The Kentucky Agricultural Experiment Station

114th Annual Report

2001

College of Agriculture
University of Kentucky • Lexington, Kentucky 40546
To His Excellency,
The Honorable Paul Patton
Governor of Kentucky

I herewith submit the one hundred and fourteenth annual report of the Kentucky Agricultural Experiment Station for the period ending December 31, 2001. This is done in accordance with an act of Congress, approved March 2, 1887, titled, “An act to establish Agricultural Experiment Stations, in connection with the Agricultural Colleges established in the several states under the provisions of an act approved July 2, 1862, and under the acts supplementary thereto,” and also the act of Kentucky State Legislature, approved February 20, 1888, accepting the provisions of the act of Congress.

Very respectfully,

M. Scott Smith
M. Scott Smith, Director
Lexington, Kentucky
June 30, 2002
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Purpose of the Kentucky Agricultural Experiment Station

As a Land Grant institution, the University of Kentucky is responsible for serving the people of the Commonwealth of Kentucky. The College of Agriculture, with its research, teaching, and extension activities, has developed a structure and organization to provide the mandated Land Grant services in agriculture and related areas.

The Kentucky Agricultural Experiment Station has been providing research results to farmers and rural residents for more than 100 years. The continued advancement of Kentucky agriculture attests to the benefits of applying new knowledge and technology. Much of the research leading to increased quantity and improved quality of Kentucky’s agricultural output was performed by the Experiment Station. College researchers also have successfully addressed problems of agribusiness, consumers, international trade, food processing, nutrition, community development, soil and water resources, and the environment.

Although much Experiment Station research has immediate application to agricultural and natural resource-related problems, scientists are also involved in basic research, generating new information to help solve present and potential problems. The ability of Kentucky producers to be competitive in domestic and world markets requires an expanded base of knowledge in emerging areas of research applicable to agriculture, food, and natural resources.

This Annual Report lists Experiment Station research projects and publications completed during 2001. A faculty list is also provided.

The research programs of the Kentucky Agricultural Experiment Station have benefited Kentucky’s agriculture over the past century, and the results of present and future research will continue to serve Kentucky’s primary industry.

Statewide Research

Research activities of the Kentucky Agricultural Experiment Station were conducted at Lexington, Princeton, Quicksand, and Owenton and in counties throughout the state in 2001.

Efforts are constantly made to ensure that the research studies have application to the problems of all Kentucky farmers and other clientele groups. Locations of the experimental facilities provide conditions representative of most sections of the state.

Campus—Laboratories and specialized equipment for all research program areas.

Coldstream—Maine Chance—Spindletop Farms—Beef and dairy cattle, poultry, horses, sheep and swine, forages and grain crops, tobacco and turf.

South Farm—Fruits and vegetables, ornamentals.

UK Animal Research Center (Woodford County)—This farm was purchased in late 1991 as a location for development of state-of-the-art food animal research programs. The farm is in Phase I of development as a research facility.

At Princeton (Caldwell County) the Research and Education Center facilities and the West Kentucky Substation Farm are devoted to research on grain crops, beef cattle, swine, fruits and vegetables, forages, and tobacco.

At Quicksand (Breathitt County) the Robinson Station is the location of research on fruits and vegetables, ornamentals, forages, grain crops, tobacco, and wood utilization. Quicksand is also the headquarters of Robinson Forest, which spreads over parts of Breathitt, Perry, and Knott counties and is the site of forestry and watershed management research.

At the Eden Shale Farm, located in Owen County near Owenton, experimental and demonstration studies are conducted on forage crops, tobacco, fruits and vegetables, and beef management.
Regulatory Services

The Division of Regulatory Services is charged with administering state laws pertaining to manufacturing, processing, labeling, and marketing of commercial feed, fertilizer, seed, and raw milk. The Division’s primary objectives are to protect farmers and consumers from poor quality, mislabeled, or misrepresented products and to protect agricultural businesses from unfair competition.

Feed, fertilizer, and seed are monitored through manufacturing and retail channels for compliance with state laws. Label review, product and facility inspections as well as product sampling and analysis are important parts of this process. Raw milk is monitored during marketing to ensure an accurate and equitable exchange between producers and processors and to ensure the integrity of milk from farm to processor.

Ten regulatory inspectors and one auditor cover the state collecting samples, inspecting facilities, and auditing records. One specialty-products inspector is dedicated to monitoring and sampling small-package and specialty feed, fertilizer, and seed products throughout the state. Another inspector is dedicated to the milk regulatory program, auditing records and monitoring activities of sampler-weighers, haulers, testers, and lab facilities.

In addition to regulatory programs of the Division, service testing is available through the seed, soil, and milk laboratories. These and other activities in the Division are performed by a dedicated and professional staff who perform laboratory analyses, provide computer support, and process and compile reports in addition to performing various duties required to administer effective programs.

Auditing Program
H.S. Spencer

Audits of sales and fee payments were made on 311 of nearly 440 feed, fertilizer, seed, and milk firms in Kentucky to verify inspection fees. Fees are assessed to help defray costs of inspecting, sampling, and analyzing commodities in accordance with state laws. Fees are indicated below. Cash receivables were substantiated on 2,428 fertilizer reports, 2,964 feed reports, 840 seed reports, and 38 milk reports. Reports were checked for accuracy and compared to field audits of the submitting firms. Additional fees of $12,900 were found as a result of the audits.

2001 fee schedule for industries regulated by the Division of Regulatory Services.

<table>
<thead>
<tr>
<th>Industry</th>
<th>Fee Assessed per Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Feed</td>
<td>0.5 cents/100 lb.</td>
</tr>
<tr>
<td>Fertilizer</td>
<td>50 cents/ton</td>
</tr>
<tr>
<td>Milk (handlers and producers)</td>
<td>0.5 cents/100 lb.</td>
</tr>
<tr>
<td>Seed tags</td>
<td>4-24 cents/unit</td>
</tr>
</tbody>
</table>

Division of Regulatory Services 2001 income from fees, licenses, and testing services.

<table>
<thead>
<tr>
<th>Industry</th>
<th>2001 Income</th>
</tr>
</thead>
<tbody>
<tr>
<td>Feed</td>
<td>717,012</td>
</tr>
<tr>
<td>Fertilizer</td>
<td>596,011</td>
</tr>
<tr>
<td>Milk</td>
<td>63,187</td>
</tr>
<tr>
<td>Seed tags, licenses, and service testing</td>
<td>365,231</td>
</tr>
<tr>
<td>Soil Service Testing</td>
<td>143,722</td>
</tr>
<tr>
<td>Total</td>
<td>$1,885,163</td>
</tr>
</tbody>
</table>

Feed Regulatory Program
Steve Traylor

The feed regulatory program provides consumer protection for purchasers of livestock feed and pet food products as well as monitoring a marketplace environment that promotes fair and equitable competition. The Kentucky Commercial Feed Law outlines standards of quality, safety, and efficacy of commercial livestock feed and pet food industries through specific labeling requirements. Labels should identify the purpose, a guaranteed composition, ingredient list, and directions as well as warning or caution statements required for proper use. A statewide inspection, sampling, and testing program monitors feed products for accurate labeling.

The feed program is also involved in ensuring safety and wholesomeness of animal products used for human consumption, and it participates in a nationwide effort by state and federal agencies to ensure food safety and promote consumer confidence in our food supply. The feed program and the FDA are working on a ruminant-to-ruminant feeding ban of certain mammalian proteins, promulgated to prevent establishment and amplification of Bovine Spongiform Encephalopathy (BSE or “Mad Cow Disease”). Activities in this area include inspection of renderers, manufacturers, and distributors to ensure regulation compliance.

2001 highlights:
- Administered actions on 3,807 official samples of commercial feed involving 23,889 official tests to monitor about 3 million tons of commercial mixed feed and feed ingredients distributed in Kentucky.
- Administered a cooperative program with the FDA to inspect 17 feed mills that mix restricted drugs in feed and to inspect these mills for compliance with FDA’s national BSE Rule. An additional 196 BSE inspections were contracted with FDA for mills not required to be licensed with FDA. Approximately 90% are complete.
- Conducted 7,500 label reviews and maintained product registration for about 15,000 products from 900 companies.
- Participated in FDA Good Manufacturing Practices and BSE inspection training.
Fertilizer Regulatory Program
D.L. Terry

The Kentucky Fertilizer Law ensures that fertilizers sold in the state are clearly and accurately labeled, enabling consumers to make informed purchases of fertilizer and to be assured of its quality. The law also protects the legitimate fertilizer industry from unfair competition.

2001 highlights:
• Administered actions on 3,491 official and 178 unofficial samples of fertilizer involving 10,382 tests of approximately 852,000 tons of fertilizer distributed in Kentucky.
• Reviewed labels and registered 3,600 products from 527 firms, including 212 who manufactured custom blends of fertilizers.

Feed and Fertilizer Laboratory
Robert L. Beine

The goal of the Regulatory Services Feed and Fertilizer Laboratory is accurate analytical results in a timely fashion. In 2001, 3,807 feed and 3,669 fertilizer samples were reported, including official regulatory, service, and inter-lab check samples. The laboratory also assists the soil lab in analysis of manure and litter samples.

Approximately 50 different types of feed tests and 24 different fertilizer tests were performed. The laboratory also participates in several check sample programs, including the AAFCO Check Sample Program for feed, Magruder® check sample program for fertilizer, and specialty programs for microscopy, mycotoxins, UAN, phosphate, minerals, and others.

Inspection Program
F. Herald

The inspection program strives to promote industry compliance with consumer protection laws administered by the Division. Inspectors strategically located throughout the state carry out this responsibility in respective assigned areas. Their primary duty is to visit manufacturing plants, processing facilities, storage warehouses, and retail sites to collect official samples of feed, pet food, fertilizer, milk, and seed. While visiting these firms, inspectors also review records and offer assistance in improving operations to achieve compliance with the laws.

2001 highlights:
• Nine inspectors completed 5,511 feed, fertilizer and seed inspections of processing, manufacturing, and marketing firms in the state.
• Emphasis in the feed area included feed mill inspections for compliance with FDA’s BSE regulations.
• One inspector visited and sampled small-package specialty feed, fertilizer, and seed products in urban markets.
• Six inspectors made 313 visits to determine compliance with Kentucky’s Farm Milk Handler Law.

• Inspectors collected the following official samples for laboratory verification of appropriate constituents and quality:

<table>
<thead>
<tr>
<th>Feed</th>
<th>3,807</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fertilizer</td>
<td>3,491</td>
</tr>
<tr>
<td>Seed</td>
<td>2,691</td>
</tr>
<tr>
<td>Milk</td>
<td>7,536</td>
</tr>
</tbody>
</table>

Milk Regulatory Program
C.D. Thompson

The mission of the milk regulatory program is to ensure raw farm milk produced and marketed in Kentucky is bought and sold using accurate weights and tests. The program’s primary function is to monitor milk handling systems from the time a producer’s milk is sampled and weighed, through delivery and laboratory testing, until payments are calculated. The program provides support to the producers and processors of the state’s $248 million dairy industry. Industry participants are licensed by the Division and monitored accordingly to maintain compliance with the law.

In addition to regulatory functions, the milk program cooperates with other agencies in educational projects to provide additional services to Kentucky dairy producers and processors. Additionally, the milk program operates a laboratory that is available for Kentucky producer and handler service testing.

2001 highlights:
• Reviewed and issued licenses to seven transfer stations, 19 milk handlers, 19 laboratories, 63 testers, and 363 sampler-weighers.
• Analyzed and administered action on 7,536 official samples.
• Distributed 1,428 samples to licensed laboratories for comparison purposes.
• Conducted 14 pay-record and 22 raw milk receiving manifest audits.
• Conducted 39 inspections at 19 milk laboratories.
• Collaborated with Kentucky Cabinet for Health Services Milk Safety Branch to train sampler-weighers.
• Trained and examined 69 new sampler-weighers and 14 new testers.
• Conducted 21 inspections of raw milk transfer stations.
• Conducted 780 sampler-weigher inspections.

Seed Regulatory Program
D.T. Buckingham

The seed regulatory program ensures Kentucky farmers and urban consumers of quality seed while promoting fair and equitable competition among seed dealers and seedsmen through inspection and analysis of products found in the marketplace. The Division, which administers and implements the Kentucky Seed Law, promotes compliance through facility inspections, sampling, and analysis of seed offered for sale. The law requires proper labeling of seed which in-
clauses kind, variety, and lot designation; purity percentages; noxious weeds; origin; test date; and a germination guarantee. The Division is also responsible for maintaining registration of seed labelers and dealers in the state.

**2001 highlights:**
- Performed 1,742 inspections and sampled agricultural, lawn, turf, and garden seeds at more than 600 wholesale and retail locations.
- Collected and tested 2,691 official seed samples.
- Issued stop-sale orders on 541 official seed samples and 114 violative seed lots at seed dealer and seed processor locations.
- Cooperated with the USDA-Seed Branch regarding shipments of seed into the state that were in violation of the Federal Seed Act.
- Reviewed and issued 184 agricultural permits and 54 vegetable and flower permits to label seed.
- Registered 399 seed dealers and 28 non-certified custom conditioners.
- Conducted one regulatory hearing for serious infractions of the Kentucky Seed Law.
- Provided training to firms on labeling requirements, mixing procedures, and batching records.

**Seed Lab**

C. Finneseth

The Division maintains the only seed testing facility in Kentucky. This seed laboratory conducts all official testing and provides service testing for producers, dealers, retailers, and homeowners. Lab capabilities include purity testing, weed and crop seed identification, seed counts, accelerated aging, test weight, fluorescence testing for ryegrass, moisture content, tetrazolium, herbicide tolerance, endophyte, and germination. More than 14,000 different tests were performed in 2001, a 21% increase from the previous year.

**2001 highlights:**

<table>
<thead>
<tr>
<th>Sample Type</th>
<th>2001 Completed Samples</th>
</tr>
</thead>
<tbody>
<tr>
<td>Official samples</td>
<td>2,691</td>
</tr>
<tr>
<td>Service samples</td>
<td>6,214</td>
</tr>
<tr>
<td>Tobacco</td>
<td>1,914</td>
</tr>
<tr>
<td>Other certified crops</td>
<td>408</td>
</tr>
<tr>
<td>Total samples</td>
<td>8,905</td>
</tr>
</tbody>
</table>

**Soil Testing Laboratory**

F.J. Sikora and D. Reid (Lexington)
Paula Howe (UK Research and Education Center, Princeton)

Soil testing provides farmers, homeowners, greenhouse operators, surface-mine specialists, and others with scientific information about the fertility status of their soils. In partnership with the University of Kentucky Cooperative Extension Service, the soil laboratories—located on the Lexington campus and at the Research and Education Center in Princeton—perform routine tests and chemical analyses on soil samples from across the state. Subsequent unbiased lime and fertilizer recommendations are made based on nutrient need for specified crops, using fertilizer response data determined by years of research conducted by the University of Kentucky College of Agriculture.

The lab also offers analyses of poultry litter and animal wastes for farmers and farm advisors, water and nutrient solution analyses for greenhouse operators and float-bed seedling producers, and non-routine soil tests for University of Kentucky researchers.

**2001 highlights:**
- Developed a new computer program for county Extension offices for receiving, printing, and managing soil test data. Installed the program in 54 counties and conducted seven training sessions for 125 agents and county office support staff in use of the new system. Presented information about the computer program at the Cooperative Extension Service Conference and to the American Society of Agronomy.
- Provided information through five radio broadcasts with University of Kentucky Agricultural Communications Services, a Kentuckiana Crop Production Seminar on soil testing, and a presentation at the Southern Soil Fertility Conference on nitrogen and soil fertility.
- Participated in field days and various meetings giving programs on agricultural nutrient effects on water quality and provided assistance in six training sessions offered throughout the state on nutrient management planning.
- Soil laboratory analysis included the following types and number of samples in 2001 as compared to the previous year:

<table>
<thead>
<tr>
<th>Type</th>
<th>Number</th>
<th>% Increase from 2000</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agriculture</td>
<td>32,872</td>
<td>27</td>
</tr>
<tr>
<td>Home lawn and garden</td>
<td>6,578</td>
<td>6</td>
</tr>
<tr>
<td>Strip-mine reclamation</td>
<td>57</td>
<td>104</td>
</tr>
<tr>
<td>Commercial horticulture</td>
<td>601</td>
<td>11</td>
</tr>
<tr>
<td>Greenhouse</td>
<td>46</td>
<td>47</td>
</tr>
<tr>
<td>Research</td>
<td>14,363</td>
<td>116</td>
</tr>
<tr>
<td>Atrazine residue in soil</td>
<td>40</td>
<td>69</td>
</tr>
<tr>
<td>Animal waste</td>
<td>194</td>
<td>-5</td>
</tr>
<tr>
<td>Nutrient solution</td>
<td>30</td>
<td>-55</td>
</tr>
<tr>
<td>Total</td>
<td>54,781</td>
<td>14</td>
</tr>
</tbody>
</table>
Kentucky Agricultural Experiment Station Projects

Agricultural Economics
Agricultural Industrialization and Globalization: Implications for Rural Economies—Angelo Pagodatos
Analyzing the International Competitiveness of the U.S. Agricultural Processing Industry—Michael Reed
Cooperative Partnership for Small to Medium-Sized Beef Producers in the Eastern Cornbelt: Phase II—Lee Meyer
Economist for State Development Board—Timothy Woods
Electric Utility Deregulation and Rural America—David Freshwater
Enhancing Farmers’ Income through Polyculture of Paddlefish with Catfish in the Southern Region—Lee Meyer
Financing Agriculture and Rural America: Issues of Policy, Structure, and Technical Change—David Freshwater
Fruit and Vegetable Supply-Chain Management, Innovations, and Competitiveness—Timothy Woods
Impacts of Trade Agreements and Economic Policies on Southern Agriculture—Mary Marchant
International Agricultural Market Structures and Institutions, 2000—Michael Reed
Kentucky Center for Cooperative Development—Timothy Woods
Marketing Systems Approach to Removing Distribution Barriers Confronting Small Volume Fruit/vegetable Growers—Timothy Woods
Meat Processing and Marketing for Local and Direct Markets—Lee Meyer
Responding to Expressed Needs: SARE/ACE Regional Training with the Sustainable Dairy Systems Manual—Steve Isaacs
Risk Management and Profit Potential of Alternative Production Practices, Enterprises and Technologies—Carl Dillon
Rural Economic Development: Alternatives in the New Competitive Environment—David Freshwater
Rural Labor Markets: Workers, Firms and Communities in Transition—David Freshwater
Technological Progress in Agriculture, Farmers and Rural Communities—David Debertin
U.S. Consumer Demand for Dairy Products: Needs-Driven Methods and Analysis—Leigh Maynard
Wages, Jobs, and the Environment: Policy Choices for Rural Areas—Angelo Pagodatos
Work Crew Performance Model in Vocational Agriculture—Steve Isaacs

Agronomy
319 Program Site-Specific Nutrient and Biosolids Management on Agricultural Lands—R.J. Barnholt
Accelerating Development of Scab-Resistant Wheat Varieties—D.A. Van Sanford
Amount and Quality of Herbage Ingested by Cattle Grazing Tall Fescue Clover Grasslands—C.T. Dougherty
Analysis of mRNA Polyadenylation and Metabolism in Plants—A.G. Hunt
Analysis of Senescence-Specific Genes Using Arabidopsis Enhancer Trap Lines—S. Gan
Breeding for Fusarium Head Blight Resistance in Wheat for Kentucky—D.A. Van Sanford
Breeding Grasses for the Transition Zone—T.D. Phillips
Career: AGL 15 during Embryogenesis—S. Perry
Cellular and Molecular Biology Initiative in Dark Tobacco—G.B. Collins
Characterization, Classification, and Use Interpretations of Kentucky Soils—A.D. Karathanasis
CHS Paducah Gaseous Diffusion Plant Oversight—E. D’Angelo
Cloning and Heterologous Expression of Cytochrome P450 Genes from Maize (zea mays)—M. Barrett
Cloning Epoxy Fatty Acid Genes—D. Hildebrand
Comprehensive Guide to Corn Production in Kentucky—M. Bitzer
Consortium for Plant Biotechnology Research Inc.—A.G. Hunt
Corn Breeding and Genetics: White Endosperm Breeding, Genetic Variation in Food Quality and Hybrid Performance Tests—C.G. Poneleit
Dark Tobacco Breeding and Chemistry—P. Legg
Defining Optimum Seeding Dates for Establishing Bermudagrass and Zoysia Grass Fairways in the Transitional Climatic Zone—D. Williams
Defining the Roles of Interactions between Plant Nuclear poly(A) Polymerases and Other Factors—A.G. Hunt
Demonstrating Commercial Potential of Zinc Finger Proteins for Generating Value-Added Foods—D.F. Hildebrand
Determining Rates of Several Nutrient Sources for Optimum Crop Production and Soil—W.O. Thomas
Development of a Basic Soil Morphology Training Course for On-Site Sewage Disposal Treatment System Personnel—A.D. Karathanasis
Disease-Resistance Properties of Tobacco Cultivars That Express E. coli—A.G. Hunt
Dow Chemical Company Research Agreement—J. Chappell
Effect of Tillage and Land Use on Physical and Chemical Properties of Kentucky Soils—G.W. Thomas
Engineering Oilseeds for Epoxy Fatty Acids Accumulation—D.F. Hildebrand
Engineering Soybeans for Increased Value—D.F. Hildebrand
Enhancing Soil Crop Management with an Electrical Conductivity Sensor—T.G. Mueller
Epoxy Fatty Acid Accumulation in Soybean Oil—D.F. Hildebrand
Evaluation of On-Site Wastewater Treatment Vertical Distance Separation Standards in Kentucky—A.D. Karathanasis
Evaluation of Perennial Forage Crop Varieties—R. Spitaleri
Evaluation of Soybean Varieties and Breeding Lines for Use in Kentucky—T.W. Pfeiffer
Forage Crop Genetics and Breeding to Improve Yield and Quality—N.L. Taylor
Forage for Advancing Livestock Production—T.D. Phillips
Foreign Gene Introduction into Soybean—G.B. Collins
Fragmental Influence on Hillside Hydrology and Soil Water Quality—J.A. Thompson
Fusarium Gramearum Infection in the Morphological Components of Wheat Spikes—D. Tekrony
Genetic Engineering of Soybeans for Increased Oil Content and Epoxy Fatty Acid Accumulation—D.F. Hildebrand
Genetic Engineering of Dark Tobacco—a Sub-Project of Cellular and Molecular Biology Initiative in Dark Tobacco—J. Chappell
Grain Quality Laboratory—C.G. Poneleit
Herdbeef Persistence in Southern Soils Bioavailable Concentration and Effect on Sensitive Rotational Crops—W.W. Witt
Identification and Characterization of Genes Regulated by AGL-15, an Embryo-Expressed MADS-Box—S.E. Perry
Identification of Plant Genes That Confer Enhanced Capacity to Tolerate Oxidative Stress—D. Falcone
Indirect Benefit of No-Till Wheat: Enhanced Yield of Rotational No-Till Corn and Soybean—L. Munlock Jr.
Horticulture

ACC-Treated Seeds Show Increased Speed of Germination—R.L. Geneve
Bacterial Spot Resistance, Yields, and Quality in Bell and Specialty Peppers—Brent Rowell
Blackberries for Fresh and Processing Markets—Doug Archbold
Botrytis cinerea Development and Natural Volatile Compounds from Strawberry Fruit—T.R. Kemp
Characterizing Drought Resistance and Chemical Thinning of Fruit Crops—D.D. Archbold
Controlled Water Table Irrigation for Container Plant Production—J.W. Buxton
Decision Support Systems for Automated Controls Environment for Horticultural Products—Jack W. Buxton
Designing a Horticulture Laboratory Course to Accommodate Students with Disabilities—R. Durham
Dislodgable Residues of Organophosphorous Insecticides—J.C. Snyder
Evaluation of Growth and Phenolic Content of Echinacea Species under Greenhouse Conditions—R.A. Anderson
Examination of Herbicide/Mulch Interactions in Landscape Plantings—M. Williams
Fresh Produce Food Safety—B. Rowell
Ginseng Monitoring and Research—R.T. Jones
Gibberellic Synthase: A Key Enzyme in Plant Stress Tolerance?—A.B. Downie
Hydrangea paniculata Cut-Flower Production Pruning and Fertilizer Management—W. Dunwell
Identification of Genes Important for the Initiation of Adventitious Root Formation—R. Geneve
Isolations of Black Seeded Mutants from Tomato—A.B. Downie
Mechanism and Significance of Post-Translational Modifications of Ribulose Bisphosphate Carboxylase/Oxygenase—R.L. Houtz
Molecular Characterization of the Role of Raffinose in Arabidopsis, Tomato, and Corn—A.B. Downie
Natural Products, Host Resistance, and Crop Protection—J.C. Snyder
New Crop Opportunities Center—D.L. Ingram
Nursery Crop Development—Winston Dunwell
Physiological Manipulation of Wild-Type Tobacco and a Mutant Screen for Seeds from Enhancer Trap Lines of Arabidopsis Enabling Faster than Usual Seed Germination at Sub-Optimal Temperatures—A.B. Downie
Post-Translational Methylation of Lysyl Residue 14 in the Large Subunit of Ribulose-1,5-Bisphosphate Carboxylase/Oxygenase—R.L. Houtz
Production of Ethylene and Its Biosynthetic Precursors as Indicators of Seed Vigor—R.L. Geneve
A Raffinose Transporter Provides the Missing Link to Explain Raffinose Accumulation in Stressed Chloroplasts—A.B. Downie
Rootstock and Interstem Effects on Pome and Stone Fruit Trees—G.R. Brown
Seed Vigor Testing for Small-Seeded Flower Species Using Computer-Aided Image Analysis—R.L. Geneve
Technical and Economical Efficiencies of Production, Marketing, and Managing Environmental Plants—R.E. McNiel
Using Somatic Embryogenesis as a Clonal System to Regenerate Oaks in Order to Establish Juvenile Stock Plants for Cutting Propagation—W. Dunwell
Utilization of the Controlled Water Table Subirrigation System for the Production of Bedding Plants, Vegetables and Herbs—Robert Anderson

Landscapes Architecture

A Planning Model for Assessment of Agricultural Potential in Appalachia Using Information Technology Tools—Thomas J. Nieman

Plant Pathology

Advanced Genetic Technologies—C.L. Schardl
Assessment of Diseases and their Management in Trees and Other Perennials—J.R. Hartman
Biological Control of Soilborne Plant Pathogens for Sustainable Agriculture—J.W. Hendrix
Cloning of Blue Mold Resistance Genes from Wild Nicotiana Based on Conserved Resistance Gene Motifs—M.L. Farman
Comparative Genomics of Telomeres in Pathogenic and Saprophytic Fungi—M.L. Farman
Detection of Strains of Pyricularia grisea Resistant to Qol (Strobilurin) fungicides—P. Vincelli
Development of a Soybean Aphid Management Strategy for the Southern Region—S.A. Ghabrial
Development of Gray Leaf Spot-Resistant Perennial Ryegrass through Breeding and Biotechnological Approaches—M.L. Farman
Development of Management Strategies to Control Major Soybean Virus Diseases in the North Central States—S.A. Ghabrial
A Digital Imaging System for Fluorescence Microscopy and other Microscopy Applications—L. Vaillancourt
Efficacy of Fungicides and Biocontrol Trials across Locations—D.E. Hershman
Efficacy of Injected Fungicides on Prevention of Austrian Pine Tip Blight Disease Caused by the Fungus Sphaerospora sapinea and Eradication of the Causal Fungus from Symptomless Pine Tissues—J.R. Hartman
Efforts to Limit Disease in Tobacco and Vegetables—W.C. Nesmith
Evaluation of Disease Management Strategies for Corn, Forages, and Turf—P. Vincelli
Expression of a Broad-Spectrum Antifungal Polypeptide in Transgenic Tobacco Plants: Novel Approaches for Control of the Blue Mold Disease of Tobacco—S.A. Ghabrial
Factors Affecting de novo Meiotic Chromosome Deletions—M.L. Farman
Genetic Analysis of Avirulence/Virulence in Magnaporthe grisea, a Pathogen of Rice and Other Grasses—M.L. Farman
Genetic Analysis of Bioprotective Alkaloids Produced by Grass Symbionts—C.L. Schardl
Genetic Determinants of Parasitism and Pathogenicity in Colletotrichum graminicola—J.W. Vaillancourt
Identification of Pathogenicity Mutants of Colletotrichum graminicola—M.R. Thorn
Impact of Viruses on Illinois Soybean—S.A. Ghabrial
Management of Fusarium Head Blight in Wheat Using Selected Biological Control Agents and Foliar Fungicides—D.E. Hershman
Managing Plant-Parasitic Nematodes in Sustainable Agriculture with Emphasis on Crop Resistance—D.E. Hershman
Mechanism of Defective Interfering RNA Replication and Interference with Helper Infections—P.D. Nagy
Mechanisms of Virus Particle Disassembly during the Establishment of Plant Virus Infections—J.G. Shaw
Molecular Basis of Disease in a Virus-Infected Plant Pathogenic Fungus—S.A. Ghabrial
Molecular Genetics and Biosynthesis of Loline Alkaloids by Mutualistic Endophytes—C.L. Schardl
Mycoviruses-Host Interactions in Diseased Isolates of Helminthosporium victoriae—S.A. Ghabrial
National Agricultural Program to Clear Pest Control Agents for Minor Uses—W.C. Nesmith
NCR 184 2001 Kentucky State Report—D.E. Hershman
Novel Strategy to Develop Viral-Based Transient Expression Vectors for Plants—P.D. Nagy
Population Biology of a Mutation Confering Resistance to Qol Fungicides in Pyricularia grisea—M.L. Farman
Role of Promoter and Enhancer Elements in the Replication of Defective Interfering Tombusvirus RNA—P.D. Nagy
Soybean Pathology/Entomology Managed Area—S.A. Ghabrial
Survey and Management of Soybean and Wheat Diseases—D.E. Hershman
Survey for Soybean Mosaic Virus and Bean Pod Mottle Virus in Kentucky—S.A. Ghabrial
Toxin Biosynthesis in Ergopeptide Producing Fungi—C.L. Schardl
Use of Molecular Markers for Epidemiological and Population Studies of Peronospora tabacina—M.L. Farman
Vector Specificity in Potyvirus Transmission: Role of the Helper Component—T.P. Prone
Whole Genome Analysis of Host-Pathogen Interaction and Subsequent Responses in the Rice Blast Pathosystem—M.L. Farman

Rural Sociology
Assessing the Impacts of Welfare Reform on Individual, Family, and Community Well-Being: A Focus on the Rural South—J. Zimmerman
At the Laboratory Window: Genetic Engineering and Society in Canterbury, New Zealand—K. Tanaka
Best Practices Approach to Parental Involvement—P. Dyk
Determinants of Spatial Variation in Food Stamp Program Participation Dynamics—J. Zimmerman
HIV Interventions for Young Appalachian Risk Takers—G. Hansen
How Do Structured Out-of-School Experiences Contribute to Positive Youth Development?—P. Dyk
Multifunctionality Challenge to the WTO Regime—L. Burmeister
Reexamining East Asian Land Reform: Class and Culture in Action—L. Burmeister
Rural Low-Income Families: Tracking Their Well-Being and Functioning in the Context of Welfare Reform—P. Dyk
Rural Restructuring: Causes and Consequences of Globalized Agricultural and Natural Resource Systems—L. Burmeister
Sociology in Government: The Galpin-Taylor Years in the U.S. Department of Agriculture—J. Zimmerman
Strategic Restructuring of the Muscle Food Sector in Kentucky—L. Garkovich
Value of Standardization in the Global Agricultural Market: The Role of Science and Technology in Constructing Food: The Case of Red Meat in New Zealand—K. Tanaka

Veterinary Science
Advanced Genetic Technology—E. Bailes
Age Dependence of Horse Foal Immunization for Viral Infectious Diseases—T.M. Chambers
Basis for Continued Persistence of Equine Arteritis Virus in the Carrier Stallion—P.J. Timoney
Cellular Immunity to Infection of Horses by Equine Herpesvirus-1—G.P. Allen
Characterization of Potentially Protectively Immunogenic Proteins of Leptospira interrogans—J.F. Timoney
Chromosome Evolution of the Family Equidae—T.L. Lear
Clinical Cytogenetic Abnormalities in the Horse and Other Species—T.L. Lear
Collagen 3: Linkage Disequilibrium Analysis in Peruvian Pasos—K.A. Graves
Control, Transmission, and Prevalence of Natural Infections of Internal Parasites of Equids and Ruminants—E.T. Lyons
Determination of Surface Receptor Enabling Equine Arteritis Virus Cell Entry—P.J. Timoney
Diagnostics for Equine Infectious Anemia—C. Issel
Differential Gene Expression during Early Equine Conceptus Development—K.J. McDowell
EIA Vaccine Trials—C. Issel
Equine Disease Surveillance at the Local, National, and International Level—D.G. Powell
Evaluation of Host-Induced Lk 73.5 as an Antigen in Immunodiagnostics of leptospira Infection—J.F. Timoney
Evaluation of Pre-Partum Vaccination of Mares with Clostridium perfringens UKMF 05/00 in the Control of Neonatal Enterocolitis—J.F. Timoney
Evaluation of Sarcocystis neurona Antigens for Development of Subcutaneous Vaccines against Protozoal Myeloencephalitis—D. Howe
Functional Analysis of Proteins Se 72.3, Se 44.2, and Se 45.5 of Streptococcus equi—J.F. Timoney
Functional Genomics for the Horse—K.J. McDowell
Galactokinase 1: Investigation as a Candidate Gene for Cataracts in Dogs—K.A. Graves
Gene Discovery in Sarcocystis neurona, the Primary Cause of EPM—D. Howe
Gene Map for the Horse: Genes for Growth and Development—E. Bailey
Gene Mapping of the Alpaca—E.G. Cothran
Genetic Basis of Epitheliogenesis imperfecta in the Horse—E.G. Cothran
Genetic Variation and Genetic Management of Feral Horses in the United States—E.G. Cothran
Genetics of Degenerative Suspensory Ligament Desmitis in the Horse—E.G. Cothran
Identification and Characterization of Immunodominant Antigens from Sarcocystis neurona—D. Howe
Immunological Management of Lentivirus Infections: EIAV—C. Issel
Insulin Resistance and Obesity in the Mare: Implications for Reproduction and Laminitis—B.P. Fitzgerald
Interactions among Prostaglandin F2alpha Oxytocin and Conceptuses—K.J. McDowell
Investigation of the Mare Reproductive Loss Syndrome in Central Kentucky—D.G. Powell
Investigation of the Role of Thyroxine in the Control of Seasonal Reproductive Activity in the Mare—B.P. Fitzgerald
Laminin 5: Candidate Gene for Epitheliogenesis imperfecta in American Saddlebreds and Belgians—K.A. Graves
Mare Reproductive Loss Syndrome: Factors Involved and Strategies to Prevent its Reoccurrence—K.J. McDowell
Molecular Cytogenetic Approaches to the Conservation of Endangered Rhinoceros Species—T.L. Lear
Molecular Genetic Studies on Hereditary Fertility Problems in Stallions—T.L. Lear
National Animal Genome Project—E. Bailes
New Therapeutic Approaches to Equine Diseases—T. Tobin
No Effect Thresholds in Racing Horses—T. Tobin
Pathogenesis of Equine Infectious Anemia—C. Issel
Physical and Comparative Genomics for the Horse—T.L. Lear
Possible Therapeutic Approaches to Elimination of Equine Arteritis Virus in the Carrier Stallion—P.J. Timoney
Surface Exposed Proteins of Streptococcus equi with Potential as Protective Immunogens—J.F. Timoney
Surveillance and Molecular Characterization of Equine Influenza Viruses Isolated in the Western Hemisphere—T.M. Chambers
Synthesis of Equine Drug Metabolites—T. Tobin
Testing Integrity Program (TIP)—T. Tobin
Toxicological Investigations of the Potential Causes of Mare Reproductive Loss Syndrome—T. Tobin
Publications

All publication dates in this section are 2001 unless otherwise noted.

Annual Report
One Hundred and Thirteenth Annual Report of the Kentucky Agricultural Experiment Station for 2000. College of Agriculture, University of Kentucky, M. Scott Smith, Director. June.

Books and Book Chapters

Agricultural Economics


Agronomy


Biosystems and Agricultural Engineering


Entomology


Forestry


In addition, members of the department published 15 abstracts.


Regulatory Bulletins


Journal Articles

Agricultural Economics


In addition, members of the department published 15 abstracts.

Agronomy


He, Y., and S. Gan. Identical promoter elements are involved in regulation of the OPR1 gene by senescence and jasmonic acid in Arabidopsis. Plant Molecular Biology, 47:595-605.


In addition, members of the department published 107 abstracts.

Xie, M., Y. He, and S. Gan. Bidirectionalization of polar promoters

Williams, D.W., P. Vincelli, and P.B. Burrus. Severity of gray leaf spot


Wagner, G.J., and E. Wang. Exploiting the ooze: Engineering surface

TeKrony, D.M., D.B. Egli, and M. Rucker. Survival characteristics of


In addition, members of the department published 65 abstracts.

**Biosystems and Agricultural Engineering**


**Entomology**


Burg, J.G. Seasonal activity and spatial distribution of host-seeking adults of the tick Dermacentor variabilis. Medical and Veterinary Entomology, 15:413-421.


In addition, members of the department published 12 abstracts.

**Forestry**


In addition, members of the department published four abstracts.

Graduate Center for Nutritional Sciences


In addition, members of the department published seven abstracts.

Horticulture


Plant Pathology


Schardl, C.L. Epichloë festucae and related mutualistic symbionts of grasses. Fungal Genetics and Biology, 33:69-82.


In addition, members of the department published 26 abstracts.

Rural Sociology


Veterinary Science


Kumar, P., and J.F. Timoney. Light and electron microscopic studies on the nasopharynx and nasopharyngeal tonsil of the horse. Anatomia, Histologia, Embryologia, 30:77-84.


In addition, members of the department published 52 abstracts.


Agricultural Economics


Burdine, K., M. Ernst, L. Meyer, and T. Woods. Survey of Kentucky Beef Producer Perspectives on Food Safety. Staff Paper No. 422, Department of Agricultural Economics, University of Kentucky.


Narayanan, V.V., L.J. Maynard, and M. Chandrasekaran. Impact of Shelterbelts on Groundnut Production in Therilands: A Decomposition Analysis. Department of Agricultural Economics, University of Kentucky, Staff Paper 413, November.


Snell, W.M. Structural Changes in U.S. Tobacco Farms. Contribution to SARE Research Project on Impacts on Agricultural System Sustainability from Structural Change in Peanut, Poultry, Swine and Tobacco Production Systems. Department of Agricultural Economics, University of Kentucky, January.


Agronomy


Calvert, J.R., Don Fowlkes, Joe Priest, and Danny Peek. 2000 Regional Burley Tobacco Sucker Control Test. April.


**Animal Sciences**

Cantor, A.H. Dietary selenium and the environment. Proceedings, Midwest Poultry Convention, St. Paul, Minn.

Cromwell, G.L. History and Significance of NCR-42 and S-145 Swine Nutrition Committees. International Ingredients Nutrition Advisory Board Meeting, St. Louis, Mo.


**Biosomes and Agricultural Engineering**


Entomology


Potter, D.A. Conserve natural enemies on your golf course. United States Golf Association Green Section Record, November/December:8-10.


Potter, D.A. Goodbye, grubs. Landscape Management, April:64-70.


Forestry
Barnes, T.G. Native Warm-Season Grass Habitat in One Season. Birdscapes, Fall:23.


Horticulture


**Plant Pathology**


**Rural Sociology**


**Veterinary Science**


Chambers, T.M., and R.E. Holland Jr. To vaccinate or not to vaccinate—When is the question for your foal. The Quarter Horse Journal.


Dwyer, R.M. MRLS Epidemiological Study. Equine Disease Quarterly, October.

Dwyer, R.M. The Making of a Veterinarian. The Horse, 52-64, November.


Timoney, P.J. Does equine viral arteritis truly merit the international notoriety it has acquired? pp. 39-45. Proceedings, 15th International Seminar: A Review of Some Infectious Diseases of Animals of Economic and/or Zoonotic Importance, Frosinone, Italy, June 4-5.


Timoney, P.J. EVA (Equine Viral Arteritis), a Manageable Problem. Video and instructional booklet produced by the USDA in collaboration with the University of Kentucky. Coauthored with Dr. Timothy R. Cordes and Dr. William H. McCollum. Video running time–13 minutes; instructional booklet–24 pages. April.

Tobin, T. National Horsemen’s Benevolent and Protective Association Inc. Proposed national policy on drug testing and therapeutic medication.


Agronomy
Afitlhile, Meshack. Regulation of in planta jasmonic acid and methyl jasmonate synthesis.
Díaz-Zorita, Martín. Towards the interpretation of soil structure in agricultural soils.
Duan, Ran. Relationship between yield and number of recombination events in soybean breeding.
Liu, G. Bayesian computations for general linear-bilinear models.
Mubiru, Drake N. Water dispersible soil colloid properties and their role in the adsorption and transport of Escherichia coli through intact soil columns.
Ralston, Jennifer L. Promoter analysis and herbicide metabolism capabilities of a safener-inducible cytochrome P450 from corn.
Sukop, Michael C. Porosity, percolation thresholds, and water retention behavior of random fractal porous media.

Animal Sciences
Akay, Veysel. Nutritional evaluation of Nutridense™ and waxy corn hybrids for ruminants.
Amako, Donatus Emerenini Ndubuisi. Numerical modeling of a food analog and heat transfer parameters and nutrient retention of selected foods thermally processed in retortable semi-rigid plastic trays.
Jamikorn, Uttra. Influence of processing temperature and time on nutrient quality of canned dog food.
Lei, Qingxin. Chemistry of odor-impact volatiles from soy protein concentrates.
Tricárico, Juan M. Influence of exogenous enzyme preparations on in vitro digestion and activities of ruminal microbial populations.

Biosystems and Agricultural Engineering
Crofcheck, Czarena L. Characterization of milk by light scattering for fiber optic sensor applications.
Tarhan, Sefa. Fermentation kinetics and modeling of non-growing Clostridium thermocellum JW20.

Entomology
Cesak, Mary Ellen. Evolutionary genetics of egg size and number in a seed beetle, Stator limbatus.
Hilgarth, Roland Sebastian. Identification and analysis of the repeat element gene family in the Campoletis sonorensis ichnovirus.

Forestry
Larkin, J.L. Demographic characteristics of a reintroduced elk herd in eastern Kentucky.

Veterinary Science
Breathnach, C.C. Mucosal humoral and cellular immune defense mechanisms of the horse's upper respiratory tract against equine herpesvirus-1 infection.
Dirikolu, L. Detection, quantification, and pharmacokinetics of triazine-based antiprotozoal agents for the treatment of equine protozoal myeloencephalitis.
Gallagher, P. Repetitive DNA sequences in the horse genome.
Nally, J.E. Temperature regulated antigens of Leptospira interrogans.
Terry, R.R. Investigations of candidate genes for Appaloosa coat color in horses.
M.S. Theses

Agricultural Economics
Burke, Victoria. The impact of state prisons on the economy of Kentucky.
Coffey, Brian. New input and output risk management strategies for livestock producers.
Ferguson, Meagan. Valuing ultrasound predictions on carcass quality grade.
Godley, Janet. An analysis of the economic impacts of agriculture and its related sectors on the Kentucky economy.
Green, Daniel. A farm-level analysis of specialty crop production in Kentucky.
Long, James. Using variography to better understand spatial correlation and systematic risk in U.S. corn yields.
Orr, Nolita. Black farmer’s transition from tobacco in Kentucky.
Subramaniam, Vijayaranta. A benefit-cost spreadsheet analysis of precision farming technologies for grain producers of varying sizes.

Agronomy
Abnee, Amanda C. Landscape influences on soil respiration rates of southeastern Kentucky forest soils.
Coulter, Christopher B. Water quality implications of urban development in mixed use watersheds.
Hartsock, Nathaniel J. In situ soil electrical conductivity variability in several Kentucky agricultural fields.
Potter, Cora L. Vegetation effects on the performance of constructed wetlands treating domestic wastewater.
Sandefur, Brian C. Geochemical, hydrologic and vegetation characteristics of three southern Appalachian mountain wetlands.

Animal Sciences
Behrends, Jason Monroe. Microbial, chemical, and visual characteristics of whole muscle beef steaks from the round with different USDA grade groups as affected by high oxygen case-ready packaging.
Broaddus, Brent Allen. Impact of season and heat stress on somatic cell counts.
Janicki, Kristen Michelle. The effect of dietary selenium source and level on broodmares and their foals.
Jose, Nancy S. Effect of receptor blockers on bacteriophage proliferation.
King, Amy Lynn. Effects of transforming growth factor-ß2 on development of bovine embryos in vitro.
Nugent, Amelia Marie. The effects of the intramammary infusion of Escherichia coli endotoxin on ovulation in lactating dairy cows.
Woods, Chad Ashley. Substrate recognition and regulation of canine pept1 function using a MDCK cell model.

Biosystems and Agricultural Engineering
Danao, Mary-Grace C. Determining product transitions in a liquid piping system using a transmission sensor.

Entomology
Collins, Joseph T. A survey for red imported fire ant, Solenopsis invicta Buren (Hymenoptera: Formicidae), in selected Kentucky counties.
Hanley, Anthony Marcel. Plodia interpunctella (Hübner) (Lepidoptera: Pyralidae) and Sitotroga cerealella (Olivier) (Lepidoptera: Gelechiidae) response to CRY1AB and CRY90 Bacillus thuringiensis Berliner transformed corn and multi CRY toxin products, and potential for resistance development.
McNabb, Denise M. Utilizing stable isotopes to infer trophic connections of generalist predators in a detritus-enriched agroecosystem.
Pucci, Thomas M. A revision of Agathirsia (Hymenoptera: Braconidae) with an analysis of its adult feeding.

Forestry
Brosi, Sunshine Liberty. Controls on American chestnut establishment in Kentucky’s Cumberland Plateau Region.
Kirillova, Natalia V. Optimal financial management of yellow-poplar-oak stands in the Central Appalachian Region.
Wichrowski, M. Activity and habitat use of a reintroduced elk herd in Eastern Kentucky.

Horticulture
Vires, Jennifer. Biomass and total phenolic content of purple cone flower (Echinacea sp.) grown in Kentucky, U.S.A., as influenced by genotype and cultural practices.

Rural Sociology
Kershaw, D. Nebraska farm women: Contributions to the survival of the small family farm.

Veterinary Science
Donofrio, J.C. Examination of T-lymphocyte tolerance in foals vaccinated against equine influenza in the presence of maternal antibodies.
Ward, M.M. Development of a perifusion culture system to examine oxytocin and prostaglandin PGF2α interaction in the mare.
Statement of Current General Fund
Income and Expenditures
Fiscal Year 2001

**INCOME**

<table>
<thead>
<tr>
<th>Federal Funds:</th>
<th>Total Federal Funds</th>
<th>State Funds</th>
<th>Total Funds</th>
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<tr>
<td>Hatch Amended</td>
<td>$3,932,333</td>
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<tr>
<td>Hatch Multistate</td>
<td>865,931</td>
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<tr>
<td>McIntire-Stennis</td>
<td>416,686</td>
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<td>Animal Health</td>
<td>60,984</td>
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<tr>
<td><strong>Total Federal Funds</strong></td>
<td>$5,275,934</td>
<td>$24,173,759</td>
<td>$29,449,693</td>
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</table>

**EXPENDITURES**

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<th></th>
<th>Federal</th>
<th>State</th>
<th>Total</th>
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<tr>
<td>Personal Services</td>
<td>$4,245,701</td>
<td>$15,639,094</td>
<td>$19,884,795</td>
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<td>Travel</td>
<td>130,762</td>
<td>184,119</td>
<td>314,881</td>
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<tr>
<td>Equipment</td>
<td>181,047</td>
<td>336,431</td>
<td>517,478</td>
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<tr>
<td>Other Operating Expenses</td>
<td>718,424</td>
<td>8,014,115</td>
<td>8,732,539</td>
</tr>
<tr>
<td><strong>Total Expenditures</strong></td>
<td>$5,275,934</td>
<td>$24,173,759</td>
<td>$29,449,693</td>
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</tbody>
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Parker, G.R., Professor
Powell, D.M., Research Specialist
Randolph, J.H., Research Specialist
Schillo, K.K., Associate Professor
Stilett, W.J., Associate Professor
Strobel, H.J., Associate Professor
Sunjatuan, Iwan, Research Specialist
Thrif, F.A., Professor
Tidwell, J., Assistant Professor*
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Wang, C., Assistant Professor*
Webster, Carl, Assistant Professor*
Xiong, Y., Professor

* Adjunct

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Nokes, S.E., Assistant Professor
Overhults, D.G., Associate Professor
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Priddy, K.T., Research Specialist
Shearer, S.A., Associate Professor
Smith, T., Research Specialist
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Taraa, J.I., Professor
Warner, R.C., Associate Professor
Wells, L.G., Professor
Workman, S.R., Assistant Professor

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Dobson, S.L., Assistant Professor
Fox, C.W., Associate Professor
Haynes, K.F., Professor
Knapp, F.W., Professor
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Rauter, C.M., Assistant Professor
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Rhoades, C., Assistant Professor
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Wagner, D.B., Associate Professor

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Chow, C.K., Professor
Glaeutter, H.P., Professor

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Downie, B., Assistant Professor
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Houtz, R.L., Associate Professor
Kemp, T.R., Professor
McNiel, R.E., Professor
Rowell, A.B., Associate Professor
Snyder, J.C., Associate Professor
Wolfe, D.E., Research Specialist

Landscape Architecture
Schach, Horst, Chair & Professor

Plant Pathology
Smith, D.A., Chair & Professor
Bachi, P.R., Research Specialist
Beale, J.W., Research Specialist
Farman, M.L., Assistant Professor
Ghatrial, S.A., Professor
Hendrix, J.W., Professor
Jarifors, U.E., Research Specialist
Nuckles, E.M., Research Specialist
Prone, T.P., Professor
Schardl, C.L., Professor
Thom, M.R., Assistant Professor
Thom, M.R., Professor
Thornbury, D.W., Scientist II
Vaillancourt, L.J., Assistant Professor
Wang, R., Research Specialist
Regulatory Services
Miller, E., Director & Professor
Beine, R.L., Laboratory Coordinator
Buckingham, D.T., Seed Regulatory Coordinator
Coffey, D.S., Inspector
Cox, B.W., Inspector
Finnesth, C.H., Seed Testing Specialist
Flood, J.S., Inspector
Herald, F., Inspection Coordinator
Johnston, C.B., Inspector
Johnston, N.T., Inspector
Kirkland, D.L., Soil Testing Specialist
Lichtenberg, D., Lab Specialist
Mason, D.W., Inspector
McMurty, S.W., Inspector
Prather, T.G., Inspector
Spencer, H.S., Auditor
Terry, D.L., Fertilizer Coordinator & Assistant Director
Thompson, C.D., Milk Coordinator
Troutman, D., Inspector

Rural Sociology
Hansen, G., Chair & Professor
Burmeister, L.L., Associate Professor
Dyk, P.A., Associate Professor
Garkovich, L.E., Professor
Greider, T.R., Associate Professor
Harris, R.P., Associate Professor
Strang, N.L., Research Specialist

Veterinary Science
Timoney, P.J., Chair & Professor
Adams, M.H., Research Specialist
Allen, G.P., Professor
Artushin, S.C., Research Specialist
Bailey, E.F., Professor
Chambers, T.M., Associate Professor
Cook, R.F., Assistant Professor
Cothran, E.G., Associate Professor
Donahue, J.M., Professor
Dwyer, R.M., Associate Professor
Fitzgerald, B.P., Associate Professor
Giles, R.C., Professor
Graves, K.A., Assistant Professor
Hale, G., Librarian
Hankins, J.D., Research Specialist
Harrison, L.H., Professor
Henney, P.J., Research Specialist
Hong, C.B., Professor
Issel, C.J., Professor
Leach, R.B., Research Specialist
Lear, T.L., Assistant Professor
Lehner, A.F., Research Specialist
Lyons, E.T., Professor
McCollum, W.H., Professor
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Williams, N.M., Assistant Professor
Woods, W.E., Research Specialist
Yeung, M.R., Research Specialist

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