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THE AGRICULTURAL EXPERIMENT STATION
INSTITUTE OF AGRICULTURE
AND NATURAL RESOURCES
UNIVERSITY OF NEBRASKA-LINCOLN 68583-0704



Agricultural Experiment Station News

August 1983

VOL 17 NO 2

FACULTY DEVELOPMENT LEAVES

The Board of Regents has approved Faculty Development Leaves for the following faculty for 1983-84:

Stephen R. Lowry, Associate Professor, Biometrics & Information Systems Center, will spend one semester, September 1, 1983 to January 8, 1984 at Cornell University. He will be working with undergraduate teaching programs and taking courses and doing research in statistics.

James R. Gilley, Professor, Agricultural Engineering, will be on leave from March 1, 1984 to September 1, 1984 in Belgium at the Catholic University. He will be doing research at the Soils and Water Laboratory there.

Paul H. Gessaman, Professor, Agricultural Economics, will be on leave from January 1, 1984 to December 31, 1984. He will spend his time at Washington State University and Iowa State University, where he will be conducting library research and working on a proposal for implementation of in-service training for extension personnel.

Dean A. Linsenmeyer, Associate Professor, Agricultural Economics, is on leave from June 15, 1983 to December 15, 1983 in Maumee, Ohio, with Anderson Grain Co. He will study domestic and export marketing of grain.

NAME THE NEW EVENT

A contest will be conducted between now and September 30, 1983 to determine a name for the new, Institute-wide annual event that will be held at the University Field Laboratory starting in 1984. The Steering Committee for the 1984 event was announced in the July Newsletter and the first event will focus on animal agriculture. There is need for a general title which can be used each year together with the particular agricultural emphasis for that year. All members of IANR are eligible to enter the contest (except the deans/directors and the vice chancellor who will serve as judges). The person who submits the winning entry will receive \$50 (non-tax funds). All entries must be received in the Agricultural Experiment Station Office, 109 Agricultural Hall, by 5 p.m. September 30, 1983.

STATION NAME CHANGE PROPOSED

To more clearly identify the role of the Agricultural Experiment Station, it is proposed that this division of IANR be referred to as the **Agricultural Research Division**. This designation eliminates the prevailing misconception that the Agricultural Experiment Station is a specific location in Nebraska, rather than the agricultural research component of IANR. Preliminary reactions from most unit administrators to this suggested change have been favorable, but additional comments are being sought. The Director's Office would appreciate receiving staff reactions to the proposal before September 10, 1983.

FIELD LABORATORY TASK FORCE

Membership on the Task Force to develop a long-range comprehensive plan for the University Field Laboratory was incomplete as listed in the July Newsletter. The complete committee is as follows:

Chairman.....	Roger Uhlinger
Ag Communications.....	John Adams
Ag Economics.....	Bill Miller
Ag Engineering.....	Dennis Schulte
Ag Experiment Station.....	Warren Sabs
Agronomy.....	Dale Flowerday
Agronomy.....	Jim Specht
Animal Science.....	Robert Fritschen
Animal Science.....	Terry Klopfenstein
CAMAC.....	Shashi Verma
College of Agriculture.....	Earl Ellington
Cooperative Extension Service.....	Ken Bolen
Entomology.....	Z. B. Mayo
Forestry, Fisheries & Wildlife.....	Jim Brandle
Horticulture.....	Bob Shearman
Plant Pathology.....	Stan Jensen
Southeastern Extension Agents.....	Gayle Hutton
Veterinary Science.....	Merwin Frey

This is an extremely important committee and all staff are encouraged to give their suggestions to representatives on the Task Force. The Field Laboratory has made tremendous strides since it became a research facility in 1962, but even greater changes are expected during the next 20 years to make it a first-class research and educational facility.

NATIONAL RESEARCH PRIORITIES

The Joint Council on Food and Agricultural Sciences recommended to the Secretary of Agriculture that the FY 1985 budget provide continued support to ongoing science and education in addition to the following eight priority areas:

- * Mission-oriented basic research
- * Scientific expertise development
- * Communications technology
- * Analysis of price and income policies
- * Sustained soil productivity
- * Human nutrition (including food safety and quality)
- * Water Management
- * Forest and range (including forages) productivity

PROJECT REVIEWS

Project leaders and IANR Unit Administrators are requested to critically evaluate all research project proposals before they are submitted to the Agricultural Experiment Station. When one considers that the research projects cover a 5-year period, this represents a large commitment of resources by both the department and the Experiment Station. We cannot afford to approve poorly conceived projects either from a professional or a budgetary standpoint. Critical review of proposed research projects is an important step in insuring a quality research program so we ask everyone who participates in the review process to take the assignment seriously. Those departments who do not routinely conduct a critical internal review of proposed research projects are requested to implement this step immediately. Please visit with Irv Omtvedt if you have any questions.

GOVERNOR SUPPORTS AG RESEARCH

In a recent letter from Governor Robert Kerrey, in response to receiving a copy of the *96th Annual Report of the Nebraska Agricultural Experiment Station*, the Governor wrote: "I'm a firm believer that agricultural research is very important to the well-being of agricultural industry in Nebraska and will continue to gain in importance within the next few years."

AGRONOMY DEPARTMENT HEAD SEARCH

Four candidates are scheduled to interview for the position of Department Head in Agronomy during September. They are:

David Koepp, Chairman of Crop and Soil Science at Texas Tech University.

David Lewis, Professor of Agronomy, University of Nebraska.

Lowell Moser, Professor of Agronomy, University of Nebraska.

Darrell Nelson, Soil Biochemist, Purdue University.

FACULTY DEVELOPMENT LEAVE REPORT

Merlyn K. Nielsen, Associate Professor in Animal Science, spent 11 months on faculty development leave in the Department of Genetics, University of Edinburgh, Scotland. He conducted research on growth, body composition and energy use in several lines of mice. This will provide a background for a new selection project in Animal Science using mice as the model. He also developed a technique for measuring components of litter size in mice which will be the key in a new selection study. Courses in statistics and animal genetics were audited and several scientific meetings attended. He feels that taking the leave in another country was very rewarding professionally and a memorable and enjoyable experience for his family.

Jerry W. Maranhville, Professor of Agronomy, spent the past year on faculty development leave with the University of the Philippines at Los Banos, and worked with the Institute of Plant Breeding in their physiology section. His work centered on training students and scientists in the use of physiological techniques for corn and sorghum improvement for rice-based systems. He reports that he was able to interact with scientists of different training and was able to learn different approaches to research useful in his Nebraska program. He gave several seminars, wrote a section in a Philippine publication, and will present a paper at the American Society of Agronomy meetings on some of his work in the Philippines. He also worked with the Multiple Cropping Department at the International Rice Research Institute in assisting them in agronomic research where sorghum was a component. He was given Visiting Scientist status at IRRI with an office and some support for research. He feels that the year spent in the Philippines was successful and served its intended purpose. INTSORMIL intends to support future work in the Philippines and Maranhville has been appointed country coordinator for this project.

BUDGET REALLOCATION

In compliance with President Roskens directive to reallocate two percent of the General Fund budget to areas of greatest importance, the Director's office will be meeting with IANR unit administrators and the Agricultural Experiment Station Advisory Council to establish criteria. It is obvious that further erosion in support positions and operating funds cannot be tolerated, so program reductions will be necessary to maintain a quality research program. This will not be an easy assignment coming on the heels of two successive years of base budget reductions, but it represents an opportunity to "free up" funds to address high priority needs within the Experiment Station, including salary improvement. Faculty input through their Agricultural Experiment Station Advisory Council representatives and unit administrators is needed and expected.

GRANTS & CONTRACTS

Ball, H. J. (Entomology) - American Cyanamid Company	1,000
Ball, H. J. (Entomology) - FMC Corporation	1,000
Ball, H. J. (Entomology) - Stauffer Chemical Company	500
Blad, B. L. (Ag Meteorology & Climatology) - NASA - University Affairs Office	14,300
Burnside, O. C. (Agronomy) - American Cyanamid Company	400
Burnside, O. C. (Agronomy) - American Cyanamid Company	1,650
Burnside, O. C. (Agronomy) - FMC Corporation	500
Burnside, O. C. (Agronomy) - ICI Americas, Inc.	2,500
Calkins, C. R. (Animal Science) - Donation/Gift - Lefsiell Company	4,850
Case, R. M. (Forestry, Fisheries & Wildlife) - Michigan State University	200
Compton, W. A. (Agronomy) - Illinois Foundation Seeds, Inc.	1,000
Deutscher, G. H. (North Platte Station) - Hoffman-LaRoche, Inc.	2,000
Deutscher, G. H. (North Platte Station) - The Upjohn Company	2,500
Dickason, E. A. (Entomology) - FMC Corporation	500
Dickey, E. (Ag Engineering) - UN Foundation	3,292
Flowerday, A. D. (Agronomy) - Union Carbide	3,000
Gustafson, W. A. (Southeast Extension & Research Center) Alice & Lee Franks	200
Holtzer, T. O. (Entomology) - Dow Chemical USA	500
Kerr, E. D. (Panhandle Station) - FMC Corporation	500
Kerr, E. D. (Panhandle Station) - Stauffer Chemical Company	700
Kerr, E. D. (Panhandle Station) - Union Carbide	2,000
Klocke, N. L. (North Platte Station) - Anna H. Elliott/UN Foundation	30,000
Lane, L. C. (Plant Pathology) - NC + Hybrids	120
Lane, L. C. (Plant Pathology) - Pioneer Hi-Bred International, Inc.	1,450
Larson, L. (Animal Science) - Mid-America Dairymen, Inc.	4,757
Martin, A. R. (Agronomy) - American Cyanamid Company	250
Mayo, Z. B. (Entomology) - American Cyanamid Company	1,000
Mayo, Z. B. (Entomology) - Dow Chemical	2,000
Mayo, Z. B. (Entomology) - FMC Corporation	1,000
Mayo, Z. B. (Entomology) - Stauffer Chemical	1,000
Moomaw, R. S. (Northeast Station) - American Cyanamid Company	400
Moomaw, R. S. (Northeast Station) - American Cyanamid Company	1,200
Moomaw, R. S. (Northeast Station) - Stauffer Chemical Company	700
Moomaw, R. S. (Northeast Station) - Union Carbide	750
Moser, L. E. Waller, S. S. (Agronomy) - Anna H. Elliott/UN Foundation	18,760
Moser, L. E. (Agronomy) - Union Pacific	7,532
Nelson, L. A. (Panhandle Station) - Anna H. Elliott Fund/UN Foundation	21,000
Nichols, J. T. (North Platte Station) - Anna H. Elliott Fund/UN Foundation	12,000
Olson, R. A. (Agronomy) - Tennessee Valley Authority	24,000
Owen, F. G. Larson, L. L. (Animal Science) - T. H. Nutrition Company, Inc.	10,800
Penas, E. J. (Southeast Extension & Research Center) - Dow Chemical Company	500
Peters, L. L. (South Central Station) - American Cyanamid Company	500
Peterson, G. A. (Agronomy) - Anna H. Elliott/UN Foundation	8,700
Roeth, F. W. (South Central Station) - American Cyanamid Company	2,050
Roeth, F. W. (South Central Station) - ICI Americas	1,000
Satterlee, L. D. (Food Science & Tech) - Layman Funds/UN Foundation	18,000

Schmidt, J. W. (Agronomy) - Rohm and Haas Company	3,500
Schulte, D. (Ag Engineering) - UN Foundation	807
Shahani, K. M. (Food Science & Technology) - Roberts Investments Company	4,000
Shearman, R. C. (Horticulture) - 3M Corporation	500
Shearman, R. C. (Horticulture) - BFC Chemicals	500
Shearman, R. C. (Horticulture) - Layman Funds/UN Foundation	33,000
Shearman, R. C. (Horticulture) - Union Carbide	1,000
Smith, J. A. (Panhandle Station) - Anna H. Elliott Fund/UN Foundation	16,500
Steadman, J. R. (Plant Pathology) - BASF Wyandotte Corporation	2,000
Stedman, J. R. (Plant Pathology) - Rhone-Poulenc, Inc.	750
Stubbendieck, J. (Agronomy) - Anna H. Elliott Fund/UN Foundation	8,175
Sullivan, T. W. (Animal Science) - Smith Kline Animal Health Products	4,000
Wagner, F. W. (Ag Biochemistry) - USDA - Science & Education	85,000
Wilson, R. G. (Panhandle Station) - American Cyanamid Company	500
Wilson, R. G. (Panhandle Station) - American Cyanamid Company	1,500
Wilson, R. G. (Panhandle Station) - Anna H. Elliott/UN Foundation	16,200
Witkowski, J. F. (Northeast Station) - Abbott Laboratories	500
Witkowski, J. F. (Northeast Station) - American Cyanamid Company	250
Witkowski, J. F. (Northeast Station) - American Cyanamid Company	1,500
Witkowski, J. F. (Northeast Station) - EM Industries, Inc.	1,000
	393,743

NEW OR REVISED PROJECTS

NEB 14-031 - Genetic Resistance of Pigs and Cattle to Infectious Diseases with Special Consideration of Lysozyme

This is a new Animal Health project with **E. Karbe** of the Veterinary Science Department as project leader. Objectives of the research are (1) determination of effect of lysozyme on establishment of intestinal flora and on infection with pathogenic *E coli* in baby pigs; (2) determination of bovine serum lysozyme activity and its relation to age, productivity, disease occurrence and degree of heritability; (3) determination of relation between lysozyme activity and resistance toward specific diseases by animal experiments; and (4) investigation of additional resistance factors to establish a set of tests suitable to measure and select for genetic resistance factors in livestock.

NEB 21-005 - Control of Cephalosporium Stripe of Wheat, *Rhizoctonia solani* of Sugar Beets and Soilborne Diseases

This is a revised Hatch project with **M. G. Boosalis** as project leader. The objectives of the research are (1) determine the future status of Cephalosporium stripe; (2) develop control system(s) for Cephalosporium stripe based on comparison of crop rotations and screening of varietal resistance; (3) determine whether *Laetisaria arvalis* protects transplants of sugar beets against *Rhizoctonia solani*; and (4) isolate microorganisms antagonistic to *R. solani*.

NEB 21-034 - Genetics and Genome of a Eukaryotic Algal Virus

This new Hatch project has **J. L. VanEtten** of the Plant Pathology Department as the project leader. The objectives of the research are (1) to characterize the dsDNA genome of the virus, PBCV-1, which replicates in certain, eukaryotic, unicellular *Chlorella*-like green algae; (2) to prepare a restriction map of the viral DNA; (3) to identify the synthesis of viral gene products during the viral replication cycle; (4) to isolate and characterize temperature sensitive mutants of the virus; and (5) to characterize the viral associated plant cell wall degrading enzymes.

PROJECT ACCOMPLISHMENTS

Roger J. Kittok, Associate Professor, Animal Science and **Dwane R. Zimmerman**, Professor, Animal Science. Project: Factors Influencing Uterine Competency in Swine.

This project emphasized the use and requirements of gonadal steroid hormones (progesterone and estrogen) during early gestation in swine. Although progesterone is removed from the blood as it passes through the circulatory system of the uterus during pregnancy, the removal of the uterus does not affect the metabolic clearance rate of progesterone. This indicated that progesterone uptake by the uterus does not account for a significant portion of progesterone metabolism in the pig. Also, the metabolic clearance of progesterone during early gestation did not differ from that observed on respective days of the estrous cycle. Daily injections of estrone between days 14 and 24 of gestation did not affect embryo survival, extra embryonic membrane weight and length, or the volume of allantoic fluid. When estrone was combined with an intravenous infusion of progesterone, a decrease in embryo survival was observed. Estrone or progesterone treatments were not detrimental to survival. These data indicate that there may be a delicate balance between steroid hormone requirements and embryo survival in swine.

Robert Sorensen, Professor, Agronomy. Project: Soil Factors and the Mineral Nutrient Uptake by Plants Grown on Selected Northern Nebraska Soils.

The soils of the Nebraska Sandhills, although inherently fertile, often require fertilizers and lime for maximum production of range and cultivated plants. The general patterns of movement of phosphorus were established. Although other nutrients affect the movement of phosphorus, each moves separately. Organic compounds present in soil are involved in the movement. There seems to be little problem with reversion of phosphorus to forms not accessible to plants. Most of these soils have the capability of supplying large amounts of calcium, magnesium and potassium to plants. Several soil testing procedures are too insensitive

for determining the amounts of lime needed on these sandy soils. Whereas in many acid soils, problems are caused by high levels of natural aluminum, this has not proved true in Sandhills soils.

Anne K. Vidaver, Professor, Plant Pathology. Project: Isolation, Purification and Characterization of Bacterial Plant Pathogens, Their Viruses and Bacteria.

Among the most important accomplishments are:

Bacteriocins. Specialized antibiotics were detected, isolated and purified from the plant pathogenic bacteria *Pseudomonas syringae* and related bacteria, *P. cepacia* (biotype differentiation showed for the first time that there were differences between human, soil and plant pathogens), corynebacteria and the soybean inoculant, *Rhizobium japonicum*. This research was the first to show bacteriocin production in plants.

New Bacteria. Beneficial. Bacteria capable of nitrogen fixation were discovered in the roots of winter wheat and sorghum. Unfortunately, irreproducibility of results in greenhouse and growth chamber tests have hampered successful, artificial inoculation with these bacteria. **Pathogenic.** In 1978, a bacterium producing undescribed leaf lesions of dent (field) corn was isolated and identified. Its identification as a previously described bacterium which is seldom of economic importance was reassuring. A new corynebacterial pathogen of wheat was detected and described. It produces symptoms similar to viruses, so that it was called bacterial mosaic. In determining its relationship to other corynebacterial pathogens, new insights were gained in the relationship of all the corynebacteria and to other bacteria.

George E. Meyer, Assistant Professor of Ag Engineering. Project: Adaptive, Physiological Crop, Production Models with Controlled and Natural Environments.

Two special microprocessor-controlled, plant growth chambers were used to study the effect of a weather sequence on corn and soybean growth, development, and plant water-use. This was part of a new program in Agricultural Engineering for developing microprocessor-assisted instrumentation and control systems. The development system is a special computer used to design, debug, and test special microprocessor hardware and software for agricultural applications. Information obtained from the plant growth chamber studies is combined with field data to develop and test comprehensive computer simulation models for corn and soybean growth. The advantage of the computer model is that a plant's annual life cycle can be reviewed in seconds, making it an important teaching and research tool.

Max D. Clegg, Assoc. Professor of Agronomy. Project: Environmental and Morphological Crop Physiology.

The objective of this project was to look at the physiological basis of environment and crop morphology in cropping systems.

Erect (leaves with a stiff mid-rib, 100 cm ht), short normal (107 cm ht) and tall normal (130 cm ht) were grown in 38, 76, and 114 cm rows. Light interception of photosynthetically active radiation (PAR) and grain yield was the same for all hybrids in both the 38 and 76 cm rows. Only the short normal leaved type intercepted less PAR and yielded less in the 114 cm rows. Plant height and erect leaves compensated and resulted in a nearly complete canopy for PAR utilization.

Light interception of wheat in relation to height showed that in 35 cm rows a plant height of 100 cm resulted in maximum PAR interception. Tall wheat varieties (100 cm) yielded more than short genotypes (70

cm) in 15 and 30 cm rows. Yields of these wheat varieties were greater in 15 cm rows.

A developmental index (DI) for identifying cool tolerant sorghum hybrids has been developed, is based on growing degree units to 50% anthesis using a base temperature of 15.5 C. This should help in interpreting field data and be used in modeling.

PANHANDLE STATION DIRECTOR POSITION

The Search Committee for the Director of the Panhandle Station and Extension District I Director met on July 27, 1983. The position is currently being advertised and applications will be accepted until October 15, 1983. **Robert G. Wilson** is chairman of the Search Committee and applications and nominations should be sent to him at the Panhandle Station.