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UK AGRICULTURAL EXPERIMENT STATION
UNIVERSITY OF KENTUCKY — COLLEGE OF AGRICULTURE

The Kentucky Agricultural Experiment Station

115th Annual Report 2002

UK
UNIVERSITY OF KENTUCKY
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 fifteenth annual report of the Kentucky Agricultural Experiment Station for the period ending December 31, 2002. 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, 2003

Contents

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.

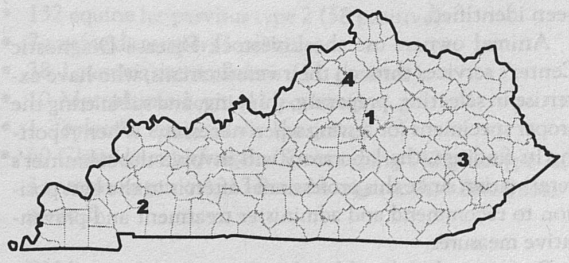
This Annual Report lists Experiment Station research projects and publications completed during 2002. A faculty list is also provided.

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 2002.

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.



Map position 1

- **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.

Map position 2

- 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.

Map position 3

- 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.

Map position 4

- 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.

Livestock Disease Diagnostic Center

The Livestock Disease Diagnostic Center is charged with the diagnoses of animal diseases and performance of tests that safeguard the health of the animal population in Kentucky. The Center helps identify infectious diseases, identifies chemical and toxic contaminants that may harm animals or humans, diagnoses nutritional diseases, identifies regulatory diseases, provides the means to meet export sales requirements, and provides an early warning system for impending epidemics.

The objective of the program is to provide veterinary diagnostic laboratory-based assistance to veterinary practitioners, farmers and agribusinesses, companion animal owners, wildlife conservationists, and public programs. Also, laboratory support is provided to the animal disease control and eradication programs of the Animal Health Programs, Kentucky Department of Agriculture. An outcome of handling complex and difficult cases is consultation and continuing education for veterinarians in veterinary diagnostic medicine.

The program provides surveillance for emerging diseases such as West Nile virus (WNV) infection and for possible threats to Kentucky agribusiness such as Foot and Mouth Disease. Also, for more than 15 years, stringent surveillance for Bovine Spongiform Encephalopathy (BSE) has been in place. Results of the surveillance are reported quarterly to federal authorities. No suspicious cases have even been identified.

Animal owners use the Livestock Disease Diagnostic Center's services through their veterinarians, who have expertise in selecting, preparing, shipping, and submitting the proper specimens for testing when necessary. When reporting its findings, the laboratory will involve the submitter's veterinarian since this professional often is in the best position to recommend and administer treatment and preventative measures.

Professional and technical staff are specialists in essential scientific disciplines directly related to animal health. Disease diagnostic efforts are coordinated and handled by specialists in the appropriate disciplines. The Livestock Disease Diagnostic Center is organized into sections so that specialized workload/activities can be handled efficiently.

Highlights:

All faculty and staff participated in the Mare Reproductive Loss Syndrome (MRLS) diagnostic and investigational efforts.

- Posted the number of equine abortion accessions of all breeds on a weekly basis for the winter and spring of 2002 on the College of Agriculture, Department of Veterinary Science website. This weekly posting of abortion accessions was done to help the equine industry manage concerns about the perceived long-term impact of MRLS.
- In cooperation with the Kentucky Department of Public Health and the Kentucky Department of Agriculture, conducted the assays for statewide surveillance and diagnosis of West Nile Virus (WNV) in birds, horses, and mosquito pools.
- Provided laboratory support for the Kentucky Department of Agriculture and the Kentucky Department of Fish and Wildlife Resources for surveillance of chronic wasting disease in the wild and farmed cervid population.

Pathology

L.R. Harrison

This section provides service in necropsy, histopathology, and surgical biopsy. Pathologists evaluate changes found at necropsy and correlate them with other laboratory test results, including light microscopic examination of tissues.

Necropsy: A postmortem examination is conducted to identify any injury or change in an organ that has resulted in impairment or loss of function.

Total Necropsy Cases	**5,299**
Avian	103
Canine and feline	454
Caprine and ovine	359
Bovine	1,369
Equine	2,862
Porcine	37
Other species (exotic—zoo, wildlife)	115

Histopathology: Tissues are prepared for light microscopic examination to reveal changes in body tissues due to disease. Tissues of 5,527 cases were processed and examined. A report has been generated for each case.

Biopsy: Small tissue specimens prepared for light microscopic examination for evidence of neoplasia or other diseases. Tissue samples representing 4,565 cases were processed and examined. A report was generated for each case.

Cytology: Preparations of cells denuded from tumors or other type lesions, recovered from secretions and exudates for microscopic examination. Cytopathologic examinations were done and a report generated for 545 cases.

Bacteriology/Mycology

J.M. Donahue

The primary mission of the Bacteriology/Mycology Section is to detect or isolate and identify pathogenic bacteria or fungi present in animals. The section also determines the antibiotics that might be used for the treatment of specific bacterial infections. The section is also responsible for culture of bacteria for two federal/state regulatory programs; CEM in equine and brucellosis in bovine.

Highlights:

- 20,583 aerobic cultures were performed on samples submitted to the Livestock Disease Diagnostic Center; significant bacterial pathogens were found in over 50% of the samples.
- 2,469 milk samples from dairy cows were tested for microorganisms that cause mastitis; over 50% were positive for pathogenic microorganisms.
- 4,587 different bacterial isolates were tested to determine the antibiotics that could be used for their treatment in exposed animals.
- 6,815 samples from horses were cultured for CEMO. One mare imported from Germany was found to be carrying the bacterium before she exposed the equine population of Kentucky.
- 249 late- to full-term equine fetuses that died due to MRLS were tested for bacterial infections. Significant bacteria were recovered from approximately 75% of the fetuses. This information together with 2001 MRLS culture results were presented to researchers at the Workshop on MRLS, to veterinarians at the 29th Mid-America Veterinary Conference, and to bacteriologists at the 45th Annual Meeting of the American Association of Veterinary Laboratory Diagnosticians.

Serology

B.J. Smith

The Serology Section provides accurate and timely results for both diagnostic and regulatory testing. This provides veterinarians and regulatory personnel with data upon which to base their decisions. These tests also enable Kentucky to export animals internationally. Testing for 30 animal diseases was available utilizing various testing techniques. A total of 157,926 tests were performed.

Highlights:

Anaplasmosis	14,732
Avian influenza	3,320
Bovine leukemia virus	1,278
Brucellosis	18,685
Contagious equine metritis	1,547
Equine infectious anemia	54,380
Johne's disease	3,714
Leptospirosis	3,867
Mycoplasma gallisepticum	18,636
Mycoplasma synoviae	18,637
Salmonella pullorum-typhoid	6,861

Molecular Diagnostics

S. Sells

The Molecular Diagnostics Section uses assay to extract, detect, and identify the specific nucleic acids of pathogenic bacteria and viruses. This application takes advantage of technologies in molecular science that have been developed during the last decade. Nucleic acid based tests are now used so that unknown organisms can be identified, closely related organisms can be differentiated, and small numbers of pathogens can be detected in complex samples.

Highlights:

One of the new responsibilities of this section during FY 2002 was screening for WNV in Kentucky's wild birds, mosquitoes, and animals. Working with the Kentucky Department for Public Health, the Kentucky Department of Agriculture, the Kentucky Department of Fish and Wildlife Resources, and other sections of the LDDC, this section screened:

- 537 birds from 88 of the 120 Kentucky counties. In Kentucky the first positive bird was collected on September 5, 2001, and the last positive on October 10, 2001. There were 43 birds positive for WNV from nine counties.
- 5,242 mosquitoes from nine counties. WNV is carried by mosquitoes. Mosquito trapping was carried out once a week and continued through the first week in October. Pools of no more than 50 mosquitoes were tested for the virus. Positive pools were identified in two counties.
- 146 equines. Between April and December eight positive equines were identified in Kentucky, six of which either died or were euthanized because of the severity of their illness.

This section provides specific assays for more than 30 pathogens. More than 9,000 samples were tested. Highlights include:

- 635 *Streptococcus equi* (31 positive)
- 441 equine herpesvirus type 1 versus type 4 (four type 4, five type 1)
- 132 equine herpesvirus type 2 (58 positive)
- 7 canine distemper (1 positive)
- 38 *Lawsonia intracellularis* (12 positive)
- 10 *Mycoplasma bovis* (11 positive)
- 1 *Taylorella equigenitalis* (positive)
- 60 *Clostridium perfringens* Toxin typing (40 genotype A, 3 enterotoxigenic A, 13 Beta 2 toxigenic A, 1 beta 2 toxigenic B

DNA sequencing was used to identify 60 bacterial isolates that were cultured in the Bacteriology Section of the LDDC. These included microbacteria, *Bacillus cereus*, *Oerskovia xanthineolytica*, *Crossiella equi*, *Nocardia otitidiscaviarum*, *Brevibacterium otitidis*, *Cellulomonas* sp., *Helcococcus* sp., *Pasteurella* sp., as well as 22 streptococci and nine actinobacilli isolated from MRLS cases.

Virology

M.L. Vickers

The Diagnostic Virology Section of the Livestock Disease Diagnostic Center provides diagnostic virology support to laboratory pathologists, veterinarians, regulatory officials, and State and Federal Veterinarians.

This section provides 65 different tests, including 35 fluorescent antibody tests to detect antigens of viruses in tissues, 13 serology tests to detect antibodies of viruses, virus isolation for cattle, horses, sheep, pigs, goats, cats, dogs, birds, reptiles, etc., as well as electron microscopy and various test kits for the detection of viral antigens. In addition, the section maintains 12 tissue culture cell lines that are used routinely.

The section performed 32,672 tests during this year. Of this total, 12,500 were virus neutralization serology tests done to meet regulatory requirements.

This year the Diagnostic Virology section obtained a grant from the Kentucky Department of Public Health funded by the Centers for Disease Control. This grant was to initiate surveillance for WNV in wild birds, horses, and mosquitoes. WNV is transmitted by mosquitoes. Mosquito trapping was carried out, and the pools of these insects were submitted to the laboratory for identification and testing for this virus. Birds are the most important sentinel species to provide information on the earliest activity of the virus in a given locality. The public was encouraged to report dead birds and to submit them to the local health department for shipment to the laboratory. Testing of birds and mosquitoes for WNV was done as a cooperative effort of this section and Molecular Diagnostics. WNV was first detected in the Commonwealth of Kentucky in the fall of 2001.

Toxicology

R.A. Smith

A variety of assays are done routinely that identify poisonous substances in tissues taken at necropsy, such as metals, certain elements, pesticides, plant toxins, and a variety of other toxins. Also, blood, serum, and urine from live animals are assayed for mineral/element deficiencies and toxins. These assays are done when a potential toxicological problem exists and when a pathologist identifies changes in tissues/organs that are consistent with specific toxic agents.

Highlights:

The numbers refer to the number of cases, not the number of animals involved. On some premises numerous animals were involved.

Acorn poisoning	10
Aldrin poisoning	3
Antifreeze poisoning	28
Arsenic poisoning	6
Buckeye poisoning	2
Carbofuran poisoning	6
Elevated copper levels	7
Diazinon poisoning	1
Elevated mercury	1
Elevated molybdenum levels (molybdenum is a copper antagonist)	3
Endosulfan poisoning	3
Lead poisoning	4
Nicotine poisoning	1
Nitrate at dangerous levels	65
Strychnine poisoning	1
Taxus poisoning	7

Veterinary Extension/Epidemiology

P.B. Scharko

A ruminant extension veterinarian located at the Livestock Disease Diagnostic Center is available to assist veterinarians in the investigation of serious or unusual disease problems. An example of assistance provided is aldrin poisoning that occurred in a herd of cattle. Because aldrin is a banned chemical, regulatory officials placed the exposed herd under quarantine. All cattle had to be tested for residue of this substance. Only those cattle that were negative for aldrin could be marketed for human consumption. In addition to helping to obtain the tissue samples from the live exposed cattle, we were instrumental in coordinating the actions of regulatory officials, veterinarians, farmer, and representatives of the program certified to do the aldrin assays so that the economic and emotional impact on the farmer was kept to a minimum.

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 other consumers from poor quality, mislabeled, or misrepresented products and to protect agricultural and other 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. Two specialty product inspectors are dedicated to monitoring and sampling small-package and specialty pet food, fertilizer, and seed products throughout the state. This reflects the Division's commitment to provide consumer protection to the purchaser of nonagricultural products such as lawn seed, fertilizer, and dog and cat food. 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 288 of 422 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 2,310 fertilizer reports, 2,936 feed reports, 816 seed reports, and 72 milk reports. Reports were checked for accuracy and compared to field audits of the submitting firms. Additional fees of $6,700 were found as a result of the audits.

2002 fee schedule for industries regulated by the Division of Regulatory Services.

Industry	Fee Assessed per Unit
Feed	35 cents/ton
Fertilizer	50 cents/ton
Milk (handlers and producers)	0.5 cents/100 lb.
Seed tags	4-24 cents/unit

Division of Regulatory Services 2002 income from fees, licenses, and testing services.

Industry	2002 Income
Feed	$821,279
Fertilizer	556,370
Milk	206,235
Seed tags, licenses, and service testing	385,683
Soil service testing	158,236
Total	$2,127,803

Feed Regulatory Program

S. 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 suitability of animal products used for human consumption and participates in a nationwide effort by state and federal agencies to ensure food safety and to promote consumer confidence in our food supply. The feed program and the FDA are cooperatively working together to inspect facilities for compliance with the ruminant-to-ruminant feeding ban, which was promulgated to prevent establishment and amplification of Bovine Spongiform Encephalopathy (BSE or "Mad Cow Disease").

2002 highlights:

- Administered actions on 3,231 official samples of commercial feed involving 19,867 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 15 feed mills that mix restricted drugs in feed and to inspect these mills for compliance with the FDA's national BSE Rule. An additional 85 BSE inspections were

contracted with the FDA for mills not required to be licensed with the FDA.
- Conducted 7,500 label reviews and maintained product registration for about 15,000 products from 900 companies.
- Participated in the FDA's 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.

2002 highlights:
- Administered actions on 3,137 official and 68 unofficial samples of fertilizer involving 9,146 tests of the approximately 865,000 tons of fertilizer distributed in Kentucky.
- Reviewed labels and registered 3,652 products from 535 firms, including 202 who manufactured custom blends of fertilizers.

Feed and Fertilizer Laboratory

M. Bryant

The laboratory provided analytical support for the feed, fertilizer, and soil programs. Accurate and timely analyses of these materials were provided for the official fertilizer and feed regulatory programs and for the support of agriculture in Kentucky. In 2002, the lab analyzed 3,205 fertilizer samples and 3,406 feed samples. In addition, 42,922 agriculture-related samples were analyzed in the laboratory, i.e., soil, manure, litter, and research samples. The laboratory analyzed many materials from check sample programs and special sample requests from the College of Agriculture. Laboratory special projects were also conducted for method development and evaluation of laboratory method performance.

Check sample materials were analyzed from regional, national, and international programs: AAFCO, Magruder®, mycotoxins, UAN, phosphate rock, mineral, and other sample types. The lab routinely provides program support using approximately 75 different analytical methods. Samples are also submitted to and analyzed by commercial and other regulatory programs to provide additional analytical method support and to ensure the quality of the Regulatory Services laboratory results.

The lab also participates in a monthly aflatoxin share sample program, established by the North Carolina Department of Agriculture. Laboratory staff provided one of the monthly samples for the program. The statistical analysis of the data for all lab results was performed, and these results were provided to all participant labs.

Inspection Program

S. McMurry

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 their 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.

2002 highlights:
- 11 inspectors completed 5,101 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 the FDA's BSE regulations.
- Two inspectors visited and sampled small package specialty feed, fertilizer, and seed products in urban markets.
- Six inspectors made 302 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:

Feed	3,231
Fertilizer	3,137
Seed	2,492
Milk	6,430

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 producer payments are calculated. The program provides support to the producers and processors of the state's $264 million per year dairy industry. Industry participants are trained, licensed, and subsequently monitored to maintain compliance with the law.

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

2002 highlights:
- Reviewed and issued licenses to six transfer stations, 23 milk handlers, 23 laboratories, 71 testers, and 359 sampler-weighers.

- Analyzed and administered action on 6,430 official samples.
- Distributed 3,168 samples to licensed laboratories for comparison purposes.
- Conducted 16 pay-record and 28 raw milk receiving manifest audits.
- Conducted 29 inspections at 21 milk laboratories.
- Collaborated with the Kentucky Cabinet for Health Services Milk Safety Branch to train sampler-weighers.
- Trained and examined 52 new sampler-weighers and eight new testers.
- Conducted 24 inspections of raw milk transfer stations.
- Conducted 667 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 includes 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.

2002 highlights:

- Performed 1,977 inspections and sampled agricultural, lawn, turf, and garden seeds at more than 600 wholesale and retail locations.
- Collected and tested 2,492 official seed samples.
- Issued stop-sale orders on 384 official seed samples and 841 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 202 agricultural permits and 48 vegetable and flower permits to label seed.
- Registered 413 seed dealers and 29 non-certified custom conditioners.
- 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 in the state and provides service testing for producers, dealers, retailers, researchers, 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 as well as many other tests. More than 15,000 different tests were performed in 2002, a 9% increase from the previous year.

2002 highlights:

Sample Type	2002 Completed Samples
Official samples	2,492
Service samples	6,958
Tobacco	2,063
Other certified crops	394
Total samples	9,450

Soil Testing Laboratory

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

Soil testing provides farmers, homeowners, greenhouse operators, and others with scientific information about the fertility status of their soils. In partnership with the Cooperative Extension Service, it also provides them with lime and fertilizer recommendations based on soil test results. We also offer analyses of animal wastes, water, and research soil tests.

The soil test website has been updated with an order form for supplies, sample forms, and calculators for determining fertilizer, lime, and manure application rates. The site is at <www.soil.rs.uky.edu>.

The number of samples analyzed in 2002 were:

Type	Number	% Increase from 2001
Agriculture	37,719	15
Home lawn and garden	6,745	3
Strip-mine reclamation	28	-51
Commercial horticulture	676	12
Greenhouse	65	41
Research	10,818	-25
Atrazine residue in soil	36	-25
Animal waste	226	16
Nutrient solution	20	-33
Special research solutions	913	N/A
Total	57,256	3

Kentucky Agricultural Experiment Station Projects

Hatch and McIntire-Stennis Projects

Hatch and McIntire-Stennis projects for calendar year 2002 (as reported in the USDA Current Research Information System database) follow.

Agricultural Economics

Agricultural Industrialization and Globalization: Implications for Rural Economies—*A. Pagoulatos*

Alternative Policy Designs for Sharing Agricultural Risk in Market-Based Economies—*J. Skees*

Analyzing the Industrial Organization and Financial Economic Performance of the Global Agribusiness Sector—*S. Vickner*

Analyzing the International Competitiveness of the U.S. Agricultural Processing Industry—*M. Reed*

Benefits and Cost of Natural Resources Policies Affecting Public and Private Lands—*R. Fleming*

Benefits and Costs of Resource Policies Affecting Public and Private Land—*R. Fleming*

Financing Agriculture and Rural America: Issues of Policy, Structure, and Technical Change—*D. Freshwater*

Fruit and Vegetable Supply-Chain Management, Innovations, and Competitiveness—*T. Woods*

Impacts of Trade Agreements and Economic Policies on Southern Agriculture—*M. Marchant*

Risk Management and Profit Potential of Alternative Production Practices, Enterprises, and Technologies—*C. Dillon*

Rural Economic Development Alternatives in the New Competitive Environment—*D. Freshwater*

Rural Labor Markets: Workers, Firms, and Communities in Transition—*D. Freshwater*

Technological Progress in Agriculture, Farmers, and Rural Communities—*D. Debertin*

U.S. Consumer Demand for Dairy Products: Needs-Driven Methods and Analysis—*L. Maynard*

Agronomy

Amount and Quality of Herbage Ingested by Cattle Grazing Tall Fescue Clover Grasslands—*C. Dougherty*

Breeding and Genetics of Forage Crops to Improve Productivity, Quality, and Industrial Uses—*T. Phillips*

Breeding for Fusarium Head Blight Resistance in Wheat for Kentucky—*D. Van Sanford*

Breeding Grasses for the Transition Zone—*T. Phillips*

Corn Breeding and Genetics: White Endosperm Breeding, Genetic Variation in Food Quality and Hybrid Performance Tests—*W. Pearce*

Evaluation of Soybean Varieties and Breeding Lines for Use in Kentucky—*T. Pfeiffer*

Forage Crop Genetics and Breeding to Improve Yield and Quality—*N. Taylor*

Fragipan Influence on Hillslope Hydrology and Soil Water Quality—*W. Thom*

Identification and Characterization of Genes Regulated by AGL15, an Embryo-Expressed MADS-Box Gene—*S. Perry*

Microbial Ecology of Nitrate Reduction in Fragipan Soils—*M. Coyne*

Mineralogical Controls on Colloid Dispersion and Solid-Phase Speciation of Soil Contaminants—*R. Barnhisel*

Multiplicative (Linear-Bilinear) Models for Genotype X Environment Interaction in Crop Cultivars—*P. Cornelius*

Plant Genetic Resource Conservation and Utilization—*N. Taylor*

Potential Impact of Global Warming on Seed Germination Ecology of Summer Annual and of Winter Annual Weeds—*C. Baskin*

Predicting Solute Transport Parameters from Pore Characteristics of Kentucky Soils—*A. Karathanasis*

Regulation of Isoprenoid Metabolism in Plant-Pathogen Interactions—*J. Chappell*

Seed Biology and Technology Investigations—*D. TeKrony*

Species and Crop Management Effects on the Yield and Quality of Round Bale Silage—*M. Collins*

Turfgrass Management Practices in Kentucky—*D. Williams*

Animal Sciences

Animal Manure and Waste Utilization, Treatment, and Nuisance Avoidance for a Sustainable Agriculture—*G. Cromwell*

Assessment and Regulation of Sexual Behavior in Beef Bulls—*K. Schillo*

Breeding to Optimize Maternal Performance and Reproduction of Beef Cows in the Southern Region—*F. Thrift*

Calcium and Phosphorus Nutrition of Pregnant and Lactating Mares—*L. Lawrence*

Detection of Estrus in Gilts and Sows—*L. Edgerton*

Development of a Swine Model to Evaluate the Reduction of Antibiotic Resistant Enteric Bacteria in Domestic Livestock—*M. Newman*

Development of Peptide Blockers to Enhance Cheese Production—*C. Hicks*

Dietary Regulation of Cationic Amino Acid Transporter Protein Expression in Cattle—*J. Matthews*

Effect of Dietary Fiber Type and Amount on Large Intestinal Volatile Fatty Acids and Water Balance in Horses—*L. Lawrence*

Enhancing Food Safety through Control of Food-Borne Disease Agents—*M. Newman*

Forage Protein Characterization and Utilization for Cattle—*E. Vanzant*

Formation and Treatment of Ovarian Cysts in Dairy Cows—*W. Silvia*

Interaction of Structurally Modified Food Proteins in Processed Meat Systems—*Y. Xiong*

Management Systems for Improved Decision Making and Profitability of Dairy Herds—*D. Amaral-Phillips*

Mastitis Resistance to Enhance Dairy Food Safety—*R. Harmon*

Metabolic Relationships in Supply of Nutrients for Lactating Cows—*D. Harmon*

Modifying Milk Fat Composition for Improved Manufacturing Qualities and Consumer Acceptability—*S. Franklin*

Molasses-Based, Strategic Supplementation Program to Enhance Beef Cow Reproductive Performance and Calf Weaning Weight from Endophyte-Infected Tall Fescue Pasture—*D. Ely*

Nutrition and Health of Dairy Calves—*S. Franklin*

Nutritional Systems for Swine to Increase Reproductive Efficiency—*M. Lindemann*

Organic Chromium and Anionic Salt Supplementation in the Diet of Transition Dairy Cattle—*J. Jackson*

Post-Harvest Biochemistry of and Methods of Minimizing Methanethiol and Dimethyl Trisulfide in Soy Protein Products—*W. Boatright*

Proteomic Analysis of Anaerobic Bacterial Metabolism—*H. Strobel*

Regulation of Carbohydrate Digestion and Absorption in the Ruminant Small Intestine—*D. Harmon*

Strategies for Improving Ewe Lactational Performance and Predicting Preweaning Growth of Lambs—*D. Aaron*

Zinc Nutrition and Endothelial Integrity—*B. Hennig*

Biosystems and Agricultural Engineering

Characterization of Laboratory and Pilot Scale Foam Fractionation of Industrial Enzymes—C. *Crofcheck*

Decision Support for Design and Control of Plant Growth Systems—R. *Gates*

Demand-Controlled Ventilation (DCV) for Residential Indoor Air Quality Control— D. *Colliver*

Develop and Assess Precision Farming Technology and Its Economic and Environmental Impacts—S. *Shearer*

Marketing and Delivery of Quality Cereals and Oilseeds—M. *Montross*

Measuring and Predicting Soil Compaction Caused by Machinery—L. *Wells*

Optical Sensor Measurement of Food Composition Based on Light Scattering Distribution—*F. Payne*

Stress Factors of Farm Animals and Their Effects on Performance—R. *Gates*

Systematic Approach to Enzyme Recovery from Solid-State Fermentation—S. *Nokes*

Systems for Controlling Air Pollutant Emissions and Indoor Environments of Poultry, Swine, and Dairy Facilities—*R. Gates*

Water and Solute Transport in Subsurface Environments—S. *Workman*

Community and Leadership Development

Assessing Impacts of Welfare Reform on Individual, Family, and Community Well-Being in the Rural South—*J. Zimmerman*

How Do Structured Out-of-School Experiences Contribute to Positive Youth Development?—*P. Dyk*

Impacts of Structural Change in the Dairy Industry—*L. Garkovich*

Rural Low-Income Families: Monitoring 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*

Entomology

Biological Control of Arthropod Pests and Weeds—*K. Yeargan*

Biology and Management of Insects Attacking Turf and Woody Landscape Plants—*D. Potter*

Characterization of Selected Proteins Derived from an Insect Parasitoid—S. *Palli*

Consequences of Variation in Host Plant Resistance for the Evolution of Offspring Size in a Seed-Feeding Beetle—C. *Fox*

Development, Evaluation, and Safety of Entomopathogens for Control of Arthropod Pests—G. *Brown*

Development of Pest Management Strategies for Forage Alfalfa Persistence—*F. Knapp*

Dynamic Soybean Insect Management for Emerging Agricultural Technologies and Variable Environments—*K. Yeargan*

Ecology and Management of European Corn Borer and Other Stalk-Boring Lepidoptera—G. *Brown*

Field Evaluation and Implementation of Economic Injury Levels Incorporating Biological Control Agents—G. *Brown*

Functional Implications of Polydnavirus Genome Organization—*B. Webb*

Herbivory in Deciduous Forests: Implications for Forest Regeneration and Restoration—*L. Rieske*

Impacts of Interactions among Generalist Arthropod Predators in Two Complex Food Webs: Vegetable-Crop Gardens and Forest-Floor Leaf Litter—*D. Wise*

Mating Disruption and the Evolution of Pheromone Communication in Moths—*K. Haynes*

Potential for Evolution of Resistance to Synthetic Pheromone—*K. Haynes*

Sources, Dispersal, and Management of Stable Flies on Grazing Beef and Dairy Cattle—S. *Dobson*

Systematics and Biodiversity of Biological Control Agents with Special Reference to the Braconidae—M. *Sharkey*

Forestry

Biological Improvement of Chestnut and Management of the Chestnut Pathogens and Pests— C. *Rhoades*

Conservation, Ecology, and Restoration of Large Mammals in Eastern Kentucky—*D. Maehr*

Controls on Litter Decay and N Transformations: Effects of Tree Species, Microclimate, and Soil Mesofauna in Oak and Mixed Hardwood Stands—M. *Arthur*

Developing a Digital Photogrammetric Method for Forest Stand Density Estimation—C. *Liu*

Edaphic and Fungal Controls on American Chestnut Restoration: Seedling Growth and Susceptibility to the Root Pathogen Phytophthora Cinnamomi—C. *Rhoades*

Effects of Disturbance Corridors (Roads and Hiking Trails) on Invertebrate Macrofauna of Forest Soils on the Cumberland Plateau of Kentucky—*P. Kalisz*

Genetic Diversity of White Oak Regeneration in Kentucky Forests—*D. Wagner*

Restoration of the American Peregrine Falcon (*Falco peregrinus anatum*) to Cliff Habitats in Kentucky—M. *Lacki*

Graduate Center for Nutritional Sciences

Effect of Dietary Antioxidants on Hepatic NF-κB Activation—*H. Glauert*

Effects of Fish Oil and N-3 Fatty Acids on Antioxidant Defense System and Inflammatory Processes—*L. Chen*

Mechanisms of Anti-Inflammatory Action of Eicosapentaenoic Acid (EPA)—*L. Chen*

Horticulture

Botrytis cinerea Development and Natural Volatile Compounds from Strawberry Fruit—*T. Kemp*

Controlled Water Table Irrigation for Container Plant Production—*J. Buxton*

Evaluation of Natural Products for Mediating Plant Resistance to Arthropods and for Use in Protecting Horticultural Crops From Insect Damage—*J. Snyder*

Molecular Characterization of the Role of Raffinose in the Model Plants Corn and Arabidopsis—*A. Downie*

Peptide Deformylase: A Novel Herbicide Target Amenable to Genetically Engineered Tolerance—M. *Williams*

Post-Translational Methylation of Lysyl Residue 14 in the Large Subunit of Ribusco-1—*R. Houtz*

Production of Ethylene and Its Biosynthetic Precursors as Indicators of Seed Vigor—*R. Geneve*

Regulation of Sorbitol Dehydrogenase Activity during Apple Fruit Development: Genotypic Differences and the Impact of Cultural Practices—*D. Archbold*

Rootstock and Interstem Effects on Pome and Stone Fruit Trees—*J. Masabni*

Technical and Economical Efficiencies of Producing, Marketing, and Managing Environmental Plants—*R. McNiel*

Landscape Architecture

Planning Model for Assessment of Agricultural Potential in Appalachia Using Information Technology Tools—*T. Nieman*

Plant Pathology

Biological Control of Soilborne Plant Pathogens for Sustainable Agriculture—*J. Hendrix*

Epidemiology, Genetic Diversity, and Strategies to Control Bean Pod Mottle Virus—*S. Ghabrial*

Genetic Analysis of Avirulence/Virulence in *Magnaporthe grisea*, a Pathogen of Rice—M. *Farman*

Genetics and Biochemistry of Alkaloid Production by Endophytes—C. *Schardl*

Genomic Studies of the Model Phytopathogenic Fungus *Magnaporthe grisea*—M. *Farman*

Managing Plant-Parasitic Nematodes in Sustainable Agriculture with Emphasis on Crop Resistance—*D. Hershman*

Molecular Genetics of the Interaction between Corn and Corn Stalk Rot Fungi (*Colletotrichum graminicola* and *Fusarium graminearum*)—*L. Vaillancourt*

National Agricultural Program to Clear Pest Control Agents for Minor Uses—*W. Nesmith*

Role of Promoter and Enhancer Elements in the Replication of Defective Interfering Tombusvirus RNA—*P. Nagy*

Vector Specificity in Potyvirus Transmission: Role of the Helper Component—*T. Pirone*

Veterinary Science

Changes in Gene Expression in Equine Conceptuses and Uteri during Estrous Cycle and Early Pregnancy—*K. McDowell*

Control, Transmission, and Prevalence of Natural Infections of Internal Parasites of Equids and Ruminants—*E. Lyons*

Identification and Characterization of Immunodominant Antigens from the Coccidian Parasite *Sarcocystis neurona*—*D. Howe*

Investigation of the Role of Thyroxine in the Control of Seasonal Reproductive Activity in the Mare—*B. Fitzgerald*

National Animal Genome Research Program Species Coordinator (Horse)—*E. Bailey*

New Therapeutic Approaches for Equine Protozoal Myelitis—*T. Tobin*

Non-Immune Cellular/Molecular Responses to Influenza Infection of the Horse—*T. Chambers*

Pathogenesis of Equine Infectious Anemia—*C. Issel*

Collegewide Extramural Funding

Collegewide active extramurally funded research projects for calendar year 2002 (as listed in the Office of Sponsored Projects Administration database) follow.

Agricultural Economics

Total—$195,916

Analyzing the Farmer Profitability of Supplying Biomass, Kentucky Governor's Office, $30,000—*G. Ibendahl, T. Woods*

Consumer Purchasing Behavior toward GM Foods in Europe, University of Missouri, $13,500—*S. Vickner*

Delivery and Development of Risk Management Programs to Help Kentucky Farmers Improve Their Risk Management Skills, Texas A&M University, $15,000—*G. Ibendahl, S. Isaacs, R. Trimble*

Evaluation of Dairy Options Pilot Program, Economic Research Service, $60,732—*L. Maynard*

Exporting U.S. Livestock Products to China: Assessment of the Chinese Marketing Distribution System, North Carolina A&T State University, $50,000—*M. Marchant*

Policy Designs for Sharing Agricultural Risk, GlobalAgRisk Inc., $26,684—*J. Skees*

Agronomy

Total—$3,713,844

Accelerating Development of Scab-Resistant Wheat Varieties, USDA, $38,118—*D. Van Sanford*

Burley Tobacco Breeding and Genetics, Philip Morris Inc., $1,000,000—*R. Miller*

Career: Microbial Population Dynamics during PCB Bioremediation in Soils, National Science Foundation, $225,002—*E. D'Angelo*

Developing Higher Value Soybeans, Kentucky Soybean Promotion Board, $15,000—*D. Hildebrand*

Efficient Leaf Aldehyde Production, Kentucky Science and Technology Corporation Inc., Kentucky Science and Engineering Foundation R&D Excellence, $68,302—*D. Hildebrand, P. Nagy (Plant Pathology)*

Epoxy Fatty Acid Accumulation in Soybean Oil, United Soybean Board, $27,500—*D. Hildebrand*

Forage for Advancing Livestock Production II, USDA, $343,278—*M. Collins, J. Henning*

Functions of Multiple Poly(A) Polymerases in Arabidopsis, USDA, $110,000—*A. Hunt*

Fusarium graminearum Infection in the Morphological Components of Wheat Spikes, Agricultural Research Service, $14,634—*D. TeKrony*

Identification of Protein Interactors of AGL15, an Embryo MADS-Domain Factor, USDA, $75,000—*S. Perry*

Introduction of Synthetic Auxin Metabolizing Genes into Agronomic Crops, United Agriproducts Company, $125,000—*G. Collins*

Interactions of Iron with the Nitrogen Cycle, USDA, $190,000—*C. Matocha*

Investigating and Improving Dense Pubescence Germplasm, Kentucky Soybean Promotion Board, $10,000—*T. Pfeiffer*

Molecular Regulation and Transport of Sterols in Plants, National Science Foundation, $116,746—*J. Chappell*

Monitoring and Recommendations for the Prevention of MRLS, Kentucky Thoroughbred Owners and Breeders, $351,200—*J. Henning, L. Bush, H. Burton*

Non-Transgenic Methods to Create Mutations in Specific Protein and Oil Genes, USDA, $84,495—*D. Hildebrand*

Partnering for Innovative Commercialization of Technology: The University of Kentucky Natural Products Alliance, National Science Foundation, $600,000—*M. Smith*

Polymerase Chain Reaction-Based Strategies for the Isolation of Nicotine–Demethylase from Tobacco, North Carolina State University, $178,595—*B. Siminszky*

Reduction of Saturated Fatty Acid Content of Soybean Oil, United Soybean Board, $56,974—*D. Hildebrand*

Soft Red Winter Wheat Breeding and Variety Development for Kentucky, Kentucky Small Grain Growers Association, $25,000—*D. Van Sanford*

Soybean Genetic Engineering for Increased Disease Resistance, Kentucky Soybean Promotion Board, $15,000—*G. Collins, C. Meurer, R. Dinkins*

Structure and Function of Terpene Cyclase, Salk Institute, $44,000—*J. Chappell*

Animal Sciences

Total—$762,689

Bone Density Changes in Lactating Mares, Cooperative Research Farms, $7,168—*L. Lawrence*

Commercialization Fund: Development of a Value-Added Food Processing Incubator, Kentucky Science and Technology Corporation Inc., $74,960—*W. Mikel*

Determination of the Potential for Peptide Amino Acid Absorption in the Dog, IAMS Co., $73,843—*J. Matthews*

Effect of Diet on Bone Density of Lactating Mares, Cooperative Research Farms, $25,856—*L. Lawrence*

Effect of Diet Quality on Growth during Weaning, Cooperative Research Farms, $19,297—*L. Lawrence*

Evaluation of the Efficacy of Various Intervention Methods for Pork, National Pork Producers Council, $25,000—*W. Mikel, M. Newman*

Forage-Animal Production Research, USDA, $50,000—*N. Cox*

HACCP Training for Small Meat Processors, Food Safety and Inspection Service, $25,000—*W. Mikel*

In Vitro Methods for Assessing Starch Digestibility of Horse Feeds, Cooperative Research Farms, $4,096—*L. Lawrence*

Master Cattlemen Program, Kentucky Cattlemen's Association, $249,000—*W. Burris, L. Anderson, J. Henning (Agronomy)*

Nutrient Utilization in the Dog, Hills Pet Nutrition Inc., $115,000—*D. Harmon*

Remote, Continuous Temperature Detection in Beef Cattle, Kentucky Science and Technology Corporation Inc., Kentucky Science and Engineering Foundation R&D Excellence, $93,469—*E. Vanzant, L. Turner (Biosystems and Agricultural Engineering), J. Johns (Animal Sciences)*

Biosystems and Agricultural Engineering

Total—$1,852,669

Cooperative Extension Radon and Indoor Air Quality Education, Kentucky Department for Public Health, $3,132—*L. Piercy*

Development of Embedded Processor Platform for Intelligent Sensors, Kentucky Science and Technology Corporation Inc., Kentucky Science and Engineering Foundation R&D Excellence, $54,005—*F. Payne, L. Holloway (Electrical and Computer Engineering)*

Development of Robust, Automatic Calibration Algorithms for Online Detection of Diseased and Defective Poultry Carcasses, Agricultural Research Service, $70,084—*R. Gates*

Improved Recovery of Engineered Pharmaceutical Proteins from Tobacco Plant Extract, Kentucky Science and Technology Corporation Inc., Kentucky Science and Engineering Foundation R&D Excellence, $50,393—*C. Crofcheck, M. Jay (Pharmaceutical Sciences), P. Bummer (Pharmaceutical Sciences)*

Kentucky Lead Education and Outreach Project, University of Georgia, $10,279—*L. Piercy, K. Henken (Cooperative Extension Service)*

Post-Harvest Physical Properties of Corn Stover, Oak Ridge National Laboratory, $139,674—*M. Montross, S. McNeill, S. Shearer*

Precision Agriculture: Development and Assessment of Integrated Practices for Kentucky Producers Phase III, USDA, $700,014—*S. Shearer, T. Mueller (Agronomy), C. Dillon (Agricultural Economics)*

Precision Agriculture: Development and Assessment of Integrated Practices for Kentucky Producers—Phase IV, USDA, $685,620—*S. Shearer, T. Mueller (Agronomy), C. Dillon (Agricultural Economics)*

Sensors for Delineation of Spatial Management Zones, USDA, $129,632—*T. Stombaugh, T. Mueller (Agronomy)*

Streambank Erosion Associated with Grazing Activities in Kentucky, University of Georgia, $9,836—*D. Edwards*

Community and Leadership Development

Total—$171,401

Determinants of Spatial Variation in Food Stamp Program Participation Dynamics, Pennsylvania State University, $3,500—*J. Zimmerman*

Permanency and Stability of Kinship Care Families—Community Collaboration for Children, Kentucky Cabinet for Families and Children, $167,901—*P. Dyk*

Entomology

Total—$1,215,146

Administration and Evaluation of the Southern Region IPM Program, USDA, $12,874—*F. Knapp*

Cooperative Agricultural Pest Survey, USDA, $74,955—*F. Knapp*

Enhancing Biological Control of White Grubs by Native Parasitic Wasps on Golf Courses, US Golf Association, $42,952—*D. Potter*

Fire and Acorn Predation Interact to Affect Oak Regeneration, Forest Service, $17,820—*L. Rieske*

Identification Keys to the Economically Important Species of Cotesia, USDA, $137,206—*M. Sharkey*

Insect Survey of a Megadiverse Country (Phase II): Colombia, National Science Foundation, $350,000—*M. Sharkey*

Management of Eastern Tent Caterpillar Populations in Kentucky, Agricultural Research Service, $48,780—*B. Webb, K. McDowell*

Monitor Gypsy Moth Populations for Slow-the-Spread Program, Slow the Spread Foundation, $50,000—*F. Knapp, C. Harper*

Real and Apparent Complexity in Polydnavirus Genomes, National Science Foundation, $133,163—*B. Webb*

Studies on ECR-Based Gene Switch, RheoGene, $196,000—S. Palli

Tick Survey of the Kentucky Horse Park to Assess Potential Vectors of Equine Babesiosis (Piroplasmosis), National Equestrian Federation of the US, $25,450—*L. Townsend*

Trophic Cascades and Interacting Control Processes in a Detritus-Based Terrestrial Food Web, National Science Foundation, $29,566—*D. Wise*

Wolbachia Research Coordination Network, National Science Foundation, $96,380—*S. Dobson*

Forestry

Total—$289,874

Channel Restoration and Riparian Reforestation along Wilson Creek, Bernheim Arboretum and Research Forest, $36,254—*C. Rhoades*

Ecology of Black Bears at the Los Alamos National Laboratory, Los Alamos National Laboratory, $60,000—*D. Maehr*

Effects of an Introduced Pest on the C and N Dynamics of a Northern Hardwood Forest, Institute of Ecosystems Studies, $56,224—*M. Arthur*

Influence of Riparian Management Prescriptions on the Use of Upland and Riparian Habitats by Bats in Forests of the Pacific Northwest, Northwest Bat Cooperative, $57,500—*M. Lacki*

Kentucky Mountain Elk, Earthwatch Institute, $22,205—*D. Maehr, J. Cox (Animal Sciences), J. Larkin (Forestry)*

Loch Vale Watershed Forest Re-Survey, Colorado State University, $4,511—*M. Arthur*

Silvicultural and Topographic Controls on American Chestnut Establishment, National Wild Turkey Federation, American Chestnut Foundation, Forest Service, $48,180—*C. Rhoades*

Sterilization of Wood for Pallet Construction, Limestone Bluffs Resource RC and D Inc., $5,000—*F. Fackler, T. Conners*

Horticulture

Total—$2,730,110

Alternative Production Systems for Mid-South Fruit and Vegetable Growers, University of Tennessee, $170,000—*A. Rowell, R. Bessin (Entomology)*

Database Design and Usability Testing for Advanced Digital Information Systems in Horticulture, Kentucky Science and Technology Corporation R&D Voucher, Athenic Systems, $132,720—*M. Williams, R. Geneve, P. Cappiello*

Ginseng/Golden Seal Research Project, 2001-2002, Kentucky Department of Agriculture, $8,000—*R. Jones*

Kentucky Horticulture Council Project, Kentucky Horticulture Council, $1,731,899—*D. Ingram*

New Crop Opportunities, Phase III, USDA, $687,491—*D. Ingram, D. Van Sanford (Agronomy), G. Ibendahl (Agricultural Economics)*

Livestock Disease Diagnostic Center

Total—$32,300

Study of Bacteria Associated with Mare Reproductive Loss Syndrome, Grayson Jockey Club Research Foundation Inc., $22,300—*J. Donahue, S. Sells (Veterinary Science)*

West Nile Surveillance on Horses and Birds, Kentucky Department for Public Health, $10,000—*L. Harrison, M. Vickers (Veterinary Science)*

Plant Pathology

Total—$897,707

Comparative Genomics of Telomeres in Pathogenic and Saprophytic Fungi, National Science Foundation, $160,000—*M. Farman, C. Schardl, C. Staben (Biology)*

Development of a Novel Biotechnology Tool Based on RNA Recombination, Kentucky Science and Technology Corporation Inc., Kentucky Science and Engineering Foundation R&D Excellence, $43,936—*P. Nagy*

Development of Gray Leaf Spot Resistant Perennial Ryegrass through Breeding and Biotechnological Approaches, U.S. Golf Association, $25,000—*M. Farman*

Development of Management Strategies to Control Major Soybean Virus Diseases in the North Central States, Iowa State University, $28,366—*S. Ghabrial*

Enhancing Genetic Analysis and Sequencing Facility, USDA, $32,500—*C. Schardl, B. Webb (Entomology), S. Perry (Agronomy)*

Identification of Genes Involved in Anthracnose Stalk Rot Pathogenesis, E. I. DuPont De Nemours & Company, $75,000—*L. Vaillancourt*

Mechanism of the Transition between Biotrophy and Necrotrophy in a Hemibiotroph, Cooperative State Research Education and Extension, $195,000—*L. Vaillancourt*

Mechanisms of Defective Interfering RNA Replication and Interference with Helper Virus Infections, National Science Foundation, $5,000—*P. Nagy*

Molecular Basis of Disease in a Virus-Infected Plant Pathogenic Fungus, USDA, $65,000—*S. Ghabrial*

Molecular Biology and Biosynthesis of Lolines by Grass Endophytes, National Science Foundation, $120,000—*C. Schardl, L. Bush (Agronomy)*

Role of a *Colletotrichum graminicola* Pathogenicity Gene Homologue in *Fusarium Graminearum*, USDA, $6,413—*L. Vaillancourt, D. Van Sanford (Agronomy), D. TeKrony (Agronomy)*

Survey and Epidemiology of Soybean Mosaic Virus and Bean Pod Mottle Virus in Late-Planted Soybean in Kentucky, Kentucky Soybean Promotion Board, $10,000—*S. Ghabrial, D. Hershman*

Whole Genome Analysis of Pathogen-Host Recognition and Subsequent Responses in the Rice Blast Patho-System, North Carolina State University, $131,492—*M. Farman*

Regulatory Services

Total—$27,298

FDA Feed Establishment Inspections, Food and Drug Administration, $27,298—*S. Traylor*

Veterinary Science

Total—$914,525

13th North American Colloquium on Animal Cytogenetics and Gene Mapping, USDA, $5,000—*T. Lear, E. Bailey*

Equine Infectious Anemia Vaccine Trial, University of Pittsburgh, $27,500—*C. Issel*

Experimental Challenge of the Intervet Inc. Equine Influenza Vaccine, Intervet Inc., $14,730—*T. Chambers*

Functional Genomics for Horses, Morris Animal Foundation, $300,000—*E. Bailey*

Galactokinase 1: A Candidate Gene for Juvenile Cataracts in Dogs, AKC Canine Health Foundation, $17,946—*K. Graves*

Identification and Characterization of Immunodominant Antigens from *Sarcocystis neurona*, the Primary Cause of EPM, Amerman Family Foundation, $96,800—*D. Howe*

Identification of Immunogenic Proteins Unique to *Streptococcus equi.*, Grayson Jockey Club Research Foundation Inc., $45,600—*J. Timoney*

Molecular Cytogenetics Approaches to the Conservation of Endangered Rhinoceros Species, Morris Animal Foundation, $40,992—*T. Lear*

Quality Assurance/Blind Sample Testing and New Analytical Methods/Metabolite Synthesis/Standardized Testing Research, Kentucky State Racing Commission, $360,000—*T. Tobin*

Research on Hookworms in Pinnipeds (California Sea Lions/Northern Fur Seals) on San Miguel Island, California, National Oceanic and Atmospheric Administration, $5,957—*E. Lyons*

Publications

All publication dates in this section are 2002 unless otherwise noted.

Annual Report

One Hundred and Fourteenth Annual Report of the Kentucky Agricultural Experiment Station for 2001. College of Agriculture, University of Kentucky, M. Scott Smith, Director. June.

Books and Book Chapters

Agricultural Economics

Lovely, S., T.D. Rowley, and D. Freshwater. *The Morphing of Main Street USA*. NewCities Foundation, Lexington, Kentucky.

Marchant, M.A., T. Manukyan, and W. Koo. International trade and foreign direct investment: A focus on the free trade area of the Americas. IN: *Free Trade Area of the Americas, The WTO, and New Farm Legislation: Responding to Opportunities and Challenges*. Conference Proceedings, Farm Foundation, Chicago.

Skees, J.R., P. Varangis, D. Larson, and P. Siegel. *Can Financial Markets Be Tapped to Help Poor People Cope with Weather Risks?* Wider Press of the United Nations.

Varangis, P., J. Skees, and B. Barnett. Weather indexes for developing countries. IN: R.S. Dischel, ed. *Climate Risk and the Weather Market: Financial Risk Management with Weather Hedges*. Risk Books, London.

Agronomy

Baskin, C.C., J.M. Baskin, and E.W. Chester. Seed germination ecology of summer annual species of dewatered reservoir shorelines (mudflats), a temporally unpredictable habitat. pp. 353-368. IN: E.W. Chester and J.A. Fralish, eds. *Land Between The Lakes, Kentucky and Tennessee: Four Decades of Tennessee Valley Authority Stewardship*. The Center for Field Biology, Austin Peay State University, Clarksville, Tennessee.

Bush, L.P. Forage production and sustainable agriculture. pp. 185-227. IN: W.B. Yook and K.I. Sung, eds. *Forage Production and Environment in 21st Century*. Korean Society of Grassland Science.

Crossa, J., and P.L. Cornelius. Linear-bilinear models for the analysis of genotype-environment interaction. pp. 389-393. IN: M.S. Kang, ed. *Quantitative Genetics, Genomics and Plant Breeding*. CAB International.

D'Angelo., E.M. Wetlands: Biodegradation of organic pollutants. pp. 3401-3417. IN: E.L. Madsen, ed. *Encyclopedia of Environmental Microbiology*. John Wiley and Sons, N.Y.

Diaz-Zorita, M., J.H. Grove, and E. Perfect. Aggregation, fragmentation and structural stability measurement. pp. 37-40. IN: R. Lal, ed. *Encyclopedia of Soil Science*. Marcel Dekker Inc., New York.

Dougherty, C.T., and M. Collins. Forage utilization. Chapter 17, pp. 391-414. IN: R.F. Barnes and M. Collins, eds. *Forages: The Science of Grassland Agriculture*. 7th edition. Iowa State Press, Ames, Iowa.

Hildebrand, D.F., S. Rao, and T. Hatanaka. Redirecting lipid metabolism in plants. Chapter 3, pp. 57-84. IN: T. Kuo & H. Gardner, eds. *Lipid Biotechnology*. Marcel Dekker Inc., New York.

Karathanasis, A.D. Mineral equilibria in environmental soil systems. pp. 109-151. IN: J.B. Dixon and D. Schulze, eds. *Soil Mineralogy with Environmental Applications*. Soil Science Society America Book Series #7.

Karathanasis, A.D. Weathering and alteration of clay minerals. pp. 187-192. IN: R. Lal, ed. *Encyclopedia of Soil Science*, Marcel Dekker Inc., New York.

Karathanasis, A.D., and D.A. Ming. Colloid-mediated transport of metals associated with lime-stabilized biosolids. pp. 49-63. IN: A. Violante, P.M. Huang, J.M. Bollag, and L. Gianfreda, eds. *Soil Mineral-Organic Matter-Microorganism Interactions and Ecosystem Health*. Developments in Soil Science 28A, Elsevier Science.

Matocha, C.J. Charge properties of clays: High activity and low activity clay. pp. 183-186. IN: R. Lal, ed. *Encyclopedia of Soil Science*. Marcel Dekker Inc.

Animal Sciences

Bullock, D., M. Enns, L. Gould, M. MacNeil, and G.P. Rupp. Utilization. Chapter 6. IN: *Guidelines for Uniform Beef Improvement Programs*. 8th edition.

Cromwell, G.L. Why and how antibiotics are used in swine production. pp. 7-27. IN: L.B. Schook, ed. *Animal Biotechnology*. Vol 13, No. 1. Marcel Dekker, Monticello, New York.

Franklin, S.T., and J.A. Jackson. Replacement management, cattle: Health management. IN: *Encyclopedia of Dairy Sciences*. Academic Press.

Franklin, S.T. Replacement management, cattle: Preruminant diets and weaning practices. IN: *Encyclopedia of Dairy Sciences*. Academic Press.

Harmon, R.J. Milk quality issues: What does it take to get somatic cell count down to 100,000 and keep it there? pp. 179-183. IN: T.P. Lyons and K.A. Jacques, eds. *Nutritional Biotechnology in the Feed and Food Industries*. Nottingham University Press, Nottingham, England.

Klopfenstein, T., R. Angel, G.L. Cromwell, G.E. Ericckson, D.G. Fox, C. Parsons, L.D. Satter, and A.L. Sutton. *Animal Diet Modification to Decrease the Potential for Nitrogen and Phosphorus Pollution*. Council for Agricultural Science and Technology Issue Paper No. 21, June, CAST, Ames, Iowa.

Paton, N.D., A.H. Cantor, A.J. Pescatore, M.J. Ford, and C.A. Smith. Absorption of selenium by developing chick embryos during incubation. pp. 107-121. IN: T.P. Lyons and K. A. Jacques, eds. *Proceedings, Alltech's Eighteenth Annual Symposium, Nutritional Biotechnology in the Feed and Food Industries*. Nottingham University Press, Nottingham, England.

Toborek, M., Y.W. Lee, S. Kaiser, and B. Hennig. Measurement of inflammatory properties of fatty acids in human endothelial cells. pp. 198-219. IN: Sen and Packer, eds. *Redox Cell Biology and Genetics*. Methods in Enzymology, Vol. 352. Academic Press, New York.

Community and Leadership Development

Burmeister, L.L., G. Ranis, and M. Wang. Group Behaviour and Development: A Comparison of Farmers' Organizations in South Korea and Taiwan. pp. 125-143. IN: J. Heyer, F. Stewart, and R. Thorp, eds. *Group Behaviour and Development: Is the Market Destroying Cooperation?* Oxford University Press Inc., New York.

Zimmerman, J.N., and T. Hirschl. Welfare Reform in Rural Areas: A Voyage Through Uncharted Waters. IN: D.L. Brown and L. Swanson, eds. *Challenges for Rural America in the 21st Century*. Penn State University Press, University Park, Pennsylvania.

Entomology

Held, D.W., and D.A. Potter. June beetles, *Phyllophaga* spp. IN: *Encyclopedia of Entomology*. Kluwer Publishers.

Potter, D.A. Clearwing moths (Lepidoptera: Sesiidae). IN: *Encyclopedia of Entomology*. Kluwer Publishers.

Potter, D.A. *Destructive Turfgrass Insects: Biology, Diagnosis, and Control*. Wiley, Indianapolis, Indiana. 1998. (Revisions to Second Printing, 2002).

Turnbull, M., and B. Webb. Perspectives on polydnavirus origins and evolution. pp. 203-254. IN: *Advances in Virus Research*. Elsevier Science, U.S.A.

Webb, B.A. Ichnovirus. IN: R. Lange and O. Tidona, eds. *The Springer Index of Viruses*. Springer-Verlag, Heidelberg.

Forestry

Maehr, D.S., R.C. Lacy, E.D. Land, O.L. Bass, and T.S. Hoctor. Population viability of the Florida panther: A multi-perspective approach. pp. 284-311. IN: S. Beissinger and D. McCullough, eds. *Population Viability Analysis*. University of Chicago Press, Chicago, Illinois.

Graduate Center for Nutritional Sciences

Chow, C.K., ed. Antioxidant Nutrients and Environmental Health. Special issue of the journal of Toxicology. Elsevier Science, Amsterdam, Vol. 180, No.1, pp. 1-106, part A, Oct. 30.

Chow, C.K., ed. Antioxidant Nutrients and Environmental Health. Special issue of the journal of Toxicology, Elsevier Science, Amsterdam, Vol. 180, No. 2, pp. 107-208, part B, Nov. 15.

Horticulture

Hartmann, H.T., D.E. Kester, F.T. Davies Jr., and R.L. Geneve. *Hartmann and Kester's Plant Propagation: Principles and Practices*. 7th edition. Prentice-Hall Inc., Englewood Cliffs, New Jersey.

Hartmann, H.T., D.E. Kester, F.T. Davies Jr., and R.L. Geneve. *Plant Propagation Teaching Manual*. 2nd edition. Prentice-Hall Inc., Englewood Cliffs, New Jersey.

Peffley, E., R. Durham, and C. McKenney. *Introductory Horticulture Laboratory Manual, Second Edition*. Kendall/Hunt Publishing Company, Dubuque, Iowa. 123 pp.

Plant Pathology

Clay, K., and C.L. Schardl, Evolution origins and ecological consequences of endophyte symbiosis with grasses. pp. S99-S127. IN: *American Naturalist 160*.

Ghabrial, S.A. Chrysovirus (Partitiviridae). pp. 682-684. IN: C.A. Tidona and G. Darai, eds. *The Springer Index of Viruses*. Springer-Verlag, New York.

Ghabrial, S.A. Partitivirus (Partitiviridae). pp. 685-688. IN: C.A. Tidona and G. Darai, eds. *The Springer Index of Viruses*. Springer-Verlag, New York.

Ghabrial, S.A. Rhizidiovirus. pp. 1313-1314. IN: C.A. Tidona and G. Darai, eds. *The Springer Index of Viruses*. Springer-Verlag, New York.

Ghabrial, S.A., A.I. Soldevila, and W.M. Havens. Molecular genetics of the viruses infecting the plant pathogenic fungus *Helminthosporium victoriae*. pp. 213-236. IN: S. Tavantzis, ed. *Molecular Biology of Double-Stranded RNA: Concepts and Applications in Agriculture, Forestry and Medicine*. CRC Press, Boca Raton, Florida.

Vincelli, P. Field crop pest management (plant pathogens). pp. 270-273. IN: D. Pimental, ed. *Encyclopedia of Pest Management*. Marcel Dekker Inc., New York.

Veterinary Science

Cook, R.F., and C.J. Issel. Equine infectious anemia. pp. 640-641. IN: C. Moore, ed. *Encyclopedia of Science and Technology, Vol. 6*. 9th edition. McGraw-Hill Publishers Inc., New York.

Allen, G.P. Respiratory infections by equine herpesvirus types 1 and 4. IN: P. Lekeux, ed. *Equine Respiratory Diseases*. International Veterinary Information Service, Ithaca, New York. <http://www.ivis.org/special_books/Lekeux/allen/chapter_frm.asp?LA=1>

Timoney, P.J. Equine viral arteritis. IN: P. Lekeux, ed. *Equine Respiratory Diseases*. International Veterinary Information Service, Ithaca, New York. <http://www.ivis.org/special_books/Lekeux/timoney/chapter_frm.asp?LA=1>.

Patents

Agronomy

Michael Barrett received a patent for "Cytochrome P450 Enzymes and Related Compounds and Methods." Patent No. 6,380,465. Issued April 30.

Susheng Gan and co-inventors Mingtang Xie and Yuehui He received a patent for "Bidirectional Promoters and Methods Related Thereto." Patent No. 6,388,170. Issued May 14.

Arthur G. Hunt and co-inventors *Glenn B. Collins*, Christopher Lawrence, Qingshun Li, and Santanu Dasgupta received a patent for "Use of Bacterial Acetate Kinase and Their Genes for Protection of Plants against Different Pathogens." Patent No. 6,476,293. Issued November 5.

Quingshum Li and co-inventors Songhai Shen, *Arthur Hunt*, and Sheng Yang He received a patent for "Use of HRMA Proteins and Their Genes for Broad Range Protection of Plants against Bacterial, Fungal, and Viral Pathogens." Patent No. 6,342,654. Issued January 29.

Animal Sciences

William Boatright received a patent for "Soybean Protein Products Having Improved Odor and Flavor and Methods Related Thereto." Patent No. 6,426,112. Issued July 30.

Clair Hicks and co-inventor Zeynep Ustunol received a patent for "Method of Inhibiting Binding Activity of Immunoglobulins." Patent No. 6,348,346. Issued February 19.

Entomology

Douglas L. Dahlman and co-inventors *Bruce Webb* and *Indu Maiti* (Kentucky Tobacco Research and Development Center) received a patent for "Materials and Methods Useful to Affect Growth and Development of Lepidoptera Larvae." Patent No. 6,337,432. Issued January 8.

Kentucky Tobacco Research and Development Center

Indu B. Maiti and co-inventors Nrisingha Dey and Robert Shephard received a patent for "Use of the Full Length Transcript (FLT) from Mirabilis Mosaic Caulimovirus to Express Chimeric Genes in Plants." Patent No. 6,420,571. Issued July 16.

Plant Pathology

Christopher L. Schardl and co-inventor Jinghung Wang received a patent for "Endophyte Ergot Alkaloid Synthetic Compounds, Compounds Which Encode Therefor and Related Methods." Patent No. 6,335,188. Issued January 1.

Veterinary Science

John F. Timoney and co-inventor *Sergey Artiushin* received a patent for "Compounds Encoding the Protective M-Like Protein of *Streptococcus Equi* and Assays Therefor." Patent No. 6,458,358. Issued October 1.

Genbank Register

Horticulture

Siriwitayawan, G., B. Downie, and R.L. Geneve. Ethylene evolution is positively correlated with seed vigor in sweet corn and tomato seed lots with differing vigor levels but similar germination capacity. DEFINITION Zea mays 1-aminocyclopropane-1-carboxylic acid oxidase (acco1) mRNA, partial cds. ACCESSION AY155581.

Zhao,T.-Y., R.B. Meeley, and B. Downie. Aberrant processing of a Maize galactinol synthase transcript is caused by heat stress. DEFINITION Zea mays galactinol synthase 3 (gols3) gene. ACCESSION AY192144.

Zhao,T.-Y., R.B. Meeley, K.J. Bradford, and B. Downie. Expression and regulation of the maize galactinol- and raffinose-synthase gene families in seeds and cultured cells by ABA, environmental stress and carbohydrate. DEFINITION Zea mays galactinol synthase 1 mRNA, complete cds. ACCESSION AF497507.

Zhao,T.-Y., R.B. Meeley, K.J. Bradford, and B. Downie. Expression and regulation of the maize galactinol- and raffinose-synthase gene families in seeds and cultured cells by ABA, environmental stress and carbohydrate. DEFINITION Zea mays galactinol synthase 2 mRNA, complete cds. ACCESSION AF497508.

Zhao,T.-Y., R.B. Meeley, K.J. Bradford, and B. Downie. Expression and regulation of the maize galactinol- and raffinose-synthase gene families in seeds and cultured cells by ABA, environmental stress and carbohydrate. DEFINITION Zea mays galactinol synthase 3 mRNA, complete cds. ACCESSION AF497509.

Zhao,T.-Y., R.B. Meeley, K.J. Bradford, and B. Downie. Expression and regulation of the maize galactinol- and raffinose-synthase gene families in seeds and cultured cells by ABA, environmental stress and carbohydrate. DEFINITION Zea mays raffinose synthase 1 mRNA, partial cds. ACCESSION AF497510.

Zhao,T.-Y., R.B. Meeley, K.J. Bradford, and B. Downie. Expression and regulation of the maize galactinol- and raffinose-synthase gene families in seeds and cultured cells by ABA, environmental stress and carbohydrate. DEFINITION Zea mays raffinose synthase 2 mRNA, partial cds. ACCESSION AF497511.

Zhao,T.-Y., R.B. Meeley, K.J. Bradford, and B. Downie. Expression and regulation of the maize galactinol- and raffinose-synthase gene families in seeds and cultured cells by ABA, environmental stress and carbohydrate. DEFINITION Zea mays raffinose synthase 3 mRNA, complete cds. ACCESSION AF497512.

Progress Reports

PR-457: *2001 Annual and Perennial Ryegrass Report*. R.F. Spitaleri, J.C. Henning, G.D. Lacefield, and P.B. Burrus.

PR-458: *2001 Orchardgrass Report*. R.F. Spitaleri, J.C. Henning, T.D. Phillips, G.D. Lacefield, D.C. Ditsch.

PR-459: *2001 Summer Forage Annuals Report*. R.F. Spitaleri, J.C. Henning, D.C. Ditsch, G.D. Lacefield, and W. Turner.

PR-460: *2001 Cool-Season Grass Grazing Tolerance Variety Report*. R.F. Spitaleri, J.C. Henning, T.D. Phillips, G.D. Lacefield, C.T. Dougherty, and J.E. Roberts.

PR-461: *2001 Alfalfa Grazing Tolerance Variety Report*. R.F. Spitaleri, J.C. Henning, G.D. Lacefield, and C.T. Dougherty.

PR-462: *2001 Cool-Season Grass Grazing Variety Report: Tolerance to Horses*. R.F. Spitaleri, J.C. Henning, L.M. Lawrence, G.D. Lacefield, T.D. Phillips, and D. Powell.

PR-463: *2002 Beef Research*. D. Bullock, ed.

PR-464: *2002 Agronomy Research Report*. Michael Barrett, ed.

PR-465: *Kentucky Turfgrass Research Report*.

PR-466: *2002 Kentucky Small Grains Variety Trials*. G.C. Claywell, C.S. Swanson, J. Connelly, and D.A. Van Sanford.

PR-467: *2002 Kentucky Hybrid Corn Performance Test*. W.L. Pearce, R.W. Curd, and C. Lee.

PR-468: *2002 Nursery and Landscape Program Research Report*. D. Ingram, ed.

PR-469: *2002 Kentucky Soybean Performance Tests*. E. Lacefield and T. Pfeiffer.

PR-470: *2002 Fruit and Vegetable Crops Research Report*. B. Rowell and J.C. Snyder, eds.

PR-471: *2002 Alfalfa Report*. R.F. Spitaleri, J.C. Henning, G.D. Lacefield, J. Wyles, B. Sleugh, and P.C. Vincelli.

Regulatory Bulletins

RB-285: *Annual Report: Analysis of Official Fertilizer Samples, July 2000-June 2001*. D.L. Terry.

RB-286: *Seed Inspection Report, 1997-2001*. D.T. Buckingham.

RB-287: *Commercial Feeds in Kentucky, 2001*. C.E. Miller.

RB-288: *Annual Report: Analysis of Official Fertilizer Samples, July 2001-June 2002*. D.L. Terry.

Journal Articles

Agricultural Economics

Debertin, D.L. Review of Char Miller, ed. *Fluid arguments: Five centuries of western water conflict*. Growth and Change 33(1):152-155.

Debertin, D.L. Yo Quiero Taco Bell Amarillo. Choices (Spring):31-33.

Fleming, R.A., and J.D. Long. Measuring the cost of restricting access to crop land for manure nutrient management. Journal of Agronomy 94 (January-February):57-64.

Ibendahl, G., L. Maynard, and A. Branstetter. Measuring the perceived effectiveness of training for the dairy option pilot program. Journal of Extension 40(6): Research in Brief article No. 4.

Ibendahl, G., S. Isaacs, and R. Trimble. Financial information base of participants in FSA borrower training. Journal of Extension 40(5).

Lackey, S.B., D. Freshwater, and A. Rupansingha. Factors influencing local government cooperation in rural areas. Economic Development Quarterly 16(2):138-154.

Marchant, M.A., D.N. Cornell, and W. Koo. International trade and foreign direct investment: Substitutes or complements? Journal of Agricultural and Applied Economics (JAAE) 34(2):289-302.

Popp, M.P., T.C. Keisling, R.W. McNew, L.R. Oliver, C.R. Dillon, and D.M. Wallace. Planting date, cultivar and tillage system effects on dryland soybean production. Agronomy Journal 94(1):81-88.

Rawls, E., L. Meyer, and K. Burdine. Niche marketing of cattle/beef. In the series: Managing for today's cattle market and beyond. Livestock Marketing Information Center, Denver, Colorado. March.

Rupasingha, A., S.J. Goetz, and D. Freshwater. Social and institutional factors as determinants of economic growth: Evidence from the United States counties. Papers in Regional Science 81(2):139-155.

Saghaian, S.H., M.R. Reed, and M.A. Marchant. Monetary impacts and overshooting of agricultural prices in an open economy. American Journal of Agricultural Economics 84(1):90-103.

Saghaian, S.H., M.R. Reed, and M.F. Hasan. Overshooting of agricultural prices in four Asian economies. Journal of Agricultural and Applied Economics 34(1):95-109.

Vickner, S.S. Food securities: Where Wall Street meets Main Street. Choices 16 (Winter 2001-2002):11-14.

Vickner, S.S, and S.P. Davies. Estimating strategic price response using cointegration analysis: The case of the domestic black and herbal tea industries. Agribusiness: An International Journal 18(Spring):131-144.

In addition, members of the department published 21 abstracts.

Agronomy

Ayora-Talavera, T., J. Chappell, E. Lozoya-Gloria, and V.M. Loyola-Vargas. Over expression in Catharanthus roseus hairy roots of a truncated hamster 3-Hydroxy-3-Methylglutaryl-CoA reductase gene. Applied Biochemistry and Biotechnology 97:135-145.

Barton, C.D., and A.D. Karathanasis. A novel method for measurement and characterization of soil macroporosity. Communications in Soil Science and Plant Analysis 33:1305-1322.

Barton, C.D., and A.D. Karathanasis. Influence of soil colloids on the migration of atrazine and Zn through large soil monoliths. Air, Soil & Water Pollution 14:44-63.

Baskin, C.C., and J.M. Baskin. Achene germination ecology of the federally threatened floodplain endemic *Boltonia decurrens* (Asteraceae). American Midl. National 147:16-24.

Baskin, C.C., and J.M. Baskin. Studies on the seed germination and flowering stages of the life cycle of the shale barren endemic *Arabis serotina* Steele (Brassicaceae). National Areas Journal 22:270-276.

Baskin, C.C., P. Milberg, L. Andersson, and J.M. Baskin. Nondeep simple morphophysiological dormancy in seeds of the weedy facultative winter annual *Papaver rhoeas* L. (Papaveraceae). Weed Research 42:194-202.

Baskin, C.C., O. Zackrisson, and J.M. Baskin. Role of warm stratification in promoting germination of seeds of *Empetrum hermaphroditum* (Empetraceae), circumboreal species with a stony endocarp. American Journal of Botany 89:486-493.

Bender, M.H., J.M. Baskin, and C.C. Baskin. Flowering requirements of *Polymnia canadensis* (Asteraceae) and their influence on its life history variation. Plant Ecology 160:113-124.

Bender, M.H., J.M. Baskin, and C.C. Baskin. Phenology and glasshouse, common garden, and reciprocal transplant studies of *Polymnia canadensis* (Asteraceae), a monocarpic species of the North American temperate deciduous forest. Plant Ecology 161:15-39.

Bender, M.H., J.M. Baskin, and C.C. Baskin. Role of intraspecific competition in mass seeding and senescence in *Polymnia canadensis*, a primarily monocarpic species. Journal Torrey Botanical Society 129:107-114.

Bloom, T.C., J.M. Baskin, and C.C. Baskin. Ecological life history of the facultative woodland biennial *Arabia laevigata* variety *laevigata* (Brassicaceae): Reproductive phenology and fecundity. Journal Torrey Botanical Society 129:29-38.

Bloom, T.C., J.M. Baskin, and C.C. Baskin. Ecological life history of the facultative woodland biennial *Arabis laevigata* variety *laevigata* (Brassicaceae): Seed dispersal. Journal Torrey Botanical Society 129:21-28.

Chappell, J. The genetics and molecular genetics of terpene and sterol origami. Curriculum Opinions Plant Biology 5:151-7.

Clements, R.K., J.M. Baskin, and C.C. Baskin. The comparative biology of the two closely-related species *Penstemon tenuiflorus* Pennell and *P. hirsutus* (L.) Willd. (Scrophulariaceae, Section *Graciles*): IV. Effects of shade, drought, and soil type on survival and growth. Castanea 67:177-187.

Clements, R.K., J.M. Baskin, and C.C. Baskin. The comparative biology of the two closely-related species *Penstemon tenuiflorus* Pennell and *P. hirsutus* (L.) Willd. (Scrophulariaceae, Section *Graciles*): III. Ecological life cycle, growth characteristics, and flowering requirements. Castanea 67:161-176.

Collaku, A., S.A. Harrison, P.L. Finney, and D.A. Van Sanford. Clustering of environments of southern soft red winter wheat region for milling and baking quality attributes. Crop Science 42:58-63.

Crossa, J., and P.L. Cornelius. Biplots of linear-bilinear models for studying crossover genotype x environment interactions. Crop Science 42:619-633.

Dattaroy, T., and A.G. Hunt. Polyadenylation of RNAs associated with a nuclear phosphorolytic nuclease complex from plants. Journal of Plant Biochemistry and Biotechnology 11:21-25.

Devarenne, T.P., A. Ghosh, and J. Chappell. Regulation of squalene synthase, a key enzyme of sterol biosynthesis in tobacco. Plant Physiology 129:1095-1106.

Diaz-Zorita, M., and J.H. Grove. Duration of tillage management affects carbon and phosphorus stratification in phosphatic Paleudalfs. Soil Tillage Research 66:165-174.

Diaz-Zorita, M., G.A. Duarte, and J.H. Grove. A review of no-till systems and soil management for sustainable crop production in the subhumid and semiarid Pampas of Argentina. Soil Tillage Research 65:1-18.

Diaz-Zorita, M., E. Perfect, and J.H. Grove. Disruptive methods of assessing soil structure: A review. Soil Tillage Research 64:3-22.

Dinkins, R.D., C. Pflipsen, A. Thompson, and G.B. Collins. Ectopic expression of an *Arabidopsis* single zinc finger gene in tobacco results in dwarf plants. Plant Cell Physiology 43:743-750.

Egli, D.B., and W.P. Bruening. Flowering and fruit set dynamics at phloem-isolated nodes in soybean. Field Crops Research 79:9-19.

Egli, D.B., and W.P. Bruening. Synchronous flowering and fruit set at phloem-isolated nodes in soybean. Crop Science 42:1535-1540.

Faeth, S.H., L.P. Bush, and T.J. Sullivan. Peramine alkaloid variation in *Neotyphodium*-infected Arizona fescue: Effects of endophyte and host genotype and environment. Journal of Chemical Ecology 28:1511-1526.

Gonzalez-Zertuche, L., A. Orozco-Segovia, C.C. Baskin, and J.M. Baskin. Effects of priming on germination of *Buddleja cordata* sp. *cordata* (Loganiaceae) seeds and possible ecological significance. Seed Science Technology 30:535-548.

Hamman, B., D.B. Egli, and G. Koning. Seed vigor, soil-borne pathogens, pre-emergent growth and soybean seedling emergence. Crop Science 42:451-457.

He, Y., H. Fukushige, D. Hildebrand, and S. Gan. Evidence supporting a role of jasmonic acid in Arabidopsis leaf senescence. Plant Physiology 128:876-884.

Hidayati, S.N., J.M. Baskin, and C.C. Baskin. Effects of dry storage on afterripening and survivorship of seeds of four *Lonicera* species (Caprifoliaceae). Seed Science Technology 30:137-148.

Koning, G., D.M. TeKrony, T. Pfeiffer, and S.A. Ghabrial. Influence of soybean mosaic virus (SMV) resistance gene (Rsv1) on Phomopsis spp. seed infection, in an aphid-free environment. Crop Science 42:178-185.

Koren'kov,V., R.W. Shepherd, and G.J. Wagner. The use of reconstitution to distinguish between Ca/H and Cd/H antiporter activities of oat and tobacco tonoplast vesicles. Physiology Plantarum 116:359-367.

Kroumova, A.B., G.J. Wagner, and H.M. Davies. Biochemical observations on medium-chain-length polyhydroxyalkanoate biosynthesis and accumulation in Pseudomonas mendocina. Archives of Biochememistry Biophysics 405:95-103.

Modarresi, R., M. Rucker, and D.M. TeKrony. Accelerated aging test for comparing wheat seed vigour. Seed Science and Technology 30:683-687.

Perfect, E., M. Diaz-Zorita, and J.H. Grove. A prefractal model for predicting soil fragment-size distributions. Soil Tillage Research 64:79-90.

Reddy, M.S.S., R.D. Dinkins, and G.B. Collins. Overexpression of the *Arabidopsis thaliana MinE1* bacterial division inhibitor homologue gene alters chloroplast size and morphology in transgenic Arabidopsis and tobacco plants. Planta 215:167-176.

Wang, E., S. Gan, and G.J. Wagner. Isolation and characterization of the CYP71D16 trichome-specific promoter from Nicotiana tabacum L. Journal of Experimental Botany 53:1891-1897.

In addition, members of the department published 97 abstracts.

Animal Sciences

Akay, V., J.A. Jackson Jr., and D.L. Harmon. NutriDense and waxy corn hybrids: Effects on site and extent of disappearance of nutrients in sheep. Journal of Animal Science 80:1335-1343.

Boatright, W.L. Effect of gallic acid on the aroma constituents of soymilk and soy protein isolates. Journal of the American Oil Chemists' Society 79(4):317-323.

Bogaki, M., W.J. Silvia, R. Rekawiecki, and J. Kotwica. Direct inhibitory effect of progesterone on oxytocin-induced secretion of prostaglandin F_{2a} from bovine endometrial tissue. Biology of Reproduction 67:184-188.

Chaiyotwittayakun, A., R.J. Erskine, P.C. Bartlett, T. Herdt, P.M. Sears, and R.J. Harmon. The effect of ascorbic acid and L-histidine therapy on acute mammary inflammation in dairy cattle. Journal of Dairy Science 85:60-67.

Cromwell, G.L. Why and how antibiotics are used in swine production. Animal Biotechnology 13:7-27.

Cromwell, G.L., M.D. Lindemann, J.H. Randolph, G.R. Parker, R.D. Coffey, K.M. Laurent, C.L. Armstrong, W.B. Mikel, E.P. Stanisiewski, and G.F. Hartnell. Soybean meal from Roundup Ready® or conventional soybeans in diets for growing-finishing swine. Journal of Animal Science 80:708-715.

Donovan, D.C., S.T. Franklin, A.R. Hippen, and C.C.L. Chase. Growth and health of Holstein calves fed milk replacers supplemented with antibiotics or Enteroguard. Journal of Dairy Science 85:947-950.

Elgaali, H., M.C. Newman, T.R. Hamilton-Kemp, R.W. Collins, K.Yu, and D.D. Archbold. Comparison of volatile compounds emitted from food-borne and related gram positive and gram negative bacteria. Journal of Basic Microbiology 42(6):546-552.

Feng, J., and Y.L. Xiong. Interaction of myofibrillar and preheated soy proteins. Journal of Food Science 67:2851-2856.

Flora, G., Y.W. Lee, A. Nath, W. Maragos, B. Hennig, and M. Toborek. Methamphetamine-induced TNF-a gene expression and activation

of AP-1 in discrete regions of mouse brain: Potential role of reactive oxygen intermediates and lipid peroxidation. Neuromolecular Medicine 2:71-85.

Hennig, B., B.D. Hammock, R. Slim, M. Toborek, V. Saraswathi, and L.W. Robertson. PCB-induced oxidative stress in endothelial cells: Modulation by nutrients. International Journal Hygiene Environmental Health 205:95-102.

Hennig, B., P. Meerarani, R. Slim, M. Toborek, A. Daugherty, A. Silverstone, and L.W. Robertson. Proinflammatory properties of co-planar PCBs: In vitro and in vivo evidence. Toxicology and Applied Pharmacology 181:174-183.

Imwalle, D.B., A. Daxenberger, and K.K. Schillo. Effects of melengestrol acetate on reproductive behavior and concentrations of LH and testosterone in bulls. Journal of Animal Science 80:1059-1067.

Imwalle, D.B., D.L. Fernandez, and K.K. Schillo. Melengestrol acetate blocks the preovulatory surge of luteinizing hormone, the expression of behavioral estrus, and ovulation in beef heifers. Journal of Animal Science 80:1280-1284.

Imwalle, D.B., and K.K. Schillo. Castration increases pulsatile luteinizing hormone release but fails to diminish mounting behavior in sexually experienced bulls. Domestic Animal Endocrinology 22:223-235.

Jones, C.R., M. Ray, and H.J. Strobel. Cloning and transcriptional analysis of the *Thermoanaerobacter ethanolicus* strain 39E maltose ABC transport system. Extremophiles 6:291-299.

Jones, C.R., M. Ray, and H.J. Strobel. Transcriptional analysis of the xylose ABC transport operons in the thermophilic anaerobe *Thermoanaerobacter ethanolicus*. Current Microbiology 45:54-62.

Lee, Y.W., K.W. Son, G. Flora, B. Hennig, A. Nath, and M. Toborek. Methamphetamine activates DNA-binding of specific redox-responsive transcription factors in mouse brain. Journal of Neuroscience Research 70:82-89.

Matthews, J.C., and K.J. Anderson. Recent advances in amino acid transporters and excitatory amino acid receptors. Current Opinion in Clinical Nutrition and Metabolic Care 5:77-84.

Meyer, T.A., M.D. Lindemann, G.L. Cromwell, H.J. Monegue, and N. Inocencio. Effects of pharmacological levels of zinc as zinc oxide on fecal zinc and mineral excretion in weanling pigs. Professional Animal Scientist 18:162-168.

Nugent, A.M., T.B. Hatler, and W.J. Silvia. The effect of intramammary infusion of *Eschericia coli* endotoxin on ovulation in lactating dairy cows. Reproductive Biology 2:295-309.

Park, H.J., Y.W. Lee, B. Hennig, and M. Toborek. Linoleic acid-induced VCAM-1 expression in human microvascular endothelial cells is mediated by the NF-κB-dependent pathway. Nutrition and Cancer 41:126-134.

Paton, N.D., A.H. Cantor, A.J. Pescatore, M.J. Ford, and C.A. Smith. The effect of dietary selenium source and level on the uptake of selenium by developing chick embryos. Poultry Science 81:1548–1554.

Pena-Ramos, E.A., and Y.L. Xiong. Antioxidative activity of soy protein hydrolysates in a liposomal system. Journal of Food Science 67:2952-2956.

Portocarrero, S.M., M.C. Newman, and B. Mikel. Microbial population, chemical status and shelf stability of smoked and non-smoked country cured hams. Journal of Food Science 67(6):1892-1898.

Portocarrero, S.M., M.C. Newman, and B. Mikel. Staphylococcus aureus survival and toxin production on smoked and non-smoked country cured hams. Meat Science 62(2):267-273.

Ramirez-Suarez, J.C., and Y.L. Xiong. Transglutaminase cross-linking of whey/myofibrillar proteins and the effect on protein gelation. Journal of Food Science 67:2885-2891.

Silvia, W.J., R.W. Hemken, and T.B. Hatler. Timing of onset of somatotropin supplementation on reproductive performance in dairy cows. Journal of Dairy Science 85:384-389.

Swanson, K.C., J.C. Matthews, C.A. Woods, and D.L. Harmon. Postruminal administration of partially hydrolyzed starch and casein influences pancreatic α-amylase expression in calves. Journal of Nutrition 132:376-381.

Thrift, F.A., D.E. Franke, and T.A. Thrift. Review: The issue of dystocia expressed when sires varying in percent Bos indicus inheritance are mated to Bos taurus females. Professional Animal Scientist 18:18-25.

Thrift, F.A., and T.A. Thrift. Review: The issue of carcass tenderness expressed by cattle varying in Bos indicus inheritance. Professional Animal Scientist 18:193-201.

Toborek, M., Y.W. Lee, R. Garrido, S. Kaiser, and B. Hennig. Dietary unsaturated fatty acids selectively induce an inflammatory environment in human endothelial cells. American Journal of Clinical Nutrition 75:119-125.

Tseng, Y.C., Y.L. Xiong, C.D. Webster, K.R. Thompson, and L.A. Mvzinic. Quality changes in Australian red claw crayfish, Cherax quadricarinatus, stored at 0°C. Journal of Applied Aquaculture 12(4):53-66.

Van de Ligt, C.P.A., M.D. Lindemann, and G.L. Cromwell. Assessment of chromium tripicolinate supplementation and dietary energy level and source on growth, carcass, and blood criteria in growing pigs. Journal of Animal Science 80:483-493.

Van de Ligt, C.P.A., M.D. Lindemann, and G.L. Cromwell. Assessment of chromium tripicolinate supplementation and dietary protein level and source on growth, carcass, and blood criteria in growing pigs. Journal of Animal Science 80:2412-2419.

Van de Ligt, J.L.G., M.D. Lindemann, R.J. Harmon, H.J. Monegue, and G.L. Cromwell. Effect of chromium tripicolinate supplementation on porcine immune response during the periparturient and neonatal period. Journal of Animal Science 80:456-466.

Van de Ligt, J.L.G., M.D. Lindemann, R.J. Harmon, H.J. Monegue, and G.L. Cromwell. Effect of chromium tripicolinate supplementation on porcine immune response during the postweaning period. Journal of Animal Science 80:449-455.

Washburn, S.P., W.J. Silvia, C.H. Brown, B.T. McDaniel, and A.J. McAllister. Trends in reproductive performance in southeastern Holstein and Jersey dairy herds. Journal of Dairy Science 85:244-251.

White, L.A., M.C. Newman, G.L. Cromwell, and M.D. Lindemann. Brewers dried yeast as a source of mannan oligosaccharides on growth performance and intestinal characteristics of weanling pigs. Journal of Animal Science 80:2619-2628.

Xiong, S., Y.L. Xiong, S.P. Blanchard, B. Wang, and J.H. Tidwell. Tenderness evaluation of prawns (*Machrobrachium rosenbergii*) marinated in various salt and acid solutions. International Journal of Food Science and Technology 37:1-6.

Zhou, A., W.L. Boatright, L.A. Johnson, and M. Reuber. Binding properties of 2-pentyl pyridineto soy protein as measured by solid phase microextraction. Journal of Food Science 67(1):142-145.

In addition, members of the department published 63 abstracts.

Biosystems and Agricultural Engineering

Bicudo, J.R., D.R. Schmidt, S.W. Gay, R.S. Gates, L.D. Jacobson, and S.J. Hoff. Air quality and emissions from livestock and poultry production/waste management systems. National Center for Manure and Animal Waste Management White Papers, North Carolina State University, Raleigh, North Carolina. Available on CD-ROM from Midwest Plan Service, 57 pp.

Burks, T.F., S.A. Shearer, J.D. Green, and J.R. Heath. Influence of weed maturity levels on species classification using machine vision. Journal of Weed Science 50(6):802-811.

Camenisch, G.A., L.G. Wells, T.D. Smith, and G.A. Duncan. Reduced-cost mechanical handling and curing of burley tobacco. Applied Engineering in Agriculture 18(2):161-169.

Castillo, M., F.A. Payne, C.L. Hicks, J. Laencina, and M.B. Lopez. Effect of calcium and enzyme in cutting time prediction of coagulating goats' milk using a light scattering sensor. International Dairy Journal 12:1019-1023.

Crofcheck, C.L., F.A. Payne, C.L. Hicks, M.P. Mengüç, and S.E. Nokes. Fiber optic sensor response to high levels of fat in cream. Transactions of the American Society of Agricultural Engineers 45(1):171-178.

Crofcheck, C.L., F.A. Payne, and M.P. Mengüç. Characterization of milk properties using a radiative transfer model. Applied Optics 41(10):2028.

Fife, J.P., and S.E. Nokes. Evaluation of the effect of rainfall intensity and duration on the persistence of chlorothalonil on processing tomato foliage. Crop Protection 21(9):733-740.

Fulton, J.P., L.G. Wells, and T.D. Smith. A mechanical system for soil reconstruction. Applied Engineering in Agriculture 18(5):517-524.

Liberty, K.R., and J.L. Taraba. Modeling ammonia removal and biotransformation within laboratory-scale yard-waste compost biofilters. Proceedings, 95th Annual Conference of the Air and Waste Management Association. A&WMA, Pittsburgh, Penn.

Molenda, M., J. Horabik, I.J. Ross, and M.D. Montross. Friction of wheat: Grain-on-grain and on corrugated steel. Transactions of the American Society of Agricultural Engineers 45(2):415-420.

Molenda, M., J. Horabik, S.A. Thompson, and I.J. Ross. Bin loads induced by eccentric filling and discharge of grain. Transactions of the American Society of Agricultural Engineers 45(3):781-785.

Montross, M.D., D.E. Maier, and K. Haghighi. Development of a new finite element stored grain ecosystem model. Transactions of the American Society of Agricultural Engineers 45(5):1455-1464.

Montross, M.D., D.E. Maier, and K. Haghighi. Validation of a new finite element stored grain ecosystem model. Transactions of the American Society of Agricultural Engineers 45(5):1465-1474.

Morgan, S.E., H.P. Cole, L.R. Piercy, and T. Struttmann. Stories or statistics? Farmers' attitudes toward messages in an agricultural safety campaign. Journal of Agricultural Safety & Health 8(2):225-239.

O'Callaghan, D.J., C.P. O'Donnell, and F.A. Payne. Review of systems for monitoring curd setting during cheesemaking. International Journal of Dairy Technology 55(2):65-74.

Walker, J.N., J.W. Buxton, and L. Dunn. Ventilated plastic row cover protection system. Applied Engineering in Agriculture 18(5):603-607.

Westerman, P.W., and J. R. Bicudo. Application of mixed and aerated pond for nitrification and denitrification of flushed swine manure. Applied Engineering in Agriculture 18(3):351-358.

Xin, H., R.S. Gates, M.C. Puma, and D.U. Ahn. Drinking water temperature effects on laying hens subjected to warm cyclic environments. Poultry Science 81:606-617.

Yanagi, T. Jr., H. Xin, and R.S. Gates. A research facility for studying poultry responses to heat stress and its relief. Applied Engineering in Agriculture 18(2):255-260.

Yanagi, T. Jr., H. Xin, and R.S. Gates. Optimization of partial surface wetting to cool caged laying hens. Transactions of the American Society of Agricultural Engineers 45(4):1091-1100.

Zolnier, S., R.S. Gates, R.L. Geneve, and J.W. Buxton. Surface diffusive resistances of rooted poinsettia cuttings under controlled-environment conditions. Transactions of the ASAE 44:1779-1787.

In addition, members of the department published two abstracts.

Community and Leadership Development

Braun, B., F. Lawrence, P. Dyk, and M. Vandergriff-Avery. Southern rural family economic well-being in the context of public assistance. Southern Rural Sociology 18:259-293.

Burmeister, L.L. Lagoons, Litter and the Law: CAFO Regulations as social risk politics. Southern Rural Sociology 18:56-87.

Hustedde, R.J., and J. Ganowicz. The basics: Essential theory for community development practice. Journal of the Community Development Society 33:1-19.

Hustedde, R.J., and B.S. King. Rituals: Emotions, community faith in soul and the messiness of life. Community Development Journal 37:338-348.

Zimmerman, J.N. Contextualizing cash assistance and the South: Introduction to the special issue. Southern Rural Sociology 18:1-20.

Zimmerman, J., and L. Garkovich. How much would it take? Making ends meet in the era of welfare reform. Social Insight: Knowledge at Work 7:40-46.

Entomology

Bartholomew, C.S., and K.V. Yeargan. Phenology of milkweed growth and monarch reproduction in Kentucky and ovipositional preference between common and honeyvine milkweed. Journal of the Kansas Entomological Society 74:211-220.

Beeler, A.E., C.M. Rauter, and A.J. Moore. Mate discrimination by females in burying beetle *Nicrophorus orbicollis*: The influence of male size on attractiveness to females. Ecological Entomology 27:1-6.

Carroll, S.P., H. Dingle, T.R. Famula, and C.W. Fox. Genetic architecture of adaptive differentiation in evolving host races of the soapberry bug, *Jadera haematoloma*. Genetica 112-113:257-272.

Czesak, M.E., and C.W. Fox. The evolutionary ecology offspring size: Concepts and a case study. Recent Research Ecology 1:97-114.

Dobson, S., C.W. Fox, and F.M. Jiggins. The effect of Wolbachia-induced cyoplasmic incompatibility on host population size in natural and manipulated systems. Proceedings of the Royal Society of London, Series B 269:437-445.

Dobson, S.L., E.J. Marsland, and W. Rattanadechakul. Mutualistic wolbachia infection in *Ades albopictus*: Accelerating cytoplasmic drive. Genetics 160:1087-1094.

Dobson, S.L., E. Marsland, Z. Veneti, K. Bourtzis, and S.L. O'Neill. Characterization of Wolbachia host cell range via the vitro establishment of infections. Applied and Environmental Microbiology 656-660.

Evenden, M.L., B.G. Spohn, A.J. Moore, R.F. Preziosi, and K.F. Haynes. Inheritance and evolution of male response to sex pheromone in *Trichoplusia ni* (Lepidopter: Noctuidae). Journal of Chemoecology 12:53-59.

Gels, J.A., D.W. Held, and D.A. Potter. Hazards of insecticides to bumble bees, *Bombus impatiens* (Hymenoptera: Apidae), foraging on flowering white clover in turf. Journal of Economic Entomology 95(4):722-728.

Griffin, M.L., and K.V. Yeargan. Factors potentially affecting oviposition site selection by the lady beetle *Coleomeogilla maculata* (Coleoptera: Coccinellidae). Environmental Entomology 31(1):112-119.

Griffin, M.L., and K.V. Yeargan. Ovipositon site selection by the spotted lady beetle *Coleomegilla maculata* (Coleoptera: Coccinellidae): Choices among plant species. Environmental Entomology 31(1):107-111.

Halaj, J., and D.H. Wise. Impact of a detrital subsidy on trophic cascades in a terrestrial grazing food web. Ecology 83:3141-3151.

Haynes, K.F., C. Gemeno, K.V. Yeargan, J.G. Millar, and K.M. Johnson. Aggressive chemical mimicry of moth pheromones by bolas spider: How does this specialist predator attract more than one species of prey? Chemoecology 12:99-105.

Held, D.W., P. Gonsiska, and D.A. Potter. Evaluating companion planting and non-host masking odors for protecting roses from the japanese beetle (Coleoptera: Scarabaeidae). Journal of Economic Entomology 96:81-87.

Hillgarth, R.S., and B.A. Webb. Characterization of *Campoletis sonorensis* iscnovirus segment 1 genes as members of the repeat element gene family. Journal of General Virology 83:2393-2402.

Miller, G.L., M.B. Stoetzel, R. Lopez, and D. Potter. *Geoica setulosa* (Passerini) (Hemiptera: Aphididae): New distribution records for North America. Proceedings, Entomological Society of Washington 104(1):60-163.

Moore, A.J., K.F. Haynes, R.F. Preziosi, and P.J. Moore. The evolution of interacting phenotypes: Genetics and evolution of social dominance. American Naturalist 160:S186-S197.

Moya-Laraño, J., J. Halaj, and D. Wise. Climbing to reach females: Romeo should be small. Evolution 56(2):420-425.

Moya-Laraño, J., J.M. Orta-Ocaña, J.A. Barrientos, C. Bach, and D.H. Wise. Territoriality in a cannibalistic burrowing wolf spider. Ecology 83(2):356-361.

Newton, B.L., and K.V. Yeargan. Population characteristics of *Phalangium opilio* (Opiliones: Phalangiidae) in Kentucky agroecosystems. Environmental Entomology 31(1):92-98.

Newton, B.L., and K.V. Yeargan. Predation of *Helicoverpa zea* (Lepidoptera: Noctuidae) eggs and first instars by *Phalangium opilio* (Opiliones: Phalangiidae). Journal of Kansas Entomological Society 74:199-204.

Pfannenstiel, R.S., and K.V. Yeargan. Identification and diel activity patterns of predators attacking *Helicoverpa zea* eggs in soybean and sweet corn. Environmental Entomology 31:232-41.
Potter, D.A., and D.W. Held. Biology and management of the Japanese beetle. Annual Review of Entomology 47:175-205.
Potter, M.F., and A.E. Hillery. Exterior-targeted liquid termiticides: An alternative approach to managing subterranean termites (Isoptera: Rhinotermitidae) in buildings. Sociobiology 39:373-405.
Rana, R.L., D.L. Dahlman, and B.A. Webb. Expression and characterization of a novel teratocyte protein of the braconid, *Microplitis croceipes* (cresson). Insect Biochemistry and Molecular Biology 32:1507-1515.
Rauter, C.M., and A.J. Moore. Evolutionary importance of parental care performance, food resources, and direct and indirect genetic effects in a burying beetle. Journal of Evolutionary Biology 15:407-417.
Rauter, C., and A.J. Moore. Quantitative genetics of growth and development time in the burying beetle *Nicrophorus pustulatus* in the presence and absence of post-hatching parental care. Evolution 56(1):96-110.
Rowe, J. II, D.A. Potter, and R.E. McNiel. Susceptibility of purple- versus green-leaved cultivars of woody landscape plants to the Japanese beetle. Horticultural Science 37(2)362-366.
Rieske, L.K. Wildfire alters oak growth, foliar chemistry, and herbivory. Forest Ecology and Management 168:91-99.
Rieske, L.K., and L.J. Buss. Abundance of non-target, stem-dwelling arthropods in central hardwood forests of Kentucky treated for gypsy moth. Academic Science 63(1):8-18.
Rieske, L.K., H.H. Housman, and M.A. Arthur. Effects of prescribed fire on canopy foliar chemistry and suitability for an insect herbivor. Forest Ecology and Management 160:177-187.
Rogers, M.E., and D.A. Potter. Enhancing biological control of white grubs by native and exotic parasitic wasps. (Research Information Series). U.S. Golf Association Green Section Record 40(6):9-12.
Rogers, M.E., and D.A. Potter. Kairomones from scarabaeid grubs and their frass as cues in below-ground host location by the parasitoids *Tiphia vernalis* and *Tiphia pygidialis*. Entomologia Experimentalis et Applicata 102:307-314.
Savalli, U.M., and C.W. Fox. Proximate mechanisms influencing egg size plasticity in the seed beetle, *Stator limbatus*. Annals of the Entomological Society of America 95(6):724-734.
Sharkey, M., and A. Roy. Phylogeny of the Hymenoptera: A reanalysis of the Ronquist et al. (1999) reanalysis, emphasizing wing venation and apocritan relationships. The Norwegian Academy of Science and Letters, Zoologica Scripta 31:57-66.
Turnbull, M.W., and N.J. Fashing. Efficacy of the ventral abdominal secretion of the cockroach *Eurycotis floridana* (Blattaria: Blattidae) as a defense allomone. Journal of Insect Behavior 15(3):369-384.
Vichitbandha, P., and D. Wise. A field experiment on the effectiveness of spiders and carabid beetles as biocontrol agents in soybean. Agricultural and Forest Entomology 4:31-38.
Volkoff, A.-N., C. Beliveau, J. Rocher, R. Hilgarth, A. Levasseur, M.D. Cerutti, M. Cusson, and B.A. Webb. Evidence for a conserved polydnavirus gene family: Ichnovirus homologs of CsIV repeat element genes. Virology 300:316-331.
Webb, B.A. Direct and indirect interactions between eastern tent caterpillars and mare reproductive loss syndrome. Nutritional Biotechnology in the Feed and Food Industries: Proceedings, Alltech's 18th Annual Symposium 385-391.

In addition, members of the department published 22 abstracts.

Forestry

Conners, T.E., H. Yan, and S. Banerjee. Mechanism Of VOC release from high temperature softwood lumber drying. Wood and Fiber Science 34(4):666-669.
Conrad, P.W., R.J. Sweigard, D.H. Graves, J.M. Ringe, and M.H. Pelkki. Impacts of soil conditions on reforestation of surface mined lands. Mining and Engineering 54(1):39-46.
Conrad, P.W., R.J. Sweigard, J.C. Yingling, D.H. Graves, and J.M. Ringe. Use of ripping to alleviate excessive compaction on reclaimed surface mined land. Transaction of the Society of Mining Engineers of AIME, preprint no. 02-044.
Cox, J.J., D.S. Maehr, and J.L. Larkin. The biogeography of faunal place names in the United States. Conservation Biology 16:1143-1150.
Krupa, I.J., and M.J. Lacki. Mammals of Robinson Forest: Species composition of an isolated, mixed-mesophytic forest on the Cumberland Plateau in southeastern Kentucky. Special Publications, Museum of Texas Tech University 45:1-44.
Kuddes-Fischer, L.M., and M.A. Arthur. Response of understory vegetation and tree regeneration to a single prescribed fire in oak-pine forests. Natural Areas Journal 22:43-52.
Larkin, J.L., D.S. Maehr, J.J. Cox, and C. Logsdon. Yearling males successfully breed in a reintroduced elk (*Cervus elaphus nelsoni*) population in Kentucky. Southeastern Naturalist 1:279-286.
Larkin, J.L., D.S. Maehr, J.J. Cox, M.W. Wichrowski, and R.D. Crank. Factors affecting reproduction and population growth in a restored elk herd. Wildlife Biology 8:49-54.
Lovett, G.M., K.C. Weathers, and M.A. Arthur. Control of N loss from forested watershed by soil C:N ratio and tree species composition. Ecosystems 5:712-718.
Maehr, D.S., and J.P. Deason. Wide-ranging carnivores and development permits: Constructing a multi-scale model to evaluate impacts on the Florida panther. Clean Technologies and Environmental Policy 3:398-406.
Maehr, D.S., and R.C. Lacy. Avoiding the lurking pitfalls in Florida panther recovery. Wildlife Society Bulletin 30:971-978.
Maehr, D.S., E.D. Land, D.B. Shindle, O.L. Bass, and T.S. Hoctor. Florida panther dispersal and conservation. Biological Conservation 106:187-197.
Maehr, D.S., J.L. Larkin, K.J. Alexy, R.J. Warren, N.W. Seward, J.W. Day, T. Toman, J.J. Cox, and M.A. Orlando. Graduate education should not count more toward TWS certification. Wildlife Society Bulletin 30:979-982.
Maehr, D.S., B.C. Thompson, G.F. Mattfeld, K. Montei, J.B. Haufler, and J. Ramakka. Directions in professionalism and certification in The Wildlife Society. Wildlife Society Bulletin.
Maehr, D.S., and P. Widen. International guest lectures promote conservation learning. Conservation Biology 16:1179-1183.
Meegan, R.P., and D.S. Maehr. Landscape conservation and regional planning for the Florida panther. Southeastern Naturalist 1:217- 232.
Pelkki, M.H., and J.M. Ringe. Using informatics to value forest stand information. Proceedings, 2001 Southern Forest Economics Workshop, Atlanta, Georgia. March 26-28, 2001.
Pelkki, M.H., J.M. Ringe, W.R. Thomas, and D.H. Graves. Economically efficient sampling of surface-mined spoils. International Journal of Surface Mining, Reclamation, and Environment 16(1):48-58.
Ra, J.B., H.M. Barnes, and T.E. Conners. Predicting boron diffusion in wood from surface sorption. Forest Products Journal 52(10):67-70.
Rhoades, C., T. Barnes, and B. Washburn. Prescribed fire and herbicide effects on soil processes during barrens restoration. Restoration Ecology 10:656-664.
Stringer, J., S. Shouse, M. Smidt, M. Pelkki, J. Ringe, and R. Kolka. BMP costs associated with erosion control measures for skid trails. IN: J. Shepard, ed. Proceedings, Forestry Best Management Research Symposia, Atlanta, Georgia. Compact disc. National Council for Air and Stream Improvement. April.
Washburn, B.E., T.G. Barnes, C.C. Rhoades, and R. Remington. Using imazapic and prescribed fire to enhance native warm season grasslands in Kentucky, USA. Natural Areas 1 22(1):20-27.

In addition, members of the department published four abstracts.

Graduate Center for Nutritional Sciences

Calfee-Mason, K.G., B.T. Spear, and H.P. Glauert. Vitamin E inhibits hepatic NF-κB activation in rats administered the hepatic tumor promoter, phenobarbital. Journal of Nutrition 132:3178-3185.

Chen, L.H., V. Thielen, R.M. Ciccia, and P.J. Langlais. Effects of chronic ethanol feeding and thiamin deficiency on antioxidant defense systems in kidney and lung of rats. Nutrition Research 22:835-845.

Chow, C.K. Antioxidant nutrients and environmental health: Introduction. Toxicology 180:1-3.

Chow, C.K. Health foods: Trend and future aspects. Food Information Service FoodInfo Online Features, Dec. 9. <http://www.foodsciencecentral.com/library.html#ifis/11555>.

Chow, C.K., and C.B. Hong. Dietary vitamin E and selenium and toxicity of nitrite and nitrate. Toxicology 180:195-207.

Chow, C.K., W. Ibrahim, S.C. Yen, and D.K. St. Clair. Manganese superoxide dismutase transgenic mice: Characterization and implications. Methods in Enzymology 353:398-409.

Fadhel, Z., Z. Lu, L.W. Robertson, and H.P. Glauert. Effect of 3,3',4,4'-tetrachlorobiphenyl and 2,2',4,4',5,5'-hexachlorobiphenyl on the induction of hepatic lipid peroxidation and cytochrome P-450 associated enzyme activities in rats. Toxicology 175:15-25.

Fischer, J.G., H.P. Glauert, T. Yin, M.L. Sweeney-Reeves, N. Larmonier, and M.C. Black. Moderate iron overload enhances lipid peroxidation in livers of rats, but does not affect NF-κB activation induced by the peroxisome proliferator, Wy-14,643. Journal of Nutrition 132:2525-2531.

O'Brien, M.L., M.L. Cunningham, B.T. Spear, and H.P. Glauert. Peroxisome proliferators do not activate the transcription factors AP-1, early growth response-1 (Egr-1), or heat shock factors 1 and 2 (HSF1/2) in rats or hamsters. Toxicological Sciences 69:139-148.

Tharappel, J.C., E.Y. Lee, L.W. Robertson, B.T. Spear, and H.P. Glauert. Regulation of cell proliferation, apoptosis, and transcription factor activities during the promotion of liver carcinogenesis by PCBs. Toxicology and Applied Pharmacology 179:172-184.

In addition, members of the department published five abstracts.

Horticulture

Archbold, D.D., T.R. Hamilton-Kemp, and E. Fallik. Postharvest injury, strawberry volatiles, and *Botrytis* development. Acta Horticulturae 567:767-769.

Dirk, L., M. Williams, and R. Houtz. Specificity of chloroplast-localized peptide deformylases as determined with peptide analogs of chloroplast-translated proteins. Archives of Biochemistry and Biophysics 406:135-141.

Muigai, S.G., D.J. Schuster, J.C. Snyder, J.W. Scott, M.J. Bassett, and H.J. McAuslane. Mechanisms of resistance in *lycopersicon* germplasm to the whitefly *Bemisia argentifolii*. Phytoparisitica 30:347-360.

Trievel, R.C., B.M. Beach, L.M.A. Dirk, R.L. Houtz, and J.H.Hurley. Structure and catalytic mechanism of a SET domain protein methyltransferase. Cell 111:91-103.

In addition, members of the department published 32 abstracts.

Landscape Architecture

Nieman, T.J., and Z.R. Merkin. Long term land use planning for drastically disturbed land. pp. 961-975. IN: R. Barnhisel and M. Collins, eds. Reclamation with a Purpose: Proceedings, 19th Annual Meeting, American Society of Mining and Reclamation, Lexington, Kentucky.

Livestock Disease Diagnostic Center

Donahue, J.M., N.M. Williams, S.F. Sells, and D.P. Labeda. *Crossiella equi* sp. nov., isolated from equine placentas. International Journal of Systematic and Evolutionary Microbiology 52:2169-2173.

Jackson, C.B., and K.B. Kirkpatrick. Nephrogenic rest in a Crl: CD (SD)IGS BR rat. Veterinary Pathology 39(5):588-589.

Patterson-Kane, J.C., J.M. Donahue, and L.R. Harrison. Placentitis, fetal pneumonia, and abortion due to *Rhodococcus equi* infection in a thoroughbred. Journal of Veterinary Diagnostic Investigation 14(2):157-9.

Vascellari, M., G. Cattoli, E. Melchiotti, F. Mutinelli, F. Tiberio, and J.M. Donahue. Equine nocardioform placentitis in Italy. p. 203. Proceedings, 20th meeting European Society of Veterinary Pathology, Grugliasco, Italy.

In addition, members of the department published seven abstracts.

Plant Pathology

Chauhan, R., M.L. Farman, P. Ronald, H.-B. Zhang, and S.A. Leong. Genetic and physical mapping of a rice blast resistance locus, Pi-CO39(t), corresponding to AVRI-CO39 of *Magnaporthe grisea*. Molecular Genetics Genomics 267:603-612.

Cheng, C.-P., J. Pogany, and P.D. Nagy. Mechanism of DI RNA formation in Tombusviruses: Dissecting the requirement for primer extension by the Tombusviruses RNA-dependent RNA polymerase *in vitro*. Virology 304:460-473.

Fang, G.-C., R.M. Hanau, and L.J. Vaillancourt. The SOD2 gene, encoding a manganese-type superoxide dismutase, is up-regulated during conidiogenesis in the plant-pathogenic fungus *Colletotrichum graminicola*. Fungal Genetics and Biology 36:155-165.

Farman, M.L. Meiotic deletion at the *Magnaporthe grisea* BUFI locus is controlled by interaction with the homologous chromosome. Genetics 160:137-148.

Farman, M.L. *Pyricularia grisea* isolates causing gray leaf spot of perennial ryegrass (*Lolium perenne*) in the United States: Relationship to *P. grisea* isolates from other host plants. Phytopathology 92:245-254.

Farman, M.L., Y. Eto, T. Nakao, Y. Tosa, H. Nakayashiki, S. Mayama, and S.A. Leong. Analysis of the structure of the AVRI-CO39 avirulence locus in virulent rice-infecting isolates of *Magnaporthe grisea*. Molecular Plant-Microbe Interactions 15:6-16.

Giesler, L.J., S.A. Ghabrial, T.E. Hunt, and J.H. Hill. Bean pod mottle virus: A threat to U.S. soybean production. Plant Disease 86:1280-1289.

Gu, H., A.J. Clark, P.B. de Sa, T.W. Pfeiffer, S.A. Tolin, and S.A. Ghabrial. Diversity among isolates of bean pod mottle virus. Phytopathology 92:446-452.

Heist, E.P., W.C. Nesmith, and C.L. Schardl. Interactions of *Peronospora tabacina* with roots of *Nicotiana* species in gnotobiotic associations. Phytopathology 92:400-405.

Mims, C.W., and L.J. Vaillancourt. Ultrastructural characterization of infection and colonization of maize leaves by *Colletotrichum graminicola*, and by a C. *graminicola* pathogenicity mutant. Phytopathology 92:803-812.

Moon, C.D., C.O. Miles, U. Jarlfors, and C.L. Schardl. The evolutionary origins of three new *Neotyphodium* endophyte species from grasses indigenous to the Southern Hemisphere. Mycologia 94:694-711.

Panavas, T., J. Pogany, and P.D. Nagy. Analysis of minimal promoter sequences for plus-strand synthesis by the cucumber necrosis virus RNA-dependent RNA polymerase. Virology 296:263-274.

Panavas, T., J. Pogany, and P.D. Nagy. Internal initiation by the cucumber necrosis virus RNA-dependent RNA polymerase is facilitated by promoter-like sequences. Virology 296:275-287.

Rajendran, K.S., J. Pogany, and P.D. Nagy. Comparison of turnip crinkle virus RNA-dependent RNA polymerase preparations expressed in *E. coli* or derived from infected plants. Journal of Virology 76:1707-1717.

Spiering, M.J., H.H. Wilkinson, J.D. Blankenship, and C.L. Schardl. Expressed sequence tags and genes associated with loline alkaloid expression by the fungal endophyte *Neotyphodium uncinatum*. Fungal Genetics and Biology 36:242-254.

Sukno, S., A.M. Taylor, and M.L. Farman. Development of contaminant-free RFLP probes for the tobacco blue mold pathogen, *Peronospora tabacina*. Phytopathology 92:1227-1235.

Sukno, S., A.M. Taylor, and M.L. Farman. Genetic uniformity among isolates of *Peronospora tabacina*, the tobacco blue mold pathogen. Phytopathology 92:1236-1244.

Thon, M.R., E.M. Nuckles, J.E. Takach, and L.J. Vaillancourt. CPR1: A gene encoding a putative signal peptidase that functions in pathogenicity of *Colletotrichum graminicola* to maize. Molecular Plant-Microbe Interactions 15:120-128.

Vincelli, P., and E. Dixon. Resistance to QoI (strobilurin-like) fungicides in isolates of *Pyricularia grisea* from perennial ryegrass. Plant Disease 85:235-240.

Wang, R.Y., and S.A. Ghabrial. Effect of aphid behavior on efficiency of transmission of soybean mosaic virus by the soybean-colonizing aphid, *Aphis glycines*. Plant Disease 86:1260-1264.

In addition, members of the department published 40 abstracts.

Veterinary Science

Allen, G.P. Epidemic disease caused by equine herpesvirus-1: Recommendations for prevention and control. Equine Veterinary Education 4(June):177-184.

Anzai, T., J.F. Timoney, Y. Kuwamoto, R. Wada, M. Oikawa, and T. Higuchi. Polymerase chain reaction-restriction fragment length polymorphium analysis of the SzP gene of *Streptococcus zooepidemicus* isolated from the respiratory tract of horses. American Journal of Veterinary Research 63:1298-1301.

Artiushin, S.C., J.F. Timoney, A.S. Sheoran, and S.K. Muthupalani. Characterization and immunogenicity of pyrogenic mitogens SePE-H and SePE-I of *Streptococcus equi*. Microbial Pathogenesis 32:71-85.

Balasuriya, U.B.R., C.M. Leutenegger, J.B. Topol, W.H. McCollum, P.J. Timoney, and N.J. MacLachlan. Detection of equine arteritis virus by real-time TaqMan® reverse transcription-PCR assay. Journal of Virological Methods 101:21-28.

Brooks, S.A., R.B. Terry, and E. Bailey. Association of PCR-RFLP for KIT with Tobiano coat colour in horses. Animal Genetics 33:301-303.

Champion, Z.J., B.H. Breier, W.E. Ewen, T. Tobin, and P.J. Casey. Blood plasma concentrations of insulin-like growth factor-1 (IGF-1) in resting standardbred horses. Veterinary Journal 163(1):45-50.

Cook, R.F., S.J. Cook, F. Li, R.C. Montelaro, and C.J. Issel. Development of a multiplex real-time reverse transcriptase-polymerase chain reaction for equine infectious anemia virus (EIAV). Journal of Virological Methods 105:171-179.

Craigo, J.K., C. Leroux, L. Howe, J.D. Steckbeck, S.J. Cook, C.J. Issel, and R.C. Montelaro. Transient immune suppression of inapparent carrier ponies infected with neutralization-resistant EIAV redirects antibody responses and lowers steady state viral replication. Journal of General Virology 83:1353-1359.

Dirikolu, L., B.A. Mollett, A. Troppmann, W.E. Woods, C. Bratton, C.P. Cashman, D. Schroedter, B. Mayer, A.F. Lehner, W. Karpiesiuk, C. Hughes, J. Boyles, D. Harkins, and T. Tobin. Apparent ELISA detection times for albuterol after administration with the torpex equine inhaler device. Veterinary Therapeutics 3(3):297-307.

Dubey, J.P., B.C. Barr, J.R. Barta, I. Bjerkas, C. Bjorkman, B.L. Blackburn, D.D. Bowman, D. Buxton, J.T. Ellis, B. Gottstein, A. Hemphill, D.E. Hill, D.K. Howe, M.C. Jenkins, Y. Kobayashi, B. Koudela, A.E. Marsh, J. Mattsson, M.M. McAllister, D. Modry, Y. Omata, L.D. Sibley, C.A. Speer, A.J. Trees, A. Uggla, S.J. Upton, D.J.L. Williams, and D.S. Lindsay. Redescription of *Neospora caninum* and its differentiation from related coccidia. International Journal for Parasitology 32:929-946.

Duncan, J.L., E.M. Abbott, J.H. Arundel, M. Eysker, T.R. Klei, R.C. Krecek, E.T. Lyons, C. Reinemeyer, and J.O.D. Slocombe. World Association for the Advancement of Veterinary Parasitology (WAAVP): Guidelines for evaluating the efficacy of equine anthelmintics. Veterinary Parasitology 103:1-18.

Fitzgerald, B.P., S.E. Reedy, D.R. Sessions, D.M. Powell, and C.J. McManus. Potential signals mediating the maintenance of reproductive activity during the non-breeding season of the mare. Reproduction Supplement 59:115-129.

Flesher, J., J. Horn, and A.F. Lehner. Role of the bay- and l-regions in the metabolic activation and carcinogenicity of picene and dibenz [A,H,] anthracene. Polycyclic Aromatic Compounds 22:737-745.

Flesher, J., J. Horn, and A.F. Lehner. The meso-region theory of aromatic hydrocarbon carcinogenesis. Aromatic Compounds 22:379-393.

Hanzawa, K., T.L. Lear, F. Piumi, and E. Bailey. Mapping of equine potassium chloride cotransporter (SLC12A4) and amino acid transporters (SLC7A10 and SLC7A9) and analysis for effect of polymorphism on osmotic fragility of red blood cells. Animal Genetics 33(December):455-459.

Howe, D.K., K. Tang, J.P. Dubey, P. Conrad, and L.D. Sibley. Sensitive and specific identification of *Neospora caninum* infection based on detection of serum antibodies to recombinant Ncp29. Clinical and Diagnostic Laboratory Immunology 9:611-615.

Howe, L., C. Leroux, C.J. Issel, and R.C. Montelaro. Equine infectious anemia virus envelope evolution *in vivo* during persistent infection progressively increases resistance to *in vitro* serum antibody neutralization as a dominant phenotype. Journal of Virology 76(21):10588-10597.

Huang, J., N. Ficorilli, C.A. Hartley, G.P. Allen, and M.J. Studdert. Polymorphism of open reading frame 71 of equine herpesvirus 4 (EHV-4) and EHV-1. Journal of General Virology 83:525-531.

Lear, T.L., and G. Layton. Use of Zoo-FISH to characterize a reciprocal translocation in a thoroughbred mare: t(1;16)(q16;q21.3). Equine Veterinary Journal 43:207-209.

Lehner, A.F., J. Horn, and J. Flesher. Mass spectral analysis of unstable N7aralkyl DNA adducts resulting from reaction of 7-sulfooxymethyl-12-methylbenz[A]anthracene (SMBA) with DNA and deoxynucleotides. Aromatic Compounds 22:415-432.

Lieto, L.D., T.W. Swerczek, and E.G. Cothran. Equine *Epitheliogenesis imperfecta* in two American saddlebred foals is a lamina lucida defect. Veterinary Pathology 39:576-580.

Lin, C.B., R.E. Holland Jr., J.C. Donofrio, L.R. Tudor, and T.M. Chambers. Caspase activation in equine influenza induced apoptotic cell death. Veterinary Microbiology 84:357-365.

Luis, C., C. Bastos-Silveira, E.G. Cothran, and M.M. Oom. Variation in the mitochondrial control region sequence between the two maternal lines of the Sorraia horse breed. Genetics and Molecular Biology 25:309-311.

Luis, C., E.G. Cothran, and M.M. Oom. Microsatellites in Portuguese autochthonous horse breeds: Usefulness for parentage testing. Genetics and Molecular Biology 25:131-134.

McManus, C.J., L.A. Davison, and B.P. Fitzgerald. Effect of 2-deoxy-d-glucose on gonadotropins, prolactin and serum glucose concentrations in the mare. Animal Reproduction Science 71:217-228.

Meesh, L., W.R. Fernandez, P.J. Timoney, and E.H. Birgel. Prevalencia de anticorpos antivirus da arterite dos equinos en cavalos criados no estado de Sao Paulo. Arquivo-Brasileiro-de-Medicina-Veterinaria-e-Zootecnia 54(3):223-227.

Milenkovic, D., A. Oustry-Vaiman, T.L. Lear, A. Billault, D. Mariat, F. Piumi, L. Schibler, E. Cribiu, and G. Guerin. Cytogenic localization of 136 genes in the horse: Comparative mapping with the human genome. Mammalian Genome 13:524-534.

Pavlin, J.A., C.J. Witt, D.L. Noah, and P.J. Timoney. Bioterrorism and equids. Clinical Techniques in Equine Practice 1(2):109-115.

Queiroz-Neto, A., G. Zamur, J.C. Lacerdo-Neto, and T. Tobin. Determination of the highest no-effect dose (HNED) and of the elimination pattern for cocaine in horses. Journal of Applied Toxicology 22(2):117-121.

Raghavan, P.U.M., Y. Chang, S.S.D. Jusuf, S. Artiushin, J.F. Timoney, S.P. McDonough, S.C. Barr, T.J. Divers, K.W. Simpson, P.L. McDonough, and H.O. Mohammed. Cloning and molecular characterization of an immunogenic Lig A protein of *Leptospira interrogans*. Infection and Immunity 70:11-16.

Ramsay, E.C., W. Carter, D. Geiser, and T. Tobin. A comparison of delivery mediums and determination of serum concentrations following orally delivered detomidine in horses. Veterinary Anaesthesia and Analgesia 29:219-222.

Raudsepp, T., T.L. Lear, and B.P. Chowdhary. Comparative mapping in equids: The asine X chromosome is rearranged compared to horse and Hartmann's mountain zebra. Cytogenetics and Genome Research 96:206-209.

Sheoran, A.S., S. Artiushin, and J.F. Timoney. Nasal mucosal immunogenicity for the horse of a SeM peptide of *Streptococcus equi* genetically coupled to cholera toxin. Vaccine 20:1653-1659.

Su, C., D.K. Howe, J.P. Dubey, J. Ajioka, and L.D. Sibley. Identification of quantitative trait loci controlling acute virulence in *Toxo-*

plasma gondii. Proceedings, National Academy of Sciences 99:10753-10758.
Swerczek, T.W. Saprotrophic fungi and bacteria and commensal bacteria that infect frost-damaged pastures may be contributing to gut microbial overgrowth and lesions associated with the Mare Reproductive Loss Syndrome. Viewpoint. Journal of Equine Veterinary Science 22:234-237.
Terry, R.B., E. Bailey, T.L. Lear, and E.G. Cothran. Rejection of MITF and MGF as the genes responsible for appaloosa coat colour patterns in horses. Animal Genetics 33:82-84.
Walker, J.A., and J.F. Timoney. Construction of a stable non-mucoid deletion mutant of the *Streptococcus equi* Pinnacle vaccine strain. Veterinary Microbiology 2457:1-11.
Yang, Y.H., K.I. Kim, E.G. Cothran, and A.R. Flannery. Genetic diversity of Cheju horses (*Equus caballus*) determined by using mitochondrial DNA D-loop polymorphism. Biochemical Genetics 40:175-186.
Zhou, W., R.F. Cook, S.J. Cook, S.A. Hammond, K. Rushlow, N.N. Ghabrial, S.L. Berger, R.C. Montelaro, and C.J. Issel. Multiple RNA splicing and the presence of cryptic RNA splice donor and acceptor sites may contribute to low expression levels and poor immunogenicity of potential DNA vaccines containing the env gene of equine infectious anemia virus (EIAV). Veterinary Microbiology 88:127-151.

In addition, members of the department published 37 abstracts.

Other Research Publications

Agricultural Economics

Barnett, B., K. Coble, T. Knight, L. Meyer, R. Dismukes, and J. Skees. Impact of the cotton crop insurance program on cotton planted acreage. Report prepared for the Board of Directors, Federal Crop Insurance Corporation, Risk Management Agency, U.S. Department of Agriculture. May.
Burdine, K.L., L.J. Maynard, and A.L. Meyer. The Smithfield/Packerland merger and the Holstein feeder steer price differential. Staff Paper 429. Department of Agricultural Economics, University of Kentucky. July.
Burdine, K.L., A.L. Meyer, and L.J. Maynard. Market potential for locally produced meat products. Staff Paper 424. Department of Agricultural Economics, University of Kentucky. January.
Dillon, C.R., T. Mueller, and S.A. Shearer. The value of innovative seed coatings to delay germination under field average and variable rate technology. ASA, CSSA, and SSSA. Proceedings, 6th International Conference on Precision Agriculture, Madison, Wisconsin.
Dillon, C.R., and S.A. Shearer. Using spatial data to make strategic decisions for profitability and risk management. ASA, CSSA, and SSSA. Proceedings, 6th International Conference on Precision Agriculture, Madison, Wisconsin.
Economic and Technical Feasibility Team (Including R.A. Fleming). Achieving zero discharge with impermeable lagoon covers: An economic and technical feasibility report. A technical working paper produced for USDA and EPA leadership for evaluating issues related to the CAFO rule. March 22.
Freshwater, D. A U.S. perspective on multifunctionality. Staff Paper 423. Department of Agricultural Economics, University of Kentucky. January.
Freshwater, D. Measuring the entrepreneurial performance of Kentucky: 2001. Staff Paper 428. Department of Agricultural Economics, University of Kentucky. March.
Maynard, L.J., and V.V. Narayanan. Price sensitivities for U.S. frozen dairy products. Staff Paper 435. Department of Agricultural Economics, University of Kentucky. November.
Maynard, L.J., J.G. Hartell, A.L. Meyer, and J. Hao. An experimental approach to valuing new differentiated products. Staff Paper 433. Department of Agricultural Economics, University of Kentucky. November.
Powers, L., C.R. Dillon, S.G. Isaacs, and S.A. Shearer. Strategic decision making with precision agriculture data. Site Specific Issues 1(1). September.
Qin, D.X., X. Peng, and M.A. Marchant. New insights on the Chinese livestock consumer. Published online by AgEcon Search: Research in Agricultural and Applied Economics: <http: // agecon.lib.umn.edu/>. This selected paper was presented at the American Agricultural Economics Association annual meeting, Long Beach, California. July 27-31.
Seale, J.L., M.A. Marchant, and A. Basso. Imports versus domestic production: A demand system analysis of the U.S. red wine market. Staff Paper 425. Department of Agricultural Economics, University of Kentucky. January.
Skees, J.R., and B.J. Barnett. Review of proposed cost of production cotton insurance. Report prepared for the Board of Directors, Federal Crop Insurance Corporation, Risk Management Agency, U.S. Department of Agriculture. September 23.
Skees, J.R., and A. Enkh-Amgalan. Examining the feasibility of livestock insurance in Mongolia. World Bank Working Paper 2886. September 17.
Vickner, S.S. Wealth creation in the food-away-from-home distribution channel. Staff Paper 431. Department of Agricultural Economics, University of Kentucky. October 1-15.

Agronomy

Munshaw, G.C., and D.W. Williams. Enhancing stolon production of seeded bermudagrass. Golf Course Management 70(2):53-56.
Stewart, A.J., B. Kennedy, and D.A. Van Sanford. Scab screening using frozen spikes. Proceedings, National Fusarium Head Blight Forum, Cincinnati, Ohio. December 7-9.
Verges, V.L., B. Kennedy, A.J. Stewart, D. TeKrony, and D.A. Van Sanford. Apparent and actual seed quality in soft red winter wheat infected with *Fusarium graminearum*. Proceedings, National Fusarium Head Blight Forum, Cincinnati, Ohio. December 7-9.
Williams, D.W., and P.B. Burrus. Renovation of perennial ryegrass fairways with seeded bermudagrass. USGA Green Section Record 40(6):21-23.

Animal Sciences

Coffey, R.D. Nutrient Production and Removal Calculator. A website tool designed to help counties in Kentucky determine the manure nutrients produced and the potential for crops and forages to utilize those manure nutrients. <http://apps1.ca.uky.edu/NewManure/WebManureMain.asp>.
Coffey, R.D. Overview of proposed federal environmental regulations for concentrated animal feeding operations. Proceedings, Midwest Swine Nutrition Conference, Indianapolis, Indiana.
Cromwell, G.L., and M.D. Lindemann. Taking a closer look at calcium and phosphorus. Feed Management 53(5):19.
Cromwell, G.L. Review of dried whey in starter diets for pigs. International Ingredients Nutrition Advisory Board Meeting, St. Louis, Missouri.
Cromwell, G.L. Impacts of genetically modified, low-phytate corn and soybean meal and transgenic pigs possessing salivary phytase on phosphorus excretion. pp. 59-72. Proceedings, Midwest Swine Conference, Indianapolis, Indiana. September 4.
Cromwell, G.L. Approaches to meeting the animal's phosphorus requirement. pp. 61-76. Proceedings, Minnesota Nutrition Conference, Minneapolis-St. Paul, Minnesota. September 17.
Cromwell, G.L., M.D. Lindemann, J.H. Randolph, G.R. Parker, R.D. Coffey, K.M. Laurent, C.L. Armstrong, W.B. Mikel, E.P. Stanisiewski, and G.F. Hartnell. Soybean meal from glyphosate-tolerant (Roundup Ready®) or near-isogenic, conventional soybeans in diets for growing-finishing swine. pp. 268-270. Proceedings, China International Soy Conference and Exhibition, Beijing.
Cromwell, G.L. Soybean meal from glyphosate-tolerant, Roundup Ready® or near-isogenic, conventional soybeans in diets for growing-finishing swine. ASA-Asia Symposia in China, American Soybean Association, St. Louis, Missouri. October-November.

Cromwell, G.L. Whole soybeans as a protein source for swine. ASA-Asia Symposia in China, October-November. American Soybean Association, St. Louis, Missouri.

Ely, D.G., D.K. Aaron, S.E. Barr, V. Akay, and J. Jackson. Continuing livestock production from endophyte-infected tall fescue and perennial ryegrass: Recent studies with a toxin absorbent. pp. 161-172. IN: T.P. Lyons and K.A. Jacques, eds., Nutritional Biotechnology in the Feed and Food Industries. Proceedings, Alltech's 18th Annual Symposium, Nottingham University Press, U.K.

Franklin, S.T., and K.I. Meek. Seasonal effects on immunity of dairy calves. Ruminant Nutrition Workshop Proceedings 2002:1-6.

Harper, A.F., R.D. Coffey, G.R. Hollis, D.C. Mahan, and J.S. Radcliffe. Swine Diets, Pork Industry Handbook 23.

Hennig, B., V. Saraswathi, A. Daugherty, and M. Toborek. Fatty acid-induced endothelial cell activation. pp. 37-40. IN: G.M. Kostner and K.M. Kostner, eds. Atherosclerosis: Risk Factors, Diagnosis, and Treatment. International Proceedings Division. Monduzzi Editore, Bologna, Italy.

Jonker, J.S., C. Rogers, G.L. Cromwell, and C.K. Baer. Recent activities of the United States National Research Council Committee on Animal Nutrition. pp. 41-47. Comparative Nutrition Society Joint Nutrition Symposium, Antwerp, Belgium. August 21-25

Lesiow, T., and Y.L. Xiong. Rheological properties of chicken muscle homogenates as affected by pH. Proceedings, International Congress of Meat Science and Technology 48(1):256-257.

Lindemann, M.D. Feeding vegetarian diets to monogastrics: Considerations for the animals and the environment. Proceedings, Andres Pintaluba, s.a. Technical Meeting on Additives and New Feed Technologies, Madrid, Spain. 10 pp.

Lindemann, M.D. Dietary fat: More than just an energy source. Proceedings, AFIA Nutrition Conference held in conjunction with the 94th AFIA Convention, Reno, Nevada. 8 pp.

Lindemann, M.D., J.H. Agudelo, and R.D. Nimmo. Effect of Stafac (Virginiamycin) on phosphorus digestibility in pigs. pp. 22-26. Proceedings, Phibro Animal Health Symposium, Kansas City, Kansas.

Lindemann, M. D. Effect of chromium source on tissue retention in pigs. pp. 4-9. Proceedings, Prince Agri Products 22nd Annual Feed Ingredient Conference, Kansas City, Kansas.

Matthews, J.C. Genomics and proteomics: Of what relevance are these to the cattle industry? Cow Country News, November:30.

Scaletti, R.W., and R.J. Harmon. Brief research update: Copper supplementation and its role in decreasing severity of mastitis. pp. 21-25. Proceedings, Kentucky Ruminant Nutrition Workshop, University of Kentucky, Lexington.

Silvia, W.J., T.B. Hatler, A.M. Nugent, and L.F. Laranja da Fonseca. Ovarian follicular cysts: An abnormality in folliculogenesis. Domestic Animal Endocrinology 23:167-177.

Vanzant, E., and S. Workman. GPS for tracking cattle. Cow Country News, November. Kentucky Cattlemen's Association, Lexington, Kentucky.

Biosystems and Agricultural Engineering

Bicudo, J.R., C.L. Tengman, D.R. Schmidt, and L.D. Jacobson. Ambient H_2S concentrations near swine barns and manure storages. ASAE Paper No. 024059. American Society of Agricultural Engineers, St. Joseph, Michigan.

Bicudo, J.R., D.R. Schmidt, C.J. Clanton, W. Powers, C.L. Tengman, and L.D. Jacobson. A two-year study of the effectiveness of geotextile covers to reduce odor and gas emissions from manure storages. ASAE Paper No. 024195. American Society of Agricultural Engineers, St. Joseph, Michigan.

Bicudo, J.R., D.R. Schmidt, W. Powers, J.A. Zahn, C.L. Tengman, C.J. Clanton, and L.D. Jacobson. Odor and VOC emissions from swine manure storages. Proceedings, Odors and Toxic Air Emissions. WEF, Albuquerque, New Mexico.

Bicudo, J.R., and R.S. Gates. Water consumption, air and water temperature issues related to portable water systems for grazing cattle. ASAE Paper No. 024052. American Society of Agricultural Engineers, St. Joseph, Michigan.

Bicudo, J.R. Lagoon covers. Idaho Agricultural Odor Technology Conference, Twin Falls, Idaho. May 21-23.

Bicudo, J.R. Aerobic systems. Idaho Agricultural Odor Technology Conference, Twin Falls, Idaho. May 21-23.

Blackall, P.J., G.A. Runge, and K.D. Casey. Pathogens and poultry litter—A risk assessment approach. Proceedings, 7th WPSA Asian Pacific Federation Conference, Australia.

Braun, M., M.D. Montross, C. Beaman, R.S. Gates, and G.A. Duncan. Development and testing of a condensation sensor for environmental control. ASAE Paper No. 024013. American Society of Agricultural Engineers, St. Joseph, Michigan.

Bridges, T.C., M.D. Montross, and S.G. McNeill. Aeration strategies and optimal airflow rates for the mid-South corn and wheat production areas. ASAE Paper No. 026079. American Society of Agricultural Engineers, St. Joseph, Michigan.

Burks, T.F., S.A. Shearer, J.P. Fulton, and T. Stombaugh. Assessment of yield monitor accuracy using the ASAE X-587 draft test. ASA, CSSA, and SSSA. Proceedings, 6th International Conference on Precision Agriculture, Madison, Wisconsin.

Byrd, E.J., R.K. Kolka, R.C. Warner, and J.M. Ringe. National Meeting of Surface Mining and Reclamation Association, Lexington, Kentucky.

Casey, K.D., R.S. Gates, E.F. Wheeler, H. Xin, P.A. Topper, J. Smith Zajaczkowski, Y. Liang, A.J. Heber, and L.D. Jacobson. Quality assured measurements of livestock building emissions: Part 4. Building ventilation rate. AWMA. Proceedings, Symposium on Air Quality Measurement Methods and Technology, Pittsburgh, Pennsylvania.

Castillo, M., F.A. Payne, M.B. Lopez, and J. Laencina. Prediccion del tiempo de corte en la elaboracion de queso de cabra mediante tecnicas de reflectancia difusa. FEAGAS 20:122-124.

Cole, H.P., L.R. Piercy, T.W. Struttmann, and S.C. Westneat. Improving farmers' self-protective behavior with a narrative-based tractor safety community education program. Presented at 6th International Conference Scientific Committee on Education and Training in Occupational Health: Best Practices in Occupational Safety & Health, Education, Training and Communication, Baltimore, Maryland.

Coleman, N.P., S.E. Nokes, and B.K. Knutson. The effects of process conditions on enantioselectivity in organic solvents. ASAE Paper No. 027005. American Society of Agricultural Engineers, St. Joseph, Michigan.

Colliver, D.G. Building a better world. ASHRAE Journal 44(8):17-21.

Colliver, D.G., R.S. Gates, and E.G. Wilkerson. Selection of appropriate design weather conditions for sizing evaporative pad cooling systems. ASAE Paper No. 024038. American Society of Agricultural Engineers, St. Joseph, Michigan.

Crofcheck, C., M. Loiselle, M. Jay, P. Bummer, I. Maiti, and S. Pattanaik. Using foam fractionation to recover pharmaceutical proteins from tobacco extract. Presented at the 2002 ASAE Annual International Meeting, Chicago, Illinois. ASAE Paper No. 027032. American Society of Agricultural Engineers, St. Joseph, Michigan.

Crofcheck, C., and K. Gillette. Evaluation of foam fractionation column scale-up for recovering a model protein. ASAE Paper No. 027003. American Society of Agricultural Engineers, St. Joseph, Michigan.

Danao, M.C., and F.A. Payne. Determining product transitions in a liquid piping system using a transmission sensor. ASAE Paper No. 026177. American Society of Agricultural Engineers, St. Joseph, Michigan.

Duncan, G.A. Casing equipment and facilities for ordering burley tobacco. Tobacco EXPO 2002, Lexington, Kentucky.

Fogle, A., J.L. Taraba, and J.S. Dinger. Errors in NO3-N and total soluble mass load estimates utilizing low-budget sampling strategies in a karst watershed in Central Kentucky. pp. 422-428. Proceedings, Total Maximum Daily Load (TMDL) Environmental Regulations. ASAE Paper No. 701P0102. American Society of Agricultural Engineers, St. Joseph, Michigan.

Fogle, A., and J.L. Taraba. Evaluation of the effect of diurnal variations on mass load estimation techniques. Proceedings, 10th Na-

tional NPS Monitoring Conference: Monitoring and Modeling from the Peaks to the Prairies. USEPA and CTIC, Purdue University.

Fulton, J.P., S.A. Shearer, T.S. Stombaugh, C.R. Dillon, and S.F. Higgins. "As-applied" model validation for variable-rate application of granular materials. IN: P.C. Robert et al., eds. ASA, CSSA, and SSSA. Proceedings, 6th International Conference on Precision Agriculture, Madison, Wisconsin.

Fulton, J.P., S.A. Shearer, T.S. Stombaugh, and S.F. Higgins. Simulation of variable-rate application of granular materials. ASAE Paper No. 021186. American Society of Agricultural Engineers, St. Joseph, Michigan.

Galvin, G., K.D. Casey, E.J. McGahan, S.A. Lowe, and M.G. Atzeni. Effect of season and loading rate on odour emission from piggery anaerobic lagoons in Australia. ASAE Paper No. 024082. American Society of Agricultural Engineers, St. Joseph, Michigan.

Galvin, G., S. Lowe, M. Atzeni, K. Casey, and E. McGahan. Spatial variability of odour emissions from anaerobic piggery ponds. CASANZ. Proceedings, Enviro 2002 Odour Conference, Eastwood, Australia.

Galvin, G., S. Lowe, M. Atzeni, K. Casey, and E. McGahan. The effect of loading rate on odour emissions from anaerobic effluent ponds in south-east Queensland. IEAust. Proceedings, 4th Queensland Environmental Conference, Brisbane, Australia.

Gates, R.S. Poultry and livestock housing with solid waste management. Sixth Discover Conference on Food Animal Agriculture—Nitrogen Losses to the Atmosphere from Livestock and Poultry Operations, American Dairy Science Association, Savoy, Illinois.

Gates, R.S. Static pressure and temperature controlled ventilation system for a caged broiler research facility. Proceedings, World Congress of Computers in Agriculture and Natural Resources. American Society of Agricultural Engineers, St. Joseph, Michigan.

Gates, R.S., and T. Banhazi. Applicable technologies for controlled environment systems (CES) in livestock production. Proceedings, ASAP/ISAH Joint Conference, Adelaide, SA, Australia.

Gates, R.S., J.D. Simmons, K.D. Casey, T.J. Greis, H. Xin, E.F. Wheeler, C.L. King, and J.R. Barnett. Fan assessment numeration system (FANS) design and calibration specifications. ASAE Paper No. 024124. American Society of Agricultural Engineers, St. Joseph, Michigan.

Gates, R.S., H. Xin, and E.F. Wheeler. Ammonia losses, evaluations and solutions for poultry systems. pp. 79-88. IN: P.H. Patterson, J.P. Blake, and K.D. Robertson, eds. NPWM Committee. Proceedings, 2002 National Poultry Waste Management Symposium.

Gillette, K.S., F.A. Payne, and C.L. Crofcheck. Light backscatter technique for measurement of non-homogenized fat in milk using optical fibers. ASAE Paper No. 026178. American Society of Agricultural Engineers, St. Joseph, Michigan.

Hart, W.E., J.B. Wilkerson, T.F. Morrow, and T.S. Stombaugh. Evaluating operator feedback accuracy of row-guidance systems with GPS. ASA, CSSA, and SSSA. IN: P.C. Robert et al., eds. Proceedings, 6th International Conference on Precision Agriculture, Madison, Wisconsin.

Heleji, K.E., M.D. Montross, and D.E. Maier. Modeling of different stored grain ecosystems with the post-harvest aeration and storage simulation tool (PHAST). ASAE Paper No. 02-6115. American Society of Agricultural Engineers, St. Joseph, Michigan.

Hudson, N., K. Casey, D. Duperouzel, S. Lowe, and A. Gies. Assessment of supported permeable covers for reduction of odour emissions from anaerobic ponds. CASANZ. Proceedings, Enviro 2002 Odour Conference, Eastwood, Australia.

Hudson, N., and K. Casey. Permeable covers, anaerobic ponds and odour management. IEAust. Proceedings, 4th Queensland Environmental Conference, Brisbane, Australia.

Jacobson, L.D., S.L. Wood, D.R. Schmidt, A.J. Heber, J.R. Bicudo, and R.D. Moon. Site selection of animal operations using air quality criteria. National Center for Manure and Animal Waste Management White Papers. Midwest Plan Service, Ames, Iowa.

Liberty, K.R., and J.L. Taraba. Microbial dynamics within a yard-waste compost biofilter that degrades ammonia, odors and toxic air emissions. Proceedings, Water Environment Federation Specialty Conference.

McNeill, S.G., M.D. Montross, and S.A. Shearer. Spatial variation of protein, oil and starch in yellow corn. ASAE Paper No. 021011. American Society of Agricultural Engineers, St. Joseph, Michigan.

Molenda, M., M.D. Montross, J. Horabik, I.J. Ross, and S.A. Thompson. Vertical wall loads in a model grain bin with non-axial internal insertions. ASAE Paper No. 024031. American Society of Agricultural Engineers, St. Joseph, Michigan.

Montross, M.D., T.S. Stombaugh, S.A. Shearer, S.G. McNeill, and S. Sokhansanj. Collection and characterization of corn stover in Kentucky. Bioenergy 2002 Conference, Boise, Idaho.

Myers, S.E., and D.R. Edwards. Bacterial quality of runoff from plots treated with animal manures. Presented at the 2002 Annual ASAE Meeting, Chicago, Illinois.

Nokes, S.E. The case for a multidisciplinary approach to educating biological engineers. ASAE Paper No. 027031. American Society of Agricultural Engineers, St. Joseph, Michigan.

Persyn, K.E., H. Xin, and R.S. Gates. Effects of beak trimming on poultry ingestion behavior. ASAE Paper No. 024070. American Society of Agricultural Engineers, St. Joseph, Michigan.

Schmidt, D.R., and J.R. Bicudo. Using a wind tunnel to determine odor and gas fluxes from manure surfaces. ASAE Paper No. 024083. American Society of Agricultural Engineers, St. Joseph, Michigan.

Shearer, S.A., T.S. Stombaugh, J.P. Fulton, and T.G. Mueller. Considerations for development of variable-rate controller test standard. ASAE Paper No. 021191. American Society of Agricultural Engineers, St. Joseph, Michigan.

Simpson, A., T.S. Stombaugh, L.G. Wells, and J. Walker. A low-cost unmanned aerial vehicle for remote sensing. ASAE Paper No. 0210839. American Society of Agricultural Engineers, St. Joseph, Michigan.

Stombaugh, T.S., and S.A. Shearer. Automatic Pilot. Resource 9(2):7-8. American Society of Agricultural Engineers, St. Joseph, Michigan.

Stombaugh, T.S., S.A. Shearer, and J.P. Fulton. Standards for comparison of GPS receiver performance. ASA, CSSA, and SSSA. IN: P.C. Robert et al., eds. Proceedings, 6th International Conference on Precision Agriculture, Madison, Wisconsin.

Stombaugh, T.S., S.A. Shearer. J.P. Fulton, and R. Ehsani. Elements of a dynamic GPS test standard. ASAE Paper No. 021150. American Society of Agricultural Engineers, St. Joseph, Michigan.

Wells, L.G., K.L. White, and L.R. Piercy. Evaluation of a rapid-braking fluid drive system for rotary field mowers. ASAE Paper No. 028039. American Society of Agricultural Engineers, St. Joseph, Michigan.

Wheeler, E.F., R.S. Gates, H. Xin, J.S. Zajaczkowski, P.A. Topper, and K.D. Casey. Field estimation of ventilation capacity using FANS. ASAE Paper No. 024125. American Society of Agricultural Engineers, St. Joseph, Michigan.

Wilkerson, E.G., R.S. Gates, and R.L. Geneve. Effects of root zone temperature on root development and water uptake during poinsettia propagation. ASAE Paper No. 024111. American Society of Agricultural Engineers, St. Joseph, Michigan.

Xin, H., T. Wang, R.S. Gates, E.F. Wheeler, K.D. Casey, A.J. Heber, J. Ni, and T. Lim. A portable system for continuous ammonia measurement in the field. ASAE Paper No. 024168. American Society of Agricultural Engineers, St. Joseph, Michigan.

Yanagi, T. Jr., H. Xin, and R.S. Gates. A measurement and control system for studying animal-environment interactions. Proceedings, World Congress of Computers in Agriculture and Natural Resources. American Society of Agricultural Engineers, St. Joseph, Michigan.

Zolnier, S., G.B. Lyra, R.S. Gates, L.C. Costa, G.C. Sediyama, and M.A.N. Sediyama. Evapotranspiration estimates for hydroponic lettuce in Brazil. ASAE Paper No. 023153. American Society of Agricultural Engineers, St. Joseph, Michigan.

Community and Leadership Development

Burmeister, L. East Asian agri-food systems and multifunctionality policy options: A sociological assessment. pp. 313-324. Proceedings, Gyeongbuk World Agri-Culture Forum 2002: A New Look at Agricultural Diversity, Gyeonogju, Korea. October 16-19.

Burmeister, L. Conflict over U.S. farm bill provisions: Domestic and international implications. pp. 49-54. Proceedings, Korea Rural Economics Institute International Seminar, U.D. Farm Bill: Progress and Perspectives, Seoul, Korea. April 19.

Dyk, P. Child and Family Services Review Analysis of Reunification, Guardianship or Permanent Placement with Relatives across Twenty-three States. Report to the Kentucky Cabinet for Families and Children. 120 pp.

Dyk, P. Community Connections for Children Parent Consultant Manual: Enhancing Parental Involvement in Policy, Program and Implementation of Child Well-Being Services. 53 pp.

Dyk, P., and J. Ford. Best Practices Approach to Parental Involvement 2000-2002. Report to the Kentucky Cabinet for Families and Children. 98 pp.

Rennekamp, R. Just in time learning: An alternative paradigm for evaluation capacity building. Hear It From the Board. American Evaluation Association, Extension Education Topical Interest Group. March.

Tanaka, K., S. Jeffries, and A. Broom. At the Laboratory Window: Genetic Engineering and Society. Department of Sociology, University of Kentucky, Lexington.

Forestry

Conners, T.E. Products made from wood. Fact Sheet FORFS 02-02. Department of Forestry, University of Kentucky.

Horticulture

Anderson, R.G. Performance of *Angelonia* cultivars as a summer greenhouse cut flower. The Cut Flower Quarterly 14(1):26-28.

Berberich, S., M. Williams, and R. Geneve. The effect of fertilizer concentration on shoot length, biomass and flower number of container produced passion flowers. Southern Nursery Association Research Conference Proceedings 47:111-114.

Buxton, J.W., and Robert McNiel. Controlled water table irrigation for nursery crops. Combined Proceedings, International Plant Propagator's Society 51:128-132. 2001.

Dutt, M., and R. Geneve. Using sequential digital images captured with a flat bed scanner to evaluate woody plant seeds with different germination requirements. Southern Nursery Association Research Conference Proceedings 47:352-356.

Fulcher, A., C. Finneseth, and W.C. Dunwell. Use of pelletized poultry litter as a container substrate. Southern Nursery Association Research Conference Proceedings 47:73-76.

Hamilton-Kemp, T.R., D.A. Archbold, and R.W. Collins. Two volatile sulfur compounds promote increases in natural aroma compounds in strawberry. Acta Horticulturae 507:775-777.

McNiel, R.E., and S. Elkins. *Aesculus parviflora* propagation by layering. Southern Nursery Association Research Conference Proceedings 47:352-356.

McNiel, R.E., and K. Ranta. Pruning influence on shoot development with container grown *Aesculus parviflora*. Southern Nursery Association Research Conference Proceedings 47:91-93.

Rowell, B. The role of non-governmental organizations in vegetable research, extension, training, and seed sector development. pp. 113-125. Perspectives of ASEAN Cooperation in Vegetable Research and Development: Proceedings, Forum on ASEAN-AVRDC Regional Network on Vegetable Research and Development (AARNET), Shanhua, Taiwan, 24-26 September 2001. Asian Vegetable Research and Development Center. AVRDC Publication No. 02-539. 151 pp.

Rowell, B., R.T. Jones, W. Nesmith, and J.C. Snyder. Bacterial spot resistance, yield, and quality of bell and specialty pepper cultivars. pp. 22-23. Proceedings, International Pepper Conference, Tampico, Mexico. November 10-13.

Rowell, B., A. Satanek, and R. Bessin. Biological control of European corn borer in peppers. p. 23. Proceedings, International Pepper Conference, Tampico, Mexico. November 10-13.

Livestock Disease Diagnostic Center

Bolin, D.C., L.R. Harrison, J.M. Donahue, R.C. Giles, C.B. Hong, K.B. Poonacha, J.F. Roberts, M.M. Sebastian, S.F. Sells, R.A. Smith, T.W. Swerczek, R.R. Tramontin, M.L. Vickers, and N.M. Williams. Pericarditis correlate of MRLS. 91st Annual Meeting, Kentucky Veterinary Medical Association and 29th Mid-America Veterinary Conference, Louisville, Kentucky. October 11.

Donahue, M., and N. Williams. Clostridial enterocolitis in horses. Equine Disease Quarterly 10(2):6-7.

Donahue, J.M., S.F. Sells, D.C. Bolin, R.C. Giles, L.R. Harrison, C.B. Hong, K.B. Poonacha, J.F. Roberts, M.M. Sebastian, R.A. Smith, T.W. Swerczek, R.R. Tramontin, M.L. Vickers, and N.M. Williams. Mare Reproductive Loss Syndrome: Bacteriologic findings in late-term fetal loss. p. 4. Proceedings, 91st Annual Meeting Kentucky Veterinary Medical Association and 29th Mid-America Veterinary Conference, Louisville, Kentucky.

Donahue, J.M. Study of bacteria associated with Mare Reproductive Loss Syndrome. p. 14. Proceedings, 2002 In-House Research Program for Mare Reproductive Loss Syndrome (MRLS), Lexington, Kentucky.

Harrison, L.R., D.C. Bolin, J.M. Donahue, R.M. Dwyer, R.C. Giles, J.C. Henning, C.B. Hong, K.J. McDowell, K. Newman, K.B. Poonacha, D.G. Powell, J.F. Roberts, M.M. Sebastian, S.F. Sells, B.J. Smith, R.A. Smith, T.W. Swerczek, T. Tobin, R.R. Tramontin, M.L. Vickers, and N.M. Williams. Kentucky equine abortion storm and related conditions: 2001 & 2002. Proceedings, 91st Annual Meeting, Kentucky Veterinary Medical Association and 29th Mid-America Veterinary Conference, Louisville, Kentucky. October 10.

Williams, N.M., D.C. Bolin, J.M. Donahue, R.C. Giles, L.R. Harrison, C.B. Hong, K.B. Poonacha, J.F. Roberts, M.M. Sebastian, T.W. Swerczek, and R.R. Tramontin. Mare Reproductive Loss Syndrome: Pathologic findings. p. 6. IN: Proceedings, 91st Annual Meeting Kentucky Veterinary Medical Association and 29th Mid-America Veterinary Conference, Louisville, Kentucky.

Plant Pathology

Hartman, J. Can water be used to prolong the life of trees infected with bacterial leaf scorch? Boxwood—volutella stem and leaf blight outlook for now that it is here, is daylily rust a threat to Kentucky? Nursery Views 32:18-20.

Hershman, D.E. Soybean cyst nematode "races" soon to be a thing of the past. PPFS-AG-S-20.

Hershman, D.E. Soybean disease control series: Are we missing opportunities? Part 1: Soybean Cyst Nematode. Part 2: Soybean Sudden Death Syndrome. Part 3: Root and Lower Stem Diseases. Part 4: Foliar Diseases Caused by Bacteria and Fungi. Part 5: Virus Diseases of Soybean. Part 6: Fungal and Pod Diseases of Soybean. PPFS-AG-S-13 to PPFS-AG-S-18.

Hershman, D.E. Soybean foliar spots and blights. PPFS-AG-S-19.

Parker, G., and P. Vincelli. Commercially available test kits for the detection of mycotoxins in corn and other grains. PPFS-AG-C-3.

Schardl, C.L., J.D. Blankenship, C. Machado, and M.J. Spiering. Web essay 13.2: Alkaloid-making fungal symbionts. IN: L. Taiz and E. Zeiger, eds. *Plant Physiology* 3rd ed. Sinauer Associates, Sunderland, Massachusetts.

Vincelli, P. Laboratories for mycotoxin analysis. PPFS-MISC-1.

Vincelli, P., and E. Dixon. Evaluation of spray programs for controlling Qol-resistant strains of *Pyricularia grisea* on perennial ryegrass, 2001. Fungicide and Nematicide Tests 57: T37.

Vincelli, P., E. Dixon, D. Williams, and P. Burrus. Efficacy of fungicides for control of brown patch of creeping bentgrass on a sand-based green, 2001. Fungicide and Nematicide Tests 57: T14.

Vincelli, P., E. Dixon, D. Williams, and P. Burrus. Efficacy of fungicides for control of dollar spot of creeping bentgrass on a soil-based green, 2001. Fungicide and Nematicide Tests 57: T17.

Vincelli, P., E. Dixon, D. Williams, and P. Burrus. Efficacy of fungicides for control of gray leaf spot of perennial ryegrass, 2001. Fungicide and Nematicide Tests 57: T33.
Vincelli, P., E. Dixon, D. Williams, and P. Burrus. Influence of fungicides on turf quality of creeping bentgrass on a soil-based green, 2001. Fungicide and Nematicide Tests 57: T23.

Veterinary Science

Bailey, E. Seven years after beginning the five year plan. IN: Nat White, ed., Proceedings, Blue Ribbon Panel on "Horse Genomics 101" sponsored by AQHA, AAEP, GJCRF, MAF.
Dwyer, R.M., and J.M. Donahue. Equine Salmonellosis in the United States and Kentucky. Equine Disease Quarterly 11(1):2-3.
Dwyer, R.M., L. Garber, J. Traub-Dargatz, B. Meade, M. Pavlick, and J. Walker. An epidemiological investigation of mare reproductive loss syndrome: Breaking ground on a new disease. pp. 44-47. Proceedings, Society for Veterinary Epidemiology and Preventive Medicine, Cambridge, England.
Dwyer, R.M., L. Garber, J. Traub-Dargatz, B. Meade, and M. Pavlick. Dissecting an outbreak of mysterious etiology: Mare reproductive loss syndrome. pp. 134. Proceedings, American College of Veterinary Internal Medicine Convention, Dallas, Texas.
Fitzgerald, B.P. Insulin resistance in the horse: Significance and pharmacologic management. Equine Disease Quarterly 11(1):4-6.
Lear, T.L. Atavisms or "what goes around, comes around." Pony Express, Florida Museum of Natural History, 1st quarter.
McDowell, K.J. Reproductive success in broodmares Part 2. Equine Disease Quarterly 10(2):2-4.
Timoney, P.J. African horsesickness. pp. 61-70. Proceedings, 16th International Seminar of the World Association of Veterinary Microbiologists, Immunologists and Specialists in Infectious Diseases, Siena, Italy, May 18-22.
Timoney, P.J. Equid herpesvirus 1 & 4 infections. pp. 71-80. Proceedings, 16th International Seminar of the World Association of Veterinary Microbiologists, Immunologists and Specialists in Infectious Diseases, Siena, Italy, May 18-22.
Timoney, P.J. Equine viral arteritis: Salient features and significance. The North American Friesian Journal 1:54-57.
Timoney, P.J., and W.H. McCollum. Understanding equine viral arteritis. <http://www.aaep.org/members/ownereducation/eva2.asp>
Walcott, K., and P.J. Timoney. Shared diseases. The Horse 19(1):57-60.

Graduate Degrees

Ph.D. Dissertations

Agricultural Economics

Bazen, Ernest. Environmental and economic tradeoffs in livestock and crop management.

Spaulding, Aslihan. The new product development practices of the North American confectionery manufacturers: Determinants of new product development time.

Vishwanathan, R. Regulatory environment and its impact on the market value of investor-owned electric utilities.

Agronomy

Brommer, Chad L. Characterization and economic analysis of perennial weed populations in Kentucky no-till production fields.

Ferhatoglu, Yurdagul. Basis for the safening of cotton from herbicide clomazone by the organophosphate insecticide phorate and studies of the clomazone mode of action.

Woosley, Paul B. Characterization and control of annual bluegrass in the transition zone.

Animal Sciences

Feng, J. Interaction of myofibrillar and thermally/enzymatically modified soy proteins.

Ramírez-Suárez, J.C. Transglutaminase-mediated aggregation and functionality of mixed food proteins.

Schultz, C.L. Comparison of an early weaning management system with a conventional system on cow and calf performance while grazing tall fescue pastures.

Biosystems and Agricultural Engineering

Jiang, Yaping. Predicting soil response to a driven pneumatic wheel using finite element analysis.

Liberty, Kenneth D. Yard-waste compost biofilters for ammonia absorption and biotransformation.

Community and Leadership Development

Ross, L.T. Comparison of accredited and non-accredited industrial technology programs.

Yotsumoto, Y. Corporate social responsibility among Japanese manufacturers: A Kentucky community case study.

Graduate Center for Nutritional Sciences

Calfee-Mason, Karen G. The effect of dietary vitamin E on NF-κB activation in rodents treated with the hepatic tumor promoters, phenobarbital and ciprofibrate.

Lu, Zijing. The role of NF-κB activation in hepatic tumor promotion by polychlorinated biphenyls (PCBs).

Horticulture

Siriwitayawan, Gunching. The involvement of ethylene in determining seed vigor and the time required for the completion of germination.

M.S. Theses

Agricultural Economics

Babool, Mohammad Ashfaqul. The importance of cross-border mergers and acquisitions: Global and regional perspectives.

Burke, Victoria. The impact of state prisons on the economy of Kentucky.

Clark, Nathan. Investigating the relationship between yield risk and agri-environmental indicators.

Cornell, Steven. Environmental concerns ranking, demographic variables and expenditures.

Garcia, Sharon Senninger. The impact of natural disasters on economic growth: A study of Mexico and Central America.

Goes, Anne. Incorporating risk-linked securities into international disaster relief: A proposal for a charity catastrophe bond.

Koch, Stephen I. Information, adverse selection, and price discovery in the thoroughbred yearling market.

Milesy, Josefina. Economic impact on cattle feedlots of early detection of bovine respiratory disease using remote temperature sensing technology.

Powers, Laura. Improving farm management decisions by analyzing site-specific economic data developed from yield maps.

Agronomy

Argyris, Jason M. Effect of *Fusarium graminearum* infection on wheat seed quality.

Hall, Marla D. Genetic variation for fusarium head blight resistance in soft red winter wheat.

Johnson, David M. Colloid-mediated heavy mobility of heavy metals associated with municipal and agricultural waste amendments.

Lee, Andrew T. Persistence and efficacy of fall-applied simazine and atrazine in no-till corn production.

Luo, Lina. Nicotine demethylation and nornicotine racemization in different nicotiana species and lines.

Meade, Terry G. Pentachlorophenol mineralization at aerobic-anaerobic, soil-water-plant interfaces.

Uranga, Maximo. Soil phosphorus stratification and the phosphorus nutrition of soybean.

Animal Sciences

Clayton, N.C. The efficacy of various *salmonella* intervention methods applied to pork carcasses during slaughter.

Fieser, B.G. Interactions between supplement energy source and tall fescue hay maturity on forage utilization by beef steers.

Hazelton, S.R. Influence of abomasal carbohydrates on small intestinal sodium-dependent glucose co-transporter activity and abundance in steers.

Howlett, C.M. Effect of supplemental nutrient source on heifer growth and reproductive performance, and on utilization of corn silage-based diets by beef steers.

Kitts, S.E. The effects of thickening agents in canned foods on digestive dynamics in dogs.

St. Lawrence, A.C. Glycemic and hormonal responses in weanling horses.

Weddington, T.J. Isolation, identification and characterization of a succinate-degrading bacterium from a bovine rumen.

Biosystems and Agricultural Engineering

Byrd, Eric. Evaluation of surface runoff and infiltration on non-compacted mine spoils.

Wilkerson, Erin. Media temperature effects on root development and water uptake during poinsettia propagation.

Community and Leadership Development

Breazeale, N. Enabling low-income, rural people in Appalachia to buy their own homes and secure quality housing: The effects of tenure, housing quality, and action on feelings of self-worth and self-competence.

Sakamoto, K. Tensions and reflections of technical change agents: Towards emancipatory knowledge and empowerment.

Entomology

Staley, A.C. Influence of plant characteristics on the ovipositional behavior and larval movement of a lady beetle, *Coleomegilla maculata*.

Williams, Jennifer. How prey detect and avoid predators: A study with an agricultural pest.

Forestry

Chiang, Jyh-min. Prescribed fire effects on oak regeneration in eastern Kentucky.

Ciuzio, E. Potential impacts of reintroduced elk on edge-nesting songbirds in eastern Kentucky.

Newman, G.S. Net primary productivity of mesic and xeric deciduous forest stands in southeastern Kentucky.

Horticulture

Bonney, Tera. Development of a sampling strategy and random amplified polymorphic DNA (RAPD) protocol for genetic analysis of the North American pawpaw [*Asimina triloba* (L.) Dunal].

Patel, Gayari. Interaction of soil organic matter with pyrethrins and piperonyl butoxide.

Plant Pathology

Du, M. Use of the HMG sequence of the mat-2 type gene for phylogenetic analysis of *Colletotrichum* species complexes.

Flowers, J.L. The occurrence and detection of latent *Sphaeropsis sapinea* infections in symptomless pine tissue.

Veterinary Science

Myka, J. The effects of Sic1, a yeast cyclin-dependent kinase inhibitor, on the mammalian cell cycle.

Note: Graduate student enrollment and graduation figures are reported by graduate program, not by department.

	2000-2001 Enrollment	2001-2002 Enrollment	Net Change	2000-2001 Degrees Awarded			2001-2002 Degrees Awarded			Net Change
				Master's	Doctoral	Total	Master's	Doctoral	Total	
Agricultural Economics	52	56	+4	8	2	10	10	2	12	+2
Animal Sciences	82	75	-7	12	10	22	9	7	16	-6
Biosystems and Agricultural Engineering	19	26	+7	3	1	4	3	1	4	0
Crop Science	16	17	+1	0	3	3	2	1	3	0
Entomology	30	40	+10	5	3	8	4	2	6	-2
Forestry	18	16	-2	6	*	6	3	*	3	-3
Plant Pathology	13	17	+4	2	0	2	1	0	1	-1
Plant Physiology	21	19	-2	*	2	2	*	2	2	0
Plant and Soil Science	30	31	+1	11	*	11	3	*	3	-8
Soil Science	10	9	-1	*	3	3	*	0	0	-3
Veterinary Science	28	26	-2	3	6	9	1	5	6	-3
Total	319	332	-13	50	30	80	36	20	56	-24

**Degree type not offered*

Financial Statement

Statement of Current General Fund
Income and Expenditures
Fiscal Year 2002

INCOME

Federal Funds:	
Hatch Amended	$3,933,236
Hatch Multistate	864,723
McIntire-Stennis	415,815
Animal Health	61,547
Total Federal Funds	$5,275,321
State Funds	$24,998,013
Total Funds	**$30,273,334**

EXPENDITURES

	Federal	*State*	*Total*
Personal Services	$4,400,057	$16,291,819	$20,691,876
Travel	122,816	226,866	349,682
Equipment	81,165	390,707	471,872
Other Operating Expenses	671,283	8,088,621	8,759,904
Total Expenditures	**$5,275,321**	**$24,998,013**	**$30,273,334**

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Billy B. Wilcoxson
Elaine A. Wilson
Barbara S. Young
Faculty Members: Davy Jones and Michael Kennedy
Staff Member: Russ Williams
Student Member: Joseph M. Ruschell

Agricultural Experiment Station
January 1, 2002—December 31, 2002

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Michael T. Nietzel, Provost
M. Scott Smith, Dean & Director
H.C. Owen, Treasurer
Nancy M. Cox, Associate Dean for Research & Associate Director
Linus R. Walton, Associate Dean for Administration
F.W. Knapp, Assistant Director
J.D. Lawson, Assistant Director for Legal & Fiscal Affairs
W.O. Peterson, Director of Management Operations

Departments

Experiment Station personnel lists for calendar year 2002 as reported by departments follow.

Agricultural Communications

Craycraft, C.G., Director
Fehr, R.L., Professor
Ragland, K., Associate Professor

Agricultural Economics

Robbins, L.W., Chair & Professor
Debertin, D.L., Professor
Dillon, C., Associate Professor
Fleming, R., Assistant Professor
Freshwater, D., Professor
Marchant, M.A., Associate Professor
Mather, L.L., Associate Professor
Maynard, L., Assistant Professor
Pagoulatos, A., Professor
Reed, M.R., Professor
Skees, J.R., Professor
Vickner, S., Assistant Professor

Agronomy

Barrett, M., Chair & Professor
Barnhisel, R.I., Professor
Baskin, C., Professor*
Bitzer, M.J., Professor
Burton, H.R., Associate Professor
Bush, L.P., Professor
Chappell, J., Professor
Collins, G.B., Professor
Collins, M., Professor
Cornelius, P.L., Professor
Coyne, M.S., Associate Professor
D'Angelo, E.M., Assistant Professor
Davis, M., Professor and Director, THRI
Dinkins, R.D., Assistant Professor
Dougherty, C.T., Professor
Egli, D.B., Professor
Grove, J.H., Associate Professor
Hildebrand, D.F., Professor
Hunt, A.G., Professor
Karathanasis, A., Professor
Kumudini, S., Assistant Professor
Kennedy, B.S., Research Specialist
Legg, P.D., Professor
Matocha, C.J., Assistant Professor
Miller, R.D., Professor
Mueller, T.G., Assistant Professor
Mullen, M.D., Associate Professor
Perry, S.E., Assistant Professor
Pfeiffer, T.W., Professor
Phillips, T.D., Associate Professor
Siminszky, B., Assistant Professor
Slack, C.H., Research Specialist
TeKrony, D.M., Professor
Van Sanford, D.A., Professor
Wagner, G., Professor
Williams, D.W., Assistant Professor
Witt, W.W., Professor

* *Joint Biological Sciences*

Animal Sciences

Harmon, R.J., Chair & Professor
Aaron, D.K., Professor
Alderton, A.L., Assistant Professor
Boatright, W.L., Associate Professor
Cantor, A.H., Associate Professor
Cromwell, G.L., Professor
Edgerton, L.A., Associate Professor
Ely, D.G., Professor
Franklin, S.T., Assistant Professor
Harmon, D.L., Professor
Hennig, B., Professor
Hicks, C.L., Professor
Jackson, J.A. Jr., Associate Professor
Lawrence, L.M., Professor
Lindemann, M.D., Professor
Matthews, J.C., Assistant Professor
McLeod, K.R., Assistant Professor
Newman, M.C., Assistant Professor
Schillo, K.K., Associate Professor
Silvia, W.J., Associate Professor
Strobel, H.J., Associate Professor
Thrift, F.A., Professor
Vanzant, E.S., Assistant Professor
Xiong, Y.L., Professor

Biosystems and Agricultural Engineering

Gates, R.S., Chair & Professor
Bicudo, J.R., Assistant Professor
Colliver, D.G., Associate Professor
Crofcheck, C., Assistant Professor
Edwards, D.R., Professor
Gates, R.S., Professor
Montross, M.D., Assistant Professor
Nokes, S.E., Associate Professor
Payne, F.A., Professor
Shearer, S.A., Professor
Taraba, J.L., Associate Professor
Wells, L.G., Professor
Workman, S.R., Associate Professor

Community and Leadership Development

Hansen, G., Chair & Professor
Burmeister, L.L., Associate Professor
Byers, C., Professor
Dyk, P.A., Associate Professor
Garkovich, L.E., Professor
Greider, T.R., Associate Professor
Harris, R.P., Associate Professor
Peiter, R., Assistant Professor
Tanaka, K., Assistant Professor
Tulloch, R., Associate Professor
Weckman, R.D., Associate Professor
Witham, D.B., Professor

Entomology

Knapp, F.W., Interim Chair & Professor
Barney, R.J., Assistant Professor*
Brown, G.C., Professor
Dobson, S.L., Assistant Professor
Fox, C.W., Associate Professor
Haynes, K.F., Professor
Hunt, R.E., Assistant Professor*
Palli, S.R., Assistant Professor
Potter, D.A., Professor
Rieske-Kinney, L.K., Associate Professor
Sedlacek, J.D., Assistant Professor*
Sharkey, M.J., Associate Professor
Townsend, L.H., Professor
Webb, B.A., Professor
Wise, D.H., Professor
Yeargan, K.V., Professor

* *Adjunct*

Forestry

Graves, D.H., Chair & Professor
Arthur, M.A., Associate Professor
Kalisz, P.J., Associate Professor
Lacki, M.J., Associate Professor
Liu, C.J., Associate Professor
Maehr, D.S., Assistant Professor
Ringe, J.M., Professor
Rhoades, C., Assistant Professor
Stringer, J.W., Associate Professor
Wagner, D.B., Associate Professor

Graduate Center for Nutritional Sciences

Chen, L.H., Professor
Chow, C.K., Professor
Glauert, H.P., Professor

Horticulture

Ingram, D.L., Chair & Professor
Anderson, R.G., Professor
Archbold, D.D., Associate Professor
Buxton, J.W., Associate Professor
Downie, B., Assistant Professor
Geneve, R.L., Associate Professor
Houtz, R.L., Associate Professor
Kemp, T.R., Professor
McNiel, R.E., Professor
Rowell, A.B., Associate Professor
Snyder, J.C., Associate Professor

Landscape Architecture

Schach, Horst, Chair & Professor
Nieman, T.J., Professor
Crankshaw, N.M., Associate Professor
Kew, B.W., Assistant Professor

Livestock Disease Diagnostic Center

Harrison, L.H., Director & Professor
Bolin, D.C., Assistant Professor
Donahue, J.M., Professor
Giles, R.C., Professor
Hong, C.B., Professor
Jackson, C.B., Associate Professor
Poonacha, K.B., Professor
Scharko, P.B., Associate Professor
Smith, R.A., Associate Professor
Tramontin, R.R., Associate Professor
Vickers, M.L., Associate Professor
Williams, N.M., Associate Professor

Plant Pathology

Smith, D.A., Chair & Professor
Bachi, P.R., Research Specialist
Beale, J.W., Research Specialist
Farman, M.L., Assistant Professor

Ghabrial, S.A., Professor
Goodin, M.M., Assistant Professor
Hendrix, J.W., Professor
Jarlfors, U.E., Research Specialist
Kachroo, P.R., Assistant Professor
Nagy, P.D., Assistant Professor*
Nuckles, E.M., Research Specialist
Pirone, T.P., Professor
Pogany, J., Research Specialist
Schardl, C.L., Professor
Thornbury, D.W., Scientist II
Vaillancourt, L.J., Associate Professor
Wang, R., Research Specialist

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* *Inadvertently omitted from faculty list for 1999, 2000, and 2001*

Regulatory Services
Miller, E., Director & Professor
Buckingham, D.T., Seed Regulatory Coordinator
Coffey, D.S., Inspector
Cox, B.W., Inspector
Finneseth, 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
McMurry, 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

Robinson Station
Ditsch, D., Acting Superintendent

Veterinary Science
Timoney, P.J., Chair & Professor
Allen, G.P., Professor
Artiushin, S.C., Research Specialist
Bailey, E.F., Professor
Chambers, T.M., Associate Professor
Cook, R.F., Assistant Professor
Cothran, E.G., Professor
Davies, K.L., Research Specialist
Dwyer, R.M., Associate Professor
Fitzgerald, B.P., Associate Professor
Graves, K.A., Assistant Professor
Hale, G., Librarian
Harkins, J.D., Research Specialist
Henney, P.J., Research Specialist
Howe, D.K., Assistant Professor
Issel, C.J., Professor
Karpiesiuk, W., Research Specialist
Leach, R.B., Research Specialist
Lehner, A.F., Research Specialist
Lear, T.L., Assistant Professor
Lyons, E.T., Professor
McCollum, W.H., Professor
McDowell, K.J., Associate Professor
Powell, D.G., Professor
Reedy, S.E., Research Specialist
Swerczek, T.W., Professor
Timoney, J.F., Professor
Tobin, T., Professor
Yeargan, M.R., Research Specialist
Zhang, D., Research Specialist

West Kentucky Substation
Davis, D., Superintendent

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Issued 6-2003