6-30-1974

88th Annual Report of the Nebraska Agricultural Experiment Station

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FOREWORD

The 60th Annual Report of the Nebraska Agricultural Experiment Station contains a list of all active projects during July 1, 1971 to June 30, 1972, a list of Station publications, staff members, and a financial report. Information derived from the various research projects is published in bulletins, circulars, scientific and trade journals, in the Nebraska Farm Ranch and Home Quarterly and as mimeographed departmental reports. Station bulletins, circulars and the Quarterly may be obtained free from any county agricultural agent or by writing to the Director of the Experiment Station, University of Nebraska-Lincoln, Institute of Agriculture and Natural Resources, Lincoln, Nebraska 68503. Reprints of most journal articles may be obtained by writing directly to the authors.

Howard W. Ottoson, Director
Agricultural Experiment Station

ADMINISTRATION AND STAFF

The Regents of the University

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Robert R. Koefoot, Grand Island
James H. Moylan, Omaha
Robert J. Prokop, Omaha
Robert Raun, Minden
Edward Schwartzkopf, Lincoln
Kermit Wagner, Schuyler
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James H. Zumberge, Chancellor of the University of Nebraska-Lincoln
Francis L. Schmehl, Ph.D., Research Administrator

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Robert W. Klein, Ph.D., Associate Director
Warren W. Sahs, Ph.D., Assistant Director and Supervisor, University Field Laboratory
Leslie F. Sheffield, Ph.D., Assistant Director and Coordinator, Irrigation Development Program
Patricia J. Sailor, Ph.D., Assistant Director and Associate Dean, College of Home Economics

THE TECHNICAL STAFF

Agronomy

D. G. Hanway 1,2,3 Ph.D., Professor and Chairman of Department
A. R. Aandahl 2 Ph.D., Professor—Soil Survey
W. A. Anderson 1 M.S., Instructor—Crop Production
O. C. Burnside 1,2 Ph.D., Professor—Weed Science
Leon Chesnin 1,2 Ph.D., Associate Professor—Soil Chemistry
M. D. Clegg 1,2 Ph.D., Associate Professor—Sorghum Physiology
W. A. Compton 1,2 Ph.D., Professor—Corn Breeding and Genetics
E. C. Conard 1,2 Ph.D., Associate Professor—Pasture Management
A. F. Dreier 2,3 M.S., Professor—Crop Variety Evaluation
J. D. Eastin 1,2 Ph.D., Professor—Sorghum Physiology
L. F. Elliott 2,5 Ph.D., Associate Professor—Soil Microbiology
A. D. Flowerday 1,2 Ph.D., Professor—Crop Production
C. O. Gardner 1,2 Ph.D., Professor—Statistics, Genetics
H. J. Gorz 2,5 Ph.D., Professor—Forage Genetics
J. M. Hart 2 M.S., Instructor—Soils
F. A. Haskins 1,2 Ph.D., Professor—Biochemical Genetics
V. A. Johnson 2,5 Ph.D., Professor—Winter Wheat Breeding

1 Teaching Staff
2 Station Staff
3 Extension Staff

R. B. Clark 2,5 Ph.D., Professor—Plant Physiology
P. W. Horlbeck 2,3 Ph.D., Asst. Prof.—Soil Fertility
P. W. Horlbeck 2,3 Ph.D., Asst. Prof.—Soil Microbiology
P. W. Horlbeck 2,3 Ph.D., Asst. Prof.—Weed Physiology

4 Leave of Absence
5 Cooperative, USDA
Earl F. Ellington 1,2 Ph.D., Associate Professor—Beef Physiology
Stanley Farlin 1,2 Ph.D., Associate Professor—Beef Nutrition
Paul O. Guyer 2,3 Ph.D., Professor—Beef Nutrition
Philip L. Kelly 1,2 Ph.D., Professor—Dairy (Emeritus)
Terry J. Klopfein 1,2 Ph.D., Professor—Ruminant Nutrition
Larry L. Larson 1,2 Ph.D., Assistant Professor—Dairy Physiology
Roger Mandigo 1,2,3 Ph.D., Professor—Meats
B. D. Moser 1,2 Ph.D., Assistant Professor—Swine Nutrition
Merlyn K. Nielsen 1,2 Ph.D., Assistant Professor—Beef Breeding
Foster G. Owen 1,2 Ph.D., Professor—Dairy Nutrition
Ernest R. Peep, Jr. 1,2 Ph.D., Professor—Swine Nutrition
Andrew B. Schultze 1,2 Ph.D., Associate Professor—Dairy Physiology (Emeritus)
John K. Ward 1,2 Ph.D., Associate Professor—Beef Nutrition
Duane R. Zimmerman 1,2 Ph.D., Professor—Swine Physiology

Laboratory of Agricultural Biochemistry

R. L. Borchers 1,2 Ph.D., Professor—Nutritional Biochemistry
J. L. Daly 1,2 Ph.D., Professor—Plant Intermediary Metabolism
Richard Dam 1,2 Ph.D., Assistant Professor—Nutritional Biochemistry
R. M. Hill 1,2 Ph.D., Associate Professor—Protein Biochemistry
R. V. Klucas 1,2 Ph.D., Assistant Professor—Nitrogen Fixation
H. W. Knoche 1,2 Ph.D., Professor and Head of Laboratory—Lipid Biochemistry
R. L. Ogden 2 B.S., Assistant Professor—Alfalfa Processing
F. W. Wagner 2 Ph.D., Associate Professor—Enzymes

Economics (Agricultural)

Glen Vollmar 1,2,3 Ph.D., Professor and Chairman of Department
Dale Anderson 1,2 Ph.D., Associate Professor—Marketing
Maurice Baker 1,2 Ph.D., Associate Professor—Resource Economics
Larry Bitney 2,3 Ph.D., Professor—Farm Management
A. W. Epp 2 Ph.D., Professor—Farm Management
Loyd Fischer 1,2 Ph.D., Professor—Resource Economics
Paul Gessaman 2,3 Ph.D., Associate Professor—Rural Resource Development
Ronald Hanson 1,2 Ph.D., Assistant Professor—Farm Management and Agricultural Finance
James Hassler 1,2 Ph.D., Professor—Marketing and Price Analysis
Glen Helmers 1,2 Ph.D., Associate Professor—Production Economics
P. A. Henderson 2,3 Ph.D., Professor—Farm Management
R. D. Johnson 2,3 M.S., Assistant Professor—Farm Management
James Kendrick 1,2 Ph.D., Professor—Marketing

D. Wendell Holmes 2,3 M.S., Associate Professor—Resource Economics
Bruce Johnson 1,2, Ph.D., Assistant Professor—Resource Economics
William Lagrone 2,5 M.S., Associate Professor—Production Economics
Paul Lytle 1,2 Ph.D., Associate Professor—Marketing
John Muehlbeier 2,5 Professor—Land Economics
Duane Olsen 2,3 Ph.D., Associate Professor—Rural Resource Development
Michael S. Turner 1,2,3 Ph.D., Professor—Marketing
Allen C. Wellman 2,3 Ph.D., Associate Professor—Marketing

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J. P. Holman 1,2,3 M.S., Professor—Experiment Station Editor
Janet Poley 1,2,3 M.S., Assistant Professor—Home Economics Radio and Television
Grant I. Johnson 2,3 B.A., Assistant Professor—Press
James Randall 2,3 M.S., Assistant Professor—Radio

Education (Agricultural)

J. T. Horner 1,2 Ed.D., Professor and Chairman of Department
R. D. Dillon 1,2,3 Ed.D., Professor—Program Planning, Advanced Studies and In-service Education
R. L. Douglas 1,2 Ph.D., Assistant Professor—Methods of Instruction and In-service Education

Education and Family Resources

Gwendolyn Newkirk 1,2,3 Ed.D., Professor and Chairman of Department
Steven Androechel 1,2 M.S., Assistant Professor—Quality Housing Environment for Low-Income Families
Healment 1,2 Ph.D., Assistant Professor—Development of Teaching Skills
M. Ann Irvine 1,2 M.S., Instructor—Development of Teaching Skills
Shirley Kreutz 1,2 Ed.D., Associate Professor—Development of Teaching Skills
Florence Walker 1,2 Ph.D., Associate Professor—Home Management Family Economics

Engineering (Agricultural)

W. E. Splinter 1,2,3 Ph.D., Professor and Chairman of Department
L. L. Bashford 1,2 Ph.D., Assistant Professor—Food Engineering
O. E. Cross 1,2,4 Ph.D., Associate Professor—Farmstead Engineering
J. A. DeShazer 1,2 Ph.D., Associate Professor—Livestock Facilities
P. E. Fischbach 2,3 M.S., Professor—Irrigation Engineering
C. B. Gilbertson 2,5 M.S., Assistant Professor—Livestock Waste Management
C. L. Linderman 2,5 M.S., Instructor—Soil and Water Conservation
D. M. Manbeck 1,2 Ph.D., Associate Professor—Natural Resources
M. L. Mumgaard 2 B.S., Assistant Professor—Tractor Testing
S. O. Nelson 2,5 Ph.D., Professor—Production Processing
L. L. Olson 2,5 Instructor—Farmstead Engineering
G. M. Petersen 1,2 M.S., Associate Professor—Farm Structures
G. W. Steinbruegge 1,2 M.S., Professor—Land Locomotion
L. E. Stetson 2,5 M.S., Instructor—Radio Frequency Energy
N. P. Swanson 2,5 B.S., Assistant Professor—Soil and Water Conservation
N. C. Teter 2,3 M.S., Associate Professor—Livestock Systems Engineering
T. L. Thompson 1,2 Ph.D., Professor—Product Processing and Systems Analysis
K. L. Von Bargen 2,5 Ph.D., Associate Professor—Systems Engineering
H. D. Wittmuss 1,2,3 M.S., Associate Professor—Machinery

Entomology

E. A. Dickason 1,2,3 Ph.D., Professor and Chairman of Department
H. J. Ball 1,2 Ph.D., Professor—Insect Physiology
J. H. Bell 2,5 B.S., Assistant Professor—Plant Pest Control
T. J. Heims 1,2 Ph.D., Associate Professor—Insect Morphology and Pathology
R. E. Hill 1,2 Ph.D., Professor—Insect Ecology (Crop Pests)
S. D. Kindler 2,5 Ph.D., Assistant Professor—Forage Crops Insects
G. R. Manglitz 2,5 Ph.D., Professor—Forage Insect Investigations
Z. B. Mayo, Jr. 1,2 Ph.D., Assistant Professor—Corn Insects, Soil Insects
K. P. Pruess 1,2 Ph.D., Associate Professor—Biology and Ecology of Crop Insects
R. E. Roselle 2,3 M.S., Professor—Economic Entomology
Robert Staples 1,2 Ph.D., Professor—Insect Transmission of Plant Pathogens

Food and Nutrition

Hazel M. Fox 1,2,3 Ph.D., Professor and Chairman
Constance Kies 1,2 Ph.D., Professor—Nutrition
Marie Knickrehm 1,2 Ph.D., Professor—Institutional Administration
Gary Miller 1,2 Ph.D., Assistant Professor—Food Service Management
Fredric Capasso 1,2 Ph.D., Ass't Prof—Food Science

Food Science and Technology

R. G. Arnold 1,2,3 Ph.D., Professor and Chairman
H. M. Barnhart, Jr. 1,2 M.S., Instructor—Food Technologist
L. B. Buller, 1,2 Ph.D., Assistant Professor—Food Microbiology
T. A. Evans 1,2 M.S., Associate Professor—Food Marketing Specialist
T. E. Hartung 1,2 Ph.D., Professor—Food Quality and Composition
R. B. Maxcy 1,2 Ph.D., Professor—Food Microbiology
L. D. Setterlee 1,2 Ph.D., Associate Professor—Food Protein Chemistry
K. M. Shahani 1,2 Ph.D., Professor—Food Chemistry

Human Development and the Family

Ruby Gingles 1,2 M.S., Professor—Middle Age and Aging
Violet Kalyan-Masih 1,2 Ph.D., Associate Professor—Cognitive Development (Piaget)
Jacqueline Voss 1,2 Ed.D., Associate Professor—Parent Child Relationships
Lois Schwab 1,2 Ed.D., Associate Professor—Rehabilitation of Handicapped Women

Library

W. R. Collings, B.S., B.L.S., Head, Agriculture Campus Library
A. McIntosh, A.B., M.S.L.S., Agriculture Campus Librarian
L. Wilcox, B.A., M.A.L.S., Agriculture Campus Librarian
A. L. Smith, A.B., B.S.L.S., Agriculture Campus Librarian
<table>
<thead>
<tr>
<th>Department</th>
<th>Name</th>
<th>Title</th>
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<tbody>
<tr>
<td>Plant Pathology</td>
<td>M. G. Boosalis</td>
<td>Ph.D., Professor and Chairman of Department</td>
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<tr>
<td></td>
<td>E. M. Ball</td>
<td>Ph.D., Associate Professor—Virus Diseases</td>
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<td></td>
<td>M. K. Brakke</td>
<td>Ph.D., Professor—Virus Diseases</td>
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<td></td>
<td>B. J. Cole</td>
<td>Ph.D., Postdoctoral Fellow—Bacterial Diseases</td>
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<td></td>
<td>D. L. Ceplin</td>
<td>Ph.D., Postdoctoral Fellow—Bacterial Diseases</td>
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<td></td>
<td>L. D. Dunkle</td>
<td>Ph.D., Assistant Professor—Microbial Physiology</td>
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<td></td>
<td>W. G. Langenberg</td>
<td>Ph.D., Associate Professor—Virus Diseases</td>
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<td></td>
<td>Glenn Peterson</td>
<td>Ph.D., Professor—Tree Diseases</td>
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<td>J. W. Riffle</td>
<td>Ph.D., Associate Professor—Tree Diseases</td>
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<td>M. L. Selvester</td>
<td>Ph.D., Professor—Bacterial Diseases</td>
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<td>J. R. Steadman</td>
<td>Ph.D., Assistant Professor—Epidemiology of Vegetable Diseases</td>
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<td>J. L. Van Etten</td>
<td>Ph.D., Associate Professor—Microbial Physiology</td>
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<td>A. K. Vidavey</td>
<td>Ph.D., Assistant Professor—Bacterial Diseases</td>
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<td></td>
<td>L. C. Lane</td>
<td>Ph.D., Postdoctoral Fellow—Virus Diseases</td>
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<td>K. W. Nickerson</td>
<td>Ph.D., Postdoctoral Fellow—Fungal Physiology</td>
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<td>A. W. Nickerson</td>
<td>Ph.D., Postdoctoral Fellow—Bacterial Diseases</td>
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<tr>
<td>Poultry and Wildlife Sciences</td>
<td>G. W. Froning</td>
<td>Ph.D., Professor and Chairman of Department</td>
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<td>R. M. Case</td>
<td>Ph.D., Assistant Professor—Wildlife Management</td>
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<td></td>
<td>D. H. Free</td>
<td>B.S., Assistant Professor—Poultry Improvement</td>
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<td>E. W. Gleaves</td>
<td>Ph.D., Professor—Poultry Nutrition</td>
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<td>F. Ben Mather</td>
<td>Ph.D., Associate Professor—Poultry Physiology</td>
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<td>T. W. Sullivan</td>
<td>Ph.D., Professor—Poultry Nutrition</td>
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<tr>
<td>Statistics</td>
<td>W. M. Schutz</td>
<td>Ph.D., Professor and Head of Department</td>
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<td>R. F. Mumm</td>
<td>Ph.D., Assistant Professor—Statistical Consultant</td>
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<td></td>
<td>A. M. Parkhurst</td>
<td>M.S., Instructor—Statistical Consultant</td>
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<tr>
<td>Textiles, Clothing and Design</td>
<td>Audrey Newton</td>
<td>Ph.D., Professor and Chairman of Department</td>
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<td></td>
<td>Patricia Sailor</td>
<td>Ph.D., Professor—Clothing Awareness and Perception</td>
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<tr>
<td></td>
<td>Barbara Geraghty</td>
<td>M.S., Assistant Professor—Consumer Textile Labeling</td>
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<td></td>
<td>Susan Kaughlin</td>
<td>Ph.D., Asst Prof—TC D</td>
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<tr>
<td>Veterinary Science</td>
<td>M. J. Twiehaus</td>
<td>M.S., D.V.M., Professor and Chairman of Department</td>
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<td></td>
<td>R. Skjeveland</td>
<td>Ph.D., Asst Prof—TC D</td>
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<td>Antigone K. Sutton</td>
<td>M.S., Instructor—TC D</td>
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</tbody>
</table>
M.G. Daharsh 1,2 B.S., M.S., D.V.M., Assistant Professor—Swine
Francis 3, M.S., M.S., Animal Science, Extension
D. L. Ferguson 1,2 Ph.D., Associate Professor—Parasitology
O. D. Grace 1,2 M.S., D.V.M., Professor—Diagnostic Laboratory
L. D. McGill 2 D.V.M., Ph.D., Assistant Professor—Diagnostic Laboratory
C. A. Mebus 1,2 D.V.M., Ph.D., Professor—Pathology
K. C. Olson 2 B.S., Instructor—SPF Swine
L. C. Payne 1,2 D.V.M., Ph.D., Professor—Physiology
M. B. Rhodes 2 M.S., Assistant Professor—Enzymology of Parasites
T. E. Socha 2 B.S., M.S., Instructor—SPF Field Coordinator
E. L. Stair 1,2 Ph.D., D.V.M., Associate Professor—Respiratory Diseases
A. Torres-Medina 2 D.V.M., M.S., Ph.D., Assistant Professor—Virology
N. R. Underdahl 2 B.S., M.S., Professor—Swine Diseases

Regional Stations

Northeast Station, Concord
Cal J. Ward 2,3 Ph.D., Professor and District Director
R. D. Fritschen 2,3 M.S., Assistant Professor—Animal Science
Russell S. Moomaw 2,3 M.S., Assistant Professor—Agronomy
George W. Rehm 2,3 Ph.D., Assistant Professor—Agronomy
Walter L. Tolman 2,3 B.S., Assistant Professor—Animal Science
John F. Wikrowski 2,3 Ph.D., Assistant Professor—Entomology

North Platte Station, North Platte
Leo E. Lucas 2,3 Ph.D., Professor and Director of Station
W. Neal Baxter 2,3 M.S., Associate Professor and Associate Director
John B. Campbell 2,3 Ph.D., Associate Professor—Entomology
Donald C. Clanton 2,3 Ph.D., Professor—Animal Science (Beef)
D. Murray Danielson 2,3 Ph.D., Associate Professor—Animal Science (Swine)
Philip H. Grabowski 2,3 M.S., Assistant Professor—Agronomy (Outstate Testing)
Clair M. Hibbs 2,3 D.V.M., Ph.D., Professor—Veterinary Science
James T. Nicholls 2,3 Ph.D., Professor—Agronomy (Range Management)
Paul T. Nordquist 2,3 Ph.D., Assistant Professor—Agronomy (Sorghum Breeding)
Darrel E. Smika 2,3 Ph.D., Associate Professor—Agronomy (Soils)
Bert R. Somerhalder 2,3 M.S., Associate Professor—Agricultural Engineering
Roger D. Uhlinar 2,3 Ph.D., Associate Professor—Horticulture and Forestry
R. Gene White 2,3 D.V.M., M.S., Associate Professor—Veterinary Science
Gail A. Wicks 2,3 M.S., Associate Professor—Agronomy (Weed Science)

Panhandle Station, Scottsbluff
J. L. Weihing 2,3 Ph.D., Professor and District Director
L. W. Andersen 2,3 Ph.D., Associate Professor and Assistant District Director
<table>
<thead>
<tr>
<th>Name</th>
<th>Title</th>
<th>Institution</th>
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<tbody>
<tr>
<td>F. N. Anderson</td>
<td>M.S., Assistant Professor-Agronomy</td>
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<tr>
<td>C. R. Fenster</td>
<td>B.S., Professor-Agronomy</td>
<td>D. W. Fonken, M.S., Assistant Professor-Agricultural Engineering</td>
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<tr>
<td>A. F. Hagen</td>
<td>M.S., Assistant Professor-Entomology</td>
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<tr>
<td>E. D. Kerr</td>
<td>Ph.D., Assistant Professor-Agronomy</td>
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<td>L. A. Nelson</td>
<td>Ph.D., Assistant Professor-Agronomy</td>
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<td>D. S. Nuland</td>
<td>M.S., Assistant Professor-Horticulture and Forestry</td>
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<td>R. E. J. Retzlaff</td>
<td>Ph.D., Assistant Professor-Agricultural Economics</td>
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<td>I. G. Rush</td>
<td>Ph.D., Assistant Professor-Animal Science</td>
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<tr>
<td>J. L. Stubbendieck</td>
<td>Ph.D., Assistant Professor-Agronomy</td>
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<tr>
<td>J. W. Webster</td>
<td>M.S., Assistant Professor-Agronomy and Administrative Assistant</td>
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<tr>
<td>A. Weiss</td>
<td>Ph.D., Assistant Professor-Meteorology</td>
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<tr>
<td>A. E. Wilson</td>
<td>Ph.D., Assistant Professor-Agronomy</td>
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<tr>
<td>Charles L. Stonecipher</td>
<td>Ph.D., Professor and Superintendent of Station</td>
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<tr>
<td>Gary N. Dornhoff</td>
<td>Ph.D., Assistant Professor-Agronomy</td>
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<tr>
<td>B. L. Doupnik</td>
<td>Ph.D., Associate Professor-Plant Pathology</td>
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<td>Kenneth D. Frank</td>
<td>Ph.D., Associate Professor-Agronomy</td>
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<td>H. Robert Muller</td>
<td>B.S., Associate Professor-Agricultural Engineering</td>
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<tr>
<td>Leroy L. Peters</td>
<td>Ph.D., Associate Professor-Entomology</td>
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<tr>
<td>Fred Roeth</td>
<td>Ph.D., Assistant Professor-Agronomy</td>
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<tr>
<td>U.S. Meat Animal Research Center, Clay Center</td>
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<tr>
<td>K. E. Gregory</td>
<td>Ph.D., Kansas-Nebraska Area Director/USMARC Director</td>
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<tr>
<td>J. E. Bond</td>
<td>Ph.D., Research Engineer</td>
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<tr>
<td>D. R. Campion</td>
<td>Ph.D., Research Chemist</td>
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<tr>
<td>R. K. Christenson</td>
<td>Ph.D., Research Physiologist</td>
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<td>J. D. Crouse</td>
<td>Ph.D., Research Food Technologist</td>
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<td>L. V. Cundiff</td>
<td>Ph.D., Research Geneticist</td>
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<td>S. E. Echternkamp</td>
<td>Ph.D., Research Physiologist</td>
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<td>J. J. Ford</td>
<td>Ph.D., Research Physiologist</td>
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<td>R. M. Koch</td>
<td>Ph.D., Research Geneticist</td>
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<td>R. H. Kohlmeier</td>
<td>Ph.D., D.V.M., Research Chemist</td>
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<tr>
<td>D. B. Laster</td>
<td>Ph.D., USMARC Assistant Director</td>
<td></td>
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<td>G. R. Long</td>
<td>Ph.D., Research Geneticist</td>
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<td>D. D. Lunnr</td>
<td>Ph.D., Research Physiologist</td>
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<tr>
<td>R. L. Prior</td>
<td>Ph.D., Research Chemist</td>
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<tr>
<td>B. D. Schambacher</td>
<td>Ph.D., Research Physiologist</td>
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<tr>
<td>G. M. Smith</td>
<td>Ph.D., Research Geneticist</td>
<td></td>
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NEBRASKA AGRICULTURAL EXPERIMENT STATION
RESEARCH PROJECTS

Research projects are listed by departments. An asterisk (*) indicates that
the project was discontinued in fiscal 1974-1975.

<table>
<thead>
<tr>
<th>Title</th>
<th>Description</th>
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<tbody>
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<td>V:2-1</td>
<td>Identification of Alternatives for Land and Use Decision</td>
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<tr>
<td>12:001</td>
<td>General administration of federal grant funds research. E. F. Frohlich and H. W. Ottoson</td>
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<tr>
<td>12:004</td>
<td>Regional Research Coordination, North Central Region. H. W. Ottoson</td>
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<tr>
<td>12:005</td>
<td>Corn breeding and genetics. W. A. Compton.</td>
</tr>
<tr>
<td>12:007</td>
<td>Developing and applying principles of alfalfa improvement. W. R. Kehr.</td>
</tr>
<tr>
<td>12:008</td>
<td>Cultural, ecological and physiological studies with various agronomic crops. A. D. Flowerday</td>
</tr>
<tr>
<td>12:010</td>
<td>Improvement of forage grasses by breeding. L. C. Newell.</td>
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<td>12:011</td>
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<tr>
<th>Name</th>
<th>Degree</th>
<th>Position</th>
<th>Location</th>
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<tr>
<td>F. N. Anderson</td>
<td>M.S.</td>
<td>Assistant Professor—Agronomy</td>
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<tr>
<td>L. A. Daigger</td>
<td>M.S.</td>
<td>Professor—Agronomy</td>
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<tr>
<td>C. R. Fenster</td>
<td>B.S.</td>
<td>Professor—Agricultural Engineering</td>
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<tr>
<td>D. W. Fonken</td>
<td>M.S.</td>
<td>Assistant Professor—Agronomy</td>
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<tr>
<td>A. F. Hagen</td>
<td>M.S.</td>
<td>Assistant Professor—Entomology</td>
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<tr>
<td>E. D. Kerr</td>
<td>Ph.D.</td>
<td>Assistant Professor—Agronomy</td>
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<tr>
<td>L. A. Nelson</td>
<td>Ph.D.</td>
<td>Assistant Professor—Agronomy</td>
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<tr>
<td>D. S. Nuland</td>
<td>M.S.</td>
<td>Assistant Professor—Horticulture and Forestry</td>
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<td>R. E. J. Retzlaff</td>
<td>Ph.D.</td>
<td>Assistant Professor—Agricultural Economics</td>
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<tr>
<td>L. S. Roberts</td>
<td>Ph.D.</td>
<td>Assistant Professor—Animal Science</td>
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<td>J. L. Stubbendieck</td>
<td>Ph.D.</td>
<td>Assistant Professor—Agronomy</td>
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<td>J. W. Webster</td>
<td>M.S.</td>
<td>Assistant Professor—Agronomy and Administrative Assistant</td>
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<tr>
<td>A. Weiss</td>
<td>Ph.D.</td>
<td>Asst Prof—Agronomy and Administrative Assistant</td>
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<td>R. E. Wilson</td>
<td>Ph.D.</td>
<td>Asst Prof—Agronomy</td>
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<tr>
<td>South Central Station, Clay Center</td>
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<tr>
<td>Charles L. Stonecipher</td>
<td>Ph.D.</td>
<td>Professor and Superintendent of Station</td>
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<tr>
<td>Gary N. Dornhoff</td>
<td>Ph.D.</td>
<td>Assistant Professor—Agronomy</td>
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<td>B. L. Douphnik</td>
<td>Ph.D.</td>
<td>Associate Professor—Plant Pathology</td>
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<td>Kenneth D. Frank</td>
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<td>Associate Professor—Agronomy</td>
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<td>H. Robert Mulliner</td>
<td>B.S.</td>
<td>Associate Professor—Agricultural Engineering</td>
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<td>Leroy L. Peters</td>
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<td>Associate Professor—Entomology</td>
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<td>Fred Reeth</td>
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<td>U.S. Meat Animal Research Center, Clay Center</td>
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<td>K. E. Gregory</td>
<td>Ph.D.</td>
<td>Kansas—Nebraska Area Director/USMARC Director</td>
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<td>T. E. Bond</td>
<td>Ph.D.</td>
<td>Research Engineer</td>
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<td>D. R. Campion</td>
<td>Ph.D.</td>
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<td>R. K. Christenson</td>
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<td>J. D. Crouse</td>
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<td>L. V. Cundiff</td>
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<td>S. E. Echtenkamp</td>
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<td>J. J. Ford</td>
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<td>R. M. Koch</td>
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<td>R. H. Kohlmeyer</td>
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<td>D. B. Laster</td>
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<td>C. R. Long</td>
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<td>D. Lusstra</td>
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<td>R. L. Prior</td>
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<td>B. D. Schambacher</td>
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<td>G. M. Smith</td>
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<tr>
<td>R. A. Scott</td>
<td>Ph.D.</td>
<td>Research Geneticist</td>
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NEBRASKA AGRICULTURAL EXPERIMENT STATION
RESEARCH PROJECTS

Research projects are listed by departments. An asterisk (*) indicates that the project was discontinued in fiscal 1974-1975.

Administration

1-001 General administration of federal grant funds research. E. E. Ennich, and H. W. Ottoson

1-004 Regional Research Coordination, North Central Region. H. W. Ottoson

Title V Identification of Alternatives for Land and Use

Agronomy

M. P. Melson, R. H. Stoddard, P. H. Gessaman

12-001 Corn breeding and genetics. W. A. Compton.

12-002 Improvement and evaluation of oats and barley. J. W. Schmidt.

12-005 Developing and applying principles of alfalfa improvement. W. R. Kehr.

12-006 Cultural, ecological and physiological studies with various agronomic crops. A. D. Flowerday

12-007 Systems of weed control. O. C. Burnside.

12-008 Improvement of forage grasses by breeding. L. C. Newell.

12-009 Sorghum breeding and genetics. W. M. Ross.

12-011 Soil mineral, chemical and physical properties as related to genesis, classification, and mapping. D. T. Lewis.

12-012 Breeding and genetics of soybeans. J. H. Williams.

12-023 Soil management investigations toward improving the productivity of irrigated soils. R. A. Olson.


12-034 Cyto genetic studies on wheat. R. M. Morris.

12-045 Ecological, morphological, chemical and nutritional changes occurring in Great Plains grasses. L. J. Perry.


174-75 - for termination this year.
Chemical genetics of forage plants with particular reference to 

Breed and evaluate wheat varieties for Nebraska. V. A. Johnson and 
J. W. Schmidt.

Genetic, physiological, morphological, and anatomical studies of 
wheat. V. A. Johnson.


Life cycle studies of important pasture and rangeland weeds. M. K. 
McCarty and L. A. Morrow.

Influence of physical properties of soil on plant growth. A. P. 
Mazurak.

Physiological processes affecting growth and development of grain 

Seed production of breeding lines of insect pollinated legumes. W. R. 
Kehr.

Pesticide mobility and degradation in soil-water systems. T. L. Lavy.

The introduction, multiplication, preservation and evaluation of new 
plants for industrial and agricultural utilization. W. R. Kehr and L. 
C. Newell.

Subsoil chemical properties in relation to nutrient requirements of 
field crops. G. A. Peterson.

Water and soil pollution from cattle feedlots in Nebraska. T. M. 
McCalla, J. R. Ellis, and L. F. Elliott.

Phytotoxic substances in plant residues and microorganisms; effects 
on plant growth. T. M. McCalla, J. R. Ellis, and J. W. Schmidt.

Field crop variety evaluation. A. F. Dreier.


Nutrient enrichment of waters by soils and sediments. R. A. Olson, 

Physiological investigations of forage plants. L. E. Moser.

Soil factors and mineral nutrient uptake by plants. R. C. Sorensen.

Utilization and disposal of waste products and pollutants in soil. 
Leon Chesnin.

Study of certain ecological and physiological factors and manage-
ment practices in relation to pasture production. E. C. Conard and 
T. J. Klopfenstein.

Forage production and utilization systems as a base for livestock 
production. L. J. Perry, Jr.

Evaluating plant nutrient needs and product quality. Delno Knud
sen.
Improving grain sorghum, wheat, and forage crop production through improved soil fertilizer practices. D. H. Sander.

Soil fertility investigations related to corn and soybean and to irrigated production of these crops. R. A. Wiese.

Ecology, vegetative development, and management of Nebraska range grasses. L. J. Perry, Jr.

Genetics, biochemistry, and breeding of forages. F. A. Haskins, H. J. Gorz.

Integrating crop culture chemicals, and life cycles to control persistent weeds. O. C. Burnside.

Management and production of forage crops and range. W. J. Moline.

Foundation Seed. R. N. Mills.

Animal Science


Beef carcass evaluation. V. H. Arthaud.

Utilization of protein and energy sources by swine. E. R. Peo, Jr. and B. S. Moser.

Factors influencing the utilization of protein and energy sources by beef cattle. S. D. Farlin.

The feeding value of complete ensiled rations. T. J. Klopfenstein.


Evaluation of pork products and accelerated processing methods. R. W. Mandigo.

Physiological mechanisms in bovine reproduction. E. F. Ellington.

The effect of genetic variability and pre-slaughter environment on pork carcass characteristics. R. W. Mandigo.

Effect of composition, distribution and quantity of lipids on meat quality. V. H. Arthaud.


Beef cow management. J. K. Ward.

Genetic improvement of efficiency in the production of quality pork. P. J. Cunningham.

Influence of hormone administration on reproductive performance in the laboratory rat. A. B. Schultze.

Improving large dairy herd management practices. R. D. Appleman and F. G. Owen.

**Biochemistry and Nutrition**

15-005 Harvesting, processing and evaluating alfalfa and other forage crops. R. L. Ogden.
15-011 Analytical advisory and service laboratory. R. M. Hill.
15-012 Physico-chemical properties at the molecular level of surfaces of biologically important proteins. R. M. Hill.
15-017 Biochemistry of plant disease. J. M. Daly.
15-018 Metabolism and biological function of lipids. H. W. Knoche.
15-020 Biological nitrogen fixation. R. V. Klucas.
15-021 Biochemical mechanisms of susceptibility and resistance and the causes of damage to corn from southern leaf blight. J. M. Daly and L. D. Dunkle.

**Economics (Agricultural)**

10-004 Economics of resource use in the Sandhills area of Nebraska. A. W. Epp.
10-043 Economic effects of alternative farm enterprises in wheat producing areas of Nebraska. G. A. Helmers and W. F. Lagrone.
10-053 Feed-livestock sector: Data relevance and information service programs. J. B. Hassler.
10-056 Geographic differentials in railroad rates and services: implications for Nebraska agriculture. D. G. Anderson.
10-057 Alternative institutional arrangements in ground water management. L. K. Fischer.
10-059 Alternative systems of vertical coordination in producing and marketing feeder cattle. J. G. Kendrick and A. C. Wellman.


Impact of changing transportation systems on local grain and farm supply firms. D. G. Anderson.

Least-cost systems for harvesting, conditioning and storing high-moisture feed grains in Nebraska. P. W. Lytle and M. S. Turner.


Marketing efficiency and growth potential of hogs western cornbelt. R. D. Johnson and M. S. Turner.

Utilization and disposal of municipal, industrial, and agricultural processing wastes on land. M. E. Baker.

Acquisition and use of external capital in rural Nebraska. T. L. Frey and P. H. Gessaman.

A rate-cost analysis of Nebraska livestock and meat transportation with grain shipment comparisons. D. G. Anderson.

Operational and economic efficiency of alternatively organized swine producing units. P. W. Lytle and Larry Bitney.

Editorial

Dissemination of research information. R. J. Graham and J. P. Holman.

Education (Agricultural)

New clientele and programs needed for occupational education in agriculture. R. D. Dillon.


Education and Family Resources

Rehabilitation of handicapped women. L. G. Schwab.

Developing technical skills of teaching. H. M. Crain.

Relationship between a home economics curriculum designed for concept learning and transfer of knowledge. S. M. Kreutz.

Consumer's commitment to achieve goals associated with purchase of expensive products. Florence Walker.

Planning farmstead buildings and livestock production systems. O. E. Cross and E. A. Olsen.

Engineering phases of tillage, land treatment and livestock waste disposal for resource conservation. H. D. Wittmuss and D. E. Lane.

The mechanics and measurement of soil tillage. G. W. Steinbruegge.

Operations research on mechanized systems for cutting, curing and handling hay. G. M. Petersen, K. L. Von Bargen, and S. A. Weeks.

Operator comfort, health and safety in mobile agricultural operations. G. W. Steinbruegge and R. D. Schneider.

Environmental design criteria for livestock housing. J. A. DeShazer.


Utilization of livestock waste to state pollution. O. E. Cross, A. P. Mazurak and Leon Chemin.

Allowable pollutional loads for fish and utilizing animal waste for fish production. O. E. Cross.


Temporary storage of high-moisture feed grains. T. L. Thompson and M. G. Boosalis.

Animal waste management with pollution control. O. E. Cross.

Grain processing and handling systems. N. C. Teter, T. L. Thompson, and Walter Tolman.


Recharge of aquifers for purpose of irrigation withdrawal. D. M. Manbeck.

Measuring and defining rheological properties of food and food products from engineering concepts. L. L. Bashford.

Water and waste systems for countryside living. D. M. Manbeck, P. H. Gessaman.

Rapid nondestructive measurement of moisture content and protein in grain. S. O. Nelson, L. E. Stetson.


Arthropod transmission of plant disease pathogens. Robert Staples.


The photosensitivity in insects. H. J. Ball.
Biology and control of human and livestock insects. C. M. Jones.


Anatomy and histopathology of Nebraska pest insects. T. J. Helms.

Biology and integrated control of the greenbug on sorghums and small grains. Robert Staples.

Studies of the European corn borer—feasibility of genetic manipulation to control the species. R. E. Hill.


Food and Nutrition


Metabolic interrelationships affecting nutrient energy requirements of humans. Constance Kies.

Nutritional status of population groups. H. M. Fox.


Nutritional interrelationships in lipid metabolism. Constance Kies.

Changes in food practices for better nutrition. H. M. Fox.

Productivity of food service operations. M. E. Knickrehm.

Nutrition improvement in the northeast regions. Constance Kies and H. M. Fox.

Food Science and Technology

Microenvironment of liquid food handling equipment. R. B. Maxcy.

Detection and control of flavor changes of food. R. G. Arnold.

Effect of various processing techniques on the physicochemical properties of food proteins. L. D. Satterlee.

The effect of processing on potentially toxic microorganisms and metabolites in food. L. B. Bullerman.

Irradiation processing of foods for quality protection. R. B. Maxcy.

Food processing influences on nutrient composition. T. E. Hartung.

Improvement in quality of various cheeses and other dairy foods. T. A. Evans.

Significance, study and use of enzymes in the food industry. K. M. Shahani.
Horticulture and Forestry

- 20-006 Improvement of vegetable crops. D. P. Coyne and R. B. O'Keefe.
- 20-010 Improvement of potatoes. R. B. O'Keefe and O. S. Malamud.
- 20-021 Agroclimatic parameters to define the growing season of selected vegetables in Nebraska. R. E. Neild.
- 20-023 Windbreak shelter effects. W. T. Bagley.
- 20-028 Tree breeding. W. T. Bagley and D. P. Coyne.
- 20-030 Adaptation, improvement and management of turfgrasses and other ground covers for Nebraska. E. J. Kinbacher.
- 20-031 Collection, propagation, culture, evaluation and maintenance of plant materials for landscaping. S. S. Salac and J. O. Young.
- 20-032 Measure evapotranspiration and photosynthesis to evaluate techniques for improvement of water use. N. J. Rosenberg.
- 20-036 Genetics, breeding and cultural interactions of beans (Phaseolus vulgaris L.) D. P. Coyne.
- 20-037 Agroclimatic Resources and Agroclimatic Relationships. R. E. Neild.

Human Development and the Family

- 93-007 Rehabilitation of handicapped women. L. D. Schwab.
- 93-008 Factors affecting patterns of living in disadvantaged families. J. C. Woodward.
- 93-011 The middle years: developmental changes between thirty and sixty-five. R. H. Gingles.
Plant Pathology

21·001  Plant disease survey and special investigations. Plant Pathology Staff.
21·005  Fundamental studies on root diseases of plants. M. G. Boosalis.
21·006  Diseases of forest and shade trees. G. W. Peterson.
21·015  Epidemiology of vegetable diseases in Nebraska. J. R. Steadman.
21·017  Physiology of fungal spore germination. J. W. Van Etten.
21·020  Biological and physiological aspects of corn and sorghum diseases. L. D. Dunkle.
21·021  Isolation, purification and characterization of bacterial plant pathogens, their viruses and bacteriocins. A. M. K. Vidaver.

Poultry Science

22·003  Physiological and physical response of poultry to environmental variables. F. B. Mather.
22·005  Nutrient interrelationships, feed additives and mineral sources in poultry diets. T. W. Sullivan.
22·010  Factors affecting the quality and characteristics of poultry meat products. G. W. Froning.
22·012  The role of physiological food intake regulators in poultry. E. W. Gleaves.
22·014  Factors affecting quality (physical, chemical and microbiological) in eggs and egg products. T. E. Hartung and G. W. Froning.
22·017  Physiological responses of chickens to varying environments. F. B. Mather and J. A. DeShazer.
22·019  Interfacing of agriculture and wildlife resources. Ronald M. Case.
Statistical Laboratory
23-001  Applications of statistics to research in agriculture. W. M. Schutz.

Textiles, Clothing and Design
94-005  Developmental aspects of clothing awareness. P. J. Sailor.

Veterinary Science
14-001  Animal disease diagnosis and surveillance in Nebraska. O. D. Grace.
14-004  Bionomics, etiology, and control of the parasites of Nebraska livestock. D. L. Ferguson and M. J. Twiehaus.
14-012  Immunological properties of parasite enzymes in sheep and swine. M. B. Rhodes.

Northeast Station
42-001  Influence of certain housing and management regimes on confinement rearing of growing-finishing pigs. R. D. Fritschen.

North Platte Station
43-009  Relation of cropping and tillage practices to crop production and maintenance of soil fertility under dryland conditions. D. E. Smika.
Animal disease surveillance in western Nebraska. R. G. White and C. M. Hibbs.


Development of ornamental plants for Nebraska as a Great Plains state. R. D. Uhlinger.

Economic analyses of irrigated grain and forage production in western Nebraska. R. E. Perry.

Injurious insects affecting livestock in Nebraska. J. B. Campbell.


Agricultural production systems for the Nebraska Sandhills. L. E. Lucas.


Dry bean variety test. F. N. Anderson and D. S. Nuland.

Maximum production of crops under irrigation in western Nebraska. F. N. Anderson and C. L. Ashburn.

Fertilizer and manure application for production of continuous corn. F. N. Anderson.


Alfalfa variety testing and corn testing. F. N. Anderson and L. A. Nelson.

Effects of high rates of phosphate fertilization on the production of corn. F. N. Anderson.

Fertilizers for sugar beet production. F. N. Anderson.

Development of dryland cropping systems for western Nebraska. C. R. Fenster.

Improvement of millet production by breeding and cultural studies. L. A. Nelson.

Biology and control of insect pests of western Nebraska. A. F. Hagen.

Wheat Production Costs & Returns in Relation to Farm Size, South Central Station R. Retzlaff.

Irrigated row crop production systems in south central Nebraska. K. D. Frank.
48-002 How cultural practices affect root and stalk rot diseases of corn and sorghum. B. L. Doupnik, Jr.
48-003 Biology and control of crop insects in south central Nebraska. L. L. Peters.

48-004 Occurrence and effects of mycotoxins in feed afeeds.
United States Meat Animal Research Center

46-001 Clay Center development. K. E. Gregory.
46-002 Improvement of beef cattle through breeding methods. R. N. Koch, G. E. Dickerson and L. V. Cundiff.
46-003 Improvement of beef cattle through breeding methods. L. V. Cundiff, G. E. Dickerson and R. M. Koch.

University Field Laboratory

45-001 Field Laboratory development. Warren W. Sahs

EXPERIMENT STATION PUBLICATIONS

Nebraska Farm, Ranch and Home Quarterly, Summer, 1973 (24 pages). 13,500 copies.
Nebraska Farm, Ranch and Home Quarterly, Fall 1973 (24 pages). 12,700 copies.
Nebraska Farm, Ranch and Home Quarterly, Winter, 1974 (24 pages). 12,700 copies.
Nebraska Farm, Ranch and Home Quarterly, Spring, 1974 (24 pages). 13,300 copies.

Bulletins

529. Legal Implications of Feedlot Pollution in Nebraska (24 pages). Doug C. Nelson. 3,000 copies.
530. Economies of Size and Plant Utilization in Distribution of Anhydrous Ammonia Fertilizer to Nebraska Farmers (37 pages). Dale G.
Reprints (Bulletins)


494. Farm Partnerships for Nebraska (15 pages). Steven McWhorter. 2,500 copies.


519. Vegetable Gardening in Nebraska (18 pages). R. E. Neild. 5,000 copies.

Research Bulletins


Reprints (Research Bulletins)


206. A Soil and Vegetation Inventory and Analysis of Three Nebraska Sandhills Range Sites (33 pages). Donald F. Burzlaff. 500 copies.


Tractor Test Reports

Nebraska Tractor Test Data 1974 (54 pages). 15,000 copies.
Reprints of individual tests: 896, 500 copies; 1130, 500 copies; 1131, 500 copies.

Outstate Testing Circulars


Miscellaneous Publications

MP 29 University of Nebraska North Platte Station – Its Beginning and

Nebraska Farm, Ranch and Home Quarterly Articles

Another Lifestyle. John C. Woodward and Mary Jane Visser. Vol XX (2) 4-5.
Who Owns Nebraska’s Farms? Thomas L. Frey. Vol XX (2) 8-10.
Summer Jobs in Ag Careers. William A. Anderson and A. D. Flowerday. Vol XX (2) 11.
Expanding the 4-H Leadership Team. Glen H. Krohn. Vol XX (3) 11.
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<td>What Employers Think About Ag College Graduates</td>
<td>Thomas L. Frey and Lowell E. Moser</td>
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Key to Abbreviations

SB—Station Bulletin
RB—Research Bulletin
DR—Departmental Report
OTC—Outstate Testing Circular
MP—Miscellaneous Publication
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THE UNIVERSITY OF NEBRASKA
AGRICULTURAL EXPERIMENT STATIONS

REPORT OF INCOME AND EXPENDITURES
For the Year Ended June 30, 1974

GENERAL CURRENT FUNDS

Funds Available:
- Received from United States Government
  - Hatch Fund: $887,985.00
  - Budgeted by the University: 4,262,320.83
- Total: $5,150,305.83

Expenditures:
- Salaries, Wages, & Staff Benefits: $4,290,763.08
- Operating Expenses: 747,137.50
- Equipment and Improvements: 112,405.25
- Total: $5,150,305.83

RESTRICTED CURRENT FUNDS

Income:
- Gifts, Grants and Contracts
  - From United States Government Agencies: $1,130,684.46
  - From State of Nebraska Agencies: 120,569.64
  - From Industry: 269,948.03
  - From Foundations & Health Organizations: 111,311.60
  - From Other Sources: 8,032.51
- Total: $1,650,549.24

Expenditures:
- Salaries, Wages & Staff Benefits: $939,339.97
- Operating Expenses: 536,660.13
- Equipment and Improvements: 165,549.14
- Total: $1,650,549.24
CASH REVOLVING FUND

Income:

Sales and Services ........................................ $2,272,316.77

Expenditures:

Salaries, Wages and Staff Benefits .... $ 438,947.20
Operating Expenses .................. 1,622,015.79
Equipment and Improvements .... 211,353.78

Total ......................................................... $2,272,316.77

AGENCY REVOLVING FUND

Income:

Sales and Services ........................................ $2,603,399.80

Expenditures:

Salaries, Wages & Staff Benefits .... $1,474,836.22
Operating Expenses .................. 948,373.35
Equipment and Improvements .... 180,190.23

Total ......................................................... $2,603,399.80

1These figures do not include capital expenditures of Station funds for Plant ("P" Accounts) expenditures totaling $331,636.57

2Includes: University Research Council funds from State appropriations and Irrigation Development Funds, Station $12,255.90
Inclusion: University Research Council funds from State appropriations and Irrigation Development Funds, Station 8,479.76

3Includes Meat Animal Research Center, Foundation Seed and Tractor Testing $20,735.66