

*The Kentucky
Agricultural Experiment Station*

124th

Annual Report
2011

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

I herewith submit the one hundred and twenty-fourth annual report of the Kentucky Agricultural Experiment Station for the period ending December 31, 2011. 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, 2012

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Experiment Station-Affiliated Departments, Centers, and Initiatives

Agricultural Economics
Animal and Food Sciences
Biosystems and Agricultural Engineering
Community and Leadership Development
Entomology
Environmental and Natural Resource Initiative
Family Sciences
Forestry
Horticulture
Kentucky Tobacco Research and Development Center
Landscape Architecture
Merchandising, Apparel, and Textiles
Nutrition and Food Science
Plant and Soil Sciences
Plant Pathology
Regulatory Services
Robinson Center for Appalachian Resource Sustainability
Sustainable Agriculture and Food Systems Working Group
UK Ag Equine Programs
UK Research and Education Center at Princeton
UK Veterinary Diagnostic Laboratory
USDA-Agricultural Research Service-Forage Animal Production Research Unit
Veterinary Science

Purpose of the Kentucky Agricultural Experiment Station

This year, the nation celebrates the 150th anniversary of the Morrill Act of 1862. This legislation created the land-grant university system that serves as a cornerstone of American public higher education. 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 130 years. The continued progress of Kentucky agriculture attests to the benefits of applying new knowledge and technology. 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.

Experiment station research spans both basic and applied sciences. 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 2011. 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

In 2011, research activities of the Kentucky Agricultural Experiment Station were conducted at Lexington, Princeton, Quicksand, and Owenton and in counties throughout the state.

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
- **C. Oran Little 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

- The **Research and Education Center** at Princeton (Caldwell County), houses facilities devoted to research on grain crops, beef cattle, fruits, ornamentals and vegetables, forages, and tobacco.



Map Position 3

- At the **Robinson Center for Appalachian Resource Sustainability** in Quicksand (Breathitt County) research is conducted 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), a comprehensive program within the College of Agriculture, is in its second year. The initiative provides leadership and focus to interdisciplinary basic and applied research, interdepartmental graduate and undergraduate instruction, and highly collaborative extension and engagement services in environmental and natural resources.

ENRI operates through a series of working groups, which are chaired by College of Agriculture faculty members. These working groups allow faculty and staff to coalesce around a topic or project to discuss and work on agricultural issues. ENRI staff provides services to faculty, staff, and students to help them conduct outreach and research programs on campus and throughout the community. Services provided include assistance with the logistics of workshops and conferences, creation and submission of proposals, grant management, and web site maintenance.

Kentucky Tobacco Research and Development Center

The Kentucky Tobacco Research and Development Center (KTRDC) mission is to utilize plant-based technology to benefit Kentucky agriculture. The focus is on the use of science, including molecular biology, genomics, plant genetic engineering, plant breeding/field research, and other advanced technologies to improve agriculture. Research focuses on the enhancement of tobacco and other *Nicotiana* species as a production system for plant-based products (including pharmaceuticals and industrial materials), for discovering new plant natural products having potential for commercialization, and on applied research in support of Kentucky tobacco production. KTRDC houses a business incubator to assist agriculture-based start-up companies in commercializing new technologies. Other facilities include research laboratories, greenhouses, and contained growth facilities for plant disease and genetic engineering research. The goal is to utilize these resources to preserve and strengthen agriculture in Kentucky and, in particular, tobacco agriculture.

Research Focus

In the Kentucky Revised Statutes, one of the stated duties for the Kentucky Tobacco Research Board (KTRB) is to provide oversight of state funds appropriated for tobacco research. The first area of research emphasis for KTRDC is given as “preserving and strengthening tobacco agriculture in Kentucky.” With passage of the Family Smoking Prevention and Tobacco Control Act, the FDA was given authority to regulate tobacco products, and the KTRB has indicated support for KTRDC to focus research efforts to better assist Kentucky tobacco growers in response to this new regulatory environment.

The FDA regulatory system is still being developed, but all information suggests that this evolving regulatory system should be based on science. KTRDC intends to contribute to the science of this impending tobacco regulation and to explore opportunities for our academic research center to be involved in research related to the major changes likely to result from tobacco product regulation. To support this research effort, KTRDC is expanding and upgrading its tobacco analytical capability, and considerable progress is being made toward establishing a tobacco analytical lab. This lab will provide support to University of Kentucky tobacco extension, breeding, and research as the groups involved in those activities adapt their research efforts in response to FDA regulation.

Through this initiative, we have merged efforts with Dr. Lowell Bush’s analytical lab in the Department of Plant and Soil Sciences, hired new researchers, and upgraded equipment. Our goal is to continue the work to build on this well-established lab as we prepare for changes in the tobacco industry related to FDA regulation. As part of this merger, KTRDC is now responsible for the analysis of foundation seed and maintenance of tobacco seed stocks using the low converter (LC) protocol to screen all burley and dark tobacco varieties related to tobacco-specific nitrosamines (TSNAs). All new burley and dark tobacco varieties that are developed go through the variety release program and will continue to be evaluated by the lab. Thus, KTRDC now has direct impact on burley and dark tobacco producers in the state of Kentucky. In addition, KTRDC was part of a group that received funds from the Specific Cooperative Agreement between the College of Agriculture and the USDA Forage Animal Production Research Unit, a five-year agreement to support forage research and analytical analysis of forage samples from other research groups. KTRDC is also initiating new research projects in response to expected FDA tobacco product regulation. In November, a “tobacco summit” was held at which Kentucky tobacco researchers met with KTRDC scientists to identify critical areas for which research is needed. Through this process, KTRDC funded 12 pilot projects to encourage collaboration between KTRDC scientists and researchers in applied tobacco research. The list of funded projects below suggests the wide range of projects being undertaken and the relevance to Kentucky tobacco producers.

- Enhanced senescence as a strategy to reduce the occurrence of green color in air-cured tobacco
- TSNA accumulation in a controlled curing environment
- Mutation populations for use in the development of tobacco varieties having novel characteristics
- Phenotypic data collection to develop molecular markers for *nic1* and *nic2*
- Evaluation of black shank resistance in dark tobacco
- Enzymatic denitrosation of tobacco-specific nitrosamines
- Field tests for phenotypic data collection to corroborate molecular marker work-demethylase mutants
- Study of stability of TSNA standards
- The effects of cytokinin application on the production of tobacco-specific nitrosamines

- Transfer of gene knockdown constructs into elite tobacco lines to alter tobacco organoleptic properties
- Increased chlorophyll in burley
- Surveying populations of *Thanatephorus cucumeris* and *Cercospora nicotianae* for sensitivity to azoxystrobin
- Dr. Maelor Davies has transitioned into a faculty position in the Department of Plant and Soil Sciences to focus more on teaching and research. Dr. Orlando Chambers is now the KTRDC managing director, and Dr. Ling Yuan is now the KTRDC research director. Both will work under the leadership of the College of Agriculture to guide KTRDC toward mission-relevant research. KTRDC has formally integrated the research efforts of Dr. Hongyan Zhu (Plant and Soil Science) and Dr. Jan Smalle (Plant and Soil Sciences) into the in-house research program.

2011 Highlights:

- Supported 33 research projects in addition to the new tobacco summit grants, for which progress reports can be found in the KTRDC Annual Report for 2001-2011. This report can be found on our web site at www.ca.uky.edu/KTRDC.
- Continued to participate in conferences, workshops, and other events worldwide. A particular emphasis was placed on participation in tobacco-related conferences such as the Tobacco Science Research Conference (four KTRDC researchers gave presentations), the CORESTA Congress (two KTRDC researchers gave presentations), the recent Tobacco Workers Conference (seven KTRDC researchers gave presentations) as well as other scientific conferences. Through this process, we are engaging other tobacco research organizations around the world and are establishing new collaborations and research projects.
- KTRDC has reincorporated the Kentucky Reference Cigarette Program. This program provides research standards for tobacco health and industry research. The reference cigarettes are necessary for emerging tobacco product regulation and play a key role in KTRDC's efforts to establish a tobacco analytical lab.

AgTeCC

The AgTeCC incubator is located in the KTRDC building and has a mission to provide an optimal laboratory environment for startup and emerging companies having research-based activities consistent with the KTRDC research mandate. Companies eligible for residence in AgTeCC aim to develop new crop-agriculture technologies into profitable businesses that can benefit farmers and the knowledge-based economy in Kentucky.

AgTeCC provides an environment that is fully equipped for plant biotechnology research and includes access to plant-growth and tissue culture resources and services. The incubator currently houses two companies that occupy 100% of the available research space.

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. Our service programs in milk, seed, and soil are administered using a cooperative, science-based approach.

The division administers four state laws covering 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, mislabeling, adulteration, and misrepresented products and to protect businesses marketing high-quality products from unfair competition.

Feed, fertilizer, and seed are monitored from ingredients through manufacturing and retail channels for compliance. Label review, product and facility inspections, 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 are conducted on 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 payment records and monitoring

activities of sampler-weighers, handlers, lab personnel, and lab facilities.

The activities in the division are performed by a dedicated and professional staff that conduct lab 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 lab analysis program monitors feed ingredients and feed products. Feed 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 U.S. 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").

2011 Highlights:

- Performed official inspections on 1,298 feed manufacturers and dealers
- Collected 2,507 official samples; others provided 46 unofficial samples that resulted in 17,385 lab analyses for more than 2 million tons of feed marketed
- Collected 823 specialty pet food samples for analysis
- Monitored the 2011 corn crop for mycotoxins including aflatoxin, fumonisin, and vomitoxin. More than 300 mycotoxin analyses were conducted on feed samples during the year.
- Conducted 75 BSE inspections for compliance and inspected four feed mills that mix restricted drugs in feed for compliance with current Good Manufacturing Practices
- Maintained registration on more than 19,000 feed products from nearly 1,200 companies and conducted new product label reviews on more than 1,000 products
- Analyzed and reported 55 feed samples from quality control programs
- Used 43 different approved analytical methods in providing results
- Income from inspection fees and product registration received during the period of July 1, 2010 to June 30, 2011 was \$1,081,176. Inspection fees are assessed at 35 cents/ton, and annual registration of \$50 is collected for products sold in less than 10-lb packages.

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 and supporting regulations also protects the legitimate fertilizer industry from unfair competition.

2011 Highlights:

- Administered actions on 2,616 official and 11 unofficial samples involving over 8,000 chemical analyses
- The official samples represented about 50,000 tons of the approximately 890,000 tons of fertilizer distributed in Kentucky during 2011, or about 5.6%.
- Reviewed labels and registered 4,548 products from 658 firms and issued licenses to 203 companies that manufactured custom-blended fertilizers
- Analyzed fertilizer materials from special quality control programs that included all-purpose fertilizers, urea-ammonium nitrate solutions, phosphate rock, manufactured phosphates, and other special fertilizers
- Provided support for 15 different analytical methods that yielded results for 28 analytes and potential contaminants
- Substantiated cash receivables with income from registration fees, inspection fees, and licenses received from July 1, 2010 to June 30, 2011 that totaled \$654,684. Fertilizers are assessed an inspection fee of 50 cents/ton.

Milk Regulatory Program

The mission of the milk regulatory program is to ensure that raw farm milk produced and marketed in Kentucky is bought and sold using accurate weights and tests. The program's primary

function is to monitor milk handling systems starting with the point at which a producer's milk is sampled and weighed through delivery and laboratory testing and until producer payments are calculated. The program provides support to the producers and processors of Kentucky's \$300 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 testing.

2011 Highlights:

- Reviewed applications and issued licenses to 2 transfer stations, 24 milk handlers, 18 laboratories, 77 technicians, and 342 sampler-weighers
- Analyzed and administered actions on 7,492 milk samples
- Administered a monthly milk lab quality control check sample program through the distribution of 2,640 samples to the 18 licensed labs and 2 other labs to ensure accurate component-analysis procedures
- Conducted 9 pay-record and 17 raw milk receiving audits
- Conducted 30 milk lab inspections
- Collaborated with the Kentucky Cabinet for Health Services Milk Safety Branch to train sampler-weighers and processor receiving personnel
- Trained and examined 13 new sampler-weighers and 7 new technicians
- Conducted 4 inspections of raw milk transfer stations
- Conducted 340 sampler-weigher inspections
- Provided analysis for research projects pertaining to cow comfort, somatic cell testing, horse milk, and other research in the College
- Provided analysis for Kentucky small processor cheese makers
- Continued sample age study to determine if the time allowed for milk sample analysis after collection can be increased from 72 hours to 120 hours
- Cash receivables were substantiated on 92 milk reports, and income from fees and licenses received from July 1, 2010 to June 30, 2011 was \$198,151. Milk handlers and producers are assessed inspection fees at 0.005 cents/100 lb.

Seed Regulatory Program

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

2011 Highlights:

- Performed 1,192 inspections of agricultural, lawn, turf, and garden seeds at Kentucky seed processing, wholesale, and retail locations
- Collected 1,579 official seed samples for laboratory analysis
- Issued stop-sale orders on 203 official seed samples and 211 violative seed lots at seed dealer and seed processor locations
- Cooperated with the USDA/AMS-Seed Regulatory and Testing Branch related to interstate seed shipments into Kentucky that violated the Federal Seed Act
- Reviewed and issued 212 agricultural seed permits and 51 vegetable and flower permits to label seed
- Registered 613 seed dealers
- Registered 25 non-certified custom seed conditioners that add coatings to seed
- Provided training to several 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, 2010 to June 30, 2011 was \$401,305. Seed products are assessed an inspection fee at 4 to 24 cents/unit, depending on unit size.

Seed Testing Laboratory

The division maintains the only certified seed analysis facility in Kentucky. This facility handles all official samples collected by inspectors and provides service testing for seed producers, dealers, retailers, research projects, and homeowners for a fee. More than 90% of the service samples handled by the laboratory in 2011 were submitted by Kentucky firms and individuals.

The laboratory analyzes seed for purity, identifies weed and crop seed, conducts germination, counts seed, determines test weight, performs accelerated aging, conducts fluorescence testing on ryegrass, determines moisture content, conducts tetrazolium analysis, assesses herbicide tolerance, determines presence of endophyte, and conducts many other analyses. Our analysts keep abreast of changes through participation in regional and national referee testing with the Association of Official Seed

Analysts (AOSA) and the USDA Federal Seed Laboratory and by attending special scheduled and regular workshops at the AOSA annual meeting. All analysts are AOSA-certified in areas of purity and germination.

2011 Highlights:

- Analyzed 6,441 service samples
- Collaborated with researchers to analyze 110 seed samples
- Supported the equine and livestock pasture management programs in analyzing 113 plant samples for endophytes
- Analyzed 23 seed samples under the provision that allows one free sample for testing each year from Kentucky residents
- Income derived from service samples from July 1, 2010 to June 30, 2011 was \$63,842.

Soil Testing Laboratory

The soil testing laboratories at Lexington and Princeton provide farmers, homeowners, greenhouse operators, and others with scientific information about the fertility status of their soils or media used for crop production or plant growth. In partnership with the Cooperative Extension Service, the soils laboratory provides lime and fertilizer recommendations based on the lab analysis. Analyses of animal wastes, nutrient solutions, and special research solutions are also offered. The program received \$244,465 from July 1, 2010 to June 30, 2011 for testing services. The soil test web site is at <http://soils.rs.uky.edu>

Number of Soil Samples Analyzed in 2011.

Type of sample	Number	% change*
Agriculture	33,689	-10
Home lawn and garden	9,682	+11
Commercial horticulture	883	+4
Greenhouse media	69	-13
Research	6,970	-7
Atrazine residue in soil	13	+30
Animal waste	367	-6
Nutrient solution	108	+29
Soil nitrate	141	+7
TOTAL	55,200	-6

*Compared to 2010.

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 Robinson Forest, which spreads over parts of Breathitt, Perry, and Knott counties and is the research site for forestry, wildlife, surface mine reclamation, and watershed management.

The Robinson Center for Appalachian Resource Sustainability has the budgetary and physical responsibility for managing the research facilities at Quicksand, the UK 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.

2011 Research Activities

Robinson Center

Department of Plant and Soil Sciences

- RCARS is the east region location for the livestock forage variety testing program. Results from these trials are published annually.
- 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.

- To better understand nitrogen nutrition for corn, three rates of each of two materials added to UAN (urea-ammonium nitrate solution) to reduce fertilizer N losses and improve N fertilizer use efficiency were evaluated.

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, melons) will be most affected.

Department of Horticulture

- Variety testing of asparagus and heirloom tomatoes
- Collaborative effort with Kentucky State University to evaluate the production of hops and hybrid filberts in eastern Kentucky
- Persimmon germplasm evaluation
- Strawberry plasticulture trial to evaluate winter hardiness and early-season production

Department of Biosystems and Agricultural Engineering

- 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 in 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

Department of Entomology

- Research is being conducted on the ecological effects of the hemlock woolly adelgid, focusing on impacts on headwater streams and associated riparian zones (benthic and riparian macroinvertebrates, litter fall, stream chemistry).
- A host suitability study to the hemlock woolly adelgid is being conducted on five hemlock species growing in a common plot, representing a spectrum of resistance to the adelgid (from the highly resistant Chinese hemlock to the highly susceptible eastern hemlock).

Department of Forestry

The department is engaged in the following research (sponsoring agencies shown):

- Enhancement of *Quercus* species establishment through soil scarification
- Appalachian Research Initiative for Environmental Science with UK Department of Biosystems and Ag Engineering and Virginia Tech
- Use of GIS and the U.S. Geological Survey model WATER to identify and delineate stream types in eastern Kentucky—USDA National Institute of Food and Agriculture (NIFA), Precision Agriculture: Precision Resource Management

- Long-term effects of forestry best management practices on hydrology, water chemistry, and woody debris in three Appalachian headwater catchments—USDA Forest Service, Cooperative Research Grant
- Evaluating streamside management zone effectiveness in forested headwater catchments of central Appalachia—Kentucky Agricultural Experiment Station
- Headwater stream restoration project—University of Kentucky, Robinson Forest. Kentucky Mitigation Review Team: U.S. Army Corps of Engineers, U.S. Fish and Wildlife, U.S. Environmental Protection Agency, Kentucky Division of Water
- Development of new methods for characterizing and predicting the potential release of constituents of concern from coal overburden and refuse materials in collaboration with the Department of Biosystems and Ag Engineering

2011 Extension Activities

- The Win with Wood Youth Event, an annual youth program focused on forestry and the forest industry, was held Oct. 13.
- 58 loggers representing 44 firms were provided training at Robinson Forest through the Kentucky Master Logger Program.
- Three continuing education workshops in hardwood silviculture and invasive species control were conducted at Robinson Forest. In total, 78 professionals obtained training, resulting in 2,128 woodland owners being provided assistance and an estimated 76,608 acres of woodland being improved.
- Three trainings for profile knife grinding moulder setup and operation were held at the UK Wood Utilization Center, impacting nine companies with over \$1.698 million saved/earned.
- UK's Department of Forestry at RCARS has worked with the Kentucky Division of Forestry in creating and maintaining a wood industries directory of the wood products companies in the state.
- Tooling design program for the secondary wood industry: Templates for 26 different products were developed, resulting in an estimated \$65,000 in earned or saved revenue to the secondary wood industry.
- The UK Wood Utilization Center Entrepreneur Development Program: Three entrepreneurs are currently participating in this program to develop new wood products businesses.
- Mountain Monday Series: Monthly extension programs on a variety of topics are held at the RCARS the second Monday of each month.
- 4-H Natural Resource and Environmental Sciences Academy: Seventh and eighth grade students are selected for this three-year program based on their academic achievements and teacher recommendations. Students study water, forestry, and wildlife resources at Robinson Forest.

2011 Teaching Activities Conducted at Robinson Forest

- NRC 320—Field Experience in Data Collection Techniques
- FOR 355—Forest Fire Control and Use
- FOR 356—Landscape Assessment
- FOR 357—Inventory and Measurements II
- FOR 358—Silviculture Practices
- FOR 359—Forest Operations and Utilization

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 as part of the land-grant mission. The group works across all departments within the College of Agriculture to develop synergy among them and its membership. Members of the working group are nominated by their department chairs and approved by the dean.

Research Support and Activities

UK Dining Services

Members of the group continue to work closely with UK Dining Services as a national leader in farm-to-college efforts. The whole-beef carcass purchase program continues to provide high quality 100% Kentucky beef, pork, and chicken for use across the University and has an economic impact of over \$2.5 million dollars annually, with most of that money going directly to the farms raising the animals.

First Friday Breakfast

Begun in April, this monthly event has become extremely popular with an ever-widening group including faculty, staff, extension agents, students, and the general public. Open to anyone, it is held monthly on the first Friday (excluding January, July, and September) and features a local breakfast of local foods cooked on site by Chef Bob Perry and speakers covering a wide variety of topics specific to or associated with agriculture. Experts have given presentations on cheese making, meat processing, bee keeping, biotechnology, heirloom fruits and vegetables, poultry

management, and agriculture and liberal arts, with many more topics to come.

National Sustainable Agriculture Education Association Conference

Over 150 agricultural educators and students from across the United States and a few foreign countries attended this conference, which was hosted by UK and the working group in August. The highlight of the multi-day conference was an event held at the Horticulture Research Farm (South Farm) in Lexington. The event showcased the College's sustainable agriculture programs and research in an informal setting, focusing in particular on the farm's organic section. Some of Kentucky's best known chefs volunteered to prepare a multi-course meal served on the grounds that included fruit and produce grown at the farm by students. UK Dining Services was an invaluable partner in this event, providing a full mobile kitchen for the chefs to use and also providing all the china, flatware, glasses, and servers to orchestrate the event.

Outreach

Members of the working group had numerous contacts with farmers and citizens seeking University expertise on areas including marketing, manufacturing, and processing questions for all types of food and sustainable agriculture systems. The working group and UK's Food Systems Innovation Center work closely when the working group's technical expertise is needed. Members of the group are also frequent speakers across campus and at conferences worldwide. The Farmers Market Report on WUKY, Lexington's National Public Radio station, relies on working group members for much of the information broadcast weekly during the growing season. This report is now in its sixth year.

UK Ag Equine Programs

The year 2011 was one of change and growth. At the end of 2011, the Equine Initiative changed its name to UK Ag Equine Programs. The name change was undertaken by the College of Agriculture in consultation with its internal and external stakeholders to better reflect the breadth of equine offerings at UK and the College's long-term commitment to serving the state's signature equine industry. The new name was announced at the beginning of 2012, with plans for implementation to occur well into 2012.

The stated mission of UK Ag Equine Programs 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.

It was launched in March 2005 when the College of Agriculture set out to radically change how it served Kentucky's signature equine industry and provide a suite of services appropriate for a land-grant university. In acknowledging the success of those efforts and a continued commitment to the state's equine industry, the College adopted a new name to better position its equine programs for continued success.

When created, the Equine Initiative was a commitment by the University of Kentucky's College of Agriculture to provide the same level of excellence in equine as it does in other species and aspects of agriculture. At that time, much noteworthy work was already being done in equine and across many departments. The formation allowed the public access to all of UK's equine programs through one front door. The initiative also was the impetus to add much more.

Before the formation of the initiative, a long and storied legacy of world-class equine health and nutrition research was already in place as well as a handful of successful outreach programs targeted to horse owners. But, despite being located in the "horse capital of the world," UK did not have a dedicated undergraduate degree in equine studies. Also, no focal point existed that would allow the public to access all of the topnotch equine efforts in the College.

A four-year, stand-alone undergraduate degree in equine science and management was launched, an internship program created, several new equine-focused faculty and staff were hired, and new research and outreach programs were created.

One example is the Horse Pasture Evaluation Program, also launched in 2005 as part of the Equine Initiative in an effort to develop stronger ties with Kentucky's equine industry. By the end of 2011, the program had performed more than 100 horse pasture evaluations representing more than 16,000 farm acres in 16 counties.

One of the most tangible outcomes of the formation of the initiative is a young and rapidly growing undergraduate degree program. One of only three stand-alone four-year equine degree programs at a land-grant university nationwide, the Equine Science and Management undergraduate degree program now has 220 students, with about half of them coming here to study from out of state. Official graduates total 39, and 94 students had completed their internships by the end of 2011. The University also offers six equine-related clubs and teams, and graduates of this program can move into a number of different graduate degree programs.

Organizationally, UK Ag Equine Programs also saw a great deal of change in 2011. Dr. James MacLeod, who had served as director in a 20% capacity and had held the position of Dickson Professor of Equine Science and Management since 2008, transitioned out in April 2011 and was replaced by Dr. Ed Squires, who currently serves in a 40% capacity as director.

Squires is a Morgantown, WV, native who received his bachelor's and master's degrees from West Virginia University and his doctorate in endocrinology and reproductive physiology from the University of Wisconsin. From 1976 to 2008, Squires was a professor in the Department of Biomedical Sciences at Colorado State University, where he was recognized as a distinguished researcher in equine reproduction and a pioneer in developing the techniques of embryo transfer. He came to UK in 2008 as executive director of the UK Gluck Equine Research Foundation and director of advancement and industry relations. He retains that position still.

Also of note in 2011 was the announcement of a comprehensive study of Kentucky's equine industry, the first of its kind conducted in Kentucky since 1977. In order to conduct a comprehensive study of all breeds of horses in all counties of Kentucky, UK Ag Equine Programs is now partnering with the University of Louisville's Equine Business Program and the National Agricultural Statistics Service (NASS) in cooperation with the Kentucky Horse Council and the Kentucky Agricultural Development Fund.

The Kentucky Equine Survey will help the state describe the economic impact of the equine industry to Kentucky; quantify the number of horses in the state at the county level; provide information for new and existing businesses; provide better information to help design and implement equine programs benefiting the state; establish a benchmark that will enable the industry to nimbly adapt to changing market conditions; provide better assessment of disease incidence and surveillance; and provide useful data for elected officials.

The year 2011 saw the announcement of the project, the formation of partnerships, and the majority of the project's funding secured. UK's College of Agriculture provided \$200,000 in seed money. Through the efforts of the Kentucky Horse Council, \$300,000 was awarded, with \$100,000 of that contingent on the project and its partners raising an additional \$100,000 in 2012

from Kentucky's equine industry, which would complete funding of the \$600,000 project.

Surveys will be mailed to 15,000 horse owners across the state beginning in July 2012. Results will be tabulated and announced by early 2013, with additional economic impact studies to be conducted by the College from that information.

Communications for UK Ag Equine Programs also continued to be very active in 2011. Two publications of note for the Equine Initiative include the *Bluegrass Equine Digest* and the *Wildcat Canter*.

The *Bluegrass Equine Digest* is a free, monthly online newsletter that covers equine research at UK. It is distributed via TheHorse.com. As of the end of 2011, the digest was distributed to 45,000 people monthly. When more complete metrics were calculated for the September 2011 issue, it was determined that the issue had stories downloaded by readers in all 50 states and in 94 different countries. The publication is just 3 years old.

The *Wildcat Canter*, also online, comes out approximately eight times per year. It began as a student newsletter about student activities. It has evolved into a publication that focuses heavily on student activities and successes within the College's equine programs, and it is read widely by internal and external audiences.

Other communications in 2011 included 22 equine-related news releases, an active online and social media presence, a handful of general awareness advertising in equine-specific media, and several equine-related events, both those organized and held by UK Ag Equine Programs and those participated in by its representatives.

The program is very active in holding equine events for a variety of stakeholders, and 2011 was no exception. Some of the noteworthy ones included:

- The third annual Equine Farm and Facilities Expo, an all-equine field day held in Bourbon County on a private Thoroughbred horse farm (Shawhan Place). The event targeted horse owners and horse farm managers and gave them the opportunity to see a range of equipment and supplies available for horse farms of all sizes. UK specialists also provided hands-on instruction in designing facilities, conducting strategic deworming and spraying, and seeding and mowing pastures. Information booths were also part of the event.
- Another annual event that has gained a loyal following is "Pastures Please!" This event was held again Feb. 1 in Scott County by central Kentucky extension agents. Topics included equine pasture establishment after a dry summer and fall; potential problems and control of weeds after a dry summer and fall; horse pasture fertilization and other fertilizer concerns; emerald ash borer; and a roundtable discussion and question-and-answer session.
- UK instituted a distinguished lecture series in 2009 to highlight important leaders in the equine industry. In 2011, UK hosted both Ted Bassett and Jerry and Ann Moss. Ted Bassett's 43-year tenure at the Keeneland Association included positions as president, chairman of the board, and trustee and coincided with the association's greatest period of growth. Jerry and Ann Moss are owners of 2010 Horse of the Year and three-time champion older mare Zenyatta.

- In addition, UK Ag Equine Programs hosted its annual equine career fair, a unique opportunity for equine students to learn more about various equine careers and network for potential internships and with employers and other equine students. It also hosted an inaugural internship appreciation reception to recognize organizations and businesses that have provided internships for UK students and a welcome-back event for equine students to get to know one another and their professors at the start of the fall semester.
 - In addition, UK's Second Annual Kentucky Breeders' Short Course was held in January.
 - Some of the high-profile events attended by the initiative in 2011 included the Rolex 3-Day Event, Hats Off to Kentucky's Horse Industry, and the Alltech National Horse Show, which was held in Lexington for the first time in 2011 in its more than 100-year span.
 - Another notable event participated in during 2011 was the All American Quarter Horse Congress in Columbus, Ohio, in October. UK participated for the first time at this show as part of the Kentucky Equine Higher Education Consortium, a group of eight Kentucky colleges and universities with equine programs that came together to promote Kentucky as the leading destination for equine education in advance of the 2010 Alltech FEI World Equestrian Games. UK remains one of the leaders of the consortium.
 - Other partnerships that UK Ag Equine Programs continued to participate in during 2011 included the Kentucky Equine Networking Association (KENA) and Saddle Up Safely.
- Program areas of excellence for equine in the College of Agriculture include the following:
- Maxwell H. Gluck Equine Research Center's development of vaccines against six of the 10 most common equine infectious diseases and active research in six areas of emphasis: genetics and genomics, immunology, infectious diseases, musculo-skeletal science, parasitology, pharmacology/toxicology, and reproductive health
 - The UK Veterinary Diagnostic Laboratory, which 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 4,500 Kentucky youth each year
 - Horse College, an adult education program reaching more than 1,500 people
 - The UK Horse Pasture Evaluation Program, which, as noted above, has evaluated more than 100 horse farms and 16,000 acres in 16 Kentucky counties
 - Expansion of the concept of Kentucky's horse industry as an economic cluster of businesses and institutions and active research in equine economics
 - Research on horse environments: mud, pervious concrete, stream crossings, and more
 - HorseQuest, a central web-based source for equine information that is now a community of practice within eXtension

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 levels 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 University of Kentucky Research and Education Center 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 center:

- Facilitates life-long 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 sandstone and limestone origin that 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 located at the center have expertise in a broad spectrum of food and agriculture topics.

Service laboratories located at the center 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.
- Research and educational programs are also conducted in beef production. A beef herd consisting of 400 animals is involved in many different experiments and demonstrations.
- 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, the following learning opportunities and resources are provided:

- 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 there are approximately 450 different meetings 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 center, attract about 3,000 people. Visitors observe research, educational displays, and demonstrations representing work conducted at the center and throughout the state.
- Individuals and small groups are welcome to visit throughout the year to observe specific projects and talk with specialists.

2011 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

Animal Science

- 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 beef cows and their calves
- Evaluation of a by-product of biodiesel (glycerin) as a feed ingredient
- Grazing wheat and stockpiled fescue for stocker calves and the effect on subsequent grain yields and compaction

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
- Corn population and row spacing study
- No-till wheat management
- Soybean management verification program
- Corn variety trial
- Wheat variety trial (2)
- Soybean variety trial
- Testing of breeding lines
- Wheat fusarium head blight nursery
- Canola variety trial

Horticulture

- Nursery/landscape
- Landscape plant evaluations
- Landscape plant establishment based on 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
 - High-density onion spacing
 - Seedless watermelon variety trial

Manure Management and Use

- Development and implementation of within-production facility (under-slat) manure composting for swine
- Poultry litter use on soybeans
- Poultry litter, biosolids, and compost use in winter wheat

Plant Pathology

Tests:

- Soybean foliar fungicides
- Wheat foliar fungicides

- 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 deoxynivalenol accumulation in wheat grain
- Impact of tillage on fusarium head blight
- Fungicide resistance of frogeye leaf spot on soybean

Soils

- High-yield soybean systems (5)
- Variable rate nitrogen fertilizer applications using remote sensing (3)
- Efficient use of nitrogen on corn and wheat
- Tissue nutrient status of winter wheat in Kentucky
- Influence of grazing winter wheat on yields and soil quality
- No-till wheat management
- Using tobacco stalks as a nutrient source
- Soil compaction
- Determining the amount of potassium in corn stover in dry falls
- Additives to improve N efficiency (3)
- Effect of chicken litter on soybean nutrient uptake and yield

Swine

- Development and evaluation of manure liquid-solid separation system for nursery and finishing swine

- Evaluation of composting of separated swine manure solids with wood chips

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

- Marehail (horseweed) control in wheat
- Giant ragweed control in wheat
- Italian ryegrass control in wheat (6 trials)
- Response of wheat to Osprey and topdressing nitrogen
- Burndown control of weeds in no-till wheat
- Weed control in corn with pyoxasulfone premixes (4 trials)
- Weed control in soybean with pyoxasulfone premixes (2 trials)
- Weed control Liberty Link soybean
- Early preplant weed control in soybean (3 trials)
- Burndown control in no-till corn
- Impact of row spacing on weed management strategies in corn
- Impact of row spacing and hybrid on corn yield
- Palmer amaranth control using soil-residual herbicides (Fulton County)

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 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 UKVDL's primary goal is to develop, apply, and utilize 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. The UKVDL is fully accredited by the American Association of Veterinary Laboratory Diagnosticians (AAVLD) and is a member of the USDA National Animal Health Laboratory Network (NAHLN) and the FDA Veterinary Laboratory Response Network (Vet-LRN).

In addition to its clinical diagnostic role, the UKVDL provides surveillance for emerging and endemic diseases such as equine infectious anemia (EIA), equine piroplasmiasis, West Nile virus, chronic wasting disease of deer, contagious equine metritis, bovine spongiform encephalitis (mad cow disease), John'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 2011, UKVDL continued its proficiency testing programs as part of the National Animal Health Laboratory Network.

Farmers and animal owners use the UKVDL's services through their practicing veterinarians. These professionals have expertise in selecting, preparing, shipping, and submitting the proper specimens for testing when needed to assist in making a clinical diagnosis. 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 several diagnostic medical 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 54,939 cases (a 3.4% increase from calendar year 2010; the overall linear trend line is increasing as well), including 4,128 necropsies (a 28.3% increase from calendar year 2010; much of this increase can be attributed to the outbreak of nocardioform placentitis). The increase in caseload and necropsy procedures is encouraging in light of current economic conditions. Total tests run in each laboratory section will be listed in the individual section reports.

Outreach:

The UKVDL continues to build and enhance outreach programs around Kentucky. The Kentucky VetLabNet listserv continues to distribute animal health bulletins and has grown to a list of almost 650 UKVDL clients, scientists, farmers, and stakeholders. Several research visits were conducted by the epidemiology section on Kentucky farms, including visits to UK's C. Oran Little Research Center for animal research in Woodford County as part of a Department of Homeland Security research project. The UKVDL director continues to contribute articles quarterly to the Kentucky Veterinary Medication Association's newsletter, *Kentucky Veterinary News*, and the Kentucky Cattleman Association's *Cow Country News*. The UKVDL director, faculty, and staff continue to deliver lectures at scientific and lay meetings and have participated in the monthly Equine Diagnostic-Research Seminar Series at the UKVDL since 2006.

Personnel Actions:

The following key positions were filled:

- Head, Diagnostic Microbiology, Dr. Erdal Erol
- Pathology, Research Animal, Dr. Kathryn "Casey" Coyle
- Pathology Veterinary Technician, Judy Tucker
- Account Clerk II, Michelle Cooper
- Account Clerk III, Christina Kane
- Business Office Manager, Ryan Redimarker
- Histology Section Chief, Jamie Howard
- IT Specialist, Derrick Miles
- Toxicology Technician, Michelle Helm

Two key technician positions were converted from STEPS to fully-budgeted positions in the Molecular Biology Section:

- Senior Technician, Ashley Skillman
- Senior Technician, Naomi Meyer-Kelly

2011 Highlights:

- Served as the UKVDL key construction liaison person to the construction manager of UK's capital project management division, College of Agriculture engineers, and other key players. Oversaw successful completion of the UKVDL expansion/renovation, including coordination of the final move into the new facilities in May.
- Participated in planning and execution of the new facility's dedication ceremony in May, including hosting Jane Beshear, First Lady of Kentucky.
- The UKVDL was accepted as a full member of the FDA's Veterinary Laboratory Response Network (VetLRN) in October. As part of the VetLRN, UKVDL personnel will be trained

and equipped to conduct laboratory testing in support of surveillance for and response to animal health problems related to feeds.

- The UKVDL is now the home for research animal pathology for the UK community, an initiative that was completed in 2011. We are fortunate as part of this administrative change to also welcome two new members to our pathology team. Dr. Kathryn (Casey) Coyle is the research animal pathologist for UK and came to UK from the University of Wisconsin. She completed her pathology residency at the University of Minnesota and the University of Wisconsin. During and after her residency, she was one of the pathologists for the Milwaukee County Zoo and worked as a pathologist at the National Wildlife Health Laboratory in Madison. She was also one of the research animal pathologists for the University of Wisconsin, which has one of the largest animal health research programs in the country. Judy Tucker is the pathology veterinary technician. She received her training at Murray State University and is a certified veterinary technician. In addition to her duties in research animal pathology, she is assisting in the UKVDL clinical pathology laboratory.
- Implementation of the TREK automated antibiotic sensitivity system
- Acquired an ABI 7500 Real-Time PCR machine to support molecular diagnostics
- Acquired a LC MS MS unit from the USDA in support of toxicology
- Managed the Kentucky VetLabNet listserv bulletins to nearly 650 subscribed clients to maintain a high level of situational awareness of animal health events
- Conducted field investigations/research studies for clients as requested/needed through the epidemiology section (over 150 farms)
- Agricultural extension consulting: fielding incoming calls from extension agents

Major issues and challenges included:

- Initiating a marketing plan, now under way, to assist in increasing income in light of continuing budget cuts
- Enhancing and improving test offerings and service for equine and small animal medicine
- Developing a national reputation as an equine diagnostic testing laboratory
- Investigation and alerting of Nocardioform placentitis abortion outbreak, January-June
- Investigation of and alerting of the causes of bovine deaths in central Kentucky, June
- Investigation of and alerting of Potomac Horse Fever cases, August
- Equine leptospirosis investigation and alerting, December
- In November, Dr. Craig Carter, UKVDL director, finished his term as president of the American Association of Veterinary Laboratory Diagnosticians. He will serve as immediate past president for 2012. 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 an Office Internationale

Epizootique (OIE) session in Berlin, Germany, that is scheduled for June 2013. Dr. Carter received the K.F. Meyer-James Steele Gold Headed Cane Award in Epidemiology at the American Veterinary Medical Association meeting in St. Louis in July. Finally, he continues to serve on the OIE Expert Committee for Reference Laboratories and Collaborating Centers in Paris, France.

Bacteriology/Mycology

Erdal Erol

The primary mission of the bacteriology/mycology section of the UKVDL is to detect or isolate and identify pathogenic bacteria or fungi present in animals in order to assist veterinarians and farmers in the diagnosis and treatment of disease processes. The section also determines the antibiotics that might be used for the treatment of specific bacterial infections and is responsible for culture of *Taylorella equigenitalis* and *T. asinigenitalis* for the federal/state contagious equine metritis (CEM) regulatory program in equine.

2011 Highlights:

- The major tests are highlighted in the table below. Aerobic cultures totaling 10,095 were performed on samples submitted to the UKVDL; significant bacterial pathogens were found in these samples, such as Nocardioform bacteria (Amycolaptosis, Cr. equi,) coliforms, Beta-hemolytic streptococci, Salmonella, Pasteurella, Mannheimia, Arcanabacterium, Mycoplasma, and Staphylococci.
- 8647 samples from equines in Kentucky were cultured for CEM organisms. With the exception of one case in which *T. asinigenitalis* was isolated, all horses tested were negative. Because four positive stallions were detected by this section in late 2008, we continue to receive a high number of samples. Early detection of this infection in the Quarter Horse population by this laboratory prevented this disease from becoming more widespread in U.S. equine populations.
- A new antimicrobial susceptibility system that utilizes the broth microdilution method has been implemented. This system now allows us to perform antibiotic susceptibility on many more microorganisms, including Nocardioform bacteria, anaerobic bacteria, and some fungi. 2,638 different bacterial isolates were tested to determine the best antibiotics for treatment of these microorganisms in exposed animals.
- 607 milk samples from dairy cows were tested for microorganisms that cause mastitis; over 50% were positive for pathogenic microorganisms.
- The laboratory section has significant collaboration within the UK College of Agriculture, such as with the Gluck Equine Research Center (Dr. Troedsson, Nocardioform placentitis research) and the UK Department of Animal and Food Sciences (Dr. Jeffrey Bewley, mastitis study) and with outside institutions, such as Pfizer (antimicrobial susceptibility) and the University of Copenhagen (beta-hemolytic streptococci).

2011 Bacteriology/Mycology Caseload	
Culture-Aerobic	10,095
Contagious Equine Metritis	8,647
Antimicrobial Susceptibility	2,638
Culture-Ruminant Mastitis	607
Culture-Microaerophilic	298
Salmonella (NPIP)	257
Culture-Fungal	182
Culture-Johne's	182
Culture-Anaerobic	176
<i>Clostridium</i> spp.	130
Culture-Mycoplasma	121
<i>Difficile</i> Toxin A/B	25
Culture-Listeria	24

- We have established a protocol to identify Salmonella bacteria in poultry following the National Poultry Improvement plan (NPIP) protocol and now provide service for the poultry industry for Salmonella culture following NPIP protocol.
- We continued Leptospirosis and Salmonella real-time PCR assay projects.
- We engaged in research activity on the antimicrobial susceptibility patterns of yeasts in horses.

Clinical Pathology

Bonnie L. Decker

The primary mission of the clinical pathology section is to provide chemistry, hematology, endocrine, urinalysis, fluid analysis, fecal parasite exams, and other testing to animal owners, veterinarians, and the agriculture community. The section also provides support and testing to UKVDL's pathologists and testing related to necropsy. In addition, University of Kentucky equine and animal science researchers can submit specimens to the clinical pathology section for monitoring various chemistry, hematology, and endocrine levels in their research animals.

In 2011 this section moved into a new, larger facility that allowed the department to spread out and be more efficient. The new facility also allows for continued growth of the department. More tests are being brought in for 2012 to provide equine veterinarians with more diagnostic information.

The section completes its testing the same day as receipt with a few exceptions. Cryptosporidium and protein electrophoresis require more time and are reported within five working days of receipt. Progesterones and Canine TSH must be in the department by 2 p.m. for same-day turnaround.

The department 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 works full time, and a veterinary technician with 15 years' experience works part time. Other qualified UKVDL personnel volunteer to provide additional technical assistance as needed in the laboratory during surge periods and as backup. Faculty and professional staff assist with diagnostic consultations.

The clinical pathology section is dedicated to meeting the current and future needs of the agriculture and companion animal communities and veterinarians.

2011 Highlights:

- Moved into new laboratory with expanded workspace and facilities
- Increased the number of tests run by 29% as compared to 2010
- Increased variety of tests run
- Increased percentages of small animal tests run compared to 2010

Epidemiology

Jacqueline L. Smith

The UKVDL epidemiology section plans and conducts veterinary epidemiological research experiments that lead to the earliest detection of animal disease outbreaks. Our primary mission is to provide animal disease surveillance and assist veterinarians in the investigation of serious and unusual disease problems. Daily monitoring of finalized necropsy and lab testing data streams provide near real-time disease cluster analysis.

The section also conducts data acquisition and statistical analysis in support of the Office of the State Veterinarian and the USDA and to provide animal health situational awareness for industry stakeholders. Many of these studies lead to publication in peer-reviewed journals and lay publications. Disease reporting to the state veterinarian (reportable infectious diseases, diseases of interest, emergency disease notification) is performed weekly for the typical endemic diseases, while unusual or emergency disease situations are reported immediately. Also available are in-depth field investigations to better characterize disease outbreaks for identifying causative etiology through the collection of diagnostic specimens and recommendations for diagnostic testing. These investigations are provided free of charge to any farm/producer in the state of Kentucky at the request of a local client with the approval of the UKVDL administration.

2011 Highlights:

- 21 research farm visits (UK beef unit) for National Institute for Hometown Security (NIHS) Project
- 124 hours in research visit time
- 2 surveys
 - National equine leptospirosis seroepidemiological study
 - Kentucky equine nocardioform placentitis farm study
- 216 telephone consults asking for suggestions, recommendations, and questions related to animal health issues
- 59 statistical requests (from UKVDL faculty, state and federal officials, local veterinarians, and other UK faculty) fulfilled, 1-10 hours each
- 63 graphics requests fulfilled, 2-10 hours each
- 52 weekly reportable disease reports sent, at approximately 1 hour each
- New GIS software implemented, allowing state and national level maps to be quickly generated and ready for dissemination via email, web, or print

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: Dr. Craig Carter, Dr. Wade Northington, Dr. Michelle Bilderback, Dr. Cindy Gaskill, Jackie Smith, and Jacki Cassidy
- U.S. leptospirosis sero-epidemiological survey: Dr. Craig Carter, Dr. Noah Cohen, Jackie Smith, Meg Steinman, and Dr. Erdal Erol

Molecular Diagnostics

Erdal Erol/Stephen Sells

Diagnostic PCR assays are being increasingly utilized because of their speed and specificity. Tests based on nucleic acid 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 laboratory also analyzes specimens received from the pathology, virology, and bacteriology sections of this and other diagnostic facilities.

2011 Highlights:

- 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.
- Working with the new head of UKVDL microbiology, this section has developed standardized protocols for new diagnostic assays, which are now offered as a service to our large and small animal practitioners. These tests are rapid, sensitive, diagnostic PCR tests for canine influenza virus, equine influenza virus, equine protozoal myeloencephalitis (caused by *Sarcocystis neurona*), and *Clostridium piliforme* (Tyzzer's disease). In addition, the methodology of the assays for equine herpesvirus types 1 and 4 and *Mycobacterium paratuberculosis* was converted from traditional qualitative gel based PCR to real-time PCR, allowing for the addition of a quantitative estimation of those pathogens when detected.
- Approximately 6,000 specimens were submitted for PCR testing in 500 accessioned cases.
- The most requested tests included leptospira (1,640), equine herpesvirus type 1 and EHV1 pathotyping (654), EHV4 (213), *Streptococcus equi* subsp. *equi* (534), *Crossiella equi* (42) and *Amycolatopsis* species (796), *Clostridium perfringens* (43 accessions), *Lawsonia intracellularis* (146), *Neorickettsia risticii* Potomac Horse Fever (200), Bovine Viral Diarrhea Virus (BVDV) (31 accessions), *Moraxella bovis* (9), EHV5 (83), and EHV2 (86).
- 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.

Pathology

Neil M. Williams

The pathology section is composed of eight faculty pathologists, four post-doctoral scholars (pathology residents), four histology technicians, four full-time necropsy technicians, and two part-time necropsy student workers. The pathologists perform complete necropsy examinations on submitted animals, histopathology on necropsy cases and surgical biopsies, and cytological examinations. They are supported by the other section personnel. As part of the comprehensive necropsy examination, additional laboratory tests are ordered by the pathologist 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. Post-doctoral (DVM) scholars are trained in veterinary anatomic pathology.

Necropsy: A postmortem 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	4,128 ^a
Avian	77
Bovine	763
Caprine	81
Equine	1919
Ovine	88
Porcine	20
Small Animal	802
Miscellaneous	45
Laboratory Animal	333

^a 28% increase over 2010.

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 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, recommended treatment, and potential prognosis. These tissue specimens are processed, and microscopic slides prepared for the pathologists to examine by microscopy. Tissue specimens representing 3,619 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 456 cases.

Pathology, Research Animal

Kathryn (Casey) Coyle

The research animal pathology section sees mostly small rodents with occasional dogs, rabbits, nonhuman primates, and pigs. Submissions from research animals during 2011 totaled over 300, including clinical pathology samples, biopsies, and necropsies. In addition to research animal work, Dr. Coyle is handling the diagnostic pathology caseload for the agricultural research animals housed at the various UK farms. Dr. Coyle also provides pathology support for several research projects for individual UK investigators.

Quality Control/Quality Assurance

Mary Harbour

The goal of the quality control/quality assurance section is continuous quality improvement of service to veterinarians, animal owners, and other clients in the animal industry. An additional goal of this program is to ensure the quality, accuracy, and timeliness of all test results. This section monitors test results, quality control results, and proficiency testing.

The program is based on American Association of Veterinary Diagnostic Laboratory (AAVLD) requirements, International Standards Organization (ISO 17025) guidelines, and standards of the Organization of International Epizootics (OIE). The UKVDL Quality Control/Quality Assurance Program also fulfills the University's mission of improving service delivery while achieving excellent human relations (internally and externally), sound leadership, and effective communications.

The requirements for maintaining the quality system and management are continuously being updated. The quality assurance manager attended quality assurance and quality management training sponsored by the USDA National Animal Health Laboratory Network in Ames, IA, and workshops at the American Association of Veterinary Laboratory Diagnosticians (AAVLD) annual meeting. Internal section audits are conducted throughout the year in preparation for the next AAVLD accreditation visit.

Besides the continuous improvement of service, the section continues to revise and improve in procedures and policies to remain in compliance with the AAVLD accreditation requirements. In addition, the section has assisted in implementing all policies and procedures required by National Animal Health Laboratory Network (NAHLN) and the Veterinary Laboratory Response Network (Vet-LRN), including providing documentation, proficiency testing, and participating in workshops.

Ruminant Extension

L. Michelle Arnold

The ruminant extension veterinarian is charged with improving the status of ruminant health by establishing and maintaining information flow among all the stakeholders in the livestock industry. This goal is accomplished through open communication with food animal veterinarians, county extension personnel, producers, state and federal authorities, and University faculty and staff in a progressive and responsive manner. Current health topics including disease risk and occurrence, diagnosis, treatment, prevention, and control

form the core of the information disseminated. New knowledge generated at the University level, governmental directives, and other stakeholder contributions are also gathered centrally and then communicated openly for discussion and action, ultimately benefiting producers throughout Kentucky.

2011 Highlights:

- Developed and presented the herd health portion of the new Master Stocker Program in seven regions of the state, impacting approximately 200 farming operations. Updated and presented the herd health portion of Master Cattlemen in seven regions, directly affecting approximately 300 farming enterprises
- Held two food animal veterinary conferences at the UKVDL, which were well-attended and received good reviews. These conferences were offered at no cost to the veterinarians through the generous support of sponsoring pharmaceutical companies
- Co-sponsored the small ruminant grazing conference in Elizabethtown, which drew 86 participants. This conference moves to a different location in Kentucky each year in order to reach sheep and goat producers in all areas of the state.
- Continued to utilize the latest technology (Microsoft® Lync™) to deliver meetings remotely over the Internet, resulting in significant savings in travel expenditures. Began to integrate the Turning Point® technology into PowerPoint presentations so the audience can answer questions with handheld clickers
- 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
- Continued a strong working relationship with veterinarians of the USDA Animal and Plant Health Inspection Service (APHIS), fostering cooperation, trust, and a bi-directional flow of information between the University and federal authorities. This relationship included integration of continuing education modules for federal accreditation into our continuing education programs.
- Worked closely with the state veterinarian's office to successfully implement state initiatives. This effort included cooperation to institute the new animal disease traceability regulations and also formulate the livestock care standards for Kentucky.
- Worked collaboratively with Purdue University, Kentucky State University, and Berea College on multiple small ruminant projects and meetings. Many of these meetings were delivered electronically with open access to the presentations and potentially reached a wide audience.
- Involvement as co-investigator on a grant from the National Institute of Food and Agriculture (NIFA) to help food animal veterinarians make diagnostic decisions in the field
- Research of critical problems unique to our state is part of the agenda as the University continues on a path of academic excellence. Toward that end, a research study is in progress to assess trace mineral levels in grazing meat goats. Preliminary results suggest a definite trend of marginal to deficient status, which we are currently addressing.
- Completed a database of food animal veterinarians that will allow rapid communication in the event of an animal

emergency situation or disease outbreak. This database is continually updated with email addresses and cell phone numbers to enhance the speed of communication.

- Worked with dairy extension to deliver Project Reduce Somatic Cell Count in seven regions to help dairy producers deal with new regulations imposed by milk processors. This effort resulted in a co-authored Cooperative Extension publication *Staphylococcus aureus* Mastitis (ID-190).
- Regularly contributed health-related articles for the Ag Extension newsletters *Off the Hoof*, *Kentucky Dairy Notes*, and the *Goat Producer's Newsletter*
- Submitted material from the Kentucky Veterinary Medical Association (KVMA) to the *Kentucky Veterinary News* and the veterinary listserv distributed by the diagnostic laboratory. Spoke at the KVMA Mid-America Veterinary Conference on the topic "What Can Extension Do for You?"
- Researched and provided numerous publications and PowerPoint presentations to veterinarians throughout the state to deliver at local producer meetings
- Kentucky veterinarians, extension agents, producers, government entities, and the University benefit from a strong livestock sector, of which health is a major consideration. In 2011, this position served to reach each of these stakeholders for the overall improvement of livestock health and sustainability of the food animal veterinary profession.

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 regarding animal health. 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 methods. This section performs a wide range of tests; the tests and numbers listed below are just a sampling of what we offer.

2011 Highlights:

Poultry:

- Continued to pass annual inspections and maintain status as a National Poultry Improvement Plan (NPIP) approved laboratory
- Personnel attended NPIP-approved training courses on avian influenza and Salmonella testing
- Tested 4,120 samples for antibody to avian influenza, 13,045 samples for antibody to *Salmonella pullorum*, and 16,876 samples for antibody to both *Mycoplasma gallisepticum* and *Mycoplasma synoviae*

Equine:

- Successfully passed the annual USDA-APHIS (Animal and Plant Health Inspection Service) inspection to continue to offer equine infectious anemia (EIA) antibody testing and ran 25,386 EIA tests in 2011
- Continued to monitor horses moving through the state stockyards for EIA antibody, testing 11,438 specimens at no charge

- Passed the required proficiency testing of the National Veterinary Services Laboratories (NVSL) for piroplasmosis testing (*Babesia caballi* and *Theileria equi*) and tested 9,390 specimens for antibodies to *Babesia caballi* and 9,409 specimens for *Theileria equi*
- Tested 823 serum samples for antibody to contagious equine metritis (CEM-CF)
- Tested 2,342 sera for antibodies to the *Leptospira* serovars *grippityphosa* and *pomona* by the microscopic agglutination titer (MAT) method. In addition, 1,497 sera from 29 states in the United States and Ontario, Canada, were tested for six leptospira serovars as part of a national sero-epidemiological survey. Results will be published in 2012.

Bovine:

- Offering a variety of antibody tests that can be performed on serum from bovines and other ruminant species, in 2011 this section tested 321 specimens for anaplasmosis, 380 specimens for antibody to bluetongue, 469 specimens for antibodies to the bovine leukemia virus, 1,584 serums for Johnes antibodies, 732 specimens for antibody to *Neospora caninum*, and 2,553 sera in screening for antibodies to *Brucella abortus*.

Canine and Feline:

- Provided a variety of tests that can be run on dogs and cats, including 160 tests for antibodies to histoplasmosis, 197 for antibodies to blastomyces, and 95 for canines for antibody to *Brucella canis*. These numbers are just a sampling of the tests we run for these species.

Porcine:

- Provided testing for swine, with 51 samples tested for pseudorabies and *Brucella* antibodies.

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, including assays for metals and minerals; tests for organic compounds including a multitude of pesticides, drugs, and other chemicals; tests for biological toxins such as plant toxins, toxic insects, and bacterial and fungal toxins; and tests for numerous other toxins. Tests are performed in tissues, gastrointestinal contents, biological fluids, baits, feed, water, soil, and other substances.

Consultation services include assistance with appropriate sample collection and submission recommendations, determination of appropriate tests to be performed, interpretation of analytical results, therapeutic advice, differential diagnoses, residue considerations, and other general toxicological information. The section personnel consist of Cynthia Gaskill, DVM PhD, clinical veterinary toxicologist; Lori Smith, PhD, senior analytical chemist; Michelle Helm, BSc, chemist/technician; and several student interns.

2011 Highlights:

- Hosted student interns for the forensic science internship program at Eastern Kentucky University
- Provided analytical support for the University of Kentucky Horse Pasture Evaluation Program
- Acquired LC-MS/MS instrumentation through an instrument sharing agreement with the USDA Agricultural Research Service Forage Animal Production Research Unit
- Continued development and validation of new diagnostic tests
- Participated in a number of proficiency testing programs to ensure accuracy and quality control for analytical methods
- Participated in the UKVDL veterinary pathology training program, providing lectures on veterinary toxicology and analytical chemistry topics to pathology residents

The section participated in several research projects that are directly applicable to improvements in diagnostic offerings. The external funding for these projects help support instrumentation and labor used also for diagnostic purposes. Current projects include:

- Analysis of ocular fluid nitrate and nitrite concentrations in aborted, stillborn, and neonatal foals to establish a normal reference range for this group
- Investigation of the effects of harvest, transport, storage and processing conditions on ergovaline analyses of tall fescue
- Ergovaline concentrations in novel endophyte tall fescue forage
- Effects of fertilization on nitrate concentrations of forages
- Feasibility of using High Performance Liquid Chromatography (HPLC) methodology for quantification of ergovaline in equine serum and placental tissues
- Quantitation of ethylene glycol and glycolic acid in urine by DART-MS
- Analysis of trace elements in liver tissue from aborted, stillborn, and neonatal foals to develop normal reference ranges for this group
- Evaluation of whole blood selenium concentrations in central Kentucky goats

Other research activity included:

- Investigation of trace element concentrations in liver tissue from aborted, stillborn, and neonatal foals
- Study of feasibility of using high performance liquid chromatography for quantification of ergovaline concentrations in serum and placental tissues from horses treated with high dosages of ergovaline
- Presented research findings, methodology, continuing education programs, and seminars at meetings including annual conferences for the American Association of Veterinary Clinical Toxicologists, the American Association of Veterinary Laboratory Diagnosticians, University of Kentucky Agriculture and Natural Resources, the University of Kentucky Beef Cattle Production Certification program, the UK Ag Equine Programs' Breeder's Short Course, the University of Kentucky Pastures Please program, the Eastern Kentucky University Department of Chemistry Seminar series, and the University of Kentucky Agricultural Biotechnology program.

- In 2011, the toxicology section received samples from more than 900 diagnostic cases, with most cases involving multiple samples such as various tissues, body fluids, forages, baits, and other samples and often involving multiple animals and 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 1,000 toxicological consultations were provided for cases in Kentucky and across North America.

Virology

Erdal Erol

The virology section performs several virological assays, which are important for both clinical diagnostic cases and regulatory cases. The section performs tests necessary (such as equine viral arteritis—EVA) for export of animals to other states and countries.

2011 Highlights:

- Investigated several disease outbreaks in Kentucky and performed testing on specimens submitted by practitioners and owners.
- Tests performed in this section are as follows (total numbers in the table below): fluorescent antibody tests (FA) on tissues 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.
- 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.

- 7,136 ELISA tests were performed for bovine viral diarrhea rotavirus and West Nile virus, and 1,099 samples underwent virus isolation (VI).

Total tests performed in 2011, UKVDL Virology Section.

Bovine Corona Virus-FA	99
Bovine Respiratory Syncytial Virus-FA	571
Bovine Respiratory Syncytial Virus-VN	37
Bovine Rotavirus-FA	83
Bovine Viral Diarrhea-ELISA	7085
Bovine Viral Diarrhea-FA	757
Bovine Viral Diarrhea 1-VN	180
Bovine Viral Diarrhea 2-VN	165
Canine Adenovirus-FA	50
Canine Corona Virus-FA	52
Canine Distemper Virus-FA	155
Canine Herpesvirus-FA	35
Canine Parainfluenza 2-FA	20
Canine Parvovirus-FA	122
Equine Herpesvirus 1-FA	1280
Equine Herpesvirus 1-VN	94
Equine Influenza A1-HI	54
Equine Influenza A2-HI	54
Equine Rotavirus-FA	29
Equine Viral Arteritis-VN	11858
Feline Herpesvirus-FA	16
Feline Infectious Peritonitis-FA	71
Feline Panleukopenia-FA	74
Infectious Bovine Rhinotracheitis-FA	667
Infectious Bovine Rhinotracheitis-VN	98
Influenza A Antigen	171
Parainfluenza-3 Virus-FA	570
Porcine Circovirus-FA	11
Porcine Reproductive and Respiratory Syndrome-FA	14
Potomac Horse Fever-IFA	183
Rotavirus-Latex Agglutination	11
Transmissible Gastroenteritis Virus-FA	11
Vesicular Stomatitis IN-VN	707
Vesicular Stomatitis NJ-VN	707
Virus Isolation	1099
West Nile IgM Capture	51

Kentucky Agricultural Experiment Station Projects

Hatch, McIntire-Stemmis, and Animal Health projects for calendar year 2011, as reported in the USDA Current Research Information System (CRIS) database, follow.

Agricultural Economics

A Comprehensive Study of Kentucky's Equine Industry—*Stowe, C.; Rossano, M.; Coleman, R.; Davis, A.*
Agricultural and Rural Finance Markets in Transition (NC1014, NC221, NCT-194)—*Katchova, A.*
Assessing the Consumer Behavior, Market Coordination, and Performance of the Consumer-Oriented Fruit and Vegetable Sector—*Woods, T.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.*
Family Firms and Policy in Times of Disruption (NC1030)—*Robbins, L.W.*
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 and Food Industries—*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.*
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.*
Improving the Sustainability of Livestock and Poultry Production in the United States—*Cromwell, G.L.; Grove, J.*

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.*
National Animal Nutrition Program—*Cromwell, G.L.*
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.*
Ovarian Influences on Embryonic Survival in Ruminants—*Bridges, P.J.*
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.*
SI033: 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.*

Biosystems and Agricultural Engineering

Agricultural Safety and Health Research and Extension—*Purschwitz, M.A.*
Development of an Algae-Based System for CO₂ Mitigation—*Crofecheck, C.L.; Montross, M.D.*
Development of Stream Assessment Tools and Riparian Corridor Techniques for Enhancing Water Quality in Karst Watersheds in Central Kentucky—*Agouridis, C.T.; Warner, R.C.*
Engineering for Food Safety and Quality—*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.*
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.*
Stress Factors of Farm Animals and Their Effects on Performance—*Gates, R.S.*
Systems for Controlling Air Pollutant Emissions and Indoor Environments of Poultry, Swine and Dairy Facilities—*Overhults, D.G.; Pescatore, A.J.; Fehr, R.E.*
The Science and Engineering for a Biobased Industry and Economy—*Nokes, S.E.; Lee, C.; Crofecheck, C.; Montross, M.*

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

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—*Yeagan, 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—*Yeagan, 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, *Cryptocerus punctulatus*—*Zhou, X.*
Genomic Approaches to Analyses of Immune-Suppressive Genes of the *Campoplex sonorensis* Polydnavirus—*Webb, B.A.*
Improving Management of Insects of Public Health Significance in Kentucky—*Brown, G.C.*
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.*
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.*

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 Seedling, 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.*
Using Remotely-Sensed Data to Evaluate Post-Fire Vegetation and Fuel Dynamics in Central and Appalachian Hardwood Forests—*Arthur, M.A.*

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.*
Multi-State Evaluation of Wine Grape Cultivars and Clones—*Archbold, D.*
New Horticultural and Grain Crop Opportunities for Kentucky—*Houtz, R.; Van Sanford, D.; Dillon, C.*
Regulation of Expression and Activity of Sorbitol Dehydrogenase in Apple—*Archbold, D.*
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

- 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.*
Cooperative Variety Testing Programs—*Van Sanford, D.A.*
Design, Assessment, and Management of Onsite Wastewater Treatment Systems: Addressing the Challenges of Climate Change—*Karathanasis, A.D.*
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.; Lacefield, E.L.*
Fate, Transport, and Ecological Effects of Livestock Antibiotics in Manure-Amended Agroecosystems—*D'Angelo, E.M.*
Functional Metagenomic Analysis of Soil-Dwelling and Plant-Associated Microbial Communities—*Moe, L.A.*
Hydrogeology: 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.*
Molecular Genetic Analysis of a Novel Feedback Inhibition Mechanism in the Cytokinin Response Pathway—*Smalle, J.S.*
Performance of Small Grain Varieties in Kentucky—*Van Sanford, D.A.; Bruening, W.P.*
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.*
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.*
New Strategies to Induce Resistance against Tombusviruses Based on Host Factors—*Nagy, P.*

University of Kentucky Veterinary Diagnostic Laboratory

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

Veterinary Science

- A Novel Dimorphic Fungus as an Emerging Cause of Reproductive Losses in Mares and Other Livestock—*Swercek, T.W.*
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.*
Genetic Basis of Attenuation of the T953 Strain of EHV-1 and Development of a Genetically Defined Live Attenuated Equine Herpesvirus-1 Vaccine—*Balasuriya, U.*
Identification of Surface Proteins of *Streptococcus equi* with Potential in Vaccine Development—*Timoney, J.*
Innate Immune Responses to Influenza Virus Infection—*Chambers, T.M.*
Interactions of Equine Viral Pathogens with the Equine Innate Immune System—*Chambers, T.M.; Horohov, D.W.*
Interferon Gamma Regulation in the Foal—*Horohov, D.W.*
Investigation of *Sarcocystis neurona* Genes Involved in Parasite Survival and Pathogenesis—*Howe, D.K.*
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.*

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.; Lawrence, L.; Bush, L.*

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, 2011–December 31, 2011) 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.

4-H Central Operations

Total—\$82,000

4-H Council National Mentoring (2010), National 4-H Council, \$82,000, *Burks, J.*

Agricultural Economics

Total—\$1,294,970

A Mobile Kitchen for Fruit and Vegetable Processing Training and Extension Initiatives for Pawpaw and Sorghum Syrup, Kentucky State University, \$32,330—*Woods, T.; Cottrell, T.; Perry, R.; Strang, J.*

CCE: Comparative Decision Making Studies Conference, National Science Foundation, \$10,000—*Pushkarskaya, H.*

Economic Relationship between Wild-Capture Fisheries and Marine Aquaculture, National Oceanic and Atmospheric Administration, \$50,000—*Hu, W.*

Extension Services in Serbia and Montenegro, Foreign Agricultural Service, \$71,720—*Reed, M.*

Hedging Opportunities against Declines in Land Values, Kentucky Small Grain Growers Association, \$50,000—*Walters, C.; Skees, J.*

Implement Plan of Work for the SARE Program, University of Georgia, \$10,000—*Meyer, A.*

Innovation in Catastrophic Weather Insurance to Improve the Livelihoods of Rural Households, GlobalAgRisk Inc, \$49,572—*Skees, J.*

Integrating ACRE and Crop Insurance (2): A Comprehensive Risk Management Strategy, University of Arkansas, \$13,018—*Walters, C.; Halich, G.*

Kentucky Dairy Preferences Survey, Kentucky Department of Agriculture, \$4,000—*Maynard, L.*

MarketReady Training Partnership with the Kentucky Department of Agriculture, Kentucky Department of Agriculture, \$18,000—*Woods, T.*

Promoting Entrepreneurship in Distressed Rural Communities: Integrating Psychological and Sociological Perspectives, National Institute of Food and Agriculture, \$349,715—*Davis, A.; Hustedde, R.*

SPARKT Sustainable Planning Aimed at Regionalism in Kentucky, Tennessee, Department of Housing and Urban Development—\$550,000, *Davis, A.; Maurer, R.*

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.*

The Economic Impact of the Kentucky Wine Industry, Kentucky Department of Agriculture, \$9,000—*Woods, T.; Davis, A.*

Towards Optimizing the Health and Well-Being of Retired Thoroughbred Racehorses, Kentucky Horse Racing Commission, \$21,708—*Stowe, C.; Kibler, M.*

Train-the-Trainer Program Based on the Helping Artisans Reach Global Markets E-Commerce Module, Mississippi State University, \$2,996—*Davis, A.*

Agricultural Programs

Total—\$245,012

Enhancing Community Resilience: Discussion-Based Exercises of Agrosecurity Plans, National Institute of Food and Agriculture, \$55,012—*Husband, A.; Yeagan, R.*

Kentucky AgrAbility, 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, \$10,000—*Husband, A.; Dwyer, R.; Newman, M.; Yeagan, R.*

Animal and Food Sciences

Total—\$4,361,205

DAIREXNET: A National Dairy Information and Communications Resource, University of Nebraska, \$15,000—*Amaral-Phillips, D.; McAllister, A.*

Editor of the Journal of Nutritional Sciences, Elsevier Science Inc., \$10,490—*Hennig, B.*

Establishing a New CoP—*Small, Medium-Sized and Backyard Poultry Flocks*, University of Nebraska, \$60,000—*Pescatore, A.*

Fighting with Food: Battling Chemical Toxicity with Good Nutrition, Miami University, \$32,836—*Hennig, B.; Gaetke, L.*

Food Production Research and Development for Kentucky's Small Food Processors, Kentucky Governor's Office of Agricultural Policy, \$95,250—*Rentfrow, G.; Hu, W.; Newman, M.; Woods, T.*

Master Cattleman Program, Kentucky Beef Network, \$271,394—*Burris, W.; Anderson, L.; Bullock, K.; Lehmkuhler, J.*

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, \$2,125,986—*Hennig, B.; Gaetke, L.*

Proteome Profile of Economically Important Muscles in Beef Hindquarters, National Institute of Food and Agriculture, \$421,112—*Suman, S.; Rentfrow, G.*

Student Sponsorship, Alltech Biotechnology Inc., \$30,000—*Harmon, D.*

Student Sponsorship, Alltech Biotechnology Inc., \$30,000—*Lawrence, L.*

Student Sponsorship, Alltech Biotechnology Inc., \$28,620—*Cantor, A.*

Student Sponsorship, Alltech Biotechnology Inc., \$25,000—*Matthews, J.*

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, \$25,000—*Urschel, K.*

The Use of Natural Antimicrobials to Mitigate Biological Threat Agents in High Risk Foods, National Institute for Hometown Security, \$1,153,509—*Newman, M.; O'Leary, J.; Rentfrow, G.; Xiong, Y.*

Associate Dean/ Director

Total—\$1,201,397

2011-12 Acquisition of Goods and Services for USDA Office in Ag North, Agricultural Research Service, \$69,850—*Cox, N.*

Equine Medical Director, Kentucky Horse Racing Commission, \$175,206—*Cox, N.*

Improving Sustainability of Forage-Based Production, Agricultural Research Service, \$809,341—*Cox, N.*

UK Robinson Forest Camp Mudslide Project, Hazard Mitigation Grant Program, Kentucky Department of Military Affairs, \$147,000—*Brashear, R.; Ditsch, D.*

Biosystems and Agricultural Engineering

Total—\$3,063,059

A Cooperative Extension Program for Kentucky's Building Systems Energy Needs 2011-2012, Kentucky Energy and Environment Cabinet, \$110,000—*Fehr, R.*

Appalachian Research Initiative for Environmental Science (ARIES), Virginia Polytechnic Institute and State University, \$383,533—*Warner, R.; Agouridis, C.; Barton, C.; Uhrine, J.*

Compost-Bedded Pack Barn Housing System for Dairy Manure Storage/Treatment, Natural Resources Conservation Service, \$132,941—*Taraba, J.; Bewley, J.; Day, G.; Missun, T.*

Energy Audits for Grain and Poultry Producers in Kentucky, Rural Development, \$3,749—*McNeill, S.; Montross, M.; Overhults, D.; Shearer, S.*

Food and Energy Production: Internationalized Agricultural and Engineering Programs, Department of Education, \$134,148—*Stombaugh, T.; Workman, S.*

UK Extension Radon Activities, Kentucky Cabinet for Health and Family Services, \$23,515—*Fehr, R.*

Implementation and Assessment of Mechanical Burley Tobacco Harvesting Systems in France, Association Nationale Interprofessionnelle et Technique du Tabac, \$27,522—*Wells, L.*

Increasing Bale Density by Crushing Nodes Using Crop Processing Rollers, Case New Holland America LLC, \$132,602—*Montross, M.*

Kentucky Cooperative Extension Service Energy Efficiency Awareness and Action, Kentucky Energy and Environment Cabinet, \$200,704—*Fehr, R.*

Next Generation Combine Grain Sampling System and Moisture Sensor Testing, Deere and Company, \$15,214—*Shearer, S.; Stombaugh, T.*

Nigeria: Commodity Storage—Technical Assistance, Foreign Agricultural Service, \$46,651—*McNeill, S.*

On-Farm Biomass Processing: Towards an Integrated High Solids Transporting/Storing/Processing System, National Institute of Food and Agriculture, \$1,000,000—*Nokes, S.; Crofcheck, C.; DeBolt, S.; Halich, G.; Lee, C.; Montross, M.; Mueller, T.; Shearer, S.; Smith, S.; Stombaugh, T.*

Optical Detection of Microbial Contamination in Food Matrices, National Institute for Hometown Security, \$819,592—*Payne, F.; Crofcheck, C.; Montross, M.*

Precision Agriculture: Precision Resource Management—Phase VI, National Institute of Food and Agriculture, \$30,973—*Stombaugh, T.; Agouridis, C.; Arthur, M.; Barton, C.; Bewley, J.; Coolong, T.; Dillon, C.; Dowdy, T.; Grove, J.; Neelakantan, S.; Lee, B.; Luck, J.; McCulley, R.; Mueller, T.; Pitla, S.; Sama, M.; Shearer, S.; Shockley, J.; Warner, R.; Wilhoit, J.; Zandonadi, R.*

Test Plan for Next Generation Combine Grain Sampling System and Moisture Sensor, Deere and Company, \$1,915, *Stombaugh, T.*

Community and Leadership Development

Total—\$169,259

Core Health Messages: A Strategy to Improve the Health and Well-Being of Rural and Low-Income Families, University of Massachusetts—\$1,564, *Dyk, P.*

Cultivating the Next Generation of Farmers: Beginning Farmers in Kentucky, American Sociological Association, \$2,700—*Tanaka, K.*

Engaging Youth, Serving Community 9, National 4-H Council, \$25,000, *Ricketts, K.; Jones, K.*

Enhancing Science Capacity in Introductory Animal, Plant, and Food Sciences Courses, Purdue University, \$131,895—*Hains, B.; Hansen, G.; Harmon, R.; Rossano, M.; Silvia, W.*

Research on the Kentucky Proud Program, Kentucky Department of Agriculture, \$3,600—*Tanaka, K.*

UK Perkins Professional Development Award 2011-2012, Kentucky Department of Education, \$4,500—*Hains, B.; Epps, R.; Vincent, S.*

eXtension

Total—\$1,057,818

ECOP/CSREES eXtension—Supplement, University of Nebraska, \$618,243—*Wood, C.; Craycraft, C.*

HorseQuest Community of Practice, University of Nebraska, \$10,000—*Griffin, A.*

New Technologies for Agriculture Extension (NTAE), University of Nebraska, \$394,247—*Wood, C.*

The Transformation of Cooperative Extension, University of Nebraska, \$35,328—*Wood, C.*

Entomology

Total—\$2,814,807

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. Lepidoptera 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. Lepidoptera Larvae, Pioneer Hi Bred International Inc., \$12,000—*Johnson, D.*

Biological Control of Cereal Aphids in Wheat: Implications of Alternative Foods and Intraguild Predation, Binational Agricultural Research and Development Fund, \$31,000—*Harwood, J.*

Citizen Volunteer Pest Survey, Animal and Plant Health Inspection Service, \$10,000—*Lensing, J.; Collins, J.*

Cooperative Agricultural Pest Survey—Gypsy Moth, Animal and Plant Health Inspection Service, \$223,933—*Obrycki, J.; Lensing, J.*

Developing a Framework for Assessing the Risks of Planta RNAi on Non-Target Arthropods, National Institute of Food and Agriculture, \$500,000—*Zhou, X.*

Ecological Genetics of the Predatory Lady Beetle *Hippodamia convergens*: Effects of Augmentative Releases, National Institute of Food and Agriculture, \$57,823—*Obrycki, J.*

Emerald Ash Borer Survey and Outreach in Kentucky, Animal and Plant Health Inspection Service, \$763,656—*Obrycki, J.; Lensing, J.*

Evaluation of Novel Insecticide Seed Treatments for Wireworm and White Grub Control in Corn, Syngenta Crop Protection, \$30,000—*Bessin, R.*

Forest Pest Outreach and Survey Project, Animal and Plant Health Inspection Service, \$37,500—*Lensing, J.; Collins, J.*

Impact of Predator Bioniversity on Pest-Suppression in Kentucky Wheat: A Denaturing Gradient Gel Electrophoresis Approach, Kentucky Science and Technology Co. Inc, \$45,074—*Harwood, J.; Johnson, D.*

Importance of Natural Enemies for Stink Bug Control, University of Georgia, \$10,000—*Harwood, J.*

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

Molecular Analysis of Juvenile Hormone Action, National Institute of General Medical Sciences, \$206,415—*Palli, S.*

Molecular Analysis of Xenobiotic Response in the Colorado Potato Beetle, National Institute of Food and Agriculture, \$456,364—*Palli, S.*

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

Pesticide Safety Education, National Institute of Food and Agriculture—\$10,000, *Townsend, L.*

Phytophthora ramorum Survey, Animal and Plant Health Inspection Service—\$25,000, *Lensing, J.*

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

Private Pesticide Applicator—FY 2011-2012, Kentucky Department of Agriculture, \$27,500—*Townsend, L.*

State Liaison for the Minor Use Pesticide Program and Eggplant Flea Beetle Insecticide Efficacy, University of Florida—\$7,000, *Bessin, R.*

TCN: Collaborative Research: Plants, Herbivores, and Parasitoids: A Model System for the Study of Tri-Trophic Associations, University of Delaware—\$12,510, *Sharkey, M.*

The Effect of an Aphid Bacterial Symbiont on Interactions Among Soybean Aphid, National Institute of Food and Agriculture, \$149,940—*White, J.*

Thousand Cankers Disease Survey in Kentucky, Animal and Plant Health Inspection Service, \$20,000—*Lensing, J.*

Tracking the Source of Aphid-Vectored Virus In Winter Wheat, Kentucky Small Grain Growers Association, \$8,521—*Harwood, J.; Johnson, D.; Kowles, K.*

Who's Eating Spider Mites? Molecular Tracking of Mite Predation (WSPC), Washington State Potato Commission, \$30,000—*Harwood, J.*

Family and Consumer Sciences

Total—\$2,899,394

2011 Kentucky Health Literacy Summit, Foundation for a Healthy Kentucky, \$1,500—*Murray, D.*

Evaluation: Martin County Prevention on the Move, Morehead State University, \$10,000—*Murray, D.*

Kentucky Healthy Homes and Communities, Auburn University, \$4,500—*Stephenson, L.*

Military—Extension Adventure Camp Initiative, Purdue University, \$200,000—*Ashurst, K.; Stephenson, L.*

Operation Military Kids Camp Initiative/OSD Supplement 2011, Kansas State University, \$50,000—*Ashurst, K.; Stephenson, L.*

Operation Military Kids Kentucky 2012, Kansas State University, \$92,083—*Ashurst, K.*

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, \$50,815—*Stephenson, L.*

Supplemental Nutrition Assistance Program Education (SNAP-Ed) 2011, Kentucky Cabinet for Health and Family Services, \$618,386—*Vail, A.; Stephenson, L.*

UK Supplemental Nutrition Assistance Program—Education (SNAP-Ed), Kentucky Cabinet for Health and Family Services, \$1,857,110—*Vail, A.; Stephenson, L.*

Forestry

Total—\$621,198

Assessment of Structure, Function and Stability in a Gradient of Disturbed SRS Streams—Phase III, Forest Service, \$45,658—*Barton, C.*

Black Bear 2012, Kentucky Department of Fish and Wildlife, \$90,000—*Cox, J.*

Continued Monitoring of American Chestnut Restoration Sites on Surface Mined Land in Kentucky, American Chestnut Foundation, \$2,500—*Barton, C.*

Forest Management Assistance on State Wildlife Management Areas and Private Lands Technical Assistance, Kentucky Department of Fish and Wildlife, \$15,000—*Stringer, J.*

Forest Stewardship Public Awareness, Publicity, Training, Kentucky Energy and Environment Cabinet, \$10,000—*Stringer, J.*

Green Forests Work for Appalachia: Phase I Development and Deployment, Appalachian Regional Commission, \$300,000—*Barton, C.*

Kentucky Woodlands Magazine—Urban vs. Rural Forests Issue, Kentucky Energy and Environment Cabinet, \$18,300—*Stringer, J.*

Kentucky Woodlands Magazine—Wood Borer Issues, Kentucky Energy and Environment Cabinet, \$20,000—*Stringer, J.; Thomas, W.*

Long-Lived Wood Products: Carbon and Competitive Advantages for Hardwood Mills, Forest Service, \$11,935—*Stringer, J.; Ammerman, B.; Conners, T.; Fackler, F.*

OptiFuels: Optimizing Fuel Treatment Location at the Landscape Level, University of Montana, \$30,000—*Contreras, M.*

Resource Selection, Movement Patterns, Survival, and Cause-Specific Mortality of Adult Bull Elk in Kentucky, Kentucky Department of Fish and Wildlife, \$50,000—*Cox, J.*

Roosting and Foraging Behavior of Rafinesque's Big-Eared Bat Near the Northern Limits of the Species Range, Kentucky Department of Fish and Wildlife, \$16,500—*Lacki, M.*

Roosting and Foraging Behavior of Rafinesque's Big-Eared Bat Near the Northern Limits of the Species Range—Years 2 and 3, Kentucky Department of Fish and Wildlife, \$1,305—*Lacki, M.*

UK Forest Management Assistance on State WMAs, Kentucky Department of Fish and Wildlife, \$10,000—*Stringer, J.*

Horticulture

Total—\$1,148,539

Coordinated Wine Grape Variety Evaluations in the Eastern USA, Cornell University, \$1,024—*Wilson, P.*

Defining Determinants and Dynamics and Cellulose Microfibril Biosynthesis, Assembly and Degradation, Cornell University, \$161,519—*DeBolt, S.*

Developing Diversified High Tunnel Systems to Enhance Food Security and Specialty Crop Production in Kentucky, Kentucky Department of Agriculture, \$62,834—*Jacobsen, K.; Coolong, T.; Williams, M.*

eXtension Consumer Horticulture Certified Cop Leadership Funds 2008, University of Nebraska, \$15,000—*Durham, R.*

Ginseng Monitoring and Research Project FY2011, Kentucky Department of Agriculture, \$10,000—*Wright, S.*

Impact and Social Acceptance of Selected Sustainable Practices in Ornamental Crop Production Systems, University of Illinois, \$114,315—*Schnelle, R.; Fulcher, A.; Geneve, R.*

Incorporating Row Covers into Muskmelon IPM with a Farming Systems Approach, Iowa State University, \$76,000—*Williams, M.; Bessin, R.; Coolong, T.*

Kentucky Horticulture Council Grant Number 5, Kentucky Horticulture Council, \$545,000—*Ingram, D.; Woods, T.*

KY EPSCoR: Conference Award 4th National Sustainable Agriculture Education Association, Kentucky Council on Postsecondary Education, \$2,665—*Jacobsen, K.; Williams, M.*

New Crop Opportunities, Phase X, Cooperative State Research Education and Extension, \$8,413—*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.*

Specialty Crop Asparagus: A Nutritious, High-Value, Early Crop for Market Gardeners, Kentucky Department of Agriculture, \$8,277—*Wright, S.; Coolong, T.*

Specialty Crop Optimizing Orchard Strategies for Yield, Plant Health, and Fruit Quality in Organic Apple Production, Kentucky Department of Agriculture—\$73,590, *Archbold, D.; Bessin, R.; Strang, J.; Williams, M.*

Specialty Crop Organic Grape Production in Kentucky, Kentucky Department of Agriculture, \$10,000—*Wilson, P.; Archbold, D.; Jacobsen, K.; Williams, M.*

Specialty Crop Persimmon Evaluation for Eastern Kentucky, Kentucky Department of Agriculture, \$2,751—*Wright, S.; Strang, J.*

The Impact of Sterol Biogenesis on Cellulose Synthesis in Higher Plants, Kansas State University, \$57,151—*DeBolt, S.*

Kentucky Tobacco Research and Development Center

Total—\$279,008

EAGER: RNAi Gene Discovery Tool to Randomly Generate Dominant Mutant Pools in Plants, National Science Foundation, \$251,593—*Tang, G.*

Field Production Plan to Grow One Acre of *Solidago nemoralis* (Grey Goldenrod) for Naprogenix, Inc., Naprogenix, \$5,273—*Mundell, R.*

Partners for Biodefense—Field Test, Planet Biotechnology Incorporated, \$22,142—*Chambers, O.; Mundell, R.*

Landscape Architecture

Total—\$25,300

Survey and Research of Historic Properties in Casey County, Kentucky, Kentucky Heritage Council, \$8,800—*Crankshaw, N.*

U.S. 27 Corridor Study and Development Guidelines, City of Falmouth, \$16,500—*Hargrove, R.*

Merchandising, Apparel, and Textiles

Total—\$47,277

Abraham Lincoln National Heritage Area Management Plan and Environmental Assessment, Heritage Strategies LLC, \$11,193—*Swanson, J.*

Quality Control Laboratory for NAILM, National Association of Institutional Linen Management, \$36,084—*Easter, E.*

Nutrition and Food Science

Total—\$585,850

Children, Youth, and Families Education and Research Network—Program Component, National Institute of Food and Agriculture, \$398,000—*Kurzynske, J.; Stivers, W.*

Children, Youth and Families at Risk Liaison, National Institute of Food and Agriculture, \$42,850—*Kurzynske, J.*

Kentucky Chefs Move to School, Kentucky Department of Agriculture, \$5,000, *Mullins, J.*

Promoting Life Skills in Middle School Youth, National Institute of Food and Agriculture, \$140,000—*Kurzynske, J.; Jones, K.*

Plant and Soil Sciences

Total—\$4,716,896

(includes Research Challenge Trust Fund)

2008 Southern Regional Water Resource Project, Texas A&M University, \$99,339—*Lee, B.*

Accelerating the Development of FHB-Resistant Soft Red Winter Wheat Varieties, Agricultural Research Service, \$57,804—*Van Sanford, D.*

Agronomic Limitations of Soybean Yield and Seed Quality in U.S. (Year 3), University of Minnesota, \$77,000—*Lee, C.*

Bacteria and Bioethanol Fermentation: Characterizing the Impact of Bacterial Contaminants and Bacterial Community Structure on Bioethanol Fermentations across the U.S., Kentucky Science and Technology Co. Inc., \$46,060—*Moe, L.*

Biomass Field Trials, Ceres Inc., \$9,520—*Smith, S.*

Branch-Chain Fatty Acid Production in Plants, Consortium for Plant Biotechnology Research Inc., \$110,228—*Hildebrand, D.*

Center for the Environmental Implications of Nanotechnology (CEIN), Duke University, \$110,001—*Bertsch, P.; Uhrine, J.*

Collaborative Research: Do Expected Evolutionary Trade-Offs in Enzyme Activities Manifest at the Level of Microbial Community Function?, National Science Foundation, \$105,576—*McCulley, R.*

Development of Hyperactive DNA Transposases by Directed Evolution, Kentucky Science and Technology Co. Inc., \$39,783—*Yuan, L.*

DTS Weed Management System—Service Order No. 12, Monsanto Co., \$4,000—*Slack, C.*

Efficient Use of Nitrogen on Grain Sorghum in Kentucky, United Sorghum Checkoff Program, \$3,000—*Murdock, L.*

Engineering High Value Oil Production into Biofuel Crops, National Institute of Food and Agriculture, \$785,784—*Chappell, J.*

Environmental Behavior and Toxicity of Ag and CeO₂ Nanoparticles: The Role of Surface Functionalization and Interaction with Natural Organic Substances and Iron Oxohydroxides, Environmental Protection Agency, \$599,840—*Uhrine, J.; Bertsch, P.; Tsyusko, O.*

Equipment Funds—Match, Kentucky Corn Growers Association, \$62,696—*Murdock, L.*

Equipment Funds—Match, Kentucky Soybean Promotion Board, \$62,971—*Murdock, L.*

Equipment Funds—State Greenhouse, Kentucky Governor's Office of Agricultural Policy, \$125,667—*Murdock, L.*

Equipment Purchase: The Value of Manure Research in Kentucky, Kentucky Corn Growers Association, \$23,000—*Ritchey, E.*

Evaluation of Altria Burley Breeding Lines, Altria Corporate Services Inc., \$11,120—*Miller, R.*

- Evaluation of Miscanthus Species as Feedstock Biofuels, Ceres Inc., \$68,110—*Williams, D.*
- Farm Scale Biomass Production for Electricity Generation and Community Development, Kentucky Forage and Grasslands Council, \$259,903—*Smith, S.; Montross, M.*
- Further Development of Chia as a New Grain Crop for Kentucky, Kentucky Small Grain Growers Association, \$10,000—*Hildebrand, D.*
- Further Development of Soybeans with Higher Levels of Improved Oil and Enhanced Fungal Resistance, United Soybean Board, \$63,500—*Hildebrand, D.*
- Impact of Climate Change on Wheat Production in Kentucky, Kentucky Small Grain Growers Association, \$5,000—*Van Sanford, D.; McCulley, R.; Russell, K.*
- Improving Barley and Wheat Germplasm for Changing Environments, University of California Davis, \$11,829—*Van Sanford, D.*
- Improving Nitrogen Application Technology under Kentucky Conditions, Kentucky Small Grain Growers Association, \$5,000—*Murdock, L.; Call, D.; Gray, J.*
- Influence of Tall Fescue Cultivar and Endophyte Genotype Combinations on Root System Architecture, Exudate Composition and Soil Biogeochemical Processes, National Institute of Food and Agriculture, \$265,507—*McNear, D.*
- Management of Troublesome Weeds in Highway Rights of Way, Kentucky Transportation Cabinet, \$233,464—*Witt, W.*
- Managing Giant Ragweed and Maretail in Wheat, Kentucky Small Grain Growers Association, \$6,000—*Martin, J.; Call, D.; Gray, J.*
- Obtaining a Transcriptome for Developing *Acacia victoriae* Seed Pods, Qwell Pharmaceutical Incorporated, \$69,500—*Chappell, J.*
- Optimum Planting Date for Soybean, Kentucky Soybean Promotion Board, \$4,000—*Herbek, J.*
- Organizing and Coordinating the 2012 South Region CSS Conference, Natural Resources Conservation Service, \$7,500—*Karathanasis, A.*
- Performance of Small Grain Varieties in Kentucky, Kentucky Small Grain Growers Association, \$8,000—*Bruening, W.*
- Plant-Microbe Communication in the *Medicago truncatula* Rhizosphere: Functional Metagenomics, Biochemistry, and Community Analysis, National Institute of Food and Agriculture, \$452,000—*Moe, L.; DeBolt, S.; McNear, D.*
- Polyadenylation of Stored mRNA During Seed Germination, Kentucky Science and Technology Co. Inc., \$46,967—*Hunt, A.; Downie, A.*
- Princeton, Kentucky Field Yield and Quality Evaluation of Burley RNAi Nicotine Demethylase Lines and Hybrids, Altria Corporate Services Inc., \$20,850—*Bailey, W.*
- Princeton, Kentucky Field Yield and Quality Evaluation of Pale Yellow Dark Tobacco Lines, Altria Corporate Services Inc., \$13,900—*Bailey, W.*
- Proximal Sensing of Soybean Crop Stress: Understanding the Relationship of Early Canopy Development to Grain Yield, Kentucky Soybean Promotion Board, \$25,000—*Grove, J.*
- Regional Biomass Feedstock Partnership, South Dakota State University, \$22,000—*Williams, D.*
- Regional Biomass Feedstock Partnership—Herbaceous Bioenergy Crop Field Trials, South Dakota State University, \$30,000—*Barrett, M.*
- Renewable Lubricant Production, Ashland Inc., \$9,000—*Hildebrand, D.*
- Soft Red Winter Wheat Breeding and Variety Development for Kentucky, Kentucky Small Grain Growers Association, \$34,955—*Van Sanford, D.*
- Soil Hydrologic Processes and Watershed Dynamics in the Shawnee Hills, Major Land Resource Area 115 and 120, Natural Resources Conservation Service, \$39,999—*Lee, B.*
- 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 2011, Kentucky Soybean Promotion Board, \$51,220—*Lee, C.; Herbek, J.; Murdock, L.*
- Survey of the Tissue Nutrient Status of Winter Wheat in Kentucky, Kentucky Small Grain Growers Association, \$4,000—*Ritchey, E.*
- Synchrotron X-ray Microprobe and Microspectroscopy Research in Low Temperature Geochemistry, University of Chicago, \$44,027—*Bertsch, P.*
- The Ripper Challenge: Is Incorporation Really Reducing Soybean and Corn Yields?, Kentucky Soybean Promotion Board, \$25,888—*Schwab, G.; Grove, J.; Murdock, L.*
- The Transition to Biofuel Feedstock Production in Kentucky, Eastern Kentucky University, \$18,333—*Smith, S.*
- Understanding Components to High Yielding Soybean Production Systems, Kentucky Soybean Promotion Board, \$20,000—*Ritchey, E.; Grove, J.; Lee, C.; Schwab, G.*
- U.S. Wheat and Barley Scab Initiative's Networking and Facilitation Office and Website, Agricultural Research Service, \$325,961—*Van Sanford, D.*
- Wheat Crop Sensing in Spring: On-Farm Comparison of Uniform, on the Go, and Prior Scanning, Kentucky Small Grain Growers Association, \$6,500—*Wendroth, O.; Egli, D.; Murdock, L.*
- Yield Evaluation of High Oil + Protein Soybeans and Further Increasing Oil + Protein, Kentucky Soybean Promotion Board, \$26,161—*Hildebrand, D.; Egli, D.*
- Plant and Soil Sciences—
Research Challenge Trust Fund**
- Enhancement of Soybean Somatic Embryo Development to Improve Regeneration and Transformation Efficiency, United Soybean Board, \$84,548—*Perry, S.*
- Enhancement of Soybean Somatic Embryo Development to Improve Regeneration and Transformation Efficiency (Year 1 of 2), United Soybean Board, \$77,995—*Perry, S.*
- Vision Paper: Development of a Web 2.0 Soil Data Browser for the NRCS, Natural Resources Conservation Service, \$25,000—*Mueller, T.*
- Plant Pathology**
- Total—\$1,353,367
(includes Research Challenge Trust Fund)*
- 2011 Kentucky Soybean Rust Monitoring and Early Warning System, Kentucky Soybean Promotion Board, \$26,000—*Hershman, D.*
- Can Foliar Applied Fungicides Reduce Yield Loss in Soybean Caused by Soybean Cyst Nematode, Kentucky Soybean Promotion Board, \$21,000—*Hershman, D.*
- Diagnostic Image Series Development for Supporting IPM in the Southern Region, University of Florida, \$10,000—*Bachi, P.*
- Engineering Resistance to Bean Pod Mottle Virus in Soybean, Kentucky Soybean Promotion Board, \$33,943—*Kachroo, A.*
- Evaluation and Mitigation of Anthracnose Disease Pressure due to the Introduction of Sorghum for Feedstock Production, Pennsylvania State University, \$51,100—*Vaillancourt, L.*
- Genetics of Quantitative Pathogenic Variation in *Fusarium graminearum*, Agricultural Research Service, \$17,228—*Vaillancourt, L.*
- Glycerol Metabolism and Its Role in Biotrophy Versus Necrotrophy in an Arabidopsis/Fungal Hemibiotroph Model System, National Science Foundation, \$66,003—*Kachroo, P.; Kachroo, A.; Vaillancourt, L.*
- Investigations into the Occurrence, Distribution, and Impact of Nematodes in Soybean Fields in the Southern United States, University of Tennessee, \$13,450—*Hershman, D.*
- Molecular, Genetic, and Biochemical Characterization of Oleate-Regulated Defense Gene Expression in Plants, National Science Foundation, \$200,000—*Kachroo, P.; Kachroo, A.*
- Multiple Disease Resistant Soybeans: Gene Discovery and Transfer of Disease Resistance into Soybean, University of Illinois, \$54,000—*Ghabrial, S.*
- Pathogenicity Determinants of *Colletotrichum graminicola*, Monsanto Co., \$136,536—*Vaillancourt, L.*
- Rapid Screening and Expression of Valuable Proteins in Soybean Using a Virus-Based Vector, Kentucky Science and Technology Co. Inc., \$40,793—*Ghabrial, S.*
- Reducing Losses to Potato and Tomato Late Blight by Enhanced Monitoring of Pathogen Populations and Improved Resistant Plants, Education and Extension, Regents of the University of California Riverside, \$10,000—*Seebold, K.*
- Southern Region Plant Diagnostic Network, IPM PIPE 2007, Kentucky Component, University of Florida, \$68,250—*Vincelli, P.*
- Survey for Strobilurin-Resistant Frogeye Leaf Spot, Kentucky Soybean Promotion Board, \$18,000—*Hershman, D.*
- Telomere Hypervariability in the Fungus *Magnaporthe oryzae*—a model plant pathogen, National Science Foundation, \$6,963—*Farman, M.*
- Towards Understanding the Mechanisms of Plant Extreme Resistance to Viruses, Kentucky Science and Technology Co. Inc., \$40,000—*Kachroo, A.*
- Understanding Soybean Responses to Root-Knot and Reniform Nematodes, United Soybean Board, \$132,398—*Kachroo, A.; Ghabrial, S.; Hershman, D.*
- Uniform Trial on Integrated Management of FHB: Kentucky, Agricultural Research Service, \$8,940—*Hershman, D.; Lee, C.*
- Use of a Novel Virus-Based Vector in the 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**
- Screening of Temperature Sensitive and Deletion Libraries for Host Factors Affecting Virus Replication, Kentucky Science and Technology Co. Inc., \$44,450—*Nagy, P.*
- The Role of a Host Ion Pump in RNA Virus Recombination, National Science Foundation, \$150,000—*Nagy, P.*

Regulatory Services

Total—\$185,264

Enhancing and Building the Capability of Feed Safety in Kentucky, Food and Drug Administration, \$151,133—*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—\$113,375

FY 2011 Class B Education Incentive Grant Project: Improving Water Quality through Public Outreach and K-12 Schools in Fayette County, Lexington-Fayette Urban County Government, \$113,375—*Hanley, C.; Agouridis, C.*

University of Kentucky Veterinary Diagnostic Laboratory

Total—\$84,206

Bovine Spongiform Encephalopathy Testing and Related Services, Kentucky Department of Agriculture, \$7,200—*Carter, C.*
Classical Swine Fever Surveillance, Animal and Plant Health Inspection Service, \$4,400—*Carter, C.*
Diagnostic Laboratory Support of NAHLN, Animal and Plant Health Inspection Service, \$55,000—*Carter, C.*
West Nile Surveillance, Kentucky Cabinet for Health and Family Services, \$17,606—*Carter, C.*

Veterinary Science

Total—\$1,115,575

Acquisition of a FluorChem, a Digital Imaging System for Arterivirus (PRRSV and EAV) Vaccine Research, National Institute of Food and Agriculture, \$13,375—*Balasuriya, U.*
Articular Cartilage Stem Cells, Kentucky Horse Racing Commission, \$100,000—*MacLeod, J.*
Deuterated Internal Standards for Equine Therapeutic Medication Regulation, Kentucky Horse Racing Commission, \$49,422—*Tobin, T.*

EIAV Envelope Variation and Vaccine Efficacy, University of Pittsburgh, \$312,750—*Issel, C.; Cook, R.; Horohov, D.*
Equine Herpesvirus-1 and the Type-I Interferon Response, American Quarter Horse Association, \$37,236—*Chambers, T.; Horohov, D.*
Evaluation of Immunoreactive Proteins of *Streptococcus zooepidemicus* for Potential as Vaccine Components, KY Horse Racing Commission, \$48,171, *Timoney, J.*
Funding Request for XIIth International Nidovirus Symposium (Nido2011), National Institute of Food and Agriculture, \$13,000—*Balasuriya, U.*
Identification of Genetic Factors Responsible for Establishment of EAV Carrier State in Stallions, Morris Animal Foundation, \$10,800—*Balasuriya, U.; Bailey, E.*
Identifying the Role of a "Metabolic Master Switch" in Equine Metabolic Syndrome and Its Implications for Targeted Treatment, American Quarter Horse Association, \$19,547—*Adams, A.; Horohov, D.*
Immunological Measurements for Influenza Infection in Equine Models, Science Applications International Co., \$11,000—*Chambers, T.*
Molecular Characterization of Neurovirulent EHVI Strains, Grayson Jockey Club Research Foundation Inc., \$48,708—*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 with Cervical Stenotic Myelopathy, Grayson Jockey Club Research Foundation Inc., \$54,420—*MacLeod, J.*
Rapid Detection of Foreign, Emerging and Zoonotic Pathogens of Equines, Kansas State University, \$40,000—*Balasuriya, U.; Artiushin, S.*
Research Fellowship, Pfizer Inc., \$120,000—*Troedsson, M.*
Role of the Horse in Interspecies Transmission of Influenza Viruses, Kentucky Science and Technology Co. Inc., \$45,146—*Chambers, T.; Balasuriya, U.*
The New Formulation of Purina Equine Senior Feed, Land O' Lakes Purina Feed LLC, \$140,000—*Horohov, D.; Adams, A.*
XIIth International Nidovirus Symposium Support Proposal, National Institute of Allergy and Infectious Diseases, \$12,000—*Balasuriya, U.*

Multidisciplinary Grants led by Other Colleges*

A Population-Based Case-Control Study of Lung Cancer in Appalachian Kentucky: The Role of Environmental Carcinogens, Army Medical Research and Materiel Command, \$1,402,528—*Uhrine, J.*
Agricultural Safety and Health Training for Public Health Graduate Students, National Institute of Occupational Safety and Health, \$58,672—*Purschwitz, M.*
American Stories from the South—University of Kentucky American Cultural Center at Shanghai University, Department of State, \$100,000—*Tanaka, K.*
Appalachia Community Cancer Network II—U54, National Cancer Institute, \$1,219,350—*Webber, K.*
Construction and Assessment of Prototype Devices to Remove Aluminium from Solutions, Alkymos Inc., \$143,429—*Uhrine, J.*
Davol Fellowship, Davol Inc. Speciality Access Products, \$75,000—*Tharappel, J.*
Demonstration of an Algae-Based System for CO₂ Mitigation from Coal-Fired Power Plants, Kentucky Energy and Environment Cabinet, \$761,553—*Croftcheck, C.; Montross, M.*
Enhancing Capacity for Water-Resource Studies in Egypt and Morocco, Department of State, \$247,472—*Hanley, C.*
Geometry of Gene Cophylogenies as Relates to Genome Evolution and Speciation, National Institute of General Medical Sciences, \$277,200—*Schardl, C.*
Implications of Caveolae in Tat Signaling and Integrity of Brain Endothelium, National Institute of Mental Health, \$344,458—*Hennig, B.*
Kentucky Center for Clinical and Translational Science, National Center for Research Resources, \$174,572—*Schardl, C.*
Kentucky Industrial Assessment Center (KIAC): Developing the Next Generation Energy Assessment Engineering Workforce, Department of Energy, \$120,000—*Colliver, D.*
KSEF Emerging Ideas: Interfacial Engineering of Biomass Saccharification by *T. reesei* enzymes, Kentucky Science and Technology Co. Inc., \$48,594—*Nokes, S.*
KY EPSCoR: Transforming Kentucky's New Economy with EPSCoR, Kentucky Council on Postsecondary Education, \$1,000,000—*Schardl, C.; Webb, B.*
NSF/EPSCoR: Transforming Kentucky's New Economy with EPSCoR, National Science Foundation, \$2,521,000—*Schardl, C.; Webb, B.*
Southeast Center for Agricultural Health and Injury Prevention, National Institute of Occupational Safety and Health, \$615,450—*Hains, B.; Purschwitz, M.; Vincent, S.*
The Cognitive and Relational Drivers of Organizational Action and Innovation: A Study of Economic Development Organizations in a Persistently Distressed Region, National Science Foundation, \$485,553—*Nah, S.*

* Only College of Agriculture co-investigators are listed.

Intellectual Property

Genbank Register

Plant Pathology

- Schardl, C.L. *Epichloe festucae* F11 unplaced genomic scaffold scaffold00002, whole genome shotgun sequence. Accession JH158804.1.
- Schardl, C.L. *Epichloe glyceriae* strain E277 ergot alkaloid biosynthetic gene cluster, partial sequence. Accession JN177504.1.
- Schardl, C.L. *Epichloe amarillans* LoIE (*loIE*), LoIT (*loIT*), LoLU (*loLU*), LoLA (*loLA*), LoLO (*loLO*), and LoLD (*loLD*) genes, complete coding sequence. Accession JF830813.1.
- Schardl, C.L. *Epichloe festucae* strain E2368 chanoclavine-I dehydrogenase (*easD*), chanoclavine synthase catalase protein (*easC*), elymoclavine monooxygenase (*cloA*), and dimethylallyl tryptophan synthase (*dmaW*) genes, complete coding sequence. Accession JN167226.1.
- Schardl, C.L. *Epichloe glyceriae* NsfA (*nsfA*) gene, complete coding sequence; lolN pseudogene, complete sequence; and LoIE (*loIE*), LoIT (*loIT*), LoLU (*loLU*), and LoLA (*loLA*) genes, complete coding sequence. Accession JF800663.1.

C.L. Schardl had 320 additional accessions.

Veterinary Science

- Balasuriya, U.B.R., et al. Equine arteritis virus complete gen3+ome sequences of F27, F60, F61, F62, and F63. Accession JN211316.
- Balasuriya, U.B.R., et al. Equine arteritis virus complete gen3+ome sequences of F27, F60, F61, F62, and F63. Accession JN211317.

- Balasuriya, U.B.R., et al. Equine arteritis virus complete gen3+ome sequences of F27, F60, F61, F62, and F63. Accession JN211318.
- Balasuriya, U.B.R., et al. Equine arteritis virus complete gen3+ome sequences of F27, F60, F61, F62, and F63. Accession JN211319.
- Balasuriya, U.B.R., et al. Equine arteritis virus complete gen3+ome sequences of F27, F60, F61, F62, and F63. Accession JN211320.

U.B.R. Balasuriya had 109 additional accessions.

Gene Expression Omnibus

Veterinary Science

- MacLeod, J.N. et al. Microarray data. GEO Accession GSE23862.

Patents Issued

Entomology

- Dobson, S.L. Transfected mosquito vectors. Patent 7,868,222. Issued Jan. 11, 2011.

Biosystems and Agricultural Engineering

- Castillo, M., C.C. Fagan, C.P. O'Donnell, D.J. O'Callaghan, and F.A. Payne. Online, continuous sensor and method for curd moisture content control in cheese making. Patent 7,892,584. Issued Feb. 22, 2011.
- Everard, C.D., D.J. O'Callaghan, C.P. O'Donnell, C.C. Fagan, M. Castillo, and F.A. Payne. Method of improving cheese quality. Patent 7,880,881. Issued Feb. 1, 2011.

- Thompson, C.D., S.M. Alexander, W.L. Crist, B.D. Luck, J.R. Moore, J.C. Paschal, F.A. Payne, T.S. Stombaugh, N. Tabayehnejad, and P.C. Womble. Security monitoring system for a bulk foodstuff transport container. Patent 7,886,959. Issued Feb. 15, 2011.
- Wells, L., G.D. Day V, T.D. Smith, and I.J. Ross. Mechanism for harvesting tobacco plants in slotted rails, Patent 7,980,048. Issued July 19, 2011.

Plant and Soil Sciences

- Dewey, R.E., S.W. Bowen, B. Siminszky, and L. Gavilano. Alteration of tobacco alkaloid content through modification of specific cytochrome P450 genes. Patent 7,884,263. Issued Feb. 8, 2011.
- Chappell, J., S. Okada, T. Niehaus, and T. Devarenne. *Botryococcus braunii* triterpene synthase proteins and nucleic acid molecules and methods for their use. Patent 7,985,568. Issued July 26, 2011.
- Chappell, J., S. Wu, M. Schalk, and A. Clark. Transformed plants accumulating terpenes. Patent 8,017,835. Issued Sept. 13, 2011.
- Hildebrand, D., S. Rao, and J. Thoguru. Fungal desaturases and related methods. Patent 8,053,633. Issued Nov. 8, 2011.

Veterinary Science

- Balasuriya, U.B.R., P.J. Timoney, and J. Zhang. Infectious cDNA clone of the modified live virus vaccine strain of equine arteritis virus. Patent 8,012,735. Issued Sept. 6, 2011.

Publications

All publication dates in this section are 2011 unless otherwise noted.

Annual Report

- One Hundred and Twenty-Third Annual Report of the Kentucky Agricultural Experiment Station for 2010*. College of Agriculture, University of Kentucky, Nancy M. Cox, Director. June.

Books and Book Chapters

Agricultural Economics

- Icazza-Lara, C., I. McMaster, D. Freshwater, and C. Neuwalder. *OECD Territorial Reviews: NORA Region*. OECD, Paris. 268 pp.

Animal and Food Sciences

- Lawrence, L.M. Nutritional management of the broodmare. Chapter 291, pp. 2760-2768. IN: *Equine Reproduction*. Second Edition. A.O. McKinnon, E.L. Squires, W.E. Vaala, and D.D. Varner, eds. Wiley-Blackwell Publishing, Chichester, West Sussex, UK.
- Suman, S.P. Modified atmosphere packaging of fresh red meats. Chapter 10, pp. 203-212. IN: S.T. Joo, ed. *Control of Meat Quality*. Research Signpost, Trivandrum, India.

Biosystems and Agricultural Engineering

- Colliver, D.G., et al. *Advanced Energy Design Guide for K-12 School Buildings: Achieving 50% Energy Savings Toward a Net Zero Energy Building*. American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc., Atlanta, GA. 232 pp.
- Colliver, D.G., et al. *Advanced Energy Design Guide for Small to Medium Office Buildings: Achieving 50% Energy Savings Toward a Net Zero Energy Building*. American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc., Atlanta, GA. 234 pp.
- Huffman, R.L., D.D. Fangmeier, W.J. Elliot, S.R. Workman, and G.O. Schwab. *Soil and Water Conservation Engineering*. Sixth Edition. American Society of Agricultural and Biological Engineers. St. Joseph, MI. 542 pp.

Community and Leadership Development

- Bauer, J.W., P.H. Dyk, S. Son, and E.M. Dolan. Rural does matter: Understanding the rural context. pp. 37-54. IN: J.W. Bauer and E.M. Dolan, eds. *Rural Families and Work: Context and Problems*. Springer Science + Business Media, LLC, New York.

- Garkovich, L. Building solidarity and agency through a participatory visioning process. Chapter 7, pp. 113-134. IN: N. Walzer and G. Hamm, eds. *Community Visioning Programs: Processes and Outcomes*. Routledge, New York.
- Garkovich, L. A historical view of community development. Chapter 2, pp. 11-34. IN: J.D. Robinson and G.P. Green, eds. *Introduction to Community Development: Theory, Practice, and Service-Learning*. Sage Publications, Thousand Oaks, CA.
- Tanaka, K., M. Williams, K. Jacobsen, and M. Mullen. Sustainably growing farmers of the future: Undergraduate curriculum in sustainable agriculture at the University of Kentucky. Chapter 8, pp. 97-114. IN: K. Bartels and K. Parker, eds. *Teaching Sustainability and Teaching Sustainably in Higher Education*. Stylus Publishing, Sterling, VA.

Entomology

- Palli S.R., H. Bai, and J. Wigginton. Insect genomics. pp. 2-23. L.I. Gilbert, ed. IN: *Insect Molecular Biology and Biochemistry*. Academic Press, Waltham, MA.
- Volkoff A.-N., J.-M. Drezen, M. Cusson, and B.A. Webb. The organization of genes encoding ichnovirus structural proteins. pp. 33-46. IN: N.E. Beckage and J.-M. Drezen, eds. *Parasitoid Viruses*. Academic Press, Waltham, MA.

Family Sciences

Trejos-Castillo, E., and A.T. Vazsonyi. Transitions into adolescence. pp. 369-375. IN: B.B. Brown and M. Prinstein, eds. *Encyclopedia of Adolescence*, vol. 1. Academic Press, San Diego, CA.

Forestry

Barnes, T.G. *Finding and Photographing Kentucky Wildflowers*. Acclaim Press, Morley, MO.

Kentucky Tobacco Research and Development Center

Pattanaik, S., J.R. Werkman, and L. Yuan. Biomolecular fluorescence complementation as a tool to study interactions of regulatory proteins in plant protoplasts. pp. 185-193. IN: L. Yuan, and S. Perry, eds. *Plant Transcription Factors: Methods and Protocols*, vol. 754, *Methods in Molecular Biology*. Humana Press, New York.

Landscape Architecture

Brasier, K., B.D. Lee, R. Stedman, and J.L. Weigle. Local champions speak out: Pennsylvania's community watershed organizations. pp. 190-206. IN: L.W. Morton and S. Brown, eds. *The Citizen Effect: Multiple Pathways to Solving Watershed Problems*. Springer Publishing, New York.

Hargrove, R. The creative classroom: A model for developing creative students. pp. 47-55. IN: H. Blythe and C. Sweet, eds. *It Works for Me, Creatively: Shared Tips for the Classroom*. New Forums Press, Stillwater, OK.

Hargrove, R. Design thinking is creative thinking. pp. 27-31. IN: H. Blythe and C. Sweet, eds. *It Works for Me, Creatively: Shared Tips for the Classroom*. New Forums Press, Stillwater, OK.

Plant and Soil Sciences

Hildebrand, D. Lipid Biosynthesis. Chapter 2, pp. 25-62. IN: H. Ashihara, A. Crozier, and A. Komamine, eds. *Plant Metabolism and Biotechnology*. John Wiley & Sons, Ltd., West Sussex, UK.

Inglett, P.W., K.R. Reddy, W.G. Harris, and E.M. D'Angelo. Biogeochemistry of wetlands. Chapter 20, pp. 1-26. IN: P.M. Huang, Y.C. Li, and M.E. Sumner, eds. *Handbook of Soil Sciences*. Second Edition, CRC Press, Boca Raton, FL.

Kurepa, J., and J. Smalle. Assaying transcription factor stability. Chapter 12, pp. 219-234. IN: L. Yuan and S.E. Perry, eds. *Plant Transcription Factors: Methods and Protocols*, vol. 754. In *Methods in Molecular Biology* (J.M. Walker, series ed.), Humana Press, New York.

Wendroth, O., E.L. Ritchey, S. Nambuthiri, J.H. Grove, and R.C. Pearce. Spatial variability of soil physical properties. pp. 827-839. IN: J. Gliński, J. Horabik, and J. Lipiec, eds. *Encyclopedia of Agrophysics*. Springer, Heidelberg, Germany.

Wendroth, O., K.C. Kersebaum, G. Schwab, and L. Murdock. Spatial relationships of soil properties, crop indices and N application pattern with wheat growth and yield in a field. Chapter 8, pp. 229-259. IN: *Methods of Introducing System Models in Field Research*, vol. 2. in the Advances in Agricultural System Modeling Series. L. Ahuja and L. Ma, eds. ASA-SSSA-CSSA, Madison, WI.

Wendroth, O., S. Koszinski, and V. Vasquez. Soil spatial variability. Part I, Chapter 10, pp. 1-25. IN: P.M. Huang, Y.C. Li, and M.E. Sumner, eds. *Handbook of Soil Sciences*. Second Edition. CRC Press, Boca Raton, FL.

Werkman, J.R., S. Pattanaik, and L. Yuan.

Directed evolution through DNA shuffling for the improvement and understanding of genes and promoters. Chapter 19, pp. 325-342. IN: L. Yuan and S.E. Perry, eds. *Plant Transcription Factors: Methods and Protocols*, vol. 54. In *Methods in Molecular Biology* (J.M. Walker, series ed.), Humana Press, New York.

Yuan, L., and S.E. Perry, eds. *Plant Transcription Factors: Methods and Protocols*, vol. 754. IN: *Methods in Molecular Biology*, Humana Press (J.M. Walker, series ed.), New York.

Zheng, Y., and S.E. Perry. Chromatin immunoprecipitation to verify or to identify *in vivo* protein-DNA interactions. Chapter 16, pp. 277-291. IN: L. Yuan and S.E. Perry, eds., *Plant Transcription Factors: Methods and Protocols*, vol. 754. In *Methods in Molecular Biology*, Humana Press (J.M. Walker, series ed.), New York.

L. Yuan contributed to one book chapter for the *Kentucky Tobacco Research and Development Center*.

Plant Pathology

Florea, S., C. Machado, K. Andreeva, and C.L. Schardl. Elimination of marker genes from transformed filamentous fungi by unselected transient transfection with a Cre-expressing plasmid. pp. 146-149. IN: A.M. Pirttilä and S. Sorvari, eds. *Prospects and Applications for Plant-Associated Microbes. A Laboratory manual, Part B: Fungi*. Karhukopio OY, Turku, Finland.

Florea, S., C. Machado, K. Andreeva, and C.L. Schardl. Elimination of resistance markers from fungi. pp. 279-281. IN: A.M. Pirttilä and S. Sorvari, eds. *Prospects and Applications for Plant-Associated Microbes. A Laboratory Manual, Part B: Fungi*. Karhukopio OY, Turku, Finland.

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C. Tidona and G. Darai, eds. *The Springer Index of Viruses*. Second Edition. Springer Science+Business, Heidelberg, Germany.

Ghabrial, S.A. Partitivirus. pp. 1179-1184. IN:

C. Tidona and G. Darai, eds. *The Springer Index of Viruses*. Second Edition. Springer Science+Business, Heidelberg, Germany.

Ghabrial, S.A. Rhizidiovirus. pp. 2041-2043.

IN: C. Tidona and G. Darai, eds. *The Springer Index of Viruses*. Second Edition. Springer Science+Business, Heidelberg, Germany.

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Gaskill C.L. Basic treatment of poisoned horses. Section 2, pp. 804-806. IN: D. Wilson, ed. *The Veterinary Clinical Advisor: The Horse*. Saunders, St. Louis, MO.

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Veterinary Science

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Ball, B.A. Embryonic loss. Chapter 239, pp. 2327-2338. IN: A.O. McKinnon, E.L. Squires, W.E. Vaala, and D.D. Varner, eds. *Equine Reproduction*. Second Edition. Wiley-Blackwell, Chichester, West Sussex, UK.

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J.M. Unrine contributed to one article in *Horticulture*.

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Plant Pathology

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University of Kentucky Veterinary Diagnostic Laboratory

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- Carter, C.N. From the diagnostic laboratory, *Cattle Country News*, March.
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- Erol, E., L. Kennedy, S. Sells, S. Locke, J. Smith, N. Williams, and C. Carter. Antimicrobial susceptibility patterns of nocardioform bacteria causing placentitis in horses. *American Association of Veterinary Laboratory Diagnosticians (AAVLD) meeting*, Buffalo, NY.
- Gaskill, C.L. Common poisons in beef cattle. *University of Kentucky Agriculture and Natural Resources Update*, Winchester, KY, October. <http://www.ca.uky.edu/ANR/Agent%20Resources/2011%20Updates/Web%20Agendas%20EAST.htm>.

- Gaskill, C.L. Research update: Ocular fluid nitrate concentrations in aborted, stillborn, and newborn foals. *University of Kentucky Bluegrass Equine Digest*. November. Published online: <http://www2.ca.uky.edu/equine/bed>.
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- Gaskill, C.L. Toxin topic: Snakebite in horses. *University of Kentucky Bluegrass Equine Digest*. July. Published online: <http://www2.ca.uky.edu/equine/bed>.
- Gaskill, C.L. Treatment of poisoned horses: Basic principles. pp. 50-58. *Proceedings, Second Annual Kentucky Breeder's Short Course*, Lexington KY, January.
- Kennedy, L., N. Williams, E. Erol, S. Sells, J. Smith, and C. Carter. Nocardioform placentitis in horses. *American Association of Veterinary Laboratory Diagnosticians (AAVLD) meeting*, Buffalo, NY.

Veterinary Science

- Adams, A.A. Weaning stress and nutritional influences. *The Horse*, Sept. 14. <http://www.thehorse.com/ViewArticle.aspx?ID=18822>.
- Bailey, E. Screening for foal immunodeficiency syndrome. *Veterinary Record* 169(25):653-654.
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- Tobin, T., and K. Brewer. Lasix and bleeders: A classic American horsemen's story. *The Horsemen's Journal*, winter issue. <http://www.hbpa.org/Horsemen'sJournalDisplay.asp?section=9&key1=13886>.

Graduate Degrees

Degrees listed are from the 2011 Spring Semester, 2011 Second Summer Session, and 2011 Fall Semester.

Ph.D. Dissertations

Agricultural Economics

Burdine, Kenneth Holton. Factors affecting feeder cattle prices in the Southeast.

Wang, Xin. Using linked household-level datasets to explain consumer response to BSE in Canada.

Animal and Food Sciences

Barding, Erin. The recovery of the river otter (*Lontra canadensis*) in Kentucky: Status, distribution, diet, reproductive characteristics and management of a reintroduced species.

Earing, Jennifer. Comparison of digestive function in young and mature horses.

Godoy, Maria. Fish oil and barley supplementation in diets for adult dogs: Effects on lipid and protein metabolism, nutrient digestibility, fecal quality, and postprandial glycemia.

Harris, Hannah. The return of the black bear to eastern Kentucky: Conflict and tolerance between people and wildlife.

Hudson, Melissa. The effects of nutritionally-modulated parturition BCS on pre- and postpartum metabolic responses, *in vitro* lipid metabolism and performance of multiparous beef cows.

Joseph, Poulson. Proteomics of color phenomena in red meats and poultry.

Kitts, Beth. Effects of adipogenic compounds on growth performance, hormonal status and fat deposition in finishing beef steers.

Liebold, Chris. Characterization of long-lived radicals in soy protein.

Ma, Yulin. Evaluation of the effects of organic minerals in growing pigs and in nutrient changes in fetal and maternal tissues.

Wagner, Ashley. Factors affecting skeletal muscle protein synthesis in the horse.

Biosystems and Agricultural Engineering

Adotey, Bless. Mathematical modeling of *Clostridium thermocellum*'s metabolic responses to environmental perturbation.

Entomology

Bixby-Brosi, Andrea. Biological control of a grass-feeding caterpillar and endophyte-mediated tritrophic interactions in turfgrass.

Colvin, Sarah M. Tritrophic effects of milkweed species on natural enemies of *Aphis nerii*.

Keathley, Craig. Insect response to modified forage grasses and implications for pasture sustainability.

Suh, Eunho. Characterization of *Wolbachia* and its interaction in host mosquitoes.

Family Sciences

Bradley, Linda A. Inter-generational and intra-generational analysis of the interactions between financial socialization, family composition, and financial outcomes.

Shipley, Ahlshia J. A lesson learned: Intimate relationship experiences among black collegiate women.

Horticulture

Harris, Darby. Molecular and chemical dissection of plant cellulose synthesis.

Plant and Soil Sciences

Aqueel, Abdullah. Using manual defoliation to simulate soybean rust: Effect on growth and yield formation.

Dampanaboina, Lavanya. Functional characterization of WD repeat proteins, AtCstF50 and AtFY in cleavage and polyadenylation.

Hall, Sarah. Restoration of tall fescue pastures to native warm season grasslands: Does a fungal endophyte symbiosis play a role in restoration success?

King, Brian. T-phylloplanin and cis-abienol, two natural products from tobacco have broad spectrum, anti-fungal activities.

Niehaus, Thomas. Elucidating the biochemical wizardry of triterpene metabolism in *Botryococcus braunii*.

Zheng, Yumei. Gene regulatory networks controlled by AGL15 in Arabidopsis embryogenesis and flowering initiation.

Plant Pathology

Bec, Sladana. Role of the sexual cycle in development of genotypic and phenotypic diversity in *Gibberella zeae*.

Faulkner, Jerome R. Intermediate steps of loline alkaloid biosynthesis.

Feliciano-Rivera, Merari. Efficacy of organically certifiable materials and natural compounds against foliar hemibiotrophic and necrotrophic fungi in cantaloupe and tomato.

Jeong, Rae-Dong. Molecular genetic and biochemical characterization of resistance protein-mediated signaling against turnip crinkle virus.

Martin, Kathleen M. Comparison of plant-adapted rhabdovirus protein localization and interactions.

Pathak, Kunj B. Characterization of viral and host proteins and RNA elements in tombusvirus replication.

Sharma, Monika. Role of lipids in tombusvirus replication.

Veterinary Science

Coleman, Stephen J. Analysis of the equine transcriptome by mRNA sequencing.

Cosden, Rebekah. *Amblystoma mexicanum*: A novel vertebrate model for diarthrodial joint development and articular cartilage repair.

Even, Deborah. Genetic immunization in the horse: the potential for enhanced immune responses with deacylated polyethyleneimine (pei) and immunostimulatory cytokines as vaccine adjuvants.

Go, Yun Young. Molecular and genomic approaches to understanding host-virus interactions in shaping the outcome of equine arteritis virus infection.

Zhang, Llang. Differential innate immune responses dictate the contrasting pathogenicity of the equine H7n7 influenza virus demonstrated in Balb/C mice and horses.

M.S. Theses

Agricultural Economics

Fernandes da Costa, Pedro Miguel. Participants in agricultural governmental cost share programs in the Kentucky River Watershed.

He, Xiao. Factors affecting rural Kentucky patients' hospital choice and bypass behavior.

Jeffcoat, Christopher David. Broadband Internet's impact on Kentucky agriculture.

Joo, Hyun-Jeong. Comparative analysis of rural and urban start-up entrepreneurs.

Kibler, Michelle Leigh. Using self-reported behavioral choices to explain health care costs at the University of Kentucky.

Pelton, Marie Elise. Rider preferences for and economic values of equestrian trail characteristics.

Poerwanto, Devie Allastoety. Consumer preferences and willingness to pay for fish quality characteristics: A comparison across species.

Wixson, Sarah Elizabeth. Price asymmetric relationships in the commodity and energy markets.

Zheng, Zijuan. World production and trade of pistachios: The role of the U.S. and factors affecting the export demand of U.S. pistachios.

In addition, two non-thesis master's degrees were awarded in calendar year 2011.

Animal and Food Sciences

Cetin Karaca, Hayriye. Evaluation of natural antimicrobial phenolic compounds against foodborne pathogens.

Jackson, Josh. Duration of grazing high versus low endophyte (*Neotyphodium coenophialum*)-infected tall fescue by growing steers differentially affects blood concentrations of prolactin, enzymes, and metabolites.

Liu, Changqi. Variations in the cross-linking pattern of chicken white and red muscle myofibrillar proteins induced by oxidative stress or microbial transglutaminase.

Martin, Sarah. Dietary effects of histidine, magnesium, dietary cation anion balance, and cranberry pomace on histamine kinetics and urine acidity in the domestic feline.

McCown, Shawna. Voluntary intake in gestating and lactating mares.

Simpson, Melinda. Use of copper sulfate to control *Haemonchus contortus* infestation in Hampshire ewes.

Zimmer, Rachel. Adaptation of lambs to an endophyte-infected tall fescue seed diet.

Biosystems and Agricultural Engineering

Cassidy, Keelin. Evaluating algal growth in different temperatures.

Dutra de Melo, Lucas. Moisture control methodology for gas phase compost biofilters.

Ferreira, Tatiana Gravena. Optimization of coagulation and syneresis processes in cheesemaking using a light backscatter sensor technology.

Morello, Gabriela Munhoz. Influence of fan operation on fan assessment numeration system (FANS) test results.
 Sperry, Robert G. Development of a semi-automated tobacco stripping machine utilizing string trimmers.

In addition, one non-thesis master's degree was awarded in calendar year 2011.

Community and Leadership Development

Anderson, Matthew. Stressors identified by agricultural education student teachers.
 Barbor, Jeremy. Exploring coaching philosophies and coaching strategies within collegiate livestock judging programs.
 Hollaway, Jillian. Student engagement and alumni involvement.
 Horseman, Allison. The effects of new media on alumni engagement among millennials: A case study of the University of Kentucky health sciences alumni.
 Ison, Robert. Curriculum and teaching methods for a graduate course in conflict analysis and resolution.
 Mullins, Jessica. Character education and 4-H Youth Development.
 Smith, Brittany. Examining administrators' disciplinary philosophies: A conceptual model.
 Yang, Chou C. A comparison of leadership traits across countries: Taiwan and United States.

In addition, three non-thesis master's degrees were awarded in calendar year 2011.

Entomology

One non-thesis master's degree was awarded in calendar year 2011.

Family Sciences

Blackburn, Kristyn M. The effect of client self-disclosure on the physiological arousal of the therapist.
 Compton, Laura. Knowledge and acknowledgement of posttraumatic stress disorder and effects on military couples.
 Flannery, Sarah M. An evaluation of "The Home is Where the Health Is" Project.
 Rorer, A. Resiliency in black father-son relationships.
 Shalash, F. Sibling conflict resolution styles and marital conflict resolution styles.
 Smith, Lauren. A qualitative inquiry into understanding the experience of wilderness family therapists.

Forestry

Wilson, Heather. Establishment of the invasive plant Amur honeysuckle in remnant Bluegrass forests.

Merchandising, Apparel, and Textiles

Ferrell, Erika. Consumer's motivation for purchasing fair trade clothing.
 Lucas, Carly. How and why Generation Y and Baby Boomer consumers use fashion brands' social media.
 Trenkamp, Stacy. Post-use analysis of fire fighter turnout gear: Phase II.

In addition, two non-thesis master's degrees were awarded in calendar year 2011.

Nutrition and Food Science

Arnette, Alicia. Chronic health conditions of individuals in public housing.
 Boyee, Jennifer. Practice and application of knowledge by nutrition students.
 Hagan, Kara. Breast cancer among Kentucky women, 2004-2007.
 Patel, Sheena. Healthy Mondays: Evaluation of behavior changes.
 Pruett, Phil. Evaluation of the built environment in Kentucky.
 Voon-Wong, Feai. Intelligence quotient and emotional intelligence: Which determines eating pattern and body weight?

In addition, one non-thesis master's degree was awarded in calendar year 2011.

Plant and Soil Sciences

Burton, Cody. Effects of long-term cattle grazing and vegetation type on soil microbial communities in dryland systems.
 Lewis, Ricky. ZN responses in *Medicago truncatula*: A study of miRNA expression, root growth, metal uptake and nodulation in *M. truncatula* WT and RAZ (requires additional ZN).
 Neal, Beau. Nozzle type and arrangement alternatives for improved application of suckercides in burley tobacco.
 Owens III, Herbert Troye. Beef cattle grazing preference of tall fescue as affected by endophyte.
 Schwer, Laura. Small mammal populations in switchgrass stands managed for biomass production compared to hay and corn fields in Kentucky.
 Simson, Matthew. Conceptualizing and improving red wine grape cultivars grown in Kentucky.
 Vasquez, Vicente. Field scale bromide transport as a function of precipitation amount, intensity and application time delay.

Veterinary Science

McGee, Rose B. Investigations into disorders of sex development in horses: Molecular studies of SRY.

Graduate Enrollment			
	2010	2011	Net Change
Agricultural Economics			
Master's	24	21	-3
Doctorate	23	28	5
Major Total	47	49	2
Animal and Food Sciences			
Master's	24	26	2
Doctorate	28	22	-6
Major Total	52	48	-4
Biosystems and Agricultural Engineering			
Master's	18	22	4
Doctorate	10	9	-1
Major Total	28	31	3
Entomology			
Master's	6	14	8
Doctorate	23	26	3
Major Total	29	40	11
Family Sciences			
Master's	20	20	0
Doctorate	19	21	2
Major Total	39	41	2
Forestry			
Master's	16	17	1
Doctorate*			
Major Total	16	17	1
Merchandising, Apparel, and Textiles			
Master's	11	10	-1
Doctorate*			
Major Total	11	10	-1
Nutrition and Food Science			
Master's	24	20	-4
Doctorate*			
Major Total	24	20	-4
Plant Pathology			
Master's	0	0	0
Doctorate	20	20	0
Major Total	20	20	0
Plant and Soil Sciences/Horticulture			
Master's	23	26	3
Doctorate	43	51	8
Major Total	66	77	11
Rural Sociology/Career, Technology, and Leadership Education			
Master's	35	33	-2
Doctorate	9	10	1
Major Total	44	43	-1
Veterinary Science			
Master's	10	12	2
Doctorate	21	21	0
Major Total	31	33	2
Grand Total			
	407	429	22

*Degree type not offered.

Note: Graduate enrollment data are from the UK Office of Institutional Research
<http://www.uky.edu/IR/student.html>

Financial Statement

Statement of Current General Fund Income and Expenditures

Fiscal Year 2011

Income	
Federal Funds	
Hatch	4,305,968
Hatch Multi-State	864,263
McIntire-Stennis	549,877
Animal Health	48,863
Total Federal Funds	5,768,972
State Funds	
Total State Funds	28,956,539
Total Funds	34,725,511

Expenditures	Federal	State	Total
Personal Services	4,809,821	23,501,226.57	28,311,048
Travel	115,341	478,885.07	594,226
Other Operating Expenses	728,276	4,617,293.39	5,345,570
Equipment	115,534	359,133.97	474,668
Total Expenditures	5,768,972	28,956,539	34,725,511

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Departments

Following are departmental faculty and leadership lists for calendar year 2011. (R) denotes Experiment Station appointment.

Agricultural Communications

Skillman, L.M., Director

Agricultural Economics

Maynard, L.J., Professor and Chair (R)
Batte, M.T., Part-time Research Professor
Brown, R., Senior Lecturer
Chambers, O., Adjunct Assistant Professor
Dasgupta, S., Adjunct Assistant Professor
Davis, A., Associate Extension Professor (R)
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
Katchova, A., Assistant Professor (R)
Kusunose, Y., Assistant Professor (R)
Meyer, A.L., Extension Professor
Pagoulatos, A., Professor (R)
Pushkarskaya, H.N., Assistant Professor (R)
Reed, M.R., Professor (R)
Robbins, L., 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.G., Assistant Extension Professor
Williamson, L., Extension Professor
Woods, T.A., 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., Extension Associate Professor
Andries, K.M., Adjunct Assistant Professor
Bewley, J.M., Assistant Extension Professor
Boatright, W.L., Professor (R)
Boling, J.A., Professor (R)
Bridges, P.J., Assistant 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)
Lehmkuhler, 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., Associate Extension 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)
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

Nokes, S.E., Professor and Chair (R)
Agouridis, C.T., Assistant Professor (R)
Byers, M.E., Adjunct Assistant Professor (R)
Castillo, M., Adjunct Associate Professor (R)
Colliver, D.G., Professor (R)
Crofcheck, C.L., Associate Professor (R)
Duncan, G.A., Extension Professor Emeritus
Edwards, D.R., Professor (R)
Fehr, R.L., Extension Professor Emeritus
Gates, R.S., Adjunct Professor (R)
McNeill, S.G., Associate Extension Professor
Montross, M.D., Associate Professor (R)
Overhults, D.G., Extension Professor
Payne, F.A., Professor (R)
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Shearer, S.A., Professor Emeritus (R)
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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
Workman, S.R., Professor and Assistant Dean for Research

Community and Leadership Development

Hansen, G., Extension Professor and Chair (R)
Dyk, P., Associate Professor (R)
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Hustedde, R., Extension Professor
Jones, K., Associate Extension Professor (R)
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Ricketts, K., Assistant Extension Professor
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Witham, D., Professor
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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.E., Professor (R)
Johnson, D.W., Extension Professor
Palli, S.R., Professor (R)
Potter, D.A., Professor (R)
Potter, M.F., Extension Professor
Rieske-Kimney, 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)
Yeagan, K.V., Professor (R)
Xuqiao, Z., Assistant Professor (R)

Environmental and Natural Resource Initiative

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

Family Sciences

Werner-Wilson, R.J., Professor and Chair (R)
Brock, G.W., Professor Emeritus
Flashman, R., Extension Professor
Haleman, D., Lecturer
Hans, J., Associate Professor and Director of Graduate Studies (R)
Heath, C.J., Professor (R)
Hosier, A., Assistant Extension Professor
Hunter, J.L., Assistant Extension Professor
Kim, H., Associate Professor (R)
Parker, T.S., Assistant Professor (R)

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Vail, A., Professor, Director of the School of Human Environmental Sciences and Assistant Director of Family and Consumer Sciences Extension (R)
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Stringer, J.W., Extension Professor
Wagner, D.B., Associate Professor

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Antonious, G., Adjunct Assistant Professor
Archbold, D.D., Professor (R)
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Coolong, T.W., Assistant Extension Professor
DeBolt, S., Associate Professor (R)
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Geneve, R.L., Professor (R)
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Pomper, K., Adjunct Associate Professor
Rowell, A.B., Adjunct Professor
Schnelle, R.A., Assistant Extension Professor
Snyder, J.C., Associate Professor (R)
Strang, J.G., Extension Professor
Williams, M.A., Associate Professor (R)

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Jack, A., Research Specialist
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Mundell, R., Scientist II
Pattanaik, S., Scientist II
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
Segura, A.C., Lecturer

Merchandising, Apparel, and Textiles

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

Nutrition and Food Science

Bastin, S.S., Extension Professor and Interim Chair
Adams, I.K., Assistant Extension Professor
Addo, K., Associate Professor (R)
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Cook-Newell, M.E., Lecturer
Forsythe, H.W., Associate Professor (R)
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Gustafson, A., Assistant Professor (R)
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Perry, S.D., Lecturer
Stephenson, T.J., Senior Lecturer
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Phillips, T.D., Associate Professor (R)

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Xu, D., Adjunct Assistant Professor (R)
Zhu, H., Associate Professor (R)

Plant Pathology

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Ghabrial, S.A., Professor
Goodin, M.M., Associate Professor (R)
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Kachroo, P., Associate Professor (R)
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Smith, D.A., Professor (R)
Vaillancourt, L.J., Professor (R)
Vincelli, P.C., Extension Professor
Ward, N.A., Assistant Extension Professor

Regulatory Services

Thom, W.O., Director and Professor
Barrow, M.C., Inspector
Benge, T., IT Program
Bryant, M., Feed/Fertilizer Laboratory Coordinator
Coffey, D.S., Inspector
Flood, J.S., Inspector
Gaither, K., Systems Programmer
Hickerson, R.R., Inspector
Howe, P., Extension Associate, Sr.
Hunter, D., Soils Lab Supervisor
Johnston, C.B., Inspector
Kiser, R., Interim Milk Coordinator
Mason, D.W., Inspector
McMurry, S.W., Fertilizer Coordinator
Pinkston, W.W., Inspector
Prather, T.G., Inspector
Shields, S., Systems Programmer
Sikora, F.J., Soil Testing Coordinator and Adjunct Associate Professor
Tillery, T., Seed Lab Supervisor
Tompkins, D., Feed/Fertilizer Lab Supervisor
True, J.A., Inspection Coordinator
Webb, S.F., Analytical Laboratory Coordinator
Young, W.B., Inspector

Robinson Center for Appalachian Resources and Sustainability

Ditsch, D., Director

Sustainable Agriculture and Food Systems Working Group

Meyer, A.L., Working Group Chair
Perry, R.R., Project Manager

UK Ag Equine Programs

Squires, E., 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

UK Research and Education Center at Princeton

Murdock, L., Director
Williams, J., Farm Superintendent

UK Veterinary Diagnostic Laboratory

Carter, C.N., Professor and Director (R)
Arnold, L.M., Ruminant Extension Veterinarian
Bryant, U.K., Assistant Professor
Bolin, D.C., Associate Professor
Cassone, L.M.C., Assistant Professor
Coyle, K., Laboratory Animal Pathology Service
Donahue, J.M., Professor
Erol E., Head, Diagnostic Microbiology
Gaskill, C.L., Associate Professor
Hong, C.B., Professor
Jackson, C.B., Associate Professor
Loynachan, A.T., Assistant Professor
Kennedy, L.A., Assistant Professor
Vickers, M.L., Associate Professor
Williams, D.M., Head, Diagnostic Services
Williams, N.M., Professor and Associate Director

Veterinary Science

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Artushin, S.C., Assistant Professor (R)
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