheries and Wildlife	
Hoagland, K. and Brandle, J. — Nebraska Department of Environmental Quality	150,400
Jelinski, D. — U.S. Fish and Wildlife Service	61,202
Jelinski, D. — NASA-Goddard	56,900
Peters, E. — U.S. Fish and Wildlife Service	54,700
Savidge, J. — U.S. Fish and Wildlife Service	50,698
Miscellaneous grants under \$5,000 each	5,150
Horticulture	
Coyne, D. — Michigan State University	58,500
Riordan, T. — Crenshaw and Doguet Turfgrass	27,783
Miscellaneous grants under \$5,000 each	18,225

Northeast Research and Extension Center	
Holshouser, D. — Crop Production Trust, NU Foundation	15,000
Holshouser, D., Shapiro, C., Shelton, D., Witkowski, J., Kranz, W. — Lower Elkhorn NRD	12,000
Miscellaneous grants under \$5,000 each	61,090
Panhandle Research and Extension Center	
Baltensperger, D. — Kansas State University	15,280
Hibberd, C. — Ostenberg Fund	15,000
Miscellaneous grants under \$5,000 each	90,416
Plant Pathology	
Powers, T. — USDA	120,000
Wysong, D. — Iowa State University	7,000
Miscellaneous grants under \$5,000 each	6,005
South Central Research and Extension Center	
Miscellaneous grants under \$5,000 each	63,125
Veterinary and Biomedical Sciences	
Donis, R. — Pfizer Central Research	15,000
Miscellaneous grants under \$5,000 each	37,800
Water Center/Environmental Programs	
Drijber, R. — Department of Interior-GS	8,500
Franti, T. — Department of Interior-GS	16,618
Kuzelka, R. — Groundwater Foundation	60,000
Schulte, D. — Department of Interior-GS	18,261
Siegfried, B., Hoagland, K. — Department of Interior-GS	15,500
Spalding, R. — Upper Elkhorn NRD	7,770
Spalding, R. — Upper Big Blue NRD	67,000
Volk, B. — Department of Interior-GS	5,666
Miscellaneous grants under \$5,000 each	10,420
West Central Research and Extension Center	
Miscellaneous grants under \$5,000 each	12,850

Grand Total \$2,069,279

NEBRASKA ENVIRONMENTAL TRUST NEWS

Grants submitted to the Nebraska Environmental Trust for 1995 included 59 recognition grants and 63 general grants. A total of nearly \$22 million was requested for environmental grants. The Nebraska Trust expects that approximately \$5 million will be available for award when the decision is made on Oct. 10, 1995.

On Sept. 12, 1995 the preliminary list of funding recommendations is presented by the Eligibility and Ratings Subcommittee to the Trust Board at Fort Robinson, Nebraska. The list of recommendations then will become public knowledge and recommendations will be publicized through press releases and the newspapers that publicize the releases. Public comment on the list will be accepted through Oct. 10, 1995. On that date the Trust will conduct a public hearing, following which it will make a final determination to approve grants for 1995.

The meeting is scheduled to be held at the Nebraska Game and Parks Commission Headquarters, 2200 North 33rd Street in Lincoln. If you would like to be on the Environmental Trust Newsletter mailing list, please contact their office at 471-5409.

PROPOSALS SUBMITTED FOR FEDERAL GRANTS

The following is a listing of proposals that were submitted after mid-May 1995 by faculty for federal grant programs. While not all grants will be funded, we applaud the faculty member's effort in submitting proposals to the various agencies.

Marion O'Leary — NIH — Calculations of Isotope Effects on Aspartate Transcarbamylase — \$63,355

Dennis Jelinski — NASA — Surface Energy and Water Balances of Forest and Wetland Subsystems in the Boreal Forest: Surface-Atmosphere Links and Ecological Control — \$56,900

Paul Staswick and Eric Davies — NSF — The Function of p40 Proteins in Plant Growth and Development — \$275,054

Shawn Kaeppler — NSF — Molecular Analysis of Tissue Culture-Induced Variation in Maize — \$371,655

Swey-Shen Alex Chen, Raul Barletta and David Smith — NIH — Structure and Function of IgE Regulatory Peptides — \$990,900

Clinton Jones — NIH — Analysis of an Alpha Herpesvirus LAT Protein — \$393,975

NEW OR REVISED PROJECTS

The following station projects were approved recently by the USDA Cooperative State Research Service:

NEB-10-128 (Agricultural Economics) Economics, Environment, and New Agricultural Technology
Investigator: W. L. Miller
Status: New Hatch project effective June 1, 1995

NEB-11-102 (Biological Systems Engineering) Identification, Modeling, and Design of Plant Sensor Systems for Variable-Rate Chemical Application
Investigator: G. E. Meyer
Status: New Hatch project effective June 1, 1995

NEB-11-103 (Biological Systems Engineering) Managing Atrazine Runoff Losses to Improve Surface Water Quality
Investigator: T. G. Franti
Status: New Hatch project effective June 1, 1995

NEB-12-240 (Agronomy) Chromosome Specific Libraries for Maize Genome Research
Investigator(s): S. M. Kaeppler, K. Arumuganathan and H. F. Kaeppler
Status: New Competitive Grant effective July 1, 1995

NEB-12-241 (Agronomy) Ecological Studies of Nebraska Rangeland Vegetation
Investigator: J. Stubbendieck
Status: New Hatch project effective June 1, 1995

NEB-12-242 (Agronomy) Defining and Assessing Basic Indicators of Soil Quality and Erodibility
Investigator(s): J. W. Doran, J. E. Gilley, J. R. Ellis, G. E. Varvel and J. F. Power
Status: New State project effective Oct. 1, 1994

NEB-12-243 (Agronomy) Weed Distribution and Demography: Elucidating Pest Management Principles for Reducing Herbicide Use
Investigator: D. A. Mortensen
Status: New Hatch project effective June 1, 1995

NEB-13-126 (Animal Science) Physiological and Management Aspects of Expression of Estrus and Ovulation Rate in Swine

Investigator: D. R. Zimmerman
Status: New Hatch project effective June 1, 1995

NEB-13-127 (Animal Science) Measurement and Manipulation of Carcass Traits Influencing Fresh Meat Value
Investigator: C. R. Calkins
Status: New Hatch project effective June 1, 1995

NEB-14-085 (Veterinary and Biomedical Sciences) Research in Support of a National Eradication Program for Pseudorabies

Investigator: F. A. Osorio
Status: New Hatch project effective Oct. 1, 1994 that contributes to regional project NC-197

NEB-16-066 (Food Science and Technology) Analytical Methods for Food Process Control and Measurement of Processing Induced Changes
Investigator: R. L. Wehling
Status: New Hatch project effective June 1, 1995

NEB-21-057 (Plant Pathology) Genetic Variability in the Cyst and Root-Knot Nematodes
Investigator: T. O. Powers
Status: New Hatch project effective Oct. 1, 1993 that contributes to regional project W-186

NEB-21-058 (Plant Pathology) Overwinter Survival of Heterodera, Pratylenchus, and Associated Nematodes in the North Central Region
Investigator(s): T. O. Powers and E. D. Kerr
Status: New Hatch project effective Oct. 1, 1994 that contributes to NC-215

NEB-24-032 (Agricultural Leadership, Education, and Communication) The Determinants and Uses of Leadership Influence in Agriculture and Natural Resources
Investigator: F. W. Brown
Status: New State project effective June 9, 1995

NEB-26-024 (Forestry, Fisheries and Wildlife) Effects of Landscape Structure and Biodiversity and Ecosystem Processes
Investigator: D. E. Jelinski
Status: New McIntire-Stennis project effective June 1, 1995

NEB-42-021 (Northeast Research and Extension Center) Development of Integrated Pest Management Techniques for Improved Weed Management
Investigator: D. L. Holshouser
Status: New Hatch project effective June 1, 1995

NEB-92-020 (Family and Consumer Sciences) The Role of Housing in rural Community Vitality
Investigator: E. R. Combs
Status: New Hatch project effective Oct. 1, 1994 that contributes to regional project NC-217

NEB-94-021 (Textiles, Clothing and Design) Family Businesses: Interaction in Work and Family Spheres
Investigator: R. Kean
Status: New Hatch project effective Oct. 1, 1993 that contributes to NE-167