AGRICULTURAL EXPERIMENT STATION • UNIVERSITY OF KENTUCKY COLLEGE OF AGRICULTURE, LEXINGTON, KY, 40546

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UNIVERSITY OF KENTUCKY
College of Agriculture

The Kentucky
Agricultural Experiment Station

123rd

Annual Report
2010

UKAg RESEARCH University of Kentucky • Lexington, Kentucky 40546

To His Excellency,
The Honorable Steven L. Beshear
Governor of Kentucky

I herewith submit the one hundred and twenty-third annual report of the Kentucky Agricultural Experiment Station for the period ending December 31, 2010. 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

Nancy M. Cox, Associate Dean for Research
Director, Agricultural Experiment Station
Lexington, Kentucky
June 30, 2011

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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, bioenergy, 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.

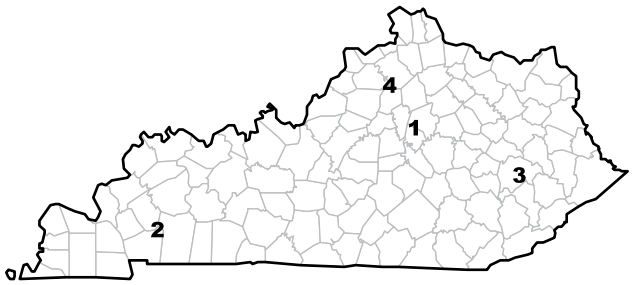
This Annual Report lists Experiment Station research projects and publications completed during 2010. A personnel list is also provided.

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 2010.

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**—Dairy cattle, poultry, and horses; forages and grain crops, tobacco, and turf.
- **Horticulture Research 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 (beef cattle, sheep, and swine) 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, fruits, ornamentals and vegetables, forages, and tobacco.

Map Position 3

- At **Quicksand** *(Breathitt County),* the Robinson Center for Appalachian Resource Sustainability 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.

Environmental and Natural Resource Initiative

The Environmental and Natural Resource Initiative (ENRI) is new within the College of Agriculture. It provides focus for the College's environmental and natural resources in interdisciplinary basic and applied research, interdepartmental graduate and undergraduate instruction, and highly collaborative extension and engagement services. ENRI has been charged with ensuring that the visibility, synergy, and impact of environmental programming within the College is recognized by individuals within and outside the University setting.

To provide the foundation for the initiative, a steering committee of faculty from across the College was formed in 2010. Another accomplishment in 2010 was the development of ENRI's website (http://www2.ca.uky.edu/environment/) with pages devoted to publications, outreach, research, graduate and undergraduate programs, and news. The website is the portal for information about the College's environmental and natural resources activities.

Equine Initiative

In March 2005, UK's College of Agriculture set out to better serve Kentucky's multi-breed horse industry by building on the university's strong tradition of excellence in equine research, teaching, and service and to enhance the state's well-deserved status as the "Horse Capital of the World." UK President Lee T. Todd Jr. named the Equine Initiative as one of UK's Commonwealth Collaboratives, a term encompassing projects aimed at improving Kentucky's schools, business climate, environment, health care, and lifestyles.

The Equine Initiative is an overarching framework for all things equine at the University of Kentucky. It is a cross-departmental and cross-disciplinary approach within the College of Agriculture. Its mission is to discover, share, and apply new knowledge that will enhance the health, performance, and management of horses commensurate with the signature status of Kentucky's horse industry.

The Equine Initiative is reflective of UK's Top 20 vision and since its inception has attracted new students, new faculty, and new research and provided outreach opportunities for the state. The ultimate destination? UK becomes the world leader in equine teaching, research, and outreach/extension. Currently, the College of Agriculture has an equine focus that includes a team of more than 50 faculty and staff working from eight different departments. Eight new horse-oriented faculty have been hired since the Equine Initiative's inception.

One of the most tangible of the Equine Initiative's enhancements was the formation of an undergraduate degree program. There are now a total of 172 students in the program, with roughly 50 percent from outside Kentucky. While a lot of other schools have an equine major of some type, only two other land grant universities in the United States—Colorado State and Arizona State—have stand-alone equine degree programs.

Noteworthy Developments in 2010

The Equine Initiative was busy in 2010. The biggest resource commitment and main work effort centered on the 2010 Alltech FEI World Equestrian Games (WEG). The UK Equine Initiative was involved in the games on many fronts, including:

- Twenty-seven of the 100 miles of the endurance event took place on the College's Maine Chance Equine Campus and Spindletop Farm. UK's Equine Initiative and the College of Ag hosted a party under the tent for stakeholders. Almost 300 people attended the event, which extended from lunch into the afternoon.
- The initiative served as part of the UK official sponsorship package. UK HealthCare was the official medical provider for the games, and with that designation, UK was considered a major partner and the Equine Initiative the games' official equine university program. Part of this sponsorship included a presence in the UK Village, a 3,000-square-foot structure. The College was one of the village's anchors, along with UK HealthCare, the UK Office for Commercialization and Economic Development, Saddle Up Safely, and UK as a whole. During this time, the UK Equine Initiative helped field 271 volunteers, and the UK Village gave away approximately 30,000 items. The College of Agriculture had a big informational presence in these giveaways, including the College's overall informational brochure, an EI postcard, a *Bluegrass Equine Digest* bookmark, and The Arboretum brochure. As a result of the display, 230 prospective students filled out a form requesting more information from the College of Agriculture. Of those requests, 34 states were represented, as were six other countries, including Columbia, Mexico, Uruguay, Canada, Australia, and the Dominican Republic. Also during WEG, the Equine Initiative featured a website landing page and sent out 186 Tweets.
- The Equine Initiative served as a leading member of a Kentucky Equine education consortium booth. UK, along with eight other equine higher education programs recognized by the Council of Postsecondary Education, designed a consortium booth themed "Where else for an equine education?" promoting Kentucky as *the* place for students to look to for an equine higher education. The display's main message featured Kentucky as a whole and coming here for an equine education, not any one school. It appeared at the games in the Equine Village and is now used by representatives from the schools when they are travelling to events around the country to promote horse college programs in Kentucky.
- As part of the lead-in to the games, UK College of Agriculture reserved one of the horses for Horse Mania, an outdoor display of fiberglass horses that had been decorated by local artists. "Big Blue" as the horse was named, was syndicated

to offset the cost. He was repurchased by the syndicate and now resides in the UK Veterinary Diagnostic Laboratory.

- The initiative was part of the Kentucky Youth Equine Festival: Celebrating the World Equestrian Games, which was held in conjunction with the American Youth Horse Council National Leaders' Symposium. It was a special one-day program targeting horse-oriented youth with prior knowledge as well as non-horse youth with no familiarity with either horses or the World Equestrian Games. Festival program activities consisted of live demonstrations of all six disciplines included in WEG, interactive and hands-on displays, and other demonstrations, booths, and vendors. Invitations were sent to all school districts in the state. Close to 6,000 students attended. The Equine Initiative and the University of Louisville Equine Industry Program were co-title sponsors.

Other notable endeavors and/or partnerships included:

- Kentucky International Equine Summit 2010. Sponsored biennially by the University of Louisville Equine Industry Program in cooperation with UK's Equine Initiative, the summit is designed to help volunteer leaders of equine organizations discover and implement practical solutions to the challenges facing a diverse industry through enhanced communication, scientific research, and expansive cooperation. The summit took place April 26-27 in Lexington. Subject tracks for 2010 included education of tomorrow's equine leaders, association leadership and management, committing to responsible equine care, and equine industry structure and strategies.
- A partnership with UKHealthCare called Saddle Up Safely. With a goal of making a great sport safer, the campaign aims to help riders more safely engage in their passion. The five-year campaign is designed to be a lasting legacy of the 2010 Alltech FEI World Equestrian Games. It includes brochures, continuing medical education opportunities, education-based programs, a volunteer-based speakers auxiliary, a website featuring safety tips and stories from injured riders, and a blog hosted by Fernanda Camargo, College of Agriculture assistant professor and head of Kentucky's 4-H Horse Program. The campaign grew out of awareness of statistics from UK's emergency department for riders hospitalized with injuries due to their riding/handling of horses. The campaign is an attempt to help drop those numbers and help Kentuckians (and those beyond the state) consider riding safety tips and practices.
- *Bluegrass Equine Digest*, a free monthly equine research e-newsletter published in conjunction with theHorse.com that features UK equine research, which continued to grow in 2010. This publication had 32,500 subscribers as of January 2011, increasing subscribers by 1,000 to 2,000 per month, as well as one of the highest click-through rates for stories appearing in theHorse.com's newsletters.
- Working with top reproductive scientists and veterinarians at Hagyard Equine Medical Institute and Rood and Riddle Equine Hospital to plan for International Summit on Equine Reproduction, held in July and attracting scientists from across the world to UK's campus.
- Held a second annual equine field day in June at Lexington's Spy Coast Farm that attracted more than 150 attendees, who learned about topics including pasture management, weed control, reproductive research, and environmental compliance.
- Partnered with Rood and Riddle Equine Hospital on Hats Off to Kentucky's Horse Industry Day in August, a free day at the Kentucky Horse Park that educates the general public about the importance of Kentucky's horse industry and raises money for important equine charities.
- Held the second in a Distinguished Lecture Series in April to showcase prominent equine industry leaders and provide students and the general public the opportunity to listen to an interview, ask questions, and interact with those leaders.
- Hosted a student career fair in March through the Equine Initiative's Student Working Group. The fair attracted more than 30 area businesses and featured talks about careers and job hunting for equine students at UK as well as many equine programs at other area university and colleges. The success of this fair has led to plans for yearly career fairs hosted by UK.

Program Areas of Excellence

Program areas of excellence for equine in the College of Ag include the following:

- Maxwell H. Gluck Equine Research Center's development of vaccines against six of the 10 most common equine infectious diseases.
- The University of Kentucky Veterinary Diagnostic Laboratory has the highest equine caseload in the world.
- The legacy of the Department of Animal and Food Sciences in nutrition research
- 4-H and youth programs that reach more than 6,000 youth
- Horse College, an adult education program reaching more than 1,500
- The UK Horse Pasture Evaluation Program, which has evaluated more than 50 horse farms and 3,700 acres in Central Kentucky
- Expansion of the concept of Kentucky's horse industry as an economic cluster of businesses and institutions
- Research on horse environments: mud, pervious concrete, stream crossings, and more
- Development of HorseQuest, a central web-based source for equine information that is now a community of practice within eXtension.

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 KTRDC program emphasizes applications-oriented research specifically designed to connect plant biotechnology research in the laboratory to the development of new crop-based businesses and technologies for Kentucky agriculture, including tobacco.

KTRDC-funded projects explore the development and use of tobacco as a production system for plant-made pharmaceuticals and industrial products and the discovery and development of new plant natural products having potential for commercialization.

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.

Renewed Investment

Early signs of renewed investment in the life-sciences industry have appeared as the economic recession has eased. While funding challenges remain very difficult for startup and early-stage companies, it seems likely that the continuing advances of science and technology, together with demand for novel industrial products and better pharmaceuticals, will soon stimulate new interest in agricultural and medical biotechnology.

The projected new uses for plants, including tobacco, to produce protein-based vaccines and other medical drugs provide a good example of this new opportunism, in that the urgent drive for more economical production of vaccines and the emergence of generic forms of "biotech medicines" (so-called "biosimilars") are generating welcome new interest in plant-based production. The center has been pleased to work with industry in exploring more efficient greenhouse production of tobacco for these new purposes, and KTRDC researchers continue to promote and develop both indoor and outdoor production of the tobacco plant as an attractive system for plant-made pharmaceutical applications.

There has also been new interest in plant-based biomanufacturing of industrial products—discussions are currently ongoing with industrial and academic researchers concerning the potential uses of tobacco to provide novel fiber for making specialty fabrics and of the Russian dandelion plant as a source of industrial chemicals and possibly medicines.

Ongoing Research, Technology Transfer

Meanwhile, ongoing research examines the use of tobacco as a biomanufacturing system for the enzymes used to convert plant material into biofuels. In the future, when plants become significant sources of transportation fuel, such enzymes will be needed in quantities far greater than can be produced currently via the established fermentation methods—hence the attraction of tobacco-based production. Not all of the new opportunities are necessarily transgenic, as illustrated by the prospective development of a new crop from the chia plant for novel food-ingredient applications.

Looking back over the development of plant biotechnology, including the technologies that enable new uses for the tobacco plant, the "bottleneck" of transition from industrial or academic laboratory breakthrough to commercial implementation always stands out as a significant constraint. While issues such as acceptance of GMOs sometimes contribute to this limiting step, the time-honored system of patenting, licensing, starting companies, and raising operating and capital funds is undeniably slow, very uncertain, and burdensome in the United States and elsewhere. An easier, quicker path would surely help so many successful inventions to reach farmers and end-users. The opportunity exists to propose ideas on technology transfer for discussion and consideration on the national scale.

Information Exchange

In 2010, KTRDC researchers continued to promote the program and to exchange information through participation in conferences, workshops, and other events worldwide. Examples include the session on plant-made pharmaceuticals at the Tobacco Workers Conference organized by Dr. Orlando Chambers, participation in the CORESTA Congress (Edinburgh, Great Britain) on promoting the scientific basis for tobacco product regulation, the Plant and Animal Genome Conference (San Diego), and the visit of a Kentucky Farm Bureau delegation to the KTRDC.

New Research

In 2010, KTRDC was again able to fund three new grants, which are highlighted here:

Dr. David Zaitlin and Dr. Michael Goodin initiated a project to use *Nicotiana benthamiana*, a well-characterized tobacco species widely employed in plant research, as a model in which to identify plant proteins that associate with a specific viral protein and participate in the infection and/or spread of Tobacco Etch Virus (TEV) in the host. This project will be carried out using a comprehensive yeast two-hybrid screen of the *N. benthamiana* transcriptome, and the top five proteins that bind strongly to the viral cytoplasmic inclusion (CI) protein will be chosen for further investigation.

The proposed research will contribute substantially to the KTRDC research mission by addressing resistance to major plant viruses (TEV, Potato Virus Y [PVY], and other potyviruses) that infect tobacco and other cultivated members of the Solanaceae. The strategies outlined will be initiated in *N. benthamiana* and could be readily transferred into cultivars of *N. tabacum*, pepper, and tomato, all of which can be grown in Kentucky. Successful engineering of virus resistance will undoubtedly improve plant health and, therefore, crop performance, particularly under conditions of high aphid numbers and heavy virus pressure. The work will also extend the current state of knowledge regarding the molecular biology of plant-potyvirus protein interactions in a living plant cell.

Dr. Indu Maiti and Dr. Robert Houtz will manipulate an important signaling pathway in plants at the genetic level to create increased disease resistance, perhaps including tobacco blue mold and black shank. Existing evidence clearly indicates the potential success of these studies and suggests that other valuable plant traits, including plant height (for increased planting densities) and severely reduced seed viability (to limit escape of genetically modified plants under field conditions), may also be controlled. The proposed studies satisfy the mission and goals of the KTRDC in providing research that potentially preserves and strengthens tobacco agriculture in Kentucky and simultaneously identifies gene targets that could improve many other agriculturally important crop species.

Dr. Orlando Chambers and Dr. Ling Yuan are advancing KTRDC's efforts on developing optimized tobacco varieties for the production of humanized therapeutic proteins by combining technology development with applied variety development. Most therapeutic proteins are post-transcriptionally modified in mammalian cells by linking complex glycan sugars. The sugar modifications of proteins produced in plant cells are structurally different from those in mammalian cells. These differences can alter the immunogenicity of the plant-produced protein, creating a significant obstacle to regulatory approval and thus to commercial production of many plant-made pharmaceutical (PMP) products. The KTRDC scientists have developed a number of novel technologies that are particularly suitable for solving this problem. These solutions include creation of an effective small-RNA based gene suppression system that allows the simultaneous inhibition of multiple genes. In addition, they have successfully created artificial, multifunctional enzymes, enabling a single polypeptide to catalyze multiple reactions. They propose to combine these technologies to create an efficient yet simple plant gene expression system that can replace the plant glycosylation machinery with one that mimics a mammalian system. The transgenic plants generated from this approach will permit protein modifications similar to those in mammalian cells, thus removing a significant technical barrier in PMP production. These traits will be engineered into Nicotiana (tobacco) lines that are under development by KTRDC to assure genetic containment and to optimize production yields.

Regulatory Services

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

The division administers four state laws pertaining to ingredients, manufacturing, processing, labeling, and marketing of feed, fertilizer, seed, and raw milk. Our primary objectives are to protect consumers of these products from poor-quality, mislabeled, or misrepresented products and to protect businesses marketing these products from unfair competition.

Feed, fertilizer, and seed are monitored from ingredients through manufacturing and retail channels for compliance. Label review and product and facility inspections as well as product sampling by our inspectors and analysis in our laboratories are important steps in this process. Raw milk is monitored during marketing to (1) ensure accurate and equitable exchange between dairy producers and processors and (2) ensure integrity of milk from farm to processor.

Eight regulatory inspectors and one auditor cover the state collecting samples, inspecting facilities, reviewing labels, and auditing records. Audits of sales and fee payments were conducted on 316 of 376 feed, fertilizer, seed, and milk firms in Kentucky to verify reports, records, and fee payments. One inspector is dedicated to the milk program for auditing testing records and monitoring activities of sampler-weighers, handlers, lab testers, and lab facilities.

The activities in the division are performed by dedicated and professional staff members who conduct laboratory analyses, provide administrative and computer support, process data, and compile reports in addition to various other duties necessary to carry out and administer effective programs.

Feed Regulatory Program

The feed regulatory program provides consumer protection for livestock feed and pet food according to provisions of the Kentucky Commercial Feed Law. The program ensures safety, suitability, and quality of animal feed in producing meat, milk, and eggs for human consumption and products for companion animals. The program provides standards of quality, safety, efficacy, and labeling for feed products. A statewide inspection, sampling, and laboratory testing program monitors feed products and reviews labels. Labels are evaluated to identify purpose of feed, guaranteed composition, ingredient list, feeding directions, and the need for any warning or caution statements.

The feed program participates in food safety efforts that promote consumer confidence in the nation's food supply. We work cooperatively with the Food and Drug Administration (FDA) in assessing compliance with the ruminant-to-ruminant feeding ban to prevent any establishment or amplification of bovine spongiform encephalopathy (BSE, or "mad cow disease").

2010 Highlights:

- The inspectors collected 2,333 official samples, and others provided 52 unofficial samples that resulted in 15,244 analyses for more than 2 million tons of feed marketed.
- The inspectors collected and the laboratory analyzed 649 specialty pet food samples.
- Analysis was provided on 425 research feed samples for College faculty.
- The feed program monitored the 2010 corn crop for mycotoxins including aflatoxin, fumonisin, and vomitoxin with laboratory analysis of 52 corn samples. More than 300 feed samples were analyzed for mycotoxins during the year.
- Inspectors conducted 75 BSE inspections for compliance and inspected four feed mills that mix restricted drugs in feed for compliance of use and adequate records.

- The program maintained registration on more than 19,000 feed products from almost 1,200 companies and conducted new product label reviews on more than 1,000 products.
- Sixty laboratory check samples for American Oil Chemists Society (AOCS) mycotoxins, American Association of Fertilizer Control Officials (AAFCO) check samples, AOCS microscopy, and USDA grain sample share programs were analyzed and reported.
- The laboratory uses 43 different approved analytical methods in providing results.
- The income from inspection fees and product registration received from July 1, 2009 to June 30, 2010 was $1,048,531. Inspection fees are assessed at 35 cents/ton.

Fertilizer Regulatory Program

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.

2010 Highlights:

- Administered actions on 2,285 official and 204 unofficial samples of fertilizer involving 7,500 chemical tests
- The official samples represented about 37,250 tons out of the approximately 762,370 tons of fertilizer distributed in Kentucky during 2010, or about 4.9%.
- Reviewed labels and registered 4,521 products from 616 firms and issued licenses to 213 companies that manufactured custom-blended fertilizers
- Analyzed laboratory check sample materials from Magruder®, urea ammonium nitrate (UAN), Association of Fertilizer and Phosphate Chemists (AFPC) phosphate rock, AFPC phosphate, and AFPC specials for the fertilizer regulatory program
- Provided support for 15 different analytical methods that yield results for 28 analytes and contaminants
- Substantiated cash receivables from fertilizer reports
- The income from registration fees, inspection fees, and licenses received from July 1, 2009 to June 30, 2010 was $528,741. Fertilizer products are assessed an inspection fee of 50 cents/ton.

Milk Regulatory Program

The mission of the milk regulatory program is to ensure raw farm milk produced and marketed in Kentucky is bought and sold using accurate weights and tests. The program's primary function is to monitor milk handling systems from the time a producer's milk is sampled and weighed through delivery and laboratory testing until producer payments are calculated. The program provides support to the producers and processors of Kentucky's $238 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, processors, and allied industries. The milk program also operates a laboratory that is available for Kentucky producer, processor, and handler service testing.

2010 Highlights:

- Reviewed and issued licenses to three transfer stations, 24 milk handlers, 19 laboratories, 74 testers, and 350 sampler-weighers (milk-haulers, receivers, and samplers)
- Analyzed and administered action on 2,083 official samples
- Administered a monthly milk lab quality control check sample program through the distribution of 2,772 check samples to the 19 licensed laboratories and two other labs to ensure accurate component testing procedures
- Conducted 12 pay-records and 15 raw milk receiving manifest audits
- Conducted 31 milk laboratory inspections
- Collaborated with Kentucky Cabinet for Health Services Milk Safety Branch to train sampler-weighers and processor receiving personnel
- Trained and examined 30 new sampler-weighers and eight new testers
- Conducted seven inspections of raw milk transfer stations
- Conducted 229 sampler-weigher inspections
- Provided testing for research pertaining to sample age, horse milk, sow milk, and other research in the College. Provided testing for Kentucky small processor cheese makers
- Intensified milk testing study conducted during the month of October. Statistical study conducted on 350 samples to see if last stop load sample could be eliminated
- Cash receivables were substantiated on 92 milk reports, and the income from fees and licenses received from July 1, 2009, to June 30, 2010 was $194,345. Milk handlers and producers are assessed at 0.5 cents per 100 lb.

Seed Regulatory Program

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, including 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, seed conditioners, and seed dealers in the state.

2010 Highlights:

- Conducted 1,188 visits to perform inspections and to sample agricultural, lawn, turf, and garden seeds at Kentucky seed processing, wholesale, and retail locations
- Collected and tested 1,533 official seed samples
- Issued stop-sale orders on 175 official seed samples and 122 violative seed lots at seed dealer and seed processor locations

- Cooperated with the USDA Seed Regulatory and Testing Branch regarding shipments of seed into the state that were in violation of the Federal Seed Act
- Reviewed and issued 236 agricultural permits and 46 vegetable and flower permits to label seed
- Registered 578 seed dealers and 25 non-certified custom conditioners
- Provided training to firms on labeling requirements, retail sales procedures, stop sale release procedures, and record-keeping requirements
- Cash receivables were substantiated on 796 seed reports, and the income from fees, permits, and licenses received from July 1, 2009, to Jun 30, 2010, was $323,009. Seed products are assessed at 4 to 24 cents per unit.

Seed Testing Laboratory

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 2010, 98% of service samples accepted into the laboratory were submitted by Kentucky firms or individuals. Services to customers in 2010 included electronic notification of sample activity and reporting of test results as well as real-time online access to service sample test 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 of analysis. More than 19,500 individual tests were performed by laboratory personnel on more than 185 different crops in 2010. The program received $79,030 in income for service testing during the period from July 1, 2009 through June 30, 2010.

Soil Testing Laboratory

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 Kentucky 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 program received $217,792 in income for service testing during the period from July 1, 2009 through June 30, 2010.

The soil test website is at http://soils.rs.uky.edu.

2010 Highlights:

Number of Soil Samples Analyzed in 2010		
Type	**Number**	**% Change***
Agriculture	37,549	-7
Home lawn and garden	8,753	-18
Commercial horticulture	850	1
Greenhouse media	79	-7
Research	7,485	4
Atrazine residue in soil	10	-68
Animal waste	390	17
Nutrient solution	84	12
TOTAL	55,200	-8
*Compared to 2009.		

Robinson Center for Appalachian Resource Sustainability

At Quicksand in Breathitt County, the Robinson Center for Appalachian Resource Sustainability (RCARS) is the east region location for research on fruits and vegetables, ornamentals, livestock forages, grain crops, biomass crops, tobacco, and wood utilization. The Robinson Center is also the administrative headquarters of the Robinson Forest, which spreads over parts of Breathitt, Perry, and Knott counties and is the site of forestry, wildlife, surface mine reclamation and watershed management research.

The Robinson Center for Appalachian Resource Sustainability has the budgetary and physical responsibility for managing the research facilities at Quicksand, the Wood Utilization Center, and Robinson Forest. The mission of this re-organized unit is to increase the long-term value-added, sustainable income and sustainable flow of economic, ecological, and social goods and services from the lands, natural resources, and people of Eastern Kentucky and the Appalachian Region.

2010 Research Activities

Robinson Center

Department of Horticulture

- Variety testing for tomato, green bean, pumpkin, sweet potato, apple, peach, and grape crops are conducted by extension horticulture faculty.

Department of Plant and Soil Sciences

- The RCARS is the east region location for livestock forage variety and corn hybrid testing programs. Results from these trials are published annually.
- Extension faculty are studying nitrogen volatilization in no-till corn production on an eastern Kentucky alluvial soil.
- RCARS is one of three sites devoted to soil fertility research in a no-tillage corn and soybean rotation involving comparisons of poultry litter and inorganic fertilizer.

Department of Plant Pathology

- Twenty experimental lines of tobacco were evaluated for resistance to blue mold as part of a collaborative international research project.

- In collaboration with Horticulture faculty at RCARS, cucurbit downy mildew sentinel plots were established in the spring and summer of 2010 at the Robinson Center. These plots are used for early detection of downy mildew, a potentially devastating disease of cucurbits, and to determine which cucurbits (cucumbers, pumpkins, and melons) will be most affected.

Collaboration

Biosystems and Agricultural Engineering, Horticulture, Plant and Soil Sciences, and the Center for Applied Energy Research are investigating the potential energy production from alternative crops on marginal agricultural land. The plots were established during 2010, and measurements taken will include changes in soil carbon, biomass production, and potential energy production (as a liquid or solid fuel) from Miscanthus, switchgrass, black locust, and cottonwood.

Robinson Forest

Research includes the following projects:

Department of Entomology

- Permanent vegetation plots to evaluate hemlock woolly adelgid-induced changes in forest composition and structure
- Comparing headwater streams with hemlock-dominated riparian zones to deciduous-dominated riparian zones with respect to stream chemistry and benthic and riparian macro-invertebrates
- Hemlock woolly adelgid host choice and predator efficacy on hemlocks with varying levels of resistance

Department of Forestry

- Use of GIS and the U.S. Geological Survey model WATER to identify and delineate stream types in eastern Kentucky (with the Department of Biosystems and Agricultural Engineering)
- Long-term effects of forestry best management practices on hydrology, water chemistry and woody debris in three Appalachian headwater catchments
- Influence of streamside management zone protection on hydrology and water quality in forested headwater catchments
- Effect of riparian zone width and disturbance on stream communities following forest harvest in eastern Kentucky watersheds
- Design of a headwater stream for a head-of-hollow fill (with the Department of Biosystems and Agricultural Engineering)
- Timber harvesting analysis using GPS and GIS
- Landscape predictors of Stream Visual Assessment Protocol (SVAP) scores and Robinson Forest (with the Department of Landscape Architecture)
- Evaluating hydrological, water quality, and biological responses to headwater stream restoration on eastern Kentucky surface mines (with the Department of Biosystems and Agricultural Engineering and the University of Louisville)
- Assessing sedimentation rates of temporary skid trail headwater stream crossings
- Evaluating spoil amendment use and mycorrhizal inoculation on reforestation success in the Eastern Kentucky Coalfield

2010 Extension Activities

- Mountain Ag and Energy Week, Sept. 28–Oct. 2
- Win With Wood youth event, annual youth program focused on forestry and the forest industry, Oct. 14
- Mined Land Reclamation Research: Reforestation, Hydrology, Water Quality, and Stream Restoration, a presentation for the U.S. Environmental Protection Agency, Starfire Mine and Guy Cove, April 20
- Streamside management zone tour at RCARS field day, Oct. 2
- USDA Silviculture Tour, Robinson Forest
- Kentucky Division of Forestry, Forest Resource Utilization/Timber Harvesting Compliance Ranger/Technician Level II Training Course, Robinson Forest and the Wood Utilization Center
- Underground mine/reforestation tour for editorial staff from the *Lexington Herald- Leader, Mountain Eagle, Appalachian News*, and East Kentucky Broadcasting
- Stream identification training course (Environmental Protection Agency, Office of Surface Mining, U.S. Army Corps of Engineers participants) led by a former professor, North Carolina State University
- UK's Department of Forestry at RCARS and the Kentucky Division of Forestry worked together to create and maintain a directory of the state's wood products companies
- Training program to teach hands-on methods for moulder setup and operations and profile knife grinding at the RCARS Wood Utilization Center

2010 Teaching Activities Conducted at Robinson Forest

NRC 320 – Field Experience in Data Collection Techniques
FOR 375 – Taxonomy of Forest Vegetation
FOR 376 – Silvicultural Practices
FOR 377 – Forest Surveying
FOR 378 – Forest Mensuration
FOR 379 – Harvest and Utilization of Wood

Sustainable Agriculture and Food Systems Working Group

The Sustainable Agriculture and Food Systems Working Group's mission is to create new knowledge to improve the sustainability of the food system in Kentucky and beyond, help Kentucky citizens and students understand sustainable agriculture and food systems, and promote UK's activities as they relate to sustainable agriculture and food systems within the land-grant mission. Inside the College of Agriculture, the group works across all departments to develop synergy between them, and its membership includes a member from every department within the College.

UK Dining Services

The whole-beef carcass purchase program, a values-based food chain developed by Dr. Gregg Rentfrow and Bob Perry for

UK Dining Services, continues to provide high quality 100% Kentucky beef for use across the University. This program has also been expanded to include pork carcasses at a substantial savings to the University and has an economic impact of over $2 million annually, with most of that money going directly to the farms raising the beef and pork. The success of this program will be noted in an upcoming publication by the USDA on food value chains, and a case study explaining the details will be published in 2011. This effort has generated many inquiries from other colleges, universities, and volume feeding operations and requests for conference presentations on how the program works.

Chefs Afield

Almost 200 agricultural and community leaders and were feted at Chefs Afield, an event held at the Horticulture Research Farm (South Farm) in Lexington in October. Chefs Afield was designed to showcase the College's sustainable agriculture programs and research in an informal setting, including a meal prepared from the farm's produce. Some of Kentucky's best-known chefs volunteered to prepare the multicourse meal, which was served on the grounds. Beef, pork, and lamb were donated by the American Grassfed Association, which had held its annual conference on campus earlier in the year. UK Dining Services was an invaluable partner in this event, providing a full mobile kitchen for use by the chefs and also providing the china, flatware, glasses, and service staff needed to orchestrate the event.

Grassfed Beef

As mentioned above, the working group hosted the American Grassfed Association's annual Grazing America conference in 2010. The association received so many positive comments from attendees at the 2009 conference at UK that the AGA board decided to hold it at UK again, which is the only time this conference has repeated a location. UK researchers presented many of the conference programs, and a direct result was the formation of the Kentucky Forage Finished Beef Project to assist Kentucky farms engaged in forage finishing of beef cattle.

Farm and Food System of the Future Convocation

This Farm and Food System of the Future Convocation brought two notable speakers to campus, Dr. Jerry Dewitt, former director of the Leopold Center at Iowa State, and Dr. Debby Sheely, director of USDA's National Institute of Food and Agriculture (NIFA). The convocation drew both faculty and staff from across the University as well as members of the general public interested in the sustainable development of agriculture. Dr. Dewitt's presentation focused on how the Leopold Center formed communities of practice around specific efforts and issues confronting small- and medium-sized farms by bringing together researchers from across various disciplines within Iowa State's College of Agriculture. Dr. Sheely explained changes in USDA grant funding and provided invaluable tips for navigating new funding streams for research.

Outreach

This year, members of the working group had numerous contacts with farmers and citizens seeking University expertise on marketing, manufacturing, and processing for all types of food and sustainable agriculture systems. The working group's website went live in the spring, and news items, events, and articles of interest to the sustainable agriculture audience are added often. Members of the group are frequent speakers across campus and at conferences worldwide. The farmers market report produced by public radio station WUKY relies on working group members for much of the information broadcast weekly during the growing season.

UK Research and Education Center at Princeton

The University of Kentucky Research and Education Center (UKREC) holds a unique position as part of the Kentucky Agricultural Experiment Station and the Kentucky Cooperative Extension Service and remains dedicated to sustaining the heritage of impact and achievement by these great institutions and the rapidly changing issues and challenges associated with them. Its vision is to be recognized at the local, state, and national level for excellence in agricultural research, education, leadership, and service to the Commonwealth.

Established in 1925, the West Kentucky Substation at Princeton has functioned as a center of agricultural activities in western Kentucky. Great advancements have been made in Kentucky's leading industry—agriculture—with considerable progress being made in improving use and conservation of resources, increasing yields of crops and livestock, better management of capital and labor, expanding markets, and finding solutions for problems facing rural people and communities. Increased returns to Kentucky farmers total millions of dollars annually just from the use of new production technologies resulting from research findings and educational programs of the College of Agriculture.

The UKREC is fundamentally interdisciplinary, applying the biological and social sciences to challenges in agricultural, food, and environmental systems. Our scholarship encompasses human and natural resources and their interaction. As part of the University of Kentucky, the UKREC:

- Facilitates lifelong learning, informed by scholarship and research
- Expands knowledge through creative research and discovery
- Serves Kentucky communities by disseminating, sharing, and applying knowledge

The UKREC is the headquarters for more than 50 faculty and staff members representing eight different departments in the College. Its faculty and staff conduct research, provide diagnostic testing services, and develop educational programs on topics of concern to Kentucky farmers, agribusinesses, and families.

The UKREC Experiment Station Farm consists of almost 1,300 acres, including soils of both sandstone and limestone origin, which are characteristic of soil types throughout the state. Researchers conduct approximately 100 different research/demonstration projects each year at the experiment station farm or on farms in western Kentucky. Information derived from these projects or research conducted elsewhere is delivered to farmers and the general public through county offices of the Cooperative Extension Service. Extension specialists at the UKREC have expertise in a broad spectrum of food and agriculture topics.

Service laboratories located at the UKREC provide information needed to make management decisions in the following areas:

- Soil testing enables farmers to develop nutrient management plans for growing crops.
- The plant disease diagnostic laboratory helps identify plant health problems and provides recommendations for disease prevention and control. Once insect and plant pests are identified, specialists can give advice on integrated pest management strategies to control them.
- Crops such as corn, wheat, soybeans, tobacco, fruit, vegetables, and ornamentals are studied for ways to increase yields and income, improve handling and storage, protect the environment, and address other problems farmers may have.
- A beef herd consisting of 400 animals is involved in many different experiments. Demonstrations and research and education programs in beef production are conducted.
- Agricultural engineering specialists conduct research and educational programs related to both crop and livestock production.
- An aquaculture program is conducted in cooperation with Kentucky State University.

In addition, UKREC provides the following learning opportunities and resources:

- The Rottering-Kuegel Agricultural Research and Extension Building is available to large and small groups for classes and meetings in agriculture, home economics, and 4-H. It is also used for a wide variety of meetings by government agencies, industry, and the general public. Each year approximately 450 different meetings are held in this building, attended by about 14,000 people. Many of these visitors come from other states and foreign countries.
- A biennial field day and other commodity field days, which showcase the work of the UKREC, attract about 3,000 people. Visitors observe research, educational displays, and demonstrations representing work conducted at the UKREC and throughout the state.
- Individuals and small groups are welcome to visit throughout the year to observe specific projects and talk with specialists.

2010 Research Activities

Agricultural Engineering

- Improving energy efficiency in broiler production
- Energy audits for grain and livestock farms
- Insects in commercial grain-handling systems
- Evaluating grain storage systems in West Africa and providing training to facility managers

Beef

- The effect of dietary supplementation of selenium in inorganic and organic forms differentially and commonly in altering blood and liver selenium concentrations and liver gene expression profiles of growing beef heifers
- Study of whether the accumulation of selenium by blood fractions and liver of beef heifers is greater with a mix of inorganic/organic or organic vs. inorganic selenium forms but the time required for maximal accumulation is tissue-specific
- Study of whether mixed or organic vs. inorganic forms of selenium (Se) differentially affect tissue Se concentrations of growing beef heifers
- Forage/management systems for beef cow-calf production

Entomology

- Bt corn variety trials
- Trials of new insecticides for soybeans
- Trials of new insecticides for corn
- Using insect pheromone traps to predict outbreaks

Forages

- Alfalfa persistence
- Alfalfa variety test
- Red clover variety test
- White clover variety test
- Tall fescue variety test
- Orchardgrass variety test
- Switchgrass for biofuels

Grain Crops

- Soybean planting date
- Wheat row spacing
- Canola management
- No-till wheat management
- Soybean management verification program
- Wheat variety trials
- Testing of breeding lines
- Wheat fusarium head blight nursery
- Canola planting methods

Horticulture

Nursery/Landscape

- Landscape plant evaluations
- Landscape plant establishment based on the production container
- Container type evaluation for sustainable production
- Efficient fertilization of nursery crops
- Maintaining water quality and efficient irrigation of nursery crops
- Kentucky native plant evaluation, production protocols, and use

- Development and maintenance of Kentucky provenance stock plants
- Integrated pest management (IPM) monitoring

Fruit
- Rootstock trials: apple and peach
- Cultivar trials: peach, wine grape, and blackberry
- Small fruit demonstration plots
- Strawberry production systems
- Germplasm orchards: pawpaw and pecan

Vegetables
- IPM cucurbits downy mildew sentinel plot
- Cole crop fall cropping evaluation/demonstration

Manure Management and Use
- Development and implementation of within-production facility (under-slat) manure composting for swine

Plant Pathology

Tests:
- Soybean foliar fungicides
- Soybean seed treatments for SCN and soilborne diseases
- Wheat foliar fungicides
- Wheat seed treatments
- National uniform test for integrated control of wheat fusarium head blight
- Soybean variety evaluations for soybean cyst nematode (SCN)
- Impact of foliar fungicides on reducing yield loss in soybean caused by SCN
- Impact of fungicide class and timing on deoxynivenol accumulation in wheat grain

Soils
- Variable rate nitrogen fertilizer applications using remote sensing
- Efficient use of nitrogen on corn and wheat
- Canola fertilization
- No-till wheat management
- Soil compaction
- Additives to improve N efficiency

Tobacco
- Variety development: dark and burley tobacco
- Tobacco transplant production management
- Insecticide performance for tobacco hornworm and budworm control
- Mechanical harvest for tobacco
- Tobacco fertility management
- Dark fire-curing systems

Weed Science
- Marestail (horseweed) control in weed
- Wheat response to Power and Osprey and topdressing nitrogen
- Impact of seeding depth and variety on response of wheat to Valor
- Wild garlic control with fall and spring applications of PowerFlex and Osprey
- Giant ragweed control in wheat
- Italian ryegrass control with pre- and post-herbicides (two trials)
- Burndown control of marestail (horseweed) in soybeans (four trials)
- Weed control in corn using burndown and soil-residual herbicides (two trials)

UK Veterinary Diagnostic Laboratory

Administration

Craig N. Carter

The University of Kentucky Veterinary Diagnostic Laboratory (UKVDL) continues to strive to be one of the premier veterinary diagnostic laboratories in the United States, providing the most timely and accurate services in support of the practicing veterinary profession, Kentucky animal agriculture, the signature equine industries, companion animals, and public health. As the state's flagship veterinary diagnostic laboratory, the University of Kentucky Veterinary Diagnostic Laboratory's primary goal is to develop, apply, and use state-of-the-art veterinary diagnostic testing methods and scientific knowledge to improve animal health and marketability, preserve the human-animal bond, and help protect and improve public health through the early and accurate identification of zoonotic diseases.

In addition to its clinical diagnostic role, the UKVDL provides surveillance for emerging and endemic diseases such as equine infectious anemia (EIA), equine piroplasmosis, West Nile virus, chronic wasting disease of deer, contagious equine metritis, bovine spongiform encephalitis (mad cow), Johne's disease, bovine leukosis, avian influenza, and many other diseases of agricultural, public health, and companion animal importance. Furthermore, the laboratory is always on the watch for the emergence of foreign animal diseases (FADs) such as foot and mouth disease and classical swine fever. In 2010, UKVDL became proficiency tested to run several tests for FADs.

Animal owners use the UKVDL's services through their practicing veterinarians, who have expertise in selecting, preparing, shipping, and submitting the proper specimens for testing when necessary. Laboratory findings are reported back to the submitting veterinarian, who then consults with his or her clients to implement a treatment protocol or a preventive solution for disease problems on the farm.

UKVDL faculty, scientists, and technical staff are specialists in essential scientific disciplines directly related to animal health, including bacteriology, clinical pathology, epidemiology, extension, molecular biology, pathology, serology, toxicology, virology, and informatics. Disease diagnostic efforts are coordinated and

handled by specialists in the appropriate disciplines. Complex clinical cases involving multiple sections are monitored by highly qualified case coordinators. The UKVDL is organized into sections so that specialized workload/activities can be handled efficiently.

The UKVDL received roughly 53,088 cases in calendar year 2010 (almost flat with 2009 at 53,268), including 3,218 necropsies. Total tests run in each laboratory section will be listed in the individual section reports.

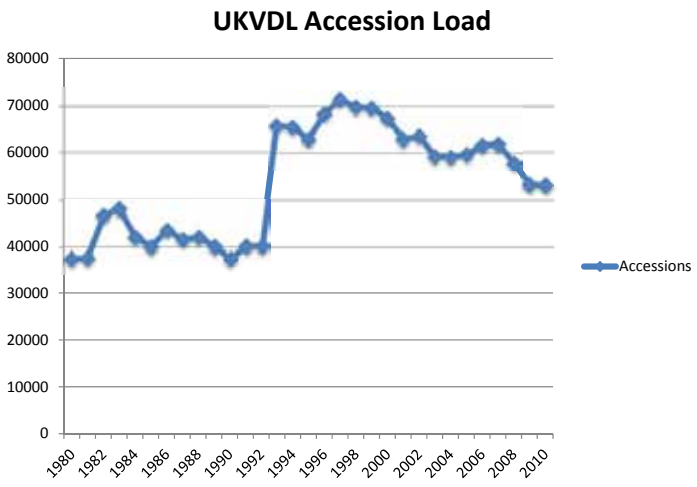
The UKVDL continues its outreach programs around Kentucky. UKVDL staffed an exhibit in Lexington for the Kentucky Cattlemen's Association annual meeting in January as well as one in Louisville for the Kentucky Veterinary Medical Association (KVMA) annual meeting in October. The Kentucky VetLabNet listserv continues to distribute animal health bulletins and has grown to almost 600 UKVDL clients, scientists, and stakeholders. Several field investigations and research visits were conducted by the epidemiology section on Kentucky farms, including dozens of visits to UK's Animal Research Center in Woodford County as part of a research project for the Department of Homeland Security. The UKVDL continues to contribute articles quarterly to the KVMA *Kentucky Veterinary News* and the Kentucky Cattlemen's Association *Cow Country News*. The UKVDL director, faculty, and staff continue to deliver lectures at scientific and lay meetings and participate in the monthly Equine Diagnostic Research Seminar Series at the UKVDL.

The following key positions were filled:

- Ruminant Extension Veterinarian—Dr. Michelle Bilderback
- Head, Diagnostic Microbiology—Dr. Erdal Erol
- Laboratory Animal Pathologist— Dr. Casey Coyle
- Veterinary Technician—Judy Tucker
- Dr. Coyle and Ms. Tucker were transferred permanently to the UKVDL from the UK Division of Laboratory Animal Resources (DLAR).

2010 Highlights:

- Moved into temporary trailers in January to allow for major renovation of UKVDL existing laboratory/administrative space
- Steve Sells and James Anderson traveled to the Kissimmee, FL laboratory to learn Polymerase Chain Reaction (PCR) methods for classical swine fever (CSF), foot and mouth disease (FMD), and avian influenza (AI) as part of UKVDL's responsibility as a member of the National Animal Health Laboratory Network (NAHLN), Jan. 26-27.
- New UKVDL histology laboratory in operation, August
- New UKVDL serology laboratory in operation, September
- New UKVDL receiving facility occupied and in operation, September
- First necropsy in new necropsy facility, Sept. 29
- Follow-up American Association of Veterinary Laboratory Diagnosticians (AAVLD) accreditation visit, Oct. 25
- Proficiency testing completed for Anaplasmosis, Equine Piroplasmosis, Brucellosis, Bluetongue, Bovine Leukosis Virus, EIA, Johne's Serology, FMD, CSF, and AI



- Dr. Carter, UKVDL director, was appointed to the Equine Health and Welfare Council, which held its first meeting Nov. 22.
- UKVDL received full five-year accreditation by the AAVLD, through December 31, 2014.
- The renovation/expansion project is expected to be completed by the end of March 2011.
- Dr. (LtCol) Carney Jackson, UKVDL veterinary pathologist and a member of the Kentucky Air National Guard, deployed to Afghanistan with an agricultural development team in June 2009 for one year. On this deployment, by providing animal health training, he assisted the Afghan Ministry of Agriculture, two veterinary schools, and farmers. His team is also involved in capacity building for animal agricultural operations in Kabul, Bagram Air Base, and other areas around Afghanistan. Dr. Jackson returned to work at UKVDL in July. He was awarded the Bronze Star Medal for his service.
- In November, Dr. Craig Carter, UKVDL director, took office as president of the American Association of Veterinary Laboratory Diagnosticians. Dr. Carter is also executive director of the World Association of Veterinary Laboratory Diagnosticians. He is currently planning for a scientific symposium on diagnostic veterinary medicine and the World Organisation for Animal Health (OIE) session in Berlin scheduled for June 2013.

Bacteriology/Mycology

Erdal Erol

The primary mission of the Bacteriology/Mycology Section of UKVDL 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 and is also responsible for culture of *Taylorella equigenitalis* and *T. asinigenitalis* for the federal/state CEM regulatory program in equine.

2010 Highlights:

- The major tests run are highlighted in the table below. Aerobic cultures totaling 9,774 were performed on samples submitted to the UKVDL; significant bacterial pathogens were found in these samples, such as Nocardioform bacteria (Amycolaptosis, Crossiela equi), coliforms, Beta-hemolytic streptococci, Salmonella, Staphylococci etc.
- 1,265 milk samples from dairy cows were tested for microorganisms that cause mastitis; over 50% were positive for pathogenic microorganisms.
- 2,462 different bacterial isolates were sensitivity tested to determine the correct antibiotics to be used for their treatment in infected animals.
- 8,745 samples from equines in Kentucky were cultured for the Contagious Equine Metritis causal bacteria. All horses tested were negative for *T. asinigenitalis* and *T. equigenitalis*. Because of the detection of four positive stallions by this section in late 2008, we continue to receive a higher than average number of samples. Early detection of this infection in the Quarter Horse population by this laboratory prevented this disease from becoming more widespread in the equine population in the United States.
- A new antimicrobial susceptibility system that uses the broth microdilution method has been purchased. This new system is able to perform antibiotic susceptibility on many additional microorganisms, including Nocardioform bacteria, anaerobic bacteria, and some fungi. We anticipate that we can switch to this system in early 2011.
- Our laboratory has significant collaboration with departments in the College of Agriculture, other institutions, and industry, including those with the Department of Animal and Food Sciences (Dr. Jeffrey Bewley, mastitis study), the Gluck Equine Research Center (Dr. Mats Troedsson, nocardioform), Purdue University (antimicrobial susceptibility), Pfizer (antimicrobial susceptibility), the University of Copenhagen (beta-hemolytic streptococci). We also have established a protocol to identify Salmonella bacteria in poultry modeled on the National Poultry Improvement Plan (NPIP) protocol.

2010 Bacteriology/Mycology Caseload	
Test	**Number Run**
Culture-Aerobic	9,774
Contagious Equine Metritis	8,745
Antimicrobial Susceptibility	2,462
Culture-Ruminant Mastitis	1,265
Culture-Microaerophilic	404
Culture-Fungal	220
Culture-Anaerobic	211
Clostridium spp.	162
Culture-Mycoplasma	140
Culture-Listeria	39
Culture-Johne's	39
Difficile Toxin A/B	11
E. coli pilus	10

Clinical Pathology

Bonnie L. Decker

The primary mission of Clinical Pathology is to provide chemistry, hematology, endocrine, urinalysis, fluid analysis, fecal parasite exams, and other testing to animal owners, veterinarians, and the agricultural community. The section also provides support and testing to UKVDL's pathologists and testing related to necropsy. In addition, it supports University of Kentucky equine and animal science researchers, who can submit specimens to Clinical Pathology for monitoring various chemistry and hematology levels in their research animals. In 2010, clinical pathology added an Immulite immunoassay system, which enables us to offer a menu of endocrine tests and phenobarbital testing. Also, we acquired a new hematology analyzer (Forcyte) that allows additional animal species to be tested. Computer interfacing for the ACE Alera chemistry analyzer, Immulite, and Forcyte is scheduled in 2011 for more efficient results entry and reduction of human transcription errors. Clinical pathology is dedicated to meeting the current and future needs of the agricultural community, companion animal community, and veterinarians.

2010 Highlights:

- New Immulite immunoassay system for performing endocrine tests and phenobarbitals
- New Forcyte hematology analyzer expanding species capabilities
- Move into larger laboratory facility
- Incorporation of DLAR personnel into the section, providing extra coverage
- The number of tests performed in Clinical Pathology remained steady from 2009 to 2010. With the addition of the Immulite, we expect to see growth in number of tests performed in 2011.
- With a few exceptions, Clinical Pathology completes its testing the same day as receipt. Cryptosporidium and protein electrophoresis require more time and are reported within five working days of receipt. Progesterones and Canine TSH must be in the section by 2 p.m. for same-day turnaround.
- Section personnel consist of 1.50 FTE: a section chief with a BS MT (ASCP) and 34 years experience in veterinary and human diagnostic laboratory testing working full time and a part-time veterinary technician with 15 years experience. Other qualified UKVDL personnel are available for backup and consultation.

Epidemiology

Jacqueline L. Smith

The primary mission of the Epidemiology Section is to provide animal disease surveillance, early detection of animal disease outbreaks, assistance to veterinarians in investigation of serious and unusual disease problems and to conduct relevant infectious disease research. The epidemiology program is driven by state-of-the-art electronic data-gathering systems that 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. We also provide in-depth field investigations to better characterize disease outbreaks for identifying causative etiology, accomplished through the collection of diagnostic specimens and recommendation of an appropriate panel of diagnostic tests. These investigations can be accomplished free of charge for any farm/producer with approval by the UKVDL director.

2010 Highlights:

- Made 36 research farm visits (UK Beef Unit) totaling 181 hours for National Institute for Hometown Security (NIHS) Project
- Sent 52 reports on reportable diseases (one per week, approximately 1 hour each week)
- In addition, the section completed:
  - 18 surveys—15 internal UKVDL; 3 UKDVL external (client satisfaction surveys, holiday hour announcements)
  - 164 consultations by phone—answering questions, offering suggestions, making recommendations
  - 27 statistics requests from UKVDL faculty, UK faculty, state or federal officials, or local vets at 1 to 10 hours each
  - 37 graphics requests at 2 to 10 hours each

Research Projects in Progress:

- Continuous health monitoring of cattle, Dr. Craig Carter, Jackie Smith
- Animal disease cluster detection, Dr. Craig Carter, Jackie Smith
- Mobile wireless and remote diagnostic computer applications, Drs. Craig Carter, Wade Northington, Michelle Bilderback, and Cindy Gaskill and Ms. Jackie Smith
- U.S. Leptospirosis Sero-epidemiological Survey, Drs. Craig Carter. Noah Cohen, and Erdal Erol and Ms. Jackie Smith, Ms. Meg Steinman
- Copy number variance study of paraffin block embedded fixed tissues, Drs. Craig Carter, Noah Cohen, and Scott Dindot

Extension

L. Michelle Arnold

Kentucky veterinarians, extension agents, producers, government entities and the University benefit from a strong livestock sector, for which health is a major consideration. In 2010, UKVDL extension activites reached these stakeholders for the overall improvement of livestock health. The ruminant extension veterinarian is charged with improving the status of ruminant health by keeping relevant information flowing among all the stakeholders in the livestock industry. This objective is accomplished through open communication in a progressive and responsive manner with food animal veterinarians, county extension personnel, producers, state and federal authorities, and University faculty and staff. Current health topics such as disease occurrence, diagnosis and treatment, new knowledge generated at the University level, governmental directives, and other stakeholder contributions are gathered centrally then communicated openly for discussion and action to ultimately benefit producers throughout Kentucky.

2010 Highlights:

- Updated and presented the herd health portion of established College extension programs, including seven Master Cattlemen and two Master Grazer sessions that directly affected some 350 farming enterprises. Currently developing new criteria for a Master Stocker program, one of the fastest growing sectors of the livestock industry in the Commonwealth
- Used the latest technology to deliver producer meetings remotely over the Internet, resulting in significant savings through reduced travel expenditures
- Participated in numerous field days, producer meetings, and farm visits throughout the state to educate producers as well as identify the scope of existing problems and find ways to promote positive change
- Established a good working relationship with the USDA Animal and Plant Health Inspection Service (APHIS) veterinarians to foster cooperation, trust, and a mutual flow of information between the University and federal authorities
- Worked closely with the state veterinarian's office to successfully implement state initiatives. This included a cooperative effort to secure multiple Kentucky positions for the federal Veterinary Medical Loan Repayment Program, which pays student loans for food animal veterinarians practicing in areas designated to have a shortage of veterinarians.
- Worked collaboratively with Purdue, Kentucky State University, and Berea College on multiple small ruminant projects and meetings, many of which were delivered electronically with open access to the presentations, potentially reaching a wide audience
- Involved as co-investigator on a National Institute of Food and Agriculture (NIFA) grant to help food animal veterinarians with the diagnostic decision-making process in the field.
- Began planning a research study that is to begin in 2011 to assess trace mineral levels in grazing goats
- Neared completion of a database of food animal veterinarians compiled through a joint effort of the UKVDL, Breathitt Laboratory, the State Veterinarian's Office, and the Kentucky Veterinary Medical Association. This database will allow rapid communication in the event of an animal emergency or disease outbreak.
- Worked with multiple extension specialists during the bloat outbreak in the spring
- Regularly contributed health-related articles for the Ag extension newsletters *Off the Hoof*, *Kentucky Dairy Notes*, and the *Goat Producer's Newsletter*
- Submitted material for the *Kentucky Veterinary News*, published by the Kentucky Veterinary Medical Association and the veterinary listserv distributed by the UKVDL
- Researched and provided numerous publications and PowerPoint presentations to veterinarians throughout the state to deliver at local producer meetings

Molecular Diagnostics

Erdal Erol/Stephen Sells

Diagnostic PCR and real-time PCR assays are being increasingly used because of their speed and specificity. 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. Specimens such as blood, swabs, washes, and feces are accepted directly from clinicians. This section of the UKVDL also analyzes specimens received from the pathology, virology, and bacteriology sections of this and other diagnostic facilities.

2010 Highlights:

- This section now occupies a newly renovated 2,000-square-foot laboratory devoted to state-of-the-art and emerging diagnostic techniques with two full-time and two part-time employees.
- This section is critical for detecting infectious disease agents, including emerging and foreign animal diseases. The molecular diagnostics section successfully demonstrated the ability to provide accurate, rapid, high-volume testing and built upon the diagnostic lab's status as a laboratory fully accredited by the American Association of Veterinary Laboratory Diagnosticians and also became an accredited member of the USDA's National Animal Laboratory Health Network. This new membership enables the unit to actively participate in national veterinary disease surveillance and provide rapid coordinated diagnostic response in the event of future high-consequence outbreaks within the animal industry.
- Working with the new head of Diagnostic Microbiology, we have developed standardized protocols for 12 new diagnostic assays, which are now offered as a service to our large and small animal practitioners. These assays are rapid, sensitive, diagnostic PCR or real-time PCR tests for equine arteritis virus, the 2009 pandemic H1N1 influenza virus, foot and mouth disease, classical swine fever, avian influenza, Newcastle's disease, Salmonella, *Rhodococcus equi*, *Mycoplasma gallisepticum*, *Mycoplasma synoviae*, leptospira, and infectious laryngotracheitis (ILT) virus. In addition, a Salmonella real-time PCR assay has been validated for the poultry industry by following the NPIP protocol.
- Approximately 3,780 specimens were submitted for PCR testing in 500 accessioned cases.
- The most requested tests included equine herpesvirus type 1 and EHV1 pathotyping (over 275 accessions), EHV4 (126 accessions), *Streptococcus equi subsp. equi* (over 290 accessions), *Crossiella equi* (55 accessions) and *Amycolatopsis species* (55 accessions), *Clostridium perfringens* (43 accessions), *Lawsonia intracellularis* (107 accessions), *Neorickettsia risticii* Potomac Horse Fever (107 accessions), BVDV (61 accessions), *Moraxella bovis* (27 accessions), and EHV2 (77 accessions)
- This section continues to be responsible for providing the majority of Kentucky's arbovirus (mosquito-borne virus) testing as part of an environmental risk analysis program with the Kentucky Department for Human Health.
- In cooperation with researchers at Michigan State University, the normal flora of the male genital tract of donkeys is being determined. An important preliminary finding of this study is that *Taylorella asinigenitalis*, one of the bacteria causing contagious equine metritis, is sometimes a part of the normal flora of male donkeys and that it can persist for at least 12 months in these animals.
- An investigation was undertaken with researchers at the Gluck Equine Research Center to determine if the treatment of semen with antibiotics will prevent the transmission of *T. equigenitalis* to mares bred by artificial insemination. Preliminary results indicated that the antibiotics did prevent the transmission of the disease.
- In conjunction with the Bacteriology section, we are using PCR methods for detecting *Crossiella equi* and *Amycolatopsis* spp. in equine placentas. These bacteria are the primary cause of nocardioform placentitis in equine.

Pathology

Neil M. Williams

The UKVDL pathology section is composed of eight faculty pathologists, four post-doctoral scholars (pathology residents), four full-time necropsy technicians, two part-time necropsy student workers, and five histology technicians. The section performs complete necropsy examinations on submitted animals, histopathology on necropsy cases and surgical biopsies, and cytological examinations. As part of the comprehensive necropsy examination, additional laboratory tests are ordered by the pathologist case coordinator to aid in confirming a diagnosis. The abnormal findings on necropsy are correlated with other laboratory tests, including microscopic examination of the tissues, and a comprehensive report is prepared for every pathology case.

Necropsy: A post-mortem examination (necropsy) is conducted to identify any pathologic changes in the tissues that would indicate disease, injury, or any other abnormal process resulting in illness.

Total Necropsy Cases	3,218
Avian	62
Bovine	852
Caprine	93
Equine	1,565
Ovine	99
Porcine	16
Small Animal	379
Miscellaneous	66

Histopathology: Tissues are prepared and processed to produce glass slides for microscopic examination conducted by the pathologists. Tissues from the necropsy and surgical biopsy cases were processed, and 34,619 microscopic slides were produced. In addition to the routine hematoxylin- and eosin-stained tissue sections, special and immunohistochemical stains were done, resulting in 3,511 slides produced for the purpose of identifying microscopic organisms/agents that may cause disease or tissue antigens that define or identify cell structures.

Biopsy: Abnormal areas or lesions are often removed surgically or a portion biopsied from live animals and sent to the laboratory for determination of the type of process and recommended treatment and potential prognosis. These tissue specimens are processed, and microscopic slides are prepared for the pathologists to examine by microscopy. Tissue specimens representing 1,488 cases were processed and examined. A report with diagnosis was produced for each case.

Cytology: Preparations of cells harvested from abnormal lesions or abnormal fluids are placed on microscopic slides and stained for examination under the microscope by the pathologists. Cytopathological examinations were performed, a diagnosis made, and a report generated for 135 cases.

Quality Assurance/Quality Control

Mary Harbour

The goals of the Quality Assurance Program are to continuously improve client service and ensure quality results. The design of the program is based on guidelines issued by the American Association of Veterinary Diagnostic Laboratory (AAVLD), the International Standards Organization (ISO), and the Organization of International Epizootics (OIE). The University of Kentucky Veterinary Diagnostic Laboratory Quality Program also helps fulfill the University's mission of improving service delivery while achieving excellent human relations (internally and externally), sound leadership, and effective communications.

Besides assuring the continuous improvement of diagnostic service, the QA/QC section oversees the revision and improvement of standard operating procedures and policies to stay in full compliance with the AAVLD accreditation requirements. The QA section has assisted in implementing all policies and procedures required by NAHLN.

Serology

Meg Steinman

The mission of the Serology Section is to provide accurate and timely results for both diagnostic and regulatory testing. The results generated provide veterinarians and regulatory personnel with data upon which to base their decisions. This section also performs testing for movement of animals within the United States and for international export purposes. Testing is done by a variety of methodologies.

2010 Highlights:

Poultry:

- Continued to pass annual inspections and maintain status as an National Poultry Improvement Plan (NPIP)-approved laboratory
- Personnel attended NPIP-approved training courses covering Avian Influenza, Mycoplasma testing, and Salmonella testing.
- Tested 11,565 samples for antibody to Avian Influenza, 16,344 samples for antibody to *Salmonella pullorum*, and 49,352 samples for antibody to both *Mycoplasma gallisepticum* and *Mycoplasma synoviae*

Equine:

- Successfully passed the annual USDA-APHIS inspection, enabling the UKVDL to continue to test offer Equine Infectious Anemia (EIA) antibody testing. In 2010, we ran 27,534 EIA tests. The serology section continues to monitor equines moving through the state stockyards for EIA antibody, testing 11,541 specimens free of charge.
- Employees went through online training and passed the required National Veterinary Services Laboratory (NVSL) proficiency testing for piroplasmosis testing (*Babesia caballi* and *Theileria equi*). We began offering piroplasmosis testing midyear, and tested 5,198 specimens for antibodies to *Babesia caballi* and 5,272 specimens for *Theileria equi*.
- Tested 923 serum samples for antibody to Contagious Equine Metritis (CEM-CF)
- Tested 2,342 sera for antibodies to the *Leptospira*, serovars *grippotyphosa* and *pomona*

Bovine:

- The section continues to offer a variety of antibody tests that can be performed on serum from bovines and other ruminant species.
- We tested 246 specimens for Anaplasmosis, 121 specimens for antibody to Bluetongue, 727 specimens for antibodies to the Bovine Leukemia Virus, 1,672 serums for Johne's antibodies, and 275 specimens for antibody to *Neospora caninum.*

Canine and feline:

- This section offers a variety of tests that can be run on dogs and cats.
- Testing in 2010 included, for example, 188 tests for antibodies to histoplasmosis and 220 samples for antibodies to blastomyces.
- Also tested were 75 samples from canines for antibody to *Brucella canis,* 19 samples for Feline Leukemia Virus Antigen, and 20 samples for Feline Immunodeficiency Virus.
- Additional tests done on variety of species included:
  - Brucella antibody: 3,024
  - Toxoplasmosis: 107
  - Pseudorabies antibody test: 78

Please refer to the UKDVL website for additional test offerings.

Toxicology

Cynthia L. Gaskill

The primary mission of the Toxicology Section at the UKVDL is to provide toxicological diagnostic testing capabilities and consultations to Kentucky veterinarians, UKVDL pathologists and pathology residents, county extension agents, livestock producers, and pet owners. A large variety of toxicological tests are available through the Toxicology section, including assays for metals and minerals; organic compounds including a multitude of pesticides, drugs, and other chemicals; biological toxins such as plant toxins, toxic insects, and bacterial and fungal toxins; and numerous other toxins. Tests are performed in tissues, gastrointestinal contents, baits, feed, water, soil, and other substances. Consultation services include assistance with appropriate sample collection and submission recommenda-

tions, determination of appropriate tests to be performed, interpretation of analytical results, therapeutic advice, differential diagnoses, residue considerations, and other general toxicological information. Section personnel consist of Cynthia Gaskill, DVM PhD, clinical veterinary toxicologist, and Lori Smith, PhD, senior analytical chemist.

2010 Highlights:

- Hosted several student interns for the Forensic Science internship program at Eastern Kentucky University
- Hosted students for the Kentucky Higher Education Assistance Authority (KHEAA) work-study program
- Provided analytical support for the University of Kentucky Horse Pasture Evaluation program
- Developed and validated several new tests, including serum bromide concentration analysis and forage ergovaline concentration analysis
- Participated in several new proficiency testing programs to ensure accuracy and quality control for analytical methods
- Participated in the UKVDL Veterinary Pathology training program; provided lectures on veterinary toxicology and analytical chemistry topics to pathology residents
- Participated in several research projects, including:
  - Development and validation of a High Performance Liquid Chromatography (HPLC) method for ergovaline analyses
  - Investigation of the effects of harvest, transport, storage, and processing conditions on ergovaline analyses of tall fescue
  - Ergovaline testing of tall fescue used as horse bedding. Collaboration: Dr. Ray Smith, Dr. Lori Smith, Dr. Cynthia Gaskill, and Joel Noah, all at University of Kentucky.
  - Hepatic copper and iron concentrations in mares dying of hemorrhage from a ruptured uterine artery
  - Evaluation of DART-linear ion trap methodology for rapid detection of ethylene glycol and glycolic acid in urine, serum, stomach contents, baits, and tissues. Collaboration: Dr. Darrin Smith, Eastern Kentucky University, and Dr. Cynthia Gaskill and Dr. Lori Smith, University of Kentucky.
  - Evaluation of DART-linear ion trap methodology for rapid screening for seizure-causing toxins in baits and stomach contents. Collaboration: Dr. Darrin Smith, Eastern Kentucky University, and Dr. Cynthia Gaskill and Dr. Lori Smith, University Of Kentucky
  - Evaluation of serum trace mineral concentrations in central Kentucky goats. Collaboration: Dr. Michelle Bilderback, Dr. Cynthia Gaskill, and Dr. Lori Smith, University of Kentucky
- Presented research findings, methodology, and continuing education programs at meetings including annual conferences for the American Association of Veterinary Clinical Toxicologists, Morehead Annual Clinic Days, American College of Veterinary Internal Medicine, and the University of Kentucky Pasture Please program
- In 2010, the toxicology section received samples from more than 1,000 cases, with most cases involving multiple samples such as various tissues, body fluids, forages, baits, and other samples and often involving multiple animals with multiple test requests per case. The most common tests requested include metal and mineral quantifications in tissues such as liver and kidney; screening of rumen and stomach contents for organic compounds; analysis of tissues for pesticides; and evaluation of forages and feeds for nitrate content, mycotoxins, ionophores, cyanide, and other feed-related toxins. Over 750 toxicological consultations were provided for cases in Kentucky and across North America.

Virology

Erdal Erol

This section performs several virological assays, which are important not only for clinical cases but also for regulatory purposes. This section performs tests such as Equine Viral Arteritis-EVA that are necessary for export of animals to other states and other countries.

2010 Highlights:

- 4,199 fluorescent antibody tests (FA) on tissues were performed for Bovine Corona Virus, Bovine Respiratory Syncytial Virus, Bovine Rotavirus, Bovine Viral Diarrhea, Canine Adenovirus, Canine Corona Virus, Canine Distemper Virus, Canine Herpesvirus, Canine Parainfluenza 2, Canine Parvovirus, Equine Herpesvirus 1, Equine Rotavirus, Equine Viral Arteritis, Feline Corona Virus, Feline Herpesvirus, Feline Infectious Peritonitis, Feline Panleukopenia, Parainfluenza-3 Virus, Porcine Circovirus, Porcine Reproductive and Respiratory Syndrome, Porcine Rotavirus, Potomac Horse Fever, Pseudorabies Virus, Swine Influenza Virus, and Infectious Bovine Rhinotracheitis.
- 16,444 virus neutralization tests were performed for Bovine Respiratory Syncytial Virus, Bovine Viral Diarrhea 1, Bovine Viral Diarrhea 2, Equine Herpesvirus 1, Equine Viral Arteritis, Infectious Bovine Rhinotracheitis, Vesicular Stomatitis IN and Vesicular Stomatitis NJ virus.
- 6,440 ELISA tests were performed for Bovine Viral Diarrhea Rotavirus and West Nile virus.
- 69 Hemagglutination Inhibition (HI) tests were performed for Equine Influenza A1 and Equine Influenza A2 virus.
- 1,149 samples were analyzed for virus isolation.

Contact the KTRDC for a detailed report of the research progress made by KTRDC-funded scientists in 2010.

Total tests performed in 2010, UKVDL Virology Section.	
Test Name	**Total Tests Performed**
Bovine Corona Virus	79
Bovine Respiratory Syncytial Virus-FA	554
Bovine Respiratory Syncytial Virus- VN	76
Bovine Rotavirus	55
Bovine Viral Diarrhea-EIA	6,333
Bovine Viral Diarrhea-FA	796
Bovine Viral Diarrhea 1-VN	207
Bovine Viral Diarrhea 2-VN	206
Canine Adenovirus	32
Canine Corona Virus	42
Canine Distemper Virus	120
Canine Herpesvirus	41
Canine Parainfluenza 2	13
Canine Parvovirus	119
Electron Microscopy	8
Equine Herpesvirus 1-FA	784
Equine Herpesvirus 1-VN	113
Equine Influenza A1	34
Equine Influenza A2	35
Equine Rotavirus	25
Equine Viral Arteritis-FA	8
Equine Viral Arteritis-VN	13,040
Feline Corona Virus	5
Feline Herpesvirus	16
Feline Infectious Peritonitis	57
Feline Panleukopenia	48
Infectious Bovine Rhinotracheitis-FA	655
Infectious Bovine Rhinotracheitis-VN	196
Influenza A Antigen	247
Parainfluenza-3 Virus	554
Porcine Circovirus	12
Porcine Reproductive & Respiratory Syndrome	12
Porcine Rotavirus	5
Potomac Horse Fever	157
Pseudorabies Virus	6
Rotavirus	44
Swine Influenza Virus	5
Transmissible Gastroenteritis Virus	4
Vesicular Stomatitis IN	1,303
Vesicular Stomatitis NJ	1,303
Virus Isolation	1,149
West Nile IgM Capture	63

Kentucky Agricultural Experiment Station Projects

Hatch, McIntire-Stennis, and Animal Health projects for calendar year 2010, as reported in the USDA Current Research Information System (CRIS) database, follow.

Agricultural Economics

Agricultural and Rural Finance Markets in Transition (NC-1014, NC-221, NCT-194)—*Katchova, A.*
Benefits and Costs of Natural Resources Policies Affecting Public and Private Lands (from W1133)—*Schieffer, J.K.*
Consumer Choice regarding Food and Health—*Maynard, L.J.*
Economic Impacts of International Trade and Domestic Policies on Southern Agriculture—*Reed, M.*
Environmental Impacts of Equine Operations—*Stowe, C.*
Estimation of Demand for Equestrian Trail Recreational Activities in Kentucky—*Pagoulatos, A.; Hu, W.; Stowe, J.*
Family Firms and Policy—*Pushkarskaya, H.N.*
Impacts of Social Capital on the Economic Development and Well-Being of Rural Areas—*Debertin, D.L.*
Nanotechnology and Biosensors—*Hu, W.*
Rural Change: Markets, Governance and Quality of Life—*Freshwater, D.; Debertin, D.; Davis, A.*
The Economics of Precision Agricultural Machinery Management—*Dillon, C.*
The Impact of Food Safety Scares on the Food Supply Chain in an Environment of Highly Integrated Monopolistically Competitive Agriculture—*Saghaian, S.H.*

Animal and Food Sciences

Characterization of Carbon-Centered Free Radicals in Food Proteins—*Boatright, W.*
Diet and Vascular Endothelial Cell Function—*Hennig, B.*
Elucidating Aldehyde-Induced Redox Instability in Carboxymyoglobin—*Suman, S.*
Enteric Diseases of Swine and Cattle: Prevention, Control and Food Safety—*Newman, M.C.*
Factors Affecting Forage Intake and Utilization by Horses—*Lawrence, L.M.*
Factors Affecting Small Intestinal Carbohydrate Assimilation in Beef Cattle—*Harmon, D.L.; McLeod, K.R.*
Factors Regulating Muscle Protein Synthesis and Accretion in Horses—*Urschel, K.L.*
Fate of Antioxidant Peptides and Proteins in Food Processing—*Xiong, Y.L.*
Genetic Considerations for Beef Cattle Production in Challenging Environments—*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.; Ely, D.G.*
Improving the Sustainability of Livestock and Poultry Production in the United States—*Cromwell, G.L.*
Management Systems to Improve the Economic and Environmental Sustainability of Dairy Enterprises (Rev. NC-1119)—*Bewley, J.M.*
Mastitis Resistance to Enhance Dairy Food Safety—*Bewley, J.M.*
Metabolic Relationships in Supply of Nutrients for Lactating Cows—*McLeod, K.R.*
Methods to Increase Reproductive Efficiency in Cattle—*Silvia, W.J.*
Nutritional and Management Abatement Strategies for Improvement of Poultry Air and Water Quality—*Cantor, A.H.; Pescatore, A.J.*
Nutritional Systems for Swine to Increase Reproductive Efficiency—*Lindemann, M.*
Rapid Assay, Probe Technologies, and Media for Monitoring Flora in Foodstuffs—*Hicks, C.L.*
Regulated Expression of Genes/Proteins Critical to Anionic Amino Acid N Metabolism by Developing and Aging Beef Cattle—*Matthews, J.C.; Boling, J.A.*
S1033: Control of Food-Borne Pathogens in Pre- and Post-Harvest Environments—*Newman, M.*
Species-Specificity in Carboxymyoglobin Redox Stability—*Suman, S.P.*
Use of a Carbohydrate-Based Toxin Adsorbent Supplement, Provided through a Mineral Carrier, to Alleviate Endophyte Toxicosis in Beef Cows and Calves Grazing Tall Fescue—*Ely, D.; Aaron, D.*

Biosystems and Agricultural Engineering

Agricultural Safety and Health Research and Extension—*Purschwitz, M.A.*
Development of an Algae-Based System for CO_2 Mitigation—*Crofcheck, C.L.; Montross, M.D.*
Engineering for Food Safety and Quality—*Payne, F.A.*
Improvement of Thermal and Alternative Processes for Foods—*Payne, F.A.*
Marketing and Delivery of Quality Grains and BioProcess Coproducts—*Montross, M.D.; McNeill, S.G.*
Modeling for TMDL Development, and Watershed Based Planning, Management and Assessment—*Edwards, D.R.*
Precision Placement of Crop Production Inputs via Distributed Control—*Shearer, S.A.*
Soil Productivity as Affected by Mechanical Influence—*Wells, L.G.*
Standardized Testing of Global Navigation Satellite System Technology—*Stombaugh, T.S.; Sama. M.P.; Shearer, S.A.*
Stream/Aquifer Interface: Understanding the Riparian Corridor—*Workman, S.R.*
Systems for Controlling Air Pollutant Emissions and Indoor Environments of Poultry, Swine and Dairy Facilities—*Overhults, D.G.; Pescatore, A.; Fehr, R.E.*
The Science and Engineering for a Biobased Industry and Economy—*Nokes, S.E.; Lee, C.; Crofcheck, C.; Montross, M.D.*

Community and Leadership Development

Interactions of Individual, Family, Community, and Policy Contexts on the Mental and Physical Health of Diverse Rural Low-Income Families—*Dyk, P.*
Research and Education Support for the Renewal of an Agriculture of the Middle—*Tanaka, K.*

Entomology

A National Agricultural Program to Clear Pest Control Agents for Minor Uses—*Bessin, R.T.*
Bed Bug Biology and Behavior—*Haynes, K.*
Biological Control in Pest Management Systems of Plants—*Harwood, J.D.*
Biological Control of Arthropod Pests and Weeds—*Yeargan, K.V.*
Biological Improvement of Chestnut through Technologies that Address Management of the Species, Its Pathogens and Pests—*Rieske-Kinney, L.K.*
Biology and Management of Insects Attacking Turf and Woody Landscape Plants—*Potter, D.A.; Redmond, C.T.*
Biology, Ecology and Management of Emerging Disease Vectors—*Dobson, S.L.*
Biology, Impact, and Management of Soybean Insect Pests in Soybean Production Systems—*Yeargan, K.*
Delineation of Structural Complexity in Above and Belowground Forest Food Webs—*Harwood, J.D.*
Ecology and Management of European Corn Borer and Other Lepidopteran Pests of Corn—*White, J.A.*
Effects of Prey Biodiversity on Pest Regulation by Generalist Predators—*Harwood, J.D.*
Exotic Organisms Interact to Influence Persistence of a Native Species: Potential Interplay between the Asian Chestnut Gall Wasp and Its Chestnut Hosts—*Rieske-Kinney, L.K.*
Genomic and Metagenomic Analyses of a Wood-Feeding Cockroach, *Cryptocercus punctulatus*—*Zhou, X.*
Genomic Approaches to Analyses of Immune-Suppressive Genes of the *Campoletis sonorensis* Polydnavirus—*Webb, B.A.*
Inbreeding and the Fitness Consequences of Colonizing Novel Environments in Herbivorous Insects—*Fox, C.W.*
Interactions of Emerging Threats and Bark Beetle-Microbial Dynamics in Forest Ecosystems (from W1187)—*Rieske-Kinney, L.; Stephen, F.; Jacobi, W.; Bernier, L.; Bonello, P.; Shaw, D.; Baker, F.; Raffa, K.*
Invasive Species and Biological Control: The Role of Facultative Inherited Bacterial Symbionts—*White, J.A.*
Molecular Analysis of Juvenile Hormone Action in the Red Flour Beetle, *Tribolium cataneum*—*Palli, S.S.*
Phylogeny and Biodiversity of Hymenopteran Biological Control Agents—*Sharkey, M.*
Research and Development Leading to an Integrated Mosquito Management Program for Kentucky—*Brown, G.C.*

Forestry

Assessing the Invasion Pattern of Exotic Plants in Forest Ecosystems in Kentucky—*Fei, S.*
Distribution and Ecology of the North American River Otter (*Lontra canadensis*) in Kentucky—*Lacki, M.J.*
Evaluating Streamside Management Zone Effectiveness in Forested Headwater Catchments of Central Appalachia—*Barton, C.*
Participation of Kentucky Woodland Owners in the Woody Biomass Market—*Stainback, G.A.*
Prescribed Fire in the Southern Appalachians: Stand Structure, Oak Seedlings, and Fuel—*Arthur, M.A.*
RREA Program—*Stringer, J.W.*
The Ecological Role of Large Mammals in the Forests of Kentucky and the Eastern United States: Implications for Conservation—*Cox, J.*
Use of Underplanting to Enhance the Health and Sustainability of Oak Dominated Ecosystems in Kentucky and the Central Hardwood Region—*Lhotka, J.; Stringer, J.*

Horticulture

Arthropod Resistance of *Lycopersicon hirsutum* LA2329, a Wild Relative of Tomato—*Snyder, J.C.*
Chemical Genetic Dissection of Plant Cellulose Synthesis—*DeBolt, S.*
Chloroplast-Localized Co- and Post-Translational Processing Enzymes: Essential Determinants of Protein Maturation—*Houtz, R.L.*
Developing Optimized Organic Production Systems for Cucurbits and Apples—*Williams, M.*
Environmental and Genetic Determinants of Seed Quality and Performance (from W1168)—*Downie, A.B.; Geneve, R.L.; Perry, S.; Baskin, C.*
Identifying the Biophysical, Biochemical, Environmental, and Genetic Factors Associated with Seed Development, Dormancy, Germination, and Establishment of Eastern Gamagrass—*Geneve, R.L.*
Improving Economic and Environmental Sustainability in Tree-Fruit Production through Changes in Rootstock Use—*Archbold, D.*
Marketing, Managing, and Producing Environmental Plants in a Technical and Economically Efficient Manner—*Ingram, D.L.*
Multi-State Evaluation of Wine Grape Cultivars and Clones—*Archbold, D.*
New Horicultural and Grain Crop Opportunities for Kentucky—*Ingram, D.; Van Sanford, D.; Dillon, C.*
Regulation of Expression and Activity of Sorbitol Dehydrogenase in Apple—*Archbold, D*.
Spider Mite Resistance Mechanisms in *Lycopersicon hirsutum* Accession LA2329—*Snyder, J.*
Sustainable Practices, Economic Contributions, Consumer Behavior, and Labor Management in the U.S. Environmental Horticulture Industry—*Ingram, D.L.*
Water Management and Quality for Ornamental Crop Production and Health—*Dunwell, W.*

Human Environmental Sciences

Antioxidant Nutrients, Reactive Oxygen Species and Oxidative Stress—*Chow, C.K.*
Dietary Selenium and Carcinogenesis by Environmental Agents—*Glauert, H.*
EFNEP Related Research, Program Evaluation and Outreach—*Forsythe, H.E.*

Landscape Architecture

An Evaluation of Postmining Land Use in Kentucky—*Nieman, T.J.*

Plant and Soil Sciences

Breeding and Genetics of Forage Crops to Improve Productivity, Quality, and Industrial Uses—*Phillips, T.D.*
Breeding Sweet Sorghum for Syrup Production—*Pfeiffer, T.W.*
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 Vadose Zone Scales (from W1188)—*Wendroth, O.*
Complementary Approaches to Developing Scab Resistant Wheat Varieties—*Van Sanford, D.A.*
Determining Impact of Lower Soybean Plant Populations on Other Practices within the Soybean Production System—*Lee, C.*
Development of Weed Management Strategies in Agronomic Crops—*Witt, W.W.*
Effect of Urease Inhibitors on Volatile N Loss From Soil and Other N Transformations—*Coyne, M.S.*
Endophyte Effects on the Structure and Function of Tall Fescue Pasture—*McCulley, R.L.*
Evaluating the Physical and Biological Availability of Pesticides and Contaminants in Agricultural Ecosystems (from W1082)—*D'Angelo, E.M.*
Evaluation of Soybean Varieties for Use in Kentucky—*Pfeiffer, T.W.*
Fate and Ecological Effects of Livestock Antibiotics in Soils—*D'Angelo, E.M.*
Fate, Transport, and Ecological Effects of Livestock Antibiotics in Manure-Amended Agroecosystems—*D'Angelo, E.M.*
Hydropedology: Genesis, Properties, and Distribution of Hydromorphic Soils—*Karathanasis, A.D.*
Messenger RNA 3 Prime End Formation in Plants—*Hunt, A.G.*
Metabolic Studies and Bioengineering of Plant Trichomes Towards Enhancing Pest/Disease Resistance and Facilitating Molecular Farming—*Wagner, G.J.*
Performance of Small Grain Varieties in Kentucky—*Van Sanford, D.A.; Bruening, W.*
Plant Genetic Resources Conservation and Utilization—*Phillips, T.D.*
Positional Cloning and Characterization of RCT1, an Anthracnose Resistance Gene in *Medicago*—*Zhu, H.*
Precision Conservation with Geospatial Technologies—*Mueller, T.G.; Shearer, S.A.*
Regulation of Gene Expression during Plant Embryogenesis—*Perry, S.E.*
Regulation of Reproductive Sink Size in Soybean (*Glycine max* L. Merrill)—*Egli, D.B.*
Roles of microRNA Structures in Plant RNA Silencing—*Tang, G.*
Seed Germination Ecology of Hawaiian Montane Species—*Baskin, C.*
Soil Survey Characterizations and Interpretations for Kentucky Soils—*Karathanasis, A.D.*
Spatial and Temporal Characteristics of Grassland Agroecosystems—*Dougherty, C.T.*
Triacylglycerol Biosynthesis in Soybeans—*Hildebrand, D.*
Turfgrass Management Practices in Kentucky—*Williams, D.W.; Powell, A.J.*
Unraveling the Catalytic Specificity of Terpene Hydroxylases and Engineering Sesquiterpene Hydroxylation in Plants—*Chappell, J.*
Weed Management Strategies for Sustainable Cropping Systems—*Grabau, L.J.*

Plant Pathology

Cellular and Molecular Biology of Plant Rhabdoviruses—*Goodin, M.M.*
Characterization of Resistance Gene-Mediated Signaling and Role of Oleic Acid and Glycerol 3-Phosphate in Plant Defense—*Kachroo, P.*
Defining RNA and Protein Factors Affecting Tombusvirus Replication—*Nagy, P.D.*
Dissecting Defense Signaling Pathways in Soybean and Arabidopsis—*Kachroo, A.*
Ecological and Genetic Diversity Of Soilborne Pathogens and Indigenous Microflora—*Seebold, K.W.*
Genes Controlling Invasive Growth in the Rice Blast Fungus *Magnaporthe oryzae*—*Farman, M.L.*
Genomics of Fungal Endophytes and Their Host Grasses—*Schardl, C.L.*
Molecular Genetics of the Interaction between Corn and Corn Stalk Rot Fungi (*Colletotrichum graminicola* and *Gibberella zeae*)—*Vaillancourt, L.J.*
Mycotoxins: Biosecurity, Food Safety and Biofuels Byproducts (NC129, NC1025)—*Vaillancourt, L.J.*

University of Kentucky Veterinary Diagnostic Laboratory

An Integrated Approach to Control Bovine Respiratory Diseases (NC107)—*Erol, E.*

Veterinary Science

Computational Methods for mRNA Transcriptome from RNA-Seq Data—*MacLeod, J.N.*
Control of Equine Infectious Anemia (EIA)—*Issel, C.J.*
Control, Transmission, and Prevalence of Natural Infections of Internal Parasites of Equids and Ruminants—*Lyons, E.T.*
Evaluation of Bacterial Endophytes of Grass and Legume Forages as Emerging Casuses of Reproductive Loss—*Swerczek, T.W.*
High sensitivity Analytical/Toxicological Approaches to Problems in Equine Medicine—*Tobin, T.*
Identification of Surface Proteins of *Streptococcus equi* with Potential in Vaccine Development—*Timoney, J.*
Innate Immune Responses to Influenza Virus Infection—*Chambers, T.*
Insulin Resistance in the Horse: Induction, Duration and Effects on the Estrous Cycle of the Mare—*Fitzgerald, B.P.*
Interferon Gamma Regulation in the Foal—*Horohov, D.W.*

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.*
National Animal Genome Research Program—*Bailey, E.*
Novel, Protectively Immunogenic, Surface Exposed, and Secreted Proteins of ***Streptococcus equi***—*Timoney, J.F.*
Reference Standards, Internal Standards and Critical Reagents/Regulatory Analytes for Analytical/Toxicological Approaches to Problems in Equine Medicine—*Tobin, T.*
Vasomodulatory Effects of Endophyte Infected Tall Fescue in Horses—*McDowell, K.*

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, 2010—December 31, 2010) 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—$667,346

Alternative Dairy Policy Programs: Analysis of Risk Management and Margin Insurance, Economic Research Service, $25,000—*Maynard, L.*
Analysis of Current Market Demand for Ahi Poke and Consumer Trend Analysis, University of Hawaii, $50,670—*Hu, W.*
Commercial Market Readiness Education for Kentucky Farmers and Southeastern States, University of Arkansas, $47,432—*Woods, T.*
Extension Services in Serbia and Montenegro, Foreign Agricultural Service, $100,243—*Reed, M.*
Implement Plan of Work for the SARE Professional Development Program (PDP), University of Georgia, $10,000—*Meyer, A.*
Implement Plan of Work for the SARE Program, University of Georgia, $20,000—*Meyer, A.*
Innovation in Catastrophic Weather Insurance to Improve the Livelihoods of Rural Households, GlobalAgRisk Inc., $135,000—*Skees, J.*
Kentucky Health Care Market Report, Foundation for a Healthy Kentucky, $118,525—*Davis, A.*
Scientific Exchanges Program, Senegal, Foreign Agricultural Service, $67,695—*Reed, M.*
Strategies and Impact Measures of Sampling for Direct Markets, Agricultural Marketing Service, $38,550—*Woods, T.*
Supporting and Enhancing the Role of SARE in Extension and Other Land Grant University Programs in the South, University of Georgia, $52,911—*Meyer, A.*
Technical Assistance to the Extension System in Serbia, Foreign Agricultural Service, $1,320—*Reed, M.*

Agriculture Programs

Total—$497,343

Improving Local Disaster Planning: A Nationwide Train-the-Trainer Project, National Institute of Food and Agriculture, $87,049—*Husband, A.; Yeargan, R.*
Kentucky AgraAbility, National Institute of Food and Agriculture, $180,000—*Hancock, J.; Purschwitz, M.*
The EDEN Strengthening Community Agrosecurity Planning (S-CAP) Train-the-Trainer Project: Phase 2, Purdue University, $176,294—*Husband, A.; Dwyer, R.; Newman, M.; Yeargan, R.*
University of Kentucky Cooperative Extension Service Liaison, Kentucky Energy and Environment Cabinet, $54,000—*Gumbert, A.*

Animal and Food Sciences

Total—$3,850,755

An Integrated Approach to Improving Dairy Cow Fertility, University of Wisconsin, $17,948—*Amaral-Phillips, D.*
Changes in Gastrointestinal Flora in Response to Antibiotic Therapy and Dietary Intervention, Kentucky Horse Racing Commission, $53,305—*Lawrence, L.*
DAIReXNET: A National Dairy Information and Communications Resource, University of Nebraska, $15,000—*Amaral-Phillips, D.; McAllister, A.*
Food Production Research and Development for Kentucky's Small Food Processors, Kentucky Governor's Office of Agricultural Policy, $263,654—*Rentfrow, G.; Hu, W.; Newman, M.; Woods, T.*
Impact of Differing Forms of Monensin on Ruminal Volatile Fatty Acid Profiles in Steers Fed a Medium Concentrate Diet, Elanco Animal Health, $24,611—*Harmon, D.; McLeod, K.*
Improving Fertility during Heat Stress in Lactating Dairy Cows, University of Florida, $60,000—*Amaral-Phillips, D.*
LAD and Monensin *in vitro* VFA Study, Elanco Animal Health, $26,653—*Harmon, D.; McLeod, K.*
Lysine Requirements in Yearling Horses Determined Using Indicator Amino Acid Oxidation, National Institute of Food and Agriculture, $149,707—*Urschel, K.*
Master Cattleman Program, Kentucky Cattlemen's Association, $190,200—*Burris, W.; Anderson, L.; Henning, J.*
National Beef Cattle Evaluation Consortium, Cornell University, $50,000—*Bullock, K.*
Nutrigenomics Applied to Meat Science: Understanding the Impact of Alltech Antioxidant Nutrients on the Quality and Storage Stability of Chicken Meat, Alltech Biotechnology Inc., $37,008—*Xiong, Y.*
Nutrition and Superfund Chemical Toxicity, National Institute of Environmental Health Sciences, $2,640,121—*Hennig, B.; Gaetke, L.*
Post Doctoral Fellow Scholarship: Rossi, Alltech Biotechnology Inc., $53,125—*Pescatore, A.*
Protein Metabolism in Old Horses: Effects of Inflammation and Glucocorticoid Excess, Morris Animal Foundation, $108,000—*Urschel, K.*
Student Sponsorship, Alltech Biotechnology Inc.; $30,000—*Harmon, D.*
Student Sponsorship, Alltech Biotechnology Inc.; $30,000—*Lawrence, L.*
Student Sponsorship, Alltech Biotechnology Inc.; $32,400—*Pescatore, A.*
The Effects of Creep Feeding Pre-Weaning Foals on Whole Body Protein Synthesis Determined Using Isotope Infusion and Stochastic Analysis, Waltham Centre for Pet Nutrition, $19,915—*Urschel, K.*
The Use of Natural Antimicrobials to Mitigate Biological Threat Agents in High Risk Foods, National Institute for Hometown Security, $49,068—*Newman, M.; O'Leary, J.; Rentfrow, G.; Xiong, Y.*

Associate Dean/Director

Total—$872,051

Acquisition of Goods and Services for USDA Offices in Ag North 2009-2010, Agricultural Research Service, $3,300—*Cox, N.*
Acquisition of Goods and Services for USDA Offices in Ag North 2010-2011, Agricultural Research Service, $42,956—*Cox, N.*
Improving Sustainability of Forage-Based Production, Agricultural Research Service, $825,795—*Cox, N.*

Biosystems and Agricultural Engineering

Total—$3,057,334

ARRA: Design Professionals Code Expertise Development—Energy Code Training, Kentucky Energy and Environment Cabinet, $131,225—*Colliver, D.*
Collaborative Refinement and Evaluation of a Phase 1 Prototype Burley Rail Harvester and of a Phase 2 Prototype Modified to Allow the Mechanization from Harvesting through Stripping and Packaging, Association Nationale Interprofessionnelle et Technique Du Tabac, $56,446—*Wells, L.*
Development and Implementation of Stream Restoration and Riparian Corridor Techniques for Enhancing Water Quality in the Cane Run Watershed, Natural Resources Conservation Service, $360,000—*Agouridis, C.; Barton, C.; Gumbert, A.; Higgins, S.; Warner, R.*
East Kentucky Bioenergy Assessment, Morehead State University, $99,375—*Montross, M.*

Electronic Tanker Lock System for Liquid Food and Chemical Transport Security, National Institute for Hometown Security, $100,055—*Payne, F.*

Energy: A Cooperative Extension Program for Kentucky's Building Systems Energy Needs 2010-2011, Kentucky Energy and Environment Cabinet, $110,786—*Fehr, R.*

Energy Audits for Grain and Poultry Producers in Kentucky, Rural Development, $100,000—*McNeill, S.; Montross, M.; Overhults, D.; Shearer, S.*

Food and Energy Production: Internationalized Agricultural and Engineering Programs, Department of Education, $68,256—*Stombaugh, T.; Workman, S.*

Incidence and Spread of Insects from Bucket Elevator Leg Boots, Ohio State University, $26,000—*McNeill, S.; Johnson, D.; Montross, M.*

Livestock Stewardship BMP Training and Demonstration Project, Kentucky Energy and Environment Cabinet, $188,814—*Higgins, S.; Gumbert, A.*

Nigeria: Commodity Storage-Technical Assistance, Foreign Agricultural Service, $15,470—*McNeill, S.*

Optical Detection of Microbial Contamination in Food Matrices, National Institute for Hometown Security, $980,408—*Payne, F.; Crofcheck, C.; Montross, M.*

Precision Agriculture: Precision Resource Management: Phase VI, National Institute of Food and Agriculture, $593,505—*Stombaugh, T.; Agouridis, C.; Arthur, M.; Barton, C.; Bewley, J.; Coolong, T.; Dillon, C.; Dowdy, T.; Grove, J.; Lee, B.; Luck, J.; McCulley, R.; Mueller, T.; Neelakantan, S.; Pitla, S.; Sama, M.; Shearer, S.; Shockley, J.; Warner, R.; Wilhoit, J.; Zandonadi, R.*

Quantifying Field Drying Rate Potential for Herbaceous Energy Crops, Oak Ridge National Laboratory, $25,000—*Montross, M.; McNeill, S.; Smith, S.*

Radon: UK Extension-Radon Activities, Kentucky Cabinet for Health and Family Services, $22,681—*Fehr, R.*

Reducing Post-Harvest Grain Losses in Ghana, Foreign Agricultural Service, $47,368—*McNeill, S.*

Soil Moisture-Based Automatic Pulse Irrigation System for Water Conservation, Natural Resources Conservation Service, $94,123—*Warner, R.; Coolong, T.; Strang, J.; Woods, T.*

Solar Decathlon Off Grid Equipment Project, Kentucky Energy and Environment Cabinet, $30,000—*Colliver, D.*

Stream Restoration in Guy Cove II, Kentucky Department of Fish and Wildlife, $41,915—*Agouridis, C.; Barton, C.; Warner, R.*

University of Kentucky Extension Service Agent, Kentucky Energy and Environment Cabinet, $60,030—*Fehr, R.*

Community and Leadership Development

Total—$615,389

CYFAR Sustainable Community Projects Common Measures Study, University of Arizona, $10,000—*Jones, K.; Kurzynske, J.*

E-Discovery Challenge, Appalachian Regional Commission, $275,000—*Hustedde, R.; Denham, M.*

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

Enhancing Science Capacity in Introductory Animal, Plant, and Food Sciences Courses, Purdue University, $7,605—*Hains, B.; Hansen, G.; Harmon, R.; Rossano, M.; Silvia, W.*

Globalizing Agricultural Education: Sustainable Agriculture, Food, and Rural Development, National Institute of Food and Agriculture, $150,000—*Tanaka, K.; Hanley, C.; Kitchel, T.; Reed, M.; Williams, M.*

Kentucky Entrepreneurial Coaches Institute: Expanding and Creating New Businesses, Rural Development, $140,784—*Hustedde, R.*

UK Teacher Educator Perkins Award, Kentucky Department of Education, $5,000—*Hains, B.; Vincent, S.*

Entomology

Total—$2,501,827

20-Hydroxyecdysone Suppression of Juvenile Hormone Response, National Science Foundation, $224,999—*Palli, S.*

2010 University Protocol for Evaluating Field Efficacy of Herculex I, YieldGard Corn Borer, and Bt11xMIR162 Deployed against Corn Earworm, Fall Armyworm, and Other Southern U.S. Ledidoptera Larvae, Pioneer Hi Bred International Inc., $12,000—*Bessin, R.*

2010 University Protocol for Evaluating Field Efficacy of Herculex I, YieldGard Corn Borer, and Bt11xMIR162 Deployed against Corn Earworm, Fall Armyworm, and Other Southern U.S. Ledidoptera Larvae, Pioneer Hi Bred International Inc., $12,000—*Johnson, D.*

Area-Wide Management of Potato Pests (AMPP) in the Pacific Northwest, Washington State University, $349,130—*Harwood, J.*

Biological Control of Cereal Aphids in Wheat: Implications of Alternative Foods and Intraguild Predation, Binational Agricultural Research and Development Fund, $3,000—*Harwood, J.*

Cooperative Agricultural Pest Survey: Gypsy Moth, Animal and Plant Health Inspection Service, $238,933—*Obrycki, J.; Lensing, J.*

Emerald Ash Borer Survey and Outreach in Kentucky, Animal and Plant Health Inspection Service, $708,657—*Obrycki, J.; Lensing, J.*

Eradication of a Primary Filariasis Vector Population at an Endemic Field Site, National Institute of Allergy and Infectious Diseases, $239,298—*Dobson, S.*

Feeding RNAi for Pest Management, Kentucky Science and Technology Co. Inc., $49,940—*Palli, S.*

Impact of Predator Bioversity on Pest-Suppression in Kentucky Wheat: A Denaturing Gradient Gel Electrophoresis Approach, Kentucky Science and Technology Co. Inc., $39,085—*Harwood, J.; Johnson, D.*

IPM in Kentucky: Integrated Development and Delivery, National Institute of Food and Agriculture, $93,645—*Johnson, D.; Coolong, T.; Durham, R.; Fulcher, A.; Lee, C.; Lucas, P.; Murdock, L.*

Kentucky Commercialization Fund: Integration of Double Stranded RNA into Baiting System: A Novel Genetic Control Strategy for Termites, Kentucky Science and Technology Co. Inc., $52,230—*Zhou, X.; Potter, M.*

Kentucky Science and Engineering Foundation Research and Development Excellence: Molecular Characterization of the Microbial Community of Invasive Arthropods, Kentucky Science and Technology Co. Inc., $61,871—*White, J.*

Light Brown Apple Moth (LBAM) National Survey, Animal and Plant Health Inspection Service, $47,250—*Obrycki, J.; Lensing, J.*

Molecular Analysis of Juvenile Hormone Action, National Institute of General Medical Sciences, $208,500—*Palli, S.*

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

Novel Methods for Improving Virion Production in Baculovirus, ParaTechs Corp., $33,000—*Webb, B.*

Plum Pox Virus Survey, Animal and Plant Health Inspection Service, $6,250—*Obrycki, J.; Lensing, J.*

Post-Invasion Forests: Composition and Structure Following Invasive Species Establishment, Forest Service, $30,000—*Rieske-Kinney, L.*

Private Pesticide Applicator Database, Kentucky Department of Agriculture, $10,000—*Townsend, L.*

Red Imported Fire Ant Survey in Kentucky, Animal and Plant Health Inspection Service, $1,375—*Obrycki, J.; Lensing, J.*

Southern Region Program to Clear Pest Control Agents for Minor Uses, University of Florida, $10,250—*Potter, D.*

State Liaison to the Minor Use Pesticide Program 2010, University of Florida, $4,250—*Bessin, R.*

Supplemental Vector Intervention Required to Eliminate Lymphatic Filariasis in the South Pacific, Bill and Melinda Gates Foundation, $16,164—*Dobson, S.*

eXtension

Total—$888,615

ECOP/CSREES-eXtension: Supplement, University of Nebraska, $350,211—*Wood, C.; Craycraft, C.*

HorseQuest Community of Practice, University of Nebraska, $12,800—*Griffin, A.*

The Development, Evaluation and Implementation of an Online Safety Course for Youth Working on Equine Facilities, Michigan State University, $44,525—*Griffin, A.*

The Extension System: Military Collaboration eXtension Initiative, University of Nebraska, $107,060—*Wood, C.*

The Transformation of Cooperative Extension, University of Nebraska, $374,019—*Wood, C.*

Extension Field Programs

Total—$36,480

Enhancing the Marketing Skills for East Kentucky Artisans, EQT Foundation, $36,480—*Stamper, C.; Jackson, V.*

Family and Consumer Sciences

Total—$4,259,790

Health Education Leadership, Kentucky, National Institute of Food and Agriculture, $566,400—*Vail, A.*
Kentucky Healthy Homes and Communities, Auburn University, $4,000—*Stephenson, L.*
Kentucky Operation: Military Kids, Kansas State University, $92,000—*Ashurst, K.*
Models of SNAP Nutrition Education and Evaluation, Wave 2, Altarum Institute, $100,000—*Stephenson, L.; Mullins, J.*
Operation Military Kids Camp Initiative/ OSD Supplement, Kansas State University, $50,000—*Ashurst, K.; Stephenson, L.*
Rural Health Care Services Outreach and Rural Health Network Development Program Evaluation, Morehead State University, $15,000—*Murray, D.*
Specialty Crop Recipe Development with Nutritional Research Component, Kentucky Department of Agriculture, $40,000—*Stephenson, L.*
Supplemental Nutrition Assistance Program-Education (SNAP-Ed) 2011, Kentucky Cabinet for Health and Family Services, $1,857,187—*Vail, A.; Stephenson, L.*
Supplemental Nutrition Assistance Program: Education (SNAP-Ed), Kentucky Cabinet for Health and Family Services, $1,535,203—*Vail, A.; Stephenson, L.*

Forestry

Total—$701,275

Assessment of Structure, Function and Stability in a Gradient of Disturbed SRS Streams–Phase III, Forest Service, $155,000—*Barton, C.*
Continued Monitoring of American Chestnut Restoration Sites on Surface Mined Land in Kentucky, American Chestnut Foundation, $2,500—*Barton, C.*
Cross-walk and Develop GIS Mapping Applications and Accomplishment Monitoring Geospatial Database, Kentucky Energy and Environment Cabinet, $6,000—*Lhotka, J.*
Emerald Ash Borer Public Conference, Kentucky Energy and Environment Cabinet, $35,000—*Thomas, W.; Stringer, J.*
Fire Management and Habitat Quality for Endangered Bats in Mammoth Cave National Park, JFSP, Forest Service, $262,759—*Lacki, M.; Rieske-Kinney, L.*
Forest Stewardship Public Awareness, Publicity, Training, Kentucky Energy and Environment Cabinet, $10,000—*Stringer, J.*
Kentucky Woodlands Magazine–Forest Certification and Forest Health Issues, Kentucky Energy and Environment Cabinet, $30,000—*Stringer, J.; Thomas, W.*
Long-Term Effects of Forestry Best Management Practices on Hydrology, Water Chemistry and Woody Debris in Three Appalachian Headwater Catchments, Forest Service, $6,711—*Barton, C.*
Regional Non-Native Invasive Plant Species Workshops, Kentucky Energy and Environment Cabinet, $12,000—*Stringer, J.*
Roosting and Foraging Behavior of Rafinesque's Big-Eared Bat near the Northern Limits of the Species Range Year 2 and 3, Kentucky Department of Fish and Wildlife, $51,305—*Lacki, M.*
Second Invasives Conference, Kentucky Energy and Environment Cabinet, $5,000—*Fei, S.*
The Common Raven in Cliff Habitat: Detectability and Occupancy–2011, Kentucky Department of Fish and Wildlife, $35,000—*Cox, J.*
UK Population Dynamics of Black Bear in Eastern Kentucky, Kentucky Department of Fish and Wildlife, $90,000—*Cox, J.*

Horticulture

Total—$1,257,266

Collaborative Research: An F-Box Protein Targeting PIF1 and PIF3, National Science Foundation, $6,000—*Downie, A.*
Developing a Training Program in Sustainable Vegetable Production for Agriculture Professionals in Kentucky and Tennessee, University of Georgia, $59,532—*Coolong, T.; Bessin, R.; Seebold, K.; Williams, M.*
eXtension Consumer Horticulture Certified COP Leadership Funds 2008, University of Nebraska, $15,000—*Durham, R.*
From Small Molecule to Gene: Using Chemical Genetics to Understand Cell Wall Sensing and Advance Molecular Resources, National Science Foundation, $31,000—*DeBolt, S.*
Influence of Propagation Type and Nitrogen on PGR Efficacy, University of Florida, $4,500—*Fulcher, A.*
Kentucky Horticulture Council, Grant 4–FY10, Kentucky Horticulture Council, $9,000—*Ingram, D.; Woods, T.*
Kentucky Horticulture Council Grant Number 5, Kentucky Horticulture Council, $620,000—*Ingram, D.; Woods, T.*
New Crop Opportunities, Phase X, Cooperative State Research Education and Extension, $2,000—*Houtz, R.; Archbold, D.; Bruening, W.; Coolong, T.; DeBolt, S.; Dillon, C.; Grabau, L.; Halich, G.; Hu, W.; Montross, M.; Pfeiffer, T.; Schnelle, R.; Seebold, K.; Smith, S.; Strang, J.; Van Sanford, D.; Vincelli, P.; Warner, R.; Williams, M.; Woods, T.*
New Crop Opportunities, Kentucky, Phase XI, National Institute of Food and Agriculture, $488,601—*Houtz, R.*
Optimizing No-Till Vegetable Production Systems for Organic Growers, Kentucky Department of Agriculture, $20,000—*Jacobsen, K.; Coolong, T.; Williams, M.*
Viticulture Consortium East, Cornell University, $1,633—*Archbold, D.*

Kentucky Tobacco Research and Development Center

Total—$358,439

STTR: Hypericum Extracts as Potential Anti-Relapse Medications in Alcoholism, Naprogenix, $156,000—*Littleton, J.*
STTR: Potential Anti-Relapse Drugs: A Plant Genomics Approach, Naprogenix, $202,439—*Littleton, J.*

Merchandising, Apparel, and Textiles

Total—$238,783

Quality Control Laboratory for NAILM, National Association of Institutional Linen Management, $38,783—*Easter, E.*
University of Kentucky Research Study on Evaluating Used Firefighter's Gear to Determine Appropriate Retirement Age, National Institute of Standards and Technology, $200,000—*Easter, E.*

Nutrition and Food Science

Total—$467,535

Abraham Lincoln National Heritage Area Management Plan and Environmental Assessment, Heritage Strategies LLC, $11,193—*Swanson, J.*
Bluegrass/Aspendale HOPE VI Revitalization, Lexington-Fayette Urban County Government, $30,842—*Forsythe, H.; Ham, S.*
Children, Youth and Families at Risk Liaison, National Institute of Food and Agriculture, $37,500—*Kurzynske, J.*
Children, Youth, and Families Education and Research Network–Program Component, Cooperative State Research Education and Extension, $218,000—*Kurzynske, J.; Stivers, W.*
Promoting Life Skills in Middle School Youth, National Institute of Food and Agriculture, $140,000—*Kurzynske, J.; Jones, K.*
Survey of Kentucky Food Consumers' Knowledge and Attitudes on Calories in Quick Serve Menu Items, Foundation for a Healthy Kentucky, $5,000—*Mullins, J.*
The Effect of Behavioral Weight Loss Program with Nutrisystem Meal Provision on Change in Weight, Fasting Blood Glucose, Total Cholesterol, and Blood Pressure Over 12 Weeks, Obesity Society, $25,000—*Webber, K.*

Plant and Soil Sciences

Total—$9,451,077
(includes Research Challenge Trust Fund)

2008 Southern Regional Water Resource Project, Texas A&M University, $63,307—*Lee, B.*
Accelerating the Development of FHB-Resistant Soft Red Winter Wheat Varieties, Agricultural Research Service, $56,359—*Van Sanford, D.*
ARRA: Advancing Drug Development in Medicinal Plants using Transcriptomics and Metabolomics, National Institute of General Medical Sciences, $2,972,425—*Chappell, J.*
ARRA: Department of Energy Merit Review, Department of Energy, $12,642—*Yuan, L.*
ARRA: Development of Rhodobacter as a Versatile Microbial Platform for Fuels Production, Pennsylvania State University, $290,119—*Chappell, J.*
Breeding and Release of Improved Wheat Varieties with High Yields and Test Weights, Enhanced Scab Resistance and Overall Disease Resistance, Increased Lodging Resistance and Increased Profitability, Kentucky Small Grain Growers Association, $47,650—*Van Sanford, D.*
Breeding for Reduced Nicotine Content in Burley Tobacco, Burley Tobacco Growers Cooperative Association Inc., $25,000—*Miller, R.*

Burley Tobacco Breeding and Genetics, Philip Morris International Management SA, $975,000—*Miller, R.*

CDRP: Integrated Research, Education, and Extension to Enable Sustainable Biofuel Production—A Proposed Workshop to Organize Research Efforts in the Southeast U.S.; Kentucky Council on Postsecondary Education, $30,000—*McNear, D.; Bertsch, P.; DeBolt, S.*

Center for the Environmental Implications of Nanotechnology (CEIN), Duke University, $110,000—*Bertsch, P.; Unrine, J.*

Collaborative Proposal: CPSF30 at the Convergence of RNA Processing, Cellular Signaling and Development in Plants, National Science Foundation, $3,000—*Hunt, A.*

Collaborative Research: Decomposition in Drylands: Soil Erosion and UV Interactions, National Science Foundation, $108,340—*McCulley, R.*

Collaborative Research: Do Expected Evolutionary Trade-Offs in Enzyme Activities Manifest at the Level of Microbial Community Function?, National Science Foundation, $69,550—*McCulley, R.*

Comparing Corn Systems in Wide and Narrow Rows, Kentucky Corn Promotion Council, $35,000—*Lee, C.; Green, J.*

Development of Chia as a Sustainable Crop, Kentucky Small Grain Growers Association, $5,000—*Hildebrand, D.*

Development of Hyperactive DNA Transposases by Directed Evolution, Kentucky Science and Technology Co. Inc., $40,217—*Yuan, L.*

Dicamba-Tolerant Soybean Weed Control System–Service Order #10, Monsanto Co., $6,000—*Carter, S.*

Distinguishing Indigenous P Level Effects on Soil and Water Quality Characteristics of Inner and Outer Bluegrass Soils in Kentucky, Natural Resources Conservation Service, $23,500—*Karathanasis, A.*

EAGER: RNAi Gene Discovery Tool to Randomly Generate Dominant Mutant Pools in Plants, National Science Foundation, $295,576—*Tang, G.*

Effects of Warming and Altered Precipitation Regime on Managed Grassland Structure and Function, Duke University, $124,258—*McCulley, R.*

Engineering High Value Oil Production into Biofuel Crops, National Institute of Food and Agriculture, $199,373—*Chappell, J.*

Evaluate the Effect of Seeding Rate of Wheat and Preharvest Applications on Managing Giant Ragweed and Marestail In Wheat, Kentucky Small Grain Growers Association, $6,000—*Martin, J.; Call, D.; Tutt, C.*

Evaluation of Pale Yellow and Standard Tobacco Varieties Response to Traditional and Aggressive Fire Curing, Altria Corporate Services Inc., $21,456—*Bailey, W.*

Expression and Distribution of Dynamic Soil Properties in Benchmark Catenas under Forest and Cultivated Land Use in the Shawnee Hills, MLRA 115 and 120, Natural Resources Conservation Service, $30,000—*Lee, B.*

Farm Test of Crop Sensing for Site-Specific Nitrogen Fertilizer Application in Winter Wheat, Kentucky Small Grain Growers Association, $6,500—*Wendroth, O.; Egli, D.; Murdock, L.; Schwab, G.*

Field Evaluation of Nicotine Demethylase Experimental Lines, Altria Corporate Services Inc., $30,580—*Bailey, W.*

Grain Farming without Subsidies–Sabbatical to Argentina, National Institute of Food and Agriculture, $79,871—*Lee, C.*

Improving Nitrogen Application Technology Under Kentucky Conditions, Kentucky Small Grain Growers Association, $5,000—*Murdock, L.; Call, D.; James, J.; Schwab, G.*

Kentucky Soil Survey Investigations 2010-2011, Natural Resources Conservation Service, $10,000—*Karathanasis, A.*

Kentucky Soil Survey Investigations, Natural Resources Conservation Service, $10,000—*Karathanasis, A.*

Obtaining a Transcriptome for Developing *Acacia victoriae* Seed Pods, Qwell Pharmaceutical Incorporated, $30,252—*Chappell, J.*

Oilseeds as a Renewable Source of Epoxy Fatty Acids, Consortium for Plant Biotechnology Research Inc., $90,000—*Hildebrand, D.*

Optimum Planting Date for Soybean, Kentucky Soybean Promotion Board, $5,000—*Herbek, J.*

Performance of Small Grain Varieties in Kentucky, Kentucky Small Grain Growers Association, $15,150—*Bruening, W.*

Polyadenylation of Stored mRNA during Seed Germination, Kentucky Science and Technology Co. Inc., $43,033—*Hunt, A.; Downie, A.*

Production of Abietic Acid and Other Potentially Useful, Related Diterpenes in Tobacco Trichomes, Procter & Gamble Company, $60,000—*Wagner, G.; Chappell, J.; Tang, G.; Yuan, L.*

Regional Biomass Feedstock Partnership–Herbaceous Bioenergy Crop Field Trials, South Dakota State University, $30,225—*Barrett, M.*

Regional Biomass Feedstock Partnership, South Dakota State University, $19,000—*Williams, D.*

Renewable Lubricant Production, Ashland Inc., $10,000—*Hildebrand, D.*

Soil Morphology Training for On-Site Sewage Disposal Systems, Kentucky Cabinet for Health and Family Services, $30,000—*Karathanasis, A.*

SOY MVP: Kentucky Soybean Management Verification Program, Year 3, Kentucky Soybean Promotion Board, $86,016—*Lee, C.; Herbek, J.; Murdock, L.; Schwab, G.*

Speciation and Spatial Distribution of Cr, Cu, and As in Bulk and Rhizosphere Soils Adjacent to CCA Treated Fences throughout the Landscape, Kentucky Council on Postsecondary Education, $1,500—*McNear, D.*

Support for Innovative Tobacco Growers Program, Burley Tobacco Growers Cooperative Association Inc., $5,000—*Pearce, R.*

Survey of the Tissue Nutrient Status of Winter Wheat in Kentucky, Kentucky Small Grain Growers Association, $4,000—*Schwab, G.; Ritchey, E.*

Synchotron X-Ray Microprobe and Microspectroscopy Research in Low Temperature Geochemistry, University of Chicago, $42,745—*Bertsch, P.*

The Transition to Biofuel Feedstock Production in Kentucky, Eastern Kentucky University, $18,333—*Smith, S.*

Tobacco Breeding and Cultural Practices Agreement, RJ Reynolds Tobacco Co., $1,000,000—*Miller, R.*

Transatlantic Initiative for Nanotechnology and the Environment (TINE), Environmental Protection Agency, $2,000,000—*Bertsch, P.; Kabengi, N.; McNear, D.; Tsyusko, O.; Unrine, J.*

U.S. Wheat & Barley Scab Initiative's Networking and Facilitation Office and Website, Agricultural Research Service, $149,316—*Van Sanford, D.*

Wheat Yield in 15-Inch Rows, Year 2, Kentucky Small Grain Growers Association, $3,000—*Lee, C.; Herbek, J.*

Wheat Yield in 15-Inch Rows, Year 3, Kentucky Small Grain Growers Association, $2,500—*Lee, C.; Herbek, J.*

Plant and Soil Sciences—Research Challenge Trust Fund

Enhancement of Soybean Somatic Embryo Development to Improve Regeneration and Transformation Efficiency (Year 1 of 2), United Soybean Board, $74,284—*Perry, S.*

Methodology for Designing Vegetative Buffers Using GIS and Terrain Analysis, Forest Service, $40,000—*Mueller, T.*

Plant Pathology

Total—$2,150,110
(includes Research Challenge Trust Fund)

2010 Kentucky Soybean Rust Monitoring and Early Warning System, Kentucky Soybean Promotion Board, $50,000—*Hershman, D.*

A Host Protein Interaction and Localization Map for a Plant, National Science Foundation, $150,000—*Goodin, M.*

Advanced Genetic Technologies, National Institute of Food and Agriculture, $604,934—*Schardl, C.*

Can Foliar Applied Fungicides Reduce Yield Loss in Soybean Caused by Soybean Cyst Nematode?, Kentucky Soybean Promotion Board, $20,000—*Hershman, D.*

Construction of a DNA-Based Virus Induced Gene Silencing Tool for Functional Genomics of Soybean Development, University of Illinois, $37,677—*Ghabrial, S.*

Consulting and Discussions on Fungicide Resistance and Monsanto Commercial Approaches to Plant Health and Disease Control Roundup Ready Cropping Systems.; Monsanto Co., $1,000—*Vincelli, P.*

Control of *Sclerotinia sclerotiorum* on Tomato with Boscalid and Other Fungicides, IR-4, University of Florida, $7,000—*Seebold, K.*

Engineering Resistance to Bean Pod Mottle Virus in Soybean, Kentucky Soybean Promotion Board, $32,575—*Kachroo, A.*

Enhancing Soybean Yield by Manipulating the Expression of Seed Size-Determining Genes, United Soybean Board, $114,691—*Kachroo, A.; Ghabrial, S.*

Genetic, Molecular and Biochemical Basis of Resistance to Turnip Crinkle Virus in *Arabidopsis*, Boyce Thompson Institute for Plant Research, $92,741—*Kachroo, P.*

Genetics of Quantitative Pathogenic Variation in *Fusarium graminearum*, Agricultural Research Service, $13,363—*Vaillancourt, L.*

Glycerol Metabolism and Its Role in Biotrophy versus Necrotrophy in an *Arabidopsis*/Fungal Hemibiotroph Model System, National Science Foundation, $6,000—*Kachroo, P.; Kachroo, A.; Vaillancourt, L.*

Improvement and Deployment of Rapid Standardized PCR Diagnostic Tools to Increase Detection Capacity for High-Impact Plant Pathogens, University of Florida, $135,772—*Vincelli, P.*

Kentucky Science and Engineering Foundation Research and Development Excellence: Development and Deployment of a Non-Toxic Endophyte in Tall Fescue for Forage, Kentucky Science and Technology Co. Inc., $56,183—*Schardl, C.; Phillips, T.*

Kentucky Science and Engineering Foundation Research and Development Excellence: Investigating the Role of the Cuticle in Resistance to Foliar Plant Pathogens, Kentucky Science and Technology Co. Inc., $39,936—*Seebold, K.; Kachroo, P.*

Managing *Phytophthora capsici* on Pepper and Summer Squash with Combinations of Bioten and Conventional Fungicides, University of Florida, $10,000—*Seebold, K.*

Multiple Disease Resistant Soybeans: Gene Discovery and Transfer of Disease Resistance into Soybean, University of Illinois, $52,333—*Ghabrial, S.*

Rapid Screening and Expression of Valuable Proteins in Soybean Using a Virus-Based Vector, Kentucky Science and Technology Co. Inc., $39,207—*Ghabrial, S.*

Reducing Soybean Yield Loss by Enhancing Resistance to Phytophthora Rot, United Soybean Board, $90,553—*Kachroo, A.*

Uniform Trial on Integrated Management of FHB: Kentucky, Agricultural Research Service, $5,122—*Hershman, D.; Lee, C.*

Use of a Novel Virus-Based Vector in Search for Resistance to the Soybean Cyst Nematode and Other Important Soybean Pathogens, Kentucky Soybean Promotion Board, $30,563—*Ghabrial, S.; Hershman, D.*

Plant Pathology—Research Challenge Trust Fund

ARRA: The Role of the Host Ca/Mn Pump in Emergence of Novel Viral RNA Recombinants, National Institute of Allergy and Infectious Diseases, $208,500—*Nagy, P.*

Functional Role of a Host Metabolic Enzyme in Viral Replication, National Institute of Allergy and Infectious Diseases, $201,960—*Nagy, P.*

The Role of a Host Ion Pump in RNA Virus Recombination, National Science Foundation, $150,000—*Nagy, P.*

Regulatory Services

Total—$237,067

Enhancing and Building the Capability of Feed Safety in Kentucky, Food and Drug Administration, $202,936—*Thom, W.; Webb, S.*

Medicated Feed Mill and BSE Rule Inspections, Food and Drug Administration, $34,131—*Thom, W.*

Tracy Farmer Institute for Sustainability and the Environment

Total—$475,000

Military Affairs Environmental Support, Kentucky Department of Military Affairs, $335,000—*Hanley, C.*

Science Literacy Project for Middle School Teachers, Year 8, Kentucky Council on Postsecondary Education, $140,000—*Hanley, C.*

University of Kentucky Veterinary Diagnostic Laboratory

Total—$542,206

Bovine Spongiform Encephalopathy Testing and Related Services, Kentucky Department of Agriculture, $22,400—*Carter, C.*

Diagnostic Laboratory Support for NAHLN, Animal and Plant Health Inspection Service, $55,000—*Carter, C.*

Diagnostic Services 2010, Kentucky Department of Fish and Wildlife, $5,000—*Carter, C.*

Mobile Wireless and Remote Diagnostic Computer Applications and Animal Health Briefing Capability in Support of Grazing Livestock Health, National Institute of Food and Agriculture, $440,206—*Carter, C.; Arnold, L.; Gaskill, C.; Smith, J.*

West Nile Surveillance, Kentucky Cabinet for Health and Family Services, $20,000—*Carter, C.*

Veterinary Science

Total—$1,412,470

ARRA: Behavioral Genomics of the White-Throated Sparrow, Indiana State University, $72,841—*Lear, T.*

Characterization of the Inflammatory Response to Anthelmintics, Pfizer Inc., $47,923—*Horohov, D.; Lyons, E.*

Comparison of *in vitro* Antiviral Activity of Herpesvirus DNA Polymerase Inhibitors against Neuropathogenic and Non-Neuropathogenic Strains of Equine Herpesvirus-1, Kentucky Horse Racing Commission, $40,499—*Balasuriya, U.; Cook, R.*

EIAV Envelope Variation and Vaccine Efficacy, University of Pittsburgh, $346,829—*Issel, C.; Cook, R.; Horohov, D.*

Fertility of Mares Inseminated with Frozen/Thawed Semen Centrifuged through a Single Layer Density Gradient, Colorado State University, $36,225—*Squires, E.*

Further Characterization of the Immunological Response of Horses to Metastim, Pfizer Inc., $48,193—*Horohov, D.*

Further Characterization of the Immunological Response of Horses to Vaccination with Fluvac Innovator, Pfizer Inc., $88,802—*Chambers, T.; Horohov, D.*

Methods to Suppress Estrus in Race Mares, Kentucky Horse Racing Commission, $48,092—*Squires, E.; Troedsson, M.*

Molecular Characterization of Neurovirulent EHV1 Strains, Grayson Jockey Club Research Foundation Inc., $46,653—*Balasuriya, U.; Cook, R.; Timoney, P.*

Morris Animal Foundation (MAF) Pfizer Animal Health (PAH) Veterinary Fellowship, Morris Animal Foundation, $40,000—*Troedsson, M.*

Orthopaedic Pathology and Genetic Associations in Cervical Stenotic Myelopathy, Morris Animal Foundation, $100,000—*MacLeod, J.*

Orthopaedic Pathology and Genetic Associations with Cervical Stenotic Myelopathy, Grayson Jockey Club Research Foundation Inc., $47,773—*MacLeod, J.*

Safety and Anti-Inflammatory Efficacy of Glucocorticoids for Intra-Articular Therapy in Racehorses, Kentucky Horse Racing Commission, $99,969—*MacLeod, J.*

Seroprevalence of *Lawsonia intracellularis* in Central Kentucky Thoroughbred Weanlings and the Economic Impact on Yearling Sales Prices, Kentucky Horse Racing Commission, $48,841—*Horohov, D.*

Testing Methods for Influenza Infection in Equine Models (Pilot #2), Science Applications International Co., $53,975—*Chambers, T.*

The Effect of Age on Equine Dendritic Cell Interactions with *Rhodococcus Equi*, National Institute of Food and Agriculture, $200,000—*Horohov, D.*

Toxins TcdA, B and *C. difficile* for Horse Immunization, Grayson Jockey Club Research Foundation Inc., $45,855—*Artiushin, S.; Timoney, J.*

Multidisciplinary Grants Led by Other Colleges*

Total—$11,816,481

Appalachia Community Cancer Network II–Centers for Reducing Cancer Disparities (U54), National Cancer Institute, $1,280,345—*Webber, K.*

ARRA: *In Vitro* and *In Vivo* Models for Ethanol Withdrawal and Antepartum Hypoxia, National Institute on Alcohol Abuse and Alcoholism, $183,617—*Littleton, J.*

ARRA: Power and Energy Institute at the University of Kentucky, Department of Energy, $2,501,773—*Colliver, D.*

ARRA: The Kentucky Diabetes and Obesity Collaborative (KDOC), National Institute of Diabetes and Digestive and Kidney Diseases, $998,571—*Murray, D.*

Development of an Algae-Based System for CO_2 Mitigation from Coal-Fired Power Plants–Year 3, Kentucky Energy and Environment Cabinet, $629,826—*Crofcheck, C.; Montross, M.*

Establishment of a Laboratory for Biofuels at the University of Kentucky, Department of Energy, $1,428,175—*Crofcheck, C.; Montross, M.*

Geometry of Gene Cophylogenies as Relates to Genome Evolution and Speciation, National Institute of General Medical Sciences, $277,200—*Schardl, C.*

Hippocamppal Neurotoxicity Induced by Ethanol Withdrawal, National Institute on Alcohol Abuse and Alcoholism, $364,677—*Littleton, J.*

Implications of Caveolae in Tat Signaling and Integrity of Brain Endothelium, National Institute of Mental Health, $347,938—*Hennig, B.*

Kentucky Girls STEM Collaborative Project, Puget Sound Center for Teaching Learning and Technology, $17,808—*Burks, J.; Hanley, C.*

Kentucky Science and Engineering Foundation Emerging Ideas: Interfacial Engineering of Biomass Saccharification by *T. reesei* enzymes, Kentucky Science and Technology Co. Inc., $41,406—*Nokes, S.*

National Science Foundation/EPSCoR: Transforming Kentucky's New Economy with EPSCoR, National Science Foundation, $2,495,000—*Schardl, C.; Webb, B.*

Separation and Recovery of High-Value Pentose Derivatives from Cellulosic Biomass Using Mol+, Kentucky Energy and Environment Cabinet, $85,720—*Nokes, S.*

Southeast Center for Agricultural Health and Injury Prevention, National Institute of Occupational Safety and Health, $164,425—*Purschwitz, M.*

State EPSCoR: Transforming Kentucky's New Economy, Kentucky Council on Postsecondary Education, $1,000,000—*McNear, D.; Schardl, C.; Webb, B.; Zhou, X.*

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

Intellectual Property

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Animal and Food Sciences

Greenwood, S.L., B.W. McBride, J.C. Matthews, and S.F. Liao. *Ovis aries* proteasome subunit C8mRNA, Partial cds gi. Accession GU551938.

Greenwood, S.L., B.W. McBride, J.C. Matthews, and S.F. Liao. *Ovis aries* ubiquitin-conjugating enzyme E2 mRNA, Partial cds gi. Accession GU551939.

Greenwood, S.L., B.W. McBride, J.C. Matthews, and S.F. Liao. *Ovis aries* polyubiquitin mRNA, Partial cds gi. Accession GU551940.

Liao, S.F., and J.C. Matthews. *Sus scrofa* sodium-coupled borate transporter (NaBC1) mRNA, Partial cds gi. Accession HQ127317.

Liao, S.F., and J.C. Matthews. *Sus scrofa* 18S ribosomal RNA mRNA, Partial cds gi. Accession HQ127318.

Entomology

Chapman, E.G., and J.D. Harwood. Eight accessions.

Johansen, Kacie. GQ502922–GQ502934.

Sharanowski, Barbara. H0079272–H0087893.

Plant Pathology

Schardl, C.L. *Neotyphodium lolii* nonfunctional non-ribosomal peptide synthetase (Lp14) gene, complete sequence 7,786 bp linear DNA. Accession GU966659.1.

Schardl, C.L. *Epichloe festucae* E2368 genomic scaffold scaffold00002, whole genome shotgun sequence 2,645 bp linear DNA. Accession GG731515.1.

Schardl, C.L. *Epichloe festucae* E2368 genomic scaffold scaffold00003, whole genome shotgun sequence 3,633 bp linear DNA. Accession GG731516.1.

Schardl, C.L. *Epichloe festucae* E2368 genomic scaffold scaffold00004, whole genome shotgun sequence 27,980 bp linear DNA. Accession GG731517.1.

Schardl, C.L. *Epichloe festucae* E2368 genomic scaffold scaffold00005, whole genome shotgun sequence 183,173 bp linear DNA. Accession GG731518.1.

Christopher Schardl had 7,307 additional accessions.

Vaillancourt, L.J. Glycerol-3-phosphate-dehydrogenase gene (GPD1) of *Colletotrichum higginsianum*. Accession HQ697252.

Veterinary Science

Balasuriya, U.B.R. Equine arteritis virus chimeric full-length infectious cDNA clone rMLV/VBS 234. Accession GU732198.

Balasuriya U.B.R. Equine arteritis virus chimeric full-length infectious cDNA clone rMLV/VBS 56. Accession GU732199.

Balasuriya U.B.R. Equine arteritis virus chimeric full-length infectious cDNA clone rMLV/VBS S. Accession GU732200.

Balasuriya U.B.R. Equine arteritis virus chimeric full-length infectious cDNA clone rVBS/MLV S Accession GU732202.

Balasuriya U.B.R. Equine arteritis virus chimeric full-length infectious cDNA clone rVBS/HK116 S. Accession GU732201.

Horohov, D.W. *Equus caballus* interleukin 17A (IL17A), mRNA. Accession NM_001143792.1.

Horohov, D.W. *Equus caballus* chemokine (C-C motif) ligand 13 (CCL13), mRNA. Accession NM_001163887.1.

Velenini, S., and J.F. Timoney. *Streptococcus equi* subsp. zooepidemicus NC29, SzP gene sequence. Accession HM565772.

Velenini, S., and J.F. Timoney. *Streptococcus equi* subsp. zooepidemicus NC32, SzP gene sequence. Accession HM565773.

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Animal and Food Sciences

Liao, S.F., J.A. Boling, and J.C. Matthews. Effect of dietary supplementation of selenium (organic vs. inorganic) on liver gene expression profile in beef heifers [*Bos taurus*], 18 microarray samples. GEO Accession GSE19696.

Liao, S.F., J.A. Boling, and J.C. Matthews. Hepatic gene expression profiles of growing beef steers grazing high vs. low endophyte-infected tall fescue grass [*Bos taurus*], 19 microarray samples. GEO Accession GSE23894.

Veterinary Science

MacLeod, J.N. Microarray data. GEO Accession GSE11760.

MacLeod, J.N. Microarray data. GEO Accession GSE14252.

MacLeod, J.N. RNA-seq tag nucleotide sequence data. GEO Accession GSE21925.

MacLeod, J.N. Microarray data. GEO Accession GSE23862.

Patents Issued

Animal and Food Sciences

Hicks, C., and P. Crooks. Bioactive peptide-based probes. Patent 7,759,468. Issued July 20, 2010.

Entomology

Webb, B., and J. Kroemer. Cell lines having enhanced cell longevity and protein expression. Patent 7,842,493. Issued November 30, 2010.

Horticulture

Houtz, R.L., L.M.A. Dirk, and M.A. Williams. Inhibitors of plant peptide deformylase for use as broad-spectrum herbicides and methods for identifying the same. U.S. Patent 7,745,693. Issued June 29, 2010.

Kentucky Tobacco Research and Development Center

Falcone, D.L., and J. M. Littleton. Methods for screening for genes and small molecules that activate mammalian receptor proteins. U.S. Patent 7,737,327. Issued June 15, 2010.

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Boatright, W.L., and M.S. Jahan. Carbon-centered radicals in soy protein products. Chapter 1, pp. 3-21. IN: K.R. Cadwallader and S.K.C. Chang. ed. *Chemistry, Texture, and Flavor of Soy*. American Chemical Society, Washington, D.C. Published online: http://pubs.acs.org/isbn/9780841225619.

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Colliver, D.G., et al. 2009. *Advanced Energy Design Guide for Small Hospitals and Healthcare Facilities*. American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc., Atlanta, GA. 179 pp.

Colliver, D.G., et. al. 2009. *Advanced Energy Design Guide for Highway Lodging.* American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc. Atlanta, GA. 108 pp.

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Community and Leadership Development

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Torres, R.M., T. Kitchel, and A.L. Ball, ed. *Preparing and Advancing Teachers in Agricultural Education*. Curriculum Materials Services, Columbus, OH.

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Leavengood Jr., J. M. Superfamily Cleroidea, Chapter 4: Where do they live." pp. 205-210. IN: Carlos Aguilar Julio. *Methods for Catching Beetles*. Jorge Barrett Viedma, ed. Collection Naturalia Scientific Editions; Montevideo-Asunción, Uruguay.

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Y.L. Xiong contributed to two articles in Biosystems and Agricultural Engineering.

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R. Dwyer contributed to one article for the UK Veterinary Diagnostic Laboratory.

E.T. Lyons contributed to one article in Animal and Food Sciences.

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Veterinary Science

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Timoney, P.J. Globalisation of trade and the increased risk of spread of equine diseases. Irish Veterinary Journal 63:210-212.
Troedsson, M.H.T. Sperm transport, elimination and endometritis. Clinical Theriogenology 2(3):320-325.
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Troedsson, M.H.T., A. Doty, M.L. Macpherson, M.C. Connor, J.P. Verstegen, M.A. Pozor, and W.C. Buhi. CRISP-3 in equine seminal plasma is involved in selective uterine sperm transport. Animal Reproduction Science 121S:192-193.
Troedsson, M.H.T., A. Doty, K. Scoggin, and W.C. Buhi. Sperm transport and elimination from the mares' reproductive tract. Pferdeheilkunde 26(1):25-28.
Wang, K., D. Singh, Z. Zeng, S.J. Coleman, H. Xiaping, P. Mieczkowski, C.M. Perou, J.N. MacLeod, D.Y. Chiang, J.F. Prins, and J. Liu. MapSplice: mapping RNA-seq reads for splice discovery. p. 54. The Biology of Genomes, Cold Spring Harbor Laboratory, Cold Spring Harbor, NY, May 11-15.
Zhang, J., Y.Y. Go, Z. Lu, B.J. Meade, P.J. Timoney, and U.B.R. Balasuriya. Development and characterization of an infectious cDNA clone of the modified live virus vaccine strain of equine arteritis virus and its potential as a vaccine vector. Proceedings, Ninth International Symposium on Positive Stranded RNA Viruses, Atlanta, GA, May 17-21.

Graduate Degrees

Degrees listed are from the 2010 Spring Semester, 2010 Second Summer Session, and 2010 Fall Semester.

Ph.D. Dissertations

Agricultural Economics

Iswariyadi, Arief. Multi-stage game analyses: An application to the oligopolistic Japanese beef market.
Shockley, Jordan Murphy. Whole farm modeling of precision agriculture technologies.
Subramaniam, Vijayaratnam. Agricultural intersectoral linkages and their contribution to economic development.

Animal and Food Sciences

Xue, Yan. The role of glutamate transport and metabolism in two chronic syndromes of ruminants: Metabolic acidosis and fescue toxicosis.

Biosystems and Agricultural Engineering

Maia, Guilherme Del Nero. Ammonia biofiltration and nitrous oxide generation as affected by media moisture content.
Palanisamy, Bakkiyalakshmi. Streamflow prediction using GIS for the Kentucky River basin.
Torrealba, Sebastian. A continuous mathematical model of the one-dimensional sedimentation process of flocculated sediment particles.

Entomology

Boring, Andy. Revision of the braconid subfamily Euphorinae and examination of the female reproductive system within Hymenoptera for useful characters in phylogenetic reconstruction.
Dodd, Luke. Disturbance affects insect prey and bat activity in deciduous forests.
Hammons, Derrick. Insect-plant relationships and sustainable management of *Popillia japonica* and *Cotinis nitida* in vineyards.
Redmond, Carl. Natural enemies and site characteristics affecting distribution and abundance of native and invasive white grubs on golf courses.

Family Studies

Blevins, Stephanie S. Program evaluation: A study of the impact of a workforce preparation program.
Gillen, Martie L. Women's alternative retirement transition stages: Social Security retirement benefits and employment status.
Hunter, Jennifer L. An analysis of household economic activities during a period of economic recession.
Koech, Alice C. Marriage attitudes of poor and nonpoor women in Kentucky.

Horticulture

Finneseth, Cynthia. Evaluation and enhancement of seed lot quality in eastern gamagrass (*Tripsacum dactyloides*).
Fulcher, Amy. Modeling water use in nursery crops.

Plant and Soil Sciences

Alvarado, Soraya P. Characterization of soil carbon stabilization in long-term row-cropped agro-ecosystems.
Chakrabarti, Manohar. Evolutionary perspective of nicotine to nornicotine conversion, its regulation and characterization of EIN2 mediated ethylene signaling in tobacco.
Johnson, Jennifer M. Grazing evaluation of a novel endophyte tall fescue developed for the upper transition zone.
Rienzi, Eduardo A. Effect of low and high kinetic energy wetting on quality of sediment produced by interrill erosion.
Ritchey, Edwin L. The influence of subsurface tillage on yield and compaction in burley tobacco.

Plant Pathology

Xia, Ye. The role of cuticle, fatty acids and lipid signaling in plant defense.

Veterinary Science

Miller, Lynda. Characterization of sperm protein at 22 kDa (SP22) in the stallion reproductive tract.
Klein, Claudia. Embryo-maternal communication during early pregnancy in the horse—A transcriptional approach.

M.S. Theses

Agricultural Economics

Tran, Chinh Cong. Public policy instruments for risk management of highly pathogenic avian influenza (HPAI) H5N1 in Vietnam.

In addition, one non-thesis master's degree was awarded in calendar 2010.

Animal and Food Sciences

Ballou, Anne Lael. Effects of diet, phlorizin, and phloretin on glucose absorption from the small intestine of steers.
Brock, Kristin. Influence of bacteria, temperature and time on raw milk component testing.
Conway, Charlotte Elizabeth. The effects of graded arginine levels on nitrogen metabolism in the lean adult dog.
Delles, Rebecca. The influence of protein oxidation on the water-binding properties of pork muscle packaged in low, normal and high-oxygen atmospheres.
Hung, I-Fen. Influences of supplementing a mannan oligosaccharide containing product to pig diets on sow and weanling pig performance.
McClelland, Kaitlyn Margaret. Effects of corn distillers dried grains with solubles (DDGS) on quality traits of pork.
Ullery, Miranda. Methods of restoring carcass firmness and other post-harvest traits in finishing pigs fed a high level of distiller's dried grains with solubles.

Biosystems and Agricultural Engineering

Atkinson Stone, Tracy. Hydrologic and water quality performance of a weep berm-grass filter system for runoff from stockpiled horse muck: A preliminary study.
Brockman, Roseann. Hydraulic geometry relationships and regional curves for the inner and outer bluegrass regions of Kentucky.

Community and Leadership Development

Yasuda, Atsuko. Building social capital through a virtual community among Japanese wives overseas: A case of Tenkintsuma.
Carrington, Amy. Exploring arts organizations as a catalyst for community development.
Anderson, Mathew. Stressors identified by agricultural student teachers.
Dunn, Jamie Parriski. Collegiate fit: Students' perceptions of retention efforts in the College of Agriculture at the University of Kentucky.

In addition, three non-thesis master's degrees were awarded in calendar 2010.

Entomology

Clark, Joshua. Using remotely sensed data to map an exotic invader: The hemlock woolly adelgid and eastern hemlock in Kentucky.
Eskelson, Mike. Trophic linkages between carabid beetles and slugs in strawberry agroecosystems.
Johansen, Kacie. Creating keys to the subfamilies of Braconidae.
Mallis, Rachael. Spiders in eastern hemlock: Potential predators of an exotic invasive?
Minter, Logan. Mesoscale spatial and temporal distribution of *Lutzomyia* spp. (Diptera : Psychodidae) in deciduous habitats of the eastern United States.
Thomas, Anna. Impact of dietary diversification on invasive slugs and biological control with notes on slug species of Kentucky.

Family Studies

Dougherty, S. Exploring the relationship between foster parents and foster agencies.
Durbin, Jessica R. Parental demandingness, control, and involvement: Predictors of female career decisions and marital attitudes.
Garrett, Nicole D. Same baby, different time: A description of the transition to parenthood in graduate school.
Perry, Martha S. Face to face versus computer-mediated communication: Couples satisfaction and experience across conditions.
Strickler, Brooke L. Defining infidelity: Attitudes, behaviors, and attributions.
Sutter, Julianne V. Assessing impact of affect recognition on therapeutic relationship.

Forestry

Augustine, Benjamin. GPS bias in resource selection studies: A case study using black bears in Southeastern Kentucky.
Brinks, Joshua. Two year response of a woody biofuel plantation to intensive management on a reclaimed surface mine in Eastern Kentucky.
Hast, John. Genetic diversity, structure, and recolonization patterns of black bears in Eastern Kentucky.
Liang, Yu. Exotic invasive plants in Kentucky.
Mastin, Courtney. Preliminary evaluation of stream restoration and passive treatment technologies for the improvement of water quality on a surface mine in Eastern Kentucky.
Shouse, Michael. Mapping and modeling select invasive exotic plants in an urban forest context.

Merchandising, Apparel, and Textiles

Brantley, Aquiashala. A quantitative study of females: ethnicity and its influence on body image, thin-internalization and social comparisons.
Evans, Laura. The effects of celebrity endorsers on the purchasing intentions of teens.
Maloney, Jennifer. Consumer willingness to purchase organic products: Application of the theory of planned behavior.
Solka, Anna. The influence of gender and culture on Generation Y consumer decision making styles.

Graduate Enrollment

	Master's			Doctorate			Total		Net
	2009	2010	Net	2009	2010	Net	2009	2010	Change
Agricultural Economics	19	24	5	20	23	3	39	47	8
Animal and Food Sciences	21	24	3	25	28	3	46	52	6
Biosystems and Agricultural Engineering	18	18	0	11	10	-1	29	28	-1
Entomology	11	6	-5	26	23	-3	37	29	-8
Family Studies	21	20	-1	18	19	1	39	39	0
Forestry	14	16	2	*	*	-	14	16	2
Merchandising, Apparel & Textiles	11**	11	0	*	*	-	11	11	0
Nutrition and Food Science	29	24	-5	*	*	-	29	24	-5
Plant and Soil Sciences/Horticulture	20	23	3	42	43	1	62	66	4
Plant Pathology	0	0	0	25	20	-5	25	20	-5
Career, Technology and Leadership Education	35	35	0	*	*	-	35	35	0
Veterinary Science	7	10	3	21	21	0	28	31	3
Grand Totals							**394**	**398**	**4**

Note: Data are from the UK Office of Institutional Research, Planning, and Effectiveness (http://www.uky.edu/IRPE/student.html).
*Degree type not offered.
**Total not combined with Interior Design, Merchandising, and Textiles beginning in 2008.

Nutrition and Food Science

Beyette, Rachel A. The characterization and calculation of diet quality for a low-income population in Quito, Ecuador.
Hines, Danita. Vegetarians and vegans in Kentucky.
Lee, Eunkyung. Impact of a 16-week behavioral weight-loss program on dietary and physical activity changes.
Marshall, Elizabeth. Examining the relationship between weight, food insecurity, food stamps, and perceived diet quality in school-aged children.
Peterson, Julie. The resting metabolic rate of the frail, institutionalized elderly in Kentucky.
Small, Sarah. Dietitians' use and perceptions of nutrition screening tools for the older adult.
Willet, Elizabeth. Improved risk communication through assessment of Kentucky citizens' perception of environmental pollutants, health and nutrition behavior.

Plant and Soil Sciences

Banerjee, Sagarika. Effects of livestock antibiotics on nitrification, denitrification and microbial community composition in soils along a topographic gradient.
Brosi, Glade B. The response of tall fescue and its fungal endophyte to climate change.
Edwards, Meghan E. Spiny amaranth control and aminopyralid persistence in Kentucky pastures.
Martin, Amanda. The effects of potassium fertilizer addition on soil test potassium levels in Kentucky soils.
Jordan, Daniel L. Impact of high input production practices on soybean yield.
O'Daniel, Stephen. Optimizing the cropload potential of 'Traminette' in Kentucky.
Schwer, Donald R. Chromium, copper, and arsenic concentration and speciation in soil adjacent to chromated copper arsenate (CCA) treated lumber along a topohydrosequence.
Suarez, Alfonso L. Cover crops and tillage systems for organic corn production in Kentucky.
Walton, Riley J. The contribution of poultry litter to soil water retention in no-till soils.

Veterinary Science

Detlefsen, Lauren. Differential gene expression in equine tendon as a function of maturation and loading.
Vanderman, Kadie. Brother of CDO expression in articular cartilage.

Financial Statement

Statement of Current General Fund Income and Expenditures

Fiscal Year 2010

Income	
Federal Funds	
Hatch	$ 3,663,982
Hatch Multi-State	837,057
McIntire-Stennis	445,602
Animal Health	45,308
Total Federal Funds	$ 4,991,949
State Funds	
Total State Funds	$ 28,301,391
Total Funds	**$ 33,293,340**

Expenditures	**Federal**	**State**	**Total**
Personal Services	4,406,537	22,828,393	27,234,931
Travel	104,333	459,884	564,218
Other Operating Expenses	377,332	4,535,537	4,912,868
Equipment	103,747	477,576	581,323
Total Expenditures	**4,991,949**	**28,301,391**	**33,293,340**

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Departments

Following are departmental faculty and leadership lists for calendar year 2010. (R) denotes Experiment Station appointment.

Agricultural Communications

Skillman, L.M., Director

Agricultural Economics

Robbins, L.W., Professor and Chair (R)
Brown, R., Senior Lecturer
Dasgupta, S., Adjunct Assistant Professor
Davis, A., Associate Extension Professor
Debertin, D.L., Professor (R)
Dillon, C., Professor (R)
Freshwater, D., Professor (R)
Gorton, W.T., Adjunct Assistant Professor
Halich, G., Assistant Extension Professor
Hu, W., Associate Professor (R)
Infanger, C.L., Extension Professor
Isaacs, S., Extension Professor
Jones, L.D., Extension Professor (R)
Katchova, A., Assistant Professor (R)
Maynard, L., Professor (R)
Meyer, A.L., Extension Professor
Pagoulatos, A., Professor (R)
Pushkarskaya, H.N., Assistant Professor (R)
Reed, M.R., Professor (R)
Saghaian, S., Associate Professor (R)
Schieffer, J.K., Assistant Professor (R)
Simon, M.E., Adjunct Assistant Professor
Skees, J.R., Professor (R)
Snell, W.M., Extension Professor
Stowe, C.J., Assistant Professor (R)
Trimble, R.L., Extension Professor
Walters, C., Assistant Extension Professor
Williamson, L., Extension Professor
Woods, T., Extension Professor

Animal and Food Sciences

Harmon, R.J., Professor and Chair (R)
Aaron, D.K., Professor (R)
Aiken, G.E., Adjunct Associate Professor
Amaral-Phillips, D.M., Extension Professor
Anderson, L.H., Associate Extension Professor
Andries, K.M., Adjunct Assistant Professor
Bewley, J.M., Assistant Extension Professor
Boatright, W.L., Professor (R)
Boling, J.A., Professor (R)
Bullock, K.D., Extension Professor
Burris, R., Extension Professor
Cantor, A.H., Associate Professor (R)
Camargo, F.C., Assistant Extension Professor
Coffey, R.D., Extension Professor
Coleman, R.J., Associate Extension Professor
Cox, N.M., Associate Dean for Research
Cromwell, G.L., Professor (R)
Dawson, K.A., Adjunct Professor
Edgerton, L.A., Associate Professor (R)
Ely, D.G., Professor (R)
Flythe, M.D., Adjunct Assistant Professor
Harmon, D.L., Professor (R)
Heersche Jr., G., Extension Professor
Hennig, B., Professor (R)
Hicks, C.L., Professor (R)
Klotz, J.L., Adjunct Assistant Professor
LaBonty, E.A., Lecturer
Lawrence, L.M., Professor (R)
Lehmkhuler, J.W., Assistant Extension Professor
Lindemann, M.D., Professor (R)
Matthews, J.C., Associate Professor (R)
McAllister, A.J., Extension Professor
McLeod, K.R., Associate Professor (R)
Newman, M.C., Associate Professor (R)
O'Leary, J., Extension Associate Professor
Pescatore, A.J., Extension Professor
Pierce, J.L., Adjunct Assistant Professor
Rentfrow, G.K., Assistant Extension Professor
Rossano, M.G., Assistant Professor (R)
Silvia, W.J., Professor (R)
Strickland, J.R., Adjunct Associate Professor
Strobel, H.J., Adjunct Associate Professor
Suman, S.P., Assistant Professor (R)
Thrift, F.A., Professor (R)
Tidwell, J., Adjunct Assistant Professor
Tricarico, J.M., Adjunct Assistant Professor
Urschel, K.L., Assistant Professor (R)
Vanzant, E.S., Associate Professor (R)
Wang, C., Adjunct Assistant Professor
Webster, C.D., Adjunct Assistant Professor
Xiong, Y., Professor (R)

Biosystems and Agricultural Engineering

Shearer, S.A., Professor and Chair (R)
Agouridis, Carmen T., Assistant Professor (R)
Byers, M.E., Adjunct Assistant Professor (R)
Castillo, M., Adjunct Associate Professor (R)
Colliver, D.G., Associate Professor (R)
Crofcheck, C.L., Assistant Professor (R)
Edwards, D.R., Professor (R)
Gates, R.S., Adjunct Professor (R)
McNeill, S.G., Associate Extension Professor
Montross, M.D., Associate Professor (R)
Nokes, S.E., Professor (R)
Overhults, D.G., Associate Extension Professor
Payne, F.A., Professor (R)
Purschwitz, M.A., Extension Professor (R)
Stombaugh, T.D., Associate Extension Professor (R)
Taraba, J.L., Extension Professor (R)
Walker, S.P., Assistant Professor (R)
Warner, R.C., Extension Professor (R)
Webb, E.G., Adjunct Assistant Professor (R)
Wells, L.G., Professor (R)
Wheeler, E.F., Adjunct Associate Professor (R)
Wilhoit, J.H., Associate Extension Professor

Community and Leadership Development

Hansen, G., Extension Professor and Chair (R)
Dyk, P., Associate Professor (R)
Epps, R., Assistant Professor (R)
Garkovich, L., Professor
Hains, B., Assistant Professor (R)
Harris, R., Associate Professor (R)
Hustedde, R., Extension Professor
Jones, K., Associate Extension Professor
Kitchel, T., Assistant Professor (R)
Maurer, R., Extension Professor
Nah, S., Assistant Professor (R)
Ricketts, K., Assistant Extension Professor
Tanaka, K., Associate Professor (R)
Vincent, S., Lecturer (R)
Weckman, R., Associate Professor (R)
Witham, D., Professor
Zimmerman, J., Associate Extension Professor (R)

Entomology

Obrycki, J.J., Professor and Chair (R)
Bessin, R.T., Extension Professor
Brown, G.C., Professor (R)
Dobson, S.L., Professor (R)
Fox, C.W., Professor (R)
Harwood, J.D., Assistant Professor (R)
Haynes, K.F., Professor (R)
Johnson, D.W., Extension Professor
Palli, S.R., Professor (R)
Potter, D.A., Professor (R)
Potter, M.F., Extension Professor
Rieske-Kinney, L.K., 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
White, J.A., Assistant Professor (R)
Yeargan, K.V., Professor (R)
Xuguo, Z., Assistant Professor (R)

Environmental and Natural Resource Initiative

Workman, S.R., Director (R)
Hanley, C., Director of Education and Communications

Equine Initiative

MacLeod, J., Director and Dickson Professor of Equine Science and Management (R)
Coleman, R., Associate Director for Undergraduate Education in Equine Science and Management
Wiemers, H., Communications Director

Family Studies

Werner-Wilson, R.J., Professor and Chair (R)
Brock, G.W., Professor Emeritus
Flashman, R., Extension Professor
Haleman, D., Lecturer
Hans, J., Associate Professor (R)
Heath, C.J., Professor (R)
Hosier, A., Assistant Extension Professor
Hunter, Jennifer L., Assistant Extension Professor

Kim, H., Associate Professor (R)
Parker, T.S., Assistant Professor (R)
Smith, D.R., Associate Professor and Director of Undergraduate Studies
Vail, A., Professor, Director of the School of Human Environmental Sciences, and Assistant Director of Family and Consumer Sciences Extension (R)
Werner-Wilson, T.A., Lecturer, Director of the UK Family Center
Wood, N., Assistant Professor (R)

Forestry

Baker, T.T., Professor and Chair
Arthur, M.A., Professor (R)
Barnes, T.G., Extension Professor
Barton, C.D., Associate Professor (R)
Conners, T.E., Associate Extension Professor
Cox, J.J., Adjunct Assistant Professor
Fei, S., Assistant Professor (R)
Gassette, J.W., Adjunct Assistant Professor
Hill, D.H., Extension Professor
Kalisz, P.J., Associate Professor
Lacki, M.J., Professor (R)
Lhotka, J.M., Assistant Professor (R)
Ringe, J.M., Professor
Stainback, G.A., Assistant Professor (R)
Stringer, J.W., Extension Professor
Wagner, D.B., Associate Professor

Horticulture

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Archbold, D.D., Professor (R)
Bomford, M., Adjunct Assistant Professor
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Rowell, A.B., Adjunct Professor
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Williams, M.A., Associate Professor (R)

Kentucky Tobacco Research and Education Center

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Chambers, O.D., Biotechnology Relations Director
Maiti, I.B., Scientist III
Zaitlin, D., Scientist III

Landscape Architecture

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Fields, L., Assistant Professor
Hargrove, R.A., Assistant Professor
Lee, B.D., Associate Professor
Nieman, T.J., Professor (R)
Schach, H., Professor

Merchandising, Apparel, and Textiles

Addo, K., Associate Professor and Interim Chair
Brown, D.O., Associate Professor
Easter, E.P., Professor
Jackson, V.P., Associate Professor
Joshi, P.R., Lecturer
Lee, M.-Y., Assistant Professor
Michelman, S.O., Associate Professor
Spillman, K.M., Associate Professor
Swanson, J.R., Assistant Professor
Wesley, S.C., Assistant Professor

National eXtension Initiative

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Nutrition and Food Science

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Adams, I.K., Assistant Extension Professor
Addo, K., Associate Professor (R)
Bastin, S.B., Extension Professor
Cook-Newell, M., Lecturer
Forsythe, H.W., Associate Professor (R)
Gaetke, L., Professor (R)
Ham, S., Associate Professor (R)
Perry, S.D., Lecturer
Stephenson, T.J., Lecturer
Tietyen Mullins, J., Associate Extension Professor
Webber, K., Assistant Professor (R)

Plant and Soil Sciences

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Bailey, W.A., Extension Associate Professor (R)
+*Baskin, C.C.,* Professor (R)
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Bertsch, P.M., Professor (R)
Chappell, J., Professor (R)
Coyne, M.S., Professor (R)
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Spencer, H.S., Auditor
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