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UK AGRICULTURAL EXPERIMENT STATION
UNIVERSITY OF KENTUCKY — COLLEGE OF AGRICULTURE

The Kentucky
Agricultural Experiment Station

119*th*

Annual Report
2006

UK
UNIVERSITY OF KENTUCKY
College of Agriculture

University of Kentucky • Lexington, Kentucky 40546

To His Excellency,
The Honorable Ernie Fletcher
Governor of Kentucky

I herewith submit the one hundred and nineteenth annual report of the Kentucky Agricultural Experiment Station for the period ending December 31, 2006. 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 the Kentucky State Legislature, approved February 20, 1888, accepting the provisions of the act of Congress.

Very respectfully,

Nancy M. Cox, Associate Dean for Research
Director, Agricultural Experiment Station
Lexington, Kentucky
June 30, 2007

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Purpose of the Kentucky Agricultural Experiment Station

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

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

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

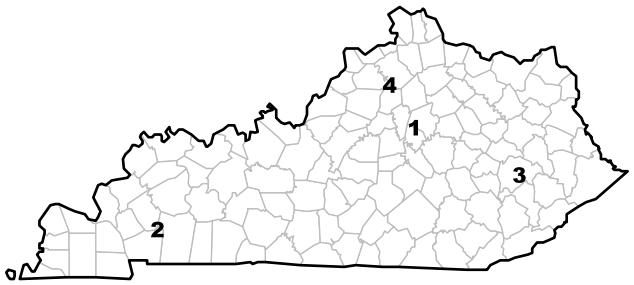
This Annual Report lists Experiment Station research projects and publications completed during 2006. A personnel list is also provided.

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 2006.

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, vegetables, and ornamentals, including organic production.
- **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.

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 Livestock Disease Diagnostic 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 specialists, 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 and endemic diseases such as West Nile virus (WNV) infection and equine herpes 1 virus infections and for possible threats to Kentucky agribusiness such as foot and mouth disease. For more than 18 years, beginning prior to the introduction of the USDA's National Surveillance Program, a stringent program has been in place at the Livestock Disease Diagnostic Center to monitor for bovine spongiform encephalopathy (BSE), also known as mad cow disease. No positive cases have 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:

This has been a very busy and challenging year. The number of accessions increased by 3 percent, but more importantly, there is an ongoing change in kinds of requests for tests and uses of laboratory services. The realm of laboratory services is changing from simple to complex procedures that require greater skilled support staff. Examples of the changing realm of laboratory tests are the PCR assays for rapid diagnosis of contagious/infectious diseases (e.g., equine herpes viruses and *Streptococcus equi*); increasing uses of complex assays that have diagnostic, regulatory, and client approval (e.g., equine viral arteritis VN); and testing that has both diagnostic and perceived value in treatment schemes (e.g., leptospirosis MAT). All of these examples define a future of expanded expectations and lessened tolerances. Recent disease outbreaks have left no room or opportunities to do anything other than molecular-based assays and to rigidly use these tests and assays to aid in the control of highly publicized outbreaks. No other options are available. The corner has been turned as practitioners, farmers, and other clientele now demand the newer technological-based assays.

Starting in the summer of 2001 and in cooperation with the Kentucky Department of Public Health and the Kentucky Department of Agriculture, the Livestock Disease Diagnostic Center conducted assays for statewide surveillance and diagnosis of West Nile virus (WNV) in birds, horses, and mosquito pools. The Livestock Disease Diagnostic Center provides 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.

Two years ago, readers were first informed that the American Association of Veterinary Laboratory Diagnosticians (AAVLD) had placed the Livestock Disease Diagnostic Center on provisional accreditation because of major facility deficiencies. Following notification of the actions taken by the AAVLD, a capital improvement request was taken to the Kentucky General Assembly during the 2005 session, and the legislature approved $8.5 million for Phase 1 to upgrade the Livestock Disease Diagnostic Center. The Phase 1 capital appropriation does not provide the funds to upgrade the other services essential for full accreditation; therefore, additional funds, Phase 2, have been requested to meet the level of support and the implementation of new technologies to promote animal health and productivity required by Kentucky's signature equine and cattle industries. The 2007 legislative session of the Kentucky General Assembly will be asked to approve the capital appropriation for Phase 2 in order to enhance the entire program.

During 2006, concerns about the potential spread of avian influenza type H5N1 to the United States drew intense national interest. In response to the requests from the local, state, and national poultry industries, the Kentucky Poultry Federation, Breathitt Veterinary Center at Murray State University, and Livestock Disease Diagnostic Center have put in place a statewide surveillance and testing program to monitor for the introduction of the H5N1 strain as well as strains of lesser disease potential.

Quality Assurance Program

L.L. Brown

The Livestock Disease Diagnostic Center Quality Program goal is based on the university mission of improving service delivery while achieving excellent human relations (internally and externally), sound leadership, and effective communications. The Quality System has been designed to focus primarily on standardization of work procedures that allow improvement of

the quality of service to our internal and external customers. It is a never-ending, long-term development that is evolutionary in implementation yet revolutionary in vision, scope, and impact.

The overall program goal is to continually improve service delivery and organize and streamline work processes for maximum efficiency.

The Quality System at the Livestock Disease Diagnostic Center was begun in 2005 as a requirement of our accrediting agency, the American Association of Veterinary Laboratory Diagnosticians. For the past two years, a Quality Manager has been working with the Livestock Disease Diagnostic Center sections to implement the required Quality System. The organization of the system has been completed. The sections are finalizing the remaining procedures and placing them under the document control system that has been established. Several internal audits have been conducted in 2006, and the sections have developed a user's guide to provide information about each test performed on the Livestock Disease Diagnostic Center Web site for clients. The laboratory currently participates in various proficiency testing programs and plans its first Quality System Management Review in April 2007.

Public Services

Pathology

L.R. Harrison

The Livestock Disease Diagnostic Center provides services in necropsy, histopathology, and surgical biopsy. Pathologists evaluate changes found at necropsy and correlate lesions with other laboratory test results, including light microscopic examination of tissues. A comprehensive report is prepared for every case requiring the services provided by the veterinary pathologists.

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	3,817
Avian	96
Bovine	930
Bovine fetus	114
Canine and feline	390
Caprine and ovine	329
Equine	1,950
Equine fetus	620
Equine placenta of live birth	129
Porcine	29
Other species (exotic—zoo, wildlife)	93

Histopathology: Tissues are prepared for light microscopic examination to reveal changes in body tissues due to disease. Tissues of 7,811 cases were processed and examined. In addition to hematoxylin and eosin (H&E) stained tissue section, special and immunochemical stains were done on 501 tissue preparations for the purpose of identifying microscopic organisms/agents that cause diseases or tissue antigens that define cell structures.

Biopsy: Small tissue specimens are prepared for light microscopic examination for evidence of neoplasia or other diseases. Tissue samples representing 4,325 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 557 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:

- 16,467 aerobic cultures were performed on samples submitted to the Livestock Disease Diagnostic Center; significant bacterial pathogens were found in over 50 percent of the samples.
- 1,081 milk samples from dairy cows were tested for microorganisms that cause mastitis; over 50 percent were positive for pathogenic microorganisms.
- 3,457 different bacterial isolates were tested to determine the antibiotics that could be used for their treatment in exposed animals.
- 6,895 samples from horses were cultured for contagious equine metritis organism (CEMO). All horses tested were negative for the bacterium, demonstrating that the disease no longer exists in horses in Kentucky.
- Approximately 2,200 samples from horses were tested for the presence of leptospires, and tissues from 21 fetuses were positive.
- Using funding provided by the Grayson-Jockey Club Research Foundation Inc., the section provided data to prove that the bacteria responsible for the death of fetuses in natural and in experimentally induced cases of mare reproductive loss syndrome are identical to the bacteria found normally in the mouth and alimentary tract of horses.
- In conjunction with the Molecular Biology Section, researchers are evaluating a PCR method for detecting *Crossiella equi* and *Amycolatopsis* spp. in equine placentas. These bacteria are the primary cause of nocardioform placentitis in equine.

Molecular Diagnostics

S. Sells

The Molecular Diagnostics Section uses assays designed to detect and identify the specific nucleic acids (DNA and RNA) 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:

The section offers specific assays for over 30 pathogens and has been increasingly used to confirm the identity of isolates cultured in the Bacteriology and Virology sections of the Livestock Disease Diagnostic Center and area veterinary clinics. During 2006, testing requests for *Streptococcus equi*, BVDV, and especially equine herpesvirus increased substantially. The numbers of the most requested assays include:

Streptococcus equi	863 (47 positive)
Equine herpesvirus 1	3,563 (202 positive)
Moraxella bovis	21
Mycoplasma bovis	57
Lawsonia intracellularis	186 (44 positive)
Clostridium perfringens	74
Equine nocardioform placentitis	752 (39 positive)*
Neorickettsia risticii	118 (28 positive)
West Nile virus	129 (3 positive birds, 1 horse, 1 alpaca)
BVDV	322
Arbovirus	752 (7 positive for West Nile)

* 11 due to *Crossiella equi*; 28 due to *Amycolatopsis*.

Serology

M. Steinman

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 animal diseases was available utilizing various testing techniques. A total of 175,379 tests were performed.

Highlights:

Anaplasmosis	164
Avian influenza	12,092
Bovine leukemia virus	878
Brucellosis	8,522
Contagious equine metritis	1,065
Equine infectious anemia	53,344
Johne's disease	1,216
Leptospirosis	4,626
Mycoplasma gallisepticum	38,902
Mycoplasma synoviae	38,904
Neospora caninum	893
Salmonella pullorum-typhoid	13,107

Virology

M.L. Vickers and M. McCoy

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

Highlights:

This section provides 52 different tests, including fluorescent antibody tests to detect antigens of viruses in tissues, serology tests to detect antibodies to viruses, virus isolations for cattle, horses, sheep, pigs, goats, cats, dogs, birds, reptiles, etc., as well as electron microscopy and various tests for the detection of viral antigens such as influenza and rotavirus. In addition, this section maintains 10 tissue culture cell lines that are used routinely.

The section performed 31,934 tests during 2006, an increase of 6 percent from the previous year. Of this total, 14,857 were virus neutralization antibody tests completed to meet regulatory requirements.

Cattle producers in Kentucky have increasingly begun utilizing the screening test to detect animals persistently infected with bovine viral diarrhea virus in their herds. There was a 20 percent increase in the number of tests requested from the previous year. Removal of a source of disease problems will give added value to one of our most important commodities.

This is the seventh year of funding from the Kentucky Department of Public Health by way of the Centers for Disease Control grant for West Nile virus (WNV) testing. The purpose of this grant is for surveillance/monitoring of WNV in wild birds, horses, and mosquitoes. Mosquito trapping was carried out by county Public Health technicians. The mosquitoes were speciated and submitted to the laboratory for testing for WNV as well as other viruses transmitted by mosquitoes to horses and humans. Dead birds and horses with neurologic signs were also tested for WNV. Testing of birds and mosquitoes for WNV was done as a cooperative effort of this section and Molecular Diagnostics which uses the polymerase chain reaction to test for the RNA of the viruses.

Toxicology

A.F. Lehner

The principal purpose of the toxicology department is to contribute to the long-term profitability of primary producers of food animals and animal athletes in Kentucky by supporting the practitioners of veterinary medicine across the commonwealth. The toxicology department supports the Livestock Disease Diagnostic Center pathologists by making it possible to identify, investigate, and quantify elements and compounds that may contribute to observed organ or tissue abnormalities that may be relevant to the differential diagnosis. The toxicology department also performs analyses of samples submitted by veterinarians, Cooperative Extension agents, and private owners to assist in diagnosing problems that affect herd health initiatives.

A variety of assays were routinely performed that identify poisonous substances in tissues taken at necropsy or from various samples submitted by veterinarians. Tests performed include analysis for heavy metals (mercury, lead, arsenic, chromium, etc.) and other elements, pesticides, plant toxins, and a variety of other toxic substances (cyanide, ethylene glycol, etc.). Blood, serum, and urine from live animals are assayed for mineral/element deficiencies or excesses and toxins. These assays are performed when a potential toxicological problem exists based on animal or herd symptomologies and when a pathologist identifies changes in tissues/organs that are consistent with specific toxic agents.

Highlights:

Tests performed in the toxicology department in the past year include:

Method/Substance	Number of Analyses Performed
GC/MS analysis (instrument used to identify organic toxicants)	437
Nitrate, nitrite, oxalates, and other anions	140
ICP analysis (instrument used to identify heavy metals and other elements)	1,039
Cyanide analysis	2
Ethylene glycol analysis	11
Ionophores	4
pH	93
Total dissolved solids	20
Cholinesterase	3
Miscellaneous analyses performed either in house or other laboratories	296
Total Number of Tests	**2,045**

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

Substance Detected	Number of Positive Cases
Acidosis	24
Acorn poisoning	1
Elevated aflatoxin levels	1
Antifreeze poisoning	4
Arsenic poisoning	2
Brodifacoum toxicity	1
Calcium deficiency	2
Carbofuran poisoning	10
Copper deficiency	119
Copper toxicity	37
Endosulfan	1
Exposure to pharmaceutical agents	12
Fumonisin toxicity	6
Iron toxicity	24
Ivermectin toxicity (canine)	2
Lead poisoning	13
Magnesium deficiency	5
Manganese deficiency	13
Maple leaf toxicosis	1
Mercury toxicity	1
Molybdenum toxicity	8
Elevated nickel level	1
Nitrate at dangerous levels	1
Organophosphate toxicosis	2
Oxalate poisoning	1
Pentobarbital	10
Petroleum hydrocarbons	1
Selenium deficiency	23
Selenium toxicity	9
Sodium deficiency	9
Elevated sodium	6
Sulfate toxicity	1
Taxus (Japanese yew) poisoning	7
Elevated vomitoxin (DON) levels	1
Elevated zinc	4
Total Toxicoses Detected	**363**

Veterinary Epidemiology

C.N. Carter

A contemporary veterinary epidemiology program located at the Livestock Disease Diagnostic Center is in the early stages of development. The primary goal of this new service is to provide animal disease surveillance and early detection of animal disease outbreaks, assist veterinarians in the investigation of serious and unusual disease problems, and conduct relevant infectious disease research. The epidemiology program will be driven by state-of-the-art electronic data-gathering systems that will allow for near real-time analysis and dissemination of diagnostic case information that will be useful to practitioners in treatment, prevention, and management of animal disease problems.

Highlights:

- USDA and Homeland Security grants were written and have been funded to overhaul the IT software infrastructure of the Lexington and Hopkinsville (Murray State's Breathitt Veterinary Center) laboratories and to provide seamless links to the Office of the State Veterinarian.
- Meetings occur regularly with staff at the state veterinarian's office and the Breathitt Veterinary Center to help in planning and coordinating the flow of animal health information from the diagnostic laboratory.
- The epidemiology section is conducting investigations on Kentucky farms and in veterinary hospitals.
- A research analyst was hired into the department in 2006 to aid the epidemiologist in building and implementing animal health information systems, surveillance systems, and reportable diseases; assist with field investigations; and conduct research on relevant infectious disease topics.
- A Field Investigation Unit (truck outfitted with a Bowie Veterinary Unit) is currently in service, and periodic farm investigations are occurring on Kentucky farms to better understand the epidemiology of animal diseases of economic importance.
- Epidemiological studies are ongoing on Rhodococcal foal pneumonia, equine leptospiral abortion, and blackleg in cattle.

Regulatory Services

Our Mission

Regulatory Services is committed to service and consumer protection of Kentucky citizens, businesses, and industries. Our programs monitor and analyze feed, fertilizer, milk, seed, and soil and are administered using a cooperative, science-based approach.

The Division of Regulatory Services is charged with administering four state laws pertaining to the manufacturing, processing, labeling, and marketing of commercial feed, fertilizer, seed, and raw milk. The Division's primary objectives are to protect producers 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. Label review and 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 dairy 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. The Division is committed to providing consumer protection to the purchaser of both agricultural and non-agricultural products such as lawn seed, fertilizer, and dog, cat, and other pet food. One inspector is dedicated to the milk regulatory program: auditing records and monitoring activities of sampler-weighers, handlers, testers, and laboratory facilities.

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

Auditing Program

H.S. Spencer

Audits of sales and fee payments were made on 326 of 408 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 1,072 fertilizer reports, 3,044 feed reports, 792 seed reports, and 79 milk reports. Reports were checked for accuracy and compared to field audits of the submitting firms.

The 2006 inspection fees for industries regulated by the Division of Regulatory Services are as follows:

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

The Division of Regulatory Services 2006 income from fees, licenses, and testing services is as follows:

Industry	2006 Income
Feed	$1,084,170
Fertilizer	602,666
Milk	190,008
Seed tags, licenses, and service testing	438,760
Soil service testing	178,066
Total	**$2,493,670**

Feed Regulatory Program

W. Thom

The feed regulatory program provides consumer protection for purchasers of livestock feed and pet food products and monitors 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 products through specific labeling requirements. Labels should identify the purpose, a guaranteed composition, ingredient list, and feeding 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 feed products fed to livestock and poultry producing meat, milk, and eggs for human consumption. This includes participation in a nationwide effort to ensure food safety and to promote consumer confidence in the food supply. The feed program and the FDA work cooperatively 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").

Highlights:

- Administered actions on 3,884 official and 86 unofficial samples of commercial feed involving 25,360 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 four feed mills that mix restricted drugs in feed and to inspect these mills for compliance with FDA's national BSE rule. An additional 60 BSE inspections were contracted with FDA for mills not required to be licensed with FDA.
- Conducted 7,500 label reviews and maintained product registration for about 15,000 products from over 900 companies.

Fertilizer Regulatory Program

D.L. Terry

The Kentucky Fertilizer Law ensures that fertilizers sold in Kentucky are clearly and accurately labeled so that consumers can make informed purchases of fertilizer with confidence in its quality. The law also protects the legitimate fertilizer industry from unfair competition.

Highlights:

- Administered actions on 3,280 official and 85 unofficial samples of fertilizer involving 10,054 chemical tests. The samples represented about 63,900 tons out of the approximately 819,000 tons of fertilizer distributed in Kentucky during 2006, or about 8 percent.
- Reviewed labels and registered 3,337 products from 534 firms and issued licenses to 191 companies that manufactured custom-blended fertilizers.

Feed and Fertilizer Analytical 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 2006, the laboratory analyzed 3,355 fertilizer samples and 3,997 feed samples. In addition, 35,200 agriculture-related samples were analyzed in the spectroscopy laboratory, i.e., soil, manure, greenhouse, water, litter, and research samples. The laboratory analyzed many materials from check sample programs. More than 83 special sample analysis requests for protein analyses were performed for the College of Agriculture. The laboratory participated in several scientific meetings: Southeast AOAC, AAPFCO, AAFCO, Fertilizer Metals Forum, and ASFFPCO. Laboratory personnel participate on numerous committees in these scientific organizations including one vice chair position.

Over 100 regulated fertilizer materials were analyzed for metals of concern to determine if they were adulterated based on AAPFCO guidelines. AOAC collaborative laboratory work has now established a standard method for the non-nutritive metal analyses. The laboratory staff participates as a member of the Fertilizer Metals and Methods Forum.

Check sample materials were analyzed from regional, national, and international programs: AOCS, AAFCO, Magruder®, mycotoxins, UAN, AFPC phosphate rock, mineral, and other sample types. We continued participation in mycotoxin and microscopy check sample programs. The laboratory 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 laboratory participates monthly in an inter-laboratory aflatoxin share sample program.

Software program upgrades have been used to provide electronic data transfer to and from the laboratory. A presentation was given at the ASFFPCO meeting in Charleston, South Carolina, on the comparison of the Leco TruSpec thermal nitrogen analyzer and the Leco FP2000 instrument and the Antek low-level nitrogen analyzer. Studies were also conducted for the analysis of slow release fertilizers using the instrument. A new chromatographic system was added to the laboratory that utilizes mass spectrometry detection. This instrument will be used for confirmatory measurements of mycotoxins in feed materials. A new flow analyzer instrument was added to the laboratory to upgrade capabilities for P and K analysis and to expand into other automated chemical analysis.

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 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.

Highlights:

- 10 inspectors completed over 5,286 feed, fertilizer, and seed inspections of processing, manufacturing, and marketing firms in the state.
- Emphasis in the feed area included feed mill inspections for compliance with FDA's BSE regulations.
- Two inspectors visited and sampled small package specialty feed, fertilizer, and seed products in urban markets.
- Two inspectors made 237 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	3,884
Fertilizer	3,280
Seed	2,772
Milk	4,170

Milk Regulatory Program

C. Thompson

The mission of the milk regulatory program is to ensure that 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 Kentucky's $220 million/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.

Highlights:

- Reviewed and issued licenses to five transfer stations, 20 milk handlers, 20 laboratories, 69 testers, and 357 sampler-weighers (milk-haulers).
- Analyzed and administered action on 4,170 official samples.
- Administered a monthly milk laboratory quality control check sample program through the distribution of 2,880 check samples to the 20 licensed laboratories to ensure accurate component testing procedures.
- Conducted 17 pay-record and 22 raw milk receiving manifest audits.
- Conducted 34 milk laboratory inspections.
- Collaborated with Kentucky Cabinet for Health Services Milk Safety Branch to train sampler-weighers and processor receiving personnel.
- Trained and examined 57 new sampler-weighers and six new testers.
- Conducted 14 inspections of raw milk transfer stations.
- Conducted 477 sampler-weigher inspections.
- Collaborated with the Cooperative Extension Service and the Kentucky Dairy Development Council in conducting a series of dairy producer meetings across Kentucky. Approximately 580 participants attended this series of meetings.
- Collaborated with dairy industry partners to evaluate the feasibility of an alternative milk sampling device for transport tankers.
- Participated with the Department of Biosystems and Agricultural Engineering in a Homeland Security-funded project to develop an electronic security system for securing bulk milk during transport.

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.

Highlights:

- Performed inspections and sampled agricultural, lawn, turf, and garden seeds at more than 600 wholesale and retail locations.
- Collected and tested 2,772 official seed samples.
- Issued stop-sale orders on 358 official seed samples and 570 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 208 agricultural permits and 39 vegetable and flower permits to label seed.
- Registered 406 seed dealers and 24 non-certified custom conditioners.
- Provided training to firms on labeling requirements, mixing procedures, and batching records.

Seed Testing Laboratory

C. Finneseth

The Division maintains the only seed testing facility in Kentucky. This laboratory conducts all official testing in the state and provides service testing for producers, dealers, retailers, researchers, and homeowners. In 2006, 99 percent of service samples accepted into the laboratory were submitted by Kentucky firms or individuals. Services to customers in 2006 included electronic notification of sample activity and reporting of test results as well as real-time online access to service sample results.

Laboratory 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. Laboratory analysts participated in regional and national referee testing through the Association of Official Seed Analysts (AOSA) and the USDA Federal Seed Laboratory to ensure inter-laboratory and intra-laboratory quality of test results. All analysts are AOSA-certified in their respective areas. More than 20,000 different tests were performed by laboratory personnel in 2006.

In addition to routine laboratory activities, the seed program participated in various educational programs and developed a demonstration to illustrate the importance of information available on seed tags.

Highlights:

Sample Type	Completed Samples
Official samples	2,772
Research samples	263
Service samples	4,779
Tobacco	1,110
Other certified crops	290
Total Samples	**7,814**

Service Tests Conducted	
Germination	6,549
Purity	2,325
Vigor	135
Other	7,137
Total Service Tests	**16,146**

Soil Testing Laboratory

F.J. Sikora and D. Reid (Lexington)
P. Howe (UKREC, Princeton)

Soil testing provides farmers, homeowners, greenhouse operators, and others with scientific information about the fertility status of their soils or greenhouse media. In partnership with the Cooperative Extension Service, it also provides them with lime and fertilizer recommendations based on laboratory results.

We also offer analyses of animal wastes, nutrient solutions, and special research solutions.

The soil test Web site contains information on our services and calculators for determining fertilizer, lime, and manure application rates. The site is at soils.rs.uky.edu.

A journal article was published on a nonhazardous buffer that can replace the SMP buffer for testing soil for lime recommendation (Soil Science Society of America Journal 70:474-486). The Lexington and Princeton labs have been using the Sikora buffer since July 2005. The Princeton laboratory started using the new Sikora buffer with an automated LabFit pH instrument in July 2005.

A new LIMS (laboratory information management system) was developed and installed for the Lexington laboratory in August 2006.

The number of samples analyzed in 2006 were:

Type	Number	% Change
Agriculture	32,007	-2
Home lawn and garden	7,238	16
Commercial horticulture	820	4
Greenhouse media	16	-75
Research	8,015	-7
Atrazine residue in soil	22	57
Animal waste	276	10
Nutrient solution	26	-21
Special research solutions	1,552	-3
Total	**49,972**	**0**

Kentucky Tobacco Research and Development Center

The Kentucky Tobacco Research and Development Center (KTRDC) conducts and supports unique research programs that examine new agricultural crop opportunities based on tobacco and other plants.

The Center's research projects explore the development and use of tobacco as a production system for plant-made pharmaceuticals and the discovery of new plant natural products having potential for commercialization. The KTRDC program emphasizes applications-oriented research designed to facilitate the development of new crop-based businesses and technologies for Kentucky agriculture.

Located in its own building on the University of Kentucky campus in Lexington, the Center is funded by a dedicated tax on cigarette sales in Kentucky.

Tobacco/Biotechnology

Plant biotechnology is a revolutionary field that harnesses to practical advantage the knowledge gained over more than half a century of basic plant research. Agriculture is already realizing huge benefits from improved crops developed through biotechnology, which show remarkable resistance to insect damage, markedly reduced dependence on herbicides, etc.

A particularly exciting branch of this fast-moving field is the engineering of plants to produce new biological substances, enabling agricultural crops to be used as "production systems" to supply valuable materials such as medical drugs, industrial enzymes, specialty plastics, and novel food ingredients. These new applications for plants, including tobacco, have the potential to generate entirely new markets for farmers and growers. Such new opportunities are constantly in demand as traditional tobacco agriculture declines and the family farm seeks new agricultural opportunities.

Although the basic technology required to "engineer" tobacco and other plants to produce new substances has been available for more than 10 years, agricultural biotechnology initially concentrated on improvements to the performance and management of such crops as cotton, soybeans, corn, etc. However, the exciting prospect of new uses for tobacco and other plants is now attracting more attention, driven especially by the critical demand for protein pharmaceuticals. Recent progress in medical biotechnology has resulted in the ongoing development of literally hundreds of new protein-based medical drugs, the production of which will greatly exceed the capacity of current protein-manufacturing capacity. Plants such as tobacco have the potential to impact this manufacturing crisis, and the resulting new agricultural biotechnology sector is referred to as "plant-made pharmaceuticals," or PMP.

The primary goal of KTRDC research is to facilitate and encourage the use of tobacco in Kentucky as a production system for commercially useful proteins and for PMP applications. The Center is also developing new technologies to expand the discovery and use of non-protein substances which are made naturally by tobacco and other plants, collectively referred to as "plant natural products." Many plant natural products are familiar as flavors and fragrances, medicinals, and natural insecticides. The relatively new science of plant genomics offers the potential to enhance their production and diversity in the plant. Plants producing high yields of useful new natural products will also represent new crop and market opportunities for growers.

Research and Services

The overall objective of KTRDC research is to encourage and facilitate the development of new crop opportunities for Kentucky agriculture, based on new applications for the tobacco plant and new plant-derived "natural products." KTRDC-funded projects address this objective in several different ways:

- Optimizing the tobacco plant, and tobacco production, for molecular farming and PMP applications;
- Developing new technologies for enhanced gene expression, metabolic engineering, and discovery of novel natural products in plants;
- Discovering and developing new plant-product concepts having potential to create new markets;
- Assisting companies to explore the use of plants as manufacturing systems for new products; and
- Devising new "support" technologies for PMP and molecular farming commercialization, addressing bioprocessing, harvesting, identity preservation, and regulatory compliance, etc.

KTRDC research is conducted by a team of scientists and faculty associates at the Center's facilities and also through grants to university faculty in Kentucky. KTRDC grants enable investigators to initiate new lines of research having relevance to the KTRDC program, such as improved gene-vector systems for high-level expression of proteins in tobacco and new strategies for extraction and purification of protein products from plants. In addition, KTRDC in-house research emphasizes longer-term projects and ongoing services, as illustrated by the following examples:

Developing prototype tobacco plants to explore the potential of a crop-based production system: Dr. Indu Maiti's research group uses promoter technology proprietary to the University of Kentucky to prepare transgenic plants for collaborators in the commercial and academic environments. By helping companies experience and evaluate the tobacco production strategy in this way, KTRDC researchers increase the opportunity for development of new applications for the tobacco plant.

Economic modeling of new applications for tobacco: Dr. Orlando Chambers's research includes detailed analysis of tobacco production strategies, as well as in-depth surveys of markets and the commercial potential for diverse product types that might be derived through tobacco farming. This research is used in the design of new tobacco varieties for molecular farming and

PMP applications and to assist companies that may become future customers of the tobacco farmer.

Manipulation of plant "natural products": The enormous variety of medicinal substances, food ingredients, and structural materials obtained routinely from plants attests to their vast potential to produce useful chemical compounds.

Dr. George Wagner's research explores novel materials produced on the surface of the tobacco leaf, which have potential use as pesticides and pharmaceuticals.

Dr. Ling Yuan is exploring the genetic regulation underlying the production of natural products in plant cells and aims to apply this knowledge to develop novel plants that make useful new substances.

Dr. Guiliang Tang investigates plant natural product pathways using gene silencing technology. He is currently exploring the gene silencing mechanisms to develop simple gene silencing technology for dissecting plant metabolic pathways.

Development of a new tobacco variety and optimized tobacco production system for PMP applications: KTRDC research conducted by Dr. David Zaitlin, Dr. Orlando Chambers, and Mr. Rich Mundell is focused on the development of a new tobacco type that will be more economical to produce and better suited to the new applications of the plant as a protein-manufacturing system. The desired new "vehicle" variety will exhibit such characteristics as disease resistance (blue mold, black shank), more economical production through multiple (mechanized) harvesting, compatibility with all appropriate gene expression systems, and several features that will obviate any possibility of commingling with conventional tobacco ("identity preservation"). This research is conducted in close collaboration with the Plant and Soil Sciences Department in the College of Agriculture.

Facilities and Equipment

Director Dr. H. Maelor Davies is responsible for all research and services of the Center, including the KTRDC building which provides approximately 66,000 square feet of laboratory and office space. State-of-the-art growth rooms provide controlled, round-the-clock, monitored environments for propagation and maintenance of plants and cultured plant tissues. Greenhouse space is available nearby, and KTRDC has constructed two larger greenhouses at the university's Spindletop Research Farm in Lexington.

KTRDC has its own equipment for DNA sequencing and analysis, DNA microarray technology, automated liquid handling, most forms of chromatography, and basic mass spectrometry. All KTRDC offices and laboratories are equipped with high-speed data ports for computer networking.

Research Services

The KTRDC Plant Genetic Engineering Service develops prototype transgenic tobacco (or Arabidopsis) plants for university researchers or company collaborators. This service, which makes use of proprietary promoters and other technologies developed at KTRDC, is very helpful to investigators who have isolated genes of relevance to agricultural biotechnology but who lack the resources needed to explore their utility in plants. To inquire about this service, please contact principal investigator Dr. Indu Maiti by e-mail (imaiti@uky.edu) or telephone 859-257-3296.

KTRDC also has considerable experience in conducting field trials with transgenic plants under permit and with the accompanying permit-application process. Researchers interested in conducting work that involves field release of transgenic plants are welcome to contact Dr. Orlando Chambers for assistance (ochamb@uky.edu or 859-257-7044).

Tracy Farmer Center for the Environment

The Tracy Farmer Center for the Environment is the University of Kentucky's focal interdisciplinary center for the comprehensive integration of research, education, and public service dedicated to advancing our knowledge and understanding of environmental systems; the analysis and management of environmental problems and issues; the development of sustainable technologies and solutions to these environmental problems and issues; and the successful transfer and dissemination of these technologies to state, federal, and local governments, private organizations, businesses and corporations, and individuals.

The Tracy Farmer Center exists under the stewardship of the University of Kentucky College of Agriculture. This arrangement affords opportunities to build upon a variety of existing synergies in research, outreach, and education, while presenting the Center with a leadership role in such projects as the Kentucky Wildlife Institute and the SB271 Groundwater Research and Education Program.

The College of Agriculture is committed to continuing the multidisciplinary role the Tracy Farmer Center plays within both the university and the broader commonwealth, while providing support in areas ranging from staffing to communication and development.

Research Support

Invasive Species Working Group

The Tracy Farmer Center is working with faculty and staff across the state to build partnerships for research and outreach regarding invasive species. The project involves the development of a steering committee, listserv, series of "brown bag" seminars to facilitate communication regarding invasive species, and a fall conference.

Planning across the Bluegrass

The Tracy Farmer Center staff assisted Dr. Ernest Yanarella and Dr. Richard Levine in forming UK's Center for Sustainable Cities in the planning and implementation of a conference, "Lexington, the Bluegrass, and the Future of Planning."

Landscape Change Conference

Staff at the Tracy Farmer Center are assisting Dr. Brian Lee in the planning and implementation of a regional "Mapping and Monitoring Land Resources Change" conference.

Kentucky Wildlife Institute (KWI)

Formed by a cooperative research agreement between the Kentucky Department of Fish and Wildlife Resources and the University of Kentucky, KWI provides research supporting the stewardship of the commonwealth's natural resources, educates and mentors current and future agency biologists, and provides technical wildlife expertise in areas that are lacking at the state agency level.

SB271 Groundwater Research Program

By working with the SB271 Groundwater Program, the Tracy Farmer Center supports groundwater research and education efforts.

Outreach

Bluegrass Partnership for a Green Community

The University of Kentucky, Lexington-Fayette Urban County Government, and Fayette County Public Schools have formed the Bluegrass Partnership for a Green Community, an initiative aimed at stimulating greater regional commitment to environmental issues by government, schools, businesses, private citizens, and young people.

Potential partnership benefits include environmental management cost savings for partners, more resources for joint research, sustainability-related business development opportunities, increased expertise for academic instruction, and improved environmental education possibilities for children and the broader community. Currently there are 10 teams implementing community-wide projects: energy-efficient buildings, environmental education, transportation, water/storm water, sustainable foods, communications/outreach, recycling, purchasing, green space, and the World Equestrian Games Team.

Primary Partners

Lexington-Fayette Urban County Government
Fayette County Public Schools

Wetland Restoration Institute

With funding from Eastern Kentucky PRIDE and Agri-Drain Corporation, the Tracy Farmer Center co-sponsored the first annual Wetland Restoration Institute with staff from the Daniel Boone National Forest. Twenty-seven attendees from Kentucky, Georgia, Michigan, Minnesota, Mississippi, Ohio, Pennsylvania, Michigan, British Columbia, and India met in the forest to learn about restoring and constructing wetlands.

Primary Partners

U.S. Forest Service
San Dimas Technology and Development Center
Eastern Kentucky PRIDE
FMSM Engineers
Daniel Boone National Forest
Ducks Unlimited
USDI FWS
USDA NRCS
Sheltowee Environmental Education Coalition
British Columbia Ministry of the Environment,
British Columbia Wildlife Federation
Copperhead Environmental Consulting Inc.
Association of State Wetland Managers
East Kentucky Power Cooperative Inc.

Education

AWAKE

The All Wild About Kentucky's Environment (AWAKE) Web site provides visitors with information about Kentucky's native plants and wildlife, as well as the ecosystems that support them. The AWAKE site (www.kentuckyawake.org) features ready-for-the-classroom units of study designed by Kentucky educators that teach about Kentucky's natural resources. The Wild About Reading and Writing and Wild About Art portions of the site allow visitors to submit their own creative, nature-related writings, art pieces, and photography. The Web site has something for anyone wanting to learn more about Kentucky's biodiversity and the environments that support it.

Kentucky Universities Partnership for Environmental Education

The Kentucky University Partnership for Environmental Education (KUPEE) is a collaborative group of centers for environmental education located at all Kentucky state universities. The partnership's mission is to increase the environmental literacy of all citizens of the commonwealth through environmental education to assure the protection and sustainable development of Kentucky's natural and cultural resources.

Primary Partners

Eastern Kentucky University
Kentucky State University
Morehead State University
Murray State University
Northern Kentucky University
University of Louisville
University of Kentucky
Western Kentucky University
Kentucky Environmental Education Council

Natural Resource Academy for Urban Youth

The Tracy Farmer Center partnered with the Lincoln Foundation, Jefferson County Public Schools, and the University of Louisville to conduct a natural resource academy for 50 high-school youth from Jefferson County. During the culminating week, 26 students did field work at Robinson Forest.

Community-Based Science for Students

The Tracy Farmer Center's Community-Based Science Program for Students and Teachers partners faculty and staff from the University of Kentucky with students and teachers. It combines relevant, job-embedded teacher professional development with year-long student explorations of real-life community science problems relevant to Kentucky. The project goal is to enhance teacher content knowledge, science process skills, the understanding of the nature of science, and the integration of core content areas, especially mathematics and literacy, into the community-based science projects and the science curriculum through a one-week, high-quality, job-embedded professional development with year-long follow-up. Seven hundred students and 20 teachers are investigating five different community science problems alongside UK and other community experts.

Primary Partners

Kentucky school districts
Kentucky Department of Education
Kentucky Institute for the Environment and Sustainable Development
Kentucky Department of Fish and Wildlife Resources
Three Chimneys Farm
Taylor Made Farm
Rood & Riddle
Kentucky Nature Preserves Commission

Professional Development for Educators

In cooperation with a wide variety of partners, the Tracy Farmer Center provides professional development opportunities for formal and non-formal educators across the commonwealth. These workshops have included such topics as water, air quality, and aquatic biodiversity.

Primary Partners

Bluegrass PRIDE
Campbellsville University
Eastern Kentucky University
Kentucky Department of Agriculture
Kentucky Division of Forestry
United States Forest Service
University of Louisville
University of Kentucky Cooperative Extension Service
Kentucky Division of Water
Governor's Office of Energy Policy
Equitable Foundation
NEED Project
Louisville Gas and Electric

Kentucky Agricultural Experiment Station Projects

Hatch, McIntire-Stennis, and Animal Health Projects

Hatch, McIntire-Stennis, and Animal Health projects for calendar year 2006, as reported in the USDA Current Research Information System (CRIS) database, follow.

Agricultural Economics

Benefits and Cost of Natural Resources Policies Affecting Public and Private Lands—*Fleming, R.A.*
Effects of Policy and Product Changes on the International Demand for U.S. Agricultural Products—*Reed, M.R.*
Ex-Post Evaluations of Environmental Projects That Affect Kentucky Agriculture and Rural Communities—*Pagoulatos, A.*
Family Firms and Policy—*Pushkarskaya, H.N.*
Risk Management and Profit Potential of Alternative Production Practices, Enterprises, and Technologies—*Dillon, C.*

Animal and Food Sciences

Animal Manure and Waste Utilization, Treatment, and Nuisance Avoidance for a Sustainable Agriculture—*Cromwell, G.L.*
Antioxidative Properties of Hydrolyzed Protein in Muscle Foods—*Xiong, Y.L.*
Assessment and Implications of Carbohydrate Utilization in the Small Intestine of Beef Cattle—*Harmon, D.L.*
Assessment and Regulation of Sexual Behavior in Beef Bulls—*Schillo, K.K.*
Calcium and Phosphorus Nutrition of Pregnant and Lactating Mares—*Lawrence, L.M.*
Characterization of Enzyme(s) Associated with Sulfur Assimilation Type Reactions in Soy Protein Products—*Boatright, W.L.*
Development of Peptides to Enhance Cheese Production and Bio-Active Probes—*Hicks, C.L.*
Enhancing Food Safety through Control of Food-Borne Disease Agents—*Newman, M.C.*
Genetic (Co) Variance of Parasite Resistance, Temperament, and Production Traits of Traditional and Non-*Bos indicus* Tropically Adapted Breeds—*Thrift, F.A.*
Genetic Selection and Crossbreeding to Enhance Reproduction and Survival of Dairy Cattle—*McAllister, A.J.*
Grading Up to Hair Sheep Genetics in a Low-Input Production System—*Aaron, D.K.*
Interpreting Cattle Genomic Data: Biology, Applications, and Outreach—*Matthews, J.C.*
Metabolic Relationships in Supply of Nutrients for Lactating Cows—*McLeod, K.R.*
Methods to Increase Reproductive Efficiency in Cattle—*Silvia, W.J.*
Nitrogen Cycling, Loading, and Use Efficiency in Forage-Based Livestock Production Systems—*Vanzant, E.S.*
Nutritional Modulation of the Vascular Endothelium—*Hennig, B.*
Nutritional Systems for Swine to Increase Reproductive Efficiency—*Lindemann, M.D.*
Post-Genomic Characterization of Anaerobic Bacterial Metabolism—*Strobel, H.J.*
Proteomic Analysis of Anaerobic Bacterial Metabolism—*Strobel, H.J.*
Regulation of Estrous Behavior in Dairy Cows—*Silvia, W.J.*
Residual Soybean Sulfur Metabolism in Isolated Proteins: Sulfate to Cysteine —*Boatright, W.L.*

Biosystems and Agricultural Engineering

Characterization of Laboratory and Pilot Scale Foam Fractionation of Industrial Enzymes—*Crofcheck, C.L.*
Demand-Controlled Ventilation (DCV) for Residential Indoor Air Quality Control—*Colliver, D.G.*
Developing and Integrating Components for Commercial Greenhouse Production Systems—*Norikane, J.H.*
Improvement of Thermal and Alternative Processes for Foods—*Payne, F.A.*
Management of Grain Quality and Security for World Markets—*Montross, M.D.*
NCR-101: Controlled Environment Technology and Use—*Norikane, J.H.*
Optical Sensor Measurement of Food Composition Based on Light Scattering Distribution—*Payne, F.A.*
Precision Agriculture: Development and Assessment of Integrated Practices for Kentucky Producers—Phase V—*Shearer, S.A.*
Precision Placement of Crop Production Inputs via Distributed Control—*Shearer, S.A.*
Soil Productivity as Affected by Mechanical Influence—*Wells, L.G.*
Stream/Aquifer Interface: Understanding the Riparian Corridor—*Workman, S.R.*
Stress Factors of Farm Animals and Their Effects on Performance—*Gates, R.S.*
Stress Factors of Farm Animals and Their Effects on Performance—*Wilkerson, E.G.*
Systems for Controlling Air Pollutant Emissions and Indoor Environments of Poultry, Swine, and Dairy Facilities—*Gates, R.S.*
The Science and Engineering for a Biobased Industry and Economy—*Nokes, S.E.*
Water and Solute Transport in Subsurface Environments—*Workman, S.R.*

Community and Leadership Development

Assessing Impacts of Welfare Reform on Individual, Family and Community Well-Being in the Rural South—*Zimmerman, J.N.*
Local Food Systems and Agricultural Diversification: Opportunities and Obstacles—*Swanson, M.*
Research and Education Support for the Renewal of an Agriculture of the Middle—*Burmeister, L.*
Rural Low-Income Families: Tracking Their Well-Being and Function in an Era of Welfare Reform—*Dyk, P.H.*

Entomology

A National Agricultural Program to Clear Pest Control Agents for Minor Uses—*Bessin, R.T.*
Biology and Management of Insects Attacking Turf and Woody Landscape Plants—*Potter, D.A.*
Consequences of Variation in Host Plant Resistance for the Evolution of Offspring Size in a Seed-Feeding Beetle—*Fox, C.W.*
Dynamic Soybean Pest Management for Evolving Agricultural Technologies and Cropping Systems—*Yeargan, K.V.*
Ecology and Management of European Corn Borer and Other Stalk-Boring Lepidopteran Pests of Corn—*Obrycki, J.*
Functional Implications of Polydnavirus Genome Organization—*Webb, B.A.*
Herbivory in Deciduous Forests: Implications for Forest Regeneration and Restoration—*Rieske-Kinney, L.K.*
Impacts of Interactions among Generalist Arthropod Predators in Two Complex Food Webs: Vegetable-Crop Gardens and Forest-Floor Leaf Litter—*Wise, D.H.*
Inbreeding and the Fitness Consequences of Colonizing Novel Environments in Herbivorous Insects—*Fox, C.W.*
Interactions among Bark Beetles, Pathogens, and Conifers in North American Forests—*Rieske-Kinney, L.K.*
Molecular Analysis of Pest Development and Resistance to Insecticides—*Palli, S.R.*
Potential for Evolution of Resistance to Synthetic Pheromone—*Haynes, K.F.*
Research and Development Leading to an Integrated Mosquito Management Program for Kentucky—*Brown, G.C.*
Sources, Dispersal, and Management of Stable Flies on Grazing Beef and Dairy Cattle—*Dobson, S.L.*
Systematics and Biodiversity of Biological Control Agents with Special Reference to the Braconidae—*Sharkey, M.J.*
Tracking the Movements of Transgenic Toxins through Complex Food Webs—*Harwood, J.D.*

Forestry

Assessing the Invasion Pattern of Exotic Plants in Forest Ecosystems in Kentucky—*Fei, S.*
Evaluating Streamside Management Zone Effectiveness in Forested Headwater Catchments of Central Appalachia—*Barton, C.*
Prescribed Fire in the Southern Appalachians: Stand Structure, Oak Seedlings, and Fuel—*Arthur, M.A.*
Restoration of the American Peregrine Falcon (*Falco peregrinus anatum*) to Cliff Habitats in Kentucky—*Lacki, M.J.*
RREA Program—*Stringer, J.W.*
The Ecological Role of Large Mammals in the Forests of Kentucky and the Eastern United States: Implications for Conservation—*Maehr, D.S.*

Horticulture

Environmental and Genetic Determinants of Seed Quality and Performance—*Downie, A.B.*
Marketing, Managing, and Producing Environmental Plants in a Technical and Economically Efficient Manner—*McNiel, R.E.*
Mechanism and Significance of Post-Translational Modifications in the Large (LS) and Small (SS) Subunits of Rubisco—*Houtz, R.L.*
Multi-State Evaluation of Wine Grape Cultivars and Clones—*Kurtural, K.*

Multi-State Evaluation of Wine Grape Cultivars and Clones—*Archbold, D.D.*
Optimizing the Water and Air Relationship and Nutrient Concentration in a Controlled Water Table Irrigated Container Growing Medium—*Buxton, J.W.*
Peptide Deformylase: A Novel Herbicide Target Amenable to Genetically Engineered Tolerance—*Williams, M.*
Regulation of Sorbitol Dehydrogenase Activity during Apple Fruit Development: Genotypic Differences and the Impact of Cultural Practices—*Archbold, D.D.*
Rootstock and Interstem Effects on Pome- and Stone-Fruit Trees—*Masabni, J.G.*
Spider Mite Resistance Mechanisms in *Lycopersicon hirsutum* Accession LA2329—*Snyder, J.*
The Role of Ethylene and Polyamine Interaction in the Time to Radicle Protrusion during Seed Germination—*Geneve, R.L.*

Nutrition and Food Science

Antioxidant Nutrients, Reactive Oxygen Species, and Oxidative Stress—*Chow, C.K.*
Dietary Antioxidants, NF-kB, and Carcinogenesis—*Glauert, H.P.*
Mechanisms of Anti-Inflammatory Action of Eicosapentaenoic Acid (EPA)—*Chen, L.*

Plant and Soil Sciences

Breeding and Genetics of Forage Crops to Improve Productivity, Quality, and Industrial Uses—*Phillips, T.D.*
Characterizing Active Soil Organic Matter Pools Controlling Soil N Availability in Maize-Based Cropping Systems—*Grove, J.H.*
Characterizing Mass and Energy Transport at Different Scales—*Wendroth, O.O.*
Fate and Ecological Effects of Livestock Antibiotics in Soils—*D'Angelo, E.*
Hydropedology: Genesis, Properties, and Distribution of Hydromorphic Soils—*Karathanasis, A.D.*
Mineral Controls on P Retention and Release in Soils and Soil Amendments—*Karathanasis, A.D.*
Plant Genetic Resources Conservation and Utilization—*Phillips, T.D.*
Regulation of Isoprenoid Metabolism in Plant-Pathogen Interactions—*Chappell, J.*
Weed Management Strategies for Sustainable Cropping Systems—*Grabau, L.J.*

Plant Pathology

Biochemistry and Genetics of Plant-Fungal Interactions—*Vaillancourt, L.*
Characterization of R-Gene-Mediated Signaling and Cross Talk between Defense Signaling Pathways—*Kachroo, P.*
Defining RNA and Protein Factors Affecting Tombusvirus Replication—*Nagy, P.D.*
Ecological and Genetic Diversity of Soilborne Pathogens and Indigenous Microflora—*Seebold, K.W.*
Epidemiology, Genetic Diversity, and Strategies to Control Bean Pod Mottle Virus—*Ghabrial, S.A.*
Genetics and Biochemistry of Alkaloid Production by Endophytes—*Schardl, C.L.*
Genomic Studies of the Model Phytopathogenic Fungus *Magnaporthe grisea*—*Farman, M.*
Genomics of Fungal Endophytes and Their Host Grasses—*Schardl, C.L.*
Genomics, Molecular Biology, and Cell Biology of Sonchus Yellow Net Virus, a Plant Rhabdovirus—*Goodin, M.M.*
Molecular Genetics of the Interaction between Corn and Corn Stalk Rot Fungi (*Colletotrichum graminicola* and *Fusarium graminearum*)—*Vaillancourt, L.J.*
Mechanisms of the Transition between Biotrophy and Necrotrophy in a Hemibiotroph—*Vaillancourt, L.*

Veterinary Science

14th North American Colloquium on Animal Cytogenetics and Gene Mapping—*Lear, T.L.*
Cartilage-Specific Fibronectin Isoform—*MacLeod, J.N.*
Control of Equine Infectious Anemia (EIA)—*Issel, C.J.*
Development of Strategies to Increase Peripheral Insulin Responsiveness in Dietary-Induced Insulin-Resistant Horses—*Fitzgerald, B.P.*
Evaluation of Bacterial Endophytes of Grass and Legume Forages as Emerging Causes of Reproductive Loss—*Swerczek, T.W.*
High Sensitivity Analytical/Toxicological Approaches to Problems in Equine Medicine—*Tobin, T.*
Identification and Characterization of Immnunodominant Antigens from the Coccidian Parasite *Sarcocystis neurona*—*Howe, D.K.*
Innate Immune Responses to Influenza Virus Infection—*Chambers, T.*
Investigation of the SnSAG Gene Family of Surface Antigens in the Coccidian Parasite *Sarcocystis neurona*—*Howe, D.K.*
Molecular Basis of Attenuation of the Modified Live Virus Vaccine Strain of Equine Arteritis—*Balasuriya, U.*
Molecular Mechanisms, Ecology, and Control of Natural Infections of Equids and Ruminants by Drug-Resistant Internal Parasites—*Lyons, E.T.*
National Animal Genome Research Program (from NSRP-8)—*Bailey, E.*
National Animal Genome Research Program Species Coordinator for the Horse—*Bailey, E.*
Novel, Protectively Immunogenic, Surface-Exposed, and Secreted Proteins of *Streptococcus equi*—*Timoney, J.F.*
Pregnancy Maintenance in Mares—*McDowell, K.J.*
Reactivation and Transmission of Latent Equine Herpesvirus-1 in Pregnant Mares: Role as Risk Factors for Equine Herpesvirus Abortion—*Allen, G.P.*
The Effect of Aging on the Immune Response of Horses—*Horohov, D.W.*
West Nile Virus Immunity in Horse Foals—*Chambers, T.*

Collegewide Extramural Funding

This information, generated from the Office of Sponsored Projects Administration database, includes any award with a start date within the reporting period (January 1, 2006—December 31, 2006) and any budgetary addition or reduction to existing projects processed within the reporting period. The grant is listed under the department of the Principal Investigator.

Agricultural Economics

Total—$1,975,123

Advanced Master Cattleman, Kentucky Beef Network, $209,120—*Burdine, K., Anderson, L., Bullock, K., Meyer, A.*

Cooperatives Intern Program, Kentucky Center for Cooperative Development, $6,300—*Woods, T.*

Improving Agricultural Education in the Republic of Georgia, Foreign Agricultural Service, $278,310—*Reed, M.*

Kentucky Agricultural Leadership Program (KALP), Kentucky Governor's Office of Agricultural Policy, $146,360—*Jones, L., Snell, W.*

Plantation Assessment for the Lokutu-Lonua Area of Democratic Republic of Congo, Southeast Consortium for International Development, $11,560—*Reed, M.*

Scholarships for Thai Ministry of Agriculture Officials, Thai Ministry of Agriculture and Cooperatives, $9,041—*Reed, M.*

Sustainable Agriculture Research and Education (SARE) Professional Development Program Plan of Work, University of Georgia, $91,361—*Meyer, A.*

Technical Assistance to the Extension System in Serbia, Foreign Agricultural Service, $123,371—*Reed, M.*

University of Kentucky Partnership Project in Indonesia, Agency for International Development, $1,000,000—*Reed, M.*

Value-Added Targeted Marketing of Feeder Cattle, Kentucky Beef Network, $99,700—*Meyer, A., Johns, J.*

Agriculture Programs

Total—$535,882

Development of an Animal Emergency/Biosecurity Management Course, Purdue University, $60,000—*Yeargan, R., Burris, W., Coffey, R., Crist, W., Dwyer, R., Husband, A., Maurer, R., McMurry, S., Newman, M., Scharko, P., Thompson, C., Wilkerson, E.*

Kentucky AgrAbility AART Special Project, University of Wisconsin, $36,180—*Hancock, J.*

Premises ID Educational Program, Kentucky Department of Agriculture, $259,880—*Henning, J.*

Salt River Basin Coordinator, Kentucky Department of Environmental Protection, $106,103—*Henning, J.*

SARE Professional Development Training Program, University of Georgia, $10,000—*Henning, J., Hutchens, T., Yeargan, R.*

Southern Region Sustainable Agriculture Research and Education (SARE) Professional Development Program Assistant for Model State Plan, University of Georgia, $20,000—*Henning, J.*

University of Kentucky Cooperative Extension Service Liaison, Kentucky Natural Resources Environmental Protection Cabinet, $43,719—*Henning, J.*

Animal and Food Sciences

Total—$3,834,043

Alternative Uses of Methyl Bromide in Country Hams, Mississippi State University, $19,000—*Rentfrow, G.*

Analyzing Production Systems to Improve the Marketability of Kentucky Goats, Kentucky Department of Agriculture, $21,048—*Hutchens, T., Harmon, R.*

Applied Beef Production Practices, Kentucky Beef Network, $100,000—*Bullock, K., Anderson, L., Wilkerson, E.*

Editor of the Journal of Nutritional Sciences, Elsevier Science Inc., ($568,100)—*Hennig, B.*

Effect of Concentrate Form and Composition on Exercising Horses, Cooperative Research Farms, $43,098—*Lawrence, L.*

Effects of Feed Additives and Processing on *in vitro* Digestibility, Cooperative Research Farms, $13,824—*Lawrence, L.*

Endocrine Regulation of Estrus Expression in Dairy Cows, Department of Agriculture, $97,492—*Silvia, W.*

Exploring Small Plant Variation in the Application of Standardized Pathogen Control Used in Beef Slaughter and Processing Food Safety Consortium for Small and Very Small Meat Processors, University of Nebraska, $36,734—*Newman, M., Rentfrow, G.*

Integrated Resource Management, Kentucky Beef Network, $200,500—*Anderson, L., Bullock, K., Burris, W.*

Master Cattlemen Program, Kentucky Cattleman's Association, $258,100—*Burris, W., Anderson, L., Henning, J.*

Master Grazer Educational Programming, Kentucky Beef Network, $166,600—*Amaral-Phillips, D., Burris, W., Johns, J., Lacefield, G., Scharko, P., Smith Jr., S.*

National Beef Cattle Evaluation Consortium, Cornell University, $60,000—*Bullock, K.*

Nutrient Utilization in the Dog, Hills Pet Nutrition Inc., $150,880—*Harmon, D., McLeod, K.*

Nutrition and Superfund Chemical Toxicity, National Institute of Environmental Health Sciences, $2,313,867—*Hennig, B., Bastin, S., Gaetke, L.*

Polycyclic Aromatic Hydrocarbon-Medicated STAT Signaling and Implications in Vascular Inflammation, American Heart Association, $21,000—*Hennig, B., Oesterling, E.*

The Alltech-UK Animal Nutrigenomics Alliance, Alltech Biotechnology Inc., $900,000—*Matthews, J.*

Arboretum

Total—$10,000

Inventory of Trees and Database Creation, Kentucky Department for Natural Resources, $10,000—*Farris, M.*

Associate Dean/Director

Total—$905,595

Acquisition of Goods and Services, Agricultural Research Service, $30,500—*Cox, N.*

Forage-Animal Production Research, Department of Agriculture, $878,095—*Cox, N., Boling, J., Collins, M., Harmon, D., Harrison, L., Lawrence, L., Matthews, J., McDowell, K., McLeod, K., Potter, D., Rieske-Kinney, L., Tobin, T., Vanzant, E., Webb, B., Witt, W.*

Support of Agricultural Research of Mutual Interest, Agricultural Research Service, ($3,000)—*Cox, N.*

Biosystems and Agricultural Engineering

Total—$3,820,098

A Cooperative Extension Program for Kentucky's Building Systems Energy Needs, Kentucky Office of Energy Policy, $95,176—*Fehr, R.*

A Virtual Education Center for Biorenewable Resources: Building Capacity and Humanizing Distance Education, Iowa State University, $122,500—*Nokes, S., Crofcheck, C., Wells, L.*

Biosystems and Agriculture Engineering Training-Educational Consortium for Sustainable Plant and Animal Production Systems, Department of Education, $60,086—*Gates, R., Montross, M.*

Cooperative Extension Radon and Indoor Air Quality Education, Kentucky Department for Public Health, $105,000—*Piercy, L., Fehr, R.*

Design, Fabrication, Testing, Evaluation, and Facilitation of Mechanical Systems to Enhance Production of Burley Tobacco, Philip Morris Inc., $150,000—*Wells, L.*

Development of an Ethanol Pilot Scale Facility to Evaluate the Effect of Collection, Storage, and Pretreatment of Corn Stover, Kentucky Office of Energy Policy, $46,362—*Montross, M., Crofcheck, C., Nokes, S., Shearer, S.*

Development of an Ethanol Pilot Scale Facility to Evaluate the Effect of Collection, Storage, and Pretreatment of Corn Stover, University of Louisville, $173,627—*Montross, M., Crofcheck, C., Shearer, S.*

Development of Robust, Automatic Calibration Algorithms for Online Detection of Diseased and Defective Poultry Carcasses, Agricultural Research Service, $109,989—*Gates, R.*

Differentiating Microbial Pathway and Membrane Adaptations for Enhanced Performance in Extreme Environments, Kentucky Office of Energy Policy, $51,389—*Nokes, S., Strobel, H.*

Differentiating Microbial Pathway and Membrane Adaptations for Enhanced Performance in Extreme Environments, University of Louisville, $160,763—*Nokes, S., Strobel, H.*

Energy Efficiency/Renewable Energy Program Support, Kentucky Office of Energy Policy, $46,026—*Colliver, D.*

Enhanced Building Energy Efficiency Technology Deployment, Kentucky Office of Energy Policy, $207,389—*Fehr, R., Colliver, D.*

Investigation of Alternatives for Restoring Headwater Streams via Sediment Pond Removal, Kentucky Public Protection and Regulation Cabinet, $44,278—*Warner, R., Agouridis, C., Barton, C., Graves, D.*

Kinetic Modeling of Biofilm Mass Exchange in Waste Water Processor and Develop Requirements for Efficient, High-Quality Lighting Systems for CEV, LSAM, and Surface Systems, Dynamac Corp., $30,000—*Norikane, J.*

Monitoring Ammonia Emissions, Iowa State University, $60,000—*Gates, R., Overhults, D.*

Mud, Horses, and Clean Water—A BMP Demonstration Project for Suburban Horse Owners, Kentucky Natural Resources Environmental Protection Cabinet, $103,436—*Workman, S., Coleman, R.*

Novel Catalytic Approaches for Bio-Oil Upgrading, Kentucky Office of Energy Policy, $27,302—*Crofcheck, C.*

Novel Catalytic Approaches for Bio-Oil Upgrading, University of Louisville, $101,083—*Crofcheck, C.*

Precision Agriculture: Precision Resource Management—Phase III, Cooperative State Research Education and Extension, $623,849—*Shearer, S., Agouridis, C., Arthur, M., Babool, A., Barton, C., Brown, R., Cox, J., Dillon, C., Fei, S., Fleming, R., Gandonou, J., Grabau, L., Grove, J., Karathanasis, A., Koostra, B., Lee, B., Lee, C., Maehr, D., Mueller, T., Obrycki, J., Pagoulatos, A., Rieske-Kinney, L., Schwab, G., Sikora, F., Stombaugh, T., Stringer, J., Workman, S.*

Production of Biomass Briquettes as an Alternative Fuel Source, Kentucky Office of Energy Policy, $35,698—*Montross, M., Shearer, S.*

Production of Biomass Briquettes as an Alternative Fuel Source, University of Louisville, $125,759—*Montross, M., Shearer, S.*

Weather Responsive Ventilation for Residential Energy Efficiency and Indoor Air Quality, Kentucky Office of Energy Policy, $31,873—*Colliver, D.*

Weather Responsive Ventilation for Residential Energy Efficiency and Indoor Air Quality, University of Louisville, $109,988—*Colliver, D.*

Seed Grant: Development of Heterogeneous Catalysts for Improved Biodiesel Production, Kentucky Office of Energy Policy, $128,749—*Crofcheck, C.*

Stream Restoration in Guy Cove II, Kentucky Department of Fish and Wildlife, $1,069,776—*Agouridis, C., Barton, C., Warner, R.*

Community and Leadership Development

Total—$31,550

Engaging Youth, Serving Community (EYSC4) Initiative, National 4-H Council, $25,000—*Jones, K.*

Enhancing Kentucky Agricultural Education Programs through UK Faculty Professional Development, Kentucky Department for Technical Education, $6,550—*Horstmeier, R., Kitchel, T.*

Entomology

Total—$2,444,304

20 Hydroxyecdysone Suppression of Juvenile Hormone Response, National Science Foundation, $120,466—*Palli, S.*

Alternative Insecticides for Management of Stink Bugs and IR-4 State Liaison, University of Florida, $7,500—*Bessin, R.*

Control of Eastern Tent Caterpillars with an Insect Virus, Kentucky Thoroughbred Owners and Breeders, $189,236—*Webb, B.*

Cooperative Agricultural Pest Survey, Animal and Plant Health Inspection Service, $231,870—*Obrycki, J., Dillon, P.*

Development of Biological Controls for the Asian Chestnut Gall Wasp, Northern Nut Growers Association, $5,130—*Rieske-Kinney, L.*

Development of Tightly Regulated Ecdysone Receptor-Based Gene Switches, Consortium for Plant Biotechnology Research Inc., $81,771—*Palli, S., Collins, G.*

Development of Tightly Regulated Ecdysone Receptor-Based Gene Switches, Dow AgroSciences, $25,000—*Palli, S., Collins, G.*

Enhancement of the Baculovirus Expression Vector System, ParaTechs Corp., $135,300—*Webb, B.*

Enhancement of the Baculovirus Expression Vector System, ParaTechs Corp., $34,593—*Webb, B., Fath-Goodin, A.*

Eradication of a Primary Filariasis Vector Population at an Endemic Field Site, National Institute of Allergy and Infectious Diseases, $330,420—*Dobson, S.*

Genetic Modification of Mosquito Populations to Make Them Incapable of Transmitting Dengue Virus, University of Queensland, $18,504—*Dobson, S.*

Migration Patterns for Aphid Pests of Small Grains as Indexed by Capture in an Aphid Suction Trap, Kentucky Small Grain Promotion Council, $2,429—*Johnson, D.*

Molecular Analysis of Juvenile Hormone Action, National Institute of General Medical Sciences, $199,206—*Palli, S.*

Monitor Gypsy Moth Populations for Slow the Spread Program, Slow the Spread Foundation, $50,000—*Obrycki, J., Collins, J., Harper, C.*

MorphBank: Web Image Database Technology for Comparative Morphology and Biodiversity Research, Florida State University, $15,005—*Sharkey, M.*

Novel Active Insecticidal Compounds from Kentucky Native Plants, Naprogenix, $51,000—*Palli, S.*

Predicting Forest Succession in the Wake of Invasive Species Establishment, Forest Service, $73,115—*Rieske-Kinney, L., Obrycki, J.*

Recovery of Wood Vegetation Following Overstory Mortality from the Southern Pine Beetle—Phase I, Forest Service, $14,850—*Rieske-Kinney, L.*

TIGER: Thailand Inventory Group for Entomological Research, National Science Foundation, $300,000—*Sharkey, M.*

Tracking the Movements of Transgenic Endotoxins through Complex Food Webs, Cooperative State Research Education and Extension, $359,703—*Harwood, J., Obrycki, J.*

Vector Population Modification Using Wolbachia Symbionts, National Institute of Allergy and Infectious Diseases, $199,206—*Dobson, S.*

eXtension

Total—$875,916

ECOP/CSREES eXtension Supplement, University of Nebraska, $385,703—*Wood, C., Craycraft, C.*

eXtension—The Transformation of Cooperative Extension, University of Nebraska, $415,213—*Wood, C., Craycraft, C.*

HorseQuest—National Equine Resource Team, University of Nebraska, $75,000—*Griffin, A., Coleman, R.*

Family and Consumer Sciences

Total—$3,070,792

Cooperative Agreement with USDA/CSREES-CYFAR Technical Assistant Liaison, Cooperative State Research Education and Extension, ($1,250)—*Kurzynske, J.*

Health Education through Extension Leadership, Cooperative State Research Education and Extension, $801,187—*Vail, A., Scutchfield, F.*

Healthy Homes in Kentucky, Department of Agriculture, $4,000—*Henken, K., Adler, L.*

Kentucky Food Stamp Nutrition Program, Kentucky Families and Children Cabinet, $2,207,835—*Sigler, P., Vail, A.*

Master Health Education Volunteers, Foundation for a Healthy Kentucky, $1,900—*Riley, P.*

Preparing Young Employees to Build Wealth over Their Working Careers, University of Tennessee, $57,120—*Badenhop, S.*

Family Studies

Total—$93,250

Improve Technical Education Programs through Family and Consumer Sciences Education Pre-Service Program, Kentucky Department for Technical Education, $6,750—*Ellington, V.*

The UK/BHMP Cooperative Relationship to Establish a Pro-Marriage/Pro-Family Initiative among Central Kentucky's Communities and Institutions, Kentucky Health Services Cabinet, $86,500—*Vail, A.*

Forestry

Total—$981,499

Assessing Invasive Exotic Plants in Urban Forests, Forest Service, $121,005—*Fei, S., Lee, B., Stringer, J.*

Black Bear Resource Selection in Eastern Kentucky, Kentucky Department of Fish and Wildlife, $64,550—*Maehr, D.*

Colonization by Invasive Plant Species into Urban and Successional Forest Remnants in the Bluegrass Region of Central Kentucky, Kentucky Natural Resources Environmental Protection Cabinet, $7,996—*Arthur, M., McEwan, R., Paratley, R.*

Colonization of the Black Bear in Kentucky: Conflict and Tolerance between People and Wildlife, Kentucky Department of Fish and Wildlife, $18,700—*Maehr, D.*

Development of a State Management Plan for Aquatic Nuisance Species in Kentucky, Kentucky Department of Fish and Wildlife, $70,100—*Maehr, D., Barnes, T.*

Effects of Silvicultural Treatments on Insect Prey and Activity Levels of Forest-Dwelling Bats in the Central Appalachians, National Council for Air and Stream Improvement Inc., $40,000—*Lacki, M., Dodd, L., Rieske-Kinney, L.*

Enhancement of Disturbed Upper Coastal Plain Stream Systems: Establishing Restoration Criteria and Strategies for a Stream Mitigation Bank, Forest Service, $89,414—*Barton, C.*

Estimating a Colonizing Black Bear Population in Eastern Kentucky, Kentucky Department of Fish and Wildlife, $104,800—*Maehr, D.*

Forest Land Enhancement Program, Kentucky Department of Environmental Protection, $12,500—*Stringer, J.*

Forest Stewardship Public Awareness, Publicity and Training, Kentucky Department of Environmental Protection, $20,000—*Stringer, J.*

Influences of Geology and Tree Species Composition on the Response of Forest Nutrient Dynamics to an Exotic Pest, National Science Foundation, $38,249—*Arthur, M.*

Injury and Mortality Risks from Wildland Fire Smoke and Heat Exposures for Endangered Indiana Bats (*Myotis sodalis*) in Maternity Roosts, Forest Service, $120,500—*Lacki, M.*

Invasive Plant Reduction in Bluegrass Woodlands, National Fish and Wildlife Foundation, $30,000—*Thomas III, W., Cox, J.*

Investigating the Effects of Meningeal Worm on Elk Calf Survival and Estimating the Elk Population in Eastern Kentucky, Kentucky Department of Fish and Wildlife, $110,000—*Maehr, D.*

Japanese Spirea Control with Herbicides in the Big South Fork National River and Recreational Area, Department of the Interior, $16,185—*Barnes, T.*

National Fire Plan Economic Action Program, Kentucky Department of Environmental Protection, $25,000—*Stringer, J.*

Roost-Site Selection and Roost Microclimates of Tree-Roosting Bats in Coniferous Forests of the Pacific Northwest, Northwest Bat Cooperative, $34,500—*Lacki, M., Baker, M.*

Single-Tree Effects of Savanna Trees and Influence of Invasive Species on Soil Nutrient and C Cycling and Soil Biota, Kentucky Nature Preserves Commission, $3,000—*Arthur, M.*

Status, Distribution, and Reproductive Characteristics of River Otters in Kentucky, Kentucky Department of Fish and Wildlife, $55,000—*Lacki, M.*

4-H Central Operations

Total—$322,261

2006 Military 4-H Grant, Kansas State University, $47,226—*Stivers, W.*

2007 Military Grant and 2007 Operation: Military Kids Grant, Kansas State University, $50,000—*Stivers, W.*

Kentucky 4-H Works (Teens Teaching Middle School Youth Workforce Preparation Skills), National 4-H Council, $5,035—*Rudolph, D., Stivers, W.*

Positive Youth Development State and Local Collaboration Demonstration Project (the KYDP), Administration for Children and Families, $120,000—*Delahanty, T., Kurth, J.*

Positive Youth Development State and Local Collaboration Demonstration Project, Administration for Children and Families, $100,000—*Delahanty, T., Kurth, J.*

Horticulture

Total—$1,980,447

A Spatial Decision Support System for Expanding Viticulture in Western Kentucky and Southern Illinois, Kentucky Department of Agriculture, $25,410—*Kurtural, S., Masabni, J.*

Assembling the Consumer Horticulture Community of Practice to Develop a Frequently Asked Questions Database and Ask the Expert Interface for the Consumer Horticulture Community of Interest, University of Nebraska, $75,000—*Durham, R.*

Evaluating Cropload of Traminette and Vidal Blanc to Ameliorate Yield and Fruit, Kentucky Department of Agriculture, $29,609—*Kurtural, S., Cottrell, T., Masabni, J.*

Evaluation of Wine and Table Grape Cultivar Performance on Reclaimed Surface-Mined Land in Eastern Kentucky, Kentucky Department of Agriculture, $6,000—*Jones, R., Kurtural, S.*

Evaluation of Wine and Table Grape Cultivars and Training Systems in Kentucky, Kentucky Department of Agriculture, $55,098—*Kurtural, S.*

Ginseng Monitoring and Research Project, Kentucky Department of Agriculture, $24,000—*Jones, R.*

IR-4 Project with Horticulture Crops in Kentucky, University of Florida, $12,000—*Masabni, J.*

Kentucky Horticulture Council Grant No. 3, Kentucky Horticulture Council, $980,100—*Ingram, D.*

Mechanism and Significance of Post-Translational Modifications in the Large Subunit of Ribulose Biphosphate Carboxylase/Oxygenase, Energy Research, $64,663—*Houtz, R.*

New Crop Opportunities, Kentucky, Phase VII, Department of Agriculture, $702,407—*Ingram, D., Archbold, D., Bastin, S., Bruening, W., Buxton, J., Coyne, M., Dillon, C., Geneve, R., Grove, J., Harwood, J., Hildebrand, D., Jones, R., Lee, C., Norikane, J., Obrycki, J., Pearce, W., Pfeiffer, T., Phillips, T., Rowell, A., Schwab, G., Strang, J., Van Sanford, D., Williams, M., Woods, T.*

Vinifera Training, Cultivar Evaluation and Trellising Trial, Kentucky Department of Agriculture, $6,160—*Strang, J., Kurtural, S.*

Kentucky Tobacco Research and Development Center

Total—$1,099,491

Application of NPG Technology to Alternate Plant Species, Naprogenix, $65,000—*Littleton, J.*

Application of Plant Genomics to Alcoholic Brain Damage., Naprogenix, $40,000—*Littleton, J.*

Development of Screens for Drugs in Alcohol Dependence, National Institute on Alcohol Abuse and Alcoholism, $642,748—*Littleton, J.*

Field Evaluation of a Transgene Containment Strategy for Plant-Made Pharmaceuticals Applications in Tobacco, Cooperative State Research Education and Extension, $351,743—*Davies, H., Chambers, O.*

Landscape Architecture

Total—$81,870

Developing Watershed Implementation Plans: Creating a Formula for Success in the Salt and Licking River Basins, Kentucky Waterways Alliance, $81,870—*Kew, B.*

Livestock Disease Diagnostic Center

Total—$1,141,253

Animal Health and Grazing, Cooperative State Research Education and Extension, $360,446—*Carter, C., Harrison, L.*

Animal Health Biosurveillance, Kentucky Department of Agriculture, $160,791—*Carter, C., Harrison, L.*

Bovine Spongiform Encephalopathy (BSE) Surveillance Testing, Kentucky Department of Agriculture, $11,516—*Harrison, L.*

Diagnostic Laboratory Services for Farmers and Agribusinesses, Kentucky Department of Agriculture, $478,500—*Harrison, L.*

H5/H7 Avian Influenza Surveillance, Kentucky Department of Agriculture, $10,000—*Harrison, L.*

West Nile Surveillance of Horses and Birds, Kentucky Department for Public Health, $120,000—*Harrison, L.*

Merchandising, Apparel, and Textiles

Total—$36,051

Quality Control Laboratory for NAILM, National Association of Institutional Linen Management, $36,051—*Easter, E.*

Nutrition and Food Science

Total—$399,702

Bluegrass/Aspendale HOPE VI Revitalization, Lexington Fayette Urban County Government, $32,502—*Forsythe, H., Ham, S.*
CYFERnet-Program, Cooperative State Research Education and Extension, $362,200—*Kurzynske, J., Stivers, W.*
Food, Activity, and Wellness Policy Survey of Kentucky Schools, Foundation for a Healthy Kentucky, $5,000—*Tietyen, J.*

Plant and Soil Sciences

Total—$4,396,707

Accelerating the Development of FHB-Resistant Soft Red Winter Wheat Varieties, Department of Agriculture, $61,196—*Van Sanford, D.*
Analysis of Cd in Field Samples, Philip Morris Inc., $15,000—*Wagner, G.*
Application Timing for Italian Ryegrass Control in Conventional and No-Tillage Wheat, Kentucky Small Grain Promotion Council, $2,000—*Martin, J., Call, D., Tutt, C.*
Arabidopsis Polyadenylation Factor Subunits—Mutants and Protein Interaction Networks, National Science Foundation, $434,000—*Hunt, A.*
Burley Tobacco Breeding and Genetics, Philip Morris Inc., $2,000,000—*Miller, R.*
Carbon Storage Consequences of Land Use Change in the Tallgrass Prairie Region of North America, Cooperative State Research Education and Extension, $32,244—*McCulley, R.*
Developing Higher Value Soybeans with Enhanced Disease Resistance, Kentucky Soybean Promotion Board, $25,000—*Hildebrand, D.*
Developing microRNA Vectors for Gene Suppression in Agricultural Plants, Cooperative State Research Education and Extension, $167,278—*Tang, G.*
Directed Evolution of Hemicellulosic Hydrolases for Conversion of Biomass for Production of Biofuels and Bioproducts, Cooperative State Research Education and Extension, $100,000—*Yuan, L.*
Economic and Agronomic Optimum Seeding Rates for Soybean, Kentucky Soybean Promotion Board, $8,000—*Herbek, J., Murdock Jr., L.*
Enhancing Water Quality Education in Kentucky, Texas A&M University, $61,960—*Thom, W.*
Epoxy Fatty Acid Accumulation in Seed Oil, Ashland Specialty Chemical Co., $15,000—*Hildebrand, D.*
Epoxy Fatty Acid Accumulation in Seed Oil, Consortium for Plant Biotechnology Research Inc., $109,555—*Hildebrand, D.*
Evaluation of Wheat Varieties for Differences in Straw Yield and Forage Potential, Kentucky Small Grain Promotion Council, $3,600—*Bruening, W., Olson, G.*
eXtension: Corn and Soybean Production, University of Nebraska, $10,000—*Lee, C.*
Finding the Next Big Thing, Kentucky Small Grain Promotion Council, $4,800—*Lee, C.*
High-Level Production of Multiple Cellulolytic and Hemicellulolytic Enzymes in Plant for the Improvement of Biomass Conversion, Kentucky Office of Energy Policy, $59,432—*Yuan, L.*
Improving Nitrogen Application Technology under Kentucky Conditions, Kentucky Small Grain Growers Association, $6,000—*Murdock Jr., L., Schwab, G.*
Influence of Timing of Topdressing Nitrogen Fertilizer Relative to Application of Osprey Herbicide, Kentucky Small Grain Promotion Council, $2,000—*Martin, J., Call, D., Tutt, C.*
In-Season Observation of Wheat Growth Status for Yield Prediction: Do Different Optical Sensors Give Us the Same Answer, Kentucky Small Grain Promotion Council, $4,000—*Wendroth, O., Egli, D., Mueller, T., Murdock Jr., L., Schwab, G., Van Doren, S.*
Isolation and Characterization of Candidate Genes Involved in Nornicotine Biosynthesis, North Carolina State University, $121,487—*Siminszky, B.*
Management of Troublesome Weeds in Highway Rights of Way, Kentucky Transportation Cabinet, $133,457—*Witt, W.*
Managing No-Till Wheat to Optimize Harvest Index and Grain Yield, Kentucky Small Grain Growers Association, $6,800—*Grabau, L.*
Managing Organic Wheat to Minimize Disease and Maximize Yield, Kentucky Small Grain Growers Association, $5,000—*Grabau, L.*
Metabolic Engineering of Isoprenoid Metabolism in Plants, Firmenich, $366,538—*Chappell, J., Pearce, R.*
Novel Approach to Microbial Hydrogen Production, Farasis Energy Inc., $26,000—*Yuan, L.*
Novel Approaches for Development of Soybeans with Improved Oil, Higher Oil Contents and Enhanced Fungal Resistance, United Soybean Board, $50,862—*Hildebrand, D.*
Optimizing Soybean Seeding Rate for Kentucky's Major Soybean Production Regions, Kentucky Soybean Promotion Board, $4,000—*Grove, J., Lacefield, E., Lee, C.*
Random RNAi Screening for Negative Regulators of Drought Resistance in Arabidposis, Cooperative State Research Education and Extension, $100,000—*Tang, G.*
Simulations of Catastrophic Events and Associated Emergency Response Planning in Mid-America, Murray State University, $54,458—*Mueller, T.*
Soft Red Winter Wheat Breeding and Variety Development for Kentucky, Kentucky Small Grain Promotion Council, $32,800—*Van Sanford, D.*
Soil Morphology Training for On-Site Sewage Disposal Systems, Kentucky Health Services Cabinet, $45,000—*Karathanasis, A.*
Soybean Genetic Engineering for Improved Vitamin E Content, Kentucky Soybean Promotion Board, $17,500—*Collins, G.*
Soybean Tissue Culture and Genetic Engineering Center, University of Georgia, $89,531—*Collins, G.*
Soybean Yield Response to Soil P and K Availability: Optimizing Fertilization Expenses, Kentucky Soybean Promotion Board, $4,000—*Grove, J., Murdock Jr., L., Schwab, G.*
Technical Liaison for the Distribution of Clover Educational Information, Oregon Clover Commission, $4,000—*Lacefield, G.*
U.S. Wheat and Barley Scab Initiative's Networking and Facilitation Office and Web Site, Agricultural Research Service, $185,823—*Van Sanford, D.*
Wheat Management of Wet-Natured Soils, Kentucky Small Grain Promotion Council, $4,000—*Schwab, G., Lee, C., Murdock Jr., L.*
Yield Loss Prediction Tool for Risk Management of Asian Soybean Rust in the Southern USA, Southern Soybean Research Program, $24,386—*Van Doren, S., Hershman, D., Lee, C.*

Plant Pathology

Total—$1,318,585

Advanced Genetic Technologies, Kentucky, Cooperative State Research Education and Extension, $596,122—*Schardl, C.*
Characterization of HRT Mediated Resistance to Turnip Crinkle Virus in Arabidopsis, Boyce Thompson Institute for Plant Research, $2,500—*Kachroo, P.*
Combinations of Potassium Phosphite and Fungicides for Management of Downy Mildew on Winter Squash, University of Florida, $10,000—*Seebold, K.*
Dissecting Soybean Defense Pathways Using Virus-Induced Gene Silencing, Cooperative State Research Education and Extension, $187,321—*Kachroo, A., Ghabrial, S.*
Fatty Acid Signaling Pathway and Its Role in Plant Defense, National Science Foundation, $128,116—*Kachroo, P., Kachroo, A.*
Fungicide Management of Soybean Rust: Evaluation of Canopy Coverage and Effects of Fungicides on Midwestern Soybean Cultivars, Agricultural Research Service, $15,000—*Hershman, D.*
Host Factors Involved in Viral RNA Recombination, National Institute of Allergy and Infectious Diseases, $66,402—*Nagy, P.*
Incidence and Epidemiology of Major Virus Disease in Soybeans in Kentucky, Kentucky Soybean Promotion Board, $15,000—*Ghabrial, S., Hershman, D.*
Mitigating the Effects of Soybean Virus Diseases in the North Central States, Iowa State University, $9,373—*Ghabrial, S.*
NCSU-USDA CSREES National Legume Risk Management Tool Project, North Carolina State University, $42,675—*Hershman, D.*
Researching Grape Diseases through Diagnostic Training, Kentucky Department of Agriculture, $5,000—*Hartman, J., Beale, J.*
Role of an Essential RNA Chaperone in Virus Replication, National Institute of Allergy and Infectious Diseases, $66,402—*Nagy, P.*
Sentinel Plots to Monitor the Spread of Soybean Rust in the U.S. Soybean Production Regions, North Central Soybean Research Program, $9,000—*Hershman, D.*
Southern Plant Diagnostic Center Laboratory, Soybean Rust Supplement, University of Florida, $14,133—*Vincelli, P.*
Southern Region Plant Diagnostic Laboratory Network—Kentucky Cooperating National Plant Disease and Pest Surveillance and Detection Network, University of Florida, $56,979—*Vincelli, P., Townsend Jr., L.*
Sudden Oak Death, Kentucky Department for Natural Resources, $50,000—*Hartman, J., De Sa' Guimaraes, P.*

Sudden Oak Death Survey, Kentucky Natural Resources Environmental Protection Cabinet, $20,000—*Hartman, J., De Sa' Guimaraes, P.*

Suppression of Viral RNA Recombination by Host Genes, National Science Foundation, $5,000—*Nagy, P.*

Survey for *P. ramorum* in Watersheds in Kentucky, Department of Agriculture, $10,000—*De Sa' Guimaraes, P., Barton, C., Hartman, J.*

The Relationship between Fungal Biomass and DON Contamination in Wheat Seeds, Agricultural Research Service, $9,562—*Vaillancourt, L., Tekrony, D., Van Sanford, D.*

Regulatory Services

Total—$20,321

Medicated Feed Mill and BSE Rule Inspections, Food and Drug Administration, $20,321—*McMurry, S.*

Tracy Farmer Center for the Environment

Total—$295,913

Bluegrass Partnership for a Green Community Conference, Science Applications International Co., $35,200—*Hanley, C.*

Community-Based Science Project No. 1, Kentucky Department of Education, $11,075—*Hanley, C.*

Community-Based Science Project No. 2, Kentucky Department of Education, $59,638—*Hanley, C.*

Solid Waste, Kentucky Department of Military Affairs, $190,000—*Hanley, C.*

Veterinary Science

Total—$1,214,214

Analysis and Testing of Equine Immunologic Reagents, University of Massachusetts, $31,250—*Horohov, D.*

Articular Cartilage Maturation and Repair, Morris Animal Foundation, $35,000—*MacLeod, J., Mienaltowski, M.*

Biology of Neuropathogenic Strains of Equine Herpesvirus-l, Grayson Jockey Club Research Foundation Inc., $60,000—*Allen, G.*

Detection of Antibodies to EAV by Microsphere Immunoassay, Grayson Jockey Club Research Foundation Inc., $24,702—*Balasuriya, U., Timoney, P.*

Development of Experimental Equine Disease Model for Equine Herpesvirus-I Myeloencephalopathy, Fort Dodge Laboratories, $81,600—*Allen, G.*

Development of Gene Delivery Approaches to Treat Equine Respiratory Diseases, Kentucky Science and Technology Co. Inc., $49,573—*Horohov, D., Cook, R.*

EIAV Envelope Variation and Vaccine Efficacy, University of Pittsburgh, $215,557—*Issel, C.*

Equine Infectious Anemia Diagnostics, IDEXX Laboratories Inc., $174,000—*Issel, C.*

Equine Trust Fund Year 06-08, Kentucky Council on Postsecondary Education, $80,000—*Timoney, P.*

Evaluation of the Immunological Response of Aged Horses to Vaccination with a Recombinant Equine Vaccine and Subsequent Influenza Challenge, Merial Ltd., $132,940—*Horohov, D., Chambers, T.*

In vitro and *in vivo* Analysis of Zylexis in Foals, Pfizer Inc., $64,059—*Horohov, D.*

Molecular Basis of Attenuation of the Modified Live Virus Vaccine Strain of Equine Arteritis Virus, Fort Dodge Laboratories, $156,335—*Balasuriya, U., Timoney, P.*

Rapid Diagnostic Assay for *Streptococcus equi*, Grayson Jockey Club Research Foundation Inc., $88,198—*Timoney, J., Artiushin, S.*

Survey of Etiology of Equine Infectious Respiratory Disease in Kentucky, Fort Dodge Laboratories, $21,000—*Powell, D.*

Multi-Disciplinary Grants Led by Other Colleges*

Total—$2,227,554

Directed and Selective Self-Assembly of Nanosized Particles via Surface-Plasmon Excitation, National Science Foundation, $129,999—*Crofcheck, C.*

Ecological and Behavioral Interactions between Golden-Winged (*Vermivora chrysoptera*) and Blue-Winged Warblers (*V. pinus*) in Eastern Kentucky, Kentucky Department of Fish and Wildlife, $15,112—*Maehr, D.*

Ecological and Behavioral Interactions between Golden-Winged (*Vermivora chrysoptera*) and Blue-Winged Warblers (*V. pinus*) in Eastern Kentucky, Kentucky Department of Fish and Wildlife, $67,272—*Maehr, D.*

Interdisciplinary Collaboration for Children's Agricultural Health and Safety, National Children's Center for Rural and Ag Health, $14,928—*Witham, D.*

National Early Childhood Transition Center, Department of Education, $324,201—*Hallam, R.*

New Product Development and Commercialization Center for Rural Manufacturers, Small Business Administration, $641,698—*Isaacs, S., Maurer, R.*

Rural Health Bioterrorism and Emergency Preparedness, University of Louisville, $750,151—*Hancock, J., Henken, K., Henning, J., Husband, A., Hustedde, R., Miller Jr, T., Newman, M., Priddy, K., Scharko, P., Vincelli, P., Welch, M.*

Southeast Center for Agriculture Health and Injury Prevention, Center for Disease Control and Prevention, $8,820—*Isaacs, S.*

Tat-Mediated Brain Endothelial Cell Dysfunction, National Institute of Neurological Disorders and Stroke, $275,373—*Hennig, B.*

** Only College of Agriculture co-investigators are listed.*

Intellectual Property

Patents Issued

Animal and Food Sciences

Boatright, William L., Modified Soy Products and Methods for Reducing Odor and Improving Flavor of Soy Products. U. S. Patent 7,147,878. Issued Dec. 12, 2006.

Payne, Fred A. System and Method for Sensing a Characteristic of a Fluid and Related Apparatus. U.S. Patent 7,092,084 B2. Issued Aug. 15, 2006.

Kentucky Tobacco Research and Development Center

Littleton, John M., and Deane L. Falcone. Methods to Identify Plant Metabolites. U.S. Patent 6,989,236 B1. Issued Jan. 24, 2006.

Maiti, Indu B., and Somnath Bhattacharyya. Methods and Composition for Expressing Multiple Genes in Plants by Alternate Splicing of a Polycistronic Message. U.S. Patent 7,052,905. Issued May 30, 2006.

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Hildebrand, D., and H. Fukushige. Recombinant Watermelon (*Citrullus lanatus*) Hydroperoxide Lyase and Uses Thereof. U.S. Patent 7,153,680. Issued Dec. 26, 2006.

Veterinary Science

Issel, C.J. EIA Vaccine and Diagnostic. U.S. Patent 7,026,113. Issued April 11, 2006.

Tobin, Thomas. Long-Acting, Reversible Veterinary Sedative and Analgesic and Method of Use. U.S. Patent 7,074,834 B2. Issued July 11, 2006.

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Majee, M., S. Wu, L. Salaita, J. Chappell, and B. Downie. *Arabidopsis thaliana* putative like-Sm ribonucleoprotein-related gene. Accession DQ666276.

Majee, M., S. Wu, L. Salaita, J. Chappell, and B. Downie. A kelch repeat containing F-box protein positively influencing seed germination. Accession DQ666277.

Plant and Soil Sciences

D'Angelo, E., and A. Nunez. Phylogenetic analysis of Ohio River sediment bacterial populations, 16 S rRNA, Accessions: EF392902, EF392903, EF392904, EF392905.

Hatanaka, T., and D.F. Hildebrand. *Glycine max* GmDGAT1a mRNA for diacylglycerolacyltransferase-1a, complete cds. Accession AB257589.

Hatanaka, T., and D.F. Hildebrand. *Glycine max* GmDGAT1b mRNA for diacylglycerolacyltransferase-1b, complete cds. Accession AB257590.

Siminszky, B. *Nicotiana tabacum* cytochrome P450 CYP85A1 mRNA, complete cds. Accession DQ649022.

Tavva, V.S., Y.-H Kim, R.D. Dinkins, and G.B. Collins. *Glycine max* omega-3 fatty acid desaturase (FAD3) gene, partial cds. Accession DQ672337.

Yuan, L. *Catharanthus roseus* geraniol 10-hydroxylase promoter. Accession EF363554.

Yuan, L. *Nicotiana tabacum* dihydroflavonol reductase gene (Dfr1). Accession EF421429.

Yuan, L. *Nicotiana tabacum* dihydroflavonol reductase gene (Dfr2). Accession EF421430.

Yuan, L. *Nicotiana benthamiana* dihydroflavonol reductase gene. Accession EF421431.

Yuan, L. *Nicotiana benthamiana* chalcone synthase gene. Accession EF421432.

Elisa D'Angelo had 672 additional submissions.

Veterinary Science

Balasuriya,U.B., E.J Snijder, H.W. Heidner, J. Zhang, J.C. Zevenhoven-Dobbe, J.D. Boone, W.H. McCollum, P.J. Timoney, and N.J. Maclachlan. Equine arteritis virus Bucyrus strain, complete genome (12704 bp). Accession DQ846750.

Balasuriya,U.B., E.J Snijder, H.W. Heidner, J. Zhang, J.C. Zevenhoven-Dobbe, J.D. Boone, W.H. McCollum, P.J. Timoney, and N.J. Maclachlan. Infectious cDNA clone sequence of equine arteritis virus Bucyrus strain (Cloning vector pEAVrVBS; 14553 bp). Accession DQ846751.

Bellone, R.R., S.M.M. Lawson, and E. Bailey. *Equus caballus* OCA2 mRNA, partial cds. Accession DQ454071.

Bellone, R., T. Lear, D.L. Adelson, and E. Bailey. E190I17_OCA2_16F CHORI-241 Equine BAC Library *Equus caballus* genomic clone 190I17 similar to OCA2, DNA sequence. Accession DU708591.

Bellone, R., T. Lear, D.L. Adelson, and E. Bailey. E190I17_OCA2_16R CHORI-241 Equine BAC Library *Equus caballus* genomic clone 190I17 similar to OCA2, DNA sequence. Accession DU708592.

Bellone, R., T. Lear, D.L. Adelson, and E. Bailey. E117B6_Sau3A1_D2 CHORI-241 Equine BAC Library *Equus caballus* genomic clone 117B6 similar to TRPM1, DNA sequence. Accession DU708593.

Bellone, R., T. Lear, D.L. Adelson, and E. Bailey. E117B6_F12 CHORI-241 Equine BAC Library *Equus caballus* genomic clone 117B6 similar to TRPM1, DNA sequence. Accession DU708594.

Crowdus, C.A., M.R. Yeargan, and D.K. Howe. *Sarcocystis neurona* surface antigen 5 (SAG5) mRNA, complete cds. Accession DQ388449.

Gaji, R.Y., and D.K. Howe. *Sarcocystis neurona* nucleoside triphosphate hydrolase (NTP1) gene, promoter region and 5'UTR. Accession DQ768092.

Gaji, R.Y., and D.K. Howe. *Sarcocystis neurona* sarco-21 gene, promoter region and 5'UTR. Accession DQ768093.

Gaji, R.Y., and D.K. Howe. *Sarcocystis neurona* surface antigen 2 (SAG2) gene, promoter region and 5'UTR. Accession DQ768090.

Gaji, R.Y., and D.K. Howe. *Sarcocystis neurona* surface antigen 3 (SAG3) gene, promoter region and 5'UTR. Accession DQ786091.

Horohov, D.W., S. Mouch, and C.C. Breathnach. *Equus caballus* CD3 zeta chain-like mRNA, partial sequence. Accession DQ885232.

Horohov, D.W., S. Mouch, and C.C. Breathnach. *Equus caballus* interleukin-13 (IL-13) mRNA, partial cds. Accession DQ889711.

Murphy, B.A., M.M. Vick, D.R. Sessions, R.F. Cook, and B.P. Fitzgerald. *Equus caballus* brain and muscle ARNT-like protein 1 (BMAL1) mRNA. Accession DQ988038.

Murphy, B.A., M.M. Vick, D.R. Sessions, R.F. Cook, and B.P. Fitzgerald. *Equus caballus* cryptochrome 1 (CRY1) mRNA, partial cds. Accession DQ988039.

Murphy, B.A., M.M. Vick, D.R. Sessions, R.F. Cook, and B.P. Fitzgerald. *Equus caballus* clock (CLOCK) mRNA, partial cds. Accession DQ988040.

Murphy, B.A., M.M. Vick, D.R. Sessions, R.F. Cook, and B.P. Fitzgerald. *Equus caballus* period 2 (PER2) mRNA, partial cds. Accession EF015879.

Tiwari, R., A. Qin, S. Artiushin, and J.F. Timoney. *Streptococcus equi* Se18.9 gene, complete cds. Accession DQ068464.1.

Verma, A., J. Hellwage, S. Artiushin, P.F. Zipfel, P. Kraiczy, J.F. Timoney, and B. Stevenson. *Leptospira interrogans* serovar Pomona Na-K symporter gene, partial cds; and LfhA (lfhA) gene, complete cds. Accession DQ370178.1.

Publications

All publication dates in this section are 2006 unless otherwise noted.

Annual Report

One Hundred and Eighteenth Annual Report of the Kentucky Agricultural Experiment Station for 2005. College of Agriculture, University of Kentucky, Nancy M. Cox, Director. June.

Books and Book Chapters

Agricultural Economics

Freshwater, David. Agricultural Policies and Rural Development. pp. 29-32. IN: Dimitris Diakosavva, ed. *Coherence of Agricultural and Rural Development Policies*. OECD, Paris.

Gramig, Ben M., Barry J. Barnett, Jerry R. Skees, and J. Roy Black. Incentive compatibility in risk management of contagious livestock diseases. IN: S.R. Koontz, ed. *Livestock Insurance Products*.

Hazell, Peter, and Jerry Skees. Insuring against bad weather: Recent thinking. IN: R. Radhakrishna, S.K. Roa, S. Mahendra Dev and K. Subbarao, ed. *India in a Globalizing World: Some Aspects of Macroeconomy, Agriculture, and Poverty*. Academic Foundation and Centre for Economic and Social Studies (CESS), Hyderabad, India.

Meuwissen, M.P.M., M.A.P.M. Van Asseldonk, J.R. Skees, and R.B.M. Huirne. Designing epidemic livestock insurance. IN: S.R. Koontz, ed. *Livestock Insurance Products*.

Skees, J., J. Hartell, and J. Hao. Weather and indexed-based insurance for developing countries: Experience and possibilities. IN: A. Sarris and D. Hallam, ed. *Agricultural Commodity Markets and Trade: New Approaches to Analyzing Market Structure and Instability*. Edward Elgar Publishing.

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Cromwell, G.L. Rendered products in swine nutrition. pp. 141-157. IN: D.L. Meeker, ed., *Essential Rendering*. National Renderers Assoc., Alexandria, Va.

Lindemann, M.D., and B.G. Kim. Recent advances in sow reproductive function. pp. 25-34. IN: J.A. Taylor-Pickard and L. Nollet, ed. *Nutritional Approaches to Arresting the Decline in Fertility of Pigs and Poultry*. Wageningen Academic Press, The Netherlands.

Newman, M.C. Antibiotic growth promoters. IN: T. Steiner, ed. *Managing Gut Health-Natural Growth Promoters as a Key to Animal Performance*. Nottingham University Press, United Kingdom.

Biosystems and Agricultural Engineering

Castillo, M. Cutting time prediction methods in cheese making. pp. 1-7. IN: Heldman, D., ed. *Encyclopedia of Agricultural, Food, and Biological Engineering*. Taylor and Francis Group, Boca Raton, Fla.

Colliver, D.G. *Advanced Energy Design Guide for Small Retail Buildings*. American Society of Heating, Refrigerating and Air-Conditioning Engineers Inc., Atlanta, Ga. 101 pages. http://www.ashrae.org/aedg.

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Workman, S.R. Precipitation. pp. 29-52. IN: D.D. Fangmeier, W.F. Elliot, S.R. Workman, R.L. Huffman, and G.O. Schwab, ed. *Soil and Water Conservation Engineering, 5th Edition*. Thomson-Delmar Publishing.

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Workman, S.R. Wetlands. pp. 270-287. IN: D.D. Fangmeier, W.F. Elliot, S.R. Workman, R.L. Huffman, and G.O. Schwab, ed. *Soil and Water Conservation Engineering, 5th Edition*. Thomson-Delmar Publishing.

Community and Leadership Development

Burmeister, L. Agricultural cooperative development and change: A window on South Korea's agrarian transformation. pp. 64-85. IN: C. Yun-shik and S.H. Lee, ed. *Pursuing Modernity: Transformation in Twentieth Century Korea*. Routeledge, London and New York.

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Campos, D., and M.J. Sharkey. Braconidae. Chapter V, pp. 331-384. IN: Fernandez F. and M.J. Sharkey, ed. *Introduccion a los Hymenoptera de la Region Neotropical*. Serie Entomologia Colombiana, Sociedad Colombiana de Entomologia, Bogota D.C., Colombia. (In Spanish).

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Sharkey, M.J., and D. Wahl. Ichneumonoidea. pp. 287-292. IN: F. Fernandez and M.J. Sharkey, ed. *Introduccion a los Hymenoptera de la Region Neotropical*. Serie Entomologia Colombiana, Sociedad Colombiana de Entomologia, Bogota D.C., Colombia. (In Spanish.)

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Koo, B.J., C.D. Barton, and D. Adriano. Evaluation of Bahiagrass (*Paspalum notatum*) as a vegetative cover for a landfill containing coal combustion waste. pp. 225-231. IN: K. Sajwan, T. Punshon, A.K. Alva, and R.F. Keefer, ed. *Coal Combustion Byproducts and Environmental Issues*. Springer Publishers, New York.

S. Maharaj, C.D. Barton, B.J. Koo, and L. Newman. Phytoavailability of trace elements from a landfill containing coal combustion waste. pp. 195-201. IN: K. Sajwan, T. Punshon, A.K. Alva, and R.F. Keefer, ed. *Coal Combustion Byproducts and Environmental Issues*. Springer Publishers, New York.

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Cai-Xia Hou, and Mark A. Williams. Actinonin-induced inhibition of plant peptide deformylase: A paradigm for the design of novel broad-spectrum herbicides. IN: A.M. Rimando and S.O. Duke, ed. *Natural Products for Pest Management*. American Chemical Society Symposium Series 927:243-254.

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Animal and Food Sciences

Bullock, K.D., D.R. Strohbehn, R.L. Weaber, E.J. Pollak, D.J. Garrick, J. K. Bertrand, D.W. Moser, and J.M. Reecy. From Research to Application: A Model for Educating Beef Producers in Animal Breeding Technologies. 8th World Congress on Genetics Applied to Livestock Production, Belo Horizonte, MG, Brazil, Aug. 13-18.

Cantor, A.H., and A.N. Mañón. Using organic sources of trace minerals for growing pullets. Proceedings, Multi-State Poultry Feeding and Nutrition Conference, Indianapolis, Ind.

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Lindemann, M.D. The role of selenium in immune function. pp. 31-51. Proceedings, Prince Summit 2006, 26th Annual Animal Nutrition Conference, Des Moines, Iowa.

Lindemann, M.D. Recent Advances in Sow Reproductive Function. Alltech Pig Fertility Meeting, Ottawa, Ontario.

Lindemann, M.D. Enhancing Reproductive Parameters: The Omega Effect. 41st Annual Pacific Northwest Nutrition Conference Pre-Conference Symposium, Vancouver, British Columbia.

Biosystems and Agricultural Engineering

Agouridis, C.T., R.C. Warner, C.D. Barton, D.A. Bidelspach, G.D. Jennings, J.W. Marchant, and R. Obsorne. Promoting a paradigm shift in head-of-hollow fill design through public education, Abstract for Stream Restoration in the Southeast: Accomplishments and Opportunities, Charlotte, N.C., Oct. 2-5.

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Álvarez, D., C.C. Fagan, M.D. Garrido, S. Bañón, Y.L. Xiong, F.A. Payne, and M. Castillo. Application of reflection photometry for determining meat emulsion stability. International Food and Technology Annual Meeting and Food Expo, Orlando, Fla., June 24-28.

Bodapati, V.S., and L.G. Wells. Dynamic mechanical control for soil reconstruction. Paper No. 06-1092. Presented at the American Society of Agricultural and Biological Engineers Annual International Meeting in Portland, Ore., July 9-12.

Burns, R., H. Xin, R. Gates, H. Li, S. Hoff, L. Moody, D. Overhults, and J. Earnest. Monitoring system design for the southeastern broiler gaseous and particulate matter air emissions monitoring project. Presented at the Workshop on Agricultural Air Quality: State of the Science, Potomac, Md., June 5-8.

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Casey, K.D., R.S. Gates, E.F. Wheeler, and H. Xin. Comparison of measured estimates of annual ammonia emissions from poultry production facilities with mass balance modeling approaches. Presented at the Workshop on Agricultural Air Quality: State of the Science, Potomac, Md., June 5-8.

Castillo, M., S. Torrealba, and F.A. Payne. A review of the models for description of whey separation during cheese making. Presented at the American Society of Agricultural and Biological Engineers Annual International Meeting, Portland, Ore., July 9-12.

Colliver, D.G. An in-depth analysis of the advanced energy design guide for small offices and its utilization. Invited lecture. American Society Heating, Refrigeration and Air-Conditioning Engineers CRS Technical Session, Chattanooga, Tenn., Sept. 8.

Crofcheck, C., M. Crocker, J. Shumaker, and M. Montross. Evaluation of heterogeneous catalysts for improved biodiesel production. Presented at the Institute of Biological Engineering Meeting, Tucson, Ariz.

Crofcheck, C., and S. Nokes. Renewable energy workshops for middle- and high-school students. Paper No. 06-8042. Presented at the American Society of Agricultural and Biological Engineers Annual International Meeting, Portland, Ore., July 9-12.

Everard, C.D., D.J. O'Callaghan, C.C. Fagan, C.P. O'Donnell, M. Castillo, and F.A. Payne. Reflection photometry and physico-chemical measurements to monitor cheese curd syneresis. 36th Annual Research Conference, Food, Nutrition, and Consumer Sciences, Cork, Ireland.

Everard, C.D., C.P. O'Donnell, C.C. Fagan, D.J. O'Callaghan, M. Castillo, and F.A. Payne. Computer vision analysis to monitor syneresis of cheese curd in a cheese vat. American Dairy Science Association-American Society of Animal Science Joint Meeting, Minneapolis, Minn., July 9-13.

Everard, C.D., C.P. O'Donnell, C.C. Fagan, D.J. O'Callaghan, M. Castillo, and F.A. Payne. Application of computer vision to control curd and whey quality during cheese syneresis. European Federation of Food Science and Technology Annual Meeting/Total Food, The Hague, The Netherlands, Nov. 7-9.

Fagan, C.C., M. Leedy, M. Castillo, F.A. Payne, C. O'Donnell, and D. O'Callaghan. Application of response surface methodology for the development of a light scatter sensor technology for concurrent monitoring of milk coagulation and whey separation. Section VI, International Symposium on Future of Food Engineering. Warsaw, Poland, April 26-28.

Fagan, C. C., M. Leedy, M. Castillo, F.A. Payne, C. O'Donnell, and D. O'Callaghan. Predicting curd moisture content, whey fat concentration, and curd yield from near infrared light backscatter. American Dairy Science Association-American Society of Animal Science Joint Meeting, Minneapolis, Minn., July 9-13.

Fisk, C., C. Crofcheck, M. Crocker, S. Lewis, and J. Storey. Novel catalytic approaches for bio-oil upgrading. Presented at the Institute of Biological Engineering Meeting, Tucson, Ariz.

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Gates, R.S., K.D. Casey, E.F. Wheeler, and H. Xin. Estimating annual ammonia emissions from U.S. broiler facilities. Presented at the Workshop on Agricultural Air Quality: State of the Science, Potomac, Md., June 5-8.

Gates, R.S. Recent advances in livestock and poultry production systems. Invited lecture. IV Biometeorology Brazilian Conference, Ribeirao Petro, SP, Brazil, April 11-14.

Hawes, E.A., J.T. Hastings, C. Crofcheck, and M.P. Mengüç. Surface plasmon assisted melting and fusion of nanosized particles: The underpinnings of directed self assembly. Presented at the Institute of Biological Engineering Meeting, Tucson, Ariz.

Hawes, E.A., J. T. Hastings, C. Crofcheck, and M.P. Mengüç. Spectrally selective heating of nanosized particles by surface plasmon resonance and an atomic force microscopy tip. Presented at Eurotherm78, Poitiers, France, April.

Koostra, B.K., T.S. Stombaugh, T.G. Mueller, and S.A. Shearer. Evaluating the effect of terrain on field area measurements. Paper No. 06-1045. Presented at the American Society of Agricultural and Biological Engineers Annual International Meeting, Portland, Ore., July 9-12.

Luck, J.D., S.R. Workman, S.F. Higgins, and M.S. Coyne. Hydrologic properties of pervious concrete. Paper No. 06-7063. Presented at the American Society of Agricultural and Biological Engineers Annual International Meeting, Portland, Ore., July 9-12.

Maia, G.D.N., R.S. Gates, E.G. Wilkerson, S.F. Higgins, A. Singh, and J.L. Taraba. Characterization of headspace gases in ventilated and impermeable swine manure tanks and their abatement using biofiltration. Paper No. 06-4027. Presented at the American Society of Agricultural and Biological Engineers Annual International Meeting, Portland, Ore., July 9-12.

McNeill, S.G., M.D. Montross, and T.S. Stombaugh. Developing and demonstrating identity-preserved protocols for grain production in Kentucky. Paper No. 06-6201. Presented at the American Society of Agricultural and Biological Engineers Annual International Meeting, Portland, Ore., July 9-12.

Montross, M.D., T.C. Bridges, and S.G. McNeill. Feasibility of ground loop systems to provide conditioned air for summer aeration. Paper No. 06-8202. Presented at the American Society of Agricultural and Biological Engineers Annual International Meeting, Portland, Ore., July 9-12.

Moody, L.B., H. Li, R.T. Burns, H. Xin, and R. Gates. Quality Assurance Project Plan (QAPP) for monitoring gaseous and particulate matter emissions from southeastern broiler houses. Proceedings, Air and Waste Management Association Air Monitoring Conference.

Moody, L., H. Li, R. Burns, H. Xin, and R. Gates. Quality Assurance Project Plan (QAPP) for monitoring gaseous and particulate matter air emissions from southeastern broiler houses. Proceedings, Symposium on Air Quality Measurement Methods and Technology, Durham, N.C., May 9-11.

Moody, L., H. Li, R. Burns, H. Xin, and R. Gates. Quality Assurance Project Plan (QAPP) implementation for the southeastern broiler gaseous and particulate matter air emissions monitoring project. Presented at the Workshop on Agricultural Air Quality: State of the Science, Potomac, Md., June 5-8.

Norikane, J.H., R.G. Anderson, R.S. Gates, and L. Dunn. The impact of modified atmosphere treatment for arthropod pest control on plant health. Paper No. 06-4021. Presented at the American Society of Agricultural and Biological Engineers Annual International Meeting, Portland, Ore., July 9-12.

Overhults, D.G. Environmental systems and facilities planning. Presented as an instructor for a Continuing Professional Development session at the International Meeting of American Society of Agricultural and Biological Engineers, Portland, Ore., July 9-12.

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Swamy, J.N., C. Crofcheck, and M.P. Mengüç. Applicability of polarized light scattering to investigate and characterize food emulsions and foams. Paper No. 06-6060. Presented at the American Society of Agricultural and Biological Engineers Annual International Meeting, Portland, Ore., July 9-12.

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Community and Leadership Development

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Forestry

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Horticulture

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Livestock Disease Diagnostic Center

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Plant Pathology

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Veterinary Science

Bailey, E. Breeding best to best. Equine Disease Quarterly 15:2.
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Timoney, P.J. Equine viral arteritis: International status and consequences for breeding populations. S05-04, pp. 1-13. Proceedings, Association Veterinaire Equine Francaise, Versailles, France, Oct. 11-14.
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Graduate Degrees

Degrees listed are from the 2006 Spring Semester, 2006 Second Summer Session, and 2006 Fall Semester.

Ph.D. Dissertations

Agricultural Economics

Hou, Jiang. A measure of the small business credit gap and the use of credit scoring by small financial institutions.

Leiva, Akssel. Theoretical and empirical strategies for managing irrigation supplies risk: The case of Rio Mayo Irrigation District in Sonora, Mexico.

Peng, Xuehua. Trade liberalization and division of labor: Implications for poverty in China.

Rattanopas, Thitinart. Policy simulation of the world wheat market.

Song, Baohui. Market power and competitive analysis of China's soybean import market.

Animal and Food Sciences

Agyare, Kingsley K. Transglutaminase-mediated functionality of hydrolyzed wheat gluten and interaction with muscle protein.

Scheuren-Portocarrero, Susana M. Yeast cell wall preparation as a strategy to control antibiotic-resistant bacteria *in vitro* and domestic animals.

Biosystems and Agricultural Engineering

Veal, Matthew. Mass flow sensing at the feeder housing for correction of yield monitor estimate on grain harvester.

Entomology

Amarillo-Suarez, Angela. Influences of host size and host quality on host use in a seed-feeding beetle.

Coleman, Tom W. Natural and anthropogenic forest disturbances alter forest composition, structure, and succession and influence arthropod communities.

Kroemer, Jeremy A. Characterization of the Vankyrin gene family in the *Campoletis sonorensis* ichnovirus: Evidence for functional divergence within a polydnavirus multi-gene family.

Lensing, Janet R. Impacts of altered rainfall predicted by climate-change models on the arthropod community, litter decomposition, and trophic cascades in a forest-floor food web.

Pitz, Kevin M. Systematic and taxonomic revision of the subfamily Cenocoeliinae (Hymenoptera: Braconidae).

Sarmiento-Monroy, Carlos. Taxonomic revision of Zelomorpha Ashmead, 1900 and Hemichoma Enderlein, 1920 (Braconidae: Agathidinae) with a phylogenetic analysis of color patterns.

Seagraves, Michael P. Factors affecting the biological control of *Helicoverpa zea* (Boddie) (Lepidoptera: Noctuidae) by *Coleomegilla maculata* (DeGeer) (Coleoptera: Coccinellidae) in sweet corn.

Horticulture

Nosarzewski, Marta. Regulation of expression and activity of sorbitol dehydrogenase in apple fruit.

Sigal-Escalada, Valeria. Interactions of AVG, MCP, and heat treatment on apple fruit ripening and quality after harvest and cold storage.

Plant and Soil Sciences

Hancock, Dennis. Spectral reflectance of canopies of rainfed and subsurface irrigated alfalfa.

Kischnick, Daniel. Companionism and antagonism in herb crops.

Li, Dandan. Soybean QTL for yield and yield components associated with *Glycine soja* alleles.

Marchi, Antonio A. Predicting nitrogen fertilizer rate and timing effects on soft winter wheat grain quality.

Peyyala, Rebecca. Transformation of perennial ryegrass with disease resistance genes from rice.

Rakshit, Sudipta. Abiotic interactions of iron(II) species with nitrate and nitrite.

Plant Pathology

Flowers, Jennifer Lee. Localization of *Diplodia pinea* in diseased and latently infected *Pinus nigra.*

Shapka, Natalia. Identification of viral and host factors involved in tombusvirus replication and recombination.

Venard, Claire Marie-Pierre. The development of *Colletotrichum graminicola* inside maize stalk tissues.

Veterinary Science

Brooks, S. Studies of genetic variation at the KIT locus and white spotting patterns in horses.

Gaji, R.Y. Identification of Cis-acting elements controlling gene expression in *Sarcocystis neurona.*

M.S. Theses

Agricultural Economics

Kumwimba, Lily Mutambo. Foreign direct investment and corruption in Africa: The case of SADC countries.

Logsdon, Tommy. A feasibility study of opening and operating a precision farming firm in Kentucky.

Ostermeier, Richard. Demand and supply model for the U.S. ski/wakeboard boat market.

Routt, Nathan. Basis variability and its effects on hedging efficiency for Kentucky feeder cattle.

In addition, two non-thesis master's degrees were awarded in calendar 2006.

Animal and Food Sciences

Balfagon-Romeo, Aitor. Nutritional approach mineral over-supplement in grow-finish pigs: Organic trace minerals and phosphorus body accretion.

Doig, William G. Influence of level of alfalfa cube intake on nutrient disappearance and rumen fermentation in Angus steers.

Miles, Edwena D. Validation of a bovine renal cell model to study factors that regulate glutamate and uridine transport and metabolism, including ergopeptides.

Reeder, Trista L. Dietary lysine: Calorie ratios and their influence on nitrogen metabolism and digestibility in moderately obese mature dogs.

Ringler, Jennifer E. An *in vitro* system for the prediction of diet DM, NDF, and ADF digestibility in horses.

Ware, Jasmine V. Effects of crossbreeding on both performance and immunological parameters of neonatal Holstein, Jersey, and reciprocal crossbred calves.

Biosystems and Agricultural Engineering

Adotey, Bless. Metabolic flux analysis of carbon flow through *Clostridium thermocellum.*

Chandler, Garrett David. Design of an intelligent optical sensing platform.

Dugid, Kathryn Blair. Mechanical fractionation of wheat stover for increased sugar recovery.

Shea, Aubrey Pui Yiu. Foam fractionation of α-lactalbumin and β-lactoglobulin from a whey solution.

Wolanin, Melinda Jeanne. Utilization of submicron and nano-sized nickel particles to facilitate recovery of histidine-tagged proteins.

Community and Leadership Development

Dotterweich, Sarah. Welcome to the neighborhood: Impact of urban immersion on participants' attitudes towards the poor, values, and belief in a just world.

Frank, Sarah M. Higher prices, limited choice: An examination of WIC food prices in rural and urban Kentucky.

Wang, Jian. Who reports what? Institutional change within the Chinese media and the production of anti-Japanese sentiment.

In addition, 15 non-thesis master's degrees were awarded in calendar 2006.

Entomology

Land, Aerin. Prescribed fire influences shortleaf pine regeneration and herbivore pressure following southern pine beetle mortality.

Saenz, Virna. Evaluation of ovitrap surveillance and seasonal abundance of the treehole mosquito *Ochlerotatus triseriatus* (Say) and the Asian tiger mosquito *Aedes albopictus* (Skuse) and a survey of mosquitoes on three Kentucky farms.

Seagraves, Bonny Lou. Relative resistance of nursery-grown maples to multiple insect pests and seasonal biology of the maple shoot borer, *Proteoteras aesculana* (Riley).
Trout, Rebecca T. Suppressing peridomestic mosquitoes utilizing residual insecticides on residential properties.

In addition, one non-thesis master's degree was awarded in calendar 2006.

Family Studies

Brody, Amanda. Family resiliency during childhood cancer: A father's perspective.

In addition, four non-thesis master's degrees were awarded in calendar 2006.

Forestry

Acker, Marty. Base cation concentration and content in litterfall and woody debris across a northern hardwood forest chronosequence.
Cotton, Claudia. Developing a method of site quality evaluation for *Quercus alba* and *Liriodendron tulipifera* in the eastern Kentucky coal fields.
Cherry, Mac Alexander. Hydrochemical characterization of ten headwater catchments in eastern Kentucky.
Dodd, Luke. Diet and prey abundance of the Ozark big-eared bat (*Corynorhinus townsendii ingens)* in Arkansas.
Fabio, Eric. Influence of moisture regime and tree species on nitrogen cycling and decomposition dynamics in deciduous forests of Mammoth Cave National Park, Kentucky, USA.
Johnson, Joseph. Foraging behavior of long-legged myotis *(Myotis volans)* in north-central Idaho.

Horticulture

Law, Derek. Ecological weed management for organic farming systems.

Plant and Soil Sciences

Andrews, Danielle M. Hyporheic zone development and water quality improvement in a restored riparian area.
Bayrer, Theresa. Wear tolerance of seeded and vegetatively propagated bermudagrasses under simulated athletic traffic.
Flynn, Ernest S. Using NDVI as a pasture management tool.
Johnson, Jonah. Wheat response to variable rate nitrogen strategies using active NDVI sensors.
Mijatovic, Blazan. Relationships between soil properties, select spatial sensors, and terrain attributes for several Kentucky fields.
Pallikonda, Praveen K. Impact of E-genes on soybean (*Glycine max* L. {Merr}) development, senescence, and yield.
Wagner, Katherine Marie. Kinetics of nitrate reduction by metallic iron.

Veterinary Science

Coleman, S.J. Comparative mapping of equine expressed sequence tags.
Kennedy, E.L. Infusion of cortisol suppresses the periovulatory rise in luteinizing hormone but not ovulation in the mare.
Strong, D. The use of a whole genome scan to find a genetic marker for degenerative suspensory ligament desmitis in the Peruvian Paso horse.
Vick, M.M. Obesity, inflammation, and insulin sensitivity in the horse.

Graduate Enrollment

Note: Data are from the UK Office of Institutional Research (http://www.uky.edu/IR/student.html).

	2005 Enrollment			2006 Enrollment			Net
	Master's	Doctoral	Total	Master's	Doctoral	Total	Change
Agricultural Economics	17	23	40	15	21	36	-4
Animal and Food Sciences	31	16	47	23	16	39	-8
Biosystems and Agricultural Engineering	20	8	28	23	6	29	1
Entomology	8	25	33	11	23	34	1
Family Studies	33	15	48	34	14	48	0
Forestry	23	*	23	20	*	20	-3
Interior Design, Merchandising, and Textiles**	11	*	11	10	*	10	-1
Nutrition and Food Science	17	*	17	16	*	16	-1
Plant Pathology	1	18	19	2	19	21	2
Plant and Soil Sciences/Horticulture	24	43	67	23	43	66	-1
Rural Sociology/Career, Technical and Leadership Education	34	10	44	29	4	33	-11
Veterinary Science	7	19	26	3	19	22	-4
Grand Total			**403**			**374**	**-29**

* Degree type not offered.
** Includes graduate student numbers in the joint School of Design Interior Design, Merchandising, and Textiles program.

Financial Statement

Statement of Current General Fund Income and Expenditures

Fiscal Year 2006

Income	
Federal Funds	
Hatch	$3,849,651
Hatch Multistate	846,910
McIntire-Stennis	469,827
Animal Health	66,708
Total Federal Funds	**$5,233,096**
Total State Funds	$27,536,538
Total Funds	**$32,769,634**

Expenditures	**Federal**	**State**	**Total**
Personal Services	$4,324,336	$21,338,279	$25,662,616
Travel	111,945	202,742	314,687
Equipment	129,189	516,425	645,614
Other Operating Expenses	667,626	5,479,092	6,146,718
Total Expenditures	**$5,233,096**	**$27,536,538**	**$32,769,634**

Staff

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Russ Williams

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Agricultural Experiment Station

January 1, 2006-December 31, 2006

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Departments

Following are departmental personnel lists for calendar year 2006. (R) denotes Experiment Station appointment.

Agricultural Communications

Miller, T.H., Interim Director
Wood, C.H., CALE Lab Director and Professor

Agricultural Economics

Robbins, L.W., Professor and Chair (R)
Brown, R., Lecturer (R)
Debertin, D.L., Professor (R)
Dillon, C., Associate Professor (R)
Fleming, R., Associate Professor (R)
Freshwater, D., Professor (R)
Infanger, C.L., Extension Professor
Isaacs, S., Extension Professor
Jones, L.D., Extension Professor (R)
Marchant, M.A., Professor (R)
Mather, L.L., Associate Professor (R)
Maynard, L., Associate Professor (R)
Meyer, A.L., Extension Professor
Pagoulatos, A., Professor (R)
Pushkarskaya, H.N., Assistant Professor (R)
Reed, M.R., Professor (R)
Riggins, S.K., Extension Professor
Saghaian, S., Assistant Professor (R)
Scorsone, E., Assistant Extension Professor
Skees, J.R., Professor (R)
Snell, W.M., Extension Professor
Trimble, R.L., Extension Professor
Williamson, L., Extension Professor
Woods, T., Associate Extension Professor

Animal and Food Sciences

Harmon, R.J., Professor and Chair
Aaron, D.K., Professor (R)
Amaral-Phillips, D.M., Extension Professor
Anderson, L.H., Associate Extension Professor
Boatright, W.L., Associate Professor (R)
Boling, J.A., Professor (R)
Bullock, K.D., Extension Professor
Burris, R., Extension Professor
Cantor, A.H., Associate Professor (R)
Coffey, R.D., Associate Extension Professor
Coleman, R.J., Associate Extension Professor
Crist, W.L., Post-Retirement Extension Professor
Cromwell, G.L., Professor (R)
Dawson, K.A., Adjunct Professor
Edgerton, L.A., Associate Professor (R)
Ely, D.G., Professor (R)
Harmon, D.L., Professor (R)
Heersche Jr., G., Extension Professor
Hennig, B., Professor (R)
Hicks, C.L., Professor (R)
Jackson Jr., J.A., Associate Professor (R)
Johns, J.T., Post-Retirement Extension Professor
Lawrence, L.M., Professor (R)
Lindemann, M.D., Professor (R)
Matthews, J.C., Associate Professor (R)
McAllister, A.J., Extension Professor
McLeod, K.R., Assistant Professor (R)
Newman, M.C., Associate Professor (R)
O'Leary, J., Extension Associate Professor
Parker, G.R., Extension Professor
Pescatore, A.J., Extension Professor
Rentfrow, G.K., Extension Assistant Professor
Schillo, K.K., Associate Professor (R)
Silvia, W.J., Professor (R)
Strobel, H.J., Associate Professor (R)
Suman, S.P., Assistant Professor (R)
Thrift, F.A., Professor (R)
Tidwell, J., Adjunct Assistant Professor
Vanzant, E.S., Associate Professor (R)
Wang, C., Adjunct Assistant Professor
Webster, C., Adjunct Assistant Professor
Xiong, Y., Professor (R)

Biosystems and Agricultural Engineering

Gates, R.S., Professor and Chair (R)
Agouridis, C., Assistant Research Professor (R)
Castillo, M., Assistant Research Professor (R)
Colliver, D.G., Associate Professor (R)
Crofcheck, C., Assistant Professor (R)
Duncan, G.A., Post-Retirement Extension Professor (R)
Edwards, D.R., Professor (R)
Fehr, R., Extension Professor (R)
McNeill, S.G., Associate Extension Professor (R)
Montross, M.D., Associate Professor (R)
Nokes, S.E., Associate Professor (R)
Norikane, J., Assistant Professor (R)
Overhults, D.G., Associate Extension Professor (R)
Payne, F.A., Professor (R)
Shearer, S.A., Professor (R)
Stombaugh, T.D., Associate Extension Professor (R)
Taraba, J., Extension Professor (R)
Warner, R.C., Extension Professor (R)
Wells, L.G., Professor (R)
Wilkerson, E., Assistant Extension Professor (R)
Workman, S., Associate Professor (R)

Community and Leadership Development

Hansen, G., Extension Professor and Chair (R)
Burmeister, L., Associate Professor (R)
Dyk, P., Associate Professor (R)
Garkovich, L., Professor (R)
Harris, R., Associate Professor (R)
Horstmeier, R.P. Assistant Professor (R)
Hustedde, R., Extension Professor
Jones, K., Extension Assistant Professor (R)
Kitchel, T., Assistant Professor (R)
Maurer, R., Extension Professor
Nall, M., Extension Professor
Tanaka, K., Assistant Professor (R)
Warner, P., Extension Professor
Weckman, R., Associate Professor
Witham, D., Professor
Zimmerman, J., Associate Extension Professor (R)

Entomology

Obrycki, J.J., Professor and Chair (R)
Barney, R.J., Assistant Adjunct Professor
Bessin, R.T., Extension Professor
Brown, G.C., Professor (R)
Dobson, S.L., Associate Professor (R)
Fox, C.W., Associate Professor (R)
Haynes, K.F., Professor (R)
Johnson, D.W., Extension Professor
Palli, S.R., Associate Professor (R)
Potter, D.A., Professor (R)
Potter, M.F., Extension Professor
Rieske-Kinney, L K., Associate Professor (R)
Sedlacek, J.D., Assistant Adjunct Professor
Sharkey, M.J., Professor (R)
Townsend, L.H., Extension Professor
Webb, B.A., Professor (R)
Webster, T.C., Assistant Adjunct Professor
Wise, D.H., Professor (R)
Yeargan, K.V., Professor (R)

Family Studies

Dyk, P., Associate Professor and Acting Chair (R)
Bradford, K.P., Assistant Professor
Brock, G.W., Professor
Ellington, V., Lecturer
Flashman, R H., Extension Professor
Forgue, R.E., Associate Professor
Hans, J.D., Assistant Professor
Heath, C.J., Professor
Hildreth, G.J., Professor
Kim, H., Assistant Professor
Mowery, R.L., Assistant Professor
Simmons, L.A., Assistant Professor
Smith, D.R., Associate Professor
Turner, L., Lecturer
Vail, A., Extension Professor
Whiting, J.B., Assistant Professor

Forestry

Bullard, S., Professor and Chair (R)
Arthur, M.A., Associate Professor (R)
Barnes, T.G., Extension Professor
Barton, C., Assistant Professor (R)
Conners, T., Associate Extension Professor
Cushing, T., Assistant Professor (R)
Fei, S., Assistant Professor (R)
Graves, D.H., Extension Professor (R)

Hill, D.H., Extension Professor
Kalisz, P.J., Associate Professor
Lacki, M.J., Associate Professor (R)
Maehr, D.S., Associate Professor (R)
Ringe, J.M., Professor (R)
Stringer, J.W., Associate Professor (R)
Wagner, D.B., Associate Professor

Horticulture

Ingram, D.L., Professor and Chair (R)
Anderson, R.G., Extension Professor Emeritus (R)
Archbold, D.D., Professor (R)
Buxton, J.W., Associate Professor (R)
Downie, A.B., Associate Professor (R)
Dunwell, W.C., Extension Professor
Durham, R.E., Associate Extension Professor
Fountain, W.M., Extension Professor
Geneve, R.L., Professor (R)
Houtz, R.L., Professor (R)
Jones, R.T., Extension Professor
Kemp, T.R., Professor (R)
Masabni, J.G., Assistant Extension Professor (R)
McNiel, R.E., Extension Professor Emeritus (R)
Rowell, A.B., Extension Professor (R)
Snyder, J.C., Associate Professor (R)
Strang, J.G., Extension Professor
Williams, M.A., Assistant Professor (R)

Kentucky Tobacco Research and Development Center

Davies, H. Maelor, Director
Chambers, O.D., Biotechnology Relations Director
Li, B., Scientist III
Maiti, I.B., Scientist III
Zaitlin, D., Scientist III

Landscape Architecture

Schach, H., Professor and Chair
Crankshaw, N.M., Associate Professor
Fields, L., Assistant Professor
Kew, B.W., Assistant Professor
Lee, B.D., Assistant Professor
Nieman, T.J., Professor (R)

Livestock Disease Diagnostic Center

Harrison, L.R., Professor and Director
Bolin, D.C., Associate Professor
Bryant, U.K., Assistant Professor
Carter, C.N., 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
Vickers, M.L., Associate Professor
Williams, N.M., Associate Professor

Merchandising, Apparel, and Textiles

Michelman, S.O., Associate Professor and Chair
Easter, E.P., Professor
Jackson, V.P., Associate Professor
Joshi, P.R., Lecturer
Spillman, K.M., Associate Professor
Wesley, S.C., Assistant Professor
Kwon, H., Visiting Scholar (R)

Nutrition and Food Science

Forsythe, H.W., Associate Professor and Chair (R) (1/06–7/06)
Kurzynske, J.S., Associate Professor and Acting Chair (starting 7/06)
Addo, K., Associate Professor
Bastin, S.B., Associate Professor
Brown, D.O., Associate Professor
Chen, L., Professor (R)
Chow, C.K., Professor (R)
Cook-Newell, M., Lecturer
Gaetke, L., Associate Professor
Glauert, H., Professor (R)
Ham, S., Associate Professor
Roseman, M.G., Assistant Professor
Stephenson, T.J., Lecturer
Wesley, M., Associate Professor

Plant and Soil Sciences

Barrett, M., Professor and Chair
Aiken, G.E., Associate Adjunct Professor
Bailey, W.A., Assistant Extension Professor
Barnhisel, R.I., Professor (R)
Baskin, C., Professor* (R)
Bitzer, M.J., Professor (Emeritus)
Blair, M., Research Specialist
Burton, H.R., Associate Professor (R)
Bush, L.P., Professor (R)
Calvert, J., Research Specialist
Chappell, J., Professor (R)
Collins, G.B., Professor (R)
Cornelius, P.L., Professor (R)
Coyne, M., Associate Professor (R)
D'Angelo, E.M., Associate Professor (R)
Davies, M., Professor and Director, KTRDC
Dinkins, R., Assistant Adjunct Professor
Ditsch, D., Associate Extension Professor
Dougherty, C.T., Professor (R)
Drury, L.T., Research Specialist
Egli, D.B., Professor (R)
Grabau, L.J., Professor (R)
Green, J.D., Extension Professor
Grove, J.H., Associate Professor (R)
Herbek, J.H., Extension Professor
Hildebrand, D.F., Professor (R)
Hill, R., Research Specialist
Hunt, A.G., Professor (R)
Jack, A.M., Research Specialist
Kagan, I., Assistant Professor Adjunct
Karathanasis, A.D., Professor (R)
Kennedy, B.S., Research Specialist
Knott, C., Research Specialist
Kumudini, S., Assistant Professor (R)
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Lacefield, G.D., Extension Professor
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Martin, J.R., Extension Professor
Matocha, C.J., Assistant Professor (R)
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Mueller, T.G., Associate Professor (R)
Murdock, L.W., Extension Professor
Olson, G., Research Specialist
Palmer, G.K., Associate Extension Professor
Pearce, R.C., Associate Extension Professor
Pearce, W.L., Research Specialist
Perry, S.E., Associate Professor (R)
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Powell, A.J., Professor (Emeritus)
Rasnake, M., Associate Extension Professor
Ritchey, E., Research Specialist
Schwab, G.J., Assistant Extension Professor
Siminszky, B., Assistant Professor (R)
Slack, C.H., Research Specialist
Smalle, J., Assistant Professor (R)
Smith, R.S., Associate Extension Professor
Stefaniak, T., Research Specialist
Tang, G., Assistant Professor (R)
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TeKrony, D.M., Professor (R)
Thom, W.O., Extension Professor
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Wagner, G.J., Professor (R)
Wendroth, O., Associate Professor (R)
Williams, D.W., Associate Professor (R)
Witt, W.W., Professor (R)
Xu, D., Assistant Adjunct Professor (R)
Yuan, L., Assistant Professor (R)
Zhu, H., Assistant Professor (R)

* *Joint Biological Sciences*

Plant Pathology

Smith, D.A., Professor and Chair
Bachi, P.R., Research Specialist
Beale, J.W., Research Specialist
De Sa Guimaraes, P., Research Specialist
Farman, M.L., Associate Professor (R)
Ghabrial, S.A., Professor (R)
Goodin, M.M., Assistant Professor (R)
Hartman, J.R., Extension Professor
Hershman, D.E., Extension Professor
Kachroo, P.R., Assistant Professor (R)
Kachroo, A.P., Research Specialist
Nagy, P.D., Associate Professor (R)
Nuckles, E.M., Research Specialist
Pogany, J., Research Specialist
Schardl, C.L., Professor (R)
Seebold Jr., K.W., Assistant Extension Professor
Thornbury, D.W., Scientist II
Vaillancourt, L.J., Associate Professor (R)
Vincelli, P., Extension Professor
Wang, R., Research Specialist

Regulatory Services

Thom, W.O., Interim Director (July-December); Interim Feed Coordinator (August-December) and Professor
Miller, C.E., Director (January-June)
Barrow, M.C., Inspector
Bryant, M., Feed/Fertilizer Laboratory Coordinator
Buckingham, D.T., Seed Regulatory Coordinator

Coffey, D.S., Inspector
Finneseth, C.H., Seed Testing Coordinator
Flood, J.S., Inspector
Hickerson, R.R., Inspector
Johnston, C.B., Inspector
Johnston, N.T., Inspector
Mason, D.W., Inspector
McMurry, S.W., Inspection Coordinator
Pinkston, W.W., Inspector
Prather, T.G., Inspector
Sikora, F.J., Soil Testing Coordinator & Professor
Spencer, H.S., Auditor
Terry, D.L., Fertilizer Coordinator and Assistant Director
Thompson, C.D., Milk Coordinator
Traylor, S.L., Feed Coordinator (January-August)
Webb, S.F., Analytical Laboratory Coordinator
Whitehouse, W.J., Inspector

Robinson Station

Ditsch, D., Acting Superintendent

Tracy Farmer Center for the Environment

Hanley, Carol, Director of Education and Communications

Veterinary Science

Timoney, P.J., Professor and Chair (R)
Allen, G.P., Professor (R)
Artiushin, S.C., Assistant Professor (R)
Bailey, E.F., Professor (R)
Balasuriya, U.B., Associate Professor (R)
Chambers, T.M., Associate Professor (R)
Cook, R.F., Assistant Professor (R)
Dwyer, R.M., Professor (R)
Fitzgerald, B.P., Associate Professor (R)
Graves, K.T., Assistant Professor (R)
Horohov, D.W., Professor (R)
Howe, D.K., Associate Professor (R)
Issel, C.J., Professor (R)
Lear, T.L., Associate Professor (R)
Lyons, E.T., Professor (R)
MacLeod, J.N., Professor (R)
McDowell, K.J., Associate Professor (R)
Powell, D.G., Professor
Swerczek, T.W., Professor (R)
Timoney, J.F., Professor (R)
Tobin, T., Professor (R)

West Kentucky Substation

Davis, D., Superintendent

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