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## Agricultural Experiment Station News September 1990

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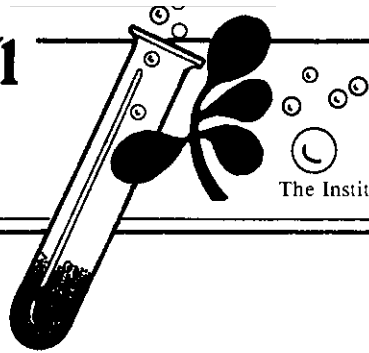
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September 1990

Volume 24, Number 1

## NATIONAL SUSTAINABLE AGRICULTURE & NATURAL RESOURCES CONFERENCE

A most successful National Sustainable Agriculture and Natural Resources Conference was held in Lincoln from August 15-18, 1990. Over 350 national and local participants attended who have interest in developing a profitable agriculture that is environmentally sound, resource efficient, socially acceptable and, thus, sustainable for the future.

The format included idea exchanges, guest speakers, state team meetings, and farm and research bus tours. Over 200 attendees participated Saturday in three bus tours which viewed sustainable based research results at ARDC and South Central Research and Extension Center and 12 farms that have practiced low or no chemical use, some for as long as twenty years.

A wide array of sponsors, including private agencies and agri-business firms, contributed to the resounding success of the conference.

Warren W. Sahs was presented a Special Commendation Award in recognition of outstanding contributions to achieving a more sustainable agriculture.

## SOYBEAN PRODUCTION, UTILIZATION AND MARKETING AT 1990 IANR EXPO

The 1990 IANR Expo featuring Soybean Production, Utilization and Marketing was held Tuesday, August 14, at the Agricultural Research and Development Center, Mead, Nebraska. This event was sponsored by the Nebraska Soybean Checkoff Board, Saunders County Soybean Growers Association and the Institute for Agriculture and Natural Resources. The attendees participated in field demonstrations, five walking and riding tours, and viewed over 40 educational exhibits. A highlight was fresh doughnuts cooked in soy oil.

Kenneth Bader, chief executive officer of American Soybean Association, spoke on future soybean utilization and marketing opportunities during a special noon luncheon.

## ARD ADVISORY COUNCIL ELECTION RESULTS

As a result of recent elections, the following individuals were selected to serve on the Agricultural Research Division Advisory Council for a three-year period:

District 1: Agricultural Economics and Food Science and Technology - **John Rupnow**

District 6: Biometrics; Forestry, Fisheries, and Wildlife; and Veterinary Science - **Edward Peters**

District 7: Biochemistry and Plant Pathology - **James Partridge**

Returning ARD Advisory Council members are:

District 2: Biological Systems Engineering; Northeast R & E Center; South Central R & E Center; Southeast R & E Center - **Fred Roeth**

District 3: Agronomy - **Pat Shea**

District 4: Agricultural Meteorology, Entomology, Horticulture, and Environmental Programs - **Shashi Verma**

District 5: Animal Science - **Rodger Johnson**

District 8: Agricultural Communications; Agricultural Education; Human Development and the Family; Human Nutrition and Food Service Management; Textiles, Clothing and Design - **Rita Kean**

District 9: West Central R & E Center and Panhandle R & E Center - **John Campbell**

The Agricultural Research Division appreciates the dedicated service and contributions to the Council by the out-going members **Azzeddine Azzam**, **Subramaniam Srikumaran**, and **Tom Powers**. The 1990-91 Council officers are: **Pat Shea**, Chair and **John Campbell**, Secretary.



## COMPARING FEDERAL COMPETITIVE GRANT PROGRAMS

The following chart compares FY 88 competitive grant statistics of the USDA's Cooperative State Research Service (CSRS), NSF, NIH overall, and the National Institute of General Medical Sciences (NIGMS).

FY 88 Parameters	CSRS	NSF	NIH	NIGMS
Number of proposals	1466	3586	19,205	2709
Number of grants funded	339	683	6212	1044
Percentage of proposals resulting in grants	23.1%	19.0%	32.3%	38.5%
Amount requested (millions)	\$339.2	\$1096.7	\$3728	\$461.5
Amount awarded for new grants (millions)	\$ 37.2	\$ 61.5	\$1098.5	\$167.4
Percentage of requested amounts awarded	10.9%	5.6%	29.0%	36.0%
Average amount/new award (thousands/year)	\$50.0	\$69.6	\$154.9	\$156.2

### FY 1991 CSRS BUDGET - HOUSE VERSION

The House Appropriations Committee marked up the FY 1991 Rural Development, Agriculture, and Related Agencies Appropriations Bill. Preliminary information obtained shows a program total for CSRS of \$375,926,000 and includes (all numbers are thousands):

	FY91 House	FY90 Approp.
Hatch Act	\$163,327	157,045
McIntire-Stennis Cooperative Forestry	13,494	17,500
Evans-Allen	26,346	25,333
Animal Health and Disease, Sec. 1433	5,695	5,476
Critical Agricultural Materials Act	500	5,368
Special Research Grants (includes Animal Health Section)	56,909	56,543
National Research Initiative	73,000 <sup>1</sup>	43,066 <sup>2</sup>
Federal Administration (direct appropriation)	14,985	13,757
Rangeland Research, Subtitle M	475	475
Aquaculture Centers, Sec. 1475	3,750	3,750
International Trade Centers, Sec. 1458A	2,227	3,152
Low Input Sustainable Agriculture (LISA)	4,450	4,450
Supplemental & Alternative Crops, Sec. 1473D	918	325
Higher Education:		
1890 Strengthening Grants	2,000	1,902
Competitive Institution	1,500	1,000
Challenge Grants		
Graduate Training Grants	3,500	2,852
Morrill-Nelson	2,850	2,850
<b>Total, CSRS</b>	<b>375,926</b>	<b>344,844</b>
CSRS Buildings and Facilities Account	\$ 45,361	45,686

<sup>1</sup>National Research Initiative specific areas of research include: \$35 million plant systems; \$20 million animal systems; \$4 million nutrition, food quality, and health; and \$14 million natural resources and the environment.

<sup>2</sup>CSRS Competitive Grants Program. The Committee has provided \$8.35 million for Water Quality Special Research Grants.

Included within the \$14.985 million for Federal Administration (direct appropriation) is \$8.25 million for the 1890 Institutions Capacity Building Grants program.

The following general provision is again included in the Bill, but note the rate has been reduced from 25 percent to 14 percent:

Sec. 639. None of the funds in this Act shall be available to pay indirect costs on research grants awarded competitively by the Cooperative State Research Service that exceed 14 percent of total direct costs under each award.

OMB has recently issued guidance to Federal agencies concerning possible implementation of a Gramm-Rudman-Hollings sequester. The initial sequester order was issued by the President on August 25. This order was based on the initial OMB sequester report that indicates a sequester of 31.9% for non-defense accounts. This sequester will take effect on October 1 unless Congress passes a deficit-reduction program. It is likely that the USDA will begin FY 1991 under a short-term Continuing Resolution since the Senate will not consider an Agricultural Appropriation Bill until September 5. We will not know the final level of the sequester until the Ag Appropriations and Deficit Reduction Bills are passed by Congress and signed by the President.

### FY 1989 ARD EXPENDITURES BY SOURCE

Funding Source	Including Revolving Funds	Without Revolving Funds
	-----% of total-----	
Federal Formula	8.4	11.7
USDA Grants & Contracts	8.4	11.7
Other Federal Grants	5.1	7.1
State Appropriations	42.8	59.7
Revolving Funds	28.2	--
Industry Grants & Contracts	4.2	5.8
Other NonFederal	2.9	4.0
<b>Total Expenditures (\$)</b>	<b>36,731,279</b>	<b>26,373,178</b>

### ANNE VIDAVER APPOINTED TO APUA SCIENTIFIC ADVISORY BOARD

The Board of Directors of the Alliance for the Prudent Use of Antibiotics recently announced that Dr. Anne K. Vidaver has been appointed to the Scientific Advisory Board.

**FY 1989 ARD EFFORTS CLASSIFIED BY  
RESEARCH PROGRAM<sup>1</sup>**

Research Program	Expenditures <sup>2</sup>	Scientist-Years	Support Years
	-----% of total-----		
Natural Resources	13.5	16.3	16.1
Crops	40.5	40.2	37.9
Animals	35.9	27.3	39.1
People, Communities & Institutions	2.5	4.4	1.1
Competition, Trade & Policy	2.6	3.7	2.3
Other Technology	3.5	4.5	2.1
Food Sci & Nutr	2.9	3.0	3.0
Unclassified	1.7	0.4	0.8

<sup>1</sup>Program efforts at MARC are not included.

<sup>2</sup>Revolving fund expenditures are not included.



**HARDIN DISTINGUISHED GRADUATE  
FELLOWSHIP 1990 - 1991**

The recipient of the Hardin Distinguished Graduate Fellowship for 1990-91 is Mr. Kyoung-Nam Kim from the Horticulture Department. This 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 pathology. Mr. Kyoung-Nam Kim's advisor is Robert Shearman of the Agronomy Department.

**WIDAMAN TRUST DISTINGUISHED  
GRADUATE ASSISTANT AWARD**

The Widaman Trust was established in 1975 through a trust provided by Miss Blanch Widaman. Miss Widaman asked that the income from the trust be used by the University in basic research in agriculture and medicine and be used to support a person rather than supplies and/or equipment. She requested the money be used as scholarship or fellowship money for graduate students doing basic research in these areas.

**List of Recipients**

Muhammad T. Javed, Agricultural Economics  
Production Economics  
Glenn A. Helmers, Advisor

Pamela J. Hutchinson, Agronomy  
Weed Science  
Patrick Shea, Advisor

Scott L. Tragesser, Agronomy  
Plant Breeding  
W. Youngquist and C. Gardner, Advisors

Roderick D. Lee, Agronomy  
Plant Breeding-Sorghum  
J.F. Pedersen, Advisor

Rafael Nunez-Domingues, Animal Science  
Animal Breeding  
Dale Van Vleck, Advisor

Gary F. Louis, Animal Science  
Non-Ruminant Nutrition  
Austin J. Lewis, Advisor

Scott J. Eilert, Animal Science  
Meat Science  
Roger Mandigo, Advisor

Juan Carulla, Animal Science  
Ruminant Nutrition  
R. Britton and T. Klopfenstein, Advisors

Sandeep Bhatnagar, Biological Systems Engineering  
Agricultural Engineering  
Milford Hanna, Advisor

Muhammad Yasin, Biological Systems Engineering  
Farm Power and Machinery  
Robert Grisso, Advisor

Michael Catangui, Entomology  
Entomology  
John B. Campbell, Advisor

Hassan Gourama, Food Science & Technology  
Food Science & Technology  
L.B. Bulleman, Advisor

Thomas A. Salaiz, Horticulture  
Turfgrass Science  
R. Shearman, T. Riordan, B. Blad & E. Walter-Shea, Advisors

Dennis Whitehead, Human Nutrition & Food Svc Mgmt  
Nutrition  
Nancy M. Betts, Advisor

Lingyu Zhang, Plant Pathology  
Plant Path-Virology  
W.G. Langenberg, Advisor

Robert A. Kinkle, Veterinary Science  
Pathology -MSIA  
G.E. Duhamel, Advisor

Douglas L. Stine, Veterinary Science  
Veterinary Immunology  
S. Srikumaran, Advisor

## INTERNATIONAL TRAVEL AWARDS 1990

Limited foreign travel funds (up to \$1,000) will be provided by the Agricultural Research Division to selected ARD faculty to pursue professional development opportunities. Participation in workshops, visiting research institutes and colleagues to acquire specific techniques or to develop new concepts or processes are example of professional development activities that qualify for consideration.

### Recipients

#### Animal Science:

**Merlyn K. Nielsen**

"4th World Congress on Genetics Applied to Livestock Production" - Edinburgh, Scotland

#### Biological Systems Engineering:

**Darrell G. Watts & Derrell Martin**

"Establishment of Cooperative Research and Graduate Student Education with the University of Concepcion - in Chillan, Chile.

#### Food Science & Technology:

**Michael Zeece**

"Proteinases & Their Inhibitors in Muscle: An International Collaborative Research Effort - in Ireland.

#### Forestry, Fisheries & Wildlife:

**Mark Harrell**

"Methods Used to Extract & Analyze Insect Pheromones, Prepare Synthetic Pheromone Lures, and Determine by Laboratory and Field Techniques.



### INTERDISCIPLINARY RESEARCH SUPPORT PROGRAM 1990

The Agricultural Research Division encourages the initiation of interdisciplinary research, in an effort to more effectively address the complex problems confronting Nebraska's agricultural and food industries and to improve the University's ability to provide more useful, integrated information to clientele. There are a number of reasons supporting the need for enhanced interdisciplinary research efforts. Greater specialization among scientists tends to lead to more fragmented, highly specialized bits of information which may be more difficult to use by traditional clientele.

New projects that were funded are as follows:

#### *Agronomy and Biological Systems Engineering*

**David Mortensen, Kenneth Von Bargen, George Meyer & Gail Wicks**

"Development of an Intermittent Sprayer System for Reducing Chemical Input in Nebraska Cropping Systems"

#### *Agronomy, USDA/ARS, and Biogenetic Services*

**Blaine Johnson, Donald Lee, Jerry Maranville, Wallace Wilhelm, James Schepers, Alex Kahler**

"Mapping of loci affecting the uptake and utilization of nitrogen in maize"

Continuing projects that were funded are as follows:

#### *Food Science & Technology, Biological Systems Engineering, and Horticulture*

**Lloyd Bullerman, Susan Cuppett, Wendell Gauger, Milford Hanna, Roger Uhlinger (grad student)**

"Utilization of Cereal Grains & Food Processing Wastes as Substrates for Exotic Mushroom and Fungal Mycelial Biomass Production"

### UNIVERSITY OF NEBRASKA FOUNDATION GRANT AWARD 1990

#### **Marion O'Leary, Biochemistry**

"Isotopic Studies in Plant Biochemistry"  
Equipment: Liquid Scintillation Counter

#### **Michael Meagher, Food Science & Technology**

"Request for Equipment for the Food Processing Center & Center for Biotechnology Fermentation Facility"  
Equipment: Bio-Recovery membrane holder & Diafiltration pump

### SAMPSON RANGE & PASTURE MANAGEMENT ENDOWMENT 1990

A substantial new endowment was established in the University of Nebraska Foundation by the widow of Arthur William Sampson to support range and pasture management programs at the University of Nebraska. Projects eligible for support include pasture management, range land management, and the study of native grasses. Those projects receiving support are:

#### **James Stubbendieck, Agronomy**

"Application of Geographic Information System Technology to Blowout Successional Dynamics"

#### **Lowell Moser, Agronomy**

"Grazing Evaluation of Cool-Season Grasses in the Nebraska Sandhills"

#### **Bruce Anderson, Agronomy**

"Intra- and Inter-Species Competition During Stand Establishment of Native Warm-Season Grasses"

## NEW OR REVISED PROJECTS

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

### 11-082 (Biological Systems Engineering) Decision Support Systems for the Agricultural Producer

*Investigator:* T. L. Thompson

*Status:* New Hatch project effective May 9, 1990

### 16-053 (Food Science & Technology) Role of Proteinase Inhibitors in Protein Degradation

*Investigator:* M. Zeece

*Status:* New Hatch project effective May 10, 1990

### 17-050 (Entomology) Integrated Management of Stable Flies and House Flies on Confined Livestock

*Investigator(s):* G. D. Thomas and J. J. Petersen

*Status:* New Hatch project effective April 1, 1990

### 17-051 (Entomology) Arthropods Associated with Buffalograss and Other Turfgrasses in Nebraska

*Investigator:* F. Baxendale

*Status:* New Hatch project effective April 1, 1990

### 21-044 (Plant Pathology) Biological Control of Soilborne Diseases of Dry Bean and Turfgrass with Antagonistic Bacteria

*Investigator:* G. Yuen

*Status:* New Hatch project effective July 5, 1990

### 27-008 (Agricultural Meteorology) Variables in Agricultural-Weather Information Systems

*Investigator:* K. G. Hubbard

*Status:* New Hatch project that contributes to NC-94 effective October 1, 1989

### 91-032 (Human Nutrition and Food Service Management) Assessment of Vitamin B-6 Requirements of Adults

*Investigator:* J. A. Driskell

*Status:* New Hatch project effective May 1, 1990

### 91-033 (Human Nutrition and Food Service Management) Nutrient Composition of Meats and Vegetables as Consumed

*Investigator(s):* J. Driskell, J. Albrecht, F. Hamouz, N. Lewis and M. Schnepf

*Status:* New Hatch project effective June 15, 1990

### 93-024 (Human Development and the Family) Nebraska's Youth at Risk, Assessing the Problem

*Investigator:* J. Woodward

*Status:* New Hatch project effective April 23, 1990

### 93-025 (Human Development and the Family) The Influence of Volunteer Companion Programs on Self Competence and Family Relationships of Children

*Investigator(s):* D. A. Abbott and W. H. Meredith

*Status:* New Hatch project effective June 1, 1990

## GRANTS AND CONTRACTS RECEIVED

MAY, JUNE, JULY, & AUGUST 1990

<b>Agronomy</b>	
Miscellaneous grants under \$5,000 each	155,977
<b>Agricultural Economics</b>	
Supalla, R. - Natural Resources Commission	20,400
<b>Agricultural Meteorology</b>	
Wilhite, D. A. - NOAA	88,347
Wilhite, D. A. - UN Environment Program	40,000
Miscellaneous Grants Under \$5,000 each	3,000
<b>Animal Science</b>	
Calkins, C. R. - National Live Stock & Meat Board	17,500
Grotjan, H. E. - National Institute of Health	157,666
Klopfenstein T. J. - Pitman-Moore	20,700
Mandigo, R. W. - National Live Stock & Meat Board	32,970
Miscellaneous Grants Under \$5,000 each	42,031
<b>Biochemistry</b>	
O'Leary, M. - National Institute of Health	121,981
Spreitzer, R. J. - USDA	86,000
<b>Biological Systems Engineering</b>	
Watts, D. G., Spalding, R., Schepers, J. - USDA	320,000
Miscellaneous Grants Under \$5,000 each	23,679
<b>Entomology</b>	
Higley, L. - USDA/CSRS	128,787
Miscellaneous Grants Under \$5,000 each	56,065
<b>Environmental Programs</b>	
Kamble, S. T. - USDA/CSRS-NAPIAP	14,787
Miscellaneous Grants Under \$5,000 each	5,000
<b>Food Processing Center</b>	
Miscellaneous Grants Under \$5,000 each	58,356
<b>Food Science &amp; Technology</b>	
Miscellaneous Grants Under \$5,000 each	10,698
<b>Forestry, Fisheries &amp; Wildlife</b>	
Savidge, J. A. - U.S. Fish & Wildlife Service	13,600
Miscellaneous Grants Under \$5,000 each	2,030
<b>Horticulture</b>	
Miscellaneous Grants Under \$5,000 each	31,088
<b>Human Nutrition &amp; Food Service Management</b>	
Kies, C. V. - Nebr. Pork Producers Ass'n	6,000
<b>Northeast Research &amp; Extension Center</b>	
Miscellaneous Grants Under \$5,000 each	27,800
<b>Panhandle Research &amp; Extension Center</b>	
Miscellaneous Grants Under \$5,000 each	86,963
<b>Plant Pathology</b>	
VanEtten, J. L. - National Institute of Health	168,112
Miscellaneous Grants Under \$5,000 each	48,271
<b>South Central Research &amp; Extension Center</b>	
Elmore, R. W. - UN Foundation	19,920
Ferguson, R. B. - UN Foundation	19,600
Miscellaneous Grants Under \$5,000 each	36,600
<b>Textiles, Clothing &amp; Design</b>	
Miscellaneous Grants Under \$5,000 each	11,500
<b>Veterinary Science</b>	
Duhamel, G. E. - National Pork Producers Council	12,500
Duhamel, G. E. - Nebraska Pork Producers	5,000
Jones, C. - National Cancer Institute	81,263
Jones, C. - Nebraska Dept. of Health	40,000
Osorio, F. A. - National Pork Producers Council	13,000
Miscellaneous Grants Under \$5,000 each	38,519
<b>West Central Research &amp; Extension Center</b>	
Dearborn, D. - USDA	93,852
Miscellaneous Grants Under \$5,000 each	51,968
<b>Grand Total</b>	<b>2,211,530</b>



The following projects were approved by the Nebraska Corn Development, Utilization and Marketing Board for July 1, 1990-June 30, 1991 Funding

M.A. Hanna R. Chinnaswamy	A Fundamental Study on Grain - Starch Quality	17,950
D. H. Sander D. T. Walters	Managing Nitrogen More Effectively for Reduced Costs and Environmental Hazards	25,706
G. W. Hergert R. B Ferguson C. A. Shapiro	Reducing Nitrate Losses to Ground Water by Improving the Accuracy of the Residual Nitrate-Nitrogen Soil Test for Corn	19,000
M. A. Hanna R. Chinnaswamy L. D. Clements	Corn-Based Biodegradable Polymers (Bioplastics)	34,000
T. J. Klopfenstein	Corn Steep Liquor in Beef Supplements	14,360
L. D. Clements	Conventional Polymers from Corn	9,500
L. D. Clements	Industrial Use of Corn Oil	10,000
M. Meagher R. Hutkins D. Jackson M. Hanna	Liquifaction of Starch by Extrusion for Direct Utilization of High Starch Concentrations in Fermentors	22,560
B. Doupnik, Jr.	Corn Lethal Necrosis Investigations Develop PCR Probe for MCMV Overwintering Mechanism of MCMV	7,000
R. Stock T. Klopfenstein R. Britton	Evaluation of Hominy Feed for Finishing Cattle	14,060
A. Azzam A. L. Frederick G. Helmers T. Park	Economic Consequences of Reverting to Low Input Agriculture: Implications for the Feed Grain and Livestock Sectors in Nebraska and the Rest of the U.S. in Light of Current & Alternative Government Programs	8,000
D. S. Jackson	Nebraska Corn Quality Evaluation	13,500

The following projects were approved by the Nebraska Soybean Development, Utilization and Marketing Board for funding July 1, 1990-June 30, 1991 Funding

Vicki Miller Judy Nelson	Agricultural Research Division Popular Research Publication	3,000
A. Azzam Roy Frederick Glenn Helmers Tim Park	Economic Consequences of Reverting to Low Input Agriculture: Implications for the Feed Grain and Livestock Sectors in Nebraska and the Rest of the United States in Light of Current and Alternative Government Programs	12,000
George Graef Jim Specht	Protein and Oil Analysis of High Protein Lines	11,675
George Graef Jim Specht	Development of Improved Soybean Varieties in Nebraska	45,175
Alex Martin	Low Rate Herbicide Application for Weed Control in Soybeans	15,600
Fred Wagner	Leghemoglobin Structured and Functional Changes	23,574
Gary Hergert Gall Wicks Paul Nordquist Norman Klocke Richard Clark	Soybean Variety Evaluations Under Sprinkler Irrigation	15,000
L. D. Clements	Industrial Use of Soybean Oil	10,000
R. Stougaard Lenis Nelson Doug Jose Keith Glewen	The Nebraska Soybean Profit- ability Project	13,420



The following projects were approved by the Nebraska Dry Bean Commission for July 1, 1990-June 30, 1991 Funding:

Dermot Coyne James Steadman Anne Vidaver David Nuland Dale Lindgren	Breeding Dry Beans with Multiple Disease Resistance Combined with Improved Seed Quality, Yield, and Plant Type	10,000
Eric Kerr James Robb John Smith Robert Wilson C. Dean Yonts	New Production Systems for Dry Edible Beans to Improve Production Efficiency - a Multidisciplinary, Systems Approach	10,800
A. Pavlista David Nuland Larry Williams Milford Hanna	Quality Determinations for a Mixed - Dry Bean/Potato Processed Food	8,000
Robert Wilson	Nightshade Control in Dry Edible Beans	5,000
Gary Yuen James Steadman Eric Kerr	Evaluation of Biological Control for the Management of White Mold Disease of Dry Bean	8,100
Durward Smith	Establishing a Data Base for Pesticides in Dry Edible Beans	2,610

The following projects were approved by the Nebraska Grain Sorghum Development, Utilization and Marketing Board for July 1, 1990-June 30, 1991 Funding:

D. T. Walters D. H. Sander	Increasing Nitrogen Use Efficiency by Dryland Sorghum Under Conventional and No-Tillage Systems	7,750
J. D. Eastin D. J. Andrews	Sorghum Stress Research <i>Part 1: Stress Screening Methodology</i> <i>Part 2: Drought/Heat Stress Screening and Testing</i>	24,400
P. T. Nordquist D. J. Andrews	Sorghum Seed Production in Columbia River Basin	15,000
B. P. Spike R. J. Wright S. D. Danielson	Biology and Behavior of the Chinch Bug in Nebraska: Factors Leading to Crop Loss and Development of Improved Management Practices	16,788
L. D. Clements	Screening of Oils, Waxes, and Tannins From Grain Sorghum for Use in Industrial Non-food Products	8,000

The following projects were approved by the Nebraska Wheat Board for July 1, 1990-June 30, 1991 Funding:

P. S. Baenzliger D. Shelton	Improving Wheat Varieties for Nebraska	24,200
D. Shelton P. S. Baenzliger	Selecting Nebraska Wheat for Processing Needs of Domestic and Foreign Markets	20,000
G. L. Hein	Economic Impact and Management of Russian Wheat aphid, <i>Duraphis noxia</i> (Mordw.) on Wheat in Nebraska	10,560
R. A. Graybosch	Antibodies as Diagnostic Tools for Improving the End-Use Quality of Nebraska Hard Red Winter Wheats	9,000
P. S. Baenzliger M. D. Clegg	Characterizing the Effect of Short Term Heat Stress on Kernel Development and Quality	1,500
D. D. Baltensperger	Control of Winter Annual Grasses in a Reduced Tillage Wheat System	12,000
D. D. Baltensperger I. G. Rush	Evaluation of Jointed Goatgrass as a Component of Feed Grain: Toxic Effects and Passage Through the Animal	2,350
P. S. Baenzliger	Support for a New Small Grains Planter	15,000
D. S. Jackson	Development of a Wheat Starch Based Bread Staling Inhibitor	13,500
R. D. Fritschen	Wheat Production and Marketing Resource Collection	585