2013
Department of Horticulture
Periodic Program Review

Submitted August 2013

Self Study

Checklist for Administrative and/or Non-degree Granting Units

Internal Self-Study

Background: The self-study document is the primary resource used by the external review team to complete the 2nd phase of the program review process. The better the quality of the self-study the more likely the work of the review team will be productive and yield helpful feedback for the unit.

This checklist is provided as a guideline for items to include in self-study documents. It is intended to be useful to the full range of programs that undergo review on our campus. Further, it reflects the required elements identified in the 2006 revision of AR II-1-0-6 (http://www.uky.edu/Regs/AR/ar027.pdf).

This checklist will also be used to identify elements of accreditation reports that are acceptable substitutions for required elements of the self-study.

Submitted for:

Unit Name: Horticulture

By: Robert L. Houtz, Chair

Date: February 16, 2013

Year of Program Review: 2012-2013

Name of Accreditation Agency: (if applicable) _____

List or describe documents available for review: see below

	Included (✓ or NA)	Page(s)	Other Comments
Executive summary	√	6-9	
• Brief account of self-study process	√	6	
• Committee composition names and affiliation	√	6	
• List of major recommendations	√	9	
Written Summary Report *This narrative report must describe, analyze and synthesize information about the unit. The report should include the components detailed below. Some documents may be tabled features within the text. Others may be featured as appendices. An electronic version of the report and supporting documentation is required for archival purposes.*	√	9-26	
Program Documents	√	9-10	
• Strategic plan	√	9-10	
I. Mission Statement	√	10	
➢ Service Support	√	10-13	
➢ Instructional Support	√	10-13	
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II. Goals/Objectives	√	10-13	
III. Criteria for measuring progress	√	10-13	
• Organization chart/Structure	√	13	
• Annual reports (SPRS or other) since the last Self-Study (List years of any missing reports:_____)	√	13	
Resources	**√**	13-16	
• **Budget** summary information & adequacy	√	13-14	

• **Facilities** summary information & adequacy	√	14-15	
• **Equipment** summary information & adequacy	√	15	
• **Personnel** summary information & adequacy (including faculty & staff numbers & demographics)	√	15	
• **Support** from other university units essential to effective operations (e.g. research, engagement, development, alumni affairs, human resources, facilities management, financial units, and information technology)	√	16	
Input from Affected Constituents	**√**	16	
• Evaluation data from **staff**	NA		
• Evaluation data from **faculty**	NA		
Adherence to Policies and Procedures	**√**	16-17	
• Evidence of adherence to procedures on personnel actions and budget request preparation (established jointly by the unit and the unit head)	√	16-17	
Evaluation of Quality and Productivity	**√**	17-22	
• Quality of collegial environment (include climate for equity and diversity)	√	17	
• Quality & productivity in public service, operations, instruction, or research	√	17-21	
• Quality of unit employees, communications and interactions	√	21	
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Analysis of Strengths and Recommendations for Quality Enhancement	**√**	22	
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Executive Summary

Self-Study Process

Materials for the present document were compiled from a variety of sources and organized according to University of Kentucky Periodic Program Review Self-Study Report Checklist. These resources included:

- Recently completed Department of Horticulture strategic plan;
- Adoption of a mission statement based on faculty interests;
- Budget information from IRIS/SAP;
- Curriculum materials;
- Departmental Annual Reports

Committee Member Names and Affiliations

Self-Study members:

Dr. Mark A. Williams, Associate Professor, Department of Horticulture, UK
Dr. Douglas D. Archbold, Professor, Department of Horticulture, UK
Dr. John G. Strang, Professor, Department of Horticulture, UK

Members of the review team:

Ned Crankshaw, Chair, Landscape Architecture, UK
Dr. Nancy Creamer, NC State University, Center for Environmental Farming Systems
Dr. Danielle Treadwell, University of Florida, Department of Horticulture
Dr. Timothy W. Coolong, Department of Horticulture, UK
Dr. Ric T. Besson, Department of Entomology, UK
Ms. Meera Nair, Graduate student, Plant Physiology/IPSS Program
Mr. Larry Brandenburg, President of OAK (Organic Association of Kentucky)

Overview of Progress Since Last Self-Study

The last Departmental Self-Study was in 2004-2005 which generated ten summary recommendations from the periodic review team (complete report attached as Appendix I). Progress on each of these recommendations is addressed below.

1. Develop a strategic plan for maintaining its traditionally strong undergraduate program, in view of the retirement of key faculty.

The department developed a new strategic plan designed to re-analyze the skills, knowledge and abilities desired in a horticulturist, and to revise the curriculum to maximize faculty impact (Objective 4). The target was to submit a revised curriculum to the college by 2009. There was little progress on this

recommendation.

2. Review the Graduate Program's policies and procedures to develop a graduate student community and greater departmental affinity.

A committee made up of faculty members from Plant and Soil Sciences (2) and Horticulture (1) developed a new umbrella graduate program called the Integrated Plant and Soil Sciences (IPSS, http://www.ca.uky.edu/pss/internal/archive/IPSS_Prog_2010_04_02.pdf) graduate program. The objectives of this program were to build strength in the currently existing graduate M.S. and Ph.D. programs in Crop Science, Plant Physiology, Molecular Biology and Biochemistry, Horticulture, and Soil Science by combining these programs into an overall integrated graduate program. The integrated program offers many advantages in student training, recruitment, program student numbers, and efficiency in administration. The program also provides unique opportunities to cultivate and exploit the benefits that can be derived from an interdisciplinary approach to graduate education and research, and significantly contributes to the culture and development of graduate students as future scholars. The program was officially implemented in the fall of 2011.

3. Future regular periodic reviews of Departments in which the Graduate Program is of a multidisciplinary nature should be at the programmatic level, not the unit level.

The current review will not address the IPSS graduate program, but will include an assessment of graduate education in the department from the perspective of graduate students whose major advisor is a faculty member in the department, and the assessment recently provided from the periodic review of the Plant and Soil Sciences Department.

4. Develop a team approach to all Horticulture-based Extension activities, including a means of providing good mentoring, and helping the Department decide how to fill positions.

Within the department there is a senior Extension Specialist (Dr. John Strang) who acts as the Extension Coordinator and provides the cohesiveness for a team approach in Extension related activities, planning, and input into filling new and/or existing positions in the department.

5. Find permanent funding for the Extension Associates, increase competitive grant efforts for Extension and applied research, and increase the quantity and quality of applied research to help solve Kentucky horticultural problems and publish research results to bring increased national recognition to the U.K. Horticulture department.

With help from college administration, the department created permanent funding for an Extension Associate (vegetables and small fruits) located at the UK Research and Education Center in Princeton, Kentucky. Additionally, an Extension Specialist in Viticulture was moved to permanent funding by college administration in recognition of the increasing importance of the wine and grape industry in the state. New faculty hires and newly developed programs in sustainable/organic production practices have significantly increased competitive funding for applied research and increased the quality of that research. The department developed a strategic plan specifically emphasizing a focus on sustainable/organic production practices in horticulture with an aim to achieve a national reputation in this area.

6. Broaden the concept of the New Crops Opportunity and Tobacco Settlement programs to fund such projects as an Extension Associate Master Gardener Coordinator and to support other departments impacted by these programs.

The concept for the New Crops Opportunity Center was broadened and the Center renamed the Crop Diversification & Biofuel Research & Education Center in 2009 (http://www.uky.edu/Ag/CDBREC/). However, in 2010 the center received its last grant (3 years), as ear-mark funding was terminated in Washington. Although the grant was instrumental in creating the beginnings of a biofuel center at the Horticulture Research Farm (HRF), further progress is on hold while efforts are being made to secure alternative funding for the center when funding runs out in June of 2013.

7. The College administration should work to obtain industry and political support for the proposed Horticulture Research and Education Center building.

With a great deal of help from college administration, a smaller version of the original Horticulture Research and Education Center building is in the final stages of completion. This building will serve the needs of extension, research, and teaching programs in the department and college.

8. Phased retirement and/or post-retirement appointments to three faculty members likely equates to net reduction in productivity and must not be allowed to delay re-filling of those positions. With three pending vacancies and a fourth retirement in the near future, the Department has an opportunity to restructure and reposition itself to better meet future challenges.

The department currently has three faculty vacancies, two of these have essentially no funds due to budget cuts and the other is temporarily on hold while funds are being used to support a two year commitment to a position in international sustainable horticulture. The department has a new policy with regard to filling faculty positions, based on the 2009 strategic plan, where all positions are open to faculty discussion with regard to DOE and area of emphasis. However, the department has been very successful in adding new positions, one in Sustainable Horticulture and another in Floral Design, both with the help of college administration.

9. With strong federal support for organic research and sustainable agriculture; the Department could become a leader in those areas with four new faculty hires. Developing a Center of Excellence for sustainable and organic agriculture, for example, would enhance the Department's national visibility and stimulate funding opportunities. Strengthening ties to the Human Nutrition and Food Systems Innovative Center (FSIC) and other food, diet and health-related initiatives also would be productive.

The department has done an outstanding job in satisfying this recommendation. A significant portion of the Horticulture Research Farm (HRF) has been certified for organic production (20 acres) and a viable Community Supported Agriculture (CSA) program was implemented that serves the entire University, as well as functioning as an educational platform for students in the newly developed Sustainable Agriculture undergraduate program (SAG). Additionally, the HRF has a 5 acre planting of biofuel crops and is widely recognized as the home of the Organic Farming Research and Education Unit.

10. The Chair, with faculty support, should work to instill a stronger sense of departmental

identity, shared vision, greater communication and common goals.

In 2009, there was a leadership change in the department. With faculty support, the current chair developed a new strategic plan designed to provide a clear goal of achieving national recognition in the area of sustainable/organic horticultural production practices. Special emphasis was placed on fostering and developing in young faculty members a sense of ownership in the department since they represent the future of the department.

Summary - Overall the department made outstanding progress at addressing the recommendations from the previous review, satisfying 90% of the review team's suggestions.

Major Recommendations

The present self-study identified the following challenges for the future of the department:

- Severe budgetary constraints that limit the ability to fill faculty positions, as well as provide adequate operating expenses.
- Unsustainable dependency on tobacco settlement funding through the Kentucky Department of Agriculture for essential extension related programs and farm operations support, as well as loss of funding for the Crop Diversification & Biofuel Research & Education Center.
- Consolidating departmental faculty in the Plant Science Building.
- Continued re-structuring of HRF facilities and management.

To address these challenges the following recommendations were identified:

- Increase the departmental budget.
- Leverage existing tobacco settlement funds towards identifying and securing sustainable long-term funding for essential extension related programs.
- Identify under-utilized office and laboratory space in the Plant Science building and lobby administration to move a significant portion (if not all) of the Horticulture Department.
- Develop a staged master plan for the HRF that will culminate with the completion of farm security, communication upgrades, management policies, and the development of new water resources.

Program Documents

Strategic Plan

Faculty in the Department of Horticulture adopted a comprehensive strategic plan during the 2009-2010

academic year associated with the following five mission areas identified in the University of Kentucky strategic plan (http://www.uky.edu/Provost/strategic_planning/plan.htm):

(1) Prepare students for a leading role in an innovation-driven economy and global society;

(2) Promote research and creative work to increase the intellectual, social, and economic capital of Kentucky and the world beyond its borders;

(3) Develop the human and physical resources of the department to achieve the Institution's Top 20 goals;

(4) Promote diversity and inclusion;

(5) Improve the quality of life for Kentuckians through outreach and service.

The complete departmental plan includes statements associated with each of the five goals that include a statement of the goal, challenges to achieving it, strategies for meeting it, and key indicators for assessment. Please see Appendix II for the complete plan.

Mission Statement

The mission of the Department of Horticulture is to provide research, educational, and instructional capabilities that demonstrate economically viable and sustainable production practices for Horticultural crops that can improve human health, nutrition, and well-being, while preserving the integrity of natural resources.

Vision Statement

It is the vision of the Department of Horticulture to become nationally recognized through our instructional, research, and extension programs in the area of sustainable/organic production practices for horticultural crops and biofuels research.

Goals, Strategies, and Key Indicators

***Goal 1*: Prepare Students for Leading Roles in an Innovation-driven Economy and Global Society.**

Strategies:

- Integrate the undergraduate Horticulture program with the interdisciplinary Sustainable Agriculture Program.
- Capitalize on graduate identity through the newly proposed Integrated Plant and Soil Science Program (IPSS).
- Maintain active participation in the Agricultural Biotechnology Program (ABT).

Key Indicators:

- Increase the number of undergraduate majors in Horticulture by 10% per year.

- Increase the number of faculty acting as advisors, research mentors, and instructors in the ABT program.

- Graduate M.S. and Ph.D. Horticulture students through the newly-implemented IPSS program and increase the number of graduates over a four year period on average by 10% per year.

***Goal 2*: Promote Research and Creative Work to Increase the Intellectual, Social and Economic Capital of Kentucky and the World Beyond its Borders.**

Strategies:

- Demonstrate the unique ability of horticultural research to provide information that serves the interest of all Kentuckians as well as citizens of the world by providing sustainable, economically profitable, healthy, and environmentally responsible information.

- Position the Department of Horticulture as one of the top three departments in the College of Agriculture by doubling the number of research publications, collective journal impact factor, competitive extramural funding, and patents by 2014.

Key Indicators (all on the basis of research FTE):

- Increase the number of competitive grant submissions by 25% per year.

- Increase the number of research publications by 25% per year.

- Increase the collective journal impact factor for total departmental research publications by 25% per year.

- Increase the number of provisional and awarded patents by 25% per year.

***Goal 3*: Develop the Human and Physical Resources of the College to Achieve Top 20 Stature.**

Strategies:

- Develop and implement plans and justification for increasing the number of faculty in the department.

- Establish plans to unify Horticulture faculty and staff in Lexington at one location.

- Foster an atmosphere of collective creativity and a community of scholars among Faculty and Staff.

- Position the Horticulture Research Farm (HRF) as a nationally recognized center of excellence for research and education in sustainable/organic production practices and environmentally sustainable infrastructure.

Key Indicators:

- Fill two vacant faculty positions by 2014.
- Identify opportunities for research and office space so the department can move towards unification.
- Secure on average over the next 4 years at least two national/international recognition awards for faculty each year.
- Increase technical and support staff by hiring 4 new positions.
- Reduce the reliance of the HRF on natural gas and city water by 20% per year utilizing natural supplies of water and biofuel derived heating sources.

***Goal 4*: Promote Diversity and Inclusion.**

Strategies:

- Develop and implement plans that emphasize the value and significance of diversity.
- Target new faculty and staff hires, as well as student recruitment, toward under-represented groups.
- Establish community and campus collaborations with diverse groups and organizations which foster inclusivity among and between under-represented groups.

Key Indicators:

- Increase the proportion of faculty, staff, and students from under-represented groups.
- Contribute to the employment goals of UK's annual Affirmative Action Plan.
- Increase the number of collaborations with organizations whose missions and goals promote diversity and inclusion.

***Goal 5*: Improve the Quality of Life of Kentuckians through Engagement, Outreach and Service.**

Strategies:

- Develop new and innovative mechanisms for the transfer of research based educational information to stakeholders and citizens of the Commonwealth.
- Facilitate the integration of research and extension faculty programs towards increased competitiveness for new funding opportunities.
- Develop and implement new extension programs designed to demonstrate viable sustainable/organic production practices for Kentucky growers.

Key Indicators:

- Capitalize on new technologies for communication with stakeholders and citizens of the Commonwealth by using eXtension, YouTube, and enhanced Web effectiveness.
- Increase the number of competitive federal and state grants awarded to faculty integrating extension, research, and educational programs.
- Increase the number of extension FTE's devoted to sustainable/organic production systems across all horticultural commodities.

Organizational Chart/Structure

The College of Agriculture organizational chart can be found in Appendix III. Dr. Robert L. Houtz, Chair of the Department of Horticulture, reports to Dean M. Scott Smith. Currently, Robert Geneve serves as the representative for Undergraduate Studies in Horticulture through the Department of Plant and Soil Sciences. The department includes two administrative support staff: Kathleen Scahill and Pam Compton, and two staff support associates, Monica Shuler and Karen Shahan.

Annual reports since the last Self-Study

The most recent Annual Progress Reports for 2009, 2010, 2011and the most recent implementation plan can be found in Appendix IV.

Annual Review Reports from 2005-2008 can be found in Appendix V

Resources

Budget

The following table summarizes the Department of Horticulture budget and budget reductions for FY 2009-2013:

Fiscal year	Base	% reduction	Amount
2009	$2.428M	7.25	$176,035
2010	$2.299M	1.4	$32,188
2011	$2.282M	1	$22,824
2012	$2.413M	4.5	$109,353
2013	$2.492M	5.9	$147,823

Although the department has suffered recurring budget reductions, these have been accommodated using salary savings from open faculty and staff positions. In 2009, one open faculty position was lost (Extension Nursery Crops). However, there have been additions to the departmental budget to salary savings from open Faculty/Staff positions. Increases in budget include start-up funds for a new assistant professor (Krista Jacobsen), a lecturer position in Floral Design (Ms. Ruth Scott), an extension associate

position in small fruits and vegetables, and an extension specialist in viticulture. So, although, our budget has remained flat or even decreased in some years we have had outstanding support from higher college administration to move forward in selected targeted areas.

The department is also the recipient of significant sources of outside funding. Competitive research based funding is identified below in the section under Evidence of Quality and Productivity in Instruction, Research, Public Service, or Operations, subsection Research. However, for many years now the department has been the recipient of significant funds from the Kentucky Agricultural Development Board (http://agpolicy.ky.gov/board/index.shtml) by the 2000 Kentucky General Assembly to distribute state monies received from the Master Tobacco Settlement Agreement. The two programs within the department that have been funded through this program have been the cross-commodity, on-farm demonstration and consultation program funded through the Kentucky Horticulture Council (KHC, http://kyhorticulture.org/) under the leadership of Dr. Dewayne Ingram, and the viticulture and enology program through the Kentucky Vineyard Society (KVS, http://kyvineyardsociety.org/) under the leadership of Ms. Patsy Wilson. Together these awards fund 6 extension associates, 2 research technicians, and 1 senior extension specialist. The most recent of these awards were $515,000 to the viticulture and enology program (2013-2014), and $1,325,000 to the on-farm demonstration and consultation program (2013-2014). Collectively these funds are nearly equal to the department's entire state and federal budget and provide absolutely critical support for our ability to meet the ever increasing need of the horticultural industries in the state.

Facilities

Office Space

Currently, office space is available for all Horticulture faculty members, graduate students, post-docs, and extension associates. Four offices are located on the fourth floor in the Plant Science building (3 faculty and one research specialist) with the remaining offices located on the third floor of Ag. Sciences North. The offices located in Plant Science are relatively new and in excellent condition while the offices in Ag. Sciences North are much older and often plagued by heating, cooling, and ventilation issues.

Laboratory Space

Laboratory-oriented research programs are also divided between the Plant Science and Ag. Sciences North buildings. Three Horticulture laboratories on the fourth floor of Plant Science are modern, well-equipped, and represent targeted research in plant biochemistry and seed biology. In Ag. Sciences North, the department has six laboratories on the North side of the third floor representing research in the areas of fruit physiology and biochemistry, viticulture and enology, plant natural product chemistry, cellulose biochemistry and biofuel research, and plant soil endophytic interactions in organic production systems.

Field Space

The department operates its own Horticulture Research Farm (HRF) located approximately 6 miles from campus at the corner of Nicholasville Road and Man O War Blvd. The farm occupies approximately 100 acres with 25 acres certified for organic farming. The organic section is also home to the Community Supported Agriculture (CSA) program (http://www2.ca.uky.edu/sustainableag/csa). The CSA project is an integral component of the interdisciplinary Sustainable Agriculture (SAG,) Undergraduate Curriculum (http://www2.ca.uky.edu/sustainableag/). The CSA project links faculty, staff, and students from the UK

community with the Organic Farming Unit located at the UK Horticulture Research Farm. The CSA project is not a commercial farm and is not managed for profit. All financial proceeds from the sale of CSA shares support the production of food during the growing season and student educational activities of the SAG program. The farm is also used for conventional production practice research, variety trials, and biofuels research. The HRF is staffed by a full-time farm superintendent, farm manager, and two farm technicians.

The department also conducts field research at two other experiment station centers, the Research and Education Center at Princeton, KY (http://ces.ca.uky.edu/wkrec/) and the Robinson Center for Appalachian Resource Sustainability (RCARS, http://www2.ca.uky.edu/rcars/).

All of these field facilities are more than adequate for our field research programs.

Equipment

The College of Agriculture provides very generous start-up packages for new faculty that have helped faculty obtain the necessary equipment to complete their research and/or outreach activities. When necessary, departmental funds from salary savings have been used for either new equipment and/or equipment repair. Additionally, faculty members include budgeting in their competitive grant proposals for equipment with matches in funding often provided by college administration. Providing new computer for faculty and staff has been a high priority.

One of the more difficult equipment concerns is farm equipment, which is rarely fundable through competitive grants, but of absolute necessity for farm operations. As much of our farm equipment ages, the cumulative cost of repair is becoming unattainable. College administration has helped on several occasions with the purchase or lease of new equipment, but as operations expand at the HRF we will have to identify other sources to fund equipment purchases.

Personnel

The department has 14 faculty members (1 Lecturer, 1 Assistant Professor, 5 Associate Professors, 7 Full Professors) and 4 Extension Specialists (non-tenure track, which we treat as faculty members). The distribution of faculty effort for the department is 3 FTEs in Instruction, 5.25 FTEs in Research, 5.54 FTEs in Extension, and 0.25 FTEs in Special Assignment. We also have 3 adjunct faculty affiliated with Kentucky State University (1890 Land Grant). There are 24 support staff in the department divided between secretarial staff, farm staff, laboratory staff, and general support staff. There are 6 extension associates in the department each affiliated with a faculty supervisor, 9 graduate students and 4 post-doctoral scholars. A complete list of all personnel including their location, affiliation, primary responsibility, and immediate supervisor can be found in Appendix VI. There are currently 3 open positions in the department, 2 in extension (fruit and vegetable research in Western Kentucky, and Greenhouse Floriculture research at Lexington), and 1 in instruction/research for greenhouse management.

The vacant position in Floriculture is regarded as a critical position that should be filled as soon as possible. There is also an interest by research faculty to fill two positions, one related to organic sustainable production practices, and another in the general area plant biochemistry.

Support from Other University Units

The department enjoys outstanding support from several other university and college level units including:

- Proteomics core facility in Biochemistry (http://www.research.uky.edu/core/proteomics/)
- Arboretum (http://www.ca.uky.edu/arboretum/)
- Facilities Management (http://www.ca.uky.edu/fm/index.php?detectflash=false&)
- Ag Business Office (http://graham.ca.uky.edu/agbusoff/)
- Agricultural Communication Services (http://www.ca.uky.edu/agcomm/index.asp)
- Center for Applied Energy research (http://www.caer.uky.edu/)
- Office for Academic Programs, Associate Dean Dr. Larry Grabau
- Director of the Experiment Station and Associate Dean for Research, Dr. Nancy Cox
- Kentucky Cooperative Extension Service Office, Associate Dean Dr. Jimmy Henning

Input from Affected Constituents

Affected constituents for the Department of Horticulture include primarily commercial growers, county agents, undergraduate and graduate students, faculty, and staff. Commercial growers often communicate their satisfaction/dissatisfaction through local county agents, and the Kentucky Cooperative Extension Service routinely surveys county agents for feedback on extension specialists and associates in the Department of Horticulture. The results from the most recent survey can be found in Appendix VII and demonstrate that our extension faculty/staff are doing a superb job of providing the educational, research, and training needs for county agents and commercial growers within the state.

The department does not have its own undergraduate or graduate degree programs. Instead, there is a "Horticulture" option offered through the Department of Plant and Soil Sciences which is also home to the graduate degree programs used by our graduate faculty (IPSS and associated programs). A description of the two Horticulture undergraduate options and the course requirements can be found in Appendix VIII. Additional details about the undergraduate and graduate degree programs can be found on the Horticulture web site (http://www.uky.edu/Ag/Horticulture/), as well as the web site for Plant and Soil Sciences (http://www.ca.uky.edu/PSS/). Departmental faculty are also participants in two undergraduate interdisciplinary programs, Agricultural Biotechnology (ABT, http://www.uky.edu/Ag/Biotechnology/) and SAG (http://www2.ca.uky.edu/sustainableag/).

Adherence to Policies and Procedures

Evidence of Adherence to Educational Policies and Procedures

The Horticulture Department follows university and college procedures, as well as department guidelines associated with faculty governance. Several governance documents have been developed in recent years to provide greater clarity about governance issues, including documents that identify criteria for faculty evaluation, promotion, and tenure as required by University regulations. Examples are: evidences of

activity in instruction, research, and extension for tenure track faculty as well as lecturers; guidelines for two-year and four-year progress towards tenure reviews; and procedural steps within the department of Horticulture used during the promotion process. Complete copies of these documents can be found in Appendix IX.

Evidence of Adherence to Faculty Personnel Actions and Budget Request Preparation

The Department of Horticulture follows university (AR 3:5) and college procedures (http://www2.ca.uky.edu/deanadmin/faculty/searches), as well as department guidelines associated with advertising, interviewing, and evaluating candidates for employment. Briefly, these guidelines are designed to facilitate recruiting a diverse pool of candidates, to provide guidance in the selection of candidates, as well as rules for interviews and offers, and negotiations for start-up funds.

Evaluation of Quality and Productivity

Evidence of Quality of Collegial Environment

As a department, we continue to move towards a position of national leadership in organic and sustainable horticultural production practices and continue as a major player in the college for the undergraduate program in sustainable agriculture (SAG). We have basic research programs with national and international reputations particularly in the area of biofuels and cellulose metabolism. Our most productive young faculty members are taking active roles throughout the college and university and are shaping the future of the department. The department has had a significant increase in the number of competitive grant dollars and research publications per FTE in research, as well as an increase in the quality of publications over the past two years. These achievements are also indicative of the quality of our collegial environment. That is not to say, however, that we have not had significant and difficult transitions and re-structuring obstacles to overcome. Perhaps the most indicative observation that reflects on the collegiality in the department is how faculty and staff are explicitly united in a common purpose, such as the emphasis on sustainability, and respect each other's abilities to work toward that goal in teaching, research, and extension activities.

Evidence of Quality and Productivity in Instruction, Research, Public Service, or Operations

Instruction

Faculty in the department participate as instructors in two interdisciplinary programs, ABT and SAG, and the Horticulture degree option offered through the Department of Plant and Soil Sciences. Therefore, there are no composite teacher/course evaluations for the Department of Horticulture as a unit. However, it is fair to say that the ratings available for each of these programs/units also represent contributions from our instructional faculty. Individual faculty course ratings can be found in Appendix X where faculty CV's and teaching portfolios are located.

	ABT		SAG		PLS		College		University	
Semester	Course	Instruct	Course	Instruct	Course	Instruct	Course	Instruct	Course	Instruct
Fall 08	3.3	3.4	NA	NA	3.2	3.4	3.3	3.4	3.3	3.4
Spr 09	3.3	3.4	3.5	3.4	3.2	3.3	3.3	3.4	3.3	3.4
Fall 09	3.5	3.6	4.0	4.0	3.3	3.5	3.3	3.4	3.3	3.4
Spr 10	3.3	3.5	3.6	3.8	3.3	3.4	3.4	3.4	3.3	3.4
Fall 10	3.4	3.5	3.7	3.9	3.5	3.6	3.4	3.5	3.3	3.4
Spr 11	3.3	3.5	3.8	3.9	3.3	3.3	3.4	3.5	3.3	3.4
Fall 11	3.6	3.8	3.8	3.9	3.6	3.7	3.4	3.5	3.3	3.4
Spr 12	3.4	3.6	3.8	3.9	3.4	3.4	3.4	3.5	3.3	3.4

The values shown represent ratings of the course value (Course) and instructor quality (Instruct) on a scale of 1-4, 1 being poor, 2 fair, 3 good, and 4 excellent.

It is worth noting that two Horticulture faculty members have major teaching responsibilities in the SAG program and routinely receive individual course ratings of 3.9-4.0.

Overall, the values suggest that our teaching faculty members are recognized by students as quality instructors on par with college and university ratings and in some programs exceeding those ratings.

Additionally, faculty have received awards and recognition for their dedication to excellence in teaching as well as participation in teaching improvement programs. Some examples are:

- The creation of an undergraduate curriculum in Sustainable Agriculture (SAG) in the College of Agriculture by Dr. Mark Williams and funded by a USDA Higher Education Challenge Grant.
- Teachers Who Made a Difference award to Dr. Mark Williams from the College of Education at UK, 2012.
- Selection of Krista Jacobsen as a participant in the College of Agriculture Academy of Teaching and Learning Scholars program for the Spring 2010 semester.
- Development of a distance learning Graduate Certificate in Advance Horticulture by Dr. Robert Geneve in collaboration with AG*IDEA, an affiliate of the Great Plains IDEA consortium (http://www.gpidea.org/).
- Approval of PLS 240 (Introduction to Floral Design) for the U.K. Core curriculum through efforts of Ms. Ruth Scott.
- Approval of SAG 201 for the U.K. Core curriculum through efforts of Dr. Krista Jacobsen.

Research

Currently, horticulture in Kentucky, across the United States, and around the world is facing imminent environmental, water, and energy issues in our dynamic economy and climate. The problems facing horticulture today shape our research programs. At the University of Kentucky Department of Horticulture, we strive to tackle some of the world's major sustainability issues by providing state of the art research facilities and an on-farm research environment that allows research and the students performing it to thrive and prosper.

Our innovative research in areas such as cell wall synthesis, enzymology, genetics, sustainable/organic production practices, carbon and nitrogen cycling, seed and fruit biology are tightly integrated into our

teaching and outreach programs.

Scholarly productivity in research is measured by number of publications, quality of publications as indicated by journal impact factor, citation rate, and competitive grant dollars. These values are normalized across faculty FTE's in research to provide a ranking of the department within the college and provided in annual reports. Annual reports for the Department of Horticulture are provided in Appendix XI and the composite comparison with other departments in the college in Appendix XII. The data indicate that after a declining trend in competitive grant dollars that ended in 2009 at $131,169 there has been a steady increase to levels of $1-2M over the last three years. When competitive grant dollars are normalized to the number of research FTEs, Horticulture has consistently increased in college rankings against other departments in some years ranking 3rd and 4th in the college. In scholarly publications, Horticulture averaged 20-25 publications per year over the past three years and generally falls in the middle of college rankings according to research articles per FTE in research. However, these rankings do not take into account the quality of publications and the fact that Horticulture faculty publish in a diverse group of journals including:

- Plant Physiology
- Global Change Biology-Bioenergy
- HortScience
- Annals of Botany
- Journal of the American Society for Horticultural Science
- Proceedings of the National Academy of Sciences U. S. A.
- Journal of Biological Chemistry
- Agronomy Journal
- Renewable Agriculture and Food Systems
- Nature Communications
- Plant Cell
- Biochemistry

Many of these journals are the highest ranked journals in their respective subject areas and have high impact factors. The department also monitors indicators of research publication quality by tracking collective faculty impact factor in its Annual Progress Reports (Appendix IV).

More examples of the quality and productivity of our research faculty members who serve on editorial boards and/or as editors for several journals include:

- Editorial Board member for Scientia Horticulturae: Dr. Robert Geneve
- Editorial Board member for Propagation of Ornamental Plants: Dr. Robert Geneve
- Associate Editor for Journal of Seed Technology: Dr. Robert Geneve
- Editorial Board member for Journal of Biological Chemistry: Dr. Robert L. Houtz
- Associate Editor for Frontiers in Plant Physiology: Dr. Seth DeBolt
- Associate editor for the journal Botany: Dr. Bruce Downie

Faculty also receive recognition through research awards; two recent awards include:

- The Robyn van Heeswijck Distinguished Lecture award recognizing early career researchers, University of Adelaide: Dr. Seth DeBolt

- Bobby Pass Excellence in Grantsmanship Award: Dr. Seth DeBolt

Many research faculty members also serve on grant review panels for funding agencies such as USDA, DOE, and NSF.

Collectively these data and observations suggest that Horticulture research faculty are not only productive in research but also in providing high quality research findings. A complete listing by year of Kentucky Agricultural Experiment Station Projects, Extramural Funding, Patents, Publications, and Graduate Degrees awarded for Horticulture can be found in the Kentucky Agriculture Experiment Station Reports at http://dept.ca.uky.edu/agc/pub_area.asp?area=EXP.

Extension/Public Service

Horticulture Extension Faculty and Extension Associates make between 2.5 to 3.5 million contacts annually (https://warehouse.ca.uky.edu/AgWeb/pubreports/stats.asp?fy=2011&r=427). These contacts are associated with diverse programs serving the needs in all areas of horticulture. Many are also associated with specific broad-based programs such as the on-farm demonstration program funded through the Kentucky Horticulture Council (KHC, http://kyhorticulture.org/) and the viticulture and enology program funded through the Kentucky Vineyard Society (KVS, http://kyvineyardsociety.org/). The KHC consists of 13 different groups that represent growers of fruits, vegetables, nuts, turf grass, nursery and bedding plants, and operators of vineyards, greenhouses, garden centers, and landscaping businesses. KVS has over 200 independent vineyard members. Both of these programs receive substantial funding (see budget section above under resources) from the Kentucky Agriculture Development Board, which was created to distribute 50% of the state monies received from the Master Tobacco Settlement Agreement to find new ways to add value to Kentucky agricultural products and exploring new opportunities for Kentucky farmers. These funds come into the department and the university under the direction of faculty principal investigators (PIs) Dr. Dewayne Ingram for KHC funds and Ms. Patsy Wilson for KVS funds. Some of these funds also go to support farm operations at the HRF, RCARS, and UKREC.

Extension Faculty and Associates are also evaluated by county agents throughout the state. The most recent survey shows that 318 agents provided feedback on Extension Specialists' in the Department of Horticulture. On a scale of 1-3, in the areas evaluated (which include degree of interaction, overall responsiveness, value of assistance or support, and effectiveness of assistance, program or support), the average rating was 2.67, representing moderately high overall satisfaction. The complete feedback report including all College of Agriculture departments and units can be found in Appendix XIII. Verbal feedback is also provided as indicated earlier and is in Appendix VII.

Extension faculty regularly seek extramural funding for their programs, as well as publish their research in peer-reviewed journals. Additionally, extension faculty publish numerous fact sheets, numbered series extension publications, and departmental publications. A complete list of these is available at http://dept.ca.uky.edu/agc/pub_dept.asp?dept=Horticulture.

Extension faculty are also the recipients of awards such as:

- Outstanding New Extension Faculty Award offered by the Kentucky Association of State Extension Professionals (KASEP), 2011: Dr. Timothy Coolong.
- 2012 Outstanding Specialist Award, KY Association of County Agricultural Agents, 2012: Dr. John Strang

- Outstanding Program Award, Hort. On-Farm Demo & Consultation Program, KASEP, 2012: Dr. John Strang
- Outstanding Extension Program Award, KASEP, 2012: Dr. Dewayne Ingram
- Southern Nursery Association 2011 Porter Henegar Memorial Award for Contributions to Environmental Horticulture Research: Dr. Winston Dunwell
- Award of Excellence for Lifetime Achievement – Northern Kentucky Urban Forestry Council, 2011: Dr. William Fountain

Additionally Horticulture Extension faculty function in service and administrative roles in societies and organizations with emphasis in horticulture professions and industries such as:

- International Society of Arboriculture, Board of Directors, Vice President: Dr. William Fountain
- eXtension Implementation and Institutionalization Team, UK, 2012, Chair: Dr. Rick Durham
- Kentucky Nurserymen and Landscape Association (KNLA), Educational Advisor, 2011-2012: Dr. Winston Dunwell
- President-Elect of ASHS, 2010-2011; President, 2011-2012; and Chair of the Board, 2012-2013: Dr. Dewayne Ingram
- Kentucky Vegetable Growers Association, Advisor, Program Committee, Chair, 2011-2012: Dr. John Strang

Collectively these data and observations demonstrate that Horticulture extension faculty are not only productive and serve the needs of the horticulture industry in the state, but are also providing high quality research-based education for horticulture clientele.

Quality of unit employees, communications and interactions

Faculty and staff within the department make every effort to maintain clear and concise communications, with individual concerns recognized, but with end results always aimed at the greater good for the department. This creates an environment where faculty and employees are encouraged to “speak their mind,” realizing that this is the quickest route to problem solving and conflict resolution. Any significant move within the department towards re-structuring of either positions or facilities is always open to discussion first. All faculty and staff adhere to the guidelines set forth by Human Resources Policy and Procedures (http://www.uky.edu/HR/policies/) with regard to personnel matters.

Quality of customer/client satisfaction

The customer/client profile for the Department of Horticulture incudes students, county agents, growers, and the general horticulture/plant science community. The level and degree of satisfaction of these individuals with the department’s performance is best reflected by the data and observations indicated previously under the sections Input from Affected Constituents and Evidence of Quality and Productivity in Instruction, Research, Public Service, or Operations. Collectively the content in those sections demonstrate that the department enjoys a high level of satisfaction from its customer/clientele base.

Quality of business & operating procedures

The Department of Horticulture meticulously follows the University of Kentucky's Business Procedures Manual (http://www.uky.edu/EVPFA/Controller/BPM.htm) which provides general rules and procedures for procurement card authorization and limits, departmental authorization and voucher (DAV) procedures, preparation of requisition purchase order processes, surplus property acquisition and disposal, and reimbursement of travel expenses and travel rules. The department has three staff positions dedicated to ensuring departmental adherence to these rules and procedures. Additionally, departmental faculty and staff labor tirelessly to conform to the plethora of Administrative Regulations, Governing Regulations, University Senate Rules, and Office of Assessment Reporting.

Analysis of Strengths and Recommendations for Quality Enhancement

Summary of Strengths

Areas of strength in the Department of Horticulture include:

- Dedication of faculty to achieve national recognition as a leader in sustainable horticulture.
- Commitment to excellence in research, teaching, and extension.
- Mentoring of young faculty members to instill ownership in the department and its future.
- Lack of hesitation to carve out new directions and opportunities for the department.
- Outstanding support for the College of Agriculture's higher administration.
- Service to all horticultural industries in the state of Kentucky.

Recommendations for Quality Enhancement

In order for the department to improve the quality of its programs, faculty, and staff the following recommendations are proposed:

- Catalyze the creation of new opportunities to provide modern office and laboratory space for all members in the department.
- Find ways to provide stable recurring funding for extension associates.
- Identify a funding source for the Crop Diversification & Biofuel Research & Education Center.
- Continue efforts to transform the HRF into a nationally recognized center for sustainable horticulture.
- Identify mechanisms to fill existing vacant faculty positions and, moreover, ways to increase the number of faculty lines in the department.
- Identify and implement a solution to the declining enrollment in the Horticulture and Plant Science undergraduate program.
- Identify mechanisms to reward outstanding faculty and staff.

Part 2
Undergraduate Student Learning Outcomes

The Department of Horticulture does not offer any stand-alone undergraduate or graduate degree programs. Instead, our undergraduate and graduate students are members of the undergraduate Horticulture degree option in the Department of Plant and Soil Sciences (HPLS) or any one of several graduate programs operating under the umbrella Integrated Plant and Soil Sciences (IPSS) graduate degree program. As components of the Plant and Soil Sciences Department, they are subject to the recent periodic review of that department. We are also participants in two interdisciplinary undergraduate degree programs, ABT and SAG. Therefore, for this component of the review, the committee is referred to the periodic review for the department of Plant and Soil Science (http://www2.ca.uky.edu/deanadmin-files/college_of_ag_self_study_docs/PSS_Periodic_Program_Review_2011.pdf), but salient features from that review are reproduced here. Dr. Robert Geneve in Horticulture acts as the Director of Undergraduate Studies and worked with others in Plant and Soil Science in developing the educational assessment of the HPLS program.

The primary concern from that review is "The HPLS degree program continues its constant decline in enrollment and degrees. In the six year period of our previous review, HPLS averaged 96 students enrolled and 21 degrees awarded per year vs. 62 students enrolled and 16 degrees awarded per year during the six years of this review period. Even if SAG students are considered a subset of students who would have previously enrolled in HPLS, the current enrollment level is low." Joint departmental efforts are currently underway to address this issue and the Department of Plant and Soil Science is actively recruiting for a position to address this problem.

STUDENT LEARNING OUTCOMES

Horticulture, Plant and Soil Sciences Undergraduate Program
Programmatic Level Student Learning Outcomes
Technical Knowledge
1. Students will demonstrate proficiency in scientific principles of the plant, soil and environmental sciences and illustrate their interrelatedness.
2. Students will apply the basic technical principles of plant production and appraise their environmental and economic sustainability.
Professional Skills
3. Students will communicate clearly in oral and written formats.
4. Given a situation, students will define the problem, retrieve and evaluate information, and propose and evaluate potential solutions.
Perspective
5. Students will examine the global diversity of our plant and soil resources.

Assessment Plan
Horticulture and Plant and Soil Sciences Undergraduate Program
I. Assessment strategies and processes

Programmatic assessment strategies and processes will be determined, instituted, and evaluated by an academic assessment committee. The committee for HPLS undergraduate programs shall initially consist of the chairs the departments of Horticulture and Plant and Soil Sciences, and the directors of undergraduate studies of the departments of Horticulture and Plant and Soil Sciences. In addition to these four individuals, the committee may seek input and participation from the faculty-at-large and also from offices both within and beyond the College of Agriculture as needed. As assessment needs and challenges change, the composition of the assessment committee will be evaluated and adjusted accordingly. Programmatic assessment will be accomplished by direct and indirect methods as indicated on the Assessment Inventory.

Direct methods of assessment will include projects related to the capstone courses within areas of specialization. This will allow direct assessment of four programmatic learning outcomes through a semester-long project culminating in a term paper, oral presentation, or both. Learning outcomes 1-4 can be directly assessed by these projects, most especially Learning Outcome (L.O.) #3. Additionally, a direct assessment of individual learning outcomes will be accomplished by a linear evaluation among appropriate courses within the curriculum for specific learning outcomes. These linear evaluations will include random collections of exams and other assignments from these and potentially other courses so as to allow for direct assessment of progress towards each learning outcome. Direct assessment will be accomplished by comparing student achievement as the expectations of the courses progress. For example, assessment of progress towards L.O. #3 will begin with evaluation of student performance on written assignments and oral presentations in GEN 100, then within one of several PLS courses at the 300 level or above (e.g., PLS 366), and culminate with student achievement in the capstone courses. Clearly, the capstone courses are extremely useful vehicles for assessment of student preparedness in nearly all of our stated learning outcomes. We will rely heavily on capstone courses for assessments of reaching our learning outcomes. Examples of linear course evaluations include:
L.O. #1: PLS 220, PLS 320, PLS 514
L.O. #2: PLS 210, PLS 386, PLS 490
L.O. #3: GEN 100, PLS 300-level and above, PLS 490
L.O. #4: GEN 100, PLS 366, PLS 490
L.O. #5: PLS 104, PLS 399, Study Abroad (GEN 301, GEN 302)
Other direct methods of assessment will include publication of undergraduate student research and other documented undergraduate contributions to research (e.g., presentations of research, participation in student presentation competitions).

Indirect assessment will be accomplished by making better use of data from the College of Agriculture Office of Student Services. For example, our programmatic assessment committee will evaluate retention and graduation rate data and specific course evaluations. We will also take full advantage of the current efforts of the Student Services Office in identifying at-risk students. The committee will request data from the office of experiential education regarding student performance during internships, and will use this data to evaluate preparedness of undergraduates for internship experiences. The committee will evaluate course syllabi on a regular schedule, re-evaluate the curriculum map, and propose curricular changes to the faculty based on these evaluations. The committee will compose a standard document which will be used to conduct exit interviews of graduating seniors. The exit interview will occur during the same semester that the capstone courses are taken and will be administered by the appropriate members of the assessment committee relative to areas of specialization within HPLS. The information gathered will be used by the committee as an indirect assessment of progress towards learning outcomes. The departments will continue to use peer evaluation of courses and instruction as a tool to improve teaching and learning. This will affect progress towards all learning outcomes. The committee would also like to institute a vehicle for tracking alumni successes. We do not currently have such a vehicle in place, but work towards this goal continues.

II. Assessment Cycle
For the next two years (2010-2012), the academic assessment committee will meet once per year in May at the end of the spring semester at a time agreed upon by all committee members. This will allow for evaluation of this new assessment plan. Adjustments to these processes and strategies will be evaluated and instituted where needed. Beginning in 2014, the committee will meet in May at the end of the spring semester of each even-numbered year for the purposes of evaluating the assessment process and programmatic progress towards meeting all of the stated learning outcomes.

III. Assessment Progress
Following the first round of instituting the assessment plan, it became clear that all data was fully subjective and also not a true assessment of achieving the stated learning outcomes. In an effort to work towards a viable improvement action plan, close examination of the model for assessment of graduate programs has been conducted. The graduate model includes an evaluation of each student immediately following thesis or dissertation defenses administered by the Director of Graduate Studies. This is an excellent tool for gathering quantitative data on student performance, especially from a logistical prospective. However, the data (evaluations) are purely subjective among graduate committee members, sometimes resulting in high variation within individual learning outcomes. Additionally, there are no similar opportunities in our undergraduate programs to conduct such evaluations as there are no defense meetings or committees.

One option under direct consideration is the institution of an exit exam for graduating seniors in HPLS undergraduate programs. The exam could be administered during each section of the capstone course (PLS 490) at the discretion of the instructor. The exam could be a direct measure of Learning Outcomes 1, 2, 4, and 5. Learning Outcome 3 would continue to be evaluated by the already-instituted course projects in each section of the capstone course. Faculty members within programs would contribute questions for the exam based on the stated learning outcomes. The exam would not contribute to or be any component of the course grade for the capstone course. Rather, it would be used as a direct assessment of programmatic progress in achieving learning outcomes. Instructors of sections of the capstone course would provide the completed exams to the Director of Undergraduate Studies for grading, data compilation, and analyses. The exam would provide purely objective data for assessment and, in conjunction with exit interviews, would provide a much more accurate and clear assessment of program strengths and weaknesses.

Graduate Student Learning Outcomes
Assessment of Student Learning Outcomes of Graduate Programs
Four learning outcomes of our graduate programs were identified by the graduate faculty. Components of these four learning outcomes are evident in the summary of assessments of learning outcomes taken soon after the final examinations of MS students in 2010-2011. There are eight equally ranked components in each learning outcome. At the completion of our graduate program students:
1. Will have acquired an extensive knowledge of the sciences and technology that support research, education, and technological innovation in plant, soil, and environmental sciences. (Abbreviated as ‘Knowledge’).
2. Will be conversant with the literature, current concepts, and experimental and analytical methods that support research, teaching, and technological innovation in plant, soil, and environmental sciences, and in their application to agriculture and the environment. (Abbreviated as ‘Skills’).
3. Will have acquired skills in critical and analytical thinking and in communication skills that may be applied to research, education, industry, government, and public service. (Abbreviated as ‘Communication’).

4. Will have acquired those elements of professionalism necessary for rewarding and developing careers in plant, soil, and environmental sciences in research, education, production agriculture, agribusiness, government, and public service. (Abbreviated as 'Professionalism').

Assessment of Learning Outcomes:
Annual Assessment of Graduate Programs: Graduate students are assessed by their advisory committees at the end of each academic year according to our assessment program and in compliance with Graduate School regulations. These regulations ensure that their advisory committee is functioning properly and that students are making good progress in their academics and research and they warrant continued support (stipend, tuition, and health benefits) if they are on graduate research assistantships and fellowships. The annual review of progress is a detailed process that incorporates the assessment of learning outcomes and uses the same rubric. These assessments are composited and incorporated in the assessment of the learning outcomes of the graduate programs.

Assessment of Graduate Programs after Completion of Qualifying Examinations: Graduate advisory committees are asked to complete an assessment rubric soon after the qualifying examination. The advisory committee is provided with a summary of the assessment of the student and others in his or her cohort. Data added to the database for overall assessment of the learning outcomes of graduate programs.

Assessment of Learning Outcomes soon after Final Examinations: Graduate advisory committees and the external examiner appointed by the Graduate School are asked to complete an assessment rubric soon after the qualifying examination. The advisory committee is provided with a summary of the assessment of the student and others in his or her cohort. Data added to the database for overall assessment of the learning outcomes of graduate programs.

Assessment of Learning Outcomes from Graduates: We plan to ask recent graduates to re-assess the learning outcomes after five years. At present, we do not have a population of graduates to generate a database.

Assessment of Learning Outcomes in Integrated Plant and Soil Sciences: Procedures for the assessment of learning outcomes have been adopted for our new graduate program (IPSS).
Conclusions:
1. Assessments of learning outcomes under the auspices of the Office of Assessment are in compliance with the Office of Assessment and on schedule.
2. Assessment of progress of graduate students is in compliance with the Graduate School.
3. We anticipate more useful information as assessment is refined and database grows.
4. Assessment of knowledge in field indicates effective teaching components; however, students are sufficiently aware of research publications and research institutions.
5. Assessment shows that graduates have satisfactory supporting skills.
6. Communication skills of graduates, primarily writing skills, needs reinforcement.
7. Research productivity of graduate students could be improved.
8. Variability among graduates is not as wide as expected.

APPENDIXES

Appendix I Report of the Previous Periodic Review Team

REPORT of the PERIODIC REVIEW TEAM

for the

Department of Horticulture

College of Agriculture

University of Kentucky

July 15, 2005

Table of Contents

Executive Summary

This report comprises the periodic annual review of the Department of Horticulture, College of Agriculture, University of Kentucky. The Review Team met over the course of Spring Semester 2005. Review team members included:

Rich Gates, Professor and Chair, Biosystems and Agriculture
John Hartman, Extension Professor, Plant Pathology
Dan Potter, Professor, Entomology
David VanSanford, Professor, Plant and Soil Sciences
John Bell, President, Elmwood Stock Farm
Jack Buxton, Professor, Horticulture
Doug Archbold, Professor, Horticulture
Randall Collins, Technician, Horticulture
Brent Rowell, Extension Professor, Horticulture
Derek Law, Research Associate, Horticulture
Barry Duncil, Undergraduate Student, Horticulture

The Horticulture Department strengths include key outstanding and visible Extension programs, significant and focused applied research, and a vigorous undergraduate program with graduates that include state industry leaders. Challenges include a substantial number of faculty retirements, accelerated demands for Horticulture by state producers transitioning from tobacco, and a strong undergraduate program that requires continual attention and faculty effort.

The report consists of a review of findings for the Instruction, Extension and Research programs, as well as Industry interaction and Administration. Each section contains recommendations, and these are summarized in the Summary of Recommendations section of the report.

Undergraduate Program

Background

The B.S. degree program in Horticulture, Plant and Soil Science is administered by faculty in three departments. Within the department of Horticulture, the areas of emphasis are Horticulture Enterprise Management and Horticulture Science. There were 48 graduates from 1999-2004 (42 in Horticulture Enterprise Management and 6 in Horticulture Science). Of the approximately 40 students enrolled annually from 1999 to 2004, about 35 were in Horticulture Enterprise Management and 5 in Horticulture Science. Both areas of emphasis require a capstone course. Students in the Horticulture Science area of emphasis are required to write a senior thesis, and students in the Enterprise Management area generally write a business plan.

Each area of emphasis requires an internship which involves extensive experience in a horticulture related position with businesses, botanical gardens or laboratories, for example. The review committee perceived this requirement as a positive, and found it indicative of the strong linkage that the Horticulture department has formed with the commercial horticulture community in Kentucky. However, while most internships provide positive experiences, discussions with a few current students suggested that the Department needs to ensure that all internships provide relevant learning experiences.

The review team was not able to interview any undergraduate students, although individual team members approached several students and their comments have been incorporated. We relied primarily on data provided in the Horticulture self study document. On this basis, it appears that Horticulture graduates are finding employment related to their areas of study. Most of the Horticulture Science undergraduates are going to graduate school, whereas most of those graduating from the Enterprise Management area intend to go into business.

One aspect of the Horticulture undergraduate program that stands out is the high visibility and high level of activity of the Horticulture club. With frequent flower sales, trips to Europe, New Zealand and the Pacific Northwest, the Horticulture Club enhances the sense of community and identity for the undergraduate students in the department.

Issues

1. There is concern among some faculty that the department's research emphasis is moving too rapidly towards basic science at the expense of research faculty interested in teaching undergraduate horticulture. This view was expressed by extension personnel who are heavily involved in undergraduate teaching.
2. Approximately 50% of teaching FTEs are Extension Title Series personnel, a situation which has pros and cons. On the plus side, the presence of extension personnel in the classroom exposes students to real-world production problems and they learn the information in a problem-solving context. The downside is that the time that specialists spend in the classroom may have a detrimental effect on their extension programs, in that they are not conducting applied research or extending knowledge to producers.
3. The undergraduate program relies heavily on one individual (Buxton) to teach key undergraduate courses and to shoulder responsibility for all of the undergraduate advising.

The problems with reliance on one individual will manifest themselves in the near future when Dr. Buxton retires. There does not seem to be any transitional plan in place to address the anticipated retirement of Dr. Buxton. The impact on length of time to achieve degree, student retention, and related student professionalism could be significant, and negative. The department has identified some possible short-term temporary fixes. The problem with a short-term approach is it delays the formulation of a long-term solution that will meet the department's needs in the coming years.

4. A disconnect seems to exist between some research faculty and teaching undergraduate Horticulture courses. However, some of the research faculty are involved in the undergraduate Agricultural Biotechnology program, as well as graduate courses.
5. Student participation in both the Horticulture Club and the Associated Landscape Contractors of America (ALCA) student competition provide key opportunities for career contacts and professional development. The future of the Horticulture Club and related activities are in doubt as Dr. McNeil and dedicated staff retires.

Recommendations

The Department of Horticulture has several interrelated challenges ahead that cannot be viewed in isolation. The Review Team recommends that the department immediately initiate development of a long-term plan to address future teaching and advising needs. This plan should include the following components:

1. Encourage mid-career research faculty to "buy in" to the importance of undergraduate Horticulture teaching by assuming a more active role in teaching and/or advising, both of which are critical to a viable and strong instructional program
2. Develop a plan for distributing responsibility for undergraduate advising
3. Decide who will teach the commodity-oriented horticulture areas needed in a viable horticulture program, upon retirement of several senior faculty. The outcome will set criteria in recruiting new faculty.
4. Strengthen the Horticulture Enterprise Management Area of Emphasis to require courses in economics, accounting, management, marketing and perhaps, Spanish.
5. Develop and communicate a transition plan for advising the Horticulture Club, ALCA and other extracurricular activities including use of key staff to help faculty support these programs.

Graduate Program

Background

Graduate students within the Department of Horticulture have diverse research interests, reflecting the expertise of faculty who advise them. The degree options (MS or PhD Crop Science, MS Plant and Soil Science, PhD Plant Physiology) available to graduate students are adequate to support this diversity. There is some confusion among graduate students regarding the status of the Horticulture Graduate Program within these various degree options.

Issues

The graduate student population is relatively small and dispersed, with some members working from Kentucky State University, and in general they cannot be described as a cohesive community. This lack of Departmental affinity is a challenge that must be addressed at the administrative level; the development of academic camaraderie is an important part of the graduate school experience. Other elements important to the education of graduate students were seen favorably including the strong encouragement to attend professional meetings, facilities and office space amply supplied, and excellent staff support readily available.

Recommendations

Two recommendations to improve the graduate student experience are:

1. Develop a graduate student community and departmental affinity. For example, develop and deliver a required, student-chosen topical seminar series/journal article reading group each semester.
2. Provide a Graduate Student Handbook to incoming students. Such a Handbook typically specifies requirements, procedures, checklists, etc.
3. Future regular periodic reviews of Departments in which the Graduate Program is of a multidisciplinary nature should be at the programmatic level, not the unit level.

Extension Programs

Background

Horticulture's Cooperative Extension programs at the University of Kentucky are diverse and include commodity specializations in arboriculture, floriculture, fruits, greenhouse management, nursery crops, residential horticulture, vegetables, and viticulture. The Horticulture Department has ten faculty positions at three locations statewide with Extension appointments ranging from 74 to 100%. Five of these faculty specialists have significant research or teaching appointments.

As a group, Horticulture Extension Specialists have very good in-state recognition and reputation; indeed, many of them are key commodity group leaders. Most are experienced and have excellent depth and breadth of knowledge of their diverse commodities with a variety of skills and training. They play a key role in maintaining interdisciplinary teams of specialists collaborating on educational programs, publications and applied research. For example, Extension commodity teams such as the fruit group and the vegetable group have garnered USDA grants and publication awards. Specialists collaborate extensively with research and extension colleagues on applied research involving entomology, plant pathology, and biosystems and agricultural engineering on the U.K. agricultural research farms. They provide key training for County Agents for Agriculture and Horticulture, and for Horticulture Extension Associates.

The Extension Horticulture program benefits from good statewide support from the fruit, vegetable, arboricultural and nursery industry, but experiences rather weak support from the floriculture industry. Funding for Extension and applied research through the New Crops Opportunities Center and other sources is excellent. Equipment, land for research plots, and field staff assistance are provided by U.K. and by grant funding. Ongoing improvements to the Horticultural Research Farm (South Farm) such as a new greenhouse complex, walk-in cooler, and storage facility have been beneficial. Applied research conducted by Extension Specialists is on the increase, and these results are published annually by the Department for the fruit, vegetable, landscape, and nursery industries. The Extension Horticulturists have access to a good network of Extension Associates, Extension Agents for Horticulture, and Master Gardeners. In addition, the departmental chair has an Extension background which provides insight into the role of specialists in fulfilling the Extension mission.

Opportunities exist for Horticulture's Extension program to make an even greater impact, both locally and nationally. Recently hired Extension Associates have increased Extension Horticulture impacts statewide, and have enabled faculty Specialists to put greater efforts into additional educational and applied research activities and undergraduate instruction. Extension Associates complement the Specialists, increasing the number of on-farm horticulture demonstration plots, and improve the credibility of county Extension programs. Extension Associates need to continue to initiate ideas for applied research that enables Specialists to work at a more specialized level. Although many Specialists are productive applied researchers, this research needs to be published in refereed journals. Collaboration with research colleagues for more publishable research can provide additional regional and national recognition. The Extension group needs to increase competitive funding; this will become more critical as future funds for Extension Associates and programs diminish. Specialists may need to broaden sustainable horticulture expertise should this become a Departmental and state wide priority.

Issues

Problems and frustrations for the Horticulture Extension programs do exist, and are outlined below:

1. It is frustrating when time and resources are expended in training County Extension Agents for Horticulture and Extension Associates only to see them leave for a better job.
2. The partial retirement of Extension specialists can tie up a position so that less full-time Extension work is accomplished, creating larger work loads for other specialists or leaving the work undone. Future full retirements will seriously erode the vast knowledge base of these experienced specialists.
3. Master Gardener requirements, curriculum, and expectations are not uniform statewide; there is a need for a staff person to run the Master Gardener program.
4. The grape and wine industry is growing, but sometimes difficult to work with because it is populated with many growers lacking a traditional agricultural background.
5. Some counties have no Extension Horticultural Agent and the Extension Agricultural & Natural Resources Agent lacks the specialization to extend horticultural information, leaving more local Extension work to the state specialist.
6. Extension Specialists have difficulty acquiring new equipment, such as computers, cell phones, and cameras due to funding restrictions.
7. Although certain components of the proposed Horticulture Research and Education Center at South Farm are being developed, the Education Center building itself apparently is not, and there has been little explanation of why from College and University administration. Such a facility could positively impact Horticulture Extension programs, and the College of Agriculture.
8. Undergraduate teaching loads affect the quantity of Extension programming.
9. A few faculty members perceive that, although Kentucky's ornamentals and greenhouse industries are larger than the fruit and vegetable industries, extension personnel and funding resources are biased towards the latter. What may not be recognized is that some of the funding obtained by the department is earmarked for specific uses. For example, funding Extension Associates to assist the four vegetable cooperatives was seen as an efficient way to transition tobacco farmers to horticultural crops. Creation of new positions to serve the grape and wine industry are also examples of funding with a specific purpose.
10. Since Extension Associates are hired mostly on what is likely to be temporary funding, the Horticulture Extension Specialists and Departmental and College Administration needs to be asking where they will be when the funding runs out?
11. The recent addition of Extension Associates is increasing the need for consultation and service efforts by other College departments such as Biosystems and Agricultural Engineering, Agricultural Economics, Entomology, and Plant Pathology with no additional support planned or provided for these important support departments.

Recommendations

The Horticulture Extension Faculty/Specialists are a competent and hard-working group of dedicated professionals. Extension and applied problem-solving research should continue to be a major focus of the Horticulture Department. The Extension group and administration need to ensure that the Horticulture Extension program remains strong by addressing the following issues:

1. Develop a system to improve communication within this large group of Extension Specialists. Frequent teleconference meetings, even within the Extension "food" and "landscape" subgroups, would be useful as would periodic meetings of the whole group.
2. Provide good mentoring and a sense of Horticulture Extension "team" accomplishment for new Extension hires.
3. Actively assist the Department in deciding how to fill positions created by retirement, including filling research positions with scientists who have the potential for collaboration with applied research efforts, and the ability to teach undergraduate horticulture courses.
4. Provide expert input to help the Department determine if Sustainable Horticulture, and/or Food Systems, or other Department-wide areas will be emphasized.
5. Find permanent funding for the Extension Associates program.
6. Increase competitive grant efforts for Extension and applied research programs.
7. Increase the quantity and quality of applied research efforts to help solve Kentucky horticultural problems and publish results nationally to bring increased recognition to the U.K. Horticulture department.
8. While grant writing and publication activities will reduce the amount of traditional faculty Extension programming, they may be necessary to maintain the level of applied research and Extension programming now supported by non-competitive funds.
9. Broaden the concept of the New Crops Opportunity and Tobacco Settlement funding programs. Funds can be used for projects such as an Extension Associate Master Gardener coordinator and to support departments impacted by new horticulture crops.
10. Develop a consensus on the desirability of and need for the Horticulture Research and Education Center building and obtain industry and political support for the facility.
11. Continue the outstanding undergraduate teaching efforts and find ways to incorporate existing instructional materials into County Extension Agent and clientele training.

Research Program

Overview and General Perceptions

The Department currently has seven faculty with a primary (68−100%) research appointment, three with 25−37% research responsibilities, and three others with 15% appointments, totaling about 7 research FTEs. Seven are full-members of the graduate faculty. As a relatively small unit, the faculty must collectively balance applied research to address immediate problems and opportunities of Kentucky's horticultural industries (food crops, nursery, greenhouse, landscape) with more fundamental, laboratory-based federally-competitive research to address long-term goals and enhance national scientific prominence. The research faculty's expertise ranges from basic plant sciences (e.g., plant molecular biology, seed biology, enzymology of carbon fixation, growth and development, natural products chemistry), to more traditional emphases in plant propagation, weed biology and management, and production of food and ornamental crops. A major challenge is how best to allocate future resources and faculty hires to strengthen the Department's national stature and extramural support while maintaining its responsiveness to the Land Grant mission and needs of clientele groups.

Research output, measured as publications in high-quality national refereed journals, is unevenly distributed for those having primary research appointments, but even those toward the low end of the continuum are contributing. Productivity ranges from respectable to very good, averaging 2−3 publications per year on a per capita basis. Besides refereed papers and book chapters, the basic plant science-oriented labs are submitting patents, whereas the more applied researchers are publishing in industry-accessible conference proceedings. Extension associates are contributing significant applied research. Extension specialists and associates generally feel that there is adequate flow of applied research to support their programs.

Research faculty are publishing in high-impact, nationally- and internationally-recognized scholarly journals for horticulture (e.g., *J. American Society for Horticultural Science*, *HortScience, HortTechnology*), plant science (e.g., *Plant Physiology, J. Experimental Botany, Plant Science*), and molecular biology (e.g., *Cell, Plant Cell, Molecular Biotechnology, Arch. of Biochemistry and Biophysics*). The preponderance of multiple-authored papers suggests productive collaborations between selected faculty clusters, as well as interaction with other departments within the College. Graduate students are publishing as first and secondary authors.

There has been, with one exception, relatively little primary productivity from faculty lines having 15−37% research appointments. Most of those individuals do, however, publish in conference proceedings, and as secondary authors of refereed papers and book chapters.

Extramural funding also is unevenly distributed among research faculty. Several investigators have sufficient extramural support (e.g., USDA, NSF) to sustain robust research programs; others seemingly could do more to seek extramural contracts and grants. Departmental funding for applied research presently is dominated by two large Agriculture Development Board grants totaling $5M, and by another $2.5 M through USDA Special Grants/New Crop Opportunities Center. Faculty members justifiably commended the Department Chair for his leadership in organizing the core KY horticulture base to get that funding. Expiration of the New Crops

Initiative funds, however, may jeopardize the department's ability to sustain commodity-oriented research. Individual Kentucky industries likely are too small to fully fund those projects.

The number of graduate degrees awarded (7 MS, 2 PhD during the past 5 years) is relatively low. Present graduate students are unevenly distributed; >60% of present students are being directed by just three faculty members. The number of current graduate students is relatively low, as is the number of post-doctoral scholars (4) over the past four years. If the Graduate Program in Horticulture were an independent program, and not part of the Crop Science, Plant and Soil Science, and Plant Physiology graduate programs, it would be designated as a "low productivity" graduate program by the Council on Postsecondary Education criteria (12 BS, 7 MS, 5 PhD per year). Several faculty members noted that growth of the Horticulture graduate program is limited by funding for research stipends.

Notable recognitions and leadership activities by faculty members (past 5 years) include:

- College of Agriculture's T.P. Cooper Research Award
- Fulbright Research Scholar
- Three faculty members are editor, associate editor, or on the editorial board of national professional journals
- Two faculty were selected as Fellows of professional scientific societies
- President of Southern Region for the American Society for Horticultural Science
- Invited presentations at major symposia or conferences

Some faculty members expressed concern regarding administration pressure to generate federally competitive extramural funding which may compromise the Department's ability to support Kentucky's horticulture industries. Others expressed frustration that USDA grant programs geared to agricultural issues may not recognize or consider funding on nursery or ornamental crops.

At present, the basic plant science and commodity-oriented programs seem somewhat divorced from one another, resulting in lack of cohesion within the graduate program and less-than optimal communication and interaction. This problem has been recently exacerbated by the physical separation of three faculty from the rest of the department in a recent move to the new Plant Science Building. Some faculty from the basic plant science group and the commodity oriented group expressed the view that their accomplishments are not appropriately valued within the department. A few faculty and staff also commented that the Department, as a consequence of its diverse roles, perhaps has suffered because of a lack of identifiable strengths.

Recommendations

1. Phased retirement and/or post-retirement appointments to three faculty members likely equates to net reduction in productivity and must not be allowed to delay re-filling of those positions. With three pending vacancies and a fourth retirement in the near future, the Department has an opportunity to restructure and reposition itself to better meet future challenges. Specifically, the committee recommends that the focus of future hires transcend individual commodities.

2. With current strong federal support for organic research and sustainable agriculture, the Department could become a leader in those areas with four new faculty hires. Developing a Center of Excellence for sustainable and organic agriculture, for example, could enhance the Department's national visibility and stimulate funding opportunities. Strengthening ties to the Human Nutrition and Food Systems Innovative Center (FSIC) and other food, diet and health-related initiatives also would be productive.

3. Emphasizing integrated research initiatives and a systems approach could reduce needless competition between present focus areas of Food Crops and Nursery/Ornamentals and open avenues for collaboration. Tapping production-oriented and food/health-related integrated science initiatives would open non-traditional funding sources and a means to build the Horticulture graduate program.

4. Encourage Extension faculty to seek extramural grants and contracts to support their programs, to supervise or co-advise graduate students, and to publish refereed articles to help cover gaps in applied research brought about by the increased molecular orientation of primary research lines.

Department Administration

Dr. Dewayne Ingram has held the position of Chair of the Horticulture Department for more than two six-year terms. The Departmental Self-Study outlines the administrative make-up. The Review Team recognizes the important role that Dr. Ingram played in development of the Horticulture Council and subsequent funding opportunities for Horticulture programs throughout the State.

Staff who attended the Review Team's meetings gave generally favorable reviews of the Chair's management. Some concerns were raised regarding communicating policies and transfer of departmental information, and this appeared to be related to staffing at multiple sites (Ag Science Center North, Plant Science Building, South Farm, Princeton, Quicksand). Some faculty expressed concern over aspects of leadership that involved communication, specifically direction for future programs (research, extension and instruction), new hires to best meet those programs, and a perceived need for more timely decisions. Some felt that there was an occasional tendency for some faculty voices to carry more weight than others with the Chair in shaping Departmental direction.

Since preparation of the Self-Study report, numerous changes have occurred including several post-retirement appointments, appointment (pending) of two research faculty positions to serve the wine/vine industry in Kentucky, and substantive discussions by faculty regarding the Department's future.

An area of potential improvement would be for the Chair, with faculty support, to work to instill a stronger sense of departmental identity, shared vision and common goals. Key accomplishments noted by the Review Team were not well-known among the Horticulture personnel interviewed. The various successful programs, noteworthy for their own merits, did not always seem to be tied together with a common theme of Horticulture. While the graduate program is understandably diffused by the makeup of the various PLSS and Crop Science options, the strong undergraduate programs seem disconnected from many research faculty. Perhaps a periodic newsletter could be one means of unification.

Industry Report

A survey was administered at the January 2005 Kentucky Vegetable Growers'/Kentucky Horticultural Society's/Kentucky Vineyard Society's annual Conference and Trade Show.

Ninety-five responses were received. The entire summary is provided in Appendix 1. Respondents indicated satisfaction with teaching, extension and applied research programs. Horticulture graduates are perceived as well-qualified and employable. Responses to questions indicated that Horticulture Industry needs are accelerating. Continued and recurring support for Extension Associates, and knowledgeable graduates to work in the industry, will be essential to fill these needs.

Summary of Recommendations

1. Develop a strategic plan for maintaining its traditionally strong undergraduate program, in view of the retirement of key faculty.
2. Review the Graduate Program's policies and procedures to develop a graduate student community and greater departmental affinity.
3. Future regular periodic reviews of Departments in which the Graduate Program is of a multidisciplinary nature should be at the programmatic level, not the unit level.
4. Develop a team approach to all Horticulture-based Extension activities, including a means of providing good mentoring, and helping the Department decide how to fill positions
5. Find permanent funding for the Extension Associates, increase competitive grant efforts for Extension and applied research, and increase the quantity and quality of applied research to help solve Kentucky horticultural problems and publish research results to bring increased national recognition to the U.K. Horticulture department.
6. Broaden the concept of the New Crops Opportunity and Tobacco Settlement programs to fund such projects as an Extension Associate Master Gardener Coordinator and to support other departments impacted by these programs.
7. The College administration should work to obtain industry and political support for the proposed Horticulture Research and Education Center building.
8. Phased retirement and/or post-retirement appointments to three faculty members likely equates to net reduction in productivity and must not be allowed to delay re-filling of those positions. With three pending vacancies and a fourth retirement in the near future, the Department has an opportunity to restructure and reposition itself to better meet future challenges.
9. With strong federal support for organic research and sustainable agriculture; the Department could become a leader in those areas with four new faculty hires. Developing a Center of Excellence for sustainable and organic agriculture, for example, would enhance the Department's national visibility and stimulate funding opportunities. Strengthening ties to the Human Nutrition and Food Systems Innovative Center (FSIC) and other food, diet and health-related initiatives also would be productive.
10. The Chair, with faculty support, should work to instill a stronger sense of departmental identity, shared vision, greater communication and common goals.

Appendix 1

95 responses to a survey given at the January 2005 Kentucky Vegetable Growers'/Kentucky Horticultural Society's/Kentucky Vineyard Society's annual Conference and Trade Show yielded the following results.

- At least 40 different counties represented
- 65% of the respondents classifies themselves as growers
- 23% of the respondents classified themselves as grower, retailer
- 11% of the respondents classified themselves as education/research
- 1% of the respondents were legislative or interested party

On a scale of 1=poor and 5=outstanding:

- How well UK Horticulture Graduates are prepared for employment = 3.76
- How well Hort. Extension program benefited respondent = 4.18
- Hort. Dept.'s applied research and demo programs = 3.99
- Slight (but statistically insignificant) trend of greater positive responses for graduate preparation among "grower, retailer" category.
- Slight (but statistically insignificant) trend of greater positive responses for extension program benefits and research/demonstration benefits among "growers"

When asked to list significant changes planned for operation; responses can be summarized as follows:

- Specialty crops / heirlooms added 8
- Greenhouses 7
- General expansion / increase production 6
- Organic 3
- Value added 3

Horticulture in Kentucky is best described as diverse. The number of different horticultural crops grown, the methods of production in terms of equipment, technology and philosophy, and finally the methods utilized in marketing are extremely diverse.

Recent agricultural survey and retailer statistics show that the various industries that make up horticulture in Kentucky are growing/expanding as a whole. The trend seems to be that the diversity is expanding as well.

This industry growth in volume apparently utilized and appreciated the applied research and the extension of that knowledge provided by the Horticulture Department. As the industry diversifies further, it would be expected that a greater demand would be placed on the Horticulture department for research on and graduates knowledgeable in a greater number of crops and production practices.

Appendix II Departmental Strategic Plan

UK College of Agriculture

Department of Horticulture

Strategic Plan

2009-2014

Mission Statement - The mission of the Department of Horticulture is to provide research, educational, and instructional capabilities that demonstrate economically viable and sustainable production practices for Horticultural crops that can improve human health, nutrition, and well-being, while preserving the integrity of natural resources.

***Goal 1*: Prepare Students for Leading Roles in an Innovation-driven Economy and Global Society.**

Strategies:

- Integrate the undergraduate Horticulture program with the interdisciplinary Sustainable Agriculture Program.
- Capitalize on graduate identity through the newly proposed Integrated Plant and Soil Science Program (IPSS).
- Maintain active participation in the Agricultural Biotechnology Program (ABT).

Key Indicators:

- Increase the number of undergraduate majors in Horticulture by 10% per year.
- Increase the number of faculty acting as advisors, research mentors, and instructors in the ABT program.
- Graduate M.S. and Ph.D. Horticulture students through the newly-implemented IPSS program and increase the number of graduates over a four year period on average by 10% per year.

***Goal 2*: Promote Research and Creative Work to Increase the Intellectual, Social and Economic Capital of Kentucky and the World Beyond its Borders.**

Strategies:

- Demonstrate the unique ability of Horticultural research to provide information that serves the interest of all Kentuckians as well as citizens of the world by providing sustainable, economically profitable, healthy, and environmentally responsible information.

- Position the Department of Horticulture as one of the top three departments in the College of Agriculture by doubling the number of research publications, collective journal impact factor, competitive extramural funding, and patents by 2014.

Key Indicators (all on the basis of research FTE):

- Increase the number of competitive grant submissions by 25% per year.
- Increase the number of research publications by 25% per year.
- Increase the collective journal impact factor for total departmental research publications by 25% per year.
- Increase the number of provisional and awarded patents by 25% per year.

***Goal 3*: Develop the Human and Physical Resources of the College to Achieve Top 20 Stature.**

Strategies:

- Develop and implement plans and justification for increasing the number of faculty in the department.
- Establish plans to unify Horticulture Faculty and Staff in Lexington at one location.
- Foster an atmosphere of collective creativity and a community of scholars among Faculty and Staff.
- Position the Horticulture Research Farm (HRF) as a nationally recognized center of excellence for research and education in sustainable/organic production practices and environmentally sustainable infrastructure.

Key Indicators:

- Fill two vacant faculty positions by 2014.
- Identify opportunities for research and office space so the department can move towards unification.
- Secure on average over the next 4 years at least two national/international recognition awards for faculty each year.
- Increase technical and support staff by hiring 4 new positions.
- Reduce the reliance of the HRF on natural gas and city water by 20% per year utilizing natural supplies of water and biofuel derived heating sources.

***Goal 4*: Promote Diversity and Inclusion.**

Strategies:

- Develop and implement plans that emphasize the value and significance of diversity.
- Target new faculty and staff hires, as well as student recruitment, toward under-represented groups.
- Establish community and campus collaborations with diverse groups and organizations which foster inclusivity among and between under-represented groups.

Key Indicators:

- Increase the proportion of faculty, staff, and students from under-represented groups.
- Contribute to the employment goals of UK's annual Affirmative Action Plan.
- Increase the number of collaborations with organizations whose missions and goals promote diversity and inclusion.

***Goal 5*: Improve the Quality of Life of Kentuckians through Engagement, Outreach and Service.**

Strategies:

- Develop new and innovative mechanisms for the transfer of research based educational information to stakeholders and citizens of the Commonwealth.
- Facilitate the integration of research and extension faculty programs towards increased competitiveness for new funding opportunities.
- Develop and implement new extension programs designed to demonstrate viable sustainable/organic production practices for Kentucky growers.

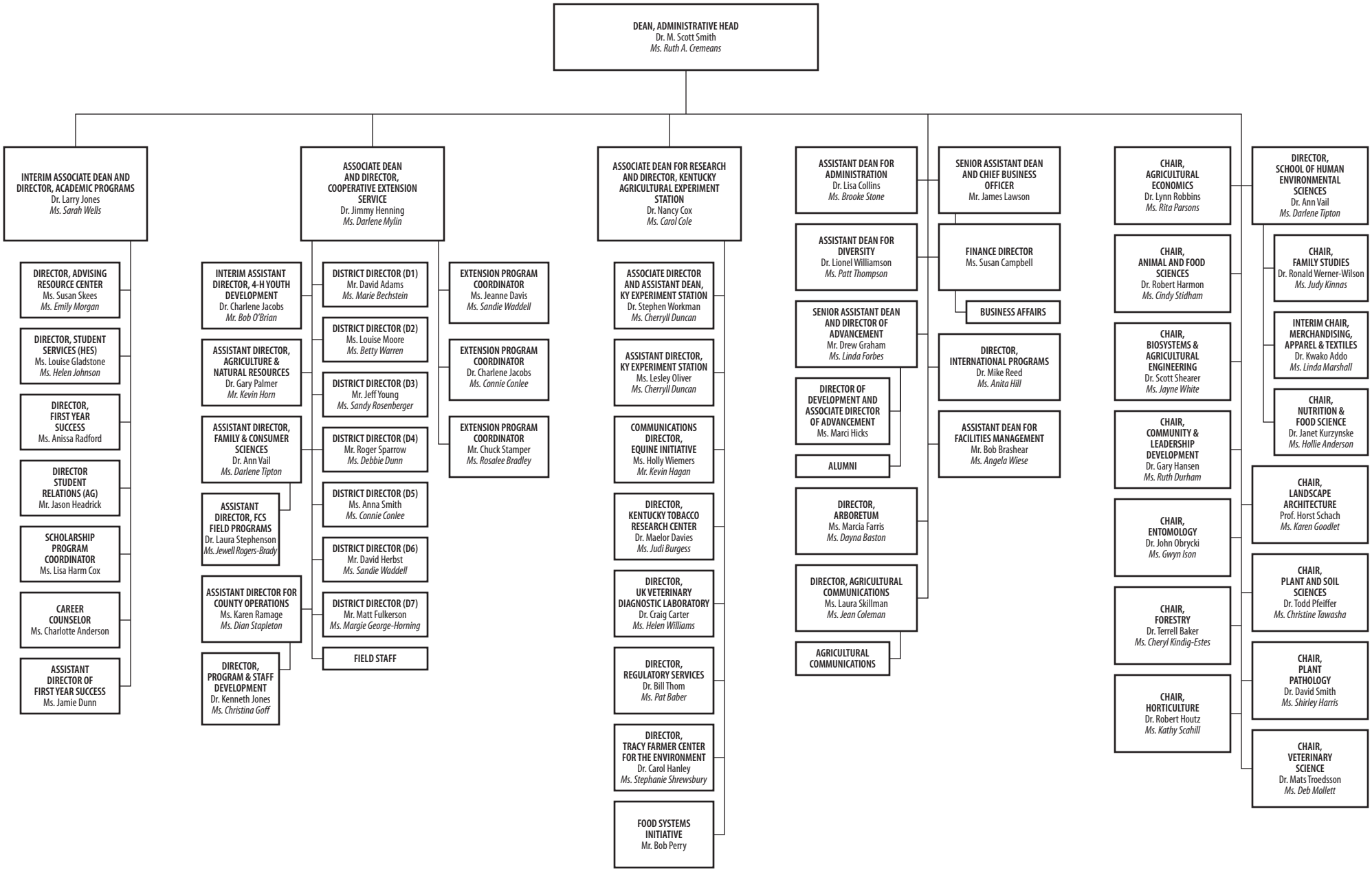
Key Indicators:

- Capitalize on new technologies for communication with stakeholders and citizens of the Commonwealth by using eXtension, YouTube, and enhanced Web effectiveness.
- Increase the number of competitive federal and state grants awarded to faculty integrating extension, research, and educational programs.
- Increase the number of extension FTE's devoted to sustainable/organic production systems across all Horticultural commodities.

Appendix III College of Agriculture Organizational Chart

ORGANIZATIONAL CHART

University of Kentucky • College of Agriculture



Appendix IV Annual Progress Reports for 2009, 2010, 2011, 2012, and the most recent implementation plans

Unit Mission

The mission of the Department of Horticulture is to provide research, educational, and instructional capabilities that demonstrate economically viable and sustainable production practices for Horticultural crops that can improve human health, nutrition, and well-being, while preserving the integrity of natural resources.

Unit Objective	HORT Objective 1.1 Increase the number of undergraduate majors in Horticulture by 10% per year
Related Goals/Metrics	Ag Goal 1. Prepare Students for Leadership in an Innovation-Driven Economy and Global Society
	HORT Goal 1 Prepare Students for Leading Roles in an Innovation-driven Economy and Global Society.
	HORT Metric 1.1 Increase the number of undergraduate majors in Horticulture by 10% per year
	UK Goal 1. Prepare Students for Leading Roles in an Innovation-driven Economy and Global Society.
Related Mission Area	Education

Strategies

The Horticulture department will actively recruit undergraduate students.

Assessment Method

IRPE data will be used to tabulate the number of undergraduate Horticulture majors.

Actual Results

Data Tables

Horticulture/Plant and Soil Science Majors

2008/2009 Baseline Yr	2009/2010	2010/2011	2011/2012
63	44	41	31

Descriptive Results

Year 1

Year 2

Year 3

Year 4

Year 5

Analysis of Results and Reflection	Improvement Actions
Year 1	
In 2009/2010, the number of Horticulture/Plant and Soil Science majors fell by 30.2% from 63 majors in 2008/2009 to 44.	The chair of the Horticulture Department will work with the College of Agriculture's Associate Dean for Instruction to recruit high-quality high school and transfer students to the undergraduate program.
Year 2	
In 2010/2011, the number of Horticulture/Plant and Soil Science majors fell by 6.8% from 44 majors in 2009/2010 to 41. Efforts to reverse the downward trend have been unsuccessful to date.	The chair of the Horticulture Department will continue to work with the College of Agriculture's Associate Dean for Instruction to recruit high-quality high school and transfer students to the undergraduate program.
Year 3	
In 2011/2012, the number of Horticulture/Plant and Soil Science majors fell by 24.4% from 41 majors in 2010/2011 to 31. The number of Horticulture majors continues to decline, inspite of departmental efforts to reverse the trend.	The chair and faculty of the Horticulture Department will devise a strayegy to reverse the decline in Horticulture/Plant and soil Science majors and will continue to work with the College of Agriculture's Associate Dean for Instruction to recruit high-quality high school and transfer students to the undergraduate program.
Year 4	
Year 5	

Unit Objective	HORT Objective 1.2 Increase the number of faculty acting as advisors, research mentors, and instructors in the ABT program
Related Goals/Metrics	Ag Goal 1. Prepare Students for Leadership in an Innovation-Driven Economy and Global Society HORT Goal 1 Prepare Students for Leading Roles in an Innovation-driven Economy and Global Society. HORT Metric 1.2 Increase the number of faculty acting as advisors, research mentors, and instructors in the ABT program UK Goal 1. Prepare Students for Leading Roles in an Innovation-driven Economy and Global Society.
Related Mission Area	Education

Strategies

Faculty will be encouraged to maintain their participation in the ABT program.

Assessment Method

The number of Horticulture faculty playing active roles in the ABT program either through advising students, teaching courses, or serving in administrative capacities will be monitored by the department chair.

Actual Results

Data Tables

Year 1

In 2007-2008, there were two faculty members with active roles in the ABT program, by 2009-2010 there were three faculty members with active roles in the ABT program.

Year 2

The number of faculty involved with the ABT program remains at three, but the number of students actively engaged in research under the direction of Horticulture faculty members has increased from 3 to 8.

Year 3

The number of faculty involved in the ABT program remains unchanged at three. However, a position, which will have an emphasis on participation in the ABT program, has recently been created in sustainable horticulture.

Year 4

Year 5

Analysis of Results and Reflection	Improvement Actions
Year 1	
The number of faculty involved in the ABT program increased by 50%, which represents adequate progress.	The department chair will monitor the number of Horticulture faculty and students involved in the ABT program.
Year 2	
The 267% increase in the number of ABT students conducting independent study projects under Horticulture faculty represents substantial progress.	Efforts will be made to increase the number of Horticulture faculty involved in the ABT program at the instructional level.
Year 3	
The newly created position in sustainable horticulture has, as part of its position description, an emphasis on participation in the ABT program. When the position is filled, the number of Horticulture faculty involved in the ABT program at the instructional level will increase.	The department will strive to fill the newly created sustainable horticulture position which includes an emphasis on ABT program participation. A mechanism which encourages increased faculty participation in the ABT program will be developed by the department.
Year 4	
Year 5	

Unit Objective	HORT Objective 1.3 Graduate M.S. and Ph.D. Horticulture students through the newly-implemented IPSS program and increase the number of graduates over a four year period on average by 10% per year
Related Goals/Metrics	Ag Goal 1. Prepare Students for Leadership in an Innovation-Driven Economy and Global Society HORT Goal 1 Prepare Students for Leading Roles in an Innovation-driven Economy and Global Society. HORT Metric 1.3 Graduate M.S. and Ph.D. Horticulture students through the newly-implemented IPSS program and increase the number of graduates over a four year period on average by 10% per year UK Goal 1. Prepare Students for Leading Roles in an Innovation-driven Economy and Global Society.
Related Mission Area	Education

Strategies

Drs. Mark Coyne, David VanSanford, and Robert L. Houtz continue to fulfill the necessary requirements for moving the IPSS program forward towards university approval

Assessment Method

Following implementation of the IPSS program, the number of graduate students specifically associated with Horticulture will be monitored using IRPE data.

Actual Results

Data Tables

Descriptive Results

Year 1

Data will not be available until the IPSS program is approved and implemented in the Fall of 2011.

Year 2

Data will not be available until the IPSS program is approved and implemented in the Fall of 2011.

Year 3

In academic year 2011-2012, four IPSS graduate students were awarded Master's degrees. There are currently three IPSS graduate students under the direction of Horticulture faculty members.

Year 4

Year 5

Analysis of Results and Reflection	Improvement Actions
Year 1	
Approval of the IPSS graduate program is in its final stages.	The department chair will continue to monitor university approval of the IPSS program to ensure its passage.
Year 2	
The IPSS program is now fully approved.	Since the IPSS program is now fully approved, the number of graduate students associated with Horticulture will be monitored.
Year 3	
There are currently three Horticulture graduate students in the IPSS program. The number of graduate students who earn an IPSS Master's or PhD degree will increase as the program becomes more established.	The department chair will continue to monitor the number of Horticulture graduate students in the IPSS program.
Year 4	
Year 5	

Unit Objective	HORT Objective 2.1 Increase the number and amount of competetive grant submissions by 25% per year
Related Goals/Metrics	Ag Goal 2. Promote Research and Creative Work to Increase the Intellectual, Social and Economic Capital of Kentucky and the World Beyond its Borders
	HORT Goal 2 Promote Research and Creative Work to Increase the Intellectual, Social and Economic Capital of Kentucky and the World Beyond its Borders.
	HORT Metric 2.1 Increase the number and amount of competitive grant submissions by 25% per year
	UK Goal 2. Promote Research and Creative Work to Increase the Intellectual, Social, and Economic Capital of Kentucky and the World beyond its Borders.
Related Mission Area	Overall

Strategies

Demonstrate the unique ability of Horticulture research to provide information that serves the interests of Kentuckians, as well as citizens of the world, by providing sustainable, economically profitable, healthy, environmentally responsible information.

Assessment Method

The College of Agriculture Research Office and OSPA will be used as sources for the number and amount of competetive grant submissions.

Actual Results

Data Tables

Grant Applications

2008 Baseline Yr.	2009/2010	2010/2011	2011/2012
20	30	22	6

Grant Awards

2008 Baseline Yr.	2009/2010	2010/2011	2011/2012
$131,169	$1,900,000	$1,257,266	$1,1164,223

Descriptive Results

Year 1

Year 2

Year 3

Year 4

Year 5

Analysis of Results and Reflection	Improvement Actions
Year 1	
In 2009/2010, the departmental faculty 30 grant applications, for an increase of 50% over the baseline year. The department recieved $1.9 million in grant awards, exceeding the target value by a factor of 10-fold.	The department chair will monitor the number of grant submissions and the total amount of grant awards to insure continued realization of this metric.
Year 2	
In 2010/2011, 22 grants were submitted by the department, below target with a 27% decrease. The grant award figure continues to be above target, still more than 5 times above the objective.	The department continues to emphasize increased grant submissions.
Year 3	
In 2011/2012, the number of departmental grant submissions fell for the second consecutive year remaining below target. Still more than 4 times above the target, total grant awards remain above the goal.	The department chair will continue to stress increases in grant submissions during faculty meetings and faculty performance reviews. However, the current economic climate has significantly reduced opportunities for grant funding and many award amounts are also reduced.
Year 4	
Year 5	

Unit Objective	HORT Objective 2.2 Increase the number of research publications by 25% per year
Related Goals/Metrics	Ag Goal 2. Promote Research and Creative Work to Increase the Intellectual, Social and Economic Capital of Kentucky and the World Beyond its Borders HORT Goal 2 Promote Research and Creative Work to Increase the Intellectual, Social and Economic Capital of Kentucky and the World Beyond its Borders. HORT Metric 2.2 Increase the number of research publications by 25% per year UK Goal 2. Promote Research and Creative Work to Increase the Intellectual, Social, and Economic Capital of Kentucky and the World beyond its Borders.
Related Mission Area	Research and Creative Work

Strategies

Demonstrate the unique ability of Horticulture research to provide information that serves the interest of Kentuckians, as well as citizens of the world, by providing sustainable, economically profitable, healthy, environmentally responsible information.

Assessment Method

The Kentucky Agricultural Experiment Station Annual Report will be used to determine the number of research publications annually.

Actual Results

Data Tables

Horticulture Research Publications

Baseline 2008-2009	2009/2010	2010/2011	2011/2012
23	13	20	16

Descriptive Results

Year 1

Year 2

Year 3

Year 4

Year 5

Analysis of Results and Reflection	Improvement Actions
Year 1	
In 2009/2010, the number of research publications is well below the target level of 29 articles.	Due to the poor performance of the department faculty in the number of research publications, the department chair will place increased emphasis on the importance of publishing more articles in highly-ranked journals.
Year 2	
The number of research publications for 2010/2011 increased by 54% over the previous year, due to the emphasis on publications by the department chair that was stressed during faculty performance reviews.	The horticulture department continues to emphasize increased publication in high-ranking journals.
Year 3	
The number of departmental research publications fell from 20 the previous year to 16 for 2011/2012, a decrease of 20%, in spite of the continued focus on publications by the department chair.	The department chair will continue to emphasize publications in high-ranking journals during faculty meetings and faculty performance reviews.
Year 4	
Year 5	

Unit Objective	HORT Objective 2.3 Increase the collective journal impact factor for total departmental research publications by 25% per year
Related Goals/Metrics	Ag Goal 2. Promote Research and Creative Work to Increase the Intellectual, Social and Economic Capital of Kentucky and the World Beyond its Borders HORT Goal 2 Promote Research and Creative Work to Increase the Intellectual, Social and Economic Capital of Kentucky and the World Beyond its Borders. HORT Metric 2.3 Increase the collective journal impact factor for total departmental research publications by 25% per year UK Goal 2. Promote Research and Creative Work to Increase the Intellectual, Social, and Economic Capital of Kentucky and the World beyond its Borders.
Related Mission Area	Overall

Strategies

Demonstrate the unique ability of Horticulture research to provide information that serves the interest of Kentuckians, as well as citizens of the world, by providing sustainable, economically profitable, healthy, environmentally responsible information.

Assessment Method

The chair of the Horticulture Department will determine the collective journal impact factor annually.

Actual Results

Data Tables

Collective Journal Impact Factor

2008/2009 Baseline	2009/2010	2010/2011	2011/2012
73.6	45.9	51.3	46.2

Descriptive Results

Year 1

Year 2

Year 3

Year 4

Year 5

Analysis of Results and Reflection	Improvement Actions
Year 1	
In 2009/2010, the collective journal impact factor is well below the target value.	Due to poor performance in the collective journal impact factor, the department chair will place increased emphasis on the publication of more articles in highly-ranked journals (by impact factor) during faculty performance reviews.
Year 2	
In 2010/2011, the collective journal impact factor increased by 8.5% over the previous year, yet continues to be below target.	Following a modest increase in the collective journal impact factor in 2010/2011, the publication of more articles in highly-ranked journals continues to be stressed within the department.
Year 3	
In 2011/2012, the collective journal impact factor fell 10% from 2010/2011 and remains below the objective.	The department chair will place increased emphasis on the publication of more research articles in highly-ranked journals during faculty meetings and annual faculty performance reviews.
Year 4	
Year 5	

Unit Objective	HORT Objective 2.4 Increase the number of awarded patents by 25% per year
Related Goals/Metrics	Ag Goal 2. Promote Research and Creative Work to Increase the Intellectual, Social and Economic Capital of Kentucky and the World Beyond its Borders HORT Goal 2 Promote Research and Creative Work to Increase the Intellectual, Social and Economic Capital of Kentucky and the World Beyond its Borders. HORT Metric 2.4 Increase the number of provisional and awarded patents by 25% per year UK Goal 2. Promote Research and Creative Work to Increase the Intellectual, Social, and Economic Capital of Kentucky and the World beyond its Borders.
Related Mission Area	Overall

Strategies

Demonstrate the unique ability of Horticulture research to provide information that serves the interest of Kentuckians, as well as citizens of the world, by providing sustainable, economically profitable, healthy, environmentally responsible information.

Assessment Method

The Kentucky Agricultural Experiment Station Annual Report and Horticulture Department chair will determine number of awarded patents annually.

Actual Results

Data Tables

Horticulture Patents Awarded

2009/2009 Baseline	2009/2010	2010/2011	2011/2012
2	0	1	0

Descriptive Results

Year 1

Year 2

Year 3

Year 4

Year 5

Analysis of Results and Reflection	Improvement Actions
Year 1	
For 2009/2010, the number of patents awarded fell to zero, well below the target value of 2.5.	Due to poor performance in the number of awarded patents, the department chair will place increased emphasis on the development of intellectual property during annual performance reviews.
Year 2	
In 2010/2011, the number of patents rose to one, but was still below the objective of 3 patents awarded.	The increased development of intellectual property remains a high priority of the Horticulture Department.
Year 3	
The department continues to be below target for the number of awarded patents with zero patents received in 2011/2012.	The department chair will continue to place additional emphasis on the development of intellectual property during annual faculty performance reviews and faculty meetings.
Year 4	
Year 5	

Unit Objective	HORT Objective 3.1 Fill two vacant faculty positions by 2014
Related Goals/Metrics	Ag Goal 3. Develop the Human and Physical Resources of the College to Achieve Top 20 Stature HORT Goal 3 Develop the Human and Physical Resources of the College to Achieve Top 20 Stature. HORT Metric 3.1 Fill two vacant faculty positions by 2014 UK Goal 3. Develop the Human and Physical Resources of the University to Achieve the Institution's Top 20 Goals.
Related Mission Area	Overall

Strategies

The department will capitalize on increasing numbers of Sustainable AG (SAG) students and the increasing visibility and success of its research programs in biofuels and sustainability to successfully argue for additional faculty positions in these areas.

Assessment Method

The total number of faculty in the department will be tracked using the UK Faculty Database and departmental records.

Actual Results

Data Tables

Descriptive Results

Year 1

2008/2009 Baseline - The department has a total of 15 faculty with two open positions.

2009/2010 - The department had a retirement in 2009 which has not been filled. Now the department has 14 faculty with 3 open positions

Year 2

2010/2011 - The department still has two open positions, but has added a lecturer position in floral design and successfully argued to create a new position in sustainable agriculture.

Year 3

2011/2012 - The department lost all of the funding for open positions through budget cuts. However, we were able to advertise and move towards filling a newly created sustainable horticulture position due to an impending faculty resignation.

Year 4

Year 5

Analysis of Results and Reflection	Improvement Actions
Year 1	
With three open positions within the department, it may become necessary to combine positions and resources in order to successfully fill vacant positions.	Stronger efforts will be made within the department to fill open positions. The department will develop a plan that fulfills the overall goals and objectives of the new strategic plan for increasing the number of faculty.
Year 2	
We have successfully combined the resources from two open positions to fund a new position, available July 1, 2012.	The department chair will continue to work with the dean of the College of Agriculture to identify funding sources in order to add faculty to the department.
Year 3	
Creative budgetary moves were necessary to accommodate a 6.4% cut and still be able to fund a new position.	The department chair continues to monitor the budget situation and press college administration for the hiring of additional horticulture faculty.
Year 4	
Year 5	

Unit Objective	HORT Objective 3.2 Identify opportunities for office and research space so the department can move towards unification
Related Goals/Metrics	Ag Goal 3. Develop the Human and Physical Resources of the College to Achieve Top 20 Stature HORT Goal 3 Develop the Human and Physical Resources of the College to Achieve Top 20 Stature. HORT Metric 3.2 Identify opportunities for office and research space so the department can move towards unification UK Goal 3. Develop the Human and Physical Resources of the University to Achieve the Institution's Top 20 Goals.
Related Mission Area	Research and Creative Work

Strategies

As the department's educational and research performance increases, we will target those areas in the Plant Science building that are under-utilized and argue for acquiring that space for Horticultural faculty.

Assessment Method

The total number of faculty with programs located in Ag. Sci. North, as well as those in the Plant Science Building, will be monitored annually.

Actual Results

Data Tables

Descriptive Results

Year 1

2008/2009 baseline - Three faculty members are located in the Plant Science Building and 11 in Ag. Sci. North Building.

2009/2010 - The distribution of faculty remains unchanged.

Year 2

2010/2011 - The distribution of faculty remains unchanged.

Year 3

2010/2012 - The distribution of faculty remains unchanged.

Year 4

Year 5

Analysis of Results and Reflection	Improvement Actions
Year 1	
In order to successfully move toward the consolidation of faculty and staff in one building, the department needs to demonstrate an imperative need for additional research and/or office space.	We will identify underutilized space at the office and laboratory level in the Plant Science Building and argue for placement of the department's most successful research program (s) in that space.
Year 2	
With approval to fill a new faculty position in research/teaching, an increased need will be created for additional laboratory space.	The department will use the hiring of a new faculty member to actively argue for additional space in the Plant Science building.
Year 3	
The spatial distribution of the Horticulture faculty remains unchanged, with faculty in both the Plant Science Building and Agricultural Sciences North Building.	The department chair will continue to actively pursue additional space for departmental faculty in the Plant Science building.
Year 4	
Year 5	

Unit Objective	HORT Objective 3.3 Secure on average over the next four years at least two national/international recognition awards for faculty each year
Related Goals/Metrics	Ag Goal 3. Develop the Human and Physical Resources of the College to Achieve Top 20 Stature HORT Goal 3 Develop the Human and Physical Resources of the College to Achieve Top 20 Stature. HORT Metric 3.3 Secure on average over the next 4 years at least two national/international recognition awards for faculty each year UK Goal 3. Develop the Human and Physical Resources of the University to Achieve the Institution's Top 20 Goals.
Related Mission Area	Research and Creative Work

Strategies

The department will foster an atmosphere of collective creativity and a community of scholars among faculty and staff.

Assessment Method

The department chair will record the number of national/international recognition awards for Horticulture faculty annually.

Actual Results

Data Tables

Horticulture National and International Awards

2008/2009 Baseline	2009/2010	2010/2011	2011/2012
0	0	0	0

Descriptive Results

Year 1

Year 2

Year 3

Year 4

Year 5

Analysis of Results and Reflection	Improvement Actions
Year 1	
No national or international recognition awards were received by the Horticulture faculty in 2009/2010.	The lack of national and/or international awards by Horticulture faculty continues to be an area of concern. The department faculty will make a concerted effort to nominate peers within the department for recognition awards.
Year 2	
No national or international recognition awards were received by the Horticulture faculty in 2010/2011.	Despite a departmental emphasis on nominations for national and/or international awards, the Horticulture Department continues to struggle with this metric. The departmental chair will emphasize the submission of nominees for national/international awards at all faculty meetings.
Year 3	
No national or international recognition awards were received by the Horticulture faculty in 2011/2012.	The department chair and faculty will continue to encourage and foster nominations for national and/or international awards within the department. The nomination of faculty members for national and international recognition awards will continue to be a priority that is discussed at all faculty meetings.
Year 4	
Year 5	

Unit Objective	HORT Objective 3.4 Increase technical and support staff by hiring four new positions
Related Goals/Metrics	Ag Goal 3. Develop the Human and Physical Resources of the College to Achieve Top 20 Stature HORT Goal 3 Develop the Human and Physical Resources of the College to Achieve Top 20 Stature. HORT Metric 3.4 Increase technical and support staff by hiring 4 new positions UK Goal 3. Develop the Human and Physical Resources of the University to Achieve the Institution's Top 20 Goals.
Related Mission Area	Overall

Strategies

Foster an atmosphere of collective creativity and a comminuty of scholars among faculty and staff

Assessment Method

The department chair will record and monitor the number of technical and support staff within the department.

Actual Results

Data Tables

Descriptive Results

Year 1

Budget cuts in state funds, as well as in soft funds like the Kentucky Horticulture Council, have prevented adding any new technical or support staff positions.

Year 2

Again, the department has not been able to add any new staff or technical positions because of budget cuts.

Year 3

Due to budgetary constraints in 2011-2012, the Horticulture Department was again unable to hire additional technical and support staff.

Year 4

Year 5

Analysis of Results and Reflection	Improvement Actions
Year 1	
We have tried to creative ways to circumvent the absence of any ability to contribute to this goal but have been uncessful.	Perhaps acquisition of additional funds from sources other than state can be used to temporarily help with this objective.
Year 2	
It is unlikely that we can contribute to this objective in the current budget environment.	We must consider removing this objective.
Year 3	
The university is currently in the third year of progressive budget cuts. Since it looks unlikely that the hiring of additional staff will be possible in the near future, the department should consider modifying or deleting this objective.	After this year, we will remove this objective.
Year 4	
Year 5	

Unit Objective	HORT Objective 3.5 Reduce the reliance of the Horticulture Research Farm on natural gas and city water by 20% per year utilizing natural supplies of water and biofuel derived from heating sources
Related Goals/Metrics	Ag Goal 3. Develop the Human and Physical Resources of the College to Achieve Top 20 Stature HORT Goal 3 Develop the Human and Physical Resources of the College to Achieve Top 20 Stature. HORT Metric 3.5 Reduce the reliance of the Horticulture Research Farm on natural gas and city water by 20% per year utilizing natural supplies of water and biofuel derived heating sources UK Goal 3. Develop the Human and Physical Resources of the University to Achieve the Institution's Top 20 Goals.
Related Mission Area	Overall

Strategies

A significant portion of funding through Crop Diversification, Biofuel Research, and the Education Center will be devoted to this objective.

Assessment Method

The department will record and monitor water and gas consumption on the Horticulture Research Farm (HRF) annually. Additionally, novel research tools for promoting sustainable/ organic production practices will be constructed.

Actual Results

Data Tables

Year 1

In the 2008/2009 baseline year, the Horticulture Reasearch Farm used 8M gallons of water and $45,000 of natural gas. The majority of these expenditures were associated with the newly constructed greenhouse complex.

The results for 2009 do not signify a reduction in the consumption of water and gas.

Year 2

This objective to reduce the reliance on city water and gas has suffered a major obstacle with the loss of the funding supplied through federal appropriations.

Year 3

The loss of federal appropriations has prevented further progress in reducing the consumption of natural gas and water at the Horticultural Research Farm.

Year 4

Year 5

Analysis of Results and Reflection	Improvement Actions
Year 1	
Although utilization of natural resources at the HRF was not reduced, careful monitoring identified where the largest consumption was occurring and appropriate measures have been identified to address this in the following year.	Improvement in conservation of water and gas usage will be achieved through the identification of problem areas where suitable modifications and alternative sources can be effectively utilized. Plans have been developed to re-engineer the pad-and-fan cooling system for the greenhouses (now documented as a major factor in water usage) and additional plans are underway to develop a biofuel-based heating system for the greenhouses.
Year 2	
In the absence of governmental funding, the department needs to explore alternative funding sources to keep this initiative active. However, major leaks in the pad and fan cooling system were repaired and a 5 acre planting of genetically unique miscanthus as a future source of on-farm biofuel was completed.	The department chair and faculty will work to identify new sources of funding for the promotion of sustainable and organic production practices at the HRF. Leadership and operations at our research farm will be greatly altered.
Year 3	
In order to more efficiently utilize natural resources, major changes in leadership and operations must be initiated at the research farm. It is hoped that this will advance our national recognition and facilitate more efficient resource utilization. New funding sources need to be identified.	The department will begin a major effort to increase the efficiency of farm operations. The department chair will continue to explore new funding sources and will work with the College of Agriculture Office for Advancement to identify new sources of funding.
Year 4	
Year 5	

Unit Objective	HORT Objective 4.1 Increase the proportion of students from under-represented groups
Related Goals/Metrics	Ag Goal 4 Promote Diversity and Inclusion HORT Goal 4 Promote Diversity and Inclusion. HORT Metric 4.1 Increase the proportion of students from under-represented groups UK Goal 4. Promote Diversity and Inclusion
Related Mission Area	Overall

Strategies

Develop and implement plans that emphasize the value and significance of diversity.
Target new faculty and staff hires, as well as student recruitment, toward under-represented groups.
Establish community and campus collaborations with diverse groups and organizations which foster inclusiveness among and between under-represented groups.

Assessment Method

Using IRPE data, the department will tabulate the number of students from under-represented groups.

Actual Results

Data Tables

Horticulture Students from Under-Represented Ethinic Groups

2008/2009 Baseline	2009/2010	2010/2011	2011/2012
0	0	0	1

Horticulture Female Undergraduate Students

2008/2009 Baseline	2009/2010	2010/2011	2011/2012
3 of 12	3 of 13	1 of 11	5 of 27

Year 1

We have 3 out of 13 undergraduates that are female and 3 female graduate students. We do not have any minority undergraduate or graduate students.

Year 2

While the number of female undergraduate students has dropped to 1, we have added an additional female graduate student to make a total of 4 female graduate students. We do not have any minority undergraduate or graduate students.

Year 3

We have increased the number of female undergraduate students to 5 and still have 4 female graduate students. We have added 1 female graduate student that is Latino.

Year 4

Year 5

Analysis of Results and Reflection	Improvement Actions
Year 1	
Efforts will continie to try and attract female students as well as students from underrepresented and minority groups. However, the general trend in enrollment has been down.	We need to evaluate our continued participation in the PLS program as HPLS especially in terms of our ability to contribute to this objective.
Year 2	
While our numbers are not declining in the area of female students and graduate students we are not increasing our numbers in terms of minorities.	It may be worthwhile to consider merging the undergraduate Hort program with the newly formed SAG program.
Year 3	
Despite downward trends in enrollment we are still holding steady in terms of female stduents and have added at least 1 student from an underrepresented group.	We have initiated discussions with SAG faculty about merging undergraduate programs.
Year 4	
Year 5	

Unit Objective	HORT Objective 4.2 Increase the proportion of faculty and staff from under-represented groups
Related Goals/Metrics	Ag Goal 4 Promote Diversity and Inclusion HORT Goal 4 Promote Diversity and Inclusion. HORT Metric 4.2 Increase the proportion of faculty and staff from under-represented groups UK Goal 4. Promote Diversity and Inclusion
Related Mission Area	Overall

Strategies

The Department of Horticulture will emphasize with each newly available staff and/or faculty position the consideration of candidates that represent minorities and other underrepresented groups.

Assessment Method

The department will record and track the number of underrepresented groups in faculty and staff positions.

Actual Results

Data Tables

Year 1

In 2008/2009, the baseline year, there were 14 faculty members in the department with two women and no minorities. In 2009/2010, the distribution of women and minority faculty members remained the same in as 2008/2009 due to no new hires of faculty or staff from underrepresented groups.

Year 2

In 2010/2011, we have three female faculty members, but still no minorities.

Year 3

In 2011/2012, the department engineered salary savings in cooperation with the Dean to hire a minority extension associate whose position was going to be eliminated. We now have three female faculty members and one minority staff.

Year 4

Year 5

Analysis of Results and Reflection	Improvement Actions
Year 1	
With hiring freezes currently in place, there will be little opportunity to facilitate a change in the distribution of women and minority faculty and staff members in the department.	Although existing budget constraints make hiring additional faculty and staff from under-represented goups unlikely, the department will continue to explore ways i to increase diversity within the department.
Year 2	
A new faculty position has been created. This will present an opportunity to recruit a candidate from an underrepresented group. We continue to make adequate strides towards increasing our appreciation and inclusion of minorities and other underrepresented groups.	With the creation of a new position, the department will attempt to fill this position with an individual from an underrepresented group.
Year 3	
We have increased the representation of minority groups in the department by one individual. The hiring of additional individuals from underrepresented groups is unlikely given the current budget climate at UK.	The current budget limitations make filling vacant positions and hiring impossible, thus making an increase in the number of faculty and staff from underrepresented groups impossible.
Year 4	
Year 5	

Unit Objective	HORT Objective 4.3 Increase the number of collaborations with organizations whose missions and goals promote diversity and inclusion
Related Goals/Metrics	Ag Goal 4 Promote Diversity and Inclusion HORT Goal 4 Promote Diversity and Inclusion. HORT Metric 4.3 Increase the number of collaborations with organizations whose missions and goals promote diversity and inclusion UK Goal 4. Promote Diversity and Inclusion
Related Mission Area	Overall

Strategies

The department will establish collaborative relationships with faculty at Kentucky State University (KSU) by appointing KSU faculty as adjunct members of the department and their promotion through UK's tenure and promotion system.

Assessment Method

The department will track the number of KSU faculty that are adjunct faculty members in the department and the number that successfully progress through the tenure and promotion progress.

Actual Results

Data Tables

Descriptive Results

Year 1

In 2009/2010, the department established a working relationship with the Bluegrass Domestic Violence Program through a community outreach program to develop a sustainable market garden and horticulture therapy program. Many of the individuals in this program are from minorities and underrepresented groups.

In the baseline year 2008/2009, there were three KSU faculty members with adjunct faculty appointments in the department. The department has increased our collaborations with Kentucky State University, an 1890 Land-Grant university with a significant body of underrepresented groups. In 2009/2010, one KSU faculty member was successfully promoted through UK to the rank of associate professor.

Year 2

In 2010/2011, one adjunct KSU faculty member will be recommended for promotion to full professor. The department continues to support the Bluegrass Domestic Violence Program through its outreach efforts in the sustainable market garden and the horticulture therapy program.

Year 3

In 2011/2012, the Horticulture Department successfully promoted a KSU faculty member to adjunct full professor. The department's work in support of the Bluegrass Domestic Violence Program is ongoing through the sustainable market garden and horticulture therapy programs.

Year 4

Year 5

Analysis of Results and Reflection	Improvement Actions
Year 1	
The department has made good strides in its outreach efforts to engage other organizations that are involved with minorities and underrepresented groups, but will still needs to add faculty and staff from underrepresented groups. With the promotion of one KSU faculty member to associate professor, some progress has been made.	The department will continue its efforts to engage other organizations such as KSU and the Bluegrass Domestic Violence Program in collaborative relationships where we can assist with inclusiveness of underrepresented groups.
Year 2	
We are fulfilling our original goals and objectives and will continue to collaborate with the KSU faculty and the Bluegrass Domestic Violence Program.	The department chair will continue to nominate KSU adjunct faculty as candidates for promotion and tenure. Another KSU faculty member with adjunct status in the department will go up for promotion in 2011. The department will continue to be actively engaged with the ongoing programs of the Bluegrass Domestic Violence Program.
Year 3	
While we have been successful at meeting this objective, the department chair continues to work with KSU faculty. The sustainable market garden and horticulture therapy programs at Bluegrass Domestic Violence Program continue to positively impact the lives of victims of domestic violence from underrepresented groups.	The Horticulture Department continues to be actively involved in the ongoing sustainable market garden and horticulture therapy programs of the Bluegrass Domestic Violence Program. The department chair and faculty will explore the possibility of adding additional adjunct KSU faculty to the department roster.
Year 4	
Year 5	

Unit Objective	HORT Objective 5.1 Capitalize on new technologies for communication with stakeholders and citizens of the Commonwealth using eXtension, YouTube, and enhanced Web effectiveness
Related Goals/Metrics	Ag Goal 5 Improve the Quality of Life for Kentuckians through Extension, Outreach and Service
	HORT Goal 5 Improve the Quality of Life of Kentuckians through Engagement, Outreach and Service.
	HORT Metric 5.1 Capitalize on new technologies for communication with stakeholders and citizens of the Commonwealth by using eXtension, YouTube, and enhanced Web effectiveness
	UK Goal 5. Improve the Quality of Life of Kentuckians through Engagement, Outreach, and Service.
Related Mission Area	Service

Strategies

Develop new and innovative mechanisms for the transfer of research based educational information to stakeholders and citizens of the Commonwealth.

Assessment Method

The department will capitalize on new technologies for communication with stakeholders and citizens of the Commonwealth by using eXtension, YouTube, and enhanced Web effectiveness.

Actual Results

Data Tables

Descriptive Results

Year 1

In the 2008/2009 baseline year, the department established a leadership role in the development and utilization of eXtension programming and technology through the efforts of Dr. Rick Durham. In 2009/2010, Dr. Durham continued his efforts with the effective enhancement and development of eXtension programming as well as other web-based technologies.

Year 2

The major re-design and development of a new web page for the department has begun.

Year 3

YouTube and other electronic web-based outlets are used by several faculty to communicate information with growers and stakeholders. A major re-design of the departmental web page continues.

Year 4

Year 5

Analysis of Results and Reflection	Improvement Actions
Year 1 The eXtension program has reached an outstanding number of clients and stakeholders and is currently still under Dr. Durham's guidance in the Master Gardner's section.	The department chair will continue to encourage the development of eXtension programming. The web site will be revamped and enhanced.
Year 2 We are anticipating that the new web page will contain every available avenue for communication with citizens in the commonwealth interested in Horticulture.	The department will continue to re-design and upgrade the web site. The development of new eXtension programming will continue to be encouraged by the department chair.
Year 3 To date, the departmental efforts to modify and enhance the Horticulture web page have been productive and are ongoing.	The department chair will continue to encourage the development of new, innovative methods of reaching citizens and stakeholders throughout the state with new technologies.
Year 4	
Year 5	

Unit Objective	HORT Objective 5.2 Increase the number of competetive federal and state grants awarded to faculty integrating extension, research, and educational programs
Related Goals/Metrics	Ag Goal 5 Improve the Quality of Life for Kentuckians through Extension, Outreach and Service HORT Goal 5 Improve the Quality of Life of Kentuckians through Engagement, Outreach and Service. HORT Metric 5.2 Increase the number of competitive federal and state grants awarded to faculty integrating extension, research, and educational programs UK Goal 5. Improve the Quality of Life of Kentuckians through Engagement, Outreach, and Service.
Related Mission Area	Service

Strategies

Increase the number of competitive federal and state grants awarded to faculty integrating extension, research, and educational programs.

Assessment Method

Using UK OSPA, the number of grants submitted and acquired through faculty with a major extension appointment will be monitored annually by the department chair.

Actual Results

Data Tables

Descriptive Results

Year 1

For the baseline year 2008/2009, two extension faculty secured extramural funding through competitive agencies for activities which integrate research, extension, and education. In 2009/2010, the number of extension faculty securing funding increased from two to three.

Year 2

In 2010/2011, there were four extension faculty with competitive funding for programs integrating research, extension, and education.

Year 3

In 2011/2012, we now have five extension faculty who secured competitive funding for their programs integrating research, extension, and education.

Year 4

Year 5

Analysis of Results and Reflection	Improvement Actions
Year 1 Progress towards developing a larger number of extension faculty with extramural support for their programs is progressing well, with an increase of 50% from year 1 to year 2.	The department chair will support and encourage extension faculty to apply for extramural grant funding.
Year 2 The number of extension faculty with extramural funding continues to increase. In 2010/2011 the number of extension faculty securing funding increased by 25%. We are making excellent progress on this objective.	Faculty will continue to be urged to pursue extramural grant funding to integrate extension, research, and educational programs.
Year 3 In 2011/2012, the number of extension faculty who secured competetive federal and state grants increased by 20%. With continued increases in extension faculty members receiving extramural funding, the department is doing well on this objective.	The department chair will continue to foster and promote the submission of grant requests for the integration of extension, research, and educational programs during all departmental faculty meetings.
Year 4	
Year 5	

Unit Objective	HORT Objective 5.3 Increase the number of extension FTE's devoted to sustainable/organic production systems across all Horticultural commodities
Related Goals/Metrics	Ag Goal 5 Improve the Quality of Life for Kentuckians through Extension, Outreach and Service HORT Goal 5 Improve the Quality of Life of Kentuckians through Engagement, Outreach and Service. HORT Metric 5.3 Increase the number of extension FTE’s devoted to sustainable/organic production systems across all Horticultural commodities UK Goal 5. Improve the Quality of Life of Kentuckians through Engagement, Outreach, and Service.
Related Mission Area	Service

Strategies

Increase the number of extension FTE’s devoted to sustainable/organic production systems across all Horticultural commodities.

Assessment Method

Using departmental records, the number of extension faculty with programs devoted to sustainable/organic production practices will be monitored annually by the department chair.

Actual Results

Data Tables

Descriptive Results

Year 1

In the 2008/2009 baseline year, the department had a minor level of extension FTE's associated with sustainable/organic production practices (0.8). In 2009/2010, the department increased the number of faculty FTE's in extension devoted to sustainable/organic production practices to 1.6.

Year 2

In 2010/2011, the FTE's in extension devoted to sustainable/organic production practices remains at 1.6.

Year 3

In 2011/2012, the FTE's in extension devoted to sustainable/organic production practices remains at 1.6.

Year 4

Year 5

Analysis of Results and Reflection	Improvement Actions
Year 1	
The department has made good progress in this area and intends to continue to add to this important extension FTE.	The department chair will work with the College of Agriculture dean's office to increase the number of extension FTE's devoted to sustainable, organic production practices.
Year 2	
By July 1, 2012, we will have added additional faculty that will carry some impact in this area in the future.	The department chair will continue to work to increase the number of extension FTE's devoted to sustainable, organic production practices.
Year 3	
We are on track to fill a new faculty position in sustainable horticulture and anticipate an increase in research efforts in this area with a potential new faculty hire.	A new faculty member will be hired by July 1, 2012, which will positively influence the number of extension FTE's devoted to sustainable, organic production practices.
Year 4	
Year 5	

Appendix V Annual Review Reports from 2005-2008

UNIVERSITY OF KENTUCKY

STRATEGIC PLANNING AND REPORTING SYSTEM

Annual Review Report 2005-2006 APPROVED

Area	**Provost**	College/Unit	**College of Agriculture**
Department	**Horticulture**	Degree	**N/A**
Data Entry	**Pam Compton**	Approver	**Dewayne Ingram**
Mission Last Modified By	**Dewayne Ingram**	Objective Last Modified By	**Pam Compton**

The Unit Mission is limited to 800 characters. Any characters entered over 800 will be deleted.

Unit Mission:

```
To expand knowledge, develop and evaluate new technologies and appropriate use
of environmental resources for horticultural crop production and utilization,
and deliver information to horticultural clientele for improving the quality
of life in Kentucky, the United States, and the world.
```

Update Unit Mission | Add Objective | Delete Report | Reset Approve Status | Reset

Go To Select Page | Go To View/Edit/Create Narrative Page

Unit Goals and Specific Strategies

To modify an objective, choose the objective button located in the 'obj#' column below.

Obj. #	Unit Goals and Specific Strategies	Assessment Methods, Criteria and Timelines	Results of Assessments	Use of Results to Improve	Relationship to UK Strategic Plan: UK Mission	UK Goal	UK Measures of Progress
01	Goal I: Reach for National Prominence Obj 1: The Department will recruit and retain graduate students who become outstanding leaders and scholars for our state and nation. Obj 2: The Department will increase it's total endowment by 40%. Obj 3: The Department will support the Kentucky Horticulture Council's efforts to secure additional funding for targeted programs. Obj 4: The Department will complete phase I of the Horticulture Research	1. The careers of recent graduates will be monitored annually. 2. The principle and market value of the endowment will be monitored. 3. Successful proposals for funding will be documented. 4. Progress in planning and construction will be monitored.	1. Data will be collected at the end of the three-year period. 2. Contributions to Horticulture endowments have increased the principle by 60% from 2002 to 2006. 3. Grants of $2.15M in 2004 and $980,000 in 2006 were secured for UK Horticulture by the KHC from the Ag. Development Board. A follow-up proposal has been submitted. 4. The cooler building and headhouse have been occupied. A request for bids for a new	1. Successful careers of graduates will be used in recruitment activities. 2.We will build on recent successes and contact other potential donors, targeting the Robert E. McNiel Horticulture Enrichment Fund. 3. Programs will be delivered to impact target clientele. Reports will be generated. 4. Approved plans and	Overall	1. National Prominence	1.1 1.4 0 0

	and Education Center Improvement Project.		greenhouse complex has been distributed. Utilities have been expanded to the site.	successful bidders will be managed toward project completion.					
02	Goal II. Attract and Graduate Outstanding Students Obj 1: Increase to 5 the number of undergraduates presenting papers at professional meetings annually. Obj 2: Increase participation in ALCA competition to 15 landscape management students. Obj 3: Increase students to 15 per year in national/international study tours. Obj 4: Increase to 50% graduates employed in horticulture or plant science professions. Obj 5: Increase to 50% the number of students in HEM pursuing a minor in Ag. Economics or Business. Obj. 6: Increase to 35% PLS/HS graduates entering graduate school.	1. The number of papers presented will be recorded annually. 2. The number of students participating will be recorded annually. 3. The number of students participating will be recorded annually. 4. The graduating senior interviews will document the employment plans for each graduate. Monitoring employment of students will continue after graduation. 5. Plans of study of current students will be studied relative to courses taken. 6. The graduating senior interviews will document plans for advanced education.	1. Six undergraduates presented papers at national/international (5) or state (1) professional meetings in 2004-05, but only 1 in 2005-06. 2. Seven students participated in the competition in 2004, 10 participated in 2005 and 8 in 2006. 3. Six students participated in the 2004, 14 in 2005 and 11 in 2006. 4. Forty-six percent of 2003-04, 55% of 2004-05 and 75% of 2005-06 graduates were employed in horticulture-related fields. 5. One-third of 2003-2006 graduates received an Ag. Economics or Business minor and more than 50% took several Business courses. 6. Twenty-three percent of 2003-04 graduates, 50% of 2004-05 graduates and 15% of 2005-06 graduates enrolled in graduate school at UK or elsewhere.	1. Students will be better informed about research and some will be encouraged to continue their education beyond the BS degree. 2. Information will be shared with all students and recruitment will begin this fall semester. 3. Methods of recruitment and methods to solidify commitments will continue to be examined. 4. Student advising, industry exposure for students and internships will continue to be emphasized. 5. Students not pursuing the minor will be counseled as to the benefit. 6. Personalized advising and exposure of undergraduates to research as well as employment opportunities will be continued.	Instructional	2. Outstanding Students	2.2	2.4	2.5	2.6
03	Goal III. Attract, Develop and Retain a Distinguished Faculty Obj 1. The Department will increase by 10% the number of faculty receiving national awards and honors. Obj 2. The Department will hire and retain quality faculty. Obj 3. The Department will hire	1. Document award nominations and record awards annually. 2. Monitor faculty hires and retention annually. 3. Monitor staff hires and	1. In 1999-2002, a total of seven awards were received. In the 2003-06 period, six have been received. 2. Two faculty members retired in 1/05, but each received part-time post-retirement appointments. Two faculty searches are underway. 3. One vacancy in 20 hard-	1. Continue efforts on professional development and mentoring of faculty and identify appropriate awards for which faculty can be nominated. 2. Communicate	Overall	3. Disting. Faculty	3.1	3.3	3.4	0

	and retain quality staff.	retention annually.	funded staff positions occurred since 2002. Grant funded Extension Associates (4), Extension Specialists (2) and technician positions (2) were filled since 2003.	needs and opportunities to the College and University for the development of institutional policies and incentives that help retain superior faculty and to fill vacant faculty positions. 3. Communicate needs and opportunities to the College and University for the development of institutional policies and incentives that help retain superior staff.						
04	Goal IV. Discover, Share and Apply New Knowledge Obj 1: The Department will increase competitive extramural grant awards by 10 %. 2. The Department will increase the number of M.S. and Ph. D. students by 15%. 3. The Department will increase the number of postdoctoral scholars and/or visiting scientists by 1 FTE. 4. The Department will increase the number of peer-reviewed research papers by 10%	1. UKRF will provide proposal and award data annually. 2. Number of graduate students supervised by Horticulture faculty will be monitored annually. 3. Monitor the number and length of employment of post doctorial scholars and visiting scientists. 4. Collect publication records on a calendar year basis.	1. Grants from nationally competitive grants with Horticulture faculty as the primary investigator totaled $439,531 in FY04 and $389,000 in FY05. Awards in FY04 totaled $3,141,280 and $1,666,621 in FY05 for all grants with Horticulture faculty as primary investigator. Nationally completive grant awards averaged $116,757 per year during FY00 - FY02. 2. There are 17 graduate students directed by Horticulture faculty in the Fall '05 and Fall '06 semesters, up from the 13 in 2002-2003. 3. There were 3 FTEs in the previous three years. There were 4 FTEs annually for 2005-06. 4. For the previous three years, we averaged 7.7 refereed and 8.5 reviewed papers per year. Refereed publications annually in 2003, 2004 and 2005 were 14, 17 and 14, respectively while reviewed papers numbered 7, 14 and 6 in	1. Identify and support targets of opportunity in research areas where cutting-edge science and critical mass exist to achieve national prominence. 2. Funds will be sought to support more students. 3. Acknowledge faculty attracting and supporting post doctorial scholars. 4. Faculty and graduate student productivity will be rewarded as possible.	Research	4. New Knowledge	4.1	4.2	4.3	4.4

			those years.							
05	Goal V. Nurture Diversity of Thought, Culture, Gender, and Ethnicity Obj 1: The Department will increase the fraction of minority undergraduate students, graduate students and faculty by 10%. Obj 2: The Department will strengthen the collaboration with Kentucky State University faculty with horticulture expertise through adjunct faculty appointments for KSU faculty, co-advising graduate students and collaboration on grant proposals. Obj 3: The Department will increase the number of female faculty members.	1. The numbers will be monitored. 2. The number of adjunct faculty will be monitored. 3. Increase the female faculty members by one.	1. One undergraduate student in Horticulture Science is African-American. 2. Currently, three KSU Principle Investigators with horticulture-related expertise are Adjunct Assistant Professors for Horticulture at UK. 3. No faculty hires have occurred, but there was one unsuccessful offer to a female candidate in 2006.	1. Build on the success of this student to attract others. 2. Continue to interact and support KSU faculty and programs. 3. Continue to search for and develop interaction with female PhD students in the U.S.	Overall	5. Nurture Diversity	5.1	0	0	0

6 objective(s) found.

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View Printable Report

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Approval Status Report | UK Strategic Indicator and/or UK Mission Report | Annual Reports With Missing Data | Print Multiple Annual Reports
User Access Search/Modify | User Access Add | User Role Report
Area Maintenance | College/Unit Maintenance | Department Maintenance | Degree Maintenance
Add Drop Down Maintenance | Search/Modify Drop Down Maintenance
Approval Date Maintenance | Mission Maintenance | Goal Maintenance | UK Measures of Progress Maintenance
Copy Records From One Fiscal Year to Another
Notes

UNIVERSITY OF KENTUCKY

STRATEGIC PLANNING AND REPORTING SYSTEM

Annual Review Report 2006-2007 APPROVED

Area	**Provost**	College/Unit	**College of Agriculture**
Department	**Horticulture**	Degree	**N/A**
Data Entry	**Pam Compton**	Approver	**Dewayne Ingram**
Mission Last Modified By	**Dewayne Ingram**	Objective Last Modified By	**Pam Compton**

The Unit Mission is limited to 800 characters. Any characters entered over 800 will be deleted.

Unit Mission

To expand knowledge, develop and evaluate new technologies and appropriate use of environmental resources for horticultural crop production and utilization, and deliver information to horticultural clientele for improving the quality of life in Kentucky, the United States, and the world.

Update Unit Mission | Add Objective | Delete Report | Reset Approve Status | Reset

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Unit Goals and Specific Strategies

To modify an objective, choose the objective button located in the 'obj#' column below.

Obj. #	Unit Goals and Specific Strategies	Assessment Methods, Criteria and Timelines	Results of Assessments	Use of Results to Improve	Relationship to UK Strategic Plan: UK Mission	UK Goal	UK Measures of Progress
01	Goal I: Enhance the University's Stature Among its Peers Objective 1: The Department will recruit, hire and retain quality faculty and staff. Objective 2: The Horticulture faculty members will receive eight significant awards and honors or be selected/elected to national professional leadership positions in this five-year period. Objective 3: The Department will complete phase II of the Horticulture Research	Obj. 1: Monitor faculty hires and retention annually. Obj. 2: Document award nominations and awards annually. Obj. 3: Progress in planning and construction will be monitored. Obj. 4: The endowment goal will be reached by 2012.	Obj. 1: Two faculty members were hired in 2006-07 with one beginning in July and the other in January, 2008. Another faculty search is underway. One vacancy in 20 hard-funded staff positions occurred since 2002. Three grant-funded Extension Associate and three technician positions were filled in 2006-07. Obj. 2: One national award was received by faculty in the first year, 2006-07. One was elected Vice-President of the American Society for Horticultural Science in 2007. Obj. 3:	Obj. 1: Communicate needs and opportunities to the College and University for the development of institutional policies and incentives that help retain superior faculty/staff and to fill vacant positions. Obj. 2: Continue efforts on professional development and mentoring of faculty and	Overall	1. Enhance Stature	12 8 0 0

	and Education Center Improvement Project. Objective 4: The Department will increase its total endowment by 10%.		The research greenhouses have been erected and electrical, plumbing and electronic controls are being installed. The shop building has been designed. Obj. 4: Contributions to Horticulture endowments increased the principle by 3% in 2006-07.	identify appropriate awards for which faculty can be nominated. Obj. 3: Approved plans and successful bidders will be managed toward project completion. Obj. 4: We will continue cultivating potential donors.						
02	Goal II. Prepare Students for Leadership in the Knowledge Economy and Global Society - Obj. 1: The Department will recruit, retain and graduate students who become outstanding leaders in horticulture for our state, nation and world. Obj. 2. The Department will increase to 20% the undergraduates actively involved in research. Obj. 3: The Department will increase landscape-oriented student participation in PLANET competition to 30%. Obj. 4. The Department will re-analyze the skills, knowledge and abilities desired in a horticulturist and revise the curriculum to maximize faculty impact.	Obj. 1: The careers of recent graduates will be monitored. Obj. 2: The number of students participating in research will be recorded annually and the goal achieved by 2012. Obj. 3: The number of students participating will be recorded annually and the goal achieved by 2012. Obj. 4: The Department will submit a revised curriculum to the College by 2009.	Obj. 1: Eighty percent of horticulture students graduating in 2006-07 took positions in the industry and the other 20% were considering graduate school. Obj. 2: Fifteen percent of undergraduates participated in research projects with Horticulture faculty in 2006-07. Obj. 3: Twenty percent of students participated in the competition in 2007. Obj. 4: The Undergraduate Education Committee has begun the process.	Obj. 1: Successful careers of graduates will be used in recruitment activities. Obj. 2: Student success and enjoyment will be used to encourage other students to participate in research and consider education beyond the BS degree. Obj. 3: Information will be shared with all students and recruitment will begin in the fall semesters. Students will make contacts for future employment. Obj. 4: The curriculum will be revised.	Instructional	2. Prepare Students	4	16	5	0
03	Goal III: Enhance the Intellectual and Economic Capital of Kentucky through Growth in Research - Objective 1: The Department will increase extramural grant support by 10%. Objective 2: The Department will increase the number of PhD students and postdoctoral scholars by 15%.Objective 3: The Department will increase the number of peer-	Obj. 1: Award data will be recorded annually and compared in 2012 to the 2004-06 annual average. Obj. 2: Number of graduate students and postdoctoral scholars supervised by Horticulture faculty in 2010-	Obj. 1: Official data for awards from nationally competitive grants with Horticulture faculty as the primary investigator and all direct awards are not yet available for FY07. Obj. 2: Baseline for comparisons will be seven PhD graduate students directed by Horticulture faculty in the Fall '07 and four postdoctoral scholars were supervised in FY07. Obj. 3: We published an average of 14.6 refereed	Obj. 1: Identify and support targets of opportunity in research areas where cutting-edge science and critical mass exist to achieve national prominence. Obj. 2: Funds will be sought to support more graduate students and postdocs. Obj. 3:	Research	3. Expand Research	6	14	15	0

	reviewed research papers by 10%.	12 will be compared to the 2004-06 average. Obj. 3: Publication records in 2010-12 will be compared to the 2004-06 average.	and 6 reviewed papers per year during 2003-05. Three book chapters, 11 refereed journal articles and 10 reviewed proceedings were published in 2006.	Faculty and graduate student productivity will be rewarded as possible.						
04	Goal IV: Embrace and Nurture Diversity - Objective 1: The Department will recruit minority undergraduate students, graduate students and faculty. Objective 2: The Department will strengthen the collaboration with Kentucky State University faculty with horticulture expertise through adjunct faculty appointments for KSU faculty, co-advising graduate students and collaboration on grant proposals. Objective 3: The Department will increase the number of female faculty and staff members.	Obj. 1: The numbers will be monitored. Obj. 2: The number of adjunct faculty, joint grant proposals and co-advised graduate students will be monitored. Obj. 3: Increase the female faculty members by one and staff members by two.	Obj. 1: Although enrollment records for the Fall '07 are incomplete at this time, it appears that there are no African-American undergraduate or graduate students in our program. Obj. 2: Three KSU Principle Investigators with horticulture-related expertise are Adjunct Assistant Professors for Horticulture at UK. One collaborative grant proposals was submitted and two graduate students were co-advised in FY07. Obj. 3: Interviewed two female faculty candidates in 2006. One offer was declined. Increased females in professional staff positions by one.	Obj. 1: Continue collaborative effort with college recruiters to attract minority students and pursue any potential faculty candidates. Obj. 2: Continue to interact and support KSU faculty and programs. Obj. 3: Continue to search for and initiate interaction with female PhD students in Horticulture in the US for potential recruitment as faculty.	Overall	4. Nurture Diversity	7	9	10	0
05	Goal V: Engage Kentuckians through Partnerships to Elevate Quality of Life Objective 1: The production of "new-opportunity" horticultural crops in Kentucky will increase by 20%. Objective 2: The Department will support the Kentucky Horticulture Council's efforts to secure additional funding for targeted programs. Objective 3: The Department will increase on-farm demonstrations/trials and on-site consultation for the horticultural industries by 10%. Objective 4: The Department will increase applied research projects at the Agricultural	Obj. 1: Monitor crop production with assistance of County Agents. Targeted crops and baseline (2005) production levels include: pot-in-pot nursery crops (15,310 units), blackberries (110 acres), blueberries (62 acres) and grapes (532 acres). Obj: 2: Successful proposals for funding will be documented. Obj. 3: Data will be collected each winter and	Obj. 1: The 2006 production levels were 23,490 units, 130 acres, 125 acres and 696 acres pot-in-pot crops, blackberries, blueberries and grape production, respectively. Obj. 2: A two-year, $2.15M grant was secured in 2007 for UK Horticulture by the KHC from the Ag. Development Board. Obj. 3: On-farm demonstrations/trials and on-farm consultations averaged 49 and 1,000 /yr, respectively, for the three previous years. In 2006, on-farm demonstrations/trials and on-farm consultations increased 34% and 50%, respectively. Obj. 4: Information from field experiments were	Obj. 1: Information about the growth of the crop will help us target program efforts. Obj. 2: Programs will be delivered to impact target clientele. Reports will be generated. Obj. 3: Programs will be modified as appropriate and reports prepared. Obj. 4: Increased information will be shared with appropriate clientele and peer groups.	Service	5. Quality of Life	16	17	0	0

Experiment Station farms by 10%.	compared to the 2005 growing season. Obj. 4: Number of applied research project reports will be recorded annually and compared to the 42 in 2005.	published in the 2006 horticulture crop research reports increased by 45%.

5 objective(s) found.

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Approval Status Report | UK Strategic Indicator and/or UK Mission Report | Annual Reports With Missing Data | Print Multiple Annual Reports
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Area Maintenance | College/Unit Maintenance | Department Maintenance | Degree Maintenance
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Approval Date Maintenance | Mission Maintenance | Goal Maintenance | UK Measures of Progress Maintenance
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UNIVERSITY OF KENTUCKY

STRATEGIC PLANNING AND REPORTING SYSTEM

Annual Review Report 2007-2008 APPROVED

Area	**Provost**	College/Unit	**College of Agriculture**
Department	**Horticulture**	Degree	**N/A**
Data Entry	**Pam Compton**	Approver	**Dewayne Ingram**
Mission Last Modified By	**Dewayne Ingram**	Objective Last Modified By	**Pam Compton**

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of environmental resources for horticultural crop production and utilization,
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Update Unit Mission | Add Objective | Delete Report | Reset Approve Status | Reset

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Unit Goals and Specific Strategies

To modify an objective, choose the objective button located in the 'obj#' column below.

Obj. #	Unit Goals and Specific Strategies	Assessment Methods, Criteria and Timelines	Results of Assessments	Use of Results to Improve	Relationship to UK Strategic Plan: UK Mission	UK Goal	UK Measures of Progress
01	Goal I: Enhance the University's Stature Among its Peers Objective 1: The Department will recruit, hire and retain quality faculty and staff. Objective 2: The Horticulture faculty members will receive eight significant awards and honors or be selected/elected to national professional leadership positions in this five-year period. Objective 3: The Department will complete phase II of the Horticulture Research and	Obj. 1: Monitor faculty hires and retention annually. Obj. 2: Document award nominations and awards annually. Obj. 3: Progress in planning and construction will be monitored. Obj. 4: The endowment goal will be reached by 2012.	Obj. 1: Two faculty members were hired in 2007-08 with one beginning in January, 2008 and the other in July. Two faculty searches are underway. Two vacancies in 20 hard-funded staff positions occurred since 2002. An grant-funded Extension Associate and one technician position was filled in 2007-08. Obj. 2: Two national awards have been received by faculty. One was installed as Vice-President of the American Society for Horticultural Science in 2008. Obj. 3:	Obj. 1: Communicate needs and opportunities to the College and University for the development of institutional policies and incentives that help retain superior faculty/staff and to fill vacant positions. Obj. 2: Continue efforts on professional development and mentoring of faculty and	Overall	Enhance Stature	12 8 0 0

	Education Center Improvement Project. Objective 4: The Department will increase its total endowment by 10%.		The research greenhouses are operational. The shop building is being released for bid. Obj. 4: Contributions to Horticulture endowments increased the principle by 3% since 2006.	identify appropriate awards for which faculty can be nominated. Obj. 3: Approved plans and successful bidders will be managed toward project completion. Obj. 4: We will continue cultivating potential donors.						
02	Goal II. Prepare Students for Leadership in the Knowledge Economy and Global Society - Obj. 1: The Department will recruit, retain and graduate students who become outstanding leaders in horticulture for our state, nation and world. Obj. 2. The Department will increase to 20% the undergraduates actively involved in research. Obj. 3: The Department will increase landscape-oriented student participation in PLANET competition to 30%. Obj. 4. The Department will re-analyze the skills, knowledge and abilities desired in a horticulturist and revise the curriculum to maximize faculty impact.	Obj. 1: The careers of recent graduates will be monitored. Obj. 2: The number of students participating in research will be recorded annually and the goal achieved by 2012. Obj. 3: The number of students participating will be recorded annually and the goal achieved by 2012. Obj. 4: The Department will submit a revised curriculum to the College by 2009.	Obj. 1: All horticulture students graduating in 2007-08 took positions in the industry or planned to work in the industry. Obj. 2: Fifteen percent of undergraduates participated in research projects with Horticulture faculty in 2007-08. Obj. 3: Fifteen percent of students participated in the competition in 2008. Obj. 4: The Undergraduate Education Committee has begun the process.	Obj. 1: Successful careers of graduates will be used in recruitment activities. Obj. 2: Student success and enjoyment will be used to encourage other students to participate in research and consider education beyond the BS degree. Obj. 3: Information will be shared with all students and recruitment will begin in the fall semesters. Students will make contacts for future employment. Obj. 4: The curriculum will be revised.	Instructional	Prepare Students	4	16	5	0
03	Goal III: Enhance the Intellectual and Economic Capital of Kentucky through Growth in Research - Objective 1: The Department will increase extramural grant support by 10%. Objective 2: The Department will increase the number of PhD students and postdoctoral scholars by 15%.Objective 3: The Department will increase the number of peer-	Obj. 1: Award data will be recorded annually and compared in 2012 to the 2004-06 annual average. Obj. 2: Number of graduate students and postdoctoral scholars supervised by Horticulture faculty in 2010-	Obj. 1: FY07 extramural grant awards were up 22% over FY06. Obj. 2: The number of PhD graduate students directed by Horticulture faculty in the Fall '08 and four postdoctoral scholars were supervised in FY07 were unchanged. Obj. 3: We published an average of 14.6 refereed and 6 reviewed papers per year during 2003-05. One book chapter, 20 refereed journal articles and 9	Obj. 1: Identify and support targets of opportunity in research areas where cutting-edge science and critical mass exist to achieve national prominence. Obj. 2: Funds will be sought to support more graduate students and postdocs. Obj. 3:	Research	Expand Research	6	14	15	0

	reviewed research papers by 10%.	12 will be compared to the 2004-06 average. Obj. 3: Publication records in 2010-12 will be compared to the 2004-06 average.	reviewed proceedings were published in 2007.	Faculty and graduate student productivity will be rewarded as possible.						
04	Goal IV: Embrace and Nurture Diversity - Objective 1: The Department will recruit minority undergraduate students, graduate students and faculty. Objective 2: The Department will strengthen the collaboration with Kentucky State University faculty with horticulture expertise through adjunct faculty appointments for KSU faculty, co-advising graduate students and collaboration on grant proposals. Objective 3: The Department will increase the number of female faculty and staff members.	Obj. 1: The numbers will be monitored. Obj. 2: The number of adjunct faculty, joint grant proposals and co-advised graduate students will be monitored. Obj. 3: Increase the female faculty members by one and staff members by two.	Obj. 1: Although enrollment records for the Fall '08 are incomplete at this time, it appears that there are no African-American undergraduate or graduate students in our program. Obj. 2: Three KSU Principle Investigators with horticulture-related expertise are Adjunct Assistant Professors for Horticulture at UK. One collaborative grant proposal was submitted and one graduate student was co-advised in FY08. Obj. 3: Interviewed two female faculty candidates for a position in 2007 and hired one.	Obj. 1: Continue collaborative effort with college recruiters to attract minority students and pursue any potential faculty candidates. Obj. 2: Continue to interact and support KSU faculty and programs. Obj. 3: Continue to search for and initiate interaction with female PhD students in Horticulture in the US for potential recruitment as faculty.	Overall	Nurture Diversity	7	9	10	0
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by 10%.	2004-06 mean. Obj. 4: Number of applied research project reports will be recorded annually and compared to the 42 in 2005.	reports.

5 objective(s) found.

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Send comments to: SPRS Comments

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UNIVERSITY OF KENTUCKY

STRATEGIC PLANNING AND REPORTING SYSTEM

Annual Review Report 2008-2009 APPROVED

Area	**Provost**	College/Unit	**College of Agriculture**
Department	**Horticulture**	Degree	**N/A**
Data Entry	**Pam Compton**	Approver	**Robert Houtz**
Mission Last Modified By	**Robert Houtz**	Objective Last Modified By	**Robert Houtz**

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Unit Goals and Specific Strategies

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	its total endowment by 10%.		Horticulture endowments increased the principle by 3% since 2006.	identify appropriate awards for which faculty can be nominated.						
02	Goal II. Prepare Students for Leadership in the Global Society - Obj. 1: The Department will recruit, retain and graduate students who become outstanding leaders in horticulture for our state, nation and world. Obj. 2. The Department will re-analyze the skills, knowledge and abilities desired in a horticulturist and revise the curriculum to maximize faculty impact.	Obj. 1: The careers of recent graduates will be monitored. Obj. 2: The number of students participating in research will be recorded annually and the goal achieved by 2012.	Obj. 1: All horticulture students graduating in 2007-08 took positions in the industry or planned to work in the industry. Obj. 2: Fifteen percent of undergraduates participated in research projects with Horticulture faculty in 2007-08.	Obj. 1: Successful careers of graduates will be used in recruitment activities. Obj. 2: Student success and enjoyment will be used to encourage other students to participate in research and consider education beyond the BS degree.	Instructional	Prepare Students	4	16	5	0
03	Goal III: Enhance the Intellectual and Economic Capital of Kentucky through Growth in Research - Objective 1: The Department will increase extramural grant support by 10%. Objective 2: The Department will increase the number of PhD students and postdoctoral scholars by 15%.	Obj. 1: Award data will be recorded annually and compared in 2012 to the 2004-06 annual average. Obj. 2: Number of graduate students and postdoctoral scholars supervised by Horticulture faculty in 2010-12 will be compared to the 2004-06 average.	Obj. 1: FY09 extramural grant awards were up 22% over FY08, and an average of 20 refereed papers per year during 200-08 and two book chapters were published.	Obj. 1: Identify and support targets of opportunity in research areas where cutting-edge science and critical mass exist to achieve national prominence. Obj. 2: Funds will be sought to support more graduate students and post-docs.	Research	Expand Research	6	14	15	0
04	Goal IV: Embrace and Nurture Diversity - Objective 1: The Department will recruit minority undergraduate students, graduate students and faculty. Objective 2: The Department will strengthen the collaboration with Kentucky State University faculty with horticulture expertise through adjunct faculty appointments for KSU faculty, co-advising graduate students and collaboration on grant proposals. Objective 3:	Obj. 1: The numbers will be monitored. Obj. 2: The number of adjunct faculty, joint grant proposals and co-advised graduate students will be monitored. Obj. 3: Increase the female faculty members by one and staff members by two.	Obj. 1: Although enrollment records for the Fall '08 are incomplete at this time, it appears that there are no African-American undergraduate or graduate students in our program. Obj. 2: Three KSU Principle Investigators with horticulture-related expertise are Adjunct Assistant Professors for Horticulture at UK. One collaborative grant proposal was submitted and one graduate student was co-advised in FY08.	Obj. 1: Continue collaborative effort with college recruiters to attract minority students and pursue any potential faculty candidates. Obj. 2: Continue to interact and support KSU faculty and programs. Obj. 3: Continue to search for and initiate interaction with	Overall	Nurture Diversity	7	9	10	0

	The Department will increase the number of female faculty and staff members.		Obj. 3: Interviewed two female faculty candidates for a position in 2007-2009 and hired two.	female PhD students in Horticulture in the US for potential recruitment as faculty.						
05	Goal V: Engage Kentuckians through Partnerships to Elevate Quality of Life Objective 1: The production of "new-opportunity" horticultural crops in Kentucky will increase by 20%. Objective 2: The Department will support the Kentucky Horticulture Council's efforts to secure additional funding for targeted programs. Objective 3: The Department will increase on-farm demonstrations/trials and on-site consultation for the horticultural industries by 10%. Objective 4: The Department will increase applied research projects at the Agricultural Experiment Station farms by 10%.	Obj. 1: Monitor crop production with assistance of County Agents. Obj: 2: Successful proposals for funding will be documented. Obj. 3: Data will be collected each winter and compared to the 2008 growing season. Obj. 4: Number of applied research project reports will be recorded annually and compared to the 42 in 2007.	Obj. 1: 2008 production levels increased by 24%, 4%, 4% and 3% for pot-in-pot crops, blackberries, blueberries and grape production, respectively over 2006. Obj. 2: A two-year, $2.15M grant was secured in 2008 for UK Horticulture by the KHC from the Ag. Development Board. Obj. 3: On-farm demonstrations/trials and on-farm consultations averaged 49 and 1,000 /yr, respectively. In 2008, on-farm demonstrations/trials and on-farm consultations increased to 58 and 1500, respectively. Obj. 4: Results from 67 applied research projects were published in the 2007 horticulture crop research reports.	Obj. 1: Information about the growth of the crop will help us target program efforts. Obj. 2: Programs will be delivered to impact target clientele. Reports will be generated. Obj. 3: Programs will be modified as appropriate and reports prepared. Obj. 4: Increased information will be shared with appropriate clientele and peer groups.	Service	Quality of Life	16	17	0	0

5 objective(s) found.

Go To Select Page | Go To View/Edit/Create Narrative Page

View Printable Report

View/Edit/Create Annual Report | Annual Report Search
Approval Status Report | UK Strategic Indicator and/or UK Mission Report | Annual Reports With Missing Data | Print Multiple Annual Reports
User Access Search/Modify | User Access Add | User Role Report
Area Maintenance | College/Unit Maintenance | Department Maintenance | Degree Maintenance
Add Drop Down Maintenance | Search/Modify Drop Down Maintenance
Approval Date Maintenance | Mission Maintenance | Goal Maintenance | UK Measures of Progress Maintenance
Copy Records From One Fiscal Year to Another
Notes

Send comments to: SPRS Comments

Last Modified - 4/09/2004

Appendix VI List of Faculty, Staff, Graduate Students and Post-Docs in Horticulture

Off Campus Faculty and Staff

Princeton, Director - Dr. Richard Coffey

Winston C. Dunwell, Professor, Extension

Dwight Wolfe, Research Specialist

Ramona June Johnston, Senior Laboratory Technician

Virginia Travis, Research Farm Technician I

Carey Grable, Extension Associate

RCARS, Quicksand, Director – Dr. David Ditsch

Shawn Wright, Extension Specialist

Mr. Darrell Slone, Farm Superintendent

Shelby County Extension Office

Ty Cato, Extension Associate

Adjunct Faculty

Kirk W. Pomper, Adjunct Associate Professor, Kentucky State University

George F. Antonious, Adjunct Professor, Kentucky State University

Michael Bomford, Adjunct Assistant Professor, Kentucky State University

On Campus Faculty and Staff

Faculty

Robert L. Houtz, Professor and Chair – Research and Teaching

Douglas D. Archbold, Professor – Research and Teaching

Seth DeBolt, Associate Professor – Research and Teaching

Bruce Downie, Associate Professor – Research and Teaching

Richard E. Durham, Professor – Extension and Teaching

William M. Fountain III, Professor, Extension

Robert L. Geneve, Professor – Research and Teaching

Dewayne L. Ingram, Professor – Extension, Research, and Teaching

Krista L. Jacobsen, Assistant Professor - Research and Teaching

Ruth A. Scott, Lecturer – Extension and Teaching

John C. Snyder, Associate Professor – Research

John G. Strang, Professor – Extension and Research

Mark A. Williams, Associate Professor – Research, Teaching, and Special Assignment

Sharon Bale, Extension Specialist – Extension and Teaching (50% Post-Retirement Appointment)

Brent Rowel, Extension Specialist - Extension

Staff

Horticulture Research farm

Mr. Ben Abell, Farm Superintendent

Mr. Dave Lowry, Research Analyst

Ms. Tiffany Thompson, Farm Manager II (CSA)

Sean Lynch, Research Farm Technician

Laboratory Technicians

Jeffrey Wheeler, Research analyst

Kim R. Schafermeyer, Research Analyst

Lynnette M.A. Dirk, Research Specialist

Sharon Kester, Research Analyst

Marta Nosarzewski, Research Analyst,

Roberta Magnani, temporary non-administrative professional

Jozsef Stork, Research Analyst

Jeffrey Wheeler, Research analyst

Secretarial Staff

Pam Compton, Administrative Support Associate

Kathleen Scahill, Administrative Staff Associate

Karen Shahan, Staff Support Associate

Monica Shuler, Staff Support Associate

Other support Personnel and Extension Associates

Christy Cassady, Coordinator, Crop Diversification Center

Shari Dutton, Staff Horticulturist

Cheryl Kaiser, Extension Associate, Crop Diversification

W. Thomas Shearin, Systems Analyst

Dave Spalding, Extension Associate

Sarah Vanek, Extension Associate

Patsy Wilson, Extension Specialist

Chris Smigell, Extension Associate

Stephen Berberich, Extension Associate

Graduate Students

Victoria Anderson, Major Advisor: Krista Jacobsen

Andrea Marisa Sanchez Barrios, Major Advisor: Seth DeBolt

Chad Brabham, Major Advisor: Seth DeBolt

Bob Caudle, Major Advisor: Mark Williams

Alex Hessler, Major Advisor: Krista Jacobsen

Meera Nair, Major Advisor: Seth DeBolt

Sutapa Roy, Major Advisor: Doug Archbold

Mizuki Tateno, Major Advisor: Seth DeBolt

Zheng Wang, Major Advisor: Tim Coolong

Postdoctoral Scholars

Susmitha Nambuthiri, Advisor: Robert Geneve

Carloalberto Petti, Advisor: Seth DeBolt

Ye Xia, Advisor: Seth DeBolt

Yumei Zheng, Advisor: Seth DeBolt

Departmental Collaborators – Selected from previous list

Marcia Farris, Director, The Arboretum State Botanical Garden of Kentucky

Keiko Tanaka, Assistant Professor, Community & Leadership Development

Rebecca McCulley, Associate Professor, Plant and Soil Sciences

Ray Smith, Extension Professor, Plant and Soil Sciences

Kenneth W. Seebold, Jr., Extension Professor, Plant Pathology

C. C. Baskin, Professor, Plant and Soil Sciences

External Constituents and County Agents

County Agents – Selected from all county Hort agents plus one Ag agent

Sarah Fannin, Morgan County

Amanda Sears, Madison County

Beth Wilson, Pulaski County

Jamie Dockery and Delia Scott, Fayette County

Lori Bowling, Boyd County

Annette Heisdorffer, Daviess County

Kelly Jackson, Christian County

External Constituents

This list is basically the same one I sent to you earlier, all of those association presidents and/or their executive directors should be invited.

Appendix VII University of Kentucky Cooperative Extension Service

Feedback on Specialists submitted by County Agents

The comments provided below are from the survey of county extension agents from September 26 through October 21, 2012.

DEPARTMENT: **Horticulture**

[Horticulture] - [BERBERICH, STEPHEN] - Steve has been a good resource for greenhouse questions and has helped straighten up some problems in area greenhouses

[Horticulture] - [BERBERICH, STEPHEN] - Worked with client on mum test plot. She improved her mum production techniques and has benefited from a high quality product to sell. Steve does a great job following up with his past clientele.

[Horticulture] - [BERBERICH, STEPHEN] - Helped with demonstration plot and was very helpful.

[Horticulture] - [BERBERICH, STEPHEN] - Steve usually goes well beyond what is in his job description. I really appreciate him and his unique knowledge base that we don't have in any other specialist.

[Horticulture] - [BERBERICH, STEPHEN] - Stephen is the most knowledgeable greenhouse specialist I have ever worked with.

[Horticulture] - [BERBERICH, STEPHEN] - Mr. Berberich has made a couple trips the my county this year. He has done a great job working with the producers.

[Horticulture] - [BERBERICH, STEPHEN] - Producers love his hands on approach - they are definitely seeing increased profits and labor saving techniques - he is truly a valuable asset!

[Horticulture] - [CATO, TYRRELL] - Ty lead two plasticulture project in my county. he was very informative to both growers and communicated with the extension office.

[Horticulture] - [CATO, TYRRELL] - TY is great to have in our area

[Horticulture] - [COOLONG, TIMOTHY] - Tim returns my emails and calls within a few hours and came to teach my gardeners toolbox class on onion and garlic production. Tim does a great job teaching and relating to my clients.

[Horticulture] - [COOLONG, TIMOTHY] - Tim is always on prompt and helpful with dealing with commercial grower issues. Great specialist!!

[Horticulture] - [COOLONG, TIMOTHY] - Great specialist! Willing to help and very responsive!

[Horticulture] - [COOLONG, TIMOTHY] - Dr Coolong is an excellent young specialist. Hed knows his subject matter and the clientele really like him.

[Horticulture] - [COOLONG, TIMOTHY] - Great specialist, great agent support.

[Horticulture] - [COOLONG, TIMOTHY] - Tim does a great job. He is very responsive and works great with producers and agents alike.

[Horticulture] - [COOLONG, TIMOTHY] - Excellent specialist

[Horticulture] - [COOLONG, TIMOTHY] - Great job, Tim!

[Horticulture] - [COOLONG, TIMOTHY] - Tim does a great job!

[Horticulture] - [COOLONG, TIMOTHY] - Dr. Coolong is very responsive to my needs as an agent and for clientel whether commercial or home horticulture. He supplies the tools that I need to perform my job on the county level effectively. In addition to effective meeting presentations, Dr. Coolong is extremely gifted while working on a one to one situation.

[Horticulture] - [COOLONG, TIMOTHY] - Dr. Coolong responds rapidly and effectively to any and all questions that arise. He consistently goes out of his way to ensure that agents are up-to-date on the latest relevant information by mailing materials such as DVD's and emailing out helpful links and updates. He gives excellent talks and is always well prepared.

[Horticulture] - [COOLONG, TIMOTHY] - extremely helpful when I have needed him for a few problems

[Horticulture] - [COOLONG, TIMOTHY] - Great in dealing with agents. Offers information in a realistic way!

[Horticulture] - [COOLONG, TIMOTHY] - responds quickly with request

[Horticulture] - [COOLONG, TIMOTHY] - Excellent specialist who goes above and beyond to take care of agents and farmers.

[Horticulture] - [COOLONG, TIMOTHY] - Tim is awesome to work with. Goes above and beyond to help

[Horticulture] - [COOLONG, TIMOTHY] - Tim is a trooper and can be depended on to get you help. He is good to work with and as a tremendous asset to the College.

[Horticulture] - [COOLONG, TIMOTHY] - Tim is very knowledgeable in vegetable production and does a good job of interacting with producers.

[Horticulture] - [COOLONG, TIMOTHY] - Tim is outstanding and invaluable in his responsiveness and outreach to county programs and agents.

[Horticulture] - [COOLONG, TIMOTHY] - Tim is a leader in the Horticulture Industry. He is an asset to the Extension Program.

[Horticulture] - [COOLONG, TIMOTHY] - Dr. Coolong is a very good vegetable specialist. He works well with farmers to do on-farm research and demonstrations and keeps agents in the loop.

[Horticulture] - [COOLONG, TIMOTHY] - Easy to contact & easy to work with.

[Horticulture] - [COOLONG, TIMOTHY] - Coolong has always been prompt in his answers back to me, and willing to come to my county if there is a problem.

[Horticulture] - [COOLONG, TIMOTHY] - Tim has worked with two projects in my county. his expertise has been valued to the growers.

[Horticulture] - [COOLONG, TIMOTHY] - Great resource.

[Horticulture] - [COOLONG, TIMOTHY] - Very helpful with anything I ask about.

[Horticulture] - [COOLONG, TIMOTHY] - excellent

[Horticulture] - [COOLONG, TIMOTHY] - Extension is fortunate to have him

[Horticulture] - [COOLONG, TIMOTHY] - Tim has helped tremendously with our local vegetable producers through workshops or one on one field meetings. He address issues with organic and traditional (and everything in between) in a way that is simple and easy for our producers to understand.

[Horticulture] - [COOLONG, TIMOTHY] - Absolutely amazing and always responsive, approachable and smiling. We need more specialists that are happy to help.

[Horticulture] - [COOLONG, TIMOTHY] - Dr Coolong has been an outstanding source of information to help with needs of homeowners and commercial growers in the Purchase Area which are submitted by the Hort Agent. Hort Agent has frequently sent requests for help in vegetable production. Response is always prompt. Many times requests for information have been submitted on nights and weekends. Dr Coolong has sent valuable answers even at these hours when the campus is closed.

[Horticulture] - [COOLONG, TIMOTHY] - He is doing a very good job for the vegetable growers of Kentucky. Good trainings offered.

[Horticulture] - [DUNWELL, WINSTON C] - Dr Dunwell is exceptionally knowledgeable and enthusiastic when providing information about horticulture. I have many consumer questions about horticulture and Dr Dunwell is an excellent source of information. He also provided support by lectures and tour guide.

[Horticulture] - [DUNWELL, WINSTON C] - Dr Dunwell is a good specialist.

[Horticulture] - [DUNWELL, WINSTON C] - Good job.

[Horticulture] - [DURHAM, RICHARD E] - Good job covering both home hort and master gardener programs.

[Horticulture] - [DURHAM, RICHARD E] - works effectatively with meto develope and maintatin excellent master gardner programs

[Horticulture] - [DURHAM, RICHARD E] - Works well with clients in addition to Extension Master Gardeners. Appreciate his help.

[Horticulture] - [DURHAM, RICHARD E] - Dr Durham has been a great leader for the Hort Agent to help with guidance of advising the Master Gardener program. Many questions and concerns have arisen and answers and advice have been priceless. Dr Durham is quick to respond and is always pleasant. Agent has attended 3 different conferences in 3 different states where Master Gardener program was featured. Dr Durham represented UK and presented at all three of these. His work to help South Korea with beginning a Master Gardener program there has shown University of Kentucky has international outreach.

[Horticulture] - [DURHAM, RICHARD E] - Rick is particularly valuable as the Ky State Master Gardener coordinator

[Horticulture] - [DURHAM, RICHARD E] - As a newer agent and coordinator of the Master Gardenier program, he has provided good resources and reccomendations on how I can improve our program. I am also working on a local rain garden installation project with him and he has been easy to work with him!

[Horticulture] - [FOUNTAIN, WILLIAM M] - Outstanding agent support, literally available 24 hours a day and always very willing to help. Very knowledgeable!

[Horticulture] - [FOUNTAIN, WILLIAM M] - Bill is an asset to the Extension Program both with knowledge and ability to work with the community. He has been there to answer any problems that arrive.

[Horticulture] - [FOUNTAIN, WILLIAM M] - Dr. Fountain is very knowledgeable and always very helpful.

[Horticulture] - [FOUNTAIN, WILLIAM M] - Wonderful resource.

[Horticulture] - [FOUNTAIN, WILLIAM M] - Very responsive when help is needed. Very good at explaining situations on home visits and developing an action plan.

[Horticulture] - [FOUNTAIN, WILLIAM M] - Great help with NJHA Funding.

[Horticulture] - [FOUNTAIN, WILLIAM M] - He is an expert in his field. Clients have many questions about trees. He is very willing to help and works well with clients.

[Horticulture] - [FOUNTAIN, WILLIAM M] - Bill is always a good resource for field staff

[Horticulture] - [FOUNTAIN, WILLIAM M] - Bill taught landscape tree pruning workshop in my county and did a great job.

[Horticulture] - [FOUNTAIN, WILLIAM M] - always provides excellent information

[Horticulture] - [FOUNTAIN, WILLIAM M] - Does not return calls well.

[Horticulture] - [GRABLE, CAREY A] - Needs to let agents know when making county visits

[Horticulture] - [INGRAM, DEWAYNE L] - Knowledgeable, outstanding representative for UK Horticulture

[Horticulture] - [INGRAM, DEWAYNE L] - Good job; very personable.

[Horticulture] - [SMIGELL, CHRISTOPHER G] - he needs a bit more understanding of how Extension, and the role of specialist/agents work

[Horticulture] - [SMIGELL, CHRISTOPHER G] - great practical approach to horticulture.

[Horticulture] - [SMIGELL, CHRISTOPHER G] - Chris is alway willing to come do farm visits to my small fruit growers and did a great job teaching small fruit pruning this spring.

[Horticulture] - [SMIGELL, CHRISTOPHER G] - Excellence in service to Extension Agent.

[Horticulture] - [SMIGELL, CHRISTOPHER G] - Chris does a great job in the field. He is very knowledgeable and an asset to our College.

[Horticulture] - [SPALDING, WILLIAM D] - Always learn something working with Dave

[Horticulture] - [STRANG, JOHN G] - Very good to work with!

[Horticulture] - [STRANG, JOHN G] - John is a pleasure to work with and is always available. Voted specialist of the year by KACAA

[Horticulture] - [STRANG, JOHN G] - Easy going and easy to follow.

[Horticulture] - [STRANG, JOHN G] - Excellent specialist

[Horticulture] - [STRANG, JOHN G] - excellent

[Horticulture] - [STRANG, JOHN G] - John is extremely helpful with my questions - he is very knowledgeable and easy to work with.

[Horticulture] - [STRANG, JOHN G] - Very knowledgeable and the growers and I really learned a lot from his on site visits to the orchards. Look forward to working with him in the future!

[Horticulture] - [STRANG, JOHN G] - Dr. Strang is a great educator with extensive knowledge. His grafting class was greatly appreciated by local clientele. He is very responsive to calls and can almost always be reached by phone or email without too much delay.

[Horticulture] - [STRANG, JOHN G] - John is an asset to the program. He always has information that goes well with the clientele. Whatever topic he is discussing will go over clear and concise witht he public.

[Horticulture] - [STRANG, JOHN G] - John is incredible. He goes above and beyond when helping agents.

[Horticulture] - [STRANG, JOHN G] - Dr. Strang is always willing to answer my questions and come to the county if we have a issue. He is spread to thin and i would like to do more county meetings with him if his time allowed.

[Horticulture] - [STRANG, JOHN G] - Unbelievably excellent service and knowledge of horticulture, especially fruits and nuts. Dr Strang has been quick to respond, especially with phone calls. Warm and sincere communication has made interaction with Dr Strang a pleasure. Trainings (3) provided by Dr Strang and

attended by Agent have been a great source of hort education. Publications written by Dr Strang have been valuable resources.

[Horticulture] - [STRANG, JOHN G] - Great with growers. Rely on him for his knowldge in fruit production. Works well with producers.

[Horticulture] - [STRANG, JOHN G] - He is a great resource and willing to help.

[Horticulture] - [STRANG, JOHN G] - Always follows up with agents. Very thorough on disease identification.

[Horticulture] - [STRANG, JOHN G] - So smart in a wide area of horticulture. Excellent leadership and support to county agents.

[Horticulture] - [STRANG, JOHN G] - should be considered as something of a role model for specialists

[Horticulture] - [STRANG, JOHN G] - John does a great job!

[Horticulture] - [STRANG, JOHN G] - John is outstanding in his support of County Agents and the Master Gardener program

[Horticulture] - [STRANG, JOHN G] - John has been great to come to the far reaches of the state. He listens well to producers and asks appropriate questions to determine accurate responses. He takes the initiative on identifying concerns in the field. His recommendations are always spelled out succinctly, with little room for misunderstanding. He makes economically sensible recommendations that help producers stay profitable. He is has always been available by phone to answer questions and takes the time necessary to make sure you are clear in you understanding. Excellent communicator and excellent specialist.

[Horticulture] - [STRANG, JOHN G] - Dr Strang is excellent. A agents we rely on him so much.

[Horticulture] - [STRANG, JOHN G] - Always available to answer questions and work with producers

[Horticulture] - [STRANG, JOHN G] - Very helpful; pleasant.

[Horticulture] - [STRANG, JOHN G] - Excellent Specialist

[Horticulture] - [STRANG, JOHN G] - Dr. Strang is great to work with. He does a great job working with producers and agents alike.

[Horticulture] - [STRANG, JOHN G] - Dr. Strang is a great friend and a real asset to our College. He always is very responsive and a great specialist.

[Horticulture] - [STRANG, JOHN G] - Does A great Job.

[Horticulture] - [STRANG, JOHN G] - Great specialist, great man! Full of knowledge and eager to help!

[Horticulture] - [STRANG, JOHN G] - Great to work with

[Horticulture] - [STRANG, JOHN G] - John is always willing to do a county program or help agents better inform producers.

[Horticulture] - [STRANG, JOHN G] - John does a wonderful job teaching fruit tree grafting here each spring.

[Horticulture] - [VANEK, SARAH J] - Excellence in service to Extension Agent.

[Horticulture] - [WILSON, PATSY E] - Dr. Wilson has been very responsive and willing to work with a local vineyard. She visited the vineyard and demonstrated pruning techniques. The client is very pleased and appreciative of her advice.

[Horticulture] - [WILSON, PATSY E] - Patsy is an asset to the program. I have learned much from her trainings.

[Horticulture] - [WILSON, PATSY E] - I find Patsy's publications and presentations to be good information for clients

[Horticulture] - [WILSON, PATSY E] - Patsy is a good resource and she has a good relationship with farmers.

[Horticulture] - [WILSON, PATSY E] - A bright new additon to our College.

[Horticulture] - [WILSON, PATSY E] - Provided valuable county visit for extension clintle on grape production.

[Horticulture] - [WILSON, PATSY E] - Very knowledgeable, Very articulate; I think Ms. Wilson is going to give Kentucky every chance to become a fine wine-producing state.

[Horticulture] - [WILSON, PATSY E] - Patsy is very well qualified for her position and it is apparent that she has extensive knowledge of her program area.

[Horticulture] - [WILSON, PATSY E] - Very knowledgeable on grape vines. Works well with agents and clients!

[Horticulture] - [WRIGHT, SHAWN] - Love the email updates... great resource for agents!

[Horticulture] - [WRIGHT, SHAWN] - Quick response to agent request. Always friendly. Positive attitude.

[Horticulture] - [WRIGHT, SHAWN] - Shawn has really good information when he does the conferences etc.

[Horticulture] - [WRIGHT, SHAWN] - Shawn has done well with his updates on the work being done at the Substation. It is very helpful to know what they are doing and issues that he is observing in the field. It helps us to know what to be looking for in our counties and gives us a greater appreciation for the work being done at RCARS. It was such a good idea, I can't believe it wasn't done before. He still seems a little tentative in working with agents and producers. I'm not sure if this is his personality or if he is introverted.

[Horticulture] - [WRIGHT, SHAWN] - Does excellent work for agents.

[Horticulture] - [WRIGHT, SHAWN] - He is very supportive of county programs and replies quickly to questions.

[Horticulture] - [WRIGHT, SHAWN] - He seems to have good knowledge but seems to be better suited to research than extension specialist. Does not seem to have the understanding of outreach to agents and county

clientele. In one instance would not let his program assistant attend a multi-county programming effort to do a presentation because he did not see the value in such programs. Needs to be less sarcastic towards producers to agents and to agents them selves. Needs to learn to dress like a proper specialist instead of a field hand, especially when do presentations to the public he couldn't get out of doing. Another instance while working at a field day, he commented he wished the tours would end with the public so he could do something productive, like finishing putting up an electric fence. He also needs to concentrate on doing his research where he is assigned to do it at Quicksand and not be worried about doing it on the more high profile South Farm at Lexington.

[Horticulture] - [WRIGHT, SHAWN] - Shawn is very responsive and has a lot of knowledge in horticulture. Although tends to give you a lot of Cons and not many pros when trying to come up with solutions for our clients.

[Horticulture] - [WRIGHT, SHAWN] - Shawn has always done everything i have asked him to do. Some say he is too negative with producers, which he might be but I also think that sometimes that comes in handy for our program participants.

[Horticulture] - [WRIGHT, SHAWN] - Love your Update as to what is going on with horticulture.

[Horticulture] - [WRIGHT, SHAWN] - Provides assistance with county and regional programs, helpful

[Horticulture] - [WRIGHT, SHAWN] - doing a great job he just needs more support from UK and some added assistance on labor issues before he can accomplish what we need.

[Horticulture] - [WRIGHT, SHAWN] - Shawn is an asset not only to RCARS, but to the whole Extension Service. His calm logical knowledgable persona comes across extremely well with clientele.

[Horticulture] - [WRIGHT, SHAWN] - Appreciate interaction with clientele

Appendix VIII Horticulture undergraduate degree options and course requirements

B.S. in Horticulture, Plant and Soil Science

Students pursuing a Horticulture, Plant and Soil Science degree may choose from two Areas of Emphasis:

Horticultural Science majors explore the basic biology of horticultural plants or become involved with innovative plant production systems. Each horticultural science option student works closely with a faculty member to develop a research project in the student's area of interest. Students completing the horticultural science option often pursue graduate degrees in plant science or advanced government or industry positions. In addition to graduate school, recent graduates have taken jobs in botanic gardens, county extension, seed companies, or even started their own companies. Several of our science option graduates have become faculty members at leading U.S. universities.

Horticulture Enterprise Management majors study horticultural production systems that include specific information about edible food crops, nursery and greenhouse plant production, as well as landscape plant installation and management. This major also includes support classes in business and pest management. Recent graduates have taken jobs in nurseries, greenhouses, county extension, landscape management and been involved in start-up or established horticultural companies. Many of our former graduates are leaders in the State's horticultural industry.

Click here for courses and graduation requirements.

For advising help contact:
Dr. Robert Geneve, Professor
401b Plant Science Building
University of Kentucky
Telephone (859) 257-8610
rgeneve@uky.edu

Horticulture, Plant and Soil Sciences

College of Agriculture and School of Human Environmental Sciences

The Horticulture, Plant and Soil Sciences degree program is designed to provide students with the knowledge and skills needed for a career in the production and management of plants and soils for food, fiber, forage, oil, recreation, landscaping and the enhancement of the human environment. Graduates have the technical and scientific skills as well as the communication, computational, leadership, and interpersonal capabilities necessary to function effectively as professionals. Careers are as diverse as they are challenging. Each Option prepares graduates for specific professional opportunities.

Options

Students pursuing a Horticulture, Plant and Soil Sciences degree may choose from the following Options:

- Horticulture Enterprise Management
- Turfgrass Science
- Crops and Livestock
- Crop, Soil and Horticulture Science

Graduation Requirements

Students must complete a minimum of 120 semester credit hours with at least 45 credit hours from courses at the 300 level or above. A 2.0 grade-point standing (on a 4.0 scale) is necessary and remedial courses may **not** be counted toward the total hours required for the degree. In addition to the UK Core and college requirements, students must select an Option with the assistance of an advisor and fulfill the area's program requirements.

Plan of Study

As a horticulture, plant and soil sciences major you are required to develop an acceptable **Plan of Study** during your sophomore year for your junior and senior years. The plan must be signed by your advisor and returned to the Office of Academic Programs.

If you are an upper division transfer student (from another university or from another UK college or department) then you will submit your plan during the first semester you are enrolled in the program.

Consult your academic advisor in developing your Plan of Study.

College Required Hours

*GEN 100 Issues in Agriculture 3

Subtotal: College Required Hours 3

**Except for students who enter the College after having already completed the U.S. Citizenship requirement of the UK Core.*

UK Core Requirements

See the *UK Core* section of the *2012-2013 Undergraduate Bulletin* at: **www.uky.edu/Registrar/bulletinCurrent/ukc.pdf** for the complete UK Core requirements. The courses listed below are (a) recommended by the college, or (b) required courses that also fulfill UK Core areas. Students should work closely with their advisor to complete the UK Core requirements.

I. Intellectual Inquiry in Arts and Creativity

Choose one course from approved list 3

II. Intellectual Inquiry in the Humanities

Choose one course from approved list 3

III. Intellectual Inquiry in the Social Sciences

Recommended:

CLD 102 The Dynamics of Rural Social Life 3

IV. Intellectual Inquiry in the Natural, Physical, and Mathematical Sciences

CHE 105 General College Chemistry I 4

CHE 111 Laboratory to Accompany General Chemistry I 1

V. Composition and Communication I

CIS/WRD 110 Composition and Communication I 3

VI. Composition and Communication II

CIS/WRD 111 Composition and Communication II 3

VII. Quantitative Foundations

MA 123 Elementary Calculus and Its Applications 4

VIII. Statistical Inferential Reasoning

STA 210 Making Sense of Uncertainty: An Introduction to Statistical Reasoning 3

IX. Community, Culture and Citizenship in the USA

GEN 100 Issues in Agriculture 3

X. Global Dynamics

Choose one course from approved list 3

UK Core Hours 33

In addition, the student must submit a proposed plan of study for the junior and senior years.

Premajor Requirements

CHE 105 General College Chemistry I 4

CHE 107 General College Chemistry II 3

CHE 111 Laboratory to Accompany General Chemistry I 1

CHE 113 Laboratory to Accompany General Chemistry II 2

MA 123 Elementary Calculus and Its Applications 4

WRD 203 Business Writing 3

Subtotal: Premajor Hours 17

Students choose one of four Options in the Horticulture, Plant and Soil Science program – Horticulture Enterprise Management; Turfgrass Science; Crops and Livestock; and Crop, Soil and Horticulture Science. All students take the Major Requirements listed below. Then, depending on their Option, take specific courses and 21 hours of Specialty Support courses, some of which may be specified. Option requirements follow Major Requirements.

– CONTINUED –

Horticulture, Plant and Soil Sciences • 2

Major Requirements

PLS 104 Plants, Soils, and People: A Science Perspective 3

PLS 210 The Life Processes of Plants 3
or
†BIO 150 Principles of Biology I
and
†BIO 152 Principles of Biology II 6

PLS 220 Introduction to Plant Identification 3
PLS 366 Fundamentals of Soil Science 4
PLS 386 Plant Production Systems 4

PLS 395 Special Problems in Plant and Soil Science
or
PLS 399 Experiential Learning in Plant and Soil Science 3
PLS 404 Integrated Weed Management 4
PLS 470G Soil Nutrient Management 3
PLS 490 Topics in Plant and Soil Science 3

†Students in the Crop, Soil and Horticulture Science Option take BIO 150/152.

Subtotal: Major Hours 30-33

Options

Horticulture Enterprise Management Option

PLS 100 An Introduction to Horticulture Professions 1
PLS 440 Plant Propagation 3
PLS 465 Greenhouses and Controlled Environments 3
PLS 520 Fruit and Vegetable Production 4
PPA 400G Principles of Plant Pathology 3

Select **9** credit hours from the following courses:
PLS 320 Woody Horticultural Plants 4
PLS 330 Herbaceous Horticultural Plants I 2
PLS 332 Herbaceous Horticultural Plants II 2
PLS 352 Nursery Production 3
PLS 451 Landscape Management and Arboriculture 3
PLS 515 Turf Management 3
PLS 525 Greenhouse Floral Crop Management 3
Other PLS courses with consent of advisor

Subtotal: Option Hours 23

Specialty Support Requirements

Select **21** hours of courses with consent of advisor 21

Subtotal: Specialty Support 21

Electives

Elective courses should be selected by the student to lead to the minimum total of 120 hours required for graduation.

Subtotal: Electives ..... minimum of 1

TOTAL HOURS: 120

Turfgrass Science Option

PLS 514 Grass Taxonomy and Identification 3
PLS 515 Turf Management 3
PPA 400G Principles of Plant Pathology 3

Select additional **9** credit hours of PLS courses 9

Subtotal: Option Hours 18

Specialty Support Requirements

ENT 320 Horticultural Entomology 3

CHE 226 Analytical Chemistry
or
CHE 236 Survey of Organic Chemistry 3

Select additional **15** credit hours of specialty support in consultation with academic advisor 15

Subtotal: Specialty Support 21

Electives

Elective courses should be selected by the student to lead to the minimum total of 120 hours required for graduation.

Subtotal: Electives ..... minimum of 1

TOTAL HOURS: 120

Crops and Livestock Option

PLS 510 Forage Management and Utilization 3
Select **15** credit hours of additional PLS courses 15

Subtotal: Option Hours 18

Specialty Support Requirements

CHE 236 Survey of Organic Chemistry 3
Earn a minor in Animal Science 18

Minor in Animal Sciences

Prerequisites

Note that several classes in both Group A and Group B have prerequisites beyond ASC 101. These are indicated in parenthesis following the courses below. Students taking the minor are responsible for satisfying the prerequisites.

Minor Requirements

ASC 101 Domestic Animal Biology 3
ASC 102 Applications of Animal Science 3

Additional Course Work 9
At least **9 credit hours** must be selected from the list that follows (Groups A and B). At least one course must be selected from Group A and one course from Group B.

Group A
ASC 300 Meat Science 4
ASC 325 Animal Physiology (*BIO 152 and CHE 107/113*) 3
ASC 362 Animal Genetics 4
ASC 364 Reproductive Physiology of Farm Animals (*CHE 230 or 236*) 4
ASC 378 Animal Nutrition and Feeding (*CHE 230 or 236*) 4

Group B
ASC 340 Poultry Production 2
ASC 404G Sheep Science (*ASC 300, 362, 364*) 4
ASC 406 Beef Cattle Science (*ASC 300, 362, 364*) 4
ASC 408G Swine Production (*ASC 378*) 2
ASC 410G Equine Science (*ASC 362, 364*) 3
ASC 420G Dairy Cattle Science (*ASC 362, 364*) 3

Total Hours Required 15

Additional specialty support classes may be selected in consultation with your academic advisor for a total of 21 hours in specialty support.

Subtotal: Specialty Support 21

Electives

Elective courses should be selected by the student to lead to the minimum total of 120 hours required for graduation.

Subtotal: Electives ..... minimum of 1

TOTAL HOURS: 120

– CONTINUED –

Crop, Soil and Horticulture Science Option

Select **18** hours of PLS courses with consent of advisor 18

Subtotal: Option Hours **18**

Specialty Support Requirements

CHE 226 Analytical Chemistry
or
CHE 230 Organic Chemistry I
or
CHE 236 Survey of Organic Chemistry 3

STA 291 Statistical Methods 3

Select additional **15** credit hours from following list or other science courses selected with consent of advisor:

BIO 304 Principles of Genetics 4
BIO 308 General Microbiology 3
BIO 315 Introduction to Cell Biology 4
BIO 430G Plant Physiology 4
GLY/EES 220 Principles of Physical Geology 4
PHY 211 General Physics 5
PHY 213 General Physics 5
CHE 231 Organic Chemistry Laboratory I 1
CHE 232 Organic Chemistry II 3
CHE 233 Organic Chemistry Laboratory II 1

Subtotal: Specialty Support **21**

Electives

Elective courses should be selected by the student to lead to the minimum total of 120 hours required for graduation.

Subtotal: Electives ..... **minimum of 1**

TOTAL HOURS: **120**

Appendix IX Educational Policies and Procedures Documents

Statement on Evidences of Activity in Instruction, Research and Extension that are Appropriate for Use in Evaluation of Faculty Candidates for Promotion and Tenure of the Horticulture Department in the College of Agriculture: Approved November 19, 2009

General Information

University regulations establish criteria for promotion and tenure. These criteria are framed in terms of the expectation for excellence across all areas of assigned activity. The Department of Horticulture expects these criteria to be applied rigorously to all faculty title series. However, faculty in the Department of Horticulture vary with regard to disciplinary expertise as well as extension, research and instruction Distribution of Effort. Therefore, specific evidences of activity to be considered in applying these criteria may vary greatly, particularly among mission areas. This statement on evidences should not be considered as inconsistent with or contradictory neither to university level regulations, nor with the criteria expressed therein.

This statement of activities applies to evaluations at all ranks, although evidences of activity demonstrating potential, professional advancement and trajectory of program development are weighted heavily for Assistant Professors being evaluated for progress toward tenure. Whereas, evidences of career achievement, sustained scholarly record, and documented impact will be more heavily factored for evaluation of Associate and Full Professors.

Scholarly Productivity

This is most often documented through written works. Original research articles, translational or extension publications, works of synthesis (reviews), and publications about instruction and pedagogy may all be examples of scholarly productivity as appropriate to the field and assignment. Non-traditional scholarly formats such as web-based or electronic records may also be considered.

In all cases, those works that have been rigorously peer-reviewed and are creative or original will be given more weight. This applies to work derived from research, instruction or extension assignments.

In extension, most forms of information delivery, including educational meetings, workshops, field days, even individual responses and contacts, are considered evidence of activity and should be summarized, reported and considered in evaluations.

For instruction, evidence of productivity includes delivery of formal courses and student contact hours, as well as support of student engagement, experiential education, organized student activities, professional development and advising.

Quality, Innovation and Impact

Both the submitted narrative and the record should demonstrate that the overall program has direction, focus and originality, and where possible documented impact.

Publication in highly selective, rigorously refereed or juried outlets can be an important metric of quality of scholarly works. Citation index and journal metrics are becoming more frequently used as quality measures.

Research faculty are generally expected to establish a coherent body of work, focused on one or a small number of significant topics, as opposed to an unrelated collection of articles or materials. In some cases, particularly for applied research, a broad, diverse portfolio of successful studies is justified on the basis of responsiveness to critical needs.

Quality extension programs are characterized by responsiveness, direction and relevance; they are science and research based; they employ creative, effective methods of education and communication. Extension programs should be associated with high quality materials or works in relevant, appropriate, accessible outlets. Quantitative or at least systematic assessment is particularly useful in extension programming.

Student teaching evaluations are considered to be a valid, if approximate, index of teaching quality particularly when considered in conjunction with other measures. Professional development and teaching improvement activities are considered to document commitment to quality instruction.

A demonstrated record of sustaining scholarly productivity through funding or support for the program as appropriate to the field can be an important factor, particularly for research assignments.

Peer recognition also is considered as evidence of quality.

When they are available, documented benefits to stakeholders, e.g., changed practice, profit, or quality of life can be important measures, not just for extension but for all faculty activities.

Collaborative Efforts, Recognition, Professional Service and Leadership

As leaders of a public, land grant institution, faculty in the Department of Horticulture are required to be highly accessible, responsive and interactive with peers, students and constituents. Horticulture faculty are expected to engage in collaborative work as appropriate to the advancement of their and the department's programs. In instruction, contributions to student success beyond formal classroom success (e.g., advising, activities, and positive interaction) can be important evaluation factors.

Documentation of peer recognition may include significant awards, invitations to make presentations externally, service on national panels or committees, editorial appointments, leadership positions in professional societies, international recognition, and other indicators. Nationally competitive grants may be significant evidence of peer recognition in many fields.

University, college or department level service may be offered as documentation of leadership in a major DOE area (research, teaching, extension) or it may be evaluated as a special assignment, as agreed upon by the chair and the faculty member.

Exceptional individual performance is typically associated with notable positive impact on the success of students, colleagues, and the department, through leadership and professional service.

College of Agriculture, Department of Horticulture

Criteria and Evidences for Appointment, Reappointment, Nonrenewal of Appointment, Terminal Appointment, Promotion and Faculty Performance for Lecturers and Senior Lecturers
Approved by Tenured Faculty in the Department of Horticulture on October 29th, 2010.

Approved by the Dean on November 5, 2010

Appointment

The criteria for appointment include an earned terminal degree appropriate to the field of assignment (with the approval of the provost, evidence of the appropriate professional experience or credentials may substitute for a terminal degree). Candidates must also have demonstrated good teaching experience. Other credentials, such as publications, may also be considered.

Appointments

Lecturer appointments in the College of Agriculture may be for 9, 10, 11, or 12 months. Periods are determined at the time of the creation of the position description.

Reappointments follow AR 2:9 http://www.uky.edu/Regs/files/ar/ar2-9.pdf.

Nonrenewal of appointments and terminal appointments follow AR 2:9 http://www.uky.edu/Regs/files/ar/ar2-9.pdf.

Performance Review

The college policies on performance review of lecturer series faculty employees prescribe that lecturer series faculty employees undergo faculty performance review as follows:

1. At the rank of lecturer, performance reviews occur annually, according to established College of Agriculture criteria posted at http://www2.ca.uky.edu/deanadmin/faculty.
2. At the rank of senior lecturer, performance reviews occur biennially, according to established College of Agriculture criteria posted at http://www2.ca.uky.edu/deanadmin/faculty.

Promotion

In order to be considered for promotion to senior lecturer in the College of Agriculture, a lecturer must have a terminal degree. A lecturer with a terminal degree may be considered for promotion (without tenure) from the rank of lecturer to the rank of senior lecturer at any time after five (5) years of continuous full-time service, contingent upon agreement of the departmental faculty with the chair, and in consultation with the dean. In preparing a recommendation to the dean on a promotion case in the lecturer series, the educational unit administrator shall consult with the appropriate faculty employees of the unit and obtain their written judgments. Prior to making a recommendation to the provost on a promotion case in the lecturer series, the dean shall provide the dossier (http://www2.ca.uky.edu/deanadmin-files/Senior_Lecturer_Promotion_Process_051710.pdf) to the college advisory committee on appointment, reappointment, promotion, and tenure, and obtain its written advice. The provost makes the final decision on the promotion, without reference to an area committee.

Teaching Portfolio

The teaching portfolio is an important element in the promotion process.

Satisfactory performance of faculty in resident teaching focuses on the development of innovative course materials, lectures, assignments, alternative teaching methods, and on examinations that provide educational benefits to students. Courses should be content driven with objectives clearly stated. Course content is expected to be up-to-date, applicable to the subject matter, and at the appropriate level. Exams and assignments should reflect course materials and lectures, and be returned and reviewed within a reasonable period. Instructors are expected to be available to assist students outside of the classroom and to follow all University Rules that protect student rights.

Teaching evaluations by students should reflect this positive learning environment, but not be the primary factor in evaluating teaching. The entire teaching portfolio (which includes numerical course evaluations as a part) should be used as the primary tool to evaluate teaching. Suggested items to include in the teaching portfolio include one's teaching philosophy, samples of materials detailing course content and innovative instructional methods, teaching awards, numerical ratings, courses taught, new course development, teaching methods, student advising, student mentoring, teaching workshops and professional meetings, student organizations, student recruitment, refereed journal articles related to teaching, non-refereed publications related to teaching, teaching grants, and other evidence of regional, national, and international recognition.

Finally, a senior lecturer should provide evidence of professional development through continued engagement with the discipline or its pedagogy, including the following:

1. published or presented research in the field of study appropriate to the discipline;
2. active participation in conferences, workshops, professional organizations, and other public venues pertinent to the discipline proper or its pedagogy.

For evidences of productivity in extension, research, or service, see the College of Agriculture Curriculum Vitae Guidelines at http://www2.ca.uky.edu/deanadmin-files/curriculum_vitae_guidelines.pdf.

Tenured and tenure-eligible faculty members in the Department Horticulture established by majority vote on October 29th, 2010 that the maximum number of lecturer faculty that may be employed is two.

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College of Agriculture
Guidelines for Two-Year and Four-Year Progress Towards Tenure Reviews

Why

While evaluation and coaching of tenure-track faculty members should be an ongoing process, the importance of timely and thorough Two-Year and Four-Year Progress towards Tenure Reviews cannot be overstated. These reviews are an important part of the progression of untenured faculty members and attention to them, both by the chair and the faculty member undergoing review is essential. These reviews constitute a major assessment of the faculty member's record of achievement and give tenure-track faculty members time before sixth-year dossier preparation to address any areas of deficiency.

When

Chairs conduct these reviews before the end of the second and fourth years of the probationary period of tenure-track faculty. Reviews should be completed no later than 30 days before the second and fourth anniversary date of initial appointment, unless the faculty member has been granted a Delay of Probationary Period. For information about these delays, see http://www.uky.edu/Provost/APFA/Promotion_Tenure/Automatic_delay.php. For faculty members granted a one-year delay, the two-year review occurs 30 days before the end of three years and the four-year review occurs 30 days before the end of five years.

If for any reason (other than a granted delay) the two-year review is not completed 30 days before the two-year anniversary of the initial appointment, the date of the four-year review is not affected. In other words, the four-year review must be conducted 30 days before the four-year anniversary date, regardless of when the two-year review occurred. Late reviews should be avoided.

Who

Two-year and four-year reviews are conducted for regular, extension, special, and librarian title series faculty members; that is, all tenure-track faculty. Reviews are not required for non-tenure track faculty members: those in the research, clinical, and adjunct title series or are visiting or temporary. Reviews are not conducted for faculty members who, for whatever reason, have appointments that are not being renewed.

How chairs are notified

At least annually, the Dean's Office provides to the chairs a list of faculty members for whom a report is due in the upcoming months. Chairs are ultimately responsible for identifying faculty members for whom a review is due and conducting the reviews in a timely manner.

Procedures

1. With a *minimum* of 60 days' notice, the chair notifies the faculty member in writing about the time line for the review. The chair solicits from the faculty member an updated CV in a format agreed upon by the faculty member and the chair, a narrative statement about his or her teaching/research/extension activities, and (as appropriate) a teaching portfolio. These materials are to be made available to all faculty members in the unit at the time they are informed that the review is under way and their comments are solicited.

2. For the four-year review, the chair shall solicit e-mail or written comments from all tenured associate and full professors in the department. Assistant professors may be invited to comment, but should not be required to do so. For the two-year review, the chair shall consult with the faculty, but this may take the form of discussion with an advisory committee or appropriate representatives of the tenured faculty. Please note, email or written comments from senior faculty members are not shared directly with the faculty member under review.

3. The chair reviews the comments solicited from faculty members and prepares a review summary. This is normally provided in the form of a letter to the faculty member being reviewed. If the review does not report satisfactory progress or considers a terminal appointment, this draft review summary and the CV are sent to the dean prior to the chair's presentation of the letter to, and discussion of progress with, the faculty member. If the review reports satisfactory progress, the chair may discuss the review with the faculty member before the letter is forwarded to the dean.

4. The chair meets with the faculty member being reviewed and discusses the review summary. After the chair and faculty member sign the document, the faculty member receives a copy.

5. The chair sends an e-mail to the dean, assistant dean for academic administration, and appropriate associate deans (e.g., if the faculty member is in the extension title series and is 100 percent extension, the associate dean for extension should be copied; if the faculty member has DOE in all three areas (extension, research, and teaching), copy all three associate deans). Attach to

the e-mail the final, signed review summary and the faculty member's CV. All other documents regarding the review remain in the departmental file.

6. The signed review statement is placed in the Standard Personnel File in the Dean's Office, recorded as completed on the two-year/four-year review schedule maintained in the assistant dean's office, and recorded as completed in the Faculty Data Base.

7. Conducting reviews for faculty members employed outside academic units

   UK regulations require that the academic chair provides leadership to conduct two-year and four-year reviews, as well as provide the final step at the department level. The department chair is required to collaborate with the administrator of the faculty member's center or other home. In other words, both are involved in this process and both have a say in the evaluation.

   Options

   One option is that the academic chair initiates the process and solicits documented input from the director. Or, it is possible that the director is responsible for initiating the process, forwarding recommendations to the academic chair, who then forwards a recommendation to the dean. In the latter instance, the academic chair writes an additional letter, which could be very brief if there is concurrence and both those are forwarded to the deans' level.

   Regarding faculty consultation, for *two-year reviews* input is solicited by the *director* of the working unit and may include only faculty from the working unit. For *four-year reviews*, the *academic chair* solicits consultation from faculty members at both locations.

General Guidelines for Chair's Review Summary

Language Choice

The chair's review summary must not include explicit prediction of the likely outcome of a future tenure review. Instead, include constructive suggestions for addressing areas of deficiency. Statements such as, "There can be no doubt that you will receive enthusiastic support for promotion from the faculty," or "You only need one more article to qualify for tenure," could later be construed as misleading.

Express concluding or summarizing statements in terms of progress towards tenure or stage of program development, e.g., "Your research productivity after four years is

consistent with the expectations of your faculty peers." Use appropriate qualifiers such as, "In the judgment of the faculty I have consulted…"

Never include comments about personality, personal life, or individual attributes, e.g., "Some faculty doubt that you have the intellectual capacity or energy to succeed in this research area." Focus on the act of "collaboration," or the functions of "service" or "leadership," not the characteristic of "collegiality." Evaluate performance as documented in the record.

Template for Letter or Memorandum

This template is intended to illustrate the points that should be included in your letter and provide examples of format and language that you may follow.

Date

I am happy to provide this letter as formal documentation of your X-Year Progress towards Tenure Review. I have requested and received letters of evaluation from all tenured faculty members in the department.

You and I discussed this review on X date. Please feel free to further discuss your performance with me at any time.

Your initial appointment date was month/day/year and your average distribution of effort during this time has been X percent research/X percent extension, and X percent instruction. Your appointment is in the X title series with an area of emphasis in X. You have a (9, 10, 11, or 12) month appointment.

You are establishing a research program in X. Progress on the establishment of a laboratory and training a technician is X. You are to be commended for X. Your investigation should lead to opportunities in X. You have established a network of collaborators at UK and at X. Areas for improvement are X and X. You are encouraged to use resources X and X.

Regarding extramural funding, you have submitted X number of grant proposals and received X dollars in X number of funded grants. Funding agencies include X and X. I would rank progress in this area as X. Areas for improvement are X and X. You are encouraged to seek advice from X.

You have submitted X number of scholarly articles, have X number in press and have published X number. I would rate progress in this area as X.

You have been active in developing your instructional program, with primary teaching responsibility in courses X and X. Teaching evaluation scores fell below/above the college mean. You have worked with the Center for the Enhancement of Learning & Teaching regarding improvement of your teaching activities and we will review your scores at the end of upcoming semesters. You

have developed X number of new courses and the effort required for this is noted and appreciated. These courses are important additions to the curriculum. Areas for improvement are X and X. You are encouraged to seek assistance from X.

In the area of professional service and recognition, you have received X awards, including X, X, and X. You have served on X number of departmental committees, X number of college committees, and X number of university committees. You have also served on external committees and working groups X, X, and X. You are serving on the editorial board of X.

Finally, your collaborative contributions and emerging leadership have been commented upon by several faculty members in the department. You have been commended for your X and X. As a chair, I appreciate your cooperative spirit and dedication, as well as your efforts to X and X.

In summary, you are showing good progress in the areas of scholarly productivity, teaching, grantsmanship, and service and recognition. It is important that you continue to show progress in these areas over the next two years. I suggest that you can improve the format/contents of your dossier by including/changing the following: X, X, and X.

I appreciate your X, X, and X in this department.

_____

Signed Chair, Date

This document has been discussed with me.

_____

Signed Faculty Member, Date

Procedural Steps Within the Department of Horticulture and the College of Agriculture Used During the Promotion Process

The process for considering faculty for tenure and promotion is outlined below. All faculty are informed of the general guidelines and criteria set forth in the Administrative Regulations for the University of Kentucky regarding faculty personnel issues, AR:2.1 (formerly AR II-1.0-1 Pages I-III). The prospective candidate prepares a draft curriculum vitae which is considered by the Department Chair in consultation with the Departmental Advisory Committee. Upon approval the curriculum vitae is circulated among all Departmental faculty for consideration as a preliminary package for promotion and/or tenure. After Departmental approval the curriculum vitae is sent to the College Administration for approval. Upon College Administration approval the Chair along with the perspective faculty member begins to assemble those documents identified in AR 2:1 Appendix II (Matrix of Dossier Contents). During this time the candidate also delivers a Departmental seminar devoted to communicating the salient features and important accomplishments during their tenure at the University of Kentucky relevant to the faculty rank sought.

In the selection of external and internal evaluators special attention is given to the policies and procedures enumerated in AR 2:1-1 Section VI.G and AR 2:1-2 Section III.F and evaluators are informed that their letters will not be confidential. At least six external evaluators are selected with at least four selected by the Chair independent of the candidate's suggestions.

After external letters have been received the candidate's dossier is made available to Departmental faculty as they prepare their written assessment. All faculty within the Department are invited to provide a written assessment but only those faculty at the rank being sought by the candidate are required.

Using the collective information in the dossier the Chair provides a written assessment of the candidate's credentials and accomplishments relative to the University-level criteria and evidences of activity to be used in evaluations for appointment, reappointment, promotion, and tenure for the various faculty title series (see AR:2.1-1, page 2) and the dossier is then submitted to the Dean.

Appendix X Faculty and Extension Specialist CV's

CURRICULUM VITA

DOUGLAS D. ARCHBOLD
Professor
Department of Horticulture

EDUCATION

Ph.D., Horticulture, Michigan State University 1982
M.S., Horticulture, Michigan State University 1979
B.S., Biology, Purdue University at Fort Wayne 1976

PROFESSIONAL EXPERIENCE

Professor	Since 2002
Associate Professor	1988 - 2002
Assistant Professor	1982 -1988

DIVISION OF EFFORT

My appointment has varied over the years due to variable teaching responsibilities but has been ~80% research and ~20% teaching.

RESEARCH PROGRAM

The goal of my research program has been to increase our knowledge of fruit crop physiology and production to provide a basis upon which fruit growers in Kentucky and elsewhere can improve efficiency, profitability, and sustainability. I have worked with apples, strawberries, blackberries, winegrapes, and pawpaws, and have focused my efforts in two areas: 1) carbohydrate metabolism of fruit crops as utilization of carbohydrates determines yield and harvest quality of fruit, and 2) postharvest quality and phytochemical content because the rapid changes following harvest may be the single largest cause of economic loss to fruit growers and reduced nutritional value to consumers.

PUBLICATIONS (* indicates graduate student)

Refereed Research Publications

Nosarzewski, M., A.B. Downie, B. Wu, and **D.D. Archbold**. 2012. The role of SORBITOL DEHYDROGENASE in Arabidopsis thaliana. Functional Plant Biology 39: 462-470.

O'Daniel, S.B., **D.D. Archbold**, and S.K. Kurtural. 2012. Effects of balanced pruning severity on Traminette (*Vitis spp.*) in a warm climate. American Journal of Enology and Viticulture 63:284-290.

Thavong, P.*, **D.D. Archbold**, T. Pankasemsuk, and R. Koslanund. 2011. Hexanal vapours suppress spore germination, mycelial growth, and fungal-derived cell wall degrading enzymes of postharvest pathogens of longan fruit. Chiang Mai J. Sci. 38(1): 139-150.

Eskelson, M.J.*, E.G. Chapman, **D.D. Archbold**, J.J. Obrycki, and J.D. Harwood. 2011. Molecular identification of predation by carabid beetles on exotic and native slugs in a strawberry agroecosystem. Biological Control. 56 245–253.

Thavong, P.*, **D.D. Archbold**, T. Pankasemsuk, and R. Koslanund. 2010. Effect of hexanal vapour on longan fruit decay, quality and phenolic metabolism during cold storage. International Journal of Food Science and Technology 45: 2313-2320.

Thavong, P.*, **D.D. Archbold**, T. Pankasemsuk, and R. Koslanund. 2010. Postharvest use of hexanal vapor and heat treatment on longan fruit decay and consumer acceptance. Thammasat Int. J. Sci. Tech. 15: 54-63.

Wu, B-H., S-H. Li, M. Nosarzewski, and **D.D. Archbold**. 2010. Sorbitol dehydrogenase gene expression and enzyme activity in apple: Tissue specificity during bud development and response to rootstock vigor and growth manipulation. Journal of the American Society for Horticultural Science 135: 379-387.

Sigal Escalada, V.* and **D.D. Archbold**. 2009. Preharvest aminoethoxyvinylglycine plus postharvest heat treatments influence apple fruit ripening after cold storage. HortScience 44: 1637-1640.

Sigal Escalada, V.* and **D.D. Archbold**. 2009. Effects of aminoethoxyvinylglycine plus 1-methylcyclopropene on 'Royal Gala' apple volatile production after cold storage. HortScience 44:1390-1394.

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INVITED PRESENTATIONS/SEMINARS

International

Beijing, China, Institute of Botany, Fruit Tree Laboratory 2011
'Insights into Sorbitol Dehydrogenase Metabolism in Plants'

Wuhan, China, Huazhong Agricultural University, 2011
'Insights into Sorbitol Dehydrogenase Metabolism in Plants'

Lampung, Indonesia, University of Lampung 2010
'Fruit and Vegetable Production in the U.S.'

Lampung, Indonesia, International Seminar on Horticulture to Support Food Security 2010
Keynote Address - 'Increasing Food Security with Postharvest Research'

Malang, Indonesia, University of Brawijaya 2010
'Fruit and Vegetable Production in the U.S.'
'Postharvest Biology and Technology of Fruit and Vegetables'

Shanghai, China, Key Practical Technologies of the Modern Peach Industry, August 14-21, 2009,

'Peach Production Practices for a Cold Climate'

Chiang Mai University Institute for Postharvest Research, Chiang Mai, Thailand 2005

'Postharvest control of *Botrytis* on berry crops with natural volatile compounds'

Beijing, China, Institute of Botany, Fruit Tree Laboratory 2005

- 'Fruit Production in the United States'
- 'Sorbitol Dehydrogenase and Apple Fruit Set'
- 'Pawpaw (*Asimina triloba* L.): Commercial Emergence of a Tree Fruit Native to North America'

Department of Postharvest Science, The Volcani Center, Bet Dagan, Israel 1998

'Postharvest control of *Botrytis* on berry crops with the natural volatile *(E)*-2-hexenal'

National

American Society for Horticultural Science Annual Meeting Workshop, 2006: Carbon Metabolism in Sorbitol-synthesizing Deciduous Fruit Trees, 'Sorbitol metabolism and the regulation of sorbitol dehydrogenase activity during apple fruit set and development'

American Society for Horticultural Science Annual Meeting Workshop, 1995: Effect of Development on Carbon Partitioning and Photosynthesis, 'Seasonal and cultivar differences in sorbitol dehydrogenase activity during apple fruit development'

4th National Strawberry Conference, Orlando, FL 1994

Title: Drought resistance in strawberry: What is the potential for improvement?

3rd National Strawberry Conference, Houston, TX 1990

Title: Drought stress resistance in *Fragaria* species

Regional

Southern Small Fruit Workers, Southern Region American Society for Horticultural Science Meeting, 2000, Lexington, KY, 'Volatile Compounds and Mold on Berry Crops'

ABSTRACTS OF CONFERENCE PRESENTATIONS

International

Wilson, P.E.*, **D.D. Archbold**, T.H. Cottrell and S.K. Kurtural. 2010. Cultural practices to improve primary bud cold hardiness of Vidal blanc grapevines in the continental climate. HortScience

Nosarzewski, M. and **D.D. Archbold**. 2008. Sorbitol availability and SORBITOL DEHYDROGENASE expression during apple bud development from budbreak to bloom. 9th International Symposium on Integrating Canopy, Rootstock, and Environmental Physiology in Orchard Systems, Geneva, NY, Program and Abstracts, p. 36.

Archbold, **D.D.**, M. Nosarzewski, B. Wu, and P. Vuppalapati. 2008. Does availability of soluble carbohydrate reserves determine apple fruit set? 9th International Symposium on Integrating Canopy, Rootstock, and Environmental Physiology in Orchard Systems, Geneva, NY, Program and Abstracts, p. 37.

Johnstone, C. and **D.D. Archbold**. 2007. Handling and storage effects on quality and health-beneficial compounds of 'ready-to-eat' edamame. 2nd International Symposium on Human Health Effects of Fruits and Vegetables, Houston, TX. Program and Abstracts, p. 104.

Wilson, P.E., T.H. Cottrell, **D.D. Archbold**, and S.K. Kurtural. 2007. Effect of crop load on vigor, yield, fruit composition, and wine phenolic composition of Vidal Blanc grapevines, 2nd

International Symposium on Human Health Effects of Fruits and Vegetables, Houston, TX. Program and Abstracts, p. 134.

Galli, F., **D.D. Archbold**, and K.W. Pomper. 2005. Pawpaw: An old fruit for new needs. International Symposium on Human Health Effects of Fruits and Vegetables, August 17-20. Quebec City, Quebec, Canada. Program of Abstracts, p. 36.

Sigal Escalada, V. and **D.D. Archbold**. 2005. Use of AVG and MCP to sustain 'Gala' apple fruit quality in cold storage. 9th International Controlled Atmosphere Research Conference. July 5-10, 2005, East Lansing, MI, p. 9.

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Koslanund, R., **D.D. Archbold**, and K.W. Pomper. 2002. Fruit softening and heat treatment of pawpaw fruit. Abstracts of the XXVI International Horticultural Congress, Toronto, CAN, p. 251.

Archbold, **D.D.**, R. Koslanund, and K.W. Pomper. 2001. Ripening and postharvest storage of pawpaw. Book of Abstracts, 2nd International Pawpaw Conference, Frankfort, KY, p. 20.

Archbold, **D.D.**, T.R. Hamilton-Kemp, and E. Fallik. 2000. Postharvest injury, strawberry volatiles, and *Botrytis* development. Book of Abstracts, 4th International Strawberry Symposium, Tampere, Finland, p. 225.

Archbold, **D.D.** and A.M. Clements. 2000. Using chlorophyll fluorescence to identify *Fragaria* accessions with photosynthetic heat tolerance. Book of Abstracts, 4th International Strawberry Symposium, Tampere, Finland, p. 225.

Hamilton-Kemp, T.R., **D.D. Archbold**, and R. W. Collins. 2000. Two volatile sulfur compounds promote increases in natural aroma compounds in strawberry. Book of Abstracts, 4th International Strawberry Symposium, Tampere, Finland, p.227

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National

Wilson, P.E., **D.D. Archbold**, and S.K. Kurtural. 2010. Cultural practices to improve primary bud cold hardiness of vidal blanc grapevines in the continental climate. American Society for Horticultural Science Conference, HortScience 45:

Wilson, P.E., **D.D. Archbold**, T.H. Cottrell and S.K. Kurtural. 2008. Effects of pruning severity and cluster thinning on vigor, yield, fruit composition and crop load of Vidal Blanc grapevines. 33rd American Society of Enology and Viticulture/Eastern Section Conference. July 2008 St. Catharines, Ontario, Canada.

Wilson, P.E., T.H. Cottrell, **D.D. Archbold**, and S.K. Kurtural. 2008. Grapevine sustainability and wine composition ameliorated by severity of canopy management. American Society for Horticultural Science Conference, HortScience 43:1233.

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Archbold, **D.D.**, M. Nosarzewski, and P. Vuppalapati. 2007. Carbohydrate availability and sorbitol metabolism in apple buds and fruit from bud swell to fruit drop. American Society for Horticultural Science Conference, HortScience 42:908-909.

Eskelson, M.J., J.D. Harwood, J.J. Obrycki, and **D.D. Archbold**. 2007. Tracking the role of generalist predators in biological control of slugs in strawberry crops. Program and Abstracts, 55th Annual Meeting, Entomological Society of America Annual Meeting, San Diego, CA.

Archbold, **D.D.** and M. Nosarzewski. 2006. Sorbitol metabolism and the regulation of sorbitol dehydrogenase activity during apple fruit set and development. American Society for Horticultural Science Conference, HortScience 41:931.

Sigal Escalada, V. and **D.D. Archbold**. 2006. Effect of AVG and MCP on volatile production of 'Gala' apple. American Society for Horticultural Science Conference, HortScience 41:977.

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Fulkerson, J.M. and **D.D. Archbold**. 2004. Impact of modified atmosphere storage on eastern thornless blackberry quality and antioxidant levels. American Society for Horticultural Science Conference, HortScience 39:826.

Sigal-Escalada, V. and **D.D. Archbold**. 2004. Cultivar variation in response to AVG and heat treatments for sustaining apple fruit quality in cold storage. American Society for Horticultural Science Conference, HortScience 39:781

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Yu, K., T.R. Hamilton-Kemp, **D.D. Archbold**, and M.C. Newman. 2001. Survival of *E. coli* O157:H7 on strawberry fruit and removal by sanitizing agents. American Society for Horticultural Science Conference, HortScience. 36:557.

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Archbold, **D.D.**, A. M. Clements, T.R. Hamilton-Kemp, and R.W. Collins. 1999. Compression bruising alters the strawberry volatile profile. American Society for Horticultural Science Conference, HortScience 34:511.

Archbold, **D.D.** and A. M. Clements. 1999. Heat tolerance varies with species, provenance, and accession in *Fragaria*. American Society for Horticultural Science Conference, HortScience 34:498.

Ringo, J.D., **D.D. Archbold**, and A. M. Clements. 1999. Transpiration and membrane competence in *Fragaria* exhibit genotype-specific responses to ABA. American Society for Horticultural Science Conference, HortScience 334:490.

Koslanund, R. and **D.D. Archbold**. 1999. Postharvest quality of eastern north American strawberry cultivars during short-term storage. American Society for Horticultural Science Conference, HortScience 34:511.

Yu, K., T.R. Hamilton-Kemp, **D.D. Archbold**, M. Newman, and B.E. Langlois. 1999. Volatiles of E. coli O157:H7 and foodborne pathogen detection on strawberry fruit. American Society for Horticultural Science Conference, HortScience 34:510.

Archbold, **D.D.**, T.R. Hamilton-Kemp, A.M. Clements, and R.W. Collins. 1998. Fumigation of 'Flame Seedless' grape With *E*-2-hexenal reduces mold during long term cold storage. American Society for Horticultural Science Conference, HortScience 33:511.

Hamilton-Kemp, T.R., **D.D. Archbold**, B.E. Langlois, and R.W. Collins. 1998. Antifungal activity of *(E)*-2-hexenal on strawberries and grapes. American Chemical Society Abstracts, AFCD 33.

Villalba, A., B.E. Langlois, **D.D. Archbold**, and T.R. Hamilton-Kemp. 1998. Effect on selected pathogens of exposure to naturally occurring volatile compounds. 1998 International Association of Milk, Food, and Environmental Sanitarians Meeting Abstracts.

Fallik, E., **D.D. Archbold**, T.R. Hamilton-Kemp, A.M. Clements, R.W. Collins, and MM. Barth. 1997. (*E*)-2-Hexenal both stimulates and inhibits *Botrytis cinerea* growth *in vitro* and on strawberry fruit *in vivo*. American Society for Horticultural Science Conference, HortScience 32:505.

Archbold, **D.D.** 1996. Temperature response of *Fragaria* species. American Society for Horticultural Science Conference, HortScience 31:640.

Archbold, **D.D.** 1996. Sorbitol dehydrogenase activity of apple fruit is affected by defoliation and girdling. American Society for Horticultural Science Conference, HortScience 31:645.

Archbold, **D.D.**, T.R. Hamilton-Kemp, M.M. Barth, and B.E. Langlois. 1996. Volatile compounds for control of *Botrytis* on strawberry: duration of treatment and polymer film. American Society for Horticultural Science Conference, HortScience 31:683.

Archbold, **D.D.** and L. Cheng. 1995. Partitioning of a drought-induced root signal within the *Fragaria chiloensis* plant. American Society for Horticultural Science Conference, HortScience 30:836.

Archbold, **D.D.** 1994. Sink activity and carbohydrate allocation patterns within developing apple fruit with and without fruit thinning. American Society for Horticultural Science Conference, HortScience 29:472.

McDonald, S.S., **D.D. Archbold**, and L. Cheng. 1994. Evaluation of g_{ti} method to assess heat and desiccation injury among *Fragaria* species. American Society for Horticultural Science Conference, HortScience 29:477.

Hamilton-Kemp, T.R., R.A. Anderson, D.F. Hildebrand, W. Deng, and **D.D. Archbold**. 1993. Volatile antimicrobial compounds from plants. Abstracts of the 206th American Chemical Society Annual Meeting, Chicago, IL. No. 101.

McDonald, S.S., T.R. Hamilton-Kemp, and **D.D. Archbold**. 1993. Genotypic variation of lipoxygenase/lyase-derived volatile production by *Fragaria* species. American Society for Horticultural Science Conference, HortScience 28:591.

Archbold, **D.D.** and T.R. Hamilton-Kemp. 1993. Developmental and cultivar comparisons of lipoxygenase/lyase-derived volatile compounds from strawberry fruit. American Society for Horticultural Science Conference, HortScience 28:570.

Archbold, **D.D.** 1993. Seasonal variation in the activity of nitrogen assimilation enzymes from strawberry roots. American Society for Horticultural Science Conference, HortScience 28:570.

Archbold, **D.D.** 1993. Sorbitol dehydrogenase activity and cultivar-specific apple fruit growth rates. American Society for Horticultural Science Conference, HortScience 28:449.

Archbold, **D.D.** 1992. Regulation of apple fruit growth rate by turgor pressure? American Society for Horticultural Science Conference, HortScience 27:625.

Zhang. B. and **D.D. Archbold**. 1991. Solute accumulation in leaves of *Fragaria chiloensis* and *F. virginiana* in response to water deficit stress. American Society for Horticultural Science Conference, HortScience 26:792.

Malik, H. and **D.D. Archbold**. 1991. Nitrogen partitioning in thornless blackberry. American Society for Horticultural Science Conference, HortScience 26:687.

Houtz, R.L., **D.D. Archbold**, and M.L. Royer. 1990. Atmospheric CO_2 enrichment of tomato and strawberry plants under field production conditions. American Society for Horticultural Science Conference, HortScience 25:1141.

Zhang, B. and **D.D. Archbold**. 1990. Diurnal changes in leaf conductance and water relations in *Fragaria chiloensis* and *F. virginiana* following water deficit stress. American Society for Horticultural Science Conference, HortScience 25:1105.

Archbold, **D.D.**, T.R. Hamilton-Kemp, and J.H. Loughrin. 1990. Floral-derived volatile compounds: a role in pollination? American Society for Horticultural Science Conference, HortScience 25:1128.

Archbold, **D.D.** 1990. Cultivar variation in apple fruit growth rates, sorbitol accumulation, and tissue osmotic potential. American Society for Horticultural Science Conference, HortScience 25:1070.

Zhang, B. and **D.D. Archbold**. 1990. Water deficit effects on water relations and photosynthesis in *Fragaria chiloensis* and *F. virginiana*. Plant Physiol. 93 (Suppl.):103.

Zhang, B. and **D.D. Archbold**. 1989. Adaptive responses of *Fragaria chiloensis* and *F. virginiana* to water stress. Program and Abstracts of the 1989 American Society for Horticultural Science Annual Meeting. p. 111.

Zhang, B. and **D.D. Archbold**. 1988. Osmotic adjustment in *Fragaria chiloensis* leaves. Plant Physiol. 86(Suppl.):156.

Zhang, B. and **D.D. Archbold**. 1988. Morphological and biochemical responses of strawberry plants to water stress. American Society for Horticultural Science Conference, HortScience 23:817.

Archbold, **D.D.** and C. T. MacKown. 1988. Fertilizer nitrogen allocation patterns at harvest in short day strawberry cultured in matted rows. American Society for Horticultural Science Conference, HortScience 23:741.

Archbold, **D.D.**, J. G. Strang, and D. M. Hines. 1988. Thornless blackberry vegetative growth, yield components, and foliar elemental content as influenced by nitrogen rate and organic mulch. American Society for Horticultural Science Conference, HortScience 23:776.

Archbold, **D.D.** 1988. Abscisic acid biosynthesis, import, and metabolism during apple fruit development. American Society for Horticultural Science Conference, HortScience 23:808.

Lakitan, B., D. E. Knavel, R. L. Houtz, R. L. Geneve, and **D.D. Archbold**. 1987. Water influx and calcium content as related to fruit cracking in pepper (*Capsicum annuum* L.). American Society for Horticultural Science Conference, HortScience 22:1082.

Jones, R. T., D. **Archbold**, and J. Strang. 1987. Evaluation of fifteen everbearing strawberry varieties for yield and winter survival. American Society for Horticultural Science Conference, HortScience 22:719.

Strang, J. G., **D.D. Archbold**, and D. M. Hines. 1987. Effects of nitrogen levels and organic mulches on growth and yield of 'Hull Thornless' blackberry. American Society for Horticultural Science Conference, HortScience 22:718.

Archbold, **D.D.** 1987. GA_3 as an antidote to paclobutrazol on field-cultured strawberry. American Society for Horticultural Science Conference, HortScience 22:720.

Archbold, **D.D.** and C. T. MacKown. 1987. Recovery and partitioning patterns of ^{15}N-ammonium nitrate following spring or fall application to short-day strawberry. American Society for Horticultural Science Conference, HortScience 22:1043.

Archbold, **D.D.** 1987. Influence of abscisic acid on sucrose uptake by strawberry fruit explants and tissue discs *in vitro*. American Society for Horticultural Science Conference, HortScience 22:1134.

Archbold, **D.D.** and R. L. Houtz. 1986. Strawberry plant growth, photosynthesis, and ribulose-1, 5-bisphosphate carboxylase/oxygenase (rubisco) activity as affected by paclobutrazol and flurprimidol. American Society for Horticultural Science Conference, HortScience 21:708

Archbold, **D.D.** and J. G. Strang. 1985. Effect of 6-benzyladenine on growth and fruiting of strawberry. American Society for Horticultural Science Conference, HortScience 20:564.

Brown, G. R. and **D.D. Archbold**. 1984. Twelve year summary of the effect of rootstock and spacing on growth and yield of apple. American Society for Horticultural Science Conference, HortScience 19:203.

Archbold, **D.D.** and F. G. Dennis, Jr. 1982. Quantification of abscisic acid and free and bound indoleacetic acid in strawberry (*Fragaria x ananassa*) achenes and receptacles during fruit development. American Society for Horticultural Science Conference, HortScience 17:72

Archbold, **D.D.** and F.G. Dennis, Jr. 1980. Tomato fruit set: Is mobilization involved? American Society for Horticultural Science Conference, HortScience 14:473.

EXTRAMURAL FUNDING/GRANTS

USDA National Research Initiative Competitive Grants Program 2001-2004 $114,212
Ripening and Storage Life Extension of the Native American Pawpaw Fruit
D.D. Archbold (PI) and K.W. Pomper

USDA National Research Initiative Competitive Grants Program 1994-1996 $110,000
Natural Volatile Compounds for Control of Microbial Spoilage and Quality of Strawberry During Modified Atmosphere Storage
D.D. Archbold (PI), T.R. Hamilton-Kemp, B. Langlois, and M. M. Barth

Cooperative Regional Project S-263 1995-2000 $ 76,000
Enhancing Food Safety Through Control of Foodborne Disease Agents
B.E. Langlois (PI), D.D. Archbold, and T.R. Hamilton-Kemp

New Crop Opportunities Grants Program
As PI

Specialty Crop Block Grant Program USDA-AMS/KY Department of Agriculture
Optimizing Orchard Management Strategies for Yield, Plant Health, and Fruit Quality in Organic Apple Production D.D. Archbold (PI), M.A. Williams, J.G. Strang, R. Bessin 2010-2013 $ 73,590

New Crop Opportunities Grants Program USDA Special Program
Marketing Nutrition for Kentucky Produce T. Woods (PI), W. Hu, J. Strang, T. Coolong, D. Archbold (Co-PI) 2009-2010 $ 23,000
Evaluating the role of generalist predators in reducing damage and disease transmission by slugs in strawberry crops J.D. Harwood (PI), D.D. Archbold (Co-PI), J.J. Obrycki 2005-2009 $ 69,378
Optimizing Market Quality of Edamame 2005-2008 $ 57,450
Developing Organic Apple Thinning Agents For Kentucky Fruit Growers 2004-2006 $70,047
Extending Blackberry Fruit Shelf Life with Modified Atmosphere Storage 2002-04 $ 48,250

As Co-PI

Evaluating the Role of Generalist Predators in Reducing Damage and Disease Transmission by Slugs in Strawberry Crops J.D. Harwood (PI), D.D. Archbold, J.J. Obrycki
2005-2009 $ 69,378

National Science Foundation 1990 $ 87,000

Acquisition of a Stable Isotope Ratio Mass Spectrometer for Determining Nitrogen Transformations and Metabolism in Soil, Plant, and Animal Systems
C.T. MacKown (PI), D.D. Archbold, M.S. Smith, J.A. Boling

North American Strawberry Growers Association - as PI - 1986-1993 - 6 grants $ 8,150

Tennessee Valley Authority – as PI – 1987 $ 6,000

Hatch Project

Regulation of Expression and Activity of Sorbitol Dehydrogenase in Apple 2007-2011

GRADUATE STUDENTS

Graduated

Porntip Thavong	Ph.D., Chiang Mai University, Thailand		Co-advisor
Federica Galli	Ph.D. Plant Physiology	2007	Co-advisor
Marta Nosarzewski	Ph.D. Plant Physiology	2007	Advisor
Valeria Sigal Escalada	Ph.D. Plant Physiology	2006	Advisor
Federica Galli	M.S. Nutritional Sciences	2005	Advisor
Kyung Myung	Ph.D. Plant Physiology	2005	Co-advisor
Rumphan Koslanund	Ph.D. Plant Physiology	2003	Advisor
Matthew Fulkerson	M.S. Plant & Soil Science	2004	Co-advisor
Keshun Yu	Ph.D. Nutritional Sciences	2001	Co-advisor
Suzanne McDonald	M.S. Horticulture	1995	Advisor
Baolin Zhang	Ph.D. Plant Physiology	1991	Advisor
Hermen Malik	M.S. Horticulture	1990	Advisor

Graduate Committees since 1982 >20

Outside examiner 10 Ph.D. Defenses since 1982

Current

Patsy Wilson	Ph.D. candidate	Advisor
Sutapa Roy	Ph.D. candidate	Advisor

VISITING SCIENTISTS/POSTDOCTORAL SCHOLARS

Dr. Khalid Al Absi, Mu-tah University, Jordan Fulbright Scholar 9/2010-6/2011

Vilma Ruth Calderon, CENTA, El Salvador Borlaug Fellow 10/2009

Dr. Benhong Wu Visiting Scientist, Institute of Botany, Beijing, China 11/2007-11/2008

Dr. Xiaodan Zhao Postdoctoral Scholar 5/2007-5/2008

Angelo Niculescu Laboratory of Fresh Fruits and Vegetables Research, Development Institute for Industrialization and Marketing of Horticultural Products, Bucharest, Romania November 2006

Roberta Magnani, Ph.D. Candidate, University of Bologna, Bologna, Italy, January-November, 2003

Yugang Sun, Associate Professor, Shandong Institute of Pomology, Taian, Shandong, China, 11/2002-4/2003

Dr. Hana Konradova, Assistant Professor, Dept of Plant Physiology, Charles University, Prague, Czech Republic, 8 weeks, Summer 2002
Dr. Elazar Fallik, Senior Research Scientist, The Volcani Center, Bet Dagan, Israel 8/1996-8/1997
Dr. Lailiang Cheng, Assistant Professor, Shandong Agricultural College, Shandong, China 9/1993 – 8/1994

MENTORING

Chlodys Johnstone	UK Horticulture undergraduate	7/2006 – 12/2007
Aurora Raveneau	French undergraduate summer intern	2005
Erin Truitt	Sayre High School	2005-2006
Cindy Kulik	UK Biology undergraduate	1999-2000
Rameeza Allie	UK Biology undergraduate	1998-1999
Decker Ringo	Dunbar High School	1997-1998
Genelle Price	U.S. Dept. of Education Minority Science Summer Fellowship	1991

PROFESSIONAL ACTIVITIES/SERVICE

Editorial/Review Activities

International

Editorial Committees

Notulae Botanicae Horti Agrobotanici Cluj-Napoca from University of Agricultural Sciences and Veterinary Medicine, Cluj-Napoca, Romania, 2008-2012

Proceedings of the 4th International Strawberry Symposium, 2000, Tampere, Finland, International Society for Horticultural Science

Proceedings of the 3rd International Strawberry Symposium, 1996, Veldhoven, The Netherlands, International Society for Horticultural Science

National

Associate Editor, Journal for the American Society for Horticultural Science - 2001 to 2004

International Journal of Fruit Science – Editorial Board since 1996

Peer Reviewer

10 year mean – 16/year

Refereed Journals including:

Plant Molecular Biology
Annals of Botany
Plant Cell Reports
Physiologia Plantarum
Journal of Plant Physiology
PLoS ONE
BMC Plant Biology
Journal of the American Society for Horticultural Science
Scientiae Horticulturae
HortScience
HortTechnology
Postharvest Biology and Technology
Tree Physiology

Journal of the American Society of Enology and Viticulture
Australian Journal of Grape and Wine Research
Journal of the American Pomological Society
Crop Protection
Acta Horticulturae
Journal of Agricultural and Food Chemistry
Journal of Food Science
International Journal of Food Science and Technology
Food Science and Technology International
Crop Protection
Italian Journal of Food Science
LWT - Food Science and Technology
Agrivita Journal of Agricultural Science, Agriculture Faculty Brawijaya University
Journal of Zhejiang University-Science-B (Biomedicine & Biotechnology)

Competitive Grants Programs Proposal Reviews
NSF Plant Genome Research Program - 2010
USDA National Research Initiative Competitive Grants Program
2006, 2005, 2001, 1999, 1998, 1995, 1993, 1992
U.S.-Israel Binational Agriculture and Research Development (BARD) Program
2011, 2010, 2006, 2005, 2004, 2003, 2001, 2000, 1999
German-Israeli Foundation Grants Program 2000
USDA/CSRS Regional Research Project W-130: Freeze Damage and Protection of Fruit and Nut Crops 1993
USDA/CSRS Small Business Innovations Research Program 1991

Fulbright Scholarship Review Committee 2002
California Dept. of Food and Agriculture Fertilizer Research and Education Grants Program Reviewer 2008
Outside reviewer of promotion packages for faculty at the Department of Postharvest Science, The Volcani Center, Bet Dagan, Israel 2009, 2008, 2006, 2003, 2001, 1997
Outside Reviewer of promotion package, University of Jordan, Amman, Jordan 2010
Book reviews (6) for the magazine Choice: Current Reviews for Academic Libraries

Committees
International
Scientific Review Committee, Eurasia 2007: International Symposium on Quality Management in Chains, Bangkok, Thailand.
International Scientific Committee of the 2002 International Berry Crops Symposium; Berry Crop Breeding, Production, and Utilization for a New Century; XXVIth International Horticultural Congress Toronto, CAN, August 11-17, 2002.

National
American Society for Horticultural Science

2001 Organized and chaired a Colloquium at the 2001 Annual Meeting of the American Society for Horticultural Science, 'Understanding Floral Induction and Morphogenesis'

1996 Technical Program Committee Member for national ASHS Meeting

1993-1995 Chair Crop Physiology Working Group

1988, 1994 Cross-commodity Publication Award Screening Committee

USDA NCCC-22 Small Fruit and Viticulture Committee, 1985 to present; Chair 1988-1989

USDA Small Fruit Crop Germplasm Committee, 1996 to 2004

American Pomological Society

A.P Wilder Award Selection Committee 2003-2011, Chair 2008-2011

Societies

American Society for Horticultural Science
International Society for Horticultural Science
American Pomological Society
Sigma Xi
Gamma Sigma Delta
Kentucky State Horticultural Society

HONORS

George M. Darrow Award 1985, American Society for Horticultural Science

For excellence in viticulture and small fruits research during Ph.D. dissertation for the paper - Quantification of free ABA and free and conjugated IAA in strawberry achene and receptacle tissue during fruit development. 1984. D. D. Archbold and F. G. Dennis, Jr. J. Amer. Soc. Hort. Sci. 109:330-335.

SABBATIC AND RELATED ACTIVITIES

Beijing, China, Institute of Botany, Fruit Tree Laboratory

October – November, 2011, 2 month sabbatical, research collaboration, grant and manuscript reviews. Funded by Chinese Academy of Sciences.

October 2007. Invited for a 2 week visit to discuss research projects with faculty and graduate students, and have provided preliminary reviews of over 15 manuscripts in 2007-2008. Travel and expenses funded by the Institute.

May 7 – June 5, 2005. Invited to spend 1 month sabbatic at the Institute, to discuss and plan collaborative research, to observe fruit and vegetable production in the region, and to present 3 seminars of my research. Travel and expenses funded by the Institute.

Chiang Mai University Institute for Postharvest Research, Chiang Mai, Thailand, August 19 – September 4, 2005. Appointed as Adjunct Faculty to serve as Co-Advisor for Ph.D. student Porntip Thavong. Planned and designed the Ph.D. research, along with scientists from the Thailand Department of Agriculture and Chiang Mai University Institute for Postharvest Research, a study of natural products for control of postharvest diseases of longan fruit. Presented a seminar on my research at the Institute. Travel and expenses funded by the Institute

Bangkok and Chiang Mai, Thailand, March 10-20, 2004

Visited the Thailand Department of Agriculture, Kasetsart University, and Chiang Mai

University Institute for Postharvest Research for possible research collaboration. Travel and expenses funded by the Institute.

TEACHING

Courses

PLS 520 Fruit & Vegetable Production	2006-2011
PLS 597 Vegetable Crop Production	2000-2005
PLS 597 Fruit Crop Production	2000-2005
PLS 623 Physiology of Plants II (Plant Hormones)	1987-2008
PLS 622 Physiology of Plants I (Water Relations)	1992-1998
PLS 697 Postharvest Biology and Technology Of Horticultural Crops	2003
GEN 200 Issues in Agriculture	2002-2004
HOR 402 Fruit Crop Production	1983-1999
HOR 410 Growth and Development of Horticultural Crops	1987-1998
PLS 605 Growth and Development of Horticultural Crops: Advanced Production Systems	1997-1998
HOR 601 Physiological Mechanisms in Horticultural Plants	1994, 1998

Student Evaluations Since 2000

Course	Year	Credit Hrs	Students	Course Commitment	Teaching Quality Course (College/Dept. Means)
PLS 520	2011	4	7	100%	4.0 (3.3/3.5)
	2010	4	7	100%	3.8 (3.4/3.4)
	2009	4	13	100%	3.9 (3.3/3.4)
	2008	4	10	100%	3.9 (3.3/3.4)
	2007	4	9	100%	3.9 (3.4/3.5)
	2006	4	18	100%	3.8 (3.4/3.6)
PLS 597 Fruit	2005	2	13	100%	3.6 (3.4/3.5)
	2004	2	20	100%	3.6 (3.4/3.4)
	2003	2	13	100%	3.4 (3.4/3.4)
	2002	2	20	100%	3.4 (3.2/3.4)
	2001	2	13	100%	3.2 (3.4/3.5)
	2000	2	11	100%	3.3 (3.4/3.2)
PLS 597 Vegetables	2005	2	14	100%	3.5 (3.4/3.5)
	2004	2	20	100%	3.6 (3.4/3.4)
	2003	2	13	100%	3.4 (3.4/3.4)
	2002	2	20	100%	3.4 (3.2/3.4)
	2001	2	13	100%	3.2 (3.4/3.5)
	2000	2	14	100%	3.3 (3.4/3.2)
PLS 623	2000-2008	3	8-12/year	16.3%	Not rated
GEN 200	2004	3	25	100%	3.3 (3.4/3.4)

	2003	3	25	100%	3.5 (3.3/3.4)
	2002	3	27	100%	2.5 (3.4/3.2)
PLS 697	2003	3	6	100%	Not rated

OUTREACH, SERVICE AND MISCELLANEOUS ACTIVITIES

International

Bolivia and Ecuador, Partners of the Americas Conference and site visits June 1998
University of Lampung, Lampung, Indonesia October 1989 and January 1990
Taught Crop Physiology Short Course to Indonesian University faculty
Ecuador, Partners of the Americas site visits June 1984

National

North American Strawberry Growers Association Annual Meeting, Louisville, KY 1997
Presentation: 'Natural volatile compounds control gray mold on strawberry during postharvest storage'
Session moderator: Plasticulture strawberry production
North American Bramble Growers Association Annual Meeting, Louisville, KY 1997
Presentation: 'Nitrogen recovery and cycling by thornless blackberry'
Session moderator: Blackberry and raspberry nutrition
North American Strawberry Growers Association Annual Meeting, St. Petersburg, FL 1991
Presentation: 'Use of gel polymers as slow-release sources of nitrogen'
Intel International Science Fair, Louisville, KY, Judge 1998

State/Region

Kentucky State Horticultural Society, Secretary 1983-2012
Kentucky Department of Agriculture Grape Industry Advisory Board 1991-1994
Kentucky State Horticultural Society Annual Winter Meeting Presentations
Apple Fruit Thinning 2010
Results of the NC-140 Rootstock Trials in KY 2009
Promoting Fruit and Vegetable Phytochemical Content 2008
History of the KSHS 2007
Aminoethoxyvinylglycine (AVG) and Apple Fruit Quality in Cold Storage 2005
Extending Apple Storage Life with 1-MCP 2004
Extending Strawberry and Blackberry Seasons with Tunnels And Greenhouses 2001
The Future of Strawberries in Kentucky: Roundtable Discussion Leader 2000
Strawberry Cultivar Trial Results Using the Matted Row System and Plasticulture 1999
Alternative Strawberry Production Systems 1998
Innovations in Matted Row Strawberry Production 1997
New Strawberry Cultivars for Kentucky 1993
Seasonal Patterns of Plant Growth and Nitrogen Recovery 1993
Marketing Table Grapes 1992
Strawberry Water Use and Drought Stress 1990
New Horizons in Small Fruit Research 1989
Nitrogen Use in Strawberry and Blackberry 1988

Can Your Fruit Trees Be Overthinned? 1987
Summer Pruning Fruit Trees 1986
Fruit Production in Ecuador 1986
Strawberry Cultivars 1984
Nutrient Deficiency Problems in Peach 1983
Pruning Peach Trees 1982

Kentucky State University Presentations
Pawpaw Workshop
Storing Pawpaw Fruit 2008
Postharvest Storage and Handling of Pawpaw 2004
Sustainable Agriculture Workshop
Strawberries and Brambles 2000
Storing Pawpaws 1999

Kentucky Grape and Wine Production Courses
Phenolics and Ripening in Grape Berries 2007
Cultural Practices and Chemicals that Affect Berry Size and Quality 1994
Cold Tolerance and Injury in Grapes 1993
pH and Titratable Acidity in Grape Musts 1986

Boone County-Northern Kentucky Extension Meeting 2001
Strawberry and Bramble Production

Illinois Small Fruit and Strawberry Schools 1997
Strawberry Cultural Systems: Matted Rows And Beyond
Kentucky Blackberry Industry and Research

Ohio Pawpaw Festival, Albany, Ohio, September 2004
Ripening and Storing Pawpaws

South Farm and Princeton Field Days
Numerous presentations since 1982 on tree fruit management, rootstocks, grapes, and berry crops

University of Kentucky

College
Promotion and Tenure Committee, College of Agriculture 2007-2009, Chair 2008-2009
Faculty Appeals Committee 2007

Department
Coordinator of Graduate Studies, Department of Horticulture 2007-2008
Chair, Viticulture Position Search and Screening Committee 2008
Departmental Advisory Committee 1995-2008
Biochemistry/Molecular Biology Position Search and Screening Committee 2006
Research Group Coordinator 1995-2007
Viticulture and Enologist Positions Search and Screening Committees 2003-2004
Nursery Crops Search and Screening Committee 2005
Princeton Fruit Extension Position Search and Screening Committee 2001
Hatch Proposal Review Committee 2000-2007
Landscape /Nursery Position Search and Screening Committee 2000
Director of Graduate Studies 1989-1996
Faculty Meeting Secretary 1982-1989

Timothy W. Coolong
Department of Horticulture, University of Kentucky
Lexington, KY 40546-0091
Ph: 859-257-3374 email:timcoolong@uky.edu

2012-Current *Associate Professor, 80% Extension 20% Research*

FUNDING (*most recent in each category first-includes funding obtained prior to 2011/2012 but still active during the previous two years*)

EXTRAMURAL FUNDING, *Nationally and Regionally Competitive*

Shielding cucurbit crops for resilient agroecosystems. *NIFA-Specialty Crop Research Initiative. $1,552,870 for 2 years starting September 2012, UK portion $164,519.* PI: M. Gleason, (Iowa State University), with 22 additional Co-PIs from Ohio State University, Pennsylvania State University, Michigan State University and University of Kentucky. **T. Coolong** *primary PI for UK and leading a primary grant objective (tillage)* with M. Williams, and R. Bessin.

Whole farm organic management of Brown Marmorated Stink Bug and endemic pentatomids though behavior-based habitat manipulation. *USDA-Organic Research and Education Initiative. $2,672,327 for 3 years starting September 2012, UK portion $84,310.* PI: A. Neilsen, A. (Rutgers, University), Co-PI. R. Bessin primary PI for UK, T. Coolong, and 15 others.

Incorporating row covers into muskmelon IPM with a farming systems approach. *Pest Management Alternatives Program. $190,000 for 2 years starting September 2011, UK portion $76,000* . PI: M Gleason, (Iowa State University). Co-PI. D. Lewis, L. Jesse, M. Duffy, and J. Batzer (Iowa State University), Co-PI M. Williams, **T. Coolong**, and R. Bessin (University of Kentucky)

A training program in sustainable vegetable production for extension personnel in Kentucky and Tennessee. Southern SARE Professional Development Program. *$59,532 for 1 year starting July 2010.* **PI: Timothy Coolong**, Co-PI: (University of Kentucky) Mark Williams, Kenny Seebold, Ricardo Bessin, Co-PI: Annette Wszelaki (University of Tennessee), Co-PI: Michael Bomford (Kentucky State University) *1year no cost extension received through June 2012.* ***Completed 2012.***

IPM in Kentucky-Integrated development and delivery. *NIFA- Extension Integrated Pest Management Coordination and Support. $280,934 ($40,198 Coolong) for 3 years starting October 2010.* PI: D. Johnson, **Co-PI: T. Coolong (leader for Vegetable IPM group)**, R. Durham, A. Fulcher, W. Dunwell, C. Lee, G. Schwab, and L. Murdock.

Sustainable Production Systems for Cucurbit Crops on Organic Farms. *USDA Organic Agriculture Research and Education Initiative. Total funding $1,047,000 for 3 years, UK portion $276,488 starting in Sept. 2009.* PI: Mark Gleason (Iowa State University). Co-PI D. Lewis, J. Batzer, L. Jesse, F. Nutter, and A. Correia (Iowa State University), Co-PI S. Fleischer, E. Sanchez, B. Gugino, and D. Biddinger (Pennsylvania State University), Co-PI M. Williams, R. Bessin and **T. Coolong** (University of Kentucky). ***Completed 2012.***

EXTRAMURAL FUNDING, *Statewide Competitive*

Building Technical Support Capacity for Kentucky's High Tunnel Specialty Crop Producers. *Kentucky Dept. of Agriculture Specialty Crops Block Grant. Total funding $50,791 for two years starting January 2013.*

The Vegetable Academy: A Short Course to Advance Vegetable Production in Kentucky. *Kentucky Dept. of Agriculture Specialty Crops Block Grant. Total funding $24,469 for two years starting in January 2012.* **PI: Timothy Coolong** Co-PI: Kenneth Seebold, Ric Bessin, John Wilhoit, Shawn Wright, Timothy Woods, and Ricky Yeargan.

Developing Diversified High Tunnel Systems to Enhance Food Security and Specialty Crop Production in Kentucky. *Kentucky Dept. of Agriculture Specialty Crops Block Grant. Total funding $62,834 for 2 years starting October 2010* PI: Krista L. Jacobsen, **Co-PI: T. Coolong,** M. Williams.

Asparagus: A Nutritious, High-Value, Early Crop for Market Gardeners. *Kentucky Dept. of Agriculture Specialty Crops Block Grant. Total funding $8,277 for 2 years starting in October 2010.* PI: Shawn R. Wright, **Co-PI: T. Coolong.**

INTRAMURAL FUNDING, *Non competitive*

Novel New Crops for Kentucky. *USDA Special Grant New Crops Opportunity Center, University of Kentucky*. *Total funding $42,976 for three years starting September 2010.* **PI: Timothy Coolong.**

OTHER FUNDING

Developing Farm to School Training for Farmers Through County Extension Agents, 2012. *Kentucky Dept. of Public Health.* Total funding $6,000 for one year starting July 2011. University of Kentucky Cooperative Extension Service; PI: Kenny Seebold, Co-PI: **Timothy Coolong** , Gary Palmer, Ricky Yeargan, and Ric Bessin

PUBLICATIONS

Book chapters

Coolong, T.W.. Using irrigation to manage weeds: A focus on drip irrigation. In: Weed and Pest Control. S. Soloneski (ed.) INTECH publishing open access. ISBN 980-953-307-953-5. *(Accepted, October 2, 2012, in proof stage)*

Coolong, T.W. 2012. Mulches for Weed Management in vegetable production. p. 57-74. In:Weed Control. A. Price (ed.) INTECH publishing open access. ISBN 979-953-51-0159-8.

Peer Reviewed Journal Publications *(2011-2012, *denotes temporary post-doc)*

Coolong, T., S. Mishra, T. Barickman, and C. Sams. 2012. Impact of supplemental calcium chloride on yield, quality, nutrient status, and postharvest attributes of tomato. J. Plant Nutrition. *Accepted July 9, 2012.*

Antonious, G., T.S. Kochhar, and T. Coolong. 2012 Yield, quality, and concentration of seven heavy metals in cabbage and broccoli grown in sewage sludge and chicken manure amended soil. J. Env. Sci. Health Part A. 47:1955-1965.

Coolong, T.W., S. Surendran*, J. Snyder, R. Warner, and J. Strang. 2012. The relationship between soil water potential, environmental factors, and plant moisture status for Poblano pepper (*Capsicum annuum*) grown using tensiometer-scheduled irrigation. International J. Veg. Sci. 18:137-152.

Antonious, G., R. Hill, K. Ross, and T. Coolong. 2012. Dissipation, half-lives, and mass spectrometric identification of endosulfan isomers and the sulfate metabolite on three field-grown vegetables. J. Env. Sci. Health Part B: Pesticides, Food Contaminants, Agr. Waste. 47:369-378

Coolong, T.W. and K.Seebold. 2011. Impact of fungicide program and powdery mildew resistance in three varieties of pumpkin. HortTechnology 21:533-538.

Coolong, T.W.**,** S. Surendran*, and R. Warner. 2011. Evaluation irrigation threshold and duration for tomato grown in a silt loam soil. HortTechnology 21:466-473.

Submitted in Review

Vassalos, M, C.R. Dillon, T. Coolong. *(In review).* Fresh vegetable production decisions for optimal timing for Kentucky growers. J. Agr. Appl. Econ.

PUBLISHED ABSTRACTS *(2011-2012)*

Coolong, T.W. 2011. A low-cost high tunnel demonstration program in Kentucky. HortScience 46(9): S17

UNIVERSITY OF KENTUCKY COOPERATIVE EXTENSION PUBLICATIONS
NUMBERED SERIES PUBLICATIONS (Peer reviewed)

Coolong, T (ed.), K. Seebold, R Bessin, and T. Woods. 2012. Sweetpotato production for Kentucky. (ID-195) 16 p.

Durham, R.T (ed.), T. Coolong, R.T. Jones, J. Strang, M. Williams, S. Wright, R. Bessin, N.Ward, and K. Seebold. 2012. Home vegetable gardening in Kentucky. (ID-128) 48 p. (revised)

Coolong, T., K. Seebold, R. Bessin, J. Strang, and S. Wright. 2011. Vegetable production guide for commercial growers 2012-2013. (ID-36) 131 p. (extensive revision).

Coolong, T (ed.), J. Snyder, and C. Smigell. 2011. 2011 Fruit and veg. res. report. PR 626. 53 p.

Vincelli, P, L. Meyer, R. Burris, T. Coolong, R. Bessin, J. Bewley, J. Taraba, T. Barnes, R. McCulley, and G. Wagner. 2011. The scientific consensus on global warming. ID-191

Coolong, T (ed.), K. Seebold, R. Bessin, and J. Strang. 2011. An IPM scouting guide for common pests of Solanaceous crops in Kentucky (ID-172). 32 p. (revised)

Durham, R.T (ed.), T. Coolong, R.T. Jones, J. Strang, M. Williams, S. Wright, R. Bessin, J.Hartman, and K. Seebold. 2011. Home vegetable gardening in Kentucky. (ID-128) 50 p. (revised)

FACT SHEETS

Coolong, T., and S. Surendran. 2011 Tensiometer installation. HortFact 7003.

RESEARCH REPORTS (2011-2012)

Antonious, G., T. Kochhar, J. Snyder, and T. Coolong. Concentration of heavy metals in soil and mobility to plants. 2011 Fruit and Veg. Crop Res. Report. PR 626:41-44.

Wang, Z., and T. Coolong. 2011. Evaluation of conservation tillage and plasticulture production systems for organically and conventionally grown bell peppers in well-watered and drought conditions. 2011 Fruit and Veg. Crop Res. Report. PR 626:38-41.

Berberich, S., and T. Coolong. 2011. Hydroponic tomato demonstration. 2011 Fruit and Veg. Crop Res. Report. PR 626:28-30

Coolong, T. 2011. An evaluation of onion varieties and set-size. 2011 Fruit and Veg. Crop Res. Report. PR 626:26-28.

Coolong, T, L. Hanks, and J. Cole. 2011. Seedless watermelon variety evaluation. 2011 Fruit and Veg. Crop Res. Report. PR 626:24-25.

Fenton, V., T. Coolong, and P. Williams. 2011. Bell pepper variety evaluation 2011. 2011 Fruit and Veg. Crop Res. Report. PR 626:25-26.

Spalding, D., and T. Coolong. 2011. On-farm commercial vegetable demonstrations in Central KY. 2011 Fruit and Veg. Crop Res. Report. PR 626:7

Cato, T., and T. Coolong 2011. On-farm commercial vegetabl.e demonstrations in West-Central KY. 2011 Fruit and Veg. Crop Res. Report. PR 626:8.

REGIONAL PUBLICATIONS

Kemble J (ed), T. Coolong, R. Bessin and K. Seebold *and extension specialists from 12 southeastern states*. 2012. 2012 Southeastern U.S. Vegetable Crop Handbook. 274 p.

Kemble J (ed), T. Coolong, R. Bessin and K. Seebold *and extension specialists from 12 southeastern states*. 2011. 2011 Southeastern U.S. Vegetable Crop Handbook. 284 p.

POPULAR PRESS

Gordon, R. and Coolong, T. Understanding drip irrigation. Amer. Veg. Grower. May 10, 2012.

Gordon, R. and Coolong, T. Field prep and plastics. Amer. Veg. Grower. Jan. 13, 2012.

PRESENTATIONS [National and regional out of state (*invited)]

Nambuthiri, S., R. Warner, and T. Coolong. Comparison of soil-moisture based irrigation scheduling to potential evapotranspiration in tomato grown using plastic mulch. Kentucky Water Resources Annual Symposium, March 19, 2012, Lexington, KY.

Vassalos, M., C.R. Dillon, and T. Coolong. Choice of optimal planting and marketing decisions for fresh vegetable producers: A mathematical programming approach. SAEA Feb. 6, 2012, Birmingham, Al.

Minter, L., R. Bessin, T. Coolong, and M. Williams. Balancing pest and pollinator management in cucurbit production systems. ESA National Conference, Nov. 13-16, 2011, Reno NV.

*Coolong, T. Organic production systems for onions and colored bell peppers. Virginia Biological Farming Conference, Feb 11, 2012, Richmond, VA.

**Chaired Extension Outreach sessions at National ASHS meeting Aug 5, 2010 in Palm Desert, CA and SRASHS Feb. 6, 2011 in Corpus Christi, TX.*

Coolong, T, and D. Slone. A low cost high tunnel demonstration program in Kentucky. SRASHS Feb 6, 2011, Corpus Christi, TX.

*Coolong, T. Pulse and drip irrigation for vegetable crops; Crops for high tunnel production including: tomatoes, peppers, cucurbits, and more. Indiana Hort Congress. Jan 18-20, 2011 Indianapolis, IN.

*Coolong, T. Drip irrigation regimes for tomatoes and specialty peppers; Transplanting Sweet Corn: Effects of transplant age and maturity date on yield and quality. Illinois Specialty Crops, Agritourism and Organic Conference Jan 5-7, 2011, Springfield, IL.

STATE AND COUNTY PRESENTATIONS/OUTREACH

I have delivered over 60 presentations at the state and county level. I have conducted approximately 40-50 farm visits over the past two years.

COUNTY AGENT TRAINING

2012 Horticulture workshop and in-field training, Aug. 7, 2012
2011 Vegetable variety updates, Oct. 28, 2011, Winchester, KY
Irrigation for the home gardens and high tunnel vegetable production, Oct. 20, 2011, Hopkinsville, KY; In-field vegetable production training, Sept. 6, 2011, Lexington, KY; Introduction to hydroponic tomato production, July 27, Lexington, KY; Managing fertility in organic systems, July 21, KSU Farm, Frankfort, KY; Persistent herbicides in compost: What this could mean for your growers, June, 30, Madison County, KY

FIELD DAYS

2012 Jefferson County Plasticulture Field Day July 25, Horticulture Research Farm Field Day Aug. 7, Allen County Plasticulture Field Day Aug. 23. RCARS Taste of the Mountains Field Day Sept. 22.
2011 Spencer County Plasticulture Field Day Aug. 26, Graves County Field Day, Aug. 29, Breckinridge County Field Day Aug. 1, Garrard County High Tunnel Field Day July 29, Fairview Produce Auction Field Day July 19

GRANT REVIEW PANELS

2011 USDA NIFA Childhood Obesity Research and Education grants. *Primary or secondary reviewer on 19 grants*
Southern SARE: Professional Development Preproposals and Full Proposals. *Reviewer on 7 full grants and 12 preproposals.*

RECENT AWARDS

Outstanding Extension Program Award: Horticulture On-Farm Demonstration and Consultation Program. Presented by The Kentucky Association of State Extension Professionals, Mar. 20, 2012 Lexington, KY.

SRASHS Blue Ribbon Extension Communications Award: 2011 Southeastern U.S. Vegetable Crop Handbook. J.M. Kemble (ed) and 11 others. Presented at SRASHS annual conference, Feb 4-7, 2012, Birmingham, Al.

Outstanding New Extension Faculty Award. Presented by The Kentucky Association of State Extension Professionals, Mar. 11, 2011 Lexington, KY.

Narrative
Timothy Coolong
Extension and Research Program Overview

Over the previous two years I have tried to focus my extension and research efforts to develop new production tactics (strip tillage of vegetables) as well as refine some ongoing long-term applied research projects (irrigation and organic melon production) to bring them to completion so that recommendations can be made for growers in Kentucky. In 2011 and 2012 I took the lead for UK on a multistate SCRI grant ($164, 519 for UK) to develop Resilient Agroecosystems for Cucurbit Production in Kentucky. In short, this project seeks to develop alternative tillage and pest control methods for Cucurbit crops. I am leading a primary objective focusing on conservation tillage for Cucurbit crops. In addition, I have been advising a PhD student, who is in year two of his program. This student is looking at water use efficiency and the impact of tillage system on drought tolerance in pepper. My goal is to develop alternative tillage strategies for Kentucky vegetable farmers that result in more environmentally sustainable production and increased profits. I have been routinely publishing results of research projects in peer-reviewed journals and expect to compile the results of my research focusing on tillage and irrigation management into recommendations for Kentucky farmers. Several ongoing projects were also brought to completion in 2011 and 2012, including a S. SARE funded on-farm grant for sweetpotato production in Eastern Kentucky (resulting in a numbered extension publication for sweetpotato production) and a S. SARE Professional Development Grant that allowed for training of Extension professionals in organic and sustainable vegetable production.

In 2011 was the PI for funding ($24,469) obtained from the Kentucky Department of Agriculture's Specialty Crops Block Grant Program to develop a "Vegetable Academy" for Kentucky. This program was first held in the winter of 2012 in Henry and Campbell Counties. Although I took leadership in coordinating this program it would not have been possible without the efforts of faculty and staff in several departments in the College of Agriculture. We had nearly 100 growers and Extension personnel attend the two workshops. Programs consisted of approximately 14 hours of programming over two days. Surveys and posttests indicated the program was successful. This funding was combined with grant funds obtained in collaboration with Dr. Kenny Seebold for "Farm to School" educational programming for growers. The funds, $6,000, were used in conjunction with the Vegetable Academy to provide education to growers about selling produce to schools in KY. In 2013 we are planning on modifying the program and hold it in Eastern and Southern KY counties. A goal would be to refine the materials presented so that a curriculum could be developed to be provided online for Extension professionals, teachers, and growers to use in the future.

In addition to the Vegetable Academy I have delivered over 60 presentations at the state and county level. I have conducted approximately 40 farm visits over the past two years. In 2011 and 2012 I was an invited speaker to state-wide vegetable production meetings in West Virginia, Indiana, Illinois, Virginia, and Tennessee.

I also implement the vegetable crops diversification program that is part of the HortCouncil grant program funded by the Kentucky Agriculture Development Board. Currently I supervise two Extension associates, though had supervised three until July 2012. The Extension associates are stationed throughout Kentucky. The Extension associates also conduct farm visits and outreach efforts in addition to on-farm demonstrations. I support each associate with technical advice and routinely speak at field days and visit demonstration plots.

In 2011 I also had the opportunity to conduct Extension programming in the Bekaa Valley Region of Lebanon. As part of a two-week assignment for USAID and Winrock International, I helped develop fertility recommendations for nearly a dozen vegetable and fruit crops for growers in the region. This was a rewarding experience to be able to act as an ambassador for the University of Kentucky and help farmers in the region. The production systems in the Bekaa Valley are similar to those in Kentucky and this experience allowed me to observe some innovative production practices that I could implement here in Kentucky to help our growers.

As I move forward I would like to focus more efforts on community-based development projects. I feel that we have the tools in Kentucky to grow nearly any crop successfully, but that there are key limitations to expanding the vegetable industry. These limitations are in my opinion more related to development and infrastructure than production tactics. In addition I would like to focus more energy on ensuring food security for a larger portion of our population. I feel much of my expertise in vegetable production could be utilized to assist vulnerable portions of our population. Furthermore, I feel that this could be a way to collaborate more with faculty in the nutritional and medical sciences. Traditionally the Department of Horticulture has not worked closely with faculty in these fields, but I feel it is an obvious fit for those of us that work with edible crops.

Timothy W. Coolong
Assistant Professor of Horticulture
Department of Horticulture, University of Kentucky

NARRATIVE

Current Position

Currently I maintain a split appointment of 80% extension and 20% research, with responsibilities related to vegetable production. Kentucky's vegetable industry is primarily composed of small and medium-diversified vegetable farms. It is estimated that vegetables are grown on about 10,000 acres annually in Kentucky, accounting for $25-30 million in farm-gate income. It is not unusual for larger wholesale producers to grow five or more crops, while those who market directly to consumers may grow 15-20 different types of vegetables in addition to fruits and in some cases ornamental crops. To meet the needs of such an industry I conduct both systems-based and crop-specific research, integrating the results into educational programming for agents and growers covering a range of topics; though all tied to the common goal of improving productivity on diversified vegetable farms.

Extension Program Overview

Research is the basis for quality extension programming. Without the results from applied research programs, in Kentucky and across the United States, my extension program would have little new to offer. Even the most basic recommendations are based on research data at some level. A primary objective of my position is to select the most appropriate research results for vegetable production in Kentucky and use the data to provide educational experiences for Extension agents and growers. To understand the unique needs of each audience, perspective, gained through substantial personal interaction, is required. Generally I cater educational programming to each audience through lecture or experiential-based learning, one-on-one interactions, and publications addressing the needs of constituents. Sample extension activities and programs are listed.

- I have participated in 155 state and county meetings, agent trainings, and field days since July 2007. Topics have ranged from hydroponic tomato production, to irrigation management, to cover cropping and rotations on organic farms and everything in between. With an estimated average attendance of 20-25 individuals per program, I have had the opportunity to reach large numbers of constituents. This allows me to stay connected with growers, agents, and the pressing issues at hand.

- Recently I was the PI for funding ($24,469) obtained from the Kentucky Department of Agriculture's Specialty Crops Block Grant Program to develop a "Vegetable Academy" for Kentucky with colleagues in the Departments of Horticulture, Entomology, Plant Pathology, Agricultural Economics, and Biosystems and Agricultural Engineering. This

program will be taught in two locations each year for 2.5 years and feature lecture-based and experiential learning (hands-on labs) for growers. Each program will last two days and be strategically located to impact large numbers of commercial growers.

- A series of IPM Identification guides have been published with colleagues in the Departments of Horticulture, Entomology, and Plant Pathology. I am the coordinator of the vegetable IPM group in Kentucky and have worked with state IPM coordinator Dr. Doug Johnson and Drs. Ric Bessin and Kenny Seebold to obtain nationally and regionally competitive funding for development and printing of color guides ($60,213 from 2008-2013) as well as the implementation of related IPM educational programming. These IPM guides help growers and agents accurately identify problems in the field. Guides for solanaceous crops (http://www.ca.uky.edu/agc/pubs/id/id172/id172.pdf), cucurbits (http://www.ca.uky.edu/agc/pubs/id/id91/id91.pdf), and sweet corn (http://www.ca.uky.edu/agcomm/PUBS/id/id184/id184.pdf) have been developed. *The IPM Scouting Guide for Common Pests of Solanaceous Crops in Kentucky* received a Blue Ribbon Extension Communications Award from SRASHS in 2009.

- To provide education in organic and sustainable production practices for agriculture professionals in Kentucky and Tennessee, I led an effort to obtain a SARE Professional Development Grant ($59,532) with Dr. Annette Wszelaki from The University of Tennessee, Dr. Michael Bomford from Kentucky State University, and Drs. Mark Williams, Ric Bessin, and Kenny Seebold from The University of Kentucky. This funding has allowed for unique training opportunities for Extension agents in organic and sustainable vegetable production. This program was developed in direct response to a stated need for more educational opportunities in organic vegetable production.

- I worked closely with Morgan County Agriculture and Natural Resources Agent, Sarah Fannin, and Dr. Timothy Woods in the Department of Agricultural Economics to obtain a SARE On-Farm Research Grant ($14,791) to enhance sweetpotato production strategies for small farms in Eastern Kentucky. This has been one of the most rewarding programs in which I have participated. The SARE grant funds allowed for the purchase of sweetpotato slips and to conduct research with growers interested in sweetpotato production. The number of growers participating ranged from 10-15 in a given year. An East Kentucky Sweetpotato Growers Association has been formed and several growers are selling sweetpotatoes on a wholesale, albeit small acreage, market.

- In addition to grant funded programming, I have participated in the authorship or revision of 22 numbered extension publications, factsheets, and eXtension articles. The most significant of these publications is *The Vegetable Production Guide for Commercial Growers in Kentucky* (http://www.ca.uky.edu/agc/pubs/id/id36/id36.htm). This publication is revised every two years and is a collaborative effort between the Departments of Horticulture, Entomology, and Plant Pathology. I now serve as the primary editor. This publication is *the* reference that the vast majority of vegetable growers in Kentucky utilize. I am also the primary editor, with Dr. John Snyder and Chris Smigell as co-editors, of the annual Kentucky Fruit and Vegetable Research Report (http://www.ca.uky.edu/agc/pubs/pr/pr608/pr608.pdf). This report is available online and

in print and is a way to quickly distribute research results from the recent growing season and is used by agents and growers alike.

- I implement the vegetable crops diversification program that is part of the HortCouncil grant program funded by the Kentucky Agriculture Development Board. Currently I supervise three Extension associates, though had supervised four until 2009. The Extension associates are stationed throughout Kentucky. Each associate is charged with implementing plasticulture demonstration plots with 5-7 growers during the growing season. The goal of this program is to introduce new growing techniques to farmers who are diversifying production from tobacco or other crops. The Extension associates also conduct farm visits and outreach efforts in addition to on-farm demonstrations. I support each associate with technical advice and routinely speak at field days and visit demonstration plots.

- Since 2007 I have also conducted between 80-100 on-farm consultations with growers in Kentucky. Providing direct support to County Extension agents and growers helps build grassroots support for Cooperative Extension in Kentucky. As a faculty member, these visits keep me abreast of the current issues facing growers.

- From 2008-2010 I worked closely with eOrganic (part of the eXtension initiative). I collaborated with a multistate team for two significant efforts to obtain continued funding for the vegetable production systems community of practice on eOrganic. I have contributed to writing two articles and reviewing several others. However, due to limited resources and other demands on my time I have reduced my involvement in eOrganic to reviewing and authoring articles when appropriate.

Research Program Overview

The goal of my research program has been to conduct systems-based research that can be applied across multiple crops. However, when necessary, I conduct crop-specific research as well. As a faculty member with a primary extension appointment it is my role to conduct applied research and distribute those results in timely fashion to other faculty, agents, and growers. The results of this applied research are distributed through journal publications, production guides, or in research reports. Some highlights from my research program are listed.

- Growers in Kentucky typically rely on drip irrigation for water management. However there is a lack of information available for scheduling drip irrigation in diversified vegetable systems. Costs associated with irrigation can be substantial for vegetable farmers in Kentucky. Therefore a cornerstone of my research program has been to develop innovative irrigation strategies for vegetable farmers. I have worked with Dr. Richard Warner in Biosystems and Agricultural Engineering and Dr. John Strang in Horticulture to obtain funding ($138,939) to develop and demonstrate pulsed-irrigation management for vegetables and small fruits in Kentucky. The

results of this work have been included in several extension publications and two journal articles with several more in preparation. I anticipate growing my research program in this area.

- I have worked with Drs. Mark Williams and Ric Bessin from the University of Kentucky on a multistate grant led by Dr. Mark Gleason from Iowa State University for organic production of cucurbit crops. Drs. Williams and Bessin are the lead Kentucky PIs on this project and I have worked closely with both on this project to optimize production strategies and assist with outreach efforts. Cucurbit crops are nearly impossible to produce organically in Kentucky. This work will result in new production strategies that can be implemented by organic farmers in Kentucky, which will open new markets and increase profitability. The information gained from this research was recently used to procure a Pest Management Alternatives Program Grant, led by Dr. Mark Gleason, for work to be conducted at the Iowa State University and University of Kentucky beginning in the summer of 2012.

- Other research activities have included: developing onion production systems, evaluating asparagus, pumpkins, field and hydroponic tomatoes, cover crops, melons, and sweet corn varieties for growers in Kentucky. I have also worked with Dr. Krista Jacobsen on funded research for tillage management in organic systems and high tunnel production for organic farmers. Recently implemented research projects include the construction of a solar greenhouse and the effects of tillage system (strip tillage vs. plasticulture) and production strategy (organic vs. conventional) on water relations in bell pepper.

- In addition to traditional research activities I have been asked to serve on several grant panels including: SARE Research and Education, On-Farm Research, Professional Development, and Graduate Student grants; USDA SCRI Planning grants; and USDA NIFA Early Childhood and Childhood Obesity grants. Though serving on these review panels is very time consuming I have learned valuable lessons on grantsmanship, which should pay dividends down the road. Furthermore, meeting with a group of people with similar interests has allowed me to network with professionals that I may not have ordinarily interacted with. Serving on these review panels has been a worthwhile effort that I hope to continue.

Curriculum Vitae

Timothy W. Coolong
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Ph: 859-257-3374 email:timcoolong@uky.edu
(http://www.uky.edu/Ag/Horticulture/kysvp_files/kysvpproj.htm)

EDUCATION

Ph.D. 2007 Horticulture, University of Georgia, Athens, GA
Dissertation: Physiological Factors Affecting Onion (*Allium cepa* L.) Storability-Cultural Methods for Improving Postharvest Quality

M.S. 2003 Horticulture, University of Georgia, Athens, GA
Thesis: Temperature, Nitrogen and Sulfur Fertility Influence the Flavor Pathway in Onion (*Allium cepa* L.)

B.S.A. 2000 Horticulture, University of Georgia, Athens, GA

PROFESSIONAL EXPERIENCE

2007-Current Assistant Professor, 80% Extension 20% Research, Vegetable Production, Department of Horticulture, University of Kentucky

2004-2007 Graduate Research Assistant, Onion Laboratory, Under Direction of Dr. William Randle, Department of Horticulture, University of Georgia

2003-2004 Graduate Research Assistant, Department of Plant Sciences, University of Tennessee

2001-2003 Graduate Research Assistant, Onion Laboratory, Under the Direction of Dr. William Randle, Department of Horticulture, University of Georgia

RECENT AWARDS

Outstanding New Extension Faculty Award. Presented by The Kentucky Association of State Extension Professionals, Mar. 11, 2011 Lexington, KY.

SRASHS Blue Ribbon Extension Communications Award: An IPM Scouting Guide for Common Pests of Solanaceous Crops in Kentucky. T. Coolong (ed.), K. Seebold, R. Bessin, J. Strang, T. Jones, and J. Masabni. Presented at SRASHS annual conference, Feb. 6-8, 2010 Orlando Fl.

ASHS Outstanding Extension Publication Award: Southeastern U.S. 2009 Vegetable Crop Handbook, G.J. Holmes and J.M. Kemble (eds.). T. Coolong with 37 others. Presented at the ASHS annual conference July 24-28, 2009 St. Louis, MO.

FUNDING (*most recent in each category first*)

EXTRAMURAL FUNDING*, Nationally and Regionally Competitive*

A training program in sustainable vegetable production for extension personnel in Kentucky and Tennessee. Southern SARE Professional Development Program. *$59,532 for 1 year starting July 2010.* **PI: Timothy Coolong**, Co-PI: (University of Kentucky) Mark Williams, Kenny Seebold, Ricardo Bessin, Co-PI: Annette Wszelaki (University of Tennessee), Co-PI: Michael Bomford (Kentucky State University) *1year no cost extension applied for and received through June 2012.*

IPM in Kentucky-Integrated development and delivery. *NIFA- Extension Integrated Pest Mangement Coordination and Support. $280,934 ($40,198 Coolong) for 3 years starting October 2010.* PI: D. Johnson, **Co-PI: T. Coolong**, R. Durham, A. Fulcher, W. Dunwell, C. Lee, G. Schwab, and L. Murdock.

Soil moisture based automatic pulse irrigation control system. *NRCS Conservation Innovation Grant.Total federal funding $94,123 with 1:1 match for $188,922 for 1 year starting in October 2009.* PI: R. Warner, **Co-PI: T. Coolong**, J. Strang, T. Woods. *One year no cost extension applied for and accepted through September 2011.*

Sustainable Production Systems for Cucurbit Crops on Organic Farms. *USDA Organic Agriculture Research and Education Initiative. Total funding $1,047,000 for 3 years, UK portion $276,488 starting in Sept. 2009.* PI: Mark Gleason (Iowa State University). Co-PI D. Lewis, J. Batzer, L. Jesse, F. Nutter, and A. Correia (Iowa State University), Co-PI S. Fleischer, E. Sanchez, B. Gugino, and D. Biddinger (Pennsylvania State University), Co-PI M. Williams, R. Bessin and **T. Coolong** (University of Kentucky).

An Integrated Pest Management Program for Kentucky. *USDA CSREES. Total funding $108,169 ($12,015 Coolong) for 1 year starting August 2009.*PI: D. Johnson, **Co-PI: T. Coolong**, A. Fulcher, C. Lee, G. Schwab, and L. Murdock. *1 year no cost extension applied for and received through July 2011.*

Sweetpotatoes: A profitable, low-input crop for small farms in rural Eastern Kentucky. *Southern SARE On Farm Research Program. Total funding $14,791 for 2 years starting April 2009.* **PI: Timothy Coolong**.

EXTRAMURAL FUNDING, *Statewide Competitive*

The Vegetable Academy: A Short Course to Advance Vegetable Production in Kentucky *Kentucky Dept. of Agriculture Specialty Crops Block Grant. Total funding $24,469 for two years starting in January 2012.* **PI: Timothy Coolong** Co-PI: Kenneth Seebold, Ric Bessin, John Wilhoit, Shawn Wright, Timothy Woods, and Ricky Yeargan.

Developing Diversified High Tunnel Systems to Enhance Food Security and Specialty Crop Production in Kentucky. *Kentucky Dept. of Agriculture Specialty Crops Block Grant. Total funding $62,834 for 2 years starting October 2010* PI: Krista L. Jacobsen, **Co-PI: T. Coolong,** M. Williams.

Asparagus: A Nutritious, High-Value, Early Crop for Market Gardeners. *Kentucky Dept. of Agriculture Specialty Crops Block Grant. Total funding $8,277 for 2 years starting in October 2010.* PI: Shawn R. Wright **Co-PI: T. Coolong.**

Optimizing No-Till Vegetable Production Systems for Organic Growers. *Kentucky Dept. of Agriculture Specialty Crop Block Grant for Organic Agriculture. Total funding $20,000 for 2 years starting June 2010.* PI: Krista L. Jacobsen **Co-PI: T. Coolong,** M. Williams.

INTRAMURAL FUNDING, *Internally Competitive*

Novel New Crops for Kentucky. *USDA Special Grant New Crops Opportunity Center, University of Kentucky. Total funding $42,976 for three years starting September 2010.* **PI: Timothy Coolong.**

Automated Guidance for Improved Plasticulture Production Systems. *Kentucky Precision Resource Management Program. Total funding $45,057 for 3 years starting September 2010.* PI: J.H. Wilhoit, **CoPI: T. Coolong**, T. Stombaugh.

Organic Production In-Service Training for Extension Agents. Barnhart Fund for Excellence. Total funding $1,000 for 1 year starting in May 2010. PI: Christy Cassady, **CoPI: T. Coolong**, M. Williams.

Developing an Optimized Production System for Fresh Market Sweet Onion Production in Kentucky. *New Crops Opportunity Center, University of Kentucky. Total funding $33,107 for three years starting July 2009.* **PI: Timothy Coolong.**

Increasing Fertilizer Efficiency With and an Automated Pulsed Irrigation System. *New Crops Opportunity Center, University of Kentucky. Total funding $6,103 for one year starting July 2009.***PI: Timothy Coolong,** Co-PI: R. Warner and J. Strang.

Marketing Nutrition for Kentucky Produce. *New Crops Opportunity Center, University of Kentucky. Total funding $23,000 for two years starting July 2009.* PI: Timothy Woods, Co-PI: W. Hu, D. Archbold, J. Strang, and **T. Coolong**.

Increasing Irrigation Water Use Efficiency in Vegetables and Small Fruit Using Automated Pulsed or Micro-drip Irrigation Systems. *New Crops Opportunity Center, University of Kentucky. Total funding $38,713 for two years starting July 2008.* **PI: Timothy Coolong**, Co-PI: R. Warner, J. Wilhoit, J. Strang, and T. Woods.

Developing an Optimized Organic Production System to Control Cucumber Beetles in Cucurbits. *New Crops Opportunity Center, University of Kentucky. Total funding $55,000 for 3 years starting July 2008.* PI: Mark Williams, **Co-PI: T. Coolong**, R. Bessin, P. Vincelli.

EXTRAMURAL FUNDING, *Other Sources*

Applying Calcium Chloride to Improve Firmness and Postharvest Quality in Fresh Market Tomatoes. *Tetra Technologies Inc. Total funding $15,000, UK portion $5,000 starting July 2009.***PI: Timothy Coolong,** Co-PI: C. Sams (University of Tennessee)

Kentucky Vegetable IPM Program 2008. *University of Kentucky IPM Center. Total funding $8,000 for one year starting January 2008.* **PI: Timothy Coolong**, Co-PI: R. Bessin, K. Seebold.

GRADUATE STUDENTS DIRECTED

Zheng Wang: PhD student started in January 2011. Impact of strip tillage and organic farming practices on drought stress responses in Bell Pepper.

GRADUATE STUDENTS ADVISED

Michael Vassalos: PhD student (*committee member, Agriculture Economics*)
Robert Caudle: PhD student (*committee member, Horticulture [Plant Sciences Program]*)
Logan Minter: PhD student (*committee member, Entomology*)

PEER REVIEWED PUBLICATIONS

(Work conducted at The University of Kentucky, *denotes temporary post-doc)

Antonious, G., R. Hill, K. Ross, and T. Coolong. 2011. Dissipation, half-lives, and mass spectrometric identification of Endosulfan isomers and the sulfate metabolite on three field-grown vegetables. J. Env. Sci. Health Part B: Pesticides, Food Contaminants, Agr. Waste. *Accepted Aug. 6, 2011, In press* (J. Env. Sci Health Part B ranked 130 or 190 journals in Environmental Science Category)

Coolong, T.W. and K.Seebold. 2011. Impact of fungicide program and powdery mildew resistance in three varieties of pumpkin. HortTechnology *Accepted July 18, 2011, To be published in the October 2011 issue.* (HortTechnology ranked 16 of 30 journals in Horticulture Category)

Coolong, T.W., S. Surendran*, J. Snyder, R. Warner, and J. Strang. 2011. The relationship between soil water potential, environmental factors, and plant moisture status for Poblano pepper (*Capsicum annuum*) grown using tensiometer-scheduled irrigation. International J. Veg. Sci. *Accepted May 6, 2011,To be published in the April 2012 issue.* (Int. J. Veg. Sci. not listed in ISI Citation Reports, SJR rank of 123 of 183 in Agronomy and Crop Science category)

Coolong, T.W.**,** S. Surendran*, and R. Warner. 2011. Evaluation irrigation threshold and duration for tomato grown in a silt loam soil. HortTechnology 21:466-473. (HortTechnology ranked 16 of 30 journals in Horticulture Category)

Coolong. T.W. 2010. Performance of paper mulches using a mechanical plastic layer and water wheel transplanter for the production of summer squash. HortTechnology 20:319-324 (HortTechnology ranked 16 of 30 journals in Horticulture Category)

Stork, J., M. Montross, R. Smith, L. Schwer, W. Chen, M. Reynolds, T. Phillips, T. Coolong, and S. Debolt. 2009. Regional examination shows potential for native feedstock options for cellulosic biofuel production. GCB Bioenergy 3:230-239. (GCB Bioenergy ranked 9 of 74 journals in Agronomy category)

(Work conducted at The University of Georgia)

Coolong, T.W. and Randle, W.M., 2008. The effects of calcium chloride and ammonium sulfate on onion bulb quality at harvest and during storage. Hortscience 43:465-471. (HortScience ranked 12 of 30 journals in Horticulture Category)

Coolong, T.W., Randle, W.M., and Wicker, L., 2008 Structural and chemical differences in the cell wall regions in relation to scale firmness of three onion (*Allium cepa* L.) selections at harvest and during storage. J. Sci. Food Agr. 88:1277-1286. (J. Sci. Food Agr. Ranked 9 of 55 journals in Agriculture Multidisciplinary category)

Coolong, T.W., Walcott, R.R., and Randle, W.M., 2008. A quantitative real-time polymerase chain reaction assay for *Botrytis aclada* in onion bulb tissue. Hortscience 43:408-413. (HortScience ranked 12 of 30 journals in Horticulture Category)

Coolong, T.W. and W.M. Randle. 2006 The Influence of Root Zone Temperature on Growth and Flavor Precursors in *Allium cepa* L. J. Hort. Sci. Biotechnology 81:199-204. (J. Hort. Sci. Biotechnology ranked 18 in Horticulture Category)

Coolong, T.W., W.M. Randle, C. E. Sams, and. 2004. Zinc availability in hydroponic culture influences glucosinolate concentrations in *Brassica rapa* L. HortScience 39:84-86. (HortScience ranked 12 of 30 journals in Horticulture Category)

Coolong, T.W., W.M. Randle, D.A. Kopsell, and D.E. Kopsell. 2004 Nitrogen and Sulfur Nutrition Influence Nutrient Accumulation in Onion (*Allium cepa* L.). J. Plant Nutr. 27:1667-1686. (J. Plant Nutr. ranked 123 of 187 journals in Plant Sciences category)

Kopsell, D.E., D.A. Kopsell, W.M. Randle, T.W. Coolong, C.E. Sams, and J. Curran-Celentano. 2003. Kale carotenoids remain stable while flavor compounds respond to changes in sulfur fertility. J. Agric. Food Chem. 51(18): 5319-5325. (J. Ag. Food Chem. ranked 2 of 55 journals in Agriculture Multidisciplinary category)

Coolong, T.W. and W.M. Randle. 2003. Sulfur and nitrogen availability interact to affect the flavor biosynthetic pathway in onion. J. Amer. Soc. Hort. Sci. 128(5): 776-783. (J. Amer. Soc. Hort. Sci. ranked 11 of 30 journals in Horticulture category)

Coolong, T.W. and W.M. Randle. 2003. Zinc concentration in hydroponic solution culture influence zinc and sulfur accumulation in *Brassica rapa* L. J. Plant Nutr. 26(5):949-959. (J. Plant Nutr. ranked 123 of 187 journals in Plant Sciences category)

Coolong, T.W. and W.M. Randle. 2003. Ammonium nitrate fertility levels influence flavour development in hydroponically grown 'Granex 33' onion. J. Sci. Food Agr. 83(5): 477-482. (J. Sci. Food Agr. Ranked 9 of 55 journals in Agriculture Multidisciplinary category)

Coolong, T.W. and W.M. Randle. 2003. Temperature influences flavor intensity and quality in 'Granex 33' onion. J. Amer. Soc. Hort. Sci. 128(2):176-181. (J. Amer. Soc. Hort. Sci. ranked 11 of 30 journals in Horticulture category)

BOOK CHAPTERS

Coolong, T.W. 2011 Mulches for Weed Management in vegetable production. In: Weed Control INTECH publishing open access. (*Accepted September 2011*) *Anticipated publication date December 22, 2011*

eXtension PUBLICATIONS (Peer reviewed national extension publications)

Coolong, T. 2008. Low cost high tunnel construction. *eOrganic*. http://www.extension.org/pages/18356/low-cost-high-tunnel-construction

Cox, B and Coolong T. 2008 Management of non-pathogenic fruit disorders of tomato in organic production Systems. *eOrganic*. http://www.extension.org/pages/18629/management-of-non-pathogenic-fruit-disorders-of-tomato-in-organic-production-systems

PUBLISHED ABSTRACTS (*Work conducted at The University of Kentucky*)

Coolong, T.W., J. Pfeiffer, and D. Slone. 2010. Transplant age and variety affects performance of transplanted sweet corn. HortScience 45(8):S310

Coolong, T.W, T. Woods and S. Fannin. 2010. A program to develop sweetpotato production for small farms in Kentucky Appalachia. HortScience 45(8):S82

Ingram D.L., T.W. Coolong, W. Dunwell, R. Schnelle and J Strang. 2010. An on-farm demonstration and consultation Extension program in Kentucky. HortScience 45(8):S294

Coolong, T.W. and L. Hanks. 2009. An IPM scouting program for small mixed vegetable farms: Providing service to Amish and Mennonite communities in KY. HortScience 44:562

Coolong, T.W., A. Wszelaki, M. Rogers, J. Vargas, S. Broughton, and D.J. Mitchell. 2009. Tomato yield and quality for commercial production in Tennessee and Kentucky. HortScience 44:567-568.

Wszelaki, A., T.W. Coolong, B. Smith, and B. Fisher. 2009. Best of Both Worlds: Bicolor sweet corn varieties for the grower and consumer. HortScience 44:568.

Coolong, T.W., and R. Warner. 2009. The effects of pulsing drip irrigation on tomato fruit yield and quality. HortScience 44:569.

Coolong, T., Williams, M., and Keating, M., 2008. Incorporating horticultural training into an undergraduate sustainable agriculture curriculum. Hortscience 43:604.

Coolong, T., 2008. Paper mulches for weed control in summer squash. Hortscience 43:628.

PUBLISHED ABSTRACTS (*Work conducted at The University of Georgia*)

Coolong.T.W. and W.M. Randle. 2007. Changes in cell wall degrading enzymes and scale firmness during storage of onion (*Allium cepa L.*) HortScience 42:458.

Coolong.T.W. and W.M. Randle. 2007. Changes in cell wall degrading enzymes and scale firmness during storage of onion (*Allium cepa L.*) HortScience 42:458

Coolong, T.W. R.R. Walcott, and W.M. Randle. 2006. Using quantitative real time PCR to predict levels of *Botrytis allii* in stored onion. HortScience 41:1016.

Coolong, T.W. and W.M. Randle. 2003. The Effect of Root Zone Temperature on Growth and Flavor Potential in Short-Day Onion. HortScience 38: 701.

Coolong, T.W. and W.M. Randle. 2002. Temperature influences flavor development in 'Granex 33' onion. HortScience 37:743.

UNIVERSITY OF KENTUCKY COOPERATIVE EXTENSION PUBLICATIONS

NUMBERED SERIES PUBLICATIONS (Peer reviewed)

Coolong, T (ed.), K. Seebold, R Bessin, and T. Woods. 2011. Sweetpotato production for Kentucky. *In press.*

Coolong, T (ed.), K. Seebold, R. Bessin, and J. Strang. 2011. An IPM scouting guide for common pests of Solanaceous crops in Kentucky (ID-172). 32 p. (revised)

Durham, R.T (ed.), T. Coolong, R.T. Jones, J. Strang, M. Williams, S. Wright, R. Bessin, J. Hartman, and K. Seebold. 2011. Home vegetable gardening in Kentucky. (ID-128) 50 p. (revised)

Coolong, T (ed.), J. Snyder, and C. Smigell. 2010. 2010 Fruit and veg. res. report. PR 608. 66 p.

Bessin R. (ed.), Seebold, K., and T. Coolong, 2010. An IPM scouting guide for common problems of sweet corn in Kentucky. (ID-184). 16 p.

Coolong, T (ed.), Bessin, R., K. Seebold, and J. Strang. 2009. Vegetable production guide for commercial growers 2010-2011. (ID-36) 135 p. (extensively revised)

Coolong, T (ed.), J. Snyder, and C. Smigell. 2009. 2009 Fruit and veg. res. report. PR 603. 55 p.

Seebold, K. (ed.), T. Coolong, R. Bessin, J. Strang and T. Jones. 2009. An IPM scouting guide f or common problems of cucurbit crops in Kentucky. (ID-91) 24 p.

Durham, R.T. (ed.), T. Coolong, R.T. Jones, J. Strang. 2009. Vegetable cultivars for Kentucky gardens-2009. (ID-133). 8 p.

Coolong, T (ed.), K. Seebold, R. Bessin, J. Strang, T. Jones and J. Masabni. 2008. An IPM scouting guide for common pests of Solanaceous crops in Kentucky (ID-172). 28 p.

Coolong, T (ed.), J. Masabni, K. Seebold, R. Bessin, T. Woods, and T. Jones. 2008. Ornamental corn production in Kentucky. (HO-81). 12 p. (revised)

Durham, R.T.(ed.), T. Coolong, R. Jones, D. Law, J. Masabni, J. Strang, M. Williams, R. Bessin, J. Hartman, and K. Seebold. 2008. Home vegetable gardening in Kentucky. (ID-128) 49 p. (revised)

Bessin, R. (ed.), T. Coolong, T. Jones, J. Masabni, K. Seebold, and J. Strang 2008 Vegetable Production Guide for Commercial Growers 2008-2009. (ID-36) 135 p. (revised)

Coolong, T (ed.), J. Snyder, and C. Smigell. 2008. 2008 Fruit and veg. research rep. PR 572 72 p.

Coolong, T (ed.), J. Snyder, and C. Smigell. 2007. 2007 Fruit and veg. research rep. PR 555 92 p.

FACT SHEETS

Coolong, T., and S. Surendran. 2011 Tensiometer installation. HortFact 7003.

Bessin, R. and T. Coolong. 2009. Row covers for insect management. EntFact 322.

Bessin, R. and T. Coolong. 2008. Silverleaf Whitefly on tomato. EntFact 320.

Coolong, T.W. 2007. Recommended storage conditions for vegetables. HortFact 7002.

Coolong, T.W. 2007. Ozone injury in watermelon. HortFact 7001.

Coolong, T.W. and R. Bessin. 2007. Silverleaf Whitefly on squash. EntFact 0319.

RESEARCH REPORTS (Work conducted at The University of Kentucky)

Fenton, V., D. Wolfe, J. Johnston, G. Travis, and T. Coolong. 2010 Cabbage and broccoli cultivar trial at Princeton, KY 2010 Fruit and Veg. Crop Res. Report. PR 608:37-38.

Spalding, D., and T. Coolong. 2010. Acorn and butternut squash cultivar Trial 2010 Fruit and

Veg. Crop Res. Report. PR:608:35.
Seebold, K., T. Coolong, and L. Hanks. 2010. Cultivar evaluations and fungicide programs for Managing Powdery Mildew on Pumpkin. 2010 Fruit and Veg. Crop Res. Report. PR 608:40-42.
Antonious, G., E. Turley, R. Hill, and T. Coolong. 2010. Dissipation of endosulfan on field-grown pepper and melon. 2010 Fruit and Veg. Crop Res. Report. PR 608:53-55.
Coolong, T., A. Poston, S. Berberich and C. Sams. 2010. Applying calcium chloride to improve firmness and postharvest quality in fresh market tomatoes. 2010 Fruit and Veg. Crop Res. Report. PR 608:56-61.
Antonious, G., E. Turely, R. Hill and T. Coolong. 2010. Effect of soil amendment and irrigation regime on bell pepper yield. 2010 Fruit and Veg. Crop Res. Report. PR 608:55-56.
Wilhoit, J., and T. Coolong. 2010. Weed control effectiveness of hay and straw mulches between plastic-covered beds. 2010 Fruit and Veg. Crop Res. Report. PR 608:45-47.
Coolong, T., L. Hanks and J. Pfeiffer. 2010 Kentucky red onion variety trial 2010. 2010 Fruit and Veg. Crop Res. Report. PR 608:36-37.
Coolong, T., L. Hanks, D. Slone, and K. Jackson. 2010 High tunnel tomato demonstration in Southwest Kentucky. 2010 Fruit and Veg. Crop Res. Report. PR 608:10-11.
Coolong, T., J. Strang, A. Lentz, R. Warner, O. Hoffman, and J. Wilhoit. 2009. The effects of pulsing drip irrigation on tomato yield and quality in Kentucky. 2009 Fruit and Veg. Crop Res. Report. PR 603:39-40.
Spalding, D., and T. Coolong. 2009. Slicing Cucumber Variety Trial. 2009 Fruit and Veg. Crop Res. Report. PR 603:28.
Howard, N, and T. Coolong. 2009. Supersweet corn evaluations in Northwestern Kentucky. 2009 Fruit and Veg. Crop Res. Report. PR 603:30.
Seebold, K., and T. Coolong. 2009. Evaluation of cultivars and fungicide programs for management of powdery mildew on pumpkin. 2009 Fruit and Veg. Crop Res. Report. PR 603:43-45.
Coolong, T. and K Seebold. 2009. Evaluation of powdery mildew tolerance on pumpkin in Central Kentucky. 2009 Fruit and Veg. Crop Res. Report. PR 603:41-43.
Coolong, T., J. Pfeiffer, D. Slone and A Poston. 2009 Fresh market tomato variety performance in 2009. 2009 Fruit and Veg. Crop Res. Rep. PR 603:37-38.
Coolong, T. 2009. Sweetpotato variety trial and response to irrigation in Central Kentucky. 2009 Fruit and Veg. Crop Res. Rep. PR 603:29.
Coolong, T. and R. Durham. 2008. Consumer taste preference for vine-ripened heirloom and hybrid tomatoes. 2008 Fruit and Veg. Crop Res. Report. PR 572:55-56.
Coolong, T., J. Pfeiffer, D. Slone, and A. Poston. 2008 Fresh market tomato variety performance in 2008. 2008 Fruit and Veg. Crop Res. Report. PR 572:53-55.
Coolong, T., 2008. Overwintering potential of onion varieties in Kentucky. 2008 Fruit and Veg. Crop Res. Report. PR 572:39-41.
Coolong, T. 2008 Spring onion cultivar evaluation in Central Kentucky. 2008 Fruit and Veg. Crop Res. Report. PR 572:38-39.
Spalding D. and T. Coolong. 2008. Romaine lettuce plant spacing trial. 2008 Fruit and Veg. Crop Res. Report. 2008 Fruit and Veg. Crop Res. Report. PR 572:37-38.

Spalding, D. and T. Coolong. 2008. Romaine lettuce cultivar trial in Kentucky. 2008 Fruit and Veg.Crop Res. Report. PR 572:37.

Coolong, T. and K Seebold. 2008. Evaluation of powdery mildew tolerance on pumpkin in Central Kentucky. 2008 Fruit and Veg. Crop Res. Report. 2008 Fruit and Veg. Crop Res. Report. PR 572:47-50.

Howell, N., A. Poston., N Howard., and T. Coolong. 2008. Grafted watermelon performance in Kentucky. 2008. 2008 Fruit and Veg. Crop Res. Report. PR 572:45-46.

Law, D., M. Williams, T. Coolong, and K. Seebold. 2008 Producing no-till pumpkins with a rye/vetch cover crop in Kentucky with conventional, low-input, and organic practices. 2008 Fruit and Veg. Crop Res. Report. PR 572:51-55.

Coolong, T.W., J. Pfeiffer, and D. Slone. 2007 Evaluation of paper mulch alternatives for production of summer squash. 2007 Fruit and Veg. Crop Res. Report PR 555:79-80.

Spalding, D., and T.Coolong, 2007. Romaine lettuce variety trial. 2007 Fruit and Veg. Crop Res.Report. PR 555:55-56.

RESEARCH REPORTS (Work conducted at The University of Georgia)

Coolong, T.W. and W.M, Randle. 2006. Supplemental calcium chloride enhances firmness in Vidalia onions. The University of Georgia, Georgia Onion 2006 Res.-Extension Report. 45-47.

Coolong, T.W., P.T. Chang and W.M. Randle. 2005. Decrease in bulb firmness during storage of Vidalia onion. The University of Georgia, Georgia Onion 2005 Res.-Extension Report. 30-32.

Coolong, T.W., P.T. Chang and W.M. Randle. 2005. The effects of liquid calcium chloride on yield in Vidalia onion. The University of Georgia, Georgia Onion 2005 Res.-Extension report. 33-35.

Coolong, T.W., and W.M. Randle. 2002. The effects of temperature during the growing season upon the flavor of onions. The University of Georgia, Georgia Onion 2001 Res.-Extension report. 17-19.

REGIONAL PUBLICATIONS
Handbooks

Kemble J (ed), T. Coolong, R. Bessin and K. Seebold *and extension specialists from 9 southeastern states*. 2010. 2010 Southeastern U.S. Vegetable Crop Handbook. 276 p.

Kemble J (ed), T. Coolong, R. Bessin and K. Seebold *and extension specialists from 9 southeastern states*. 2009. 2009 Southeastern U.S. Vegetable Crop Handbook. 278 p.

Kemble J (ed), T. Coolong, R. Bessin and K. Seebold *and extension specialists from 9 southeastern states*. 2008. 2008. Southeastern U.S. Vegetable Crop Handbook. 262 p.

REGIONAL RESEARCH REPORTS (6) *Reports chosen from Fruit and Vegetable Research Report to be published regionally*

Maynard, L. 2010. Midwest Veg. Trial Report Purdue Univ. with Univ. of KY and others. Purdue University Extension Bull.

1. Kentucky Red Onion Variety Trial p. 45-47

Maynard, L. 2009. Midwest Veg. Trial Report Purdue Univ. with Univ. of KY and others. Purdue University Extension Bull.

1. Fresh Market Tomato Variety Performance in Kentucky. p. 262-265

Maynard, L. 2008. Midwest Veg. Trial Report Purdue Univ. with Univ. of KY and others. Purdue University Extension Bull.

Evaluation of Powdery Mildew Tolerance on Pumpkin in Central Kentucky p.63

1. Grafted Watermelon Performance in Kentucky p.140
2. Spring Onion Cultivar Evaluation in Central Kentucky p.30
3. 2008 Romaine Lettuce Cultivar Trial in Kentucky p.28

PRESENTATIONS [National and regional out of state (*invited)]

(Work conducted at the University of Kentucky)

Chaired Extension Outreach sessions at National ASHS meeting Aug 5, 2010 in Palm Desert, CA and SRASHS Feb. 6, 2011 in Corpus Christi, TX.

Coolong, T, and D. Slone. A low cost high tunnel demonstration program in Kentucky. SRASHS Feb 6, 2011, Corpus Christi, TX.

*Coolong, T., Pulse and drip irrigation for vegetable crops; Crops for high tunnel production including: tomatoes, peppers, cucurbits, and more. Indiana Hort Congress. Jan 18-20, 2011 Indianapolis, IN.

*Coolong, T. Drip irrigation regimes for tomatoes and specialty peppers; Transplanting Sweet Corn: Effects of transplant age and maturity date on yield and quality. Illinois Specialty Crops, Agritourism and Organic Conference Jan 5-7, 2011, Springfield, IL.

Minter, L., and R Bessin, A. Alesch, D. Scott, M. Williams, T. Coolong, and D. Biddinger. Results of native pollinator diversity surveys on Kentucky vegetable farms. ESA National Conference, Dec. 12-15, San Diego CA.

Ingram, D., T. Coolong, W. Dunwell, R. Schnelle, and J. Strang. An on farm demonstration and consultation extension program in Kentucky. ASHS National Conference Aug 5, 2010, Palm Desert, CA.

Coolong, T. J. Pfeiffer, and D. Slone. Transplant age and variety affects performance of transplanted sweet corn. ASHS National Conference Aug 5, 2010, Palm Desert, CA.

Coolong, T., T. Woods and S. Fannin. A program to develop sweetpotato production for small farms in Kentucky Appalachia. ASHS National Conference Aug 3, 2010, Palm Desert, CA.

Wilhoit, J., T. Coolong, and R. Warner. Increasing Water Use Efficiency Using Automated Pulsed Drip Irrigation Systems. ASABE paper No. 096306. International Meeting of the American Society of Agricultural and Biological Engineers, June, 23, 2009, Reno, NV.

Coolong, T., and R. Warner. The effects of pulsing irrigation on tomato fruit yield and quality. SRASHS, Feb. 1, 2009, Atlanta, GA.

Coolong, T., and L. Hanks. An IPM scouting program for small mixed vegetable farms: Providing service to Amish and Mennonite communities in KY. SRASHS, Feb. 1, 2009, Atlanta, GA.

Coolong, T., A. Wszelaki, J. Vargas, M. Rogers, S. Broughton, and D.J. Mitchell. Tomato yield and quality for commercial production in Tennessee and Kentucky. SRASHS, Feb. 1, 2009, Atlanta, GA.

Wszelaki, A., and T. Coolong. The best of both worlds: Bicolor sweet corn varieties for the grower and consumer. SRASHS, Feb. 1, 2009, Atlanta, GA.

*Coolong, T. Irrigation management in vegetable crops; UT and UK fresh market tomato variety trial results TN Fruit and Vegetable Conference, Jan. 31, 2009, Nashville, TN.

Wilhoit, J., Coolong, T., and Williams, M. Bettering Black Plastic: Alternative Practices for Reducing Negative Impacts. Southern SAWG General Conference, Jan. 23, 2009, Chattanooga, TN.

Coolong, T., Williams, M., and Keating, M. Incorporating horticultural training into an undergraduate sustainable agriculture curriculum. SRASHS, Feb. 3, 2008, Dallas, TX.

*Coolong, T. Calcium Fertility and Vegetable Quality. Ag. Symposium 2008, Sponsored by Tetra Technologies, Oct. 5, 2008, Houston, TX.

Coolong, T.W. Paper mulches for weed control in summer squash. SRASHS, Feb. 3, 2008, Dallas, TX.

*Coolong, T.W. Onions production for direct markets and Utilizing drip irrigation to deliver vegetable fertility. S. Ill. Vegetable School. Feb. 13, 2008, Mt. Vernon, IL.

(Work conducted at The University of Georgia)

Coolong, T.W. and W.M. Randle. Changes in cell wall degrading enzymes and scale firmness during storage of Onion (*Allium cepa* L.). SRASHS Annual Conference, Feb. 3-5, 2007, Mobile, AL.

Coolong, T.W., R.R. Walcott, and W.M. Randle. Real-Time PCR Detection of *Botrytis allii* in Onion. ASHS Annual Conference, July 27-30, 2006, New Orleans, LA.

Coolong, T.W., and W.M. Randle. The Effect of Root Zone Temperature on Growth and Flavor Potential in Short-Day Onion. ASHS Annual Conference, Oct. 3-6, 2003, Providence, RI.

Randle, W.M., and T.W. Coolong. The influence of nitrogen and sulfur and their interaction on onion flavor. National Allium Research Conf., Dec. 11, 2002, Pasco, WA.

Coolong, T.W., and W.M. Randle. Ammonium nitrate concentration influences flavor development in hydroponically grown 'Granex 33' onion. ASHS International Meeting, Aug. 16, 2002, Toronto, Ontario.

Randle, W.M., T.W. Coolong, and M.J. Pearce. The role of sulfate partitioning in onion flavor. ASHS S. Region Meeting, Feb. 4, 2002, Orlando, FL.

Coolong, T.W., and W.M. Randle. Temperature influences flavor development in 'Granex 33' onion. ASHS S. Region Meeting, Feb 4, 2002, Orlando, FL.

STATE AND COUNTY PRESENTATIONS/OUTREACH

From July 2007 through July 2011 I have delivered over 155 presentations at county educational meetings, agent trainings and field days reaching several thousand individuals across Kentucky. In addition I have made approximately 80-100 on-farm consultations.

COUNTY AGENT TRAINING

2011

Introduction to hydroponic tomato production, July 27, Lexington, KY
Managing fertility in organic systems, July 21, KSU Farm, Frankfort, KY
Persistent Herbicides in Compost: What this could mean for you and your growers, June, 30, Madison County, KY

2010

Organic and sustainable vegetable production: fertility practices, June 16, Lexington KY, Aug. 19, Knoxville, TN.
New Vegetable Varieties and Irrigation Management, March 18, Quicksand, KY
High Tunnel Production and Home Vegetable Gardening, Oct 20, Winchester KY
Home Vegetable Gardening, Oct. 29, Russellville, KY

2009

Organic vegetable production resources, Oct. 20, Bowling Green, KY
High tunnels for vegetable production, Oct. 22, Winchester, KY
Irrigation and organic production of vegetable crops, June 18, 2009, Lexington, KY

2008

Vegetable variety update, Nov. 19, Elizabethtown, KY

Organic vegetable production, Dec. 11, Princeton, KY

2007
Vegetable program outlook for UK, Nov. 8, Campbell County, KY
Interpreting Soil Tests to Make Recommendations for Kentucky's Major Vegetable Crops. Oct. 24, Winchester, KY

FIELD DAYS

2011
Breckinridge County Field Day Aug. 1, Garrard County High Tunnel Field Day July 29, Fairview Produce Auction Field Day July 19

2010
RCARS Field Day Oct. 2, UK Horticulture Research Farm Field Day July 22, Paducah Vegetable Field Day July 8th, Fairview Produce Auction Field Day June, 22

2009
UKREC All Commodity Field Day July 23, Lincoln County Auction Growers Field Day July 21, Crittenden County Amish Field Walk July 15, Morgan County Vegetable Field Walk July 14, Lawrence County Plasticulture Field Day June 15, Lincoln County Field Walk June 9.

2008
Robinson Station Field Day Sept. 30, Central KY Farm Expo Aug. 28, Hancock County Farmers Market Field Day Aug. 19, Shelby County Extension Field Day Aug. 7, Nelson County Field Day Aug. 5, Spencer County Field Day Aug. 4, UK Horticulture Research Farm Field Day July 31, Fairview Horticulture Field Day July 15, Johnson County Farm Field Day June 20.

2007
Critteneden County Tomato Production Field Day Sept. 4.

ON-FARM OUTREACH
In addition to on-farm consultations I have closely worked with and supported several extension associates who conducted over 45 vegetable plasticulture demonstration plots in more than 30 counties. I am responsible for the implementation of the vegetable demonstration program in KY.

OTHER OUTREACH ACTIVITIES
Tomato festival at UK arboretum: Aug. 9, 2008 and Aug. 8, 2009**.**

TELEVISION APPEARANCES

WKYT 27 What is organic, June 4, 2009.
WKYT 27 Home vegetable gardening cost savings, Mar. 3, 2009.
Pulsed Irrigation for Vegetable Crops (UK Horticulture Research Farm Field Day), Growing Kentucky, 2008. This program has also been shown nationally on *Rural Free Delivery*.

INTERNET VIDEO

Taste of Place with Chef Donald Link "Down on the Model Farm", Filmed with Mark Williams, Timothy Coolong and Krista Jacobsen. This is national exposure for the sustainable farming program. http://www.delish.com/recipes/cooking-recipes/taste-of-place/?vid=15702f75-9f76-6396-58ba-53c48b86779c.
Hydroponic Tomato Production (204 views)
(https://www.youtube.com/ukagriculture#p/search/1/86L0OQDV8t4)
Sweetpotato Production in Eastern KY (1,870 views)
(https://www.youtube.com/ukagriculture#p/search/0/1Mwa_1jKkoI)

RADIO TAPES (2007-2011)

18 Topics have included: Developing a CSA, Fall cover crops, fall vegetables, GAP training, High temperatures and vegetables, high tunnels, irrigation management, KY Market Maker, Onion production, saving seeds, raised bed production, organic certification, difficult to grow organic crops, plastic mulches, potato production, sweetpotato production, third party audits, ripening disorders in tomato.

TEACHING (2007-2011)

PLS 386 Plant production systems (Plant water relations and irrigation, controlled environments, plasticulture) 1-3 lectures per semester

PLS 520 Fruit and Vegetable Production (budgets and profitability, season extension/plasticulture, irrigation management) 1 lecture per semester.

PLS 101 Intro. to Horticulture Professions (vegetable industry)

PLS 404 Integrated Weed Management (weed control in vegetable production)

GRANT REVIEW PANELS

2011

USDA NIFA Childhood Obesity Research and Education grants. *Primary or secondary reviewer on 19 grants*

Southern SARE: Professional Development Preproposals. *Reviewer on 12 grants.*

2010
USDA NIFA Early Childhood Obesity Research and Education grants and Extension grants. *Primary or secondary reviewer on 12 grants*

Southern SARE: **Research and Education, On Farm Research, and Graduate Student Grants,** *Primary reviewer for 9 grants*

2009
USDA Specialty Crops Research Initiative Planning Grants
Reviewed 30 grant submissions was primary reviewer for 5.

OTHER SERVICE

College of Agriculture Faculty Council 2010-current

National Vegetable Crops Initiative Met in Denver, CO for two days with other academics, administrators and industry reps to help formulate a road map to direct future funding for vegetable crops in the U.S. 2008.

PROFESSIONAL DEVELOPMENT
CSREES Grant writing workshop Oct. 9-10, 2007, Washington, D.C.
Produce Marketing Association Conference Oct 12-13, 2007, Houston, TX.

Societies/Committees:
ASHS and ISHS member
eOrganic Vegetable Production Systems COP Member
Kentucky Farms to Food Bank Committee
KY Vegetable IPM Team (coordinator).
KY Vegetable Growers Association Advisor.

Dr. Thomas Cottrell

Winery Development and Management Skills:

Over thirty years of professional career service in Winery Development, Management and Wine Production, with skills in:

- Winery Start-ups
- Business and Production Planning
- Goal Setting and Facility Design
- Marketing and Identity Projection
- Engineering and Floor Layout
- Equipment Specifications
- Technical Winemaking and Lab Know-how
- Scheduling, Spread Sheets, and Cost Control

Professional Experience:

Enology Extension Specialist, University of Kentucky, Lexington, KY 2005 to Present
Advising over 67 wineries in Kentucky, as well as others in surrounding areas
Managing extensive taste panel trials for experimental wines
Working with the KY ABC and the KY Dept of Agriculture to develop better regulations
Working with Winery and Viticultural associations to develop educational programs

Winery Consultant in Eastern U.S., California and Canada since 1979
Developing wineries, business plans and market projections
Designing wineries, selecting equipment, defining wine styles and planning wine production
Setting up laboratories and training technicians
Lecturing and writing on current wine topics

Production Manager and Winemaker, Sakonnet Vineyards, Little Compton, RI 1990 – 95
Grew sales from 12,000 to 36,000 cases per year of estate and blended wines
Planned production, and expansion, did all analysis, blended, purchased and maintained all equipment
Developed database systems to control bulk and cased goods inventory

General Manager and Winemaker, Chalk Hill Winery, Healdsburg, CA 1986-90
Increased production and sales of estate wines from 14,000 to 65,000 cases per year
Designed and effected 15,000 sq.ft. winery expansion; production, offices and crush facility
Responsible for all phases of production, equipment maintenance, and marketing in the US
Performed budgeting, long term planning and projections, and expense control

Associate Professor of Enology, Cornell University, Geneva, NY 1982-85
Developed this position at the New York State Agricultural Experiment Station
Consulted with wineries in New York State, as well as surrounding areas
Managed extensive taste panel trials, produced many experimental wines in small lots
Researched fermentation techniques and laboratory method improvements
Programmed a unique wine scoring system, to "normalize" each judge.

Founding Partner and Winemaker, Pine Ridge Winery, Yountville, CA 1979 - 80
Planned site use and production facility, taught winemaking to staff

Manager and Winemaker, Yverdon Vineyards, St. Helena, Napa Valley, CA 1977-79
Revamped cellar usage and production methods

Systems Designer/Programmer, Data Management Associates, Calistoga, CA 1975-77
Developed a complete accounting package for restaurants and small businesses in Basic

Founder, Manager and Winemaker, Cuvaison, Inc., Calistoga, Napa Valley, CA 1970-75
Personally constructed a successful small winery from preliminary grading to final wiring

Physicist, in Laser development, Spectra-Physics, Mountain View, CA 1967 - 70
Designed, built and moved novel lasers through production

Professional Affiliations:

American Wine Society 2007-Present
American Society for Enology and Viticulture 1970-Present
American Society for Enology and Viticulture, Eastern Section 1982-2007
Sonoma County Vintners Co-operative, (President 88-89) 1986-90
Sonoma County Wine Library, (Director 89-90) 1986-90
Napa Valley Wine Technical Group, (Secretary 74-75) 1970-82

Education:

Ph.D Laser Optics
University of Rochester, Rochester, NY

MS Solid State Physics
University of Delaware, Newark, DE

BEP Bachelor of Engineering Physics
Cornell University, Ithaca, NY

Community Involvement:

Member, Tompkins County Chamber of Commerce 1996 - 2001
President, Greater Ithaca B&B Association 1998 - 2000
Board Member, Cornell Corporation of Beta Theta Pi 1996 - 2001
Treasurer, City of St. Helena, CA 1976 - 80
Director, Napa Town & Country Fair, Napa, CA 1974 - 78
Member, Kiwanis, St. Helena, CA 1970 – 82
U.S. Army 1954 - 56

Other Wine Activities

2013
Wine Judge for the "International Finger Lakes Wine Competition", Rochester, NY

2012
Wine Judge for the "Big Eastern" Commercial Wine Competition, Springfield, MA
Wine Judge for "Wines of the South" Commercial Wine Competition, Knoxville, TN
Coordinated the Kentucky State Fair Commercial Wine Competition, Louisville, KY
Wine Judge for the New York State Fair Commercial Wine Competition, Syracuse, NY
Wine Judge for US National Wine Competition, Santa Rosa, CA
Wine Judge for the KY Derby Competition, Louisville, KY

2011
Wine Judge for the "Big Eastern" Commercial Wine Competition, Springfield, MA
Wine Judge for "Wines of the South" Commercial Wine Competition, Knoxville, TN
Coordinated the Kentucky State Fair Commercial Wine Competition, Louisville, KY
Wine Judge for the New York State Fair Commercial Wine Competition, Syracuse, NY
Wine Judge for the KY Derby Competition, Louisville, KY

2010
Wine Judge for "Wines of the South" Commercial Wine Competition, Knoxville, TN
Wine Judge for the "Big Eastern" Commercial Wine Competition, Springfield, MA
Wine Judge for New York State Fair Commercial Wine Competition, Syracuse, NY
Wine Judge for the KY Derby Competition, Louisville, KY

2006-2009
Wine Judge for "Wines of the South" Commercial Wine Competition, Knoxville, TN

2005, 2008
Wine Judge for the New York State Fair Commercial Wine Competition, Syracuse, NY

2002, 2008
Wine Judge for the Indy International Wine Competition, Indianapolis, IN

2004
Wine Judge for the Grand Harvest Awards, Santa Rosa, CA

1983-2004
Wine Judge for the International Eastern Wine Competition, Watkins Glen, NY
1990-93
Wine Judge for the New England Wine Competition, Westport, MA

1986-89
Wine Judge for Wine & Spirits Magazine, Berkeley, CA

1988-90
Restaurant Critic for California Visitors Review, Sonoma, CA

1985
Wine Judge, American Wine Exposition, Dallas, Texas

1984
Panelist for Eastern Winemaking at Cool Climate Viticultural Symp., Eugene, OR

1983-84
Did Computer Program & Scoring for Finger Lakes Wine Competitions, Ithaca, NY

1974-80
Director, 25th Ag District Fair (Napa, CA). Ran the Annual Wine Competitions

Publications by Tom Cottrell, Ph.D.

Peer Reviewed:

Cottrell, Thomas H. E., M. R. McLellan and B. L. Jelos-Tyror. (1986) The Effect of Fermentation Temperature on Chemical and Sensory Characteristics of Wines from 7 Cultivars Grown in New York State. A.J.E.V. 37 190-4.

Baucom, T.L., M. H. Tabacchi, T.H.E. Cottrell and B.S. Richamond. (1986) Biogenic Amine Content of New York State Wines, J. Food Sci. 51 1376-82

Cottrell, Thomas H. E., B. L. Jelos-Tyror, R. Saracino and L. Fuller-Perrine (1985) Simplifications and Improvements in Lab Methods for Small Wineries: Methodology For Volatile Acid Determination. A.J.E.V. 36 245-7

Acree, T.E. and T.H.E. Cottrell. (1984) Chemical Indices of Wine Quality, proceedings of the International Symposium on Alcoholic Beverages, Weybridge, Reading, England, Abstract

Cottrell, Thomas H.E. and G. Zepponi, (1975) White Juice Separation System for Low Solids. A.J.E.V. 26 154-7.

Trade Journal Articles:

Cottrell, Thomas. (2004) Laboratory Shortcuts that Aren't V&WM Magazine 30 No.2, 31-35

Cottrell, Thomas. (2004) Micro-oxygenation: A Modern Tool for Red Wines Wine Business Monthly 11 No.2 12-16

Cottrell, Thomas. (2004) Amelioration and Other Methods of Acid Correction: Evil? Just Bad? Or a Gift from Bacchus? V&WM Magazine 30 No.1 82-86

Cottrell, Thomas. (2003) Lab Work: When, What, Why & How, Part Three V&WM Magazine 29 No.6 13-17

Cottrell, Thomas. (2003) The Flavors of American Oak, Wine Business Monthly 10 No.11 18-21

Cottrell, Thomas. (2003) Lab Work: When, What, Why & How, Part Two V&WM Magazine 29 No.5 13-16

Cottrell, Thomas. (2003) Delestage: An Attempt to Balance Flavor and Finish, Wine Business Monthly 10 No.9 15-17

Cottrell, Thomas. (2003) Lab Work: When, What, Why & How, Part One
V&WM Magazine 29 No.4 68-71

Cottrell, Thomas. (2003) Post Fermentation Wine Management, Part Two, V&WM Magazine 29 No.3 41-45

Cottrell, Thomas. (2003) Post Fermentation Wine Management, Part One, V&WM Magazine 29 No.2 37-41

Cottrell, Thomas. (2003) Managing the ATypical Aging (ATA) Propensity, V&WM Magazine 29 No.1 26-29

Cottrell, Thomas. (2002) Managing Wine Quality During Bottling, V&WM Magazine 28 No. 6 41-45

Cottrell, Thomas. (2000) SO2: When To, When Not To, How Much To?, V&WM Magazine 26 No. 5 126-129

Cottrell, Thomas. (2000) Clarifying Filter Sheet Nomenclature, V&WM Magazine 26 No. 2 30-31, 91-94

Cottrell, Thomas. (1999) Barrel Room Management, The Unsung Key . . .Part II, V&WM Magazine 25 No. 3 36-40

Cottrell, Thomas. (1999) Barrel Room Management, The Unsung Key . . .Part I, V&WM Magazine 25 No. 2 41-50

Cottrell, Thomas. (1998) Membrane Filtration - Always a Strain, V&WM Magazine 24 No. 4 73-76

Cottrell, Thomas. (1998) Winemaking and DE Filters - Why and How, V&WM Magazine 24 No. 3 28-32

Cottrell, Thomas. (1998) Filtration of the Juice Lees. Or . . . Scraping the Bottom, V&WM Magazine 24 No. 2 25-29

Cottrell, Thomas. (1998) How to Choose the Right Press for Your Winery. V&WM Magazine 24 No. 1 38-46

Cottrell, Thomas. (1997) How to Choose the Right Labeler. V&WM Magazine 23 No. 6 38-4

Cottrell, Thomas H. E. (1985) Common Errors in Small Wineries. The Vinifera Wine Growers J. 12 35-40.

Cottrell, Thomas H. E. (1985) Common Errors in Small Wineries. The Vinifera Wine Growers J. 12 35-40.

Cottrell, Thomas H.E., (1984) Quality - A Judgement Call?,Am. Wine Soc. J. 16 118-9.

Cottrell, Thomas H.E., (1984) Winemaking Realities: When are the Grapes Ripe?,Am. Wine Soc. J. 16 79-80.

Cottrell, Thomas H.E., (1984) Winemaking Realities: Back to Basics. Am. Wine Soc. J. 16 18, 27-8.

Cottrell, Thomas H.E., (1984) Smooth Sailing for Long Island Vineyards. Wines and Vines. 65 100-3.

Cottrell, Thomas H.E., (1983) Common Errors in (small) Eastern Wineries. Eastern Grape Grower and Winery News 9 16-8.

Cottrell, Thomas H.E., (1983) Winemaking Realities: Getting the Barrel Ready for Wine. Am. Wine Soc. J. 15 83-4.

Cottrell, Thomas H.E., (1983) Winemaking Realities, Am. Wine Soc. J. 15 54-5.

Seminars by Dr. Tom Cottrell

2012

11/20 Whitley County Extension Office, Williamsburg, KY, "Making Beer & Wine"
10/12 UK Ag. Sci. Ctr. N, Lexington, KY, "Winery Basics"
10/9 Capital Cellars, Frankfort, KY, "Tasting Wine"
10/2 UK Master Gardeners, UK Arboretum, Lexington, KY, “The Status of KY Wineries”
3/6 KVS Meeting at E. S Good Barn, Lexington, KY,
"Grape Contracts"
“Wine Marketing"
1/6 KYF&VGC&TS, Embassy Suites, Lexington, KY, "Titration Technique"

2011

10/26 AICHE Meeting, Midland MI, "Winemaking from the Perspective of the Small Winery"
8/18 Master Gardener Association & Grayson County Extension Service, Leitchfield, KY,
“From Vine to Wine”
8/8 Whitely County Extension Office, Williamsburg, KY “Home Winemaking”
7/29 Ag & HES Alumni, Atwood Hill Winery, Morning View, KY, “Winemaking in Kentucky”
7/30 Talon Winery, Shelbyville, KY “Winemaking in Kentucky”
6/21 Talon Winery, Lexington, KY, “Wine Basics”, Osher Lifelong Learning Institute
6/6 Pacific NW Enology Conference, Hollywood Schoolhouse, Woodinville, WA,
“Winemaking in Cool Climates”, 2 Hours
“Color and Mouthfeel, SO2 Use”, 2 hours
5/11 KASEP Meeting, Lovers Leap Winery, Lawrenceberg, KY, “Wine in Kentucky”
4/13 UK, Lexington, “A Short Course on Wine for Travelers in France”
“Basic Laboratory Methods”
“More Basic Methods: Sugar, TA, Nitrogen”
“Harvest Preparations, Heat Stability, Cold Stability”

"Focus on Free SO2"
"Wine pH and Soil pH."
3/3-3/5 Kearney, Nebraska, 14th Annual Nebraska Winery & Grape Growers Forum & Trade Show,Holiday Inn Convention Center,
"Basic Lab Methods"
"The Story of Brix"
"Harvest Preparations"
"Stabiliizing Wine"
"Free SO2"
1/19 Dan Crocker's Rancho, Franklin, KY,
"Key Steps in Winemaking"
"Red Grapes and Berry Wine"
"Lab work"
"Titrations"
"Fermenting High Alcohol Wines!"
1/2, 1/3 Embassy Suites, Lexington, KY, 2011 Fruit & Vegetable Growers Conference & Trade Show
"Crucial Safe Winemaking Practices"
"Wine Tasting"
"Some Lab Procedures"

2010

12/17 Intervale Center, Success on Farms, Burlington, VT,
"Small Winery Management", and "Small Winery Options"
11/9 Capital Cellars, Frankfort, KY, "Winemaking in Kentucky"
8/15 Soc. of Retired Agronomists, Joseph Beth Cafe, Lexington, KY
"Winery Development in Kentucky"
4/16 Winery and Wine Distribution Law Conference, Sheraton Westport Plaza Hotel, St. Louis, MO,
"Kentucky Wine Law"
4/15 Four Rivers Center, Paducah, KY "Grand Tasting with Kentucky and Other Wines"
1/3 KY Fruit and Vegetable Growers Conference and Trade Show, Embassy Suites, Lexington KY,
"Basic Lab Work and Lab Equipment List"

2009

12/9 UK, Lexington, KY "Wine Colors- Red Wine Evolutions"
12/7 UK, Lexington, ,Wine Colors- Sources"
8/8 Home Winemakers Meeting, Letcher County Extension Office, Whitesburg, KY, "Winemaking"
8/1 2009 KVS Growers Meeting & Symposium, Lovers Leap Winery, Lawrenceburg, KY,
"Managing Free SO2"
7/23 WKWA Meeting, Purple Toad Winery, Paducah, KY "Winery Design & Operation
3/27 UK, Lexington, KY "Some Comments on Wine for Travel in France"
3/21 KVS Growers Meeting, E. S. Good Barn, UK, Lexington, KY "Grape Contracts"
3/13 Wineries Unlimited, King of Prussia, PA,
"Winery Planning, Design & Expansion, Equipment & Design Integration"
1/28 Richmond Rotary Club, Richmond, KY "Wine! In Kentucky?"
1/5 2009 KY Fruit & Vegetable Conference & Trade Show, Embassy Suites Hotel, Lexington, KY
"Key steps in Winemaking"
"Red Grapes and Berry Wine"

2008

10/18 UK Alumni Home Coming, Lexington, KY, "Winemaking in Kentucky"
9/17 The Rancho, Franklin, KY, "Overview of the steps in Winemaking"
8/25 Montgomery County Cooperative Extension, Mt. Sterling, KY, "Winemaking Procedures"
8/18 Montgomery County Cooperative Extension, Mt. Sterling, KY, "Winemaking for Fun!"
5/13 Capital Cellars, Frankfort, KY, "Microbes and Wine and SO2"
4/11 UK, Lexington, KY, "Wine Basics for France Travel"
3/19 UK, Lexington, KY, "So, You Want to Start a Winery?"
2/15 Tennessee Viticultural & Oenological Society Annual Meeting, Airport Marriot, Nashville, TN,
"Winery Building Layout"
"Winery Business Planning"
1/7 KY Fruit and Vegetable Growers Conference and Trade Show, Embassy Suites, Lexington KY,
"Recovering Damaged Wines"

2007

10/22 Capital Cellars, Frankfort, KY, "Kentucky Winery Association"
7/26 UK College of Ag. All-Commodity Field Day, Princeton, KY
"Winemaking. At Home or Otherwise"
6/19 Washington County Extension Office, Springfield, KY
"Winemaking. At Home or Otherwise"
6/13 Joint Meeting: KDA - KGWC, Ch. de Vieux Corbeau Winery, Danville, KY ,
"Marketing Small KY Wineries"
6/1 Wickland Estate, Bardstown, KY, "Wine Tasting 101"
4/12 Acres of Land Winery, Richmond, KY, "Tasting Wine"
4/5 UK, Lexington, KY,"Some Inputs on Wine for Travelers to France"
1/18 Mid America Fruit Growers Conference, Excelsior Springs, MO,
"Basics of Tasting & Judging
"Small Winery Design Basics"
1/8 2007 Fruit and Vegetable Grower Conference & Trade Show, Holiday Inn North, Lexington, KY,
"SO2 Use" and "Bottling Stable Wine"
Enology Review, Campbell County Extension Office, Newton, KY and Washington County Extension Office, Springfield, KY, 2-hour sessions:
2/17 Session 1 "pH and SO2"
3/24 Session 2 "Pad and Sterile Filtration"
4/7 Session 3 "pH Control and Acid changes"
4/21 Session 4 "Cleaning and Sanitizing, Fining and Bottling"
5/12 Session 5 "Equipment: Processing and Laboratory"
6/2 Session 6 "Yeast and Yeast management"

2006

8/31 NAFEX – SFF Meeting, Holiday Inn, Lexington, KY,"Winemaking. At Home or Otherwise"
8/1 Twilight Horticulture Meeting, UK South Farm, Lexington, KY, "Wine Grape Evaluation"
7/22 Summer KVS Meeting, Talon Winery, Lexington, KY, "Wine Evaluation"
4/5 Ag. Sci. Ctr. N, Lexington, KY, Seminar for students of PLS 520,
"So, you Want to Start a Winery?"
1/27 St. Clair Medical Center Wine Tasting, Sheltowee Country Club, Morehead, KY,
"Comparing Wines from Around the World"
1/10 2006 KY Fruit and Vegetable Grower Conference & Trade Show, Holiday Inn N, Lexington, KY,
"Winery Foibles?",
"Key Steps in Winemaking"

2005

11/10 Franklin County Extension Office, Frankfort, KY, for Northern Kentucky Extension Agents,
"Key Steps in Making Wine"
Winery Design Considerations"
10/28 Ag. Sci. Ctr. N, Lexington, KY, for the faculty of the Horticulture Dept. Seminar,
"Enology Extension at the University of Kentucky"
10/22 Kentucky Vineyard Soc. Meeting, Acres of Land Winery, Richmond, KY
"Small Winery Design Basics",
"Microbes & Wine & SO_2",
"Post-Fermentation Decisions"
10/21 Kentucky Ag Development Board, Frankfort, KY, in conjunction with Dr. Kaan Kurtural, for the Kentucky Legislative Research Committee:,"The State of Kentucky Wineries"
9/17 University of Kentucky Department of Horticulture, Fall Viticulture and Enology Meeting, Springfield, KY, Washington County Cooperative Extension Office
"The Basics of Small Winery Set-up: Some Do's and Don'ts"
"Harvest Indices for Commercial Wine Production".
8/27 Northern Kentucky Wine & Grape Growers Association, NKW&GGA, At Lost Heritage Winery,
"Avoidance and Alleviation of Microbial Problems"
"The Last Six Weeks"
8/6 St Vincent's Vineyard, in Willisburg, KY, for the Kentucky Wine Alliance, KWA,
"The Importance of pH and Free SO2"
"Wine Grape Harvest Criteria".

2004

11/6 Seminars for the University of Nebraska workshop "Instrumentation in the Vineyard and the Winery", Lincoln, Nebraska:
"Fundamentals of Winery Instrumentation"
"Advanced Wine Measurements"
6/6 Seminars for the Winery Design and Planning Workshop, sponsored by Virginia Tech and Penn State at College Park, PA:
"Winery Start-up Considerations"
"Equipping a Small Winery"
3/18 Organized and chaired an all-day program for Wineries Unlimited, at Lancaster, PA
"Advanced Winemaker's Management Seminar: The Role of Yeast and Enzymes in WineDevelopment"
3/15 Seminar for Wineries Unlimited Newcomers Day, Lancaster, PA
"Required Analyses for Beginners"
3/5-6 Seminars for Nebraska Winery and Grape Growers Forum, in Kearney, Nebraska
"Small Winery Realities"
"Equipment and Techniques to Improve Quality, and Reduce Labor"

2003

11/15 Seminars For Golden Hills Research, Conservation & Development, at Council Bluffs, Iowa
"Small Winery Design Basics"
"Equipment You Need to Operate an Ideal Winery"
"Financial Expectations in Starting a Small Winery"

8/13 Seminar for Penn State Extension at Stewartstown, PA,
" A Winemaker's Perspective on the Last Six Weeks of the Growing Season"
8/9 Seminar for the American wine Society, Rochester, NY, "Avoiding Common Wine Faults"
6/6 Organized and chaired an all-day program for Vineyard & Winery Management Magazine, at Waterloo, NY, "Cabernet Franc Wines – Fermenting and Selling"
5/31 Seminars for Winery Planning and Design Workshop, Leesburg, VA, for Virginia Tech,
"Equipping a Small Winery"
"Winery Start-up Considerations"
3/16 Seminars for Wineries Unlimited, Lancaster, PA
"Managing Phenolics and Flavors in Red Wine Fermentations"
"Deciding What Kind of Winery to Become"3/1 Seminars for the Maryland Grape Growers Association Annual Meeting in Clarksville, MD,
"Wine Analysis"
"Brettanomyces/Dekkera Analysis"
2/24 Seminar and Tasting for the Heartland 2003 Wine School, sponsored by Purdue University at the Oliver Winery in Bloomington, IN,
"Management of Wine Tannins, with Wine Examples"
"Demonstration of the Reflectoquant II Wine Analysis System"

2002

7/20 Vineyard & Winery Management Magazine's "Summer Seminar" at Niagara College, Niagara-on-the-Lake, ON. "Elementary Analysis"
3/13 Seminars: for Wineries Unlimited, Lancaster, PA,
"The Quintessential Wine Lab"
"Avoidance and Alleviation of Microbial Wine Problems"

2001

10/31 An All-day Laboratory Methods Symposium for the wineries of Southeastern Pennsylvania, at Manatawny Creek Winery in Douglassville, PA
8/10 A one-hour lecture on Microbes and SO2 for AWS, in Rochester, NY
6/15-17 Three day symposium for the Nebraska Winery Association with Murli Dharmadhikari and Kimberley Rey, SMSU, at Lincoln, Nebraska
4/21-22 Two-Day Symposium for the Rocky Mtn Winery Assoc., Grand Junction, CO
"Start-up Considerations for new Wineries"
"Winemaking Procedures"
"Microbes and Wine"
3/20-23 Seminars: for Wineries Unlimited, Lancaster, PA
"Common Wine Flaws and How to Avoid Them"
"Vine and Wine Nitrogen and Must Health" with Mark Chien, PA Extension Viticulturist
"Protocols, Tools and Methods of Filtration", with Dana Keeler - Heron Hill, and Brad McCarthy - White Hall Vineyards
3/10 Seminar for Lime Hollow Nature Center, Cortland, NY "Microbes and Wine"
3/3 Seminar for New Growers Workshop, CU Cooperative Extension, Waterloo, NY.
"What Kind of Grapes do Wineries Want?"

2000

Over 37 Seminars in the years leading up to and including 2000

SETH DEBOLT

Associate Professor, University of Kentucky 2011- present
Assistant Professor, University of Kentucky, 2008-2011

EDUCATIONAL BACKGROUND

- Postdoctoral Associate, Carnegie Institute for Science (Stanford University)
- Ph.D., Plant Biology-Viticulture, (University of Adelaide-University of California, Davis)
- Honors in Environmental Chemistry (The University of Sydney)
- B.S. Agriculture (The University of Sydney)
- Associate Diploma, The Writers Studio

RESEARCH PROGRAM

The DeBolt lab research program is focused on several interrelated questions:

1) The capacity for a drug to bind a target protein and modify or inhibit it activity is a hallmark of nature. An incredible diversity of chemicals exists in nature, with hundreds of thousands of unique chemical ligands synthesized. These chemicals not only modulate processes within a host organism, but also dictate interkingdom signaling. One of my laboratories central interests is the identification of chemical signals that modulate plant pathways, particularly focused on cell wall and cell surface signals. We employ chemical fingerprinting with genetics in plants, in the area of investigation broadly classified as chemical genomics.

2) Characterization of genes and the proteins they encode involved in cell wall synthesis. Our interest lies in cell shape and morphogenesis as well as the question of how extracellular cues are translated through the cell wall to respond to abiotic or biotic interaction. This area of research has led to an increasing effort to examine plant cell walls as a source of biobased products. Within the area of biofuel we are focused on modifying and understanding cellulose and lignin structure and studying the sustainability of biomass based feedstocks.

3) Finally, my lab has an ongoing research interest in improving the quality of grapes for wine and human consumption: grapes are one of the most cultivated and highly valued horticultural crops worldwide. We have a 3-acre research vineyard and a wine chemistry lab. In collaboration with Dr.'s Patsy Wilson, Doug Archbold, Chris Ford (Adelaide, AU) and Doug Cook (Davis, CA) we study wine tannin chemistry and the regulation of organic acid biosynthesis (USDA multi –state).

SUPPORT FOR RESEARCH PROJECTS

Current extramural funding

Project/Proposal Title:	From small molecule to gene: using chemical genetics to understand cell wall sensing and advance molecular resources: Seth DeBolt (PI)
Source of Support:	National Science Foundation NSF-IOS- 0922947
Total Award Amount:	$300,000.00
Total Award Period:	8/1/09 - 7/30/13
Location of Project:	University of Kentucky
Person-Months per Year Committed to the Project:	0.6

Project/Proposal Title:	Research Experience for Undergraduate Source of Support: Seth DeBolt (PI) NSF: 1036902
Total Award Amount:	$6000.00
Total Award Period:	2/1/10 - 8/31/12
Location of Project:	University of Kentucky
Person-Months per Year Committed to the Project:	0.1

Project/Proposal Title:	Equipment Grant (NSF-IOS) 1038812: Stereo Fluorescence Microscope: Seth DeBolt (PI)
Total Award Amount:	$35,000.00
Total Award Period:	06/10/10
Location of Project:	University of Kentucky
Person-Months per Year Committed to the Project:	0.0

Project/Proposal Title: Lignin Deconstruction for the Production of Liquid Fuels **(Co-PI)** with Rodney Andrew (PI), Mark Crocker, Samual Morton, Mark Meier (Co-PI)
Source of Support: NSF: EFRI-0937657
Total Award Amount: $**1**,984,341.00 ($693,713.00 *to DeBolt Lab*)
Total Award Period: 9/1/09 - 8/31/13
Location of Project: University of Kentucky
Person-Months per Year Committed to the Project: 0.6

Project/Proposal Title: Plant-microbe communication in the *Medicago truncatula* rhizosphere: functional metagenomics, biochemistry and community analysis (Seth DeBolt Co-PI, Luke Moe PI)
Source of Support: USDA
Total Award Amount: $499,964.00
Total Award Period: 1/15/11 - 1/14/15
Location of Project: University of Kentucky
Person-Months per Year Committed to the Project: 0.2

Project/Proposal Title: The impact of sterols on cellulose biogenesis Seth DeBolt (Co-PI), Kathrin Schrick (PI) ($300,000 to DeBolt)
Source of Support: NSF MCB
Total Award Amount: $893,794.00
Total Award Period: Funded: 7/15/11 - 6/14/15
Location of Project: Kansas State University and University of Kentucky
Person-Months per Year Committed to the Project: 0.6

Project/Proposal Title: Defining Determinants and Dynamics of Cellulose Microfibril Biosynthesis, Assembly and Degradation Jocelyn Rose (PI), Larry Walker (Co PI), Tom Brutnell (Co PI), Seth DeBolt (Co PI)($500,000 to DeBolt)
Source of Support: DOE
Total Award Amount: $2,005,372
Total Award Period: 3/1/11 - 2/28/14
Location of Project: Cornell University and University of Kentucky
Person-Months per Year Committed to the Project: 1.0

Project/Proposal Title: On-Farm Biomass Processing : Towards an Integrated High Solids Transporting/Storing/Processing System PI – Sue Nokes, 12 Co-PIs including Seth DeBolt ($500,000 to DeBolt)
Source of Support: USDA: NIFA
Total Award Amount: $6,932,786
Total Award Period: 7/1/2011-6/30/2016
Location of Project: University of Kentucky
Person-Months per Year Committed to the Project: 1.0

Project/Proposal Title: Small molecule mediated cross-talk between plant host and endophytic communities PI- Seth DeBolt
Source of Support: USDA: FAPRU
Total Award Amount: $160,000
Total Award Period: 7/1/2013-6/30/2016
Location of Project: University of Kentucky
Person-Months per Year Committed to the Project: 0.6

Project/Proposal Title: Bacterial endophytes that colonize and modify switchgrass growth (PI) – Funded to sequence the whole genome of 12 bacterial plant endophytes. DOE

JGI will provide the annotated sequenced genome, The DeBolt lab will provide the organism DNA. Funded Jan 2013.
Source of Support: Department of Energy- Joint Genome Institute
Total Award Amount: $collaborative
Total Award Period: 2012-2014
Location of Project: University of Kentucky
Person-Months per Year Committed to the Project: 0.2

Pending competitive grants

Project/Proposal Title: NSF Ky EPSCoR – Biofuels and Bioproducts Consortium PI – S DeBolt, 8 co-PI's (7 institutions)
Source of Support: NSF
Total Award Amount: $6,932,786
Total Award Period: Pending
Location of Project: University of Kentucky
Person-Months per Year Committed to the Project: 2.0

Project/Proposal Title: Exploiting the Potential of Small Effecter Molecules Produced by Epiphytic and Endophytic Microbes to Modify Cellulose Synthesis in Plants (PI)
Source of Support: National Science Foundation NSF-IOS- Pre-proposal invited
Total Award Amount: $498,798
Total Award Period: NA
Location of Project: University of Kentucky
Person-Months per Year Committed to the Project: 0.6

Current intramural/competitive funding

Project/Proposal Title: "Functional microbiomics in Tobacco" DeBolt S- 2012 (PI)
Source of Support: ALTRIA Co
Total Award Amount: $**30,0000**
Total Award Period: 7/31/12
Location of Project: University of Kentucky
Person-Months per Year Committed to the Project: 0.2

Project/Proposal Title: "Developing a Biomass Energy Crop Trial for Renewable Energy Production" Montross M, Smith R, DeBolt S- 2009 (Co-PI)
Source of Support: USDA New Crops Opportunities
Total Award Amount: $**24,716**
Total Award Period: 4/1/09 - 3/31/12
Location of Project: University of Kentucky
Person-Months per Year Committed to the Project: 0.2

Project/Proposal Title: Multi State Equipment Matching for a GC MS DeBolt S, Archbold D. (PI)
Source of Support: USDA CSREES KY011024
Total Award Amount: $**48,000.00**
Total Award Period: 6/1/09
Location of Project: University of Kentucky
Person-Months per Year Committed to the Project: 0.0

Project/Proposal Title: Chemical genetic dissection of plant cell walls
Source of Support: USDA KYAG - HATCH
Total Award Amount: $**128,000**
Total Award Period: 10/1/09 - 9/30/14
Location of Project: University of Kentucky
Person-Months per Year Committed to the Project: 0.6

Project/Proposal Title: Modifying cellulose for biofuel in poplar, a energy crop, for potential marketable genotype DeBolt S, Maiti I, (Co-PI)
Source of Support: Kentucky Tobacco Research and Development Corporation
Total Award Amount: $**120,000**
Total Award Period: 06/1/09 - 05/30/11
Location of Project: University of Kentucky
Person-Months per Year Committed to the Project: 0.6

Project/Proposal Title: Workshop to define the sustainability of biofuels production in the Southeastern United States McNear D, Bertsch P, DeBolt S (Co-PI)
Source of Support: Kentucky Science and Technology Corporation
Total Award Amount: $**30,000**
Total Award Period: 06/1/10
Location of Project: University of Kentucky
Person-Months per Year Committed to the Project: 0.1

Project/Proposal Title: Defining phosphorylation regulation of primary cell wall CESA genes as a means to modulate cellulose biosynthesis (PI)
Source of Support: Kentucky Tobacco Research and Development Corporation
Total Award Amount: $**10,000**
Total Award Period: 07/1/09 - 06/30/10
Location of Project: University of Kentucky
Person-Months per Year Committed to the Project: 0.2

Project/Proposal Title: Developing an Integrated and Sustainable Biomass Energy System for Sustainable Renewable Energy Production Montross M, DeBolt S (PI)
Source of Support: USDA Crop Diversification and Bioenergy Research and Education
Total Award Amount: $**100,000**
Total Award Period: 6/1/09 - 5/30/10
Location of Project: University of Kentucky
Person-Months per Year Committed to the Project: 0.2

Additional minor proposals-
- DeBolt S (PI) – University of Kentucky 2009-2010 Research Activity Award (RAA) in the amount of $850 for publication costs for manuscript in *Plant Physiology*.
- McNear D, and DeBolt S (Collaborator) In kind funding to explore the molecular response between the rhizosphere and plant using a patented organic fertilizer: $120,000.00
- DeBolt S The Gatton Academy of Mathematics and Science Summer Internship for High School Students $3000.00

GRADUATE STUDENT ADVISING

Ph.D.
Darby Harris* (University of Kentucky, Lexington) "Molecular and chemical dissection of plant cellulose synthesis." Jan 1st-2008 -2011 (Now Assistant Professor at Western NC University): Gordon Research Seminar, Plant Cell Walls, MA, 2009 – Darby Harris (Ph.D student) presented the work from (Harris et al., 2009) and won the research seminar award. He has represented the college twice at the National Agricultural Biotechnology Council annual meeting. UK interdisciplinary biology award 2010.
Arun Sampathkumar (Max Planck Institute, Now at Cambridge University)- Staffan Persson is the primary advisor and I am the External Advisor. "Role of actin cytoskelton during primary wall cellulose production"
Masters: **Matthew Simson** (University of Kentucky, Lexington) "Defining and correlating grape quality attributes in Kentucky" Aug 2008 to present- Completion Aug 2011

In progress:
Meera Nair (University of Kentucky, Lexington) "The molecular role of phyosteryl glycosides in plants" Aug 2008 – present.

- Currently has one peer reviewed journal publication, a first author book chapter and 2 manuscripts in review and preparation.

Shawn Lucas (University of Kentucky) "Soil biology and relationships to structure". On committee for molecular biology component of project.
Mizuki Tateno (University of Kentucky) Cellulose biosynthesis in Setaria viridis as a model organism for C4 Panicoideae
Chad Brabham (University of Kentucky) Chemical genetic dissection of cellulose biosynthesis
Andrea Sanchez (University of Kentucky) Functional microbiomics in Tobacco

Masters:
Graduated:_Matthew Simson (University of Kentucky, Lexington) "Defining and correlating grape quality attributes in Kentucky" Aug 2008 to present- Anticipated completion Aug 2010

POST DOCTORAL ASSOCIATE ADVISING
Past- Venugopal Mendu Dec 2009- 2011 (faculty at ICRISAT), Nihar Nyack (Faculty in India working on cell wall) Jozsef Stork – June 2008 –2011 (DeBolt lab tech); Carloalberto Petti Feb 2010 – present, Xia (Summer) Ye – May 2010 – present, Yumei Zhang May 2011 – present. Rekha Kushwaha – March 2012- present

UNDERGRADUATE RESEARCH STUDENT ADVISING

1. Northern Kentucky University- Megan Reynolds, summer 2008 and 2009
   - Coauthored article in Global Change Biology in DeBolt lab
2. Colby College- Rachael Strang Summer 2009
3. UKY Horticulture- Carey Grable Summer and Fall 2009
   - Senior thesis work prepared him for a position as a state Extension specialist
4. UKY Agricultural Biotechnology- Brian Williams Fall- Spring 2009-10-
   - Coauthored article in Plant Physiology in DeBolt lab
   - AMSTEMM award winner 2010
5. UKY Agricultural Biotechnology - Kendell Corbin Fall- Spring 2009-10
   - Nominated by S. DeBolt and was awarded the Outstanding Student Award – Sophmore 2010
   - NSF REU recipient 2010
   - AMSTEMM award winner 2010
6. UKY Agricultural Biotechnology - Jordan Clay Fall- Spring 2009-10
   - Medical School applicant 2011
7. UKY Agricultural Biotechnology - Rebecca Hall- Fall 2010- present
   - Begin Sophomore year
8. UKY Agricultural Biotechnology – Scott Parker- Fall 2010- present
   - Begin Junior year
9. UKY Agricultural Biotechnology – Robert Brooks- Fall 2010- present
   - Begin Senior year
10. UKY Horticulture- Tristin Considine- Fall 2010- present –Sophmore
11. UKY Agricultural Biotechnology- Rebecca Hall - Fall 2011- present –Sophmore
12. UKY LA- Curtis Mucci- Fall 2010- present –Senior

K-12 RESEARCH STUDENT ADVISING

1. David Smith- (Junior) Asbury College
2. David McChesney (Gatton Academy For Science and Mathematics)
3. Eliana Greissworth: Sayre School
4. Rick Gammill: Sayre School
5. Carlos Gutierrez: Bryan Station High School
6. Mitchell Weber (Dunbar High)
7. Zachary Barker (Dunbar High)
8. Rachel Cunningham (Dunbar High)

9. Haley Stein (Bryan Station High School)

EDUCATION AND OUTREACH

- Plant Biology Summer Internship Coordinator: Stanford University, with Prof. Kathy Barton 2007
- Scientific outreach has included several press interactions including television interviews for local news channels (Channel 27 and KYTV) as well as international interviews for Voice of America in the 'Greening America' series. Web and newspaper articles have been references (more the 15 web sites covered our bioenergy agriculture papers and several newspapers). Science magazine -Gordon Research Conference coverage (www.sciencemag.org/cgi/reprint/323/5917/1084.pdf).
- Interactive museum exhibit at the Lexington Explorium- Funded through the National Science Foundation grant IOS- 0922947- this will initiate in 2010 and involve a 1-2 College of Ag and K-12 student open day to promote plants as food, fuel and fiber.
- Science readiness program: DeBolt has also developed a *Science Readiness Program*. A simplified program was developed with a series of objectives for each stage in the *Science Readiness Program* including the teacher, the student and the faculty aimed at assisting all students who choose a STEM discipline, but particularly focusing on those under-represented in STEM, woman and minorities. The first students recruited into the program were Ms. Eliana Greisworth (Sayre School), Mr. David Smith (Asbury College) and Mr. Carlos Gutierrez (Bryan Station High School), Mr Zackary Barker (Dunbar High School) and currently Ms Haley Adams (Bryan Station HC). Ms. Greisworth is now a Biology major at Vassar College and is a coauthor on a submitted research paper. Mr. Guteirrez and Stein are now seniors in high school and preparing to enter the University of Kentucky. The goal of the *Science Readiness Program* is to bridge the gap between high school and college focused on the sciences, particularly targeting at risk students interested in the STEM disciplines. The program has a series of objectives targeting the K12 teacher, students themselves and the PI. **Stage 1** initiates by giving college level lectures in high school science classrooms focusing on transition to the depth of class material and a principle of *no fear of questioning everything,* course material, resources and STEM. Post-doctoral researchers, graduate students and the PI all contribute to these classes. DeBolt just finalized this years outreach at Bryan State High School resulting in the recruitment of Haley Stein. The second stage is based on annual stipends to fund high school/undergraduate students to engage in a laboratory experience. Examples of tasks are performing endophyte isolation, genetics crosses, DNA isolation, chemical extraction, freeze-drying and plant propagation with weekly attendance at group meetings, lab socials and they become part of the team. Key goals reached are as follows.

K12 Teachers:

- To increase high school science teachers understanding of UKs introductory science course requirements and material
- To align high school science instructional techniques with those found at UK
- To develop professional relationships between faculty and high school

Students

- To decrease the social distance between UK culture and that of the NSF funded STEM research and that of the culture of the students high school / home community. This also engages the faculty in knowing where the students come from and vise versa.
- To increase high school students understanding of the nature of science at college level
- To increase the likelihood that high school students will enter and be retained in the STEM disciplines at UK/NSF, thus choosing a STEM career/passion for research.

Faculty member (PI)

- To increase PI understanding of high school science curricula in terms of pedagogy and content standards

NATIONAL MEETINGS ORGANIZED

- Integrated Research, Education, and Extension to Enable Sustainable Biofuel Production –A proposed workshop to organize research efforts in the Southeast U.S. (Bertsch P, DeBolt S, McNear D 2010). 57 page document and workshop included 48 participants from with the US. Composed three whitepapers on Bioenergy Agriculture for regional workshop and CAP proposal organization 2010 and co-organized the workshop:
    - Genomics Genetics and Breeding of Bioenergy Crops for Southeastern United States (DeBolt S and Brummer C 2010),
    - Life cycle assessment of bioenergy agriculture (Campbell E and DeBolt S 2010).

SCHOLARLY SERVICE

Major editorial efforts consist of the organization and editing of a special issue named "Current challenges in plant cell walls" Published in Frontiers in Plant Physiology (2012). The special issue consists of 32 articles with focused mini reviews from many of the leaders in the cell wall biology field. Hosted by Jose Estevez, University of Buenos Aires and CONICET, Argentina and Seth DeBolt, University of Kentucky, USA.

> Overview: Cell morphogenesis and the arrangement of diverse cell shapes form the foundation for building a multicellular organism. In plants, cells are surrounded by a rigid cell wall that extends in a highly controlled manner to constrain the cells internal turgor pressure and define cell shape. Despite the importance of the cell wall for plant physiology, a major challenge remains to characterize the fundamental organization of all key wall components and determine how their biosynthesis and structure-function relationship are regulated. This special topics feature in Frontiers in Plant Physiology encompasses the ongoing research effort to meet this challenge. A series of perspective papers highlight the increasingly wide range of disciplinary and multidisciplinary approaches, organisms and cell types that are being employed to decode cell wall biosynthesis. This special feature welcomes outstanding contributions addressing fundamental questions in cell wall biology.

PUBLICATIONS

* Corresponding author;
º Graduate student or post doc in SD laboratory or advised by SD;
+ Undergraduate in SD lab.

Sethaphong et al. (2012) PNAS (submitted)
Nair et al (2012) (in preparation)
Xia et al organic (2012) (in preparation)
Petti et al Setaria paper (in preparation)
Xia et al. (2012) Acetobixan (in preparation)
Houtz ms (2012)
Indozoflam

BOOK CHAPTERS

1. **Harris Dº, Petti Cº, DeBolt S*** (2012) Biogenesis of lignocellulosic biomass for advanced fuels. In "Advanced Biofuels and Bioproducts". Ed. James Lee. Springer, New York
2. **Nair Mº, DeBolt S*** (2010) Analyzing cellulose biosynthesis with confocal microscopy. In 'The Plant Cell Wall: Methods and Protocols Ed: Zoë Popper. Methods in Molecular Biology Series. Springer Science Media, New York.
3. **Harris Dº, DeBolt S*** (Invited Book Chapter) The use of small molecules to dissect cellulose biosynthesis and manipulate the cortical cytoskeleton. In Plant Chemical Biology Ed. Paul Overvoorde, Dominique Audenaert. John Wiley and Sons.
4. Lucero M, **DeBolt, S,** et al. (2013) Advancing Food Security through Long Term Research Networks that Explore Agroecosystems Across Disciplines and Scales

PEER REVIEWED JOURNAL ARTICLES

2013

1. Brabham and DeBolt (2013) Chemical genetics to probe the cell wall *Frontiers in Plant Biotechnology* **3:309. doi: 10.3389/fpls.2012.00309**
2. Sahoo, D, DeBolt S, Stork J, Maiti I (2013) Manipulating cellulose biosynthesis by expression of mutant Arabidopsis proM24::CESA3ixr1-2 gene in transgenic tobacco *Plant Biotechnology Journal* **DOI: 10.1111/pbi.12024**
3. Montross, M, Adams W, DeBolt S* (2013) Interplay between yield, nitrogen application, and logistics on the potential energetic and Greenhouse Gas emissions from biomass crops *GCB Bioenergy* (in press)

2012

4. Harris DMº, Corbin Kº+, Wang T, Gutierrez R, Bertolo AL, Petti Cº, Smilgies DM, Estevez JM, Bonetta D, Urbanowicz B, Ehrhardt DW, Somerville C, Rose JCK, Hong M and DeBolt S* (2012) Cellulose

microfibril crystallinity is reduced by mutating C-terminal transmembrane region residues CESA1$^{A\text{-}V903}$ and CESA3$^{T\text{-}I942}$ *Proc Natl Acad Sci* USA, 109, 4098-103

5. Simson Mº and DeBolt S* (2012) Sustained oxalic acid biosynthesis in Chambourcin grapes. *Horticultural Science and Biotechnology* (in press)
6. Mendu, Vº, Shearin, Tº, Campbell E Jr., Stork Jº, Jae J, Crocker M, Huber G and DeBolt S* (2012) Global Bioenergy Potential From High Lignin Agricultural Residue *Proc Natl Acad Sci* USA, 109(10):4014-9
7. Schrick K, DeBolt S, Bulone V (2012) Deciphering the molecular functions of sterols in cellulose biosynthesis *Frontiers in Plant Physiology* 3:84. doi: 10.3389/fpls.2012.00084
8. DeBolt S* and Estevez J (2012) Current challenges in plant cell walls *Frontiers in Plant Physiology* doi: 10.3389/fpls.2012.00232.
9. Xia, Yº, Mucci Cº+, Griessworth Eº +, Williams M, DeBolt S*. (2012) Characterization of culturable bacterial endophytes of switchgrass (*Panicum virgatum* L.) and their capacity to effect plant growth. *GCB Bioenergy* DOI: 10.1111/j.1757-1707.2012.01208.x

2011

10. Sampathkumar A, Lindeboom J, DeBolt, S, Ketalaar T, Guterriez R, Ehrhardt D, Perrson (2011) Live cell imaging reveals structural associations between the actin and microtubule cytoskeleton in Arabidopsis *Plant Cell* 23(6):2302-13
11. Mendu Vº, Griffiths J, Persson, S, Stork Jº, Voiniciuc C, Downie AB, Haughn G, DeBolt S* (2011) Subfunctionalization of cellulose synthases in seed coat epidermal cells mediate secondary radial wall synthesis and mucilage attachment *Plant Physiol* 157(1):441-53
12. Joshi JP, Thammannagowda S, Fujino T, Gou J, Avci U, Haigler C, McDonnell LM, Mansfield SD, Menghesa B, Carpita N, Harris Dº, DeBolt S and Peter G (2010). Perturbation of wood cellulose synthesis causes pleiotropic effects in transgenic aspen *Molecular Plant* 1: 205
13. Mendu Vº, Stork Jº, Harris Dº, Debolt S* (2011) Cellulose synthesis in two secondary cell wall processes in a single cell type. *Plant Sign and Behav*. 1-6
14. Mendu Vº, Harman-Ware AE, Crocker M, Jae J, Stork Jº, Morton S 3rd, Placido A, Huber G, Debolt S* (2011) Identification and thermochemical analysis of high-lignin feedstocks for biofuel and biochemical production. *Biotechnol for Biofuels* 2011; 4: 43.

2010

15. Andrews Rodney; Crocker Mark; DeBolt Seth; et al. (2010) Lignin deconstruction for the production of liquid fuels ABSTRACTS OF PAPERS OF THE AMERICAN CHEMICAL SOCIETY Volume: 240 Meeting Abstract: 21-IEC
16. DeBolt S* (2010) Copy number variation shapes genome diversity in Arabidopsis over immediate family generational scales *Genome Biology and Evolution* 2: 441-453.
17. Stork Jº, Harris Dº, Williams B+, Griffiths J, Haughn G, Beisson F, Li Y, Mendu Vº, DeBolt S* (2010) CELLULOSE SYNTHASE9 serves a non-redundant role in secondary cell wall synthesis in the radial wall of Arabidopsis epidermal testa cells *Plant Physiology* 153: 580-589.
18. Harris Dº, Bulone V, Ding H and DeBolt S* (2010) Tools for analyzing cellulose biosynthesis *Plant Physiology* 153: 420-426.
19. Harris Dº and DeBolt S* (2010) Synthesis, regulation and utilization of lignocellulosic biomass *Plant Biotechnology Journal* 8. 244-262.

2009

20. DeBolt S*, Campbell JE, Smith R, Stork J,º (2009) Regional life cycle assessment of bioenergy agriculture on marginal land. *Global Change Biology- Bioenergy* 4: 360-369.
21. DeBolt S*, Scheible WR, Schrick K, Aurer M, Carroll A, Hematy K, Bouvier P, Nair Mº, Schaller H, Zemla M, and Somerville C. (2009) Mutations in UDP glucose:sterol-glucosyltransferase in Arabidopsis cause transparent testa phenotype and suberization defect in seeds. *Plant Physiology* 151: 78-87.
22. Stork J,º Montross M, Smith R, Schwer L, Chen W, Reynolds Mº, Phillips T, Coolong C, DeBolt S.* (2009) Regional examination shows potential for native feedstock options for lignocellulosic biofuel production. *Global Change Biology- Bioenergy* 2: 84-96.
23. Harris Dº, Stork Jº, and DeBolt S* (2009) Genetic modification of cellulose synthase reduces crystallinity and improves biochemical conversion to fermentable sugars. *Global Change Biology- Bioenergy* 1: 51-60. (Cover article)

2008

24. Harris Dº and DeBolt S* (2008) Relative Crystallinity in Plant Biomass: Studies on Assembly, Adaptation and Acclimation. *PLoS-ONE* 3(8): e2897.

25. Gu Y, Deng Z, Paredez AR, DeBolt S, Wang Z, Somerville C (2008) *Arabidopsis* Prefoldin6 is involved in delivery of tubulin to cytosolic chaperonin. *Proc. Natl. Acad. Sci. USA*. 105, 1109-1115.

26. Marak M, DeBolt S, Persson S (2008) Cellulose synthase; a complex complex. *Current opinion in Plant Biology* 11: 1-6.

27. DeBolt S, Ristic R, Iland PG, Ford CM (2008) Altered light interception reduces grape berry weight and modulates organic acid biosynthesis during development. *HortScience* 43: 957-961.

28. Goodin MM, Chakrabarty R, Banerjee R, Yelton S, DeBolt S (2007) Update on live cell imaging: New Gateways to Discovery. *Plant Physiology* 145: 1100-1109.

Selected Publications prior to coming to University of Kentucky

29. DeBolt, S., Gutierrez, R., Ehrhardt, D.W., Somerville, C (2007) Non-motile cellulose synthase rosettes repeatedly accumulate within localized regions at the plasma membrane in Arabidopsis hypocotyl cells following 2,6-dichlorobenzonitrile (DCB) treatment. *Plant Physiology* 145: 334-338.

30. DeBolt, S., Gutierrez, R., Ehrhardt, D.W., Melo, C.V., Cutler, S., Ross, L., Somerville, C and Bonetta D. (2007) Morlin, a novel inhibitor of cortical microtubule dynamics and cellulose synthase movement. *Proc. Natl. Acad. Sci. USA*. 104: 5854-5859.

31. DeBolt, S., Melano, V. and Ford, C.M. (2007) Botanical Briefing: Ascorbic acid catabolism in higher plants. *Annals of Botany* 99: 3-8.

32. DeBolt, S., Cook, D.R. & Ford, C. M. (2006) L-Tartaric acid synthesis from vitamin C in higher plants. *Proc. Natl. Acad. Sci. USA* 103: 5608-5613.

33. DeBolt, S., Melano, V. and Ford, C.M. (2006) Developments in our understanding of how grapes make tartaric acid. *Aust. & NZ Grapegrower and Winemaker* 511: 57-58.

34. DeBolt, S., Hardie, J., Tyerman S.D. and Ford, C.M. (2004) Composition and synthesis of raphide and druse crystals in berries of Vitis vinifera L. cv. Cabernet Sauvignon: the role of ascorbic acid as the biosynthetic precursor of both oxalic and tartaric acids is revealed by specific radio labelling studies. *Aust. J. Grape Wine Res* 10: 134-142.

ABSTRACTS

DeBolt, S. Gordon Research Conference Plant Cell Walls, MA, 2009 – "Chemical genetic dissection of plant cell walls"

Harris D and DeBolt, S. Gordon Research Conference Plant Cell Walls, MA, 2009 – "Modifying cellulose crystallinity decreases biochemical recalcitrace"

Xia, Ye and Seth DeBolt (2010) "Chemical mediated cell wall modification" Joint Meeting of the Mycological Society of America and of the International Symposium on Fungal Endophytes of Grasses

Andrews R, DeBolt, S, Crocker M, Meier, M, Morton S (2010) COST- Developing renewable liquid transportation fuels, Oostende Belgium April 2010

DeBolt, S Chemical biology applied to plant cell wall biosynthesis: Plant and Animal Genome, San Diego, CA- Jan 5th 2010 "Plant Biotechnology Series".

Andrews R, DeBolt, S, Crocker M, Meier, M, Morton S (2010) Emerging Frontiers in Research and Innovation, National Science Foundation, Arlington, VA

Nair M and DeBolt S. 2012 Chronicles of Steryl Glycosides: structural sterols in developmental biology. The Midwest Plant Cell Biology Meeting

Nair M and DeBolt S. 2012 Chronicles of Steryl Glycosides: structural sterols in developmental biology. The American Society of Plant Biology Annual meeting

DeBolt S. 2012. Cellulose synthesis in higher plants (COMBIO- International invited talk, Adelaide Australia).

Brabham, C. B. DeBolt S. 2013 THE MODE OF ACTION OF INDAZIFLAM. Weed Science Society of America. University of Kentucky, Lexington, KY (370)

OTHER DOCUMENTED ACCOMPLISHMENTS AND CONTRIBUTIONS

– CONFERENCE PROCEEDINGS- not all conference proceedings are mentioned- they are of minimal overall impact and when not reflected below, are reflected in the invited speaker section.

- Joint Meeting of the Mycological Society of America and of the International Symposium on Fungal Endophytes of Grasses.
- COST- Developing renewable liquid transportation fuels, Oostende Belgium April 2010

- Gordon research conference Plant Cell Walls 2009

– PATENTS

- **DeBolt S,** Cook DR and Ford, CM. Worldwide Patent 503479, Invention Title: Tartaric acid biosynthesis in plants: Involved cloning and characterisation of key gene and protein involved in tartaric acid synthesis and its knockout to create grape rich in vitamin C. (2007)
- **DeBolt S., Stork J. and Harris, D.** (Provisional patent UKRF 1595) Invention title: Improved conversion of lignocellulosic biomass to fermentable sugars by altering the high-order structure of cellulose via genetic modification of cellulose synthase genes (2008)
- **DeBolt, S** UDP- Glucose: sterol glucosyltransferase (UGT80B1) as a modulator of plant tolerance to abiotic stress (Provisional patent pending through UKRF 1649) (2009)

INVITED SPEAKER - Since January 2008

2008

- University of Tennessee Department of Biochemistry & Cellular and Molecular Biology Spring Seminar Series 2008,

2009

- Gordon Research Conference Plant Cell Walls, MA, 2009 - Chemical genetic dissection of plant cell walls-
- University of Malang Indonesia, Sustainable Farming and Agricultural Biotechnology Development, Invited to give three seminars and interact with the organic and sustainable farming movement in Malang Indonesia in May, 2009
    - Developing cellulosic bioenergy agriculture in Kentucky (Campus wide faculty- 100 participants)
    - Climate change and agriculture (Campus wide faculty, 100 participants)
    - Molecular genetic dissection of cell wall synthesis (100 graduate students and faculty)
- Scientific testimony for Kentucky legislative taskforce on bioenergy agriculture- Oct 14th, 2009- Titled "Biotechnology for biofuels".
- Regional Climate Change Forum- Kentucky Science and Technology Center Dec 2009

2010

- Plant and Animal Genome, San Diego, CA- Jan 5th 2010 "Plant Biotechnology Series". Chair Ling Yuan
- 32nd symposium on biotechnology for fuels and chemicals- April 19-22, 2010 in Clearwater Beach Fl
- Bowdoin College- 2010 Biology Department, Invited Faculty seminar, Host- Prof/Chair Bruce Kohorn
- 'Climate Change and Agriculture' for K-12 Education Webinar- for Kentucky high school teachers
- Grantees conference for Emerging Frontiers in Research and Innovation: Arlington, VA Feb 2010
- College of Agricultural Representative to the Heartland Research Summit- Purdue University, Feb 2010
- COST- Developing renewable liquid transportation fuels, Oostende Belgium April 2010
- Cornell University Department of Plant Biology- Fall Seminar speaker 2010

2011

- Seth DeBolt, Chemical genetic dissection of cellulose biosynthesis. UC Berkeley – Department of Plant and Microbial, October, 2011
- Seth DeBolt, Chemical genetic dissection of cellulose biosynthesis. Cornell University – Biotechnology, November 2011
- Andrews, Rodney; Crocker, Mark; DeBolt, Seth; Meier, Mark; Morton, Samuel A., III, Lignin deconstruction for the production of liquid fuels; ABSTRACTS OF PAPERS OF THE AMERICAN CHEMICAL SOCIETY Volume: 240 Meeting Abstract: 21-IEC

2012

- Seth DeBolt, Chemical genetic dissection of cellulose biosynthesis. ACS San Diego, March 2012
- Seth DeBolt, Renewable energy via small scale gasification plants in developing countries. Voice of America, Washington DC February 2012
- Seth DeBolt, Chemical genetic dissection of cellulose biosynthesis. Purdue University- Agronomy March, 2012
- Seth DeBolt, Chemical genetic dissection of cellulose biosynthesis. University of Kentucky, Plant Physiology Seminar Series March, 2012
- Seth DeBolt, Chemical genetic dissection of cellulose biosynthesis. Kansas State University- March 2012
- Seth DeBolt, Chemical genetic dissection of cellulose biosynthesis. McGill University, Canada, Department of Biology Seminar series April, 2012
- Gordon research seminar (discussion leader)- July, 2012
- Gordon research conference (2012) Chemical genetic dissection of cellulose biosynthesis. July, 2012

- Penn State University Department of Biology (Fall Seminar series)- Oct 2012
- Cornell University, DOE annual meeting- Oct 2012
- ComBio Research Conference Adelaide Australia- Sept 2012
- Southern Cross University- division of Plant Sciences Seminar Sept 2012
- Robyn van Heeswijck Distinguished Lecture award; University of Adelaide, Waite Institute Sept 2012
- American Chemical Society (Boston meeting) Sept 2012

2013

- Brabham CB, DeBolt S; THE MODE OF ACTION OF INDAZIFLAM. Weed Science Society of America Annual Meeting. Baltimore MD
- DeBolt S. Cellulose biosynthesis: optical and synthetic approaches to improving cellulose – Department of Chemical Engineering, University of Kentucky
- DeBolt, S. Session Chair- International conference on cellulose synthesis, structure, matrix interactions and technology. Penn State University

COMMITTEE MEMBER

- UK President's Sustainability Advisory Committee- Energy Futures Subcommittee (Spring Semester 2010)
- UK Beckman Scholar Mentoring Committee
- UK Agricultural Biotechnology Advisory Committee

ACADEMIC SERVICE

- Associate Editor- Frontiers in Plant Physiology
- Reviewer for academic journal publications 2008-2012: *Science Magazine, PNAS, Plant Cell, Frontiers, PLoS Genetics, Development, Plant Science, Plant Physiology, The Plant Journal, BMC Plant Biology, Plant Cell and Environment, Plant and Cell Physiology, Journal of Plant Physiology, Plant Cell Reports, Prog. Lipid Res., PLoS ONE, Annals of Botany, Molecular Plant, Advances in Bioscience and Biotechnology, Plant Physiology and Biochemistry, Journal of Sustainable Bioenergy Systems, Journal of Experimental Botany,* and *Hortscience.*
- Reviewer for federal funding agencies: Ad Hoc reviewer for grant applications sought from all relevant federal agencies. USDA Panel member (2011); DOE Panel member (2011), National Science Foundation Panel Member 2010, 2011, 2012.
- Reviewer for Deutsche Forschungsgemeinschaft (German Research Foundation)

INTERNATIONAL OUTREACH

Reviewer for Deutsche Forschungsgemeinschaft (German Research Foundation) grants, External PhD reviewer for Deutsche Forschungsgemeinschaft, invited research talks in Australia and Canada

HONORS AND AWARDS

- Cooperative Research Center for Cotton Honors Scholarship: 2000
- Joyce Winifred Rouse Prize For Agricultural Chemistry, The University of Sydney; 2001
- Cooperative Research Center for Viticulture Travel Grant Award: 2004
- Earl J Scherago Travel Grant Award, Plant and Animal Genome XIII: 2005
- 2010 UK State of the University- President Honored Faculty Role
- Robyn van Heeswijck Distinguished Lecture Award; University of Adelaide, Sept 21st 2012 (The Robyn van Heeswijck Lecture is named in honor of the former Senior Lecturer whose life and world class research was cut short after a courageous battle with cancer. This award recognizes early career researchers that share her passion and commitment to plant science industries)
- Bobby Pass Excellence in Grantsmanship Award: University of Kentucky (An award given every three years based on grantsmanship and collegiality). 2008-2012 recipient

PROFESSIONAL SOCIETIES

- American Society of Plant Physiologists,
- American Chemical Society,

- American Society of Microbiology

ALLAN BRUCE DOWNIE

EDUCATION

Acadia University	Biology	Bachelor of Science (Hon.)	1986
Swedish Univ. Ag. Sci.	Silviculture	Masters of Silv.	1989
University of Guelph	Botany	Ph.D.	1994

APPOINTMENTS

Associate Professor of Horticulture, University of Kentucky, Lexington	July 1 2005-present
Assistant Professor of Horticulture, University of Kentucky, Lexington	Aug. 1998-June 30, 2005
Post-Doctoral Research Associate, University of California, Davis	Jan. 1995-Aug. 1998
Ph.D. studies at the University of Guelph.	1991-1994 Dec.
Forestry Canada Tree Seed Center	1989-1991
Swedish University of Agricultural Science & Swedish Cellulose Co.	1987-1989

RESEARCH PUBLICATIONS:

44) Kushwaha, Rekha, Lloyd, Taylor, Schäfermeyer, Kim R., Kumar, Santosh, **Downie, A. Bruce**. 2012. Identification of Late Embryogenesis Abundant (LEA) protein interactors using phage display. Int. J. Mol. Sci. 2012, 13, 6582-6603.

43) Nosarzewski, Marta A C, **Downie, A. Bruce**, Wu, A. Benhong, Archbold, Douglas D. 2012. The role of SORBITOL DEHYDROGENASE in *Arabidopsis thaliana*. Functional Plant Biology. 39: 462-470.

42) Mendu, Venugopal, Griffiths, Jonathan S., Persson, Staffan, Stork, Jozsef, **Downie, A. Bruce**, Voiniciuc, Cătălin, Haughn, George W., DeBolt, Seth. 2011. Secondary cell wall synthesis and mucilage attachment are mediated by CESA6-related cellulose synthases in seed-coat epidermal cells. Plant Physiology. Plant Physiol. 157: 441–453.

41) Wu, Xiaohui, Li, Qingshun, **Downie, Bruce**, Liang, Chun, Ji, Guoli, Hunt, Arthur. 2011. Genome-wide landscape of polyadenylation in Arabidopsis provides evidence for extensive alternative polyadenylation. PNAS USA. 108: 12533–12538.

40) Chen, Tingsu, Nayak, Nihar, Maitra Majee, Susmita, Lowenson, Jonathan, Schäfermeyer, Kim R., Eliopoulos, Alyssa C., Lloyd, Taylor D., Dinkins, Randy, Perry, Sharyn E., Forsthoefel, Nancy R., Clarke, Steven G., Vernon, Daniel M., Zhou, Zhaohui Sunny, Rejtar, Tomas, and **Downie, A. Bruce.** 2010. Substrates of the *Arabidopsis thaliana* PROTEIN ISOASPARTYL METHYLTRANSFERASE 1 identified using phage display and biopanning. Journal of Biological Chemistry. 285: 37281–37292.

39) Kulshrestha, Saurabh, Chanda, Bidisha, Venugopal, Srivathsa C., **Downie, Bruce**, Kachroo, Aardra, Vaillancourt, Lisa, Kachroo, Pradeep. 2008. Glycerol-3-phosphate levels are associated with basal resistance to the hemibiotrophic fungus *Colletotrichum higginsianum* in Arabidopsis. (Plant Physiology. 147: 2017-2029).

38) Shen, Hui, Zhu, Ling, Castillon, Alicia, Majee, Manoj, **Downie, Bruce**, Huq, Enamul. 2008.

Light-induced phosphorylation and degradation of the negative regulator PIF1 depends upon its direct physical interactions with photoactivated phytochromes. Plant Cell 20: 1586-1602.

37) Dinkins, Randy D., Maitra Majee, Susmita, Nayak, Nihar R, Martin, David, Xu, Qilong, Belcastro, Marisa P., Houtz, Robert L., Beach, Carol M, **Downie, A. Bruce**. 2008. Changing transcriptional initiation sites and alternative 5'- and 3'-splice site selection of the first intron deploys Arabidopsis PROTEIN ISOASPARTYL METHYLTRANSFERASE2 variants to different subcellular compartments. The Plant Journal. 55: 1-13.

36) Sarah T. Villa, Qilong Xu, **A. Bruce Downie**, Steven G. Clarke. 2006. Arabidopsis Protein Repair L-Isoaspartyl Methyltransferases: Predominant Activities at Lethal Temperatures. Physiologia Plantarum. 128: 581-592.

35) Zhao T-Y, Corum III JW, Meeley RB, Mullen JT, Helentjaris T, Martin D, **Downie B**. 2006. *ALKALINE α-GALACTOSIDASE* is present in maize seeds and cultured embryo cells, and accumulates during stress. Seed Sci. Res. 16: 107-121.

34) Salaita L, Kar RK, Majee M, **Downie AB.** 2005. Identification and characterization of activation tagged Arabidopsis mutants exhibiting rapid seed germination. J. Exp. Bot. 56: 2059-2069.

33) Xu Q, Zhang D, **Downie B**. 2005. Rapid and efficient subcloning of DNA without dephosphorylation or gel electrophoresis. Molecular Biotechnology 29: 111-118.

32) Xu Q, Belcastro M, Dolan S, Dinkins R, Clarke S, **Downie B**. 2004. A second protein L-isoaspartyl methyltransferase gene in Arabidopsis produces two transcripts whose products are sequestered in the nucleus. Plant Physiology 136: 2652-2664.

31) Zhao T-Y, Thacker RR, Corum III JW, Snyder JC, Meeley RB, Obendorf RL, **Downie B.** 2004. Expression of the maize *GALACTINOL SYNTHASE* gene family: I) Expression of two different genes during seed development and germination. Physiologia Plantarum 121: 634-646.

30) Zhao T-Y, Martin D, Meeley RB, **Downie B**. 2004. Expression of the maize *GALACTINOL SYNTHASE* gene family: II) Kernel abscission, environmental stress and *myo*-inositol influences transcript accumulation in developing seeds and callus cells. Physiologia Plantarum 121: 647-655.

29) Nosarszewski M, Clements AM, **Downie AB**, Archbold DD. 2004. Sorbitol dehydrogenase expression and activity during apple fruit set and early development. Physiologia Plantarum 121: 391-398.

28) Wang H, Caruso LV, **Downie AB**, Perry SE. 2004. The embryo MADS-domain protein AGL15 directly regulates expression of a gene encoding an enzyme involved in gibberellin metabolism. Plant Cell 16: 1206-1219.

27) **Downie B,** Dirk LMA, Xu Q, Drake J, Zhang D, Dutt M, Levy A, Butterfield DA, Geneve RL, Corum III JW, Lindstrom KG, Snyder JC. 2004. A physical, enzymatic, and genetic characterization of perturbations in the *brownseed* mutants of tomato. Journal of Experimental Botany 55: 961-973.

26) Siriwitayawan G, Geneve RL, **Downie AB.** 2003. Seed germination of ethylene perception mutants of tomato and arabidopsis. Seed Science Research 13: 303-314.

25) **Downie B,** Zhang D, Dirk LMA, Thacker RR, Pfeiffer J, Drake J, Levy A, Butterfield DA, Buxton JW, Snyder JC. 2003. Communication between the maternal testa and the embryo and/or endosperm affect testa attributes in tomato. Plant Physiology 133: 145-160.

24) Bradford KJ, **Downie AB,** Gee OH, Alvarado VY, Yang H, Dahal P. 2003. Abscisic acid and gibberellin differentially regulate expression of genes of the *SNF1-related Kinase* (*SnRK1*) complex in tomato seeds. Plant Physiology 132: 1560-1576.

23) Zhao T-Y, Meeley RB, **Downie B.** 2003. Aberrant processing of a Maize *GALACTINOL SYNTHASE* transcript is caused by heat stress. Plant Science 165: 245-256.

22) **Downie B,** Gurusinghe S, Dahal P, Thacker RR, Snyder JC, Nonogaki H, Yim K, Fukanaga K, Alvarado V, Bradford KJ. 2003. Expression of a GALACTINOL SYNTHASE gene in tomato seeds is upregulated prior to maturation desiccation and again following imbibition whenever radicle protrusion is prevented. Plant Physiology 131: 1347-1359.

21) Siriwitayawan G, **Downie AB,** Geneve RL. 2003. Ethylene evolution is positively correlated with seed vigor in sweet corn and tomato seed lots with differing vigor levels but similar germination capacity. Journal of the American Society for Horticultural Science 128: 608-614.

TEACHING AND ADVISING:

PLS 622, Plant Physiology: (Development and Anatomy). Fall semester (1999 to present). Student evaluations in APPENDIX II: team taught: I am responsible for 1/4 of the course, produce and maintain course web page.

PLS 770, Horticulture Seminar. Fall semester (1999 to present). No evaluations: I am responsible for organizing the series speakers, grading student presentations, and evaluating student participation.

PLS 657, Seed Biology. Spring semester (every odd year; 2001) (2003 cancelled). Student evaluations for 2001 in APPENDIX II; team taught; I am the course coordinator and responsible for teaching 1/3 of the course.

Winston C. Dunwell, Ph.D.
Extension Horticulture Professor - Nursery Production: Woody Plants & Herbaceous Perennials
University of Kentucky Research and Education Center
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Phone: 270.365.7541 x 209 Fax: 270.365.2667 E-mail: wdunwell@uky.edu
URL: http://www.ca.uky.edu/HLA/Dunwell/Win1.html

Education

Ph.D. 1978. Horticulture/Plant Stress Physiology. University of Idaho, Moscow, Idaho
Dissertation Title: Cold Hardiness and Acclimation of *Ligustrum vulgare* cv. 'Cheyenne'
B.S. 1974. Plant Science-Horticulture. University of Wyoming, Laramie, Wyoming

Professional Experience

7/2003 - Present Extension Horticulture Professor - Nursery Crops - University of Kentucky College of Agriculture, Department of Horticulture at the U.K. Research and Education Center (UKREC), Princeton, Kentucky.

Journal and Proceedings Publications

Dunwell, Winston C., Carey Grable, and Dwight Wolfe. 2012. Long Residual Controlled Release Fertilizer Pour-through results from two plant species and a no-plant control. Proc. SNA Res Conf. 57:6-10. http://www.sna.org/Resources/Documents/12resprocsec01.pdf

Knox, Gary W., Jon Lindstrom, Tom Ranney, Ed Bush, Allen Owings, Winston C. Dunwell, Richard Beeson. 2012. 'Jon Jon' Magnolia.: A Late-flowering Deciduous Magnolia Recommended for Zones 6b to 8b in Southeastern U.S. Proc. SNA Res Conf 57:219-224. http://www.sna.org/Resources/Documents/12resprocsec08.pdf

LeBude, A.V., S.A. White, A.F. Fulcher, S. Frank, J-H. Chong, M.R. Chappell, A. Windham, K. Braman, W.E Klingeman III, K. Ivors, F. Hale, **W. Dunwell**, J. Williams-Woodward, C. Adkins, and J. Neal. 2012. Assessing the Integrated Pest Management Practices of Southeastern U.S. Nursery Operations. Pest Manag Sci 2012; 68: 1278–1288. http://onlinelibrary.wiley.com/doi/10.1002/ps.3295/pdf

LeBude, A., S. White, J.-H. (JC) Chong, M. Chappell, K. Braman, A. Windham, F. Hale, W. Klingeman, J. Neal, **W. Dunwell**, J. Williams-Woodward5, and A. Fulcher**.** 2011. Assessing the Integrated Pest Management Practices of Southeastern U.S. Nursery Operations. HortScience 46(9):S167-S168.

Fulcher, A., C. Adkins, K. Braman, M.R. Chappell, J-H. Chong, **W. Dunwell**, S. Frank, F. Hale, K. Ivors, W. Klingeman III, A.V. LeBude, J. Neal, S. White, Jean Williams-Woodward, and A.

Windham. 2011. Multiplier Effect of Collaborative Nursery Crops Programming On Outputs and Outcomes. HortScience 46(9):S377-S378.

Dunwell, W., C. Grable, D. Wolfe, and D. Ingram. 2011. Differences in Pour-through Results from Two Plant Species and a No-plant Control. Proc. SNA Res. Conf. 56: 246-249. http://www.sna.org/Resources/Documents/11resprocsec09.pdf

D. Ingram, T. Coolong, **W. Dunwell**, R. Schnelle and J. Strang. 2010. An on-farm demonstration and consultation Extension program in Kentucky. HortScience 45(8):S294 (Abstr.)

Finneseth C.H.*, R.L. Geneve, and **W. Dunwell**. 2009. 'Rudy Haag' Burning Bush [Euonymus alatus] as a Non-Invasive Alternative to Current Burning Bush Cultivars. HortScience 44:S290 http://ashs.confex.com/ashs/2009/webprogram/Paper2377.html

Book & Book Chapter
A. Fulcher and S. White, editors: C. Adkins, S. K. Braman, M. Chappell, J-H Chong, J. Derr, **W. Dunwell**, S. Frank, A. Fulcher, F. Hale, W. Klingeman, G. Knox, A. LeBude, J. Neal, M. Paret, N. Ward, S. White, J. Williams-Woodward, A. Windham and J. Sidebottom. 2012. IPM For Selected Deciduous Trees in Southeastern US Nursery Production. (iTunes/iBooks or print at http://wiki.bugwood.org/SNIPM). Book Chapter: J-H. Chong, N. Ward, M. Chappell and W. Dunwell. 2012. Chapter 11: Oaks – Quercus spp.

Smartphone and Tablet Applications
A. (UTF) Lead institution, C. Adkins, S. K. Braman, M. Chappell, J-H Chong, **W. Dunwell**, S. Frank, S. Gill, F. Hale, S. Jeffers, W. Klingeman, A. LeBude, J. Neal, K. Rane, S. White, J. Williams-Woodward, and A. Windham. 2012 . IPM*Pro* http://www.ipmproapp.com and IPM*Lite* http://www.ipmliteapp.com Apple and Andriod applications (apps).

Research and Education Support Generated
Dunwell, Winston C. 2012-2014. Nursery and Landscape Program Team Leader & Co-PI for the KY Horticulture Council Grant funded program ($1.4M; D. Ingram PI)

Johnson, D. – PD: Co-PIs T. Coolong, R. Durham, A. Fulcher, **W. Dunwell**, C. Lee, G. Schwab, and L. Murdock. 2010-2013. IPM in Kentucky-Integrated development and delivery. NIFA-Extension IPM Coordination and Support. $280,934 for 3 years starting October 2010. PI: (A. Fulcher, W. Dunwell, and C. Grable. 2010-2013. Nursery Crops IPM Working Group. $34,036.)

Abbreviated Vita February 2013

Richard E. Durham
Extension Professor of Horticulture
Department of Horticulture, University of Kentucky
N-318 Agriculture Science Center – North, Lexington, KY 40546-0091

Current Position:

Split appointment of 90% extension and 10% teaching. Extension activities are centered around consumer (home) horticulture and include development and maintenance of electronic and print publications and other materials, assistance in various county programming needs, and coordination of the Kentucky Master Gardener Program. Teaching activities have included PLS 220, Introduction to Plant Identification, during fall semesters and development of plant-related on-line resource materials for K-12 teachers. For the past two years I have taught PLS 490, Capstone Horticulture. I also contribute national leadership to Extension consumer horticulture and Master Gardener activities as former chair and current member of the Consumer Horticulture National Committee, as immediate past vice president of the American Society for Horticulture Science Extension Division, and as the project leader for the eXtension Consumer Horticulture Community of Practice (responsible for the www.extension.org/horticture Web site).

Education:

Ph.D. University of Florida. 1990. Horticulture.
M.S. University of Florida. 1986. Horticulture.
B.S. University of Kentucky. 1983. Horticulture.

Professional Experience:

Extension Professor of Horticulture. University of Kentucky. 2010 to present.
Associate Extension Professor of Horticulture. University of Kentucky. 2005 to 2010.
Assistant Extension Professor of Horticulture. University of Kentucky. 1999 to 2005.
Assistant Professor of Horticulture. Texas Tech University. 1993 to 1999.
Visiting Postdoctoral Research Associate. University of Illinois. 1992-93.
Postdoctoral Research Associate. University of Georgia. 1990-92.

Books and Book Chapters:

Peffley, E., R. Durham, C. McKenney and J. Wilmington. 2008. Introductory Horticulture Laboratory Manual, Forth Edition. Kendall/Hunt Publishing, Dubuque, IA. 113 p. First Edition, 1999, Second Edition, 2002, Third Edition, 2007.

Peffley, E. B., C. B. McKenney, and R. E. Durham. 1998. Principles of Horticulture. Correspondence course guide. Distance Learning. Texas Tech University. Lubbock, TX. 127 p.

Parrott, W. A., R. E. Durham, and M. A. Bailey. 1995. Somatic embryogenesis in legumes. *In*: Biotechnology in Agriculture and Forestry. Vol. 31. Somatic Embryogenesis and Synthetic Seed II. Y. P. S. Bajaj (ed.). Springer-Verlag, Berlin, Heidelburg. p. 199-227.

Moore, G. A. and R. E. Durham. 1992. Molecular markers. *In*: Biotechnology of Perennial Fruit Crops. R. Litz and F. A. Hammerschlag (eds.). CAB International, Wellington, Oxon, UK. p. 105-139.

Refereed Publications:

Durham, R. E. 2012. Workshop--The Growing Involvement of Horticulture in eXtension: Updates and Opportunities: An Introduction to the Proceedings. HortTechnology 22:574-575.

Durham, R. E. and C. Harker. 2012. Multistate Efforts to Answer Consumer Horticulture Questions in eXtension. HortTechnology 22:593-594.

Graham, J. H., D. T. Montague, R. E. Durham, and A. D. Herring. 2002. Root-zone refrigeration delays budbreak and reduces growth of two containerized, greenhouse grown grape cultivars. Texas Journal of Agriculture and Natural Resources 15:71-80.

Basinger, A. and R. E. Durham. 2000. In vitro rooting of *Vitis* species native to Texas and New Mexico. Small Fruits Review 1:29-34.

Kenworthy, K. E., D. L. Auld, D. B. Wester, R. E. Durham, and C. B. McKenney. 1999. Evaluation of buffalograss for induction of fall dormancy and spring greenup. Journal of Turfgrass Management 3:23-42.

Baker, C. M., R. E. Durham, J. A. Burns, W. A. Parrott, and H. T. Wetzstein. 1995. High frequency somatic embryogenesis in peanut (*Arachis hypogaea* L.) using mature dry seed. Plant Cell Reports 15:38-42.

Durham, R. E. and S. S. Korban. 1994. Effects of explant size, pretreatment, and light intensity on shoot regeneration from in-vitro-grown apple leaves. *In*: Progress in Temperate Fruit Breeding. H. Schmidt and M. Kellerhals (eds.). Kluwer Academic Publishers. Netherlands. p. 355-359.

Durham, R. E. and S. S. Korban. 1994. Evidence of gene introgression in apple using RAPD markers. Euphytica 79:109-114.

Durham, R. E., P. C. Liou, F. G. Gmitter, and G. A. Moore. 1992. Linkage of restriction fragment length polymorphisms and isozymes in Citrus. Theoretical and Applied Genetics 84:39-48.

Durham, R. E. and W. A. Parrott. 1992. Repetitive somatic embryogenesis from peanut cultures in liquid medium. Plant Cell Reports 11:122-125. Durham, R. E., G. A. Moore, D. Haskell, and C. L. Guy. 1991. Cold acclimation induced changes in freezing tolerance and translatable RNA content in *Citrus grandis* and *Poncirus trifoliata*. Physiologia Plantarum 82:519-522.

Gray, D. J., J. A. Mortensen, C. M. Benton, R. E. Durham, and G. A. Moore. 1990. Ovule culture to obtain progeny from hybrid seedless bunch grapes. J. American Society for Horticultural Science 115:1019-1024.

Durham, R. E., G. A. Moore, D. J. Gray, and J. A. Mortensen. 1989. The use of leaf PGI and IDH isozymes to examine the origin of polyembryony in cultured ovules of seedless grapes. Plant Cell Reports 7:669-672.

Chaparro, J. X., R. E. Durham, G. A. Moore, and W. B. Sherman. 1987. Use of isozyme techniques to identify peach X 'Nonpareil' almond hybrids. HortScience 22:300-302.

Durham, R. E., G. A. Moore, and W. B. Sherman. 1987. Isozyme banding patterns and their usefulness as genetic markers in peach. J. American Society for Hortcultural Science 112:1013-1018.

Electronic Media (selected examples):

Durham, R.E. (2013). Installing Rain Gardens at County Extension Offices. In T. Rhodus (Ed.), *Changing the Pace - Adopting a Pecha Kucha Approach to Presentations* [iBooks 3.0 or

later]. Retrieved 1/28/2013 from https://itunes.apple.com/us/book/changing-pace-adopting-pecha/id594201341?ls=1

Durham, R.E. 2008-13. www.extension.org/horticulture, National Web site featuring home horticulture information and a FAQ database with Ask an Expert application. The program was first promoted nationally in February 2008. Durham serves as the project leader for this national eXtension program.

Durham, R.E. 2005. www.gardendata.org, Interactive FAQ database with ~700 questions and answers in home horticulture and related disciplines with Ask the Expert interface for question submission by clients. Materials were developed by the Horticulture Quick Response Team, Durham was the project leader.

Durham, R., C. Cassady and C. Kaiser. 2001. Butterfly Gardening. (www.uky.edu/Ag/Horticulture/butterflypages/). Department of Horticulture Instructional Activities Web Page.

Durham, R.. E., J. R. Hartman, M. P. Johnson, and W. M. Fountain. 2001. Integrated Pest Management in the Home Landscape – Trees and Shrubs. University of Kentucky Cooperative Extension Service. Instructional Video. 35 minutes.

Extension Publications (recent activity only):

Kentucky Master Gardener Manual. Most chapters are adaptations from the Oregon/Washington Master Gardener Manual. Original authors are listed first followed by Kentucky specialist(s) involved in the adaptation. All chapters are available on-line and are catalogued at: http://www.ca.uky.edu/ANR/Master%20Gardener%20Publication.htm.

Bale, S. and R. Durham. 2011. The Kentucky Extension Master Gardener Program: An Introduction to the Kentucky Master Gardener Manual (unnumbered publication). 10 pages.

Cogger, C., D. M. Sullivan, J. A. Kroph, B. Lee, and R. Durham. 2011. Composting: Kentucky Master Gardener Manual, Chapter 5 (ID-192). 8 pages.

McNeillan, R., and R. Durham. 2011. Plant Propagation: Kentucky Master Gardener Manual, Chapter 3 (HO-98). 16 pages.

VanDerZanden, A. M., and R. E. Durham. 2011. Basic Botany: Kentucky Master Gardener Manual, Chapter 1 (HO-96). 30 pages.

Wingate, M., and R. Durham. 2011. Plant Identification: Kentucky Master Gardener Manual, Chapter 2 (HO-97). 4 pages.

Bobbit, V., R. Fox, H. Kennell, C. Moulton, G. Pinyuh, M. Robson, B. Lee and R. Durham. 2012. Your Yard and Water Quality: Kentucky Master Gardener Manual, Chapter 5 (ID-201). 8 pages.

Maleike, R., R. Durham and W. Fountain. 2012. Selecting and Planting Woody Ornamental Plants: Kentucky Master Gardener Manual, Chapter 21 (HO-107). 18 pages.

McNeilan, J., A. M. VanDerZanden and R. Durham. 2012. Landscape Design: Kentucky Master Gardener Manual, Chapter 17 (HO-102). 20 pages.

McNeillan, R. and R. Durham. 2012. Care of Woody Plants: Kentucky Master Gardener Manual, Chapter 12 (HO-101). 20 pages.

Robson, M., S. Bale and R. Durham. 2012. Annual and Perennial Flowers: Kentucky Master Gardener Manual, Chapter 13 (HO-102). 14 pages.

Updated Extension Publications:

Bale, S. and R. Durham. 2012. Annual Flowers (HO-65). 10 pages.

Bale, S., R. Durham, T. Phillips, L. Townsend and N. A. Ward. 2012. Roses (ID-118). 16 pages.

Durham, R., T. Cooling, J. Strang, M. Williams, S. Wright, R. Bessin, K Seebold and N. Ward.

2012. Home Vegetable Gardening in Kentucky (ID-128). 50 pages.
Durham, R. E., J. G. Strang, N. Ward and R. Bessin. 2012. Disease and Insect Control Programs for Home Grown Fruit in Kentucky (ID-21). 20 pages.

Other activity:

Updated numbered publications: total of 10 publication with updates, 1999-2013.
Departmental and UK Arboretum factsheets: total of 26 factsheets released 1999-2013
Electronic PowerPoint Presentations Released to County Extension Agents: total of 16 presentations released 2002-2013
Technical Publications and Popular Articles: total of 29 released 1999-2011
Radio scripts: over 250 scripts recorded 1999-2012

Formal Courses Taught:

University of Kentucky (1999-2011)

PLS 220, Introduction to Plant Identification. 18 sections taught, total of 456 students.
PLS 490. Capstone Horticulture. 4 section taught, total of 14 students.

Texas Tech University (1994-1999)

IS 1100, Tech Transition. Four sections taught, total of 78 students.
PSS 1411, Principles of Horticulture. Eight sections taught, total of 635 students.
PSS 2312, Propagation Methods. Three sections taught, total of 105 students.
PSS 3311, Fruit and Nut Culture. Two sections taught, total of 48 students.
PSS 4411, Principles of Floriculture. Three sections taught, total of 58 students.
PSS 5311, Greenhouse Management. One section taught, total of 7 students.
PSS 5315, Advanced Floriculture. Two sections taught, total of 9 students.

Graduate Students Directed (Texan Tech University):

Ph.D.: 2, M.S.: 3, and 1 Non-Thesis, served on the graduate committee of 9 additional students.

External Support (Recent Activity):

Johnson, D. (Co-PI & PD),P. Lucas, T. Coolong, R. Durham, A. Fulcher, C. Lee and L. Murdock**.** 2010. IPM in Kentucky: Integrated Development and Delivery. USDA-NIFA. (Three years -$280,934 Funded). National-Competitive, PI Durham portion ~$44,000.
Durham. R. E. 2009. eXtension Consumer Horticulture Certified Leadership Funds 2009. $15,000. USDA eXtension Initiative. National-Competitive, Recurring. lead PI.
Durham, R. E. 2008. eXtension Consumer Horticulture Certified Leadership Funds 2008. $14,800. USDA eXtension Initiative. National-Competitive, Recurring. lead PI.
Durham, R. E. 2006-2008. Progress and Continuation Plans for the eXtension Consumer Horticulture Community of Practice. $20,000. USDA eXtension Initiative. National-Competitive, Recurring. lead PI.
Durham, R. E. and M. Meyer. 2005-2008. Assembling the Consumer Horticulture Community of Practice to Develop a FAQ Database and Ask the Expert Interface for the Consumer Horticulture Community of Interest. $135,000. USDA eXtension Initiative. National-Competitive, lead PI.

Dr. Robert L. Geneve

Abbreviated Vitae

Professor
University of Kentucky, Department of Horticulture
N-404b Plant Science Building, 1405 Veterans Drive
Lexington, KY 40546
Phone: 859-257-8610
E-mail: RGENEVE@uky.edu

EDUCATION

Ph.D. Horticulture, University of Minnesota, 1982-1985.
M.S. Horticulture, Pennsylvania State University, 1977-78.
B.S. Horticulture, University of Maryland, 1973-77.

PROFESSIONAL ACTIVITY

Editorship

Associate editor – Seed Technology. 2008 to present.
Editorial Board – Propagation of Ornamental Plants. 2003 to present.
Science Editor, North American - Scientia Horticulturae. 2001 to 2008.
Editorial Advisory Board - Scientia Horticulturae. 1997 to 2001.
Associate editor – HortScience. 1994 to 1997.
Associate editor - Scientia Horticulturae. 1994 to 1997.

Honors

Fellow in the International Plant Propagators' Society, Eastern Region; elected 2003.
Fellow in the American Society for Horticultural Science; elected 2005.
George E. Mitchell Jr. Award Outstanding Faculty Service to Graduate Students; 2006.

Profession Society Officer

International Plant Propagators' Society International Board member, 2012 to present.
International Plant Propagators' Society Eastern Region, President, 2011.
International Plant Propagators' Society Eastern Region, Vice President, 2008-10.
IPPS, Eastern Region Foundation Board member 2008 to present.
International Plant Propagators' Society Eastern Region, Board of Directors 1999 to 2001.

PUBLICATIONS

Peer-reviewed Research Publications (since 2005)

Fulcher, A. and R.L. Geneve. 2012. Using the relationship between container substrate moisture and photosynthesis to schedule irrigation in *Hibiscus rosa-sinensis*. Scientia Horticultureae 138:221-226.

Gama-Arachchige, N.S., J.M. Baskin, R.L. Geneve and C.C. Baskin. 2012. The autumn effect: timing of physical dormancy break in seeds of two winter annual species of Geraniaceae by a stepwise process. Annals of Botany 110:637-651.

Finneseth, C.H. and R.L. Geneve. 2012. A standard laboratory method to assess purity and germination in eastern gamagrass seed lots. Seed Technology 34:89-109.

Fulcher, A. and R.L. Geneve. 2011. Relationship between photosynthesis and substrate moisture for container-grown *Hibiscus* and *Cornus*. Acta Horticulturae 922:183-186.

Jamboonsri, W., T. D. Phillips, R. L. Geneve, J.P. Cahill and D.F. Hildebrand. 2012. Extending the range of an ancient crop; a new ω3 source. Genetic Resources and Crop Evolution 59:171-178.

Paparozzi, E.T., A. W., Kimberly, R.L.Geneve, H. Hatterman-Valenti, C. Haynes, H. Kraus, C. Mc Kenney and P. Pitts. 2011. The AG*IDEA alliance and horticulture graduate certificate programs. HortTechnology 21:688-691.

Gama-Arachchige, N.S., J.M. Baskin, R.L. Geneve and C.C. Baskin. 2011. Acquisition of physical dormancy and ontogeny of the micropyle-water gap complex in developing seeds of *Geranium carolinianum* L. (Geraniaceae). Annals of Botany 108:51-64.

Fulcher, A., T. Steele, E. Wilkerson, R.L. Geneve, and R. S. Gates. 2011. Using transpiration chambers to detect initial transpiration in cuttings and quantify transpiration in seedlings. Acta Horticulturae 893:1037-1042.

Gama-Arachchige, N.S., J.M. Baskin, R.L. Geneve and C.C. Baskin. 2010. Identification and characterization of the water gap in physically dormant seeds of Geraniaceae, with special reference to *Geranium carolinianum* L. Annals of Botany 105:977-990. Invited as part of a special issue section on seeds "The Capacity of Seeds to Germinate and Survive".

Jayasuriya , K.M.G., J. M. Baskin, R. L. Geneve, and C. C. Baskin. 2009. Sensitivity cycling and mechanism of physical dormancy break in seeds of *Ipomoea hederacea* (Convolvulaceae). International Journal of Plant Sciences 170:429–443. 2009.

Geneve, R.L. 2009. Physical seed dormancy in selected Caesalpinioid legumes from eastern North America. Propagation of Ornamental Plants 9:129-134.

Jayasuriya, K.M.G., J.M. Baskin, R.L. Geneve, and C.C. Baskin. 2009. A proposed mechanism of physical dormancy break in sensitive and insensitive seeds of *Ipomoea lacunosa* (Convolvulaceae). Annals of Botany 103:433-445.

Jayasuriya , K.M.G., J. M. Baskin, R. L. Geneve, and C. C. Baskin. 2009. Phylogeny of seed dormancy in Convolvulaceae, subfamily Convolvuloideae (Solanales). Annals of Botany 103:45-63.

Jayasuriya , K.M.G., J. M. Baskin, R. L. Geneve, C. C. Baskin, and C. Chien. 2008. Physical dormancy in seeds of the holoparasitic angiosperm *Cuscuta australis* (Convolvulaceae, Cuscuteae): Dormancy breaking requirements, anatomy of the water gap and sensitivity

cycling. Annals of Botany 102: 39 - 48.

Geneve, R.L., L. Wood, and S.T. Kester. 2008. The relationship between ethylene production and dormancy release in *Echinacea* seeds. Acta Horticulturae 771:33-35.

Geneve, R.L. 2008. Vigor testing for small-seeded horticultural crops. Acta Horticulturae 782:77-82.

Klein, J.D., L.A. Wood, and R.L. Geneve. 2008. Hydrogen peroxide induced germination in gama grass (*Tripsacum dactyloides*). Acta Horticulturae 782:93-98.

Geneve, R.L. and *M. Dutt. 2008. Using sequential images to study seed germination and dormancy. Propagation of Ornamental Plants 8:13-16.

Geneve, R.L., S.T. Kester, and K.W. Pomper. 2007. Autonomous shoot production in pawpaw [*Asimina triloba* (L.) Dunal] on plant growth regulator free media. Propagation of Ornamental Plants 7:51-56.

Jayasuriya, K.M.G., J.M. Baskin, R.L. Geneve, and C.C. Baskin. 2007. Seed development in *Ipomoea lacunosa* (Convolvulaceae), with particular reference to anatomy of the water gap. Annals of Botany 100:459 - 470.

Jayasuriya, K.M.G., J.M. Baskin, R.L. Geneve, and C.C. Baskin. 2007. Morphology and anatomy of physical dormancy in *Ipomoea lacunosa*: Identification of the water gap in Convolvulaceae (Solanales). Annals of Botany 100:13-22.

Dutt, M. and R.L. Geneve. 2007. Time to radicle protrusion does not correlate with early seedling growth in individual seeds of impatiens and petunia. Journal of the American Society for Horticultural Science 132:423-428.

Geneve, R.L., S.T. Kester, and K.W. Pomper. 2007. Cytokinin habituation for autonomous shoot initiation in pawpaw (*Asimina triloba*). Acta Horticulturae 738:371-374.

Berberich, S., J. Snyder, R.L. Geneve, and M. A. Williams. 2006. Growth and flowering response of container grown passion flower cultivars to fertilizer and paclobutrazol. Journal of Environmental Horticulture 24:109-114.

Geneve, R.L. 2005. Comparative adventitious shoot induction in Kentucky coffeetree root and petiole explants treated with thidiazuron and benzylaminopurine. In Vitro Cellular and Developmental Biology – Plant 41:489-493.

Wilkerson, E.G., R.S. Gates, S. Zolnier, S.T. Kester, and R.L. Geneve. 2005. Predicting rooting stages in poinsettia cuttings using a root zone temperature-based model. Journal of the American Society for Horticultural Science 130:295-301.

Wilkerson, E.G., R.S. Gates, S. Zolnier, S.T. Kester, and R.L. Geneve. 2005. Transpiration capacity in poinsettia cuttings at different rooting stages and the development of a cutting coefficient for scheduling mist. Journal of the American Society for Horticultural Science 130:302-307.

Books (since 2005)

Hartmann, H.T., D.E. Kester, F. T. Davies, Jr., and R. L. Geneve. 2011. Hartmann and Kester's Plant Propagation: Principles and Practices. Prentice-Hall, Inc., Englewood Cliffs, New Jersey. Eighth edition.

Book Chapters (since 2005)

Geneve, R.L. 2010. Propagation from non-meristematic tissues - Organogenesis. In: Plant Cell Culture, Development and Biotechnology. R.N. Trigiano and D. J. Gray (eds.). CRC Press, LLC, Boca Raton, Florida. pp. 243-256.

Geneve, R.L., *M. Dutt, and A.B. Downie. 2006. Development of a sequential digital imaging system for evaluating seed germination. In: S. Navie, S. Adkins and S. Ashmore (eds.). Seeds: Biology, Development and Ecology. CAB International. London. p.p.315-323.

Geneve, R.L. 2005. Vigor testing in flower seeds. In: M.B. McDonald and F. Kwong (eds.). Flower Seeds, Biology and Technology. CAB International, London. p.p. 311-332.

Proceedings and Industry Publications (since 2005)

Fulcher, A., G. Niu, G. Bi, M. Evans, T. Fernandez, R. Geneve, A. Koeser, S. Nambuthiri, N. Pershey, R. Stewart, S. Verlinden, and X. Wang. 2012. Assessing biocontainers and a sustainable irrigation regime for the US nursery industry. Proceedings of Southern Nursery Association Research Conference 57:73-77.

Nambuthiri, S., R. Geneve, T. Fernandez, A. Fulcher, A. Koeser, G. Bi, M. Evans, G. Niu, N. Pershey, R. Stewart, S. Verlinden, and X. Wang. 2012. Substrate heat buildup and evaporation rate differs between plastic and alternative one gallon nursery containers. Proceedings of Southern Nursery Association Research Conference 57: 60-62.

R.L. Geneve. 2010. Morphological characteristics of seeds with physical dormancy. Combined Proceedings International Plant Propagators' Society 60: 610-613.

Stevens, M.E., S.T. Kester and R.L. Geneve. 2009. Adventitious root formation in poplar (*Populus*) intermodal stem cuttings grown in vitro. Combined Proceedings International Plant Propagators' Society 59: 529-532.

Steele, T., A. Fulcher, R. Gates and R.L. Geneve. 2009. Designing a growth chamber to monitor transpiration. Proceedings of Southern Nursery Association Research Conference 54:111-114.

Fulcher, A. and R.L. Geneve. 2009. *Cornus*, gas exchange, and drought. Proceedings of Southern Nursery Association Research Conference 54:22-27.

Fulcher, A., R.L. Geneve, J. Buxton, and R. Gates. 2008. The Relationship between photosynthetic activity, container moisture and growth in *Hibiscus rosa-sinensis* L. Proceedings of Southern Nursery Association Research Conference 53:549-552.

Poston, A., A. Fulcher, W. Dunwell, L. Dougherty, and R.L. Geneve. 2008. Fascination increases growth of 'Rudy Haag' burning bush during container production. Proceedings of Southern Nursery Association Research Conference 53:501-505.

Geneve, R.L. and M. Dutt. 2008. A closer look at seed germination and dormancy. Combined Proceedings International Plant Propagators' Society 58: 561-565.

Senn, M., A. Fulcher, and R.L. Geneve. 2008. Effect of physical manipulation and plant growth regulator application on branching of oak, linden, and Kentucky coffeetree. Combined Proceedings International Plant Propagators' Society 58: 399-402.

Stolz, S., J. Beale, L. Dougherty, S. Long, A. Fulcher, and R. Geneve. 2007. Biofungicide and conventional control of *Rhizoctonia solani* in a container production system. Proceedings of Southern Nursery Association Research Conference 52:289-292.

Geneve, R.L. 2006. Alternative strategies for clonal plant reproduction. Combined Proceedings International Plant Propagators' Society 56:269-273.

Tittle, S., S.T. Kester, and R.L. Geneve. 2006. Somatic embryogenesis in white oak (*Quercus alba*). Combined Proceedings International Plant Propagators' Society 56:450-452.

Kittrel, K., S.T. Kester, and R.L. Geneve. 2006. Adventitious root formation in tomato hormone mutants. Combined Proceedings International Plant Propagators' Society 56:453-457.

Poston, A. and R.L. Geneve. 2006. Propagation of spicebush (*Lindera benzoin*). Combined

Proceedings International Plant Propagators' Society 56:458-460.

Poston, A. and R.L. Geneve. 2006. Propagation of spicebush (*Lindera benzoin*). Proceedings of Southern Nursery Association Research Conference 51:364-366. (Amy Poston received a third place finish in the Master's Student Competition).

Tittle, S., S.T. Kester, and R.L. Geneve. 2006. Tissue culture in white oak (*Quercus alba*). Proceedings of Southern Nursery Association Research Conference 51:367-369

Wood, L., J. Klein, and R.L. Geneve. 2006. Ethylene and seed germination in coneflower (*Echinacea*) species. Proceedings of Southern Nursery Association Research Conference 51:374-376.

Geneve, R.L. 2005. Common misconceptions about seed dormancy. Combined Proceedings International Plant Propagators' Society 55:327-330.

Wells, S., K., S. T. Kester, and R. L. Geneve. 2005. Somatic embryo development in willow oak. Combined Proceedings International Plant Propagators' Society 55:451-453.

Professional Presentations (since 2005)

International Plant Propagator's Society – Eastern region annual meeting. 2012. Seed dormancy, Give your plants a wakeup call. Philadelphia, PA.

The 6th International Symposium on Seed, Transplant and Stand Establishment of Horticultural Crops. Seed germination and mucilage production in chia (*Salvia hispanica*). Brazilia, Brazil. 2012.

International Plant Propagator's Society – Southern region annual meeting. 2010. Searching for the water gap in seeds with physical dormancy. Raleigh, NC.

Catholic University, Santiago Chile. 2010. Advances in seed and cutting propagation.

Twenty Eighth International Horticulture Congress. Invasive woody plants in the nursery industry – a USA perspective. 2010. Lisbon, Portugal

New England Greenhouse Conference. 2008. Greenhouse seed germination. Boston, MA.

Southern Region of the International Plant Propagators' Society. 2008. A closer look at seed germination. Charlottesville, VA.

Farwest Nursery Conference. Portland, OR. 2008. Propagation systems for greenhouse.

Fifth International Conference on the Propagation of Ornamental Plants. 2007. Using sequential digital imaging to study seed germination. Sofia, Bulgaria.

American Society for Horticultural Science Annual Meeting. 2007. Seed labs for plant propagation. In: Demonstration of Laboratories Used in Teaching Plant Propagation workshop. Phoenix, AZ.

Volcani Institute. 2007. Seed vigor in small seeded crops. Israel.

4th International Symposium on Seed, Transplant and Stand Establishment of Horticultural Crops. 2006. Measuring vigor in small seeded crops. San Antonio, TX.

XXVII International Horticultural Congress. 2006. The relationship between ethylene production and dormancy release in *Echinacea* seeds. Seoul, Korea.

International Plant Propagator's Society – Eastern region annual meeting. 2006. How plants do it. Grand Rapids, MI.

Northeast Forestry University. 2005. Propagation short course; seven three-hour lectures. Harbin, China

International Seed Science Symposium. 2005. Development of a sequential digital imagery

system for evaluating seed germination. Brisbane, Australia.
International Plant Propagator's Society – Eastern region annual meeting. 2005. Misconceptions about seed dormancy. Atlantic City, NJ.
University of Kwazulu-Natal. 2005. Seed vigor. Durbin, South Africa.

GRANT AWARDS (since 2005)

Year	Funding Source	Project	Amount
2011-13	Kentucky Landscape Industries	Comparison of photosynthesis-based irrigation scheduling with daily water replacement for nursery container production	$7,000
2010-13	USDA - SCRI	Impact and social acceptance of selected sustainable practices in ornamental crop production. Co-PI.	$273,345
2007-9	Kentucky Landscape Industries	Promoting post-rooting shoot growth in Rudy Haag burning bush cuttings.	$6,000
2007-8	New Crop Opportunity Center	Rudy Haag Burning Bush as a Non-invasive Alternative to Current Burning Bush Cultivars for Kentucky Nursery Production.	$65,000
2006-8	New Crop Opportunity Center	Optimizing Pot-In-Pot Nursery Production for Kentucky Growers.	$45,914
2006-7	Kentucky Landscape Industries	Container production of Rudy Haag burning bush.	$3,500
2005-6	Kentucky Division of Forestry	Enhancing the native tree walk web site. Co-PI with R. Durham.	$6,200
2005-6	Kentucky Landscape Industries	Somatic embryogenesis in white and willow oaks.	$3,000
2005-7	New Crop Opportunity Center	Development of a novel production system for dogwood.	$25,000
	Kentucky Landscape	Novel production systems for woody	

2004-5	Industries	plants.	$6,000
2004-6	New Crop Opportunity Center	Rudy Haag burning bush as a non-invasive alternative to current burning bush cultivars.	$65,781

TEACHING

Courses

PLS 320 – Woody Plant Materials, 4 credits. 2009; 2011 to present. This is a hybrid course with lectures on-line and two lab sections.
PLS 440 - Plant Propagation, 3 credits. 1991 to present. This course has two one hour lectures and one three hour lab.
PLS 490 – Topics in Plant and Soil Science (Capstone, HPLS Science option). 2002 – present.
PLS 622/623 - Physiology of Plants, co-teach (6 lectures), 3 credits. 1990 to present.

Graduate Advising (since 2005)

Major Advisor
Cynthia Finneseth. 2010. Ph.D. student. Evaluation and enhancement of seed lot quality in eastern gamagrass (*Tripsacum dactyloides*).
Amy Fulcher. 2010. Ph.D. student. Modeling water use in nursery crops.
Laura Woods. 2007. M.S. student. Relationship between ethylene and seed dormancy release in *Echinacea* species.
Amy Poston. 2007. M.S. student. Cutting propagation and container production of Rudy Haag burning bush (*Euonymus alatus*) 'Rudy Haag'.

I. PERSONAL DATA

Name: Robert L. Houtz

Address: Department of Horticulture
401D Plant Science Building
1405 Veterans Drive
University of Kentucky, Lexington, KY 40546-0312
Phone: (859)257-1982 (day); (859)527-3850 (evening)

II. EDUCATION

Doctorate of Philosophy, 1984

Institution: Michigan State University, East Lansing, MI 48824
Major: Horticulture
Dissertation Title: Stimulation of Growth and Photosynthetic Carbon Metabolism in *Chlamydomonas reinhardtii* with Triacontanol

Master of Science, 1980

Institution: Michigan State University, East Lansing, MI 48824
Major: Horticulture
Thesis Title: Development and Characterization of an *In Vitro* System Responsive to 1-Triacontanol

Bachelor of Science (*magna cum laude*), 1977

Institution: University of Florida, Gainesville, FL 32611
Major: Horticulture

III. PROFESSIONAL EMPLOYMENT

Professor and Chair, Department of Horticulture, University of Kentucky, (60% research, 20% teaching, 20% extension), May 1, 2009-present.

Professor of Horticulture, University of Kentucky, Department of Horticulture, (70% research, 20% teaching, 10% administration), July 1, 1999-2009

Associate Professor of Horticulture, University of Kentucky, Department of Horticulture and Landscape Architecture, (85% research, 15% teaching), December 1, 1990-June 30, 1999

Assistant Professor of Horticulture, University of Kentucky, Department of Horticulture and Landscape Architecture, (90% research, 10% teaching), January 1, 1985 - November 30, 1990

Graduate Research Assistant, Michigan State University, Department of Horticulture, September 1977 - September 1984

IV. RESEARCH

Research Area: Structure/function studies and post-translational modifications in ribulose-1,5-bisphosphate carboxylase/oxygenase ; Chloroplast-localized co- and post-translational protein processing; Enzymology of SET domain protein N-methyltransferases. Functional significance of calmodulin methylation.

Significant Research Accomplishments:

- Provided evidence for the necessity of the N-terminal region of the large subunit of ribulose bisphosphate carboxylase/oxygenase for catalytic activity and identified this same region as the location of catalytic-dependent, conformational changes.

- Discovered all of the known post-translational modifications in the large subunit of ribulose bisphosphate carboxylase/oxygenase, including N-terminal removal of Met-1 and Ser-2, acetylation of Pro-3, and methylation of Lys-14.

- Provided the first evidence for species diversity in the post-translational modifications of the large subunit of ribulose bisphosphate carboxylase/oxygenase.

- Discovered the chloroplast-localized enzymatic activity responsible for one of the post-translational modifications in the large subunit of ribulose bisphosphate carboxylase/oxygenase.

- Provided the first reported DNA and protein sequence for a protein (lysine) $^{\prime}$N-methyltransferase enzyme.

- Discovered chloroplast-localized eukaryotic peptide deformylase

- Provided one of the first structural determinations of a SET domain protein methyltransferase.

- Demonstrated the potential commercial utility of peptide deformylase and peptide deformylase inhibitors as a new platform for selectable marker and broad-spectrum herbicide technology.

- Discovered the DNA and protein sequence for calmodulin lysine methyltransferase.

Patents:

Patent pending - Nucleotide and Amino Acid Sequences for Calmodulin Protein Methyltransferase, Inventor: Robert L. Houtz, Co-Inventors, Roberta Magnani, and Lynnette Dirk, U.S. Application No. 12/757,388 filed April 9, 2010.

Crystallization and Structure of a Plant Peptide Deformylase, Inventor: Robert L. Houtz, Co-Inventors, David Rodgers, Lynnette Dirk, and Mark Williams. Patent # 7,445,923 - issued November 4, 2008

U.S. Provisional Application Serial No. 60/468,966 - A Modified Rubisco Large Subunit $^{\prime}$N-methyltransferase Useful for Targeting Molecules to the Active-site Vicinity of Ribulose-1, 5-Bisphosphate - Inventor Robert L. Houtz - Filed May 7, 2004.

Inhibitors of Plant Peptide Deformylase for Use as Broad-Spectrum Herbicides. Inventors Robert L. Houtz, Lynnette Dirk, and Mark Williams. Patent # 6,730,634 - issued May 4, 2004

Nucleotide sequence of cDNAs encoding Ribulose-1,5-bisphosphate carboxylase/oxygenase large subunit $^{\prime}$N-methyltransferase from Spinach and method of inactivating Ribulose-1,5-bisphosphate carboxylase/oxygenase large subunit $^{\prime}$N-methyltransferase activity. Patent #5,908,972 - issued June 1, 1999.

Nucleotide sequence of the gene for Ribulose-1,5-bisphosphate carboxylase/ oxygenase large subunit $^{\prime}$N-methyltransferase from tobacco. Continuation of patent below. Patent #5,866,394 - issued February 2, 1999.

Nucleotide sequence of a cDNA encoding for Ribulose-1,5-bisphosphate carboxylase/oxygenase large subunit ,N-methyltransferase. Patent #5,723,752 - issued 3/15/98.

Grants:

06/09 – 07/13 Special Appropriations Grant, USDA NIFA, non-competitive, PI: R. Houtz, Crop Diversification and Biofuel Research and Education, $978,052.00

Date	Agency		Title	Duration	Amount	Status
Nationally Competitive - Extramural						
07/03	DOE OER Basic Energy Science Energy Bioscience (currently in 2 yr extension with $50,000 new funds)	PI: **R. Houtz** Co-PI: L. Dirk	Mechanism and Significance of Post-Translational Modifications in the Large and Small Subunits of Ribulose Bisphosphate Carboxylase/Oxygenase	4 yrs	$380,000.	Funded 7/03-6/08
07/02	NSF (currently in 2 yr no cost extension,	PI: **R. Houtz**, Co-PIs: L. Dirk M. Williams and A. Francis-Miller	Chloroplast-localized N-terminal protein processing by peptide deformylase	3 yrs	$300,000.	Funded 1/03-12/08
7/98	DOE OER Basic Energy Science Energy Bioscience (renewal)	PI: R Houtz Co-PI: none	Mechanism and Significance of Post-Translational Modifications in the Large and Small Subunits of Ribulose Bisphosphate Carboxylase/Oxygenase	3 yrs	$264,255	Funded 1/99-12/02
6/95	DOE OER Basic Energy Science Energy Bioscience (renewal)	PI: R Houtz Co-PI: none	Mechanism and Significance of Post-Translational Modifications of Ribulose Bisphosphate Carboxylase/Oxygenase	3.5 yrs	$264,119	Funded 6/95-12/98
6/92	USDA/ARS Cooperative Agreement	Co-PIs: R Houtz and S Crafts-Brandner	A Combination of Nuclear and Chloroplast Factors Determines Protein Stability in Tobacco Chloroplasts	2 yrs	$37,438	Funded 7/93-6/95
6/91	DOE Competitive Grants Program Division of Energy Biosciences	PI: R Houtz Co-PI: none	Mechanism and Significance of Post-Translational Modifications in the Large Subunit of Ribulose Bisphosphate Carboxylase/Oxygenase	3 yrs	$269,000	Funded 7/92-6/95
12/88	USDA Competitive Grants Program (Photosynthesis)	PI: R Houtz Co-PI: none	Mechanism and Significance of Post-Translational Modifications in the Large Subunit of Ribulose Bisphosphate Carboxylase/Oxygenase	2 yrs	$100,000	Funded 7/89-6/91

Date	Agency		Title	Duration	Amount	Status
Nationally Competitive - Extramural - Equipment						
1/01	NSF EPSCOR, Major Research Equipment Grant	PI: T Vanaman Co-PI: R Houtz, D Rodgers, T Creamer, P Speilman, M Oliveira	Center for Proteomics	3 yrs	$1,270,033	Funded 1/02-12/05
Competitive - Internal - Equipment						
5/96	UK, Major Research Equipment Grant		IAsys Optical Biosensor System (I was the lead PI on this application which had 7 other Co-PIs)		$87,035	Funded
9/89	UK, Major Research Equipment Grant		Low Pressure Liquid Chromatography System		$4,550	Funded
9/88	UK, Major Research Equipment Grant		High Performance Liquid Chromatography System		$6,780	Funded
9/87	UK, Major Research Equipment Grant		Ultra-Low Freezer, Liquid Scintillation Counter		$18,450	Funded
Competitive – Internal/local – Projects						
10/07	KSEF	PI: **R. Houtz** Co-PIs: MA Williams, Horticulture	Isolation and Identification of Plant-Specific Peptide Deformylase Inhibitors from Soil Micro-organisms for Use as Broad-Spectrum Herbicides and Selectable Markers	1 yr	$19,976	Funded 10/07-09/08
10/06	UK NPA (Natural Products Alliance)	PI: **R. Houtz** Co-PIs: MA Williams, Horticulture; R B Grossman, Chemistry; EM D'Angelo, Plant and Soil Science; and DW Rodgers, Biochemistry	Isolation and Identification of Plant-Specific Peptide Deformylase Inhibitors from Soil Micro-organisms for Use as Broad-Spectrum Herbicides and Selectable Markers.	2 yr	$40,000	Funded 01/07-12/08
11/04	KTRDC	PI: **R. Houtz**	Development and Utilization of Rubisco LSMT as a Molecular Vehicle for Targeting Enzymes to Rubisco	2 yrs	$100,000.	Funded 06/05-07/07
7/02	USDA New Crop Opportunities	PI: R Houtz Co-PI: B Rowell	Evaluation of High-Tunnels as a Seasonal Extending Technology	3 yrs	$60,020	Funded 7/02-6/05

Date	Agency		Title	Duration	Amount	Status
7/01	KTRDC	PI: M Williams Co-PI: R Houtz	Peptide Deformylase in Tobacco: A Novel Herbicide Target Amenable to Genetically Engineered Tolerance	2 yrs	$103,256	Funded 7/01-6/03
6/96	UK, Office of the Vice Chancellor for Research & Graduate Studies		Member, Plant Biotech-nology Initiative (joint proposal, majority effort held by Co-Chairs: Maelor. Davies, Director, Tobacco & Health Research Institute; and Dr. George Wagner, Agronomy.)	2 yrs	$100,000	Funded
Internal						
8/02	Office of the Vice President for Research	PI: R Houtz	Bridge Funding for graduate research assistantship stipends	1 yr	$18,000	Funded
Hatch Projects						
7/02-7/07			Mechanism and Signifi-cance of Post-Trans-lational Modifications in the Large and Small Subunits of Ribulose Bisphosphate Carboxylase/Oxygenase			Approved
7/95-6/00			Mechanism and Signifi-cance of Post-Trans-lational Modifications in the Large and Small Subunits of Ribulose Bisphosphate Carboxylase/Oxygenase			Approved
7/90-6/95			Influence of Lys-14 methylation of stability of Rubisco LS			Approved
7/85-6/90			Relationships among light, photosynthetic CO_2 assimilation, and ribulose-1,5-bisphosphate carboxylase			Approved
Non-Competitive						
7/98-8/01	Monsanto Corp		Construction and Evaluation of Transgenic Wheat and Maize Plants Expressing Full-Length and Truncated Forms of Pea Rubisco LSMT	2 yrs	$26,600	Funded
9/90-9/92	AIRCO Carbon Dioxide		*In Situ* Field Fertilization with CO_2	2 yrs	$3,000	Funded

Date	Agency	Title	Duration	Amount	Status
9/85-9/87	Kentucky Vegetable Growers Association	Optimization of Factors Affecting Bell Pepper Production	3 yrs	$1,500	Funded

V. PUBLICATIONS

*student, #post-doc

A. Research Papers

Whitney, S. M., **R. L. Houtz**, and Alonso, H. (2011). Advancing our understanding and capacity to engineer nature's CO_2-sequestering enzyme, Rubisco. **Plant Physiol.** 155(1): 27-35.

Del Rizzo, Paul A., Couture, Jean-Francois, Dirk, Lynnette M. A., Strunk, Bethany S., Roiko, Marijo S., Brunzelle, Joseph S., **Houtz, Robert L**., and Trievel, Raymond C. (2010). SET7/9 catalytic mutants reveal the role of active site water molecules in lysine multiple methylation. **J. Biol. Chem.** 285(41): 31849-31858.

Magnani, R#., Dirk, L. M., Trievel, R. C., and **Houtz, R. L.** (2010). Calmodulin methyltransferase is an evolutionarily conserved enzyme that trimethylates Lys-115 in calmodulin. **Nat. Commun.** 1:43.

Whitney, S. M., Kane, H. J., **Houtz, R. L**., and Sharwood, R. E. (2009). Rubisco oligomers composed of linked small and large subunits assemble in tobacco plastids and have higher affinities for CO_2 and O_2. **Plant Physiol.** 149(4): 1887-1895.

Raunser, S., Magnani, R#., Huang, Z., **Houtz, R. L.**, Trievel, R. C., Penczek, P. A., and Walz, T. (2009). Rubisco in complex with Rubisco large subunit methyltransferase. **Proc. Natl. Acad. Sci. USA** 106(9): 3160-3165.

Couture, J. F., Dirk, L. M., Brunzelle, J. S., **Houtz, R. L.**, and Trievel, R. C. (2008). Structural origins for the product specificity of SET domain protein methyltransferases. **Proc. Natl. Acad. Sci. USA.** 105(52): 20659-20664.

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Houtz, Robert L., R. Magnani#, N. R. Nayak#, and L. M. A. Dirk. (2008). Co- and post-translational modifications in Rubisco: unanswered questions. **J. Exp. Bot**. 59(7): 1635-1645.

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Dirk, L. M. A., E. M. Flynn*, K. Dietzel*, J.-F. Couture, R. C. Trievel, and **R. L. Houtz**. (2007). Kinetic manifestation of processivity during multiple methylations catalyzed by SET-domain protein methyltransferases. **Biochemistry** 46:3905-3915.

Hou, Cai-Xia, Dirk, Lynnette M.A., Pattanaik, Sitakanta, Das, Narayan C., Maiti, Indu B., **Houtz, Robert L.**, and Williams, Mark A. (2007). Plant Peptide Deformylase: A Novel Selectable Marker and

Herbicide Target Based on Essential Co-Translational Chloroplast Protein Processing. **Plant Biotechnology** 5:275-281 (cover article).

Shepherd, R.W., Bass, W. T., **Houtz, R.L**., and Wagner, G.J. (2005). Phylloplanins of tobacco are defensive proteins deployed on aerial surfaces by short glandular trichomes. **Plant Cell** 17: 1851-1861.

Houtz, Robert L. and Portis, Archie R. Jr. (2003) The life of ribulose-1,5-bisphosphate carboxylase/oxygenase – post-translational facts and mysteries. Minireview. **Archives Biochemistry and Biophysics**, 414:150-158, special issue on C-fixing enzymes.

Trievel, Raymond C., Flynn E.M[*]., **Houtz, Robert L.**, and Hurley, J.H. (2003). Mechanism of multiple lysine methylation by the SET domain enzyme Rubisco LSMT. **Nature Structural Biology**, 10:545-552.

Dinkins, Randy D., Conn, Heather M., Dirk, Lynnette M.A., Williams, Mark A., and **Houtz, Robert L.** (2003). The *Arabidopsis thaliana* peptide deformylase 1 protein is localized to both mitochondria and chloroplasts. **Plant Science**, 165:751-758.

Trievel, Raymond C., Beach, Bridgette M., Dirk, Lynnette, M.A., **Houtz, Robert L.** and Hurley, James H. (2002). Structure and catalytic mechanism of a SET domain protein methyltransferase. **Cell** 111:91-103 (cover article, with depiction of the active-site of pea Rubisco LSMT).

Dirk, Lynnette M.A., Mark A. Williams, and **Robert L. Houtz**. (2002). Specificity of chloroplast-localized peptide deformylases as determined with peptide analogs of chloroplast-translated proteins. **Archives of Biochemistry and Biophysics** 406:135-141.

Dirk, Lynnette, Mark A. Williams, and **Robert L. Houtz**. (2001). Eukaryotic peptide deformylases: Nuclear-encoded and chloroplast-targeted enzymes in *Arabidopsis thaliana*. **Plant Physiology** 127:97-107 (featured article).

Ying, Z.[#], Mulligan, R.M., Janney, J., Royer, M., and **Houtz, R.L.** (1999). Rubisco SSMT and LSMT: Related $^{\nabla}$N- and $^{\prime}$N-methyltransferases that methylate the large and small subunits of Rubisco. **Journal of Biological Chemistry** 274:36750-36756.

Kumar, G.N.M., **Houtz, R.L.** and Knowles, N.R. (1999). Age-induced protein modifications and increased proteolysis in potato seed-tubers. **Plant Physiol.** 119:89-99.

Keathley, C., Potter, D.A., **Houtz, R.L. (**1999). Freezing-altered palatability of Bradford pear to Japanese beetle: evidence for decompartmentalization and enzymatic degradation of feeding deterrents. **Entomologia Experimentalis et Applicata** 90:49-59.

Zheng, Q.[*], Simel, E.J.[*], Klein, P.E., Royer, M.T., and **Houtz, R.L.** (1998). Expression, purification, and characterization of recombinant ribulose-1,5-bisphosphate carboxylase/oxygenase large subunit $^{\prime}$N-methyltransferase. **Protein Expression and Purification** 14:104-112.

Mazarei, M.[#], Ying, Z.[#], and **Houtz, R.L.** (1998). Functional analysis of the Rubisco large subunit $^{\prime}$N-methyltransferase promoter from tobacco and its regulation by light in soybean hairy roots. **Plant Cell Reports** 17:907-912.

Kester, S.T., Geneve, R.L. and **Houtz, R.L.** (1997). Priming and accelerated aging affect L-iso-aspartyl methyltransferase activity in tomato (*Lycopersicon esculentum* Mill.) seed. **J. Experimental Botany** 48:943-949.

Ying, Z.[#], Janney, N., and **Houtz, R.L.** (1996). Organization and characterization of the ribulose-1,5-bisphosphate carboxylase/oxygenase large subunit $^{\prime}$N-methyltrans-ferase gene in tobacco. **Plant Mol. Biol.** 32(4):663-672.

Wang, P.[*], Royer, M., and **Houtz, R.L.** (1995). Affinity purification of Ribulose-1,5-bisphosphate carboxylase/oxygenase large subunit ^{0}N-methyltransferase **Protein Expression and Purification** 6:528-536.

Klein, R.R. and **Houtz, R.L.** (1995). Cloning and developmental expression of pea ribulose-1,5-bisphosphate carboxylase/oxygenase large subunit N-methyltransferase **Plant Mol. Biol.** 27:249-261.

Houtz, R.L., L. Poneleit*, S.B. Jones*, M. Royer, J.T. Stults. (1992). Post-translational modifications in the amino-terminal region of the large subunit of ribulose-1,5-bisphosphate carboxylase/oxygenase from several plant species. **Plant Physiol.** 98:1170-1174.

Houtz, R.L., M. Royer, M.E. Salvucci. (1991). Partial purification and characterization of ribulosebisphosphate carboxylase/oxygenase large subunit N-methyltransferase. **Plant Physiol.** 97:913-920.

Houtz, R.L., R.M. Mulligan. (1991). Catalytic protection of tryptic sensitive sites in the large subunit of ribulosebisphosphate carboxylase/oxygenase. **Plant Physiol.** 96:335-339.

Knavel, D.E., **R.L. Houtz. (**1990). Characteristics of 'Main Dwarf' short-internode muskmelon genotype as compared with its normal-internode "parent" and F_1 hybrid ('Main Dwarf' x 'Mainstream'). **HortScience.** 25:1277-1279.

Houtz, R.L., J. Stults, R.M. Mulligan, N.E. Tolbert. (1989). Post-translational modifications in the large subunit of ribulose bisphosphate carboxylase/oxygenase. **Proc. Natl. Acad. Sci. USA** 86:1855-1859.

Biernbaum, J.A., **R.L. Houtz**, S.K. Ries. (1988). Field studies with crops treated with colloidally dispersed triacontanol. **J. Amer. Soc. Hort. Sci.** 113:679-684.

Mulligan, R.M., **R.L. Houtz**, N.E. Tolbert. (1988). Reaction-intermediate analogue binding by ribulose bisphosphate carboxylase/oxygenase causes specific changes in proteolytic sensitivity: The amino-terminal residue of the large subunit is acetylated proline. **Proc. Natl. Acad. Sci. USA** 85:1513-1517.

Houtz, R.L., R.O. Nable, G.M. Cheniae. (1988). Evidence for effects on the *in vivo* activity of ribulose-bisphosphate carboxylase/oxygenase during development of Mn toxicity in tobacco. **Plant Physiol.** 86:1143-1149.

Nable, R.O., **R.L. Houtz**, G.M. Cheniae. (1988). Early inhibition of photosynthesis during development of Mn toxicity in tobacco. **Plant Physiol.** 86:1136-1142.

Archbold, D.D., **R.L. Houtz**. (1988). Photosynthetic characteristics of strawberry plants treated with paclobutrazol or flurprimidol. **HortScience.** 23(1):200-202.

Sterling, T.M., **R.L. Houtz**, A.R. Putnam. (1987). Phytotoxic exudates from velvet leaf (*Abutilon theophrasti*) glandular trichomes. **Amer. J. Bot.** 74(4):543-550.

Cockfield, S.D., D.A. Potter, **R.L. Houtz**. (1987). Chlorosis and reduced photosynthetic CO_2 assimilation of *Euonymus fortunei* infested with Euonymus scale (Homoptera: Diaspididae). **Environ. Entomol.** 16:1314-1318.

Houtz, R.L., S.K. Ries, N.E. Tolbert. (1985). Effect of triacontanol on *Chlamydomonas*. Stimulation of growth and photosynthetic CO_2 assimilation. **Plant Physiol.** 79:357-364.

Houtz, R.L., S.K. Ries, N.E. Tolbert. (1985). Effect of triacontanol on *Chlamydomonas*. II. Specific activity of ribulose-bisphosphate carboxylase/oxygenase, ribulose-bisphosphate concentration, and characteristics of photorespiration. **Plant Physiol.** 79:365-370.

Houtz, R.L. and S.K. Ries. (1983). Triacontanol levels in ascending sugar maple sap. **HortScience.** 18(1):101-102.

Ries, S.K. and **R.L. Houtz**. (1983). Triacontanol as a plant growth regulator. **HortScience** 18(5):654-662.

B. Book Chapters

1. Dirk, L. M. A., R. C. Trievel, and **R. L. Houtz.** 2006. Non-Histone Protein Lysine Methyltransferases - structure and catalytic roles p. 179-229. In Fuyu Tamanoi and Steven Clarke (ed.), *The Enzymes*. Elsevier Academic Press.

C. Conference Proceedings

1. **Robert L. Houtz**, Lynnette M.A. Dirk, Mark A. Williams, and Brent W. Meier. 2000. Primary and secondary structural elements influence the susceptibility of the Rubisco small subunit to methylation by Rubisco small subunit methyltransferase. Proceedings of the 5th International Jubilee Conference on the Role of Formaldehyde in Biological Systems. Methylation and Demethylation Processes. October 9-13, 2000. Sopron, Hungary. pp. 31.
2. **Robert L. Houtz**, Brent Meier, Lynnette Dirk, and Malcolm Royer. 1999. Characterization and functional significance of $^{\forall}$N-methylmethionine formation in the small subunit of Rubisco. Proceedings of the 6th International Congress on Amino Acids. Bonn, Federal Republic of Germany. August 3-7, 1999. Amino Acids Vol. 17:84 #2.
3. Ying, Z.[#], Mulligan, R.M., Janney, N., Royer, M., and **Houtz, R.L.** 1998 Related $^{\forall}$N- and ,N-methyltransferases methylate the large and small subunits of Rubisco. Acta Biologica Hungarica 49:173-184.
4. Ying, Z.[#], Mulligan, R.M., Janney, J., Royer, M., and **Houtz, R.L.** 1998 "Chloroplast-localized protein N-methyltransferases." Proceedings of the 4th International Conference on the Role of Formaldehyde in Biological Systems. Methylation and Demethylation Processes. July 1-4, 1998, Budapest, Hungary. Acta Biologica Hungarica 49:173-184.
5. **Houtz, R.L.**, M. Royer. 1990. "N-terminal processing of the large subunit of ribulose-P_2 carboxylase/oxygenase." Proceedings of the XXIII International Horticultural Congress. Florence, Italy. Vol. 2, 4154.
6. **Houtz. R.L.**, Putnam, A.R. and T.M. Sterling. 1984. Phytotoxic exudates from trichomes on the stems and petioles of velvetleaf (*Abutilon theophrasti* Medic.) plants. Proceedings of the ACS Symposium Series, "The Chemistry of Allelopathy."
7. **Houtz, R.L.** and S.K. Ries. 1982. Effect of triacontanol on starch phosphorylase and PEP carboxylase activities. Proceedings of the XXIst International Horticulture Congress. Hamburg, Germany. Vol. II. #2087.

D. Invited Presentations and/or Participation

International

Invited Member, Editorial Board for *Journal of Biological Chemistry*, Term, July 2003-June 2008.
Invited Member, Scientific Advisory Board, 6th International Conference on the Role of Formaldehyde in Biological Systems – Methylation and Demethylation Processes, Hungary, Oct., 12-16 2003.
Invited Speaker, NIAR/COE/BRAIN-RITE International Symposium on Photosynthetic CO_2-Assimilating Enzymes: Rubisco and PEPC, Nov. 30-Dec. 2, 2000, Greenpier Miki, Hyogo, Japan
Invited Member, Scientific Advisory Board, 5th International Conference on the Role of Formaldehyde in Biological Systems – Methylation and Demethylation Processes, Sopron, Hungary, October 9-13, 2000.
Invited Speaker, 6th International Congress on Amino Acids, Bonn, Federal Republic of Germany, August 3-7, 1999.
Invited Speaker, 4th International Conference on the Role of Formaldehyde in Biological Systems: Methylation and Demethylation Processes, Hot Topics, Budapest, Hungary, July 1-4, 1998.
Invited Seminar Speaker, Department of Agricultural, Food, and Nutritional Science, University of Alberta, Edmonton, Alberta, Canada. "Functional Aspects of Lys-14 Methylation in the Large Subunit of Ribulose-1,5-Bisphosphate Carboxylase/ Oxygenase." June 19-20, 1996.
Invited Presentation, First Joint USA-Mexico Symposium on Agrobiology, Molecular Physiology and Biotechnology of Crops Important to Mexican Agriculture, Cocoyoc, Mexico; Myrna I. Lopez (presenter), Malcolm Royer, and Robert L. Houtz, "Post-Translational Methylation of Lys-14 in the Large Subunit of Ribulose-1,5-bisphosphate Carboxylase/Oxygenase." November 5-9, 1995.
Invited Seminar Speaker and External Ph.D. Examiner, Department of Plant Science, University of Alberta, Edmonton, Alberta, Canada. November, 1992.
Invited Symposium Speaker, 5th Annual Meeting for Plant Biochemistry, Saltillo, Coahuila, Mexico. Post-translational modifications in the large subunit of ribulose bisphosphate carboxylase/oxygenase. Site specific methylation of Lys-14. October 13-17, 1991.

External Reviewer, Natural Sciences and Engineering Research Council (NSERC) of Canada Competitive Grants Program. 1989-present.
Invited External Examiner, Department of Plant Science, University of Alberta, Loretta Mikitzel, Ph.D. candidate. Dissertation title: "Physiological and biochemical characteristics of aging in potato tubers." October, 1989.
Invited Seminar Speaker and Guest Lecturer, Department of Plant Science, University of Alberta. Post-Translational Modifications in the Large Subunit of Ribulosebisphosphate Carboxylase/Oxygenase. September 20, 1988.

National

Invited Member, Editorial Board for Journal of Biological Chemistry, Term, July 2003-June 2008.
Host and Organizer, Annual meeting of Regional Project, NC-1142 Regulation of Photosynthetic Processes, University of Kentucky, November 11, 2006.
Invited Seminar Speaker, South Dakota State University, Department of Plant Science, Chloroplast-Localized Co- and Post-Translational Protein Modifications, July 18,2006.
Invited Seminar Speaker, Department of Plant Biology, University of Illinois, November 3, 2005. Chloroplast-localized co- and post-translational protein modifications: Structure/Function/ Significance.
Invited Seminar Speaker, Virginia Tech, Department of Plant Pathology, Physiology and Weed Science, Mechanism and Significance of Post-Translational Modifications in the Large and Small Subunits of Ribulose Bisphosphate Carboxylase/Oxygenase. July 20, 2005.
Invited Seminar Speaker, Department of Biochemistry, Emory University, September 23, 2004. Chloroplast-localized co- and post-translational protein modifications: Structure/Function/ Significance.
Invited Speaker, FASEB Summer Research Conference, July 10-15, 2004. Biological Methylation. Saxtons River, Vermont.
Invited Panel Review Member, DOE, Div. of Energy Biosciences grant review panel, Nov. 5-7, 2003.
Invited Seminar Speaker, Institute of Biological Chemistry, Washington State Univ., Oct. 14, 2003. Chloroplast-localized co- and post-translational protein modifications: Structure/Function/ Significance.
Invited Panel Review Member, NIH reverse site visit, NIAID, Project Grant, Oldest-Old Mortality-Demographic Models and Analysis. July 29-30, 2003.
Routine Reviewer of competitive grants for USDANRI, NSF, DOE, NIH, and BARD.
Invited Seminar Speaker, Department of Horticulture, Texas A&M University, "Chloroplast-localized Co- and Post-Translational Protein Modifications: Essential Administrative Processing of Critical Information," January 2002.
Invited Seminar Speaker, Integration Photosynthesis Research Program, University of Illinois, "Post-translational Modifications of the Large and Small Subunits of Rubisco," March 2, 2000.
Invited Seminar Speaker, Department of Biochemistry, University of Nebraska, "Post-translational Modifications of the Large and Small Subunits of Rubisco," September 29, 1998.
Invited Seminar Speaker, Botany and Plant Pathology Department, Purdue University. "Post-Translational Methylation of Lys-14 in the Large Subunit of Ribulose-1,5-bisphosphate Carboxylase/Oxygenase." March 22, 1995.
Invited Seminar Speaker, Molecular and Cellular Biology Program, Ohio University, Athens, OH. "Post-Translational Modifications in the Large Subunit of Ribulose Bisphosphate Carboxylase/Oxygenase." February 21, 1994.
External Reviewer, Consortium for Plant Biotechnology Research Inc. 1994-Present.
External Reviewer, USDA/NRI, DOE, NSF Competitive Grants Programs. 1989-Present.
Invited Attendee, The N. Edward Tolbert Symposium, Michigan State University, "Photosynthetic Carbon Metabolism and Regulation of Atmospheric CO_2 and O_2." March 4-6, 1990.
Invited Attendee, Gordon Research Conference on CO_2 Fixation in Green Plants, Plymouth State College, Plymouth, NH. July 23-27, 1990.
External Reviewer, Preproposals, Program in Science & Technology Cooperation/U.S.- Cooperative Development Research Agency for International Development, National Research Council. 1990-present.
Reviewer of manuscripts submitted for publication in *HortScience, Journal of the American Society for Horticultural Science, Plant Physiology*, and *Journal of Biological Chemistry*.
Moderator, Photosynthesis Session, 1987 meetings of the American Society for Horticultural Science.
Member, Screening Committee for the 1986 American Society for Horticultural Science, Cross-Commodity Publication Award.

Invited Participant, International Conference on Crop Productivity - Research Imperatives Revisited. Boyne Highlands, Michigan. Oct. 14-18, 1985.

Regional/Local

Special Awards Judge, Intel International Science and Engineering Fair, Louisville, KY, 2002.
Invited Speaker, Fayette County Hoe'nHope Garden Club, "Biotechnology and You," February 2002.
Science Demonstration Project - 5th grade science classes (4 sessions), Strode Station Elementary School, Winchester, KY, "Electron Transport and Photosynthesis, Chemiluminescence," September 2001.
Invited Seminar Speaker, Fayette County Master Gardener Association, "Agricultural Biotechnology in the Future," January 23, 1999.
Invited Seminar Speaker, Plant Physiology/Biochemistry Molecular Biology Program, University of Kentucky. "Exploring Methylation of Lys-14 in the Large Subunit of Rubisco. April 16, 1997.
Invited Judge, Intel International Science and Engineering Fair, Botany Section, Louisville, KY. May 10-16, 1997.
Invited Judge, Central Kentucky Science Fair, Botany Section, University of Kentucky. March 30, 1996; March 22, 1997.
Invited Seminar Speaker, Monsanto, St. Louis, MO. "Functional Aspects of Lys-14 Methylation in the Large Subunit of Ribulose-1,5-Bisphosphate Carboxylase/Oxygenase." September 23, 1996.
Invited Seminar Speaker, Monsanto, St. Louis, MO. "Post-Translational Methylation of Lys-14 in the Large Subunit of Ribulose-1,5-bisphosphate Carboxylase/Oxygenase." December 19, 1995.
Invited Seminar Speaker, 25th Educational Conference and Kentucky Association of Milk, Food and Environmental Sanitarians, Louisville, KY. "Biotechnology." February 21-23, 1995.
Reviewer, Undergraduate Research Proposals, Howard Hughes Medical Institute Undergraduate Initiative Program in Biological Sciences, University of Kentucky. 1993-1994; 1997.
Invited Member and Reviewer, Technical Advising Committee of the Tobacco and Health Research Institute, Lexington, KY. 1993-1995.
Reviewer, American Society of Testing and Materials (ASTM), Special Technical Publications. June, 1990.
Selected Participant, Technology Transfer Conference. "Structure/ Function Relationships and Post-Translational Modifications in the Large Subunit of Ribulose-1,5-Bisphosphate Carboxylase/Oxygenase." University of Kentucky, 1988.
Seminar Speaker, College of Pharmacy, Medicinal Chemistry seminar series, University of Kentucky. "Light/Dark Regulation of Ribulose-bisphosphate Carboxylase/Oxygenase Activity in Muskmelon Leaves." January 29, 1987.
Seminar Speaker, Department of Horticulture, Michigan State University. "Light/Dark Regulation of Ribulosebisphosphate Carboxylase/Oxygenase Activity in Muskmelon Leaves." Oct. 7, 1986.

E. Presentations before Professional Societies (Abstracts)

N.R. Nayak, R. Magnani, L.M. Dirk and R.L. Houtz. 2006. Elucidation of consensus amino acid sequence and potential alternate substrates of rubisco large subunit methyltransferase. American Society for Biochemistry and Molecular Biology Meetings.
Dirk, Lynnette MA , Hanger, Katherine M., Cai, Yiying, Schmidt, Jack J., Barnes, Jonathan C. Williams, Mark A., Grossman, Robert B., Rodgers, David W., **Houtz, Robert L**., 2006. Preliminary crystal structure of plant peptide deformylase, a unique potential target for broad spectrum herbicides. American Society of Plant Biologists Meetings.
EM Flynn, LMA Dirk, RC Trievel, BM Beach, JH Hurley, RL Houtz. Analysis of a structurally unique C-terminal domain of a SET domain-containing protein methyltransferase Rubisco LSMT. American Society of Biochemistry and Molecular Biology Annual Meeting. Boston, MA. June 12-16, 2004.
EM Flynn, KL Dietzel, LMA Dirk, BM Beach, JH Hurley, RC Trievel, RL Houtz. Elucidation of the Mechanism for Successive Methyl Group Transfers by SET Domain Containing Protein Methyltransferases. 29th FEBS Congress. Warsaw, Poland. June 26-July 1, 2004.
Zhang C, Dirk LMA, Hanger KM, Miller A-F, Houtz RL. 2004. The pH dependence of the active site Co(II) and Co-supported catalytic activity of peptide deformylase-2 from *Arabidopsis*. 228th American Chemical Society (ACS) National Meeting. August 22-26, 2004 Philadelphia, PA, USA.
Hanger KM, Houtz RL, Dirk LMA. 2004. Limited tryptic proteolysis of peptide deformylase

generates a core protein that retains the majority of activity without a salt-requirement for solubility. American Society of Plant Biologists' (ASPB) Plant Biology 2004. July 24 - 28, 2004 Lake Buena Vista, FL, USA.

Cai-Xia Hou, Heather M. Conn, Lynnette M.A. Dirk, Robert L. Houtz, and Mark A. Williams. Genetically Engineered Tolerance to a Peptide Deformylase Inhibitor in Tobacco. American Society of Plant Biologists Meeting. Lake Buena Vista, Florida. July 2004.

Williams MA, Houtz RL, Dirk LMA. 2004. Peptide deformylase: Site-directed mutation directed towards engineering inhibitor resistance. American Society of Plant Biologists' (ASPB) Plant Biology 2004. July 24 - 28, 2004 Lake Buena Vista, FL, USA.

Meier, Brent W., Zamora, Brian G., and Houtz, Robert L. 2002. Alteration of the methylation status of Rubisco by RNAi-mediated gene silencing of Rubisco LSMT. American Society of Plant Biologists. Abstract #616.

Conn HM, Dinkins R, Dirk LMA, Williams MA, and Houtz RL. 2002. Subcellular localization of plant peptide deformylases. American Society of Plant Biologists' Plant Biology 2002. August 3-7, 2002. Denver, CO.

Xu Q, Dirk LMA, Lowenson J, Houtz RL, Clarke S, and Downie B. 2002. An Arabidopsis protein isoaspartyl-methyltransferase gene, which produces two proteins through differential splicing, may function in the nucleus. American Society of Plant Biologists' Plant Biology 2002. August 3-7, 2002. Denver, CO.

Houtz RL, Williams MA, and Dirk LMA. 2002. Specificity of chloroplast-localized peptide deformylases as determined with N-terminal peptide analogs of chloroplast-translated proteins. American Society of Plant Biologists' Plant Biology 2002. August 3-7, 2002. Denver, CO.

Dirk LMA, and Houtz RL. 2002. Knocking out Arabidopsis peptide deformylase 2 has drastic consequences to plant growth. American Society of Plant Biologists' Plant Biology 2002. August 3-7, 2002. Denver, CO.

Williams MA, Dirk LMA, and Houtz RL. 2002. Chloroplast-localized peptide deformylase: A new target for the development of novel broad-spectrum herbicides. 42nd Annual Meeting of the Weed Science Society of America, February 10-13, 2002. Reno, NV.

Williams MA, Dirk LMA, and Houtz RL. 2001. Characterization and inhibition of chloroplast-localized peptide deformylases from *Arabidopsis thaliana*. American Society of Horticultural Science 2001 Conference and Exhibition. July 22-25, 2001. Sacramento, CA.

Dirk LMA, Kennedy HM, Conn HM, Williams MA, and Houtz RL. 2001. Activity and inhibition of two chloroplast-localized peptide deformylases. American Society of Plant Biologists' Plant Biology 2001. July 21-25, 2001. Providence, RI.

Lynnette M.A. Dirk, Mark A. Williams, and Robert L. Houtz. 2000. Post-translational modification of Rubisco SS: Methionine oxidation determines the methylatability of the N-terminal a-amino group? Plant Physiology Supplement #619

Mark A. Williams, Lynnette M.A. Dirk, and Robert L. Houtz. 2000. Characterization of a chloroplast-localized peptide deformylase from *Arabidopsis thaliana.* Plant Physiology Supplement #621.

Brent W. Meier, Malcolm Royer, and Robert L. Houtz. 1999. Characterization of Rubisco small subunit $^{\nabla}$N-methyltransferase (Rubisco SSMT) activity in spinach chloroplast lysates. Plant Physiology Supplement #307.

Lynnette M.A. Dirk, Malcolm Royer, Brent Meier, and Robert L. Houtz. 1999. Alterations in the penultimate amino acid residue of the processed form of the Rubisco SS: Influencing methylation by Rubisco. SSMT and SS stability. Plant Physiology Supplement #304.

Durbin, L., Ray, M., Royer, M., Zheng, Q., and Houtz, R.L. 1997. Identification of the S-adenosyl-L-methionine binding site in pea Rubisco large subunit $^{\nabla}$N-methyltransferase. Plant Physiol. 114:149(706).

Kumar, G.N.M., Knowles, N.R., and Houtz, R.L. 1997. Further studies on protein degradation in aging potato tubers. Plant Physiol. 114:152(725).

Zheng, Q., Royer, M., and Houtz, R.L. 1997. Characterization of the interaction between Rubisco and Rubisco large subunit $^{\nabla}$N-methyltransferase. Plant Physiol. 114:211(1062).

Ying, Z., Janney, N., and Houtz, R.L. 1996. Molecular rationale for the absence of methylation at lysyl residue 14 in the large subunit of spinach rubisco. Plant Physiol. 111:93(343).

Zheng, Q. and Houtz, R.L. 1996. Investigations of the interaction between pea rubisco LSMT and spinach rubisco using bifunctional cross-linking reagents. Plant Physiol. 111:93(344).

Kumar, G.N.M., Knowles, N.R., and Houtz, R.L. 1996. Mechanisms of protein degradation in aging potato tubers. Plant Physiol. 111:103(402).

Kester, S.T., Geneve, R.L. and Houtz, R.L. 1996. Priming and accelerated aging affect L-isoaspartyl methyltransferase activity in tomato seed. HortScience 31:632(391).

Zheng, Q., Simel, E.J., Klein, P.E. and Houtz, R.L. 1995. Functional expression of pea rubisco in *Escherichia coli*. Plant Physiol. 108:72(321).
Ying, Z., Janney, N. and Houtz, R.L. 1995. Isolation and characterization of the rubisco LSMT gene in tobacco. Plant Physiol. 108:135(701).
Wang, J., Klein, R.R. and Houtz, R.L. 1995. Transformation of *Arabidopsis thaliana* with a pea rubisco LSMT cDNA. Plant Physiol. 108:151(798).
Klein, R.R. and R.L. Houtz. 1994. Cloning and expression of Rubisco large subunit methyltransferase gene from pea. Plant Physiol. 105:85(438).
Houtz, R.L. and Royer, M. 1994. Characterization of the effects of methylation of Lys-14 in the large subunit of spinach Rubisco. Plant Physiol. 105:88(456).
Houtz, R.L., Wang, P., and Royer, M. 1993. Protein amino acid sequence of ribulose-1,5-bisphosphate carboxylase/oxygenase large subunit ε-N-methyltransferase. Plant Physiol. 102:47(248).
Crafts-Brandner, S.J. and Houtz, R.L. 1993. Protein degradation in chloroplast lysates. Agron. Abstr. 110.
Houtz, R.L., P. Wang, and M. Royer. 1992. Affinity purification of ribulose-1,5-bisphosphate carboxylase/oxygenase large subunit ε-N-methyltransferase. Plant Physiol. 99:58(343).
Houtz, R.L., H. Fang, and M. Royer. 1992. Identification and specificity studies of ribulose-1,5-bisphosphate carboxylase/oxygenase large subunit ε-N-methyltransferase. Plant Physiol. 99:58(344).
Houtz, R.L., M. Royer, and M.E. Salvucci. 1991. Partial purification and characterization of ribulose-1,5-bisphosphate carboxylase/oxygenase large subunit ε-N-methyltransferase. Plant Physiol. 96:9.
Houtz, R.L., D.D. Archbold, and M. Royer. 1990. Atmospheric CO_2 enrichment of tomato and strawberry plants under field production conditions. HortScience (in press).
Houtz, R.L., L. Poneleit, and M. Royer. 1990. N-terminal acetylation and methylation of lys-14 in the N-terminus of the large subunit of rubisco from several plant species. Plant Physiol. 93(1):64.
Knavel, D.E., R. Houtz. 1988. Yield and leaf area of short-internode muskmelon genotypes at different spacings. HortScience 23(3):136.
Houtz, R.L., R.M. Mulligan, J.T. Stults, and N.E. Tolbert. 1988. Structure/function studies of the large subunit of rubisco from spinach and muskmelon by limited tryptic proteolysis. HortScience 23(3):154.
Houtz, R.L., R.M. Mulligan, J.T. Stults, and N.E. Tolbert. 1988. Amino-terminus of the large subunit of rubisco from spinach, wheat, tobacco, and muskmelon leaves. Plant Physiol. 86(4):30.
Lakitan, B., Dean E. Knavel, Robert L. Houtz, Robert L. Geneve, Douglas D. Archbold. 1987. Water influx and calcium content as related to fruit cracking in pepper (*Capsicum annuum* L.). HortScience 22(5):1082.
Houtz, R.L., J.G. Strang. 1987. Yield of fresh-market bell peppers (*Capsicum annuum*) as influenced by cultivar and several cultural practices. HortScience 22(5):1100.
Houtz, R.L., R. Michael Mulligan. 1987. Transition-state analogue binding or catalytic conditions protect the tryptic sensitive sites on the large subunit of rubisco from proteolysis. Plant Physiol. 83(4):69.
Knavel, D.E., R.L. Houtz. 1986. Main dwarf muskmelon. HortScience 21(3):705.
Archbold, D.D., R.L. Houtz. 1986. Strawberry plant growth, photo- synthesis, and ribulose-1,5-bisphosphate carboxylase/oxygenase (rubisco) activity as affected by paclobutrazol and flurprimidol. HortScience 21(3):156.
Houtz, R.L., M. Royer. 1986. Light regulation of ribulose-1,5-bisphosphate carboxylase/oxygenase (rubisco) in muskmelon (*Cucumis melo*) leaves. HortScience 21(3):156.
Houtz, R.L., Ries, S.K. and N.E. Tolbert. 1984. Stimulation of photosynthetic CO_2 fixation by *Chlamydomonas reinhardtii* with triacontanol. HortScience 19(3):441.
Houtz, R.L., Putnam, A.R. and S.K. Ries. 1984. Allelopathic exudates from velvetleaf (*Abutilon theophrasti* Medic.) trichomes. Weed Science Society of America (Abstracts) p.58.
Houtz, R.L. and S.K. Ries. 1981. An *in vitro* system responsive to triacontanol. HortScience 16(3):441.
Ries, S., Wert, V., and R. Houtz. 1981. Rapid *in vivo* and *in vitro* effects of triacontanol. Proc. 8th Ann. Plant Growth Reg. Soc. of Amer. 137.
Ries, S., Wert, V., and R. Houtz. 1981. The rapid response of plants to triacontanol. Presented at the First Coordination Meeting of the Coordinated Research Program on Isotopic Tracer-Aided Studies of the Management, Sept. 28-Oct. 2, 1981, Vienna, Austria.
Houtz, R.L. 1981. Development and characterization of an *in vitro* system responsive to 1-triacontanol. Plant Growth Regulator Bulletin 9(3):5.

Ries, S., Wert, V., Dilley, D., Houtz, R. and R. Knowles. 1979. Rapid response of plants to triacontanol. Plant Physiol. (Supplement) 63:47.

F. Professional and Honor Societies

American Society of Horticultural Science
American Society of Plant Physiologists
American Association for the Advancement of Science
Gamma Sigma Delta
Sigma XI

G. Honors and Awards

Member of the Editorial Board for the *Journal of Biological Chemistry* 2003-2008

Thomas Poe Cooper Award for Excellence in Research, College of Agriculture, University of Kentucky, 2001.

Chairman (2006), NC1142, Regulation of Photosynthetic Processes, Multi-State Research Project

VI. RESEARCH ADVISING

A. Post-Doctoral Research Associates

Major Advisor:

Niahr Nayak, Ph.D. Development and Utilization of Rubisco LSMT as a Molecular Vehicle for Targeting Enzymes to Rubisco. From the Department of SAgronomy, University of Kentucky. June 1, 2005 – present.

Roberta Magnani, Ph.D. Mapping Polypeptide Substrate Specificity Determinants in Rubisco LSMT. From the Department of Agricultural Sciences, University of Bologna, Italy. April 21, 2005 – present

Mark A. Williams, Ph.D. Molecular Engineering of Rubisco LSMT for increased Rubisco Activity *In Vivo*. From the Department of Developmental and Cell Biology, University of California, Irvine. August, 1999-December 1, 2000.

Lynnette M. Dirk, Ph.D. Molecular and Biochemical Characteristics of the Methylation of the Small Subunit of Rubisco. From the Department of Botany, University of California, Davis. March 1, 1999- Present.

Anandita Das, Ph.D. Molecular and Biochemical Characteristics of the Methylation of the Small Subunit of Rubisco. From the Department of Botany, Bose Institute, Calcutta, India. April 1, 1998-present.

Mitra Mazarei, Ph.D., Functional Analysis of the Promoter Region for the Tobacco Rubisco LSMT Gene. From the Plant Biology Division, The Samuel Roberts Noble Foundation. January 2, 1997-January 2, 1998.

Zhentu Ying, Ph.D., Mechanism and Significance of Post-Translational Modifications in the Large Subunit (LS) of Ribulose Bisphosphate Carboxylase/Oxygenase (Rubisco). From the University of Miami Medical School, Miami, FL. 1994-1996. Currently employed by the University of Florida at the Homestead Experiment Station.

Co-Advisor:

Ross O. Nable, Ph.D., in the Department of Agronomy. Major Advisor: Dr. James E. Leggett, Adjunct Professor, Department of Agronomy. The Effects of Manganese Toxicity on Photosynthetic CO_2 Assimilation in Tobacco. May, 1985 - April, 1986.

B. Graduate

Major Advisor:

Amanda Fergusson, M.S. graduate, Plant and Soil Science Program; Project: Evaluation of high tunnels as a seasonal extending technology for vegetable production in Kentucky. Fall 2004.

Brent Meier, Ph.D. graduate, Department of Horticulture, Plant Physiology/Biochemistry/Molecular Biology Program; Project: "Molecular targeting of human carbonic anhydrase to the active-site vicinity of Rubisco LSMT." Spring 2004.

Qi Zheng, Ph.D. graduate, Department of Horticulture and Landscape Architecture, Plant Physiology/Biochemistry/Molecular Biology Program; Project: "The Mechanism of Specificity for the Interaction between Rubisco Large Subunit ε-N-Methyltransferase and Rubisco." Summer 1994; Graduated August, 1997. Currently employed by the University of Florida at the Homestead Experiment Station.

Myrna I. Lopez, M.S. graduate and recipient of Lyman T. Johnson doctoral fellowship, Department of Horticulture and Landscape Architecture, Plant & Soil Science Program; Project: "Kinetic Analysis of the Reaction Mechanism for Ribulose-1,5-Bisphosphate Carboxylase/Oxygenase Large Subunit ε-N-Methyltransferase." Graduated July, 1997.

Jianmin Wang, Ph.D. candidate, Department of Horticulture and Landscape Architecture, Plant Physiology/Biochemistry/Molecular Biology Program; Project: "Effects of Antisense and Sense Expression of Rubisco LSMT in Transgenic Tobacco Plants on the Methylation of Lys-14 in the Large Subunit of Rubisco." Fall 1994 - Fall 1995. Elected to leave program.

Pinger Wang, M.S. graduate, Department of Horticulture and Landscape Architecture, Plant Physiology/Biochemistry/Molecular Biology Program; Project: "Characterization of an Affinity Purification Technique for Rubisco Large Subunit ε-N-methyltransferase." Graduated Spring 1993.

Hui Fang, M.S. graduate, Department of Horticulture and Landscape Architecture, Plant Physiology/Biochemistry/Molecular Biology Program; Project: "Effects of Lysine-14 methylation in the Large Subunit of Ribulose Bisphosphate Carboxylase/Oxygenase on Catalytic Activity and Stability." Graduated Spring 1993.

Committee Member:

Keith Allen, Ph.D. candidate, Plant Physiology/Biochemistry/Molecular Biology Program. (in progress).

Nitima Suttipanta, Ph.D. candidate, Plant Physiology/Biochemistry/Molecular Biology Program. Graduated 2011.

Tom Niehaus, Ph.D. candidate, Plant Physiology/Biochemistry/Molecular Biology Program. Graduated 2011.

Darby Harris, Ph.D. candidate, Plant Physiology/Biochemistry/Molecular Biology Program. Graduated 2011.

Meshack Afitlhile, Ph.D. candidate, Plant Physiology/Biochemistry/Molecular Biology Program. Graduated 2000.

Timothy P. Devarenne, Ph.D. candidate, Plant Physiology/Biochemistry/Molecular Biology Program. Graduated 1998.

Cunxi Wang, Ph.D. candidate, Plant Physiology/Biochemistry/Molecular Biology Program. 1995-1998.

Shaohui Yin, Ph.D. candidate, Plant Physiology/Biochemistry/Molecular Biology Program. Graduated 1996.

Qingshun Li, Ph.D. candidate, Plant Physiology/Biochemistry/Molecular Biology Program. Graduated 1995.

Kyoungwhan Back, Ph.D. candidate, Plant Physiology/Biochemistry/Molecular Biology Program. Graduated 1995.

Yan Huang, M.S. graduate, Plant Physiology/Biochemistry/Molecular Biology Program. Graduated 1995.

Xiangha Yan, Ph.D. candidate, Plant Physiology/Biochemistry/Molecular Biology Program. Graduated 1995.

Rui Wang, Ph.D. candidate, Plant Physiology/Biochemistry/Molecular Biology Program. Graduated 1995.

Jeffrey W. Stringer, Ph.D. candidate, Department of Forestry. Graduated 1993.

Guoqiang Hou, Ph.D. candidate, Crop Science Program. 1992.

Robert C. MacDonald, Ph.D. candidate, Department of Forestry. Graduated 1991.

Lorianne Matthews, Ph.D. candidate, Department of Plant Pathology. Graduated 1991.

Herawati Thalib, M.S. candidate, Department of Horticulture and Landscape Architecture. Graduated 1988.

Benyamin H.T. Lakitan, M.S. candidate, Department of Horticulture and Landscape Architecture. Graduated 1987.

C. Undergraduate

Advisor: (research projects supplemented or fully funded by external competitive grant dollars)

Erin Mulligan, graduated Fall 2006, Agricultural Biotechnology major. Research project: Kinetic analyses of the reaction mechanism for SET-domain containing protein methyltransferases.

Janey Moore, Agricultural Biotechnology major. Research Project: Chloroplast-localized N-terminal protein processing by peptide deformylase.

Megan Flynn, Honors student and Agricultural Biotechnology major. Research project: Kinetic analyses of the reaction mechanism for SET-domain containing protein methyltransferases. Graduated Spring 2004.

Heather Conn, graduated Spring 2002, Agricultural Biotechnology major. Research project: Molecular and biochemical characterization of chloroplast-localized peptide deformylase. Recipient of a travel grant from the American Society of Plant Biology to attend the 2002 meetings. Current Position: Senior Research Analyst, Department of Horticulture, Supervisor – Dr. Mark Williams.

Brian Zamora, graduated *summa cum laude* Spring 2002, Honors student and Agricultural Biotechnology major. Research project: Molecular engineering of resistance to peptide deformylase inhibitors in *Arabidopsis thaliana*. University of Kentucky Undergraduate Research and Creativity Grant, $502., Spring 2002. Current Position: M.D./Ph.D. program at West Virginia University.

Augustine Torres, undergraduate in Agricultural Biotechnology. Senior Research Project. Summer 1998.

Laura Durbin, undergraduate in Agricultural Biotechnology. Senior Research Project. University of Kentucky Honors Program Student. Recipient: Howard Hughes Medical Institute Undergraduate Initiative Grant for Research, funded Jan 30, 1996, $850. Fall 1995-Spring 1997.

Myrna I. Lopez, recipient of United Stated Department of Education Summer Fellowship to Encourage Minority Participation in Graduate Education. Summer 1994.

Undergraduate French Interns (3), Undergraduate Fellowship Program through Agricultural International Programs, University of Kentucky:
- -Maryse Cattaneo, Summer 1993
- -Celine Hanot, Summer 1994
- -Guilleume Portejoie, Summer 1996

Loelle Poneleit, undergraduate in the Department of Horticulture and Landscape Architecture. Independent Research Project. 1989-1990.

Samantha B. Jones, recipient of United States Department of Education Summer Fellowship to Encourage Minority Participation in Graduate Education. Summer 1989.

Co-Advisor:

Mark Williams, undergraduate in the Department of Biology, independent research project with Dr. William Cohen. 1989-1990.

Academic Advisor:

Advise all Agriculture Biotechnology students fulfilling ABT 395 requirement.

1999-present Advised avg. 20 Agriculture Biotechnology students each semester.

1993-1999 Advised 5-10 Agriculture Biotechnology students each semester

D. Other

External Examiner - Eun Jeong Lim, Department of Biochemistry, September 2006

Research Mentor - Ms. E. Megan Flynn, recipient of a Beckman Scholarship, 2003.

Research Mentor - Melanie A. Stamper, Chemistry Instructor, Jessamine County High School. Recipient: Howard Hughes Medical Institute Summer Internship for Selected High School Instructors in Chemistry and Biological Science. Summer 1997.

Research Mentor - Melanie A. Stamper, Chemistry Instructor, Jessamine County High School. Recipient: Howard Hughes Medical Institute Summer Internship for Selected High School Instructors in Chemistry and Biological Science. Summer 1996.

High School Student Advisor: John Hafner, recipient of the 1995 Golden Scholarship ($7,000) award from the Multiple Sclerosis Association of America. I provided the guidance and laboratory for scientific research experience for John since 1990. John's accomplishments were featured in both the *Lexington Herald-Leader* and *Paris Sun* newspapers, where his internship at the University of Kentucky was featured as notable scholastic achievement.

Contact and placement person for Lafayette High School Experience Based Career Education Program. Coordinator: Lynn Akers. 1995-present.

University coordinator and contact individual for the implementation of the site-licensed Research Information System (RIS) Reference Update (RU) reference retrieval system. Implementation of the site-licensed software resulted in a minimum savings of $6000 to those research personnel at the University of Kentucky with active subscriptions to the RIS-RU database.

VII. RESIDENT INSTRUCTION (Teaching Portfolio available on request)

BCH/PPA/PLS 609, 3 credit hours, Plant Biochemistry (formerly BCH/PPA/PLS 503 with additional information). An in-depth examination of the biochemical mechanisms and enzymology associated with photosynthesis. 12 hours lecture. Spring 2003.

ABT 395, 1-4 credit hours, Independent Study in Biotechnology. Independent study under the supervision of a faculty member. Coordinator, Fall/Spring/Summer 1999-present.

ABT 399, 1-6 credit hours, Experiential Learning in Biotechnology. An internship in biotechnology under the supervision of a faculty member. Fall/Spring/Summer 2001-present.

ABT 201, 1 credit hour, Scientific Method and Logic in Agricultural Biotechnology. A required course for Agriculture Biotechnology majors designed to acquaint students with common experimental methods used in biotechnology, the interpretation of scientific data, and its effective communication via written and oral reports. 8 hours lecture. Fall 1994-present.

BIO/PLS/HOR/AGR/FOR 623, 3 credit hours, Physiology of Plants II. Detailed examination of the biochemical pathways involved in chaperonin-mediated protein folding and targeted protein degradation. 7 hours lecture. 1997-present.

BCH/PPA/PLS 503, 3 credit hours, Plant Biochemistry. An in-depth examination of the biochemical mechanisms and enzymology associated with photosynthesis. 12 hours lecture. 1986-2002.

HOR 375/410, 3 credit hours, Growth and Development of Horticultural Crops. A biochemical and physiological examination of the relationships between photosynthetic carbon assimilation, electron transport, water relations, and temperature stress tolerance as determinants in horticultural crop productivity. 11 hours lecture. Fall 1987-Spring 1995.

AGR 630, 3 credit hours, Experimental Techniques in Plant Physiology/Biochemistry. Principles of radioactivity and application of radioactive isotopes in biological research. 16 hours lecture and laboratory. Summer 1986, 1988, 1990.

BIO 106, 3 credit hours, Plant Biology. Thermodynamics, respiration, and photosynthesis. 15 hours lecture. Fall 1992.

HOR 601, 2 credit hours, Physiological Mechanisms in Horticultural Plants. Survey course of research in horticulture. 3 hours lecture. Fall 1994.

BIO 773, 1 credit hour, Plant Physiology/Biochemistry Seminar Series. Fall 1986 - Spring 1987.

Teaching Assistant, Michigan State University, Department of Horticulture, Horticulture 801, Research Procedures in Plant Science, Winter 1978, 1979.

Teaching Assistant, Michigan State University, Department of Horticulture, Horticulture 457, Cool Season Vegetable Crops, Fall 1979.

VIII. COMMITTEE ASSIGNMENTS

A. Departmental

Chair, Safety Committee, 1999-present
Internal Review Committee, 1993-present
Graduate Studies Committee, 1990-present
Project Review Committee, 1989-present
Chair, Search and Screening Committee, Molecular Biology Position, 1995-1998
Advisory Committee to Chair, 1994-1995
Chair, Research Committee, 1991-1995
Search and Screening Committee for Department Chair, 1989-1990
Chair, Search and Screening Committee for Molecular Biology Position, 1991-1992
Search and Screening Committee for Stress Physiology Position, 1991-1992

Co-Director, Seminar Series, Dept of Horticulture & Landscape Architecture, 1992

B. Interdepartmental Organizations

Executive Committee, Plant Physiology/Biochemistry/Molecular Biology Program, 1992-present
Member, Plant Physiology/Biochemistry/Molecular Biology Program - 1985-present
Search & Screening Committee, Biochemistry Position, Department of Agronomy, 1997-1999
Co-Chair, Plant Physiology/Biochemistry/Molecular Biology Program Seminar Committee, Fall 1986, Spring 1987

C. College

Chair, Regional Project, NC-1142 Regulation of Photosynthetic Processes, 2006
Review Committee, KTRDC, 2006
Member, Advisory Committee for Beckman Undergraduate Research Scholars Program
Chair, Advisory Committee for Appointment, Promotion and Tenure, 2004-2005
Appointed by the Dean to the College Strategic Planning Committee, 2003.
Advisory Committee for Appointment, Promotion and Tenure, 2002-2005
Member, Search Committee, Molecular Genetics position in Agronomy, 2002
Academic Scholarship Review Committee, Fall 2002
Chair, Agricultural Biotechnology Coordinating Committee, 1999-present
Member, Agricultural Biotechnology Coordinating Committee, 1990-present
Agriculture Plant Sciences Committee, 1997-1998
Agriculture Faculty Council (elected position), 1995-1997
Faculty Appeals Committee, 1993, 1997
Agricultural Biotechnology Coordinating Committee, 1990-present
College of Agriculture Library System Committee, 1991-1994
Agricultural Experiment Station Project Committee, 1994-1997
Gamma Sigma Delta, Outstanding Graduate Student Award Committee, Chair, 1996-1997
Gamma Sigma Delta, Outstanding Graduate Student Award Committee, 1995-1996

D. University

Program Review Panel, UK Intellectual Property, 2006
Fellowship Review Panel, UK Woman's Club Fellowship, 2006
Fellowship Review Panel, Presidential Fellowships, 2006
Elected Member, University Senate
Review Panel, Council of Southern Graduate Schools' Thesis Competition, December, 2005
Major Research Equipment Review Committee, 2002
Presidential Task Force on Computer Security and Resource Allocation Committee, 2002
Beckman Undergraduate Scholars Program Advisory Committee, 2001-present
Chair, Plant Science Technical Advisory Committee, Tobacco and Health Research Institute, 1998, 1999
Member, Research Committee Grants Review Panel, 1999
Howard Hughes Medical Institute, Undergraduate Research Committee, 1992-1994; 1997
Chair, University Faculty Senate Research Committee, 1996-1997
Technical Advisory Committee, Tobacco and Health Research Institute, 1993-1995
Research Committee Grants Review Panel, 1992

IX. PUBLIC SERVICE

Invited Speaker, Fayette County Master Gardener Association, "Genetically Modified Crops and You." February 24, 2001.
Science Demonstration Project - 5th Grade science classes (4 sessions), Strode Station Elementary School, Winchester, KY. "Electron Transport and Photosynthesis, Chemiluminescence." September 2000.

Invited Speaker, Fayette County Master Gardener Association. “The Future of Biotechnology.” January 23, 2000.

Invited Speaker, Extension Agents Training, Horticultural Concepts. “Transgenic Plants.” March 23, 1999.

"Biotechnology in Horticulture," presented at the 1988 133rd annual meeting of the Kentucky State Horticultural Society.

"Global atmospheric CO_2, problem or benefit?," presented to the Daughters of the American Revolution, Lexington Chapter, October 14, 1988.

Effects of Trickle Irrigation on Bell Pepper Yields, 1987. Investigators: Robert L. Houtz and John G. Strang. "Trickle Irrigation Installation for Horticultural Crops," presented a short course at the University of Kentucky research farm (South Farm) on March 24, 1987.

Evaluation of Foliar Nitrogen and Cytokinin on Bell Peppers. Investigators: Robert L. Houtz and John G. Strang. Presented at the 132nd Annual Meeting of the Kentucky State Horticultural Society, 1987.

Two Year's Results on the Effects of Trickle Irrigation, Black Plastic Mulch, Raised Beds, and Plant Density on Two Varieties of Bell Peppers. Investigators: Robert L. Houtz and John G. Strang. Presented at the 131st Annual Meeting of the Kentucky State Horticultural Society, 1986.

Reduced Tillage Sweetcorn. Investigators: Dean E. Knavel and Robert Houtz. Horticulture Field Day, South Farm, Lexington, 1985

Strang, J. G., R. L. Houtz. Effects of trickle irrigation, black plastic mulch, raised beds, and plant density on two varieties of bell peppers. 130th annual winter meeting of the Kentucky Horticultural Society, December 9-10, 1985.

Dewayne L. Ingram

Academic Background:

December, 1977	Ph.D. in Plant and Soil Science; University of Tennessee, Knoxville. Major emphasis: ornamental horticulture, plant physiology
June, 1974	B.S. in Agriculture; University of Tennessee, Knoxville. Major emphasis: ornamental horticulture and landscape design.

Professional Experience:

2009 – present	Professor, Department of Horticulture, University of Kentucky
1990 – 2009	Chair & Professor, Department of Horticulture, University of Kentucky
1977 - 1990	Assistant Professor, Associate Professor and Professor, Ornamental Horticulture Department, University of Florida, Gainesville

Selected Professional Leadership and Service Experiences:

President, American Society for Horticultural Science, 2011-12; President-Elect, 2011-12; Board Chair, 2012-13.
Chair, USDA/ARS Program (305 - Crop Production) Review Committee Chair, 2012.
Panel Manager, USDA/NIFA Specialty Crop Research Initiative grant program, 2009-2010.
President, Southern Region - ASHS, 2000-2001.
Advisor, Kentucky Horticulture Council, 1991 to present.
Chair, the Commission on Arboretum Strategic Planning. 2011-2012.

Professional Honors:

KY Cooperative Extension. 2012 Outstanding Extension Program Award. "Horticulture On-Farm Demonstration and Consultation Program". D. Ingram, Coordinator/Manager.
The Paul Smeal Leadership and Administration Award, Southern Region – ASHS, 2008.
Fellow, American Society for Horticultural Science, 2001.
Distinguished Achievement Award for Nursery Crop - ASHS, 1990.
Nursery Extension Award, presented by American Nursery and Landscape Association, 1988.
Porter Henegar Award for Outstanding Horticultural Research, presented by the Southern Nursery Association,1986.

Recent, Related Grants Received:

Kentucky Horticulture Council, Enhancing Infrastructure for Kentucky's Horticulture Industry. Ingram, D.L., PI for five integrated-system grants 2002-2012. $7.2M.
Horticulture Research Institute. 2013. Greenhouse gas emissions (carbon footprint) and associated costs of field-grown, deciduous shrub production system components and subsequent impact in the landscape. D. L. Ingram, and C. Hall. $15,000.
Horticulture Research Institute. 2012. Analyzing the environmental impact (carbon footprint) and economic costs of field-grown flowering tree production system components. D. L. Ingram, and C. Hall. $20,000.
KY Dept. of Agriculture / KY Specialty Crops Block Grant. Ingram, D.L. and S. Nambuthiri. 2011. Sustainable Ground Cover Production for More Sustainable Kentucky Landscapes. $10,780.

Dewayne L. Ingram
Recent Publications

Refereed Research Publications:

Ingram, D.L. 2010. Organizing the Kentucky Horticulture Industry for Improved Strategic Planning and Representation. *HortTechnology* 20(4): 817-819.

Ingram, D.L. 2012. Life cycle assessment of a field-grown red maple tree to estimate its carbon footprint components. *Intl. J. Life Cycle Assess*. 17(4): 453-462.

Ingram, D.L. and T. Fernandez. 2012. Life cycle assessment: A tool for determining the environmental impact of horticultural crop production. *HortTechnology* "Feature Article" 22(3):275-278.

Ingram, D.L. 2012. Life cycle assessment to study the carbon footprint of system components for colorado blue spruce field production and use. *J. Amer. Soc. Hort. Sci.* (In press).

Extension Publications:

Ingram, D. L. W. Dunwell and A. Hodges. 2011. Characteristics of Kentucky's Nursery and Greenhouse Industries. KY Cooperative Extension Service Circular HO-89. 7 p.

Ingram, D.L. and T. Fernandez. 2011. Life Cycle Assessment: Implications for the Green Industry. KY Cooperative Extension Service Circular HO-90. 4 p.

Ingram, D. L. and A. Hodges. 2012. Economic Impact of the Kentucky Green Industry. KY Cooperative Extension Service Circular HO-108. 4 p.

Ingram, D.L. 2012. Life Cycle Analysis provides information to consumers and producers about ways to reduce the carbon footprint of a product or process. Climate Change Factsheet CC-10-12. 3 p.

Ingram, D.L. and S. Vanek. 2012. Sustainable Production Systems: Efficient Wholesale Nursery Layout. KY Cooperative Extension Service Circular HO- (in press)

Vanek, S. and D.L. Ingram. 2012. Sustainable Production Systems: Operational Efficiencies in Wholesale Nurseries. KY Cooperative Extension Service Circular (In review 10/2012).

Industry Magazine Articles:

Ingram, D. L. and W. Dunwell. 2011. The general characteristics of Kentucky's nursery and greenhouse industries. Kentucky Nursery Views. Volume 41 (2). p 18-19.

Ingram, D. L. and W. Dunwell. 2011. Kentucky's nursery and greenhouse industries: Employment and Product Forms. Kentucky Nursery Views. Volume 41 (3). p 18-19.

Ingram, D. L. and W. Dunwell. 2011. Kentucky's nursery and greenhouse industries: Markets, Marketing and Advertisement. Kentucky Nursery Views. Volume 41 (4). p 14-15.

Ingram, D.L. 2012. Economic Impacts of the Kentucky Green Industry. Special Feature. Kentucky Nursery Views. Volume 42 (2). p 10-12.

Ingram, D.L. 2012. Economic Impacts of the Kentucky Green Industry: Wholesale and Retail Trade. Special Feature. Kentucky Nursery Views. Volume 42 (3):16-17.

KRISTA L. JACOBSEN, Ph.D.
Current Appointment
Assistant Professor, Appointed 1 July 2011
Distribution of Effort: 60% Research, 40% Teaching
Previous Appointment
Lecturer, 1 August 2009 – 30 June 2011

Department of Horticulture
University of Kentucky
N-310C Ag. Sci. North
Lexington, KY 40546
Phone: (859) 257-3921
krista.jacobsen@uky.edu

RESEARCH

Extramural Projects

Jacobsen, K.L. (PI), T. Coolong (co-PI). Building technical support capacity for Kentucky's high tunnel specialty crop producers. Kentucky Department of Agriculture Specialty Crops Block Grant Program. Funded, $50,791. 2012 – 2014.

Tanaka, K. (PI), K. Jacobsen (co-PI), K. Niewolny (co-PI), S. Hodges (co-PI), M. Wilcox (co-PI), M. Velandia (co-PI), A. Wszelaki (co-PI) Mapping Sustainable Farm Systems: An Integrated Focus on Upper South New Producers as Catalysts of "Good Stewardship." Southern SARE Research and Education Proposal. Funded, $269,991 (includes cooperating institution budgets). 2012 – 2015. Regionally competitive.

Jacobsen, K.L. (PI), T.W. Coolong (co-PI) & M.A. Williams (co-PI). Developing Diversified High Tunnel Systems to Enhance Food Security and Specialty Crop Production in Kentucky. Kentucky Department of Agriculture Specialty Crops Block Grant Program. Funded, $62,834. 2011-2013.

Wilson, P. (PI) & K. L. Jacobsen (collaborator). Organic Grape Production for Kentucky. Kentucky Department of Agriculture Specialty Crops Block Grant Organic Pest Management Program. Funded, $20,000. 2011-2013.

Jacobsen, K.L. (PI), T. W. Coolong (co-PI), & M.A. Williams (co-PI). Optimizing No-Till Vegetable Production Systems for Organic Growers. Kentucky Department of Agriculture Specialty Crops Block Grant Organic Pest Management Program. Funded, $20,000. 2010-2012.

Williams, M.A. (PI) & K.L. Jacobsen (co-Investigator). New Crop Opportunities in Sustainable Organic Production. National Institute of Food and Agriculture. Funded, $50,003. 2010-2011.

Other

Jacobsen, K.L. (PI). Outreach Education Sponsorship for the 4th National Sustainable Agriculture Education Association Conference. Sustainable Agriculture Research and Extension (SARE). Funded, $5,000. 2011.

Jacobsen, K.L. (PI) & M.W. Williams (co-PI). Fostering Research in Teaching and Learning in Sustainable Agriculture: Kentucky EPSCoR Conference Award. Kentucky Council on Post-Secondary Education. Funded, $2,665. 2011.

Jacobsen, K.L., D. Parr, K. Niewolny. Supporting Education in Sustainable and Organic Agriculture: A Proposal to Fund the 4th National Sustainable Agriculture Education Association (SAEA) Conference. The Ceres Trust. Funded, $10,000. 2011.

Participant, Multistate Hatch Project No: SCC83 Quantifying the Linkages Among Soil Health, Organic Farming, and Food. 2010 – current.

Proposals submitted

Schramski, John, R. (PI), K. Jacobsen, J. Gaskin, E. K. Styles, D. Gattie, J.E. Brown, K. Li, F. Papavasiliou, C. Furman, E.A. Kramer, X. Liu, G.E. Boyhan (co-PI's). Sustainability of Scale: Identify Secure Food Delivery Systems in the Southeast Through Integrated Life Cycle, Market, Land-Use, and Social Network Analysis. NIFA-AFRI: Food Security. Total request: $4,888,598.00; UK Subcontract: $258,463. Not funded, 2012. Ranked High Priority.

Schramski, John, R. (PI), M. Bomford, J. Gaskin, D. Gattie, S. Hawkins, K. Jacobsen, C. Kazanci, K. Li, K. Mulder, E.K. Styles (co-PI's). Energy in Organic Agriculture: Modeling and Case Studies for Research and Extension. NIFA:OREI. Total request: $1,980,123; UK Subcontract: $239,517. Not funded, 2012. Ranked High Priority.

Shramski, J. (PI), D. Gattie, K.L. Jacobsen, K. Mulder, C. Kazanci, K. Li, M. Williams (co-PI's) Energy in Sustainable Agriculture: Modeling and Case Studies for Research and Extension. NIFA Organic Agriculture Research and Extension Initiative. Total request: $1,800,000; UK Subcontract: $267,000. Not funded, 2011. Ranked Medium Priority.

Graduate Student Advising

Victoria Anderson, M.S., Plant and Soil Sciences (Advisor), *in progress.*

Alex Hessler, M.S., Integrated Plant and Soil Sciences (Advisor), *in progress.*

Kavita Mizin, M.S., Integrated Plant and Soil Sciences (Advisor), *in progress.*

Graduate student committee membership: 4 (2012).

TEACHING AND ADVISING

Courses Taught

Fall 2012

SAG 101: Introduction to Sustainable Agriculture (31 students). *In progress.*

PLS/SAG 386: Plant Production Systems (33 students). *In progress.*

Spring 2012

GEN 300: Agroecology (100% Jacobsen, 18 students). Course Mean: 3.9; Teaching Mean: 4.0.

SAG 201: Cultural Perspectives on Sustainability (38 students). Course mean: 3.7; Teaching Mean: 3.9.

Fall 2011

SAG 101: Introduction to Sustainable Agriculture (15 students). Course Mean: 3.7; Teaching Mean: 3.7.

PLS 386: Plant Production Systems. (Co-taught with Dr. Mark Williams (50% Jacobsen, 50% Williams; 33 students). Course Mean: 4.0; Teaching Mean: 4.0.

Spring 2011

GEN 300: Agroecology (Co-taught with Dr. Rebecca McCulley (75% Jacobsen, 25% McCulley; 14 students). Course Mean: 3.8; Teaching Mean: 3.8.

SAG 201: Cultural Perspectives on Sustainability (24 students). Course Mean: 3.9; Teaching Mean: 3.9.

HON 115: World Food Issues II (8 students). Course Mean: 4.0; Teaching Mean: 4.0.

Undergraduate Advising

Fall 2012: 20 SAG advisees

Spring 2012: 13 SAG advisees

Fall 2011: 13 SAG major advisees

Activities with Students Outside of the Classroom

Slow Foods Student Club – Faculty Advisor, February 2011 – present.

Students Engaged in Agricultural Discovery (SEAD) Student Club – Provide technical support on Gaines Center Community Garden Activities. January 2012 – present.

Shawneetown/Cooperstown Community Gardens – Provide technical support and site preparation for community gardens on campus for these Student Sustainability Council-funded activities. Supervise/mentor paid garden interns throughout the growing season. Spring 2011 - present.

Service Learning Activities – Coordinate logistics for a number of service learning activities and field trips to local farms and food based organizations in throughout the Bluegrass Region for SAG majors and students in SAG classes (average 1 per month for Fall semester). Fall 2011 – present.

Activities to Improve Teaching and Learning

Sustainable Agriculture Education Association - Organized the 4th National Sustainable Agriculture Education Association (SAEA) at the University of Kentucky in August, 2011. (Conference Committee Co-Chair).

Organized a "State of Sustainable Agriculture Education at Land Grant Universities" pre-conference workshop in conjunction with the SAEA conference. The outcomes of this workshop have been published in a special edition of the Journal of Agriculture, Food Systems and Community Development (May 2012; see publications for details).

Elected to the SAEA Steering Council (March 2012) for a 2 year term. National leadership in this group is facilitating collaboration with peer programs at institutions across the country. Activities include exchange of best practices in teaching and learning in sustainable agriculture, collaboration on grants to build education abroad networks, and involvement to develop a peer-reviewed scholarly journal for Sustainable Agriculture Education.

Globalizing Agriculture Education Project – Faculty participant in this International Science and Education (USDA) project (Keiko Tanaka, PI) effort to develop agriculture-issues curriculum in an international context. Developed of Introductory Sustainable Agriculture teaching modules for general use in COA undergraduate courses with a team of COA faculty dedicated to increasing student awareness of global agricultural issues. Currently developing Education Abroad course for Summer 2013, "Tropical Agroecology and Sustainable Development in Indonesia."

EXTENSION & OUTREACH

Development of the UK High Tunnel Research Facility – this applied research facility was developed in 2011-2012. Extension objectives during the review period include: demonstration of movable and stationary high tunnels, development of model crop rotations for diversified vegetable and fruit production focused in improving variety of year-round direct marketed crops, and yield and variety trials for organic high tunnel production.

PUBLICATIONS

Refereed journal articles

Carrillo, Y., C. F. Jordan, K. L. Jacobsen, K.G. Mitchell, & P. Raber. 2011. Shoot pruning of a hedgerow perennial legume alters the availability and temporal dynamics of root-derived nitrogen in a subtropical setting. Plant and Soil 345(1-2): 59-69.

Jacobsen, K.L., K.L. Niewolny, M.S. Schroeder-Moreno, M. Van Horn, A.H. Harmon, Y.H. Chen Faslow, M. Williams, D. Parr. 2012. Sustainable Agriculture Undergraduate Degree Programs: A Land-Grant University Mission. Journal of Agriculture, Food Systems and Community Development. *Published online 27 May 2012.* http://dx.doi.org/10.5304/jafscd.2012.023.004, pp. 1–14

Niewolny, K.L., J.M. Grossman, C.J. Byker, J.L. Helms, S.F. Clark, J.A. Cotton, K.L. Jacobsen. 2012. Sustainable Agriculture Education and Civic Engagement: The Significance of Community-University Partnerships in the New Agricultural Paradigm. Journal of Agriculture, Food Systems and Community Development. *Published online 23 May 2012.* http://dx.doi.org/10.5304/jafscd.2012.023.005, pp. 1–15

Extension Publications

Jacobsen, K.L. Organic Gardening: Kentucky Master Gardener Manual Chapter 18. 2012. University of Kentucky College of Agriculture Cooperative Extension Service Publication No. HO100. http://www.ca.uky.edu/agc/pubs/ho/ho100/ho100.pdf

Peer-Reviewed Book Chapters

Tanaka, K., M. Williams, K. Jacobsen and M. Mullen. 2012. Sustainably Growing Farmers of the Future: Undergraduate Curriculum in Sustainable Agriculture at the University of Kentucky. *In* Bartels, K. and K. Parker, *Teaching Sustainability / Teaching Sustainably.* Stylus Publishing, Herndon, VA.

Other

Reviewer, Organic Crop Production Crop Profile. 2011. Crop Diversification & Biofuel Research & Education Center. http://www.uky.edu/Ag/CDBREC/introsheets/organicproduction.pdf

Publications Under Review

Schramski, J.R., K. Jacobsen, T. Smith, M. Williams, T.M. Thompson. Energetics of Organic Agriculture: Case Study of a Diversified, Organic Vegetable Production System in Kentucky. Agriculture, Ecosystems and Environment. *Submitted August 13, 2012.*

MEETINGS

Jordan, C. F., K. Jacobsen and Y. Carrillo. 2011. Alley Cropping in the Southeast. Poster. 12th North American Agroforestry Conference. University of Georgia, Athens, GA.

Schramski, J., K. Jacobsen and T. Smith. The Coupling of Human and Natural Systems: Agroecological Energy Systems Modelling and Case Study of a Diversified Organic Vegetable Farm in Kentucky, USA. 18th Biennial International Society of Ecological Modeling Conference, Beijing, China. September 20-23, 2011.

Smith, T., K. Jacobsen, J. Schramski. 2012. Energetics of Organic Agriculture: Case Study of Community Supported Agriculture in Kentucky. Degrowth in the Americas Conference, Montreal, Canada. May 13-19th, 2012.

Schroeder-Moreno, M. and K. Jacobsen. Developing International Learning Opportunities in Sustainable Agriculture – What and How Do We Want Students to Learn? Sustainable Agriculture Education Association National Conference, Corvallis, Oregon. September 9-10th, 2012.

Tanaka, K., K. Niewolny, K. Jacobsen, L. Brislen. Mapping Sustainability, Farming Sustainably: Mapping Approach in the Study of Sustainable Farming Systems. XIII World Congress of Rural Sociology, Lisbon, Portugal. July 29th - August 4th, 2012.

Radio interviews – 1

Popular press print interviews – 2

County meetings – 3

Field days – 2

UK Organic Farming Unit tours - 12

SERVICE AND RECOGNITION

Outreach and Service

Bluegrass Domestic Violence Program Farming Project- I am providing technical support to the farm manager and BDVP staff to develop a working market garden and horticultural therapy gardens at this residential facility for women and children. I recruited and was the faculty mentor for a SAG undergraduate intern on the site to work with the farm manager during Summer 2011, and have provided high tunnel and market garden construction and technical assistance since operations began in Spring 2011.

Invited Seminars

Seminar on Biodiversity, Climate Change, Food, Energy and Sustainability: How to integrate into education curriculum and lessons learned. University of Lampung, Bandarlampung, Sumatra, Indonesia. June, 2012.

Committee Involvement

Sustainable Agriculture Curriculum Steering Committee Member (September 2009 to present)

Sustainable Agriculture and Food Systems Working Group Member (September 2009 to present)

Elected Positions

UK College of Agriculture Faculty Council (2012 – present)

National Sustainable Agriculture Education Association Steering Council Member (2012 – present)

Reviewer Service

Journals (number of reviews during performance review period): Plant and Soil (2); International Journal of Pest Management (1); Sustainable Agriculture Research (1), Journal of Horticultural Science & Biotechnology (1).

RESEARCH STATEMENT

My research program is most concisely described as examining sustainable and organic specialty cropping systems through an agroecological lens. Specifically, my group investigates how rotation, diversification, cover crops and conservation tillage affect soil quality, nutrient cycling, plant productivity and economic viability at various farming scales. In the paragraphs below I describe the foci, recent accomplishments, and trajectory of my program.

1) *The High Tunnel Research Facility at the Organic Farming Unit:* This work focuses on development and study of diversified crop rotations in high tunnels (unheated greenhouses), with the goal of year-round specialty crop production that preserves soil quality and minimizes input costs. We incorporate agro-ecological farming approaches, such as cover cropping, intense crop rotations, and the use of integrated nutrient management approaches. This facility was constructed during the review period, and is comprised of 6, 30' x 72' high tunnels, including design-build of 3 movable high tunnels designed to be accessible to Kentucky growers with varied site considerations, farm infrastructure, and available capital. This was a significant undertaking, and to our knowledge, it is the only movable tunnel demonstration site of its kind in the country. After 1.5 y of site development and piloting of management techniques, we have refined experimental design and management strategies. Future (*funded*) research directions include development of nutrient budgets and organic fertility recommendations for year-round diversified crop production, enterprise budgets, and future multi-state, federally-competitive proposals. This project is directly tied into extension activities through my collaborations with Dr. Tim Coolong (co-PI), and is funded through Kentucky Department of Agriculture Specialty Crop Block Grant funding. Dr. Coolong and I are currently developing joint NRCS and Agriculture Agent training sessions on high tunnel production and management (November 2012), designed to build connections between service providers throughout the state to better enhance support for growers on production and funding mechanisms. This is of keen grower interest with the passage of a new cost share program with the NRCS that funded the construction of over 200 high tunnels across the Commonwealth in 2012.

2) *Developing conservation tillage systems for direct market specialty crop production:* Objectives of this research area are to examine the effects of alternative residue management on nitrogen dynamics, weed suppression and production economics (labor and inputs) at various scales of organic production. We have completed a 2 year study of organic conservation tillage systems in agronomic systems with sweet corn and winter squash, and evaluated the effects of organic no-till, conservation tillage, and conventional tillage on crop yields, weed biomass and on-farm labor requirements. Research initiated in the 2012 growing season is focused on the development of conservation tillage for the small-scale, diversified grower, integrating living mulches and walk-behind tractor technologies. Based on grower interest and the scale of specialty crop production in Kentucky, future directions for the conservation tillage work will be focused on small-scale systems that are management intensive. Rigorous soil inorganic nitrogen data and plant production data from the 2012 year will be used to inform near future work to examine living mulch systems using competition thresholds/modeling and synchrony of nutrient release with uptake in concert with management activities to refine these systems.

3) *Evaluation of energy use and productivity of diversified organic vegetable systems:* Small- to medium-scale diversified, direct market vegetable farming systems are a growing trend, in part due to the increased public interest in local foods. However, the energetic inputs and outputs of these systems relative to more conventional specialty crop production systems is relatively understudied. Recent work with an energy modeling team at the University of Georgia

(PI, Dr. John Schramski) has utilized case study date from the UK CSA to examine energy use in mid-scale organic farming systems relative to conventional and low-input organic systems. Accomplishments in the review period include 2 international conferences and submission of a peer-reviewed publication, as well as development of proposals for federally competitive programs. Future directions include re-submission of energy-related work to NIFA programs, and comparisons of energy use along a spectrum of intensive to extensive agricultural organic systems utilized at the UK Organic Farming Unit.

TEACHING STATEMENT

The objectives of my teaching program span areas of resident instruction, undergraduate curriculum development, involvement in national teaching organizations, and graduate student mentorship. In the past 2 years of instruction, my courses have seen increases in student numbers while maintaining relatively high course evaluations. But more importantly, I feel I am starting to hone a facilitation style that is conducive to a positive classroom environment that is open to the expression of varied opinions and active exploration of ideas. During the review period, I have been active in curriculum development within the Sustainable Agriculture Undergraduate Degree (SAG) program, including having a new course adopted into the SAG core curriculum (Agroecology), as well as piloting SAG 201 through as a UK Core course. Near future instructional plans include building on the tradition of high-quality, student-centered instruction in the SAG with the development of a summer Education Abroad course to Indonesia that will serve SAG/ COA majors, as well as serve recruit into the SAG program.

In August 2011, the UK SAG and COA hosted the 4th National Sustainable Agriculture Education Association (SAEA) conference, the only national-level organization focused on teaching and learning in sustainable agriculture education. The conference was a significant milestone for the SAG program, and highlighted our ability to be leaders among Land Grant Universities (LGUs) in this field. I was the primary faculty coordinator in these efforts and developed a pre-conference workshop for LGUs that are in an advanced state of sustainable agriculture programmatic development (established majors and minors in sustainable agriculture). This workshop was a highly productive resource exchange and development of national needs. It generated publication of 4 journal articles in a special edition of the Journal of Agriculture, Food Systems and Community Development focused on issues of sustainable agriculture in higher education. In addition to some authorship and workshop development credit, these activities prompted the SAEA to nominate me for a leadership position in the organization. I hope to use this position to further develop the UK SAG program's network of national colleagues and infuse our program with broad and novel perspectives on sustainable agriculture education. Near future plans include working to develop a peer-reviewed journal devoted to scholarly research in teaching and learning in sustainable agriculture education.

Finally, having moved to a tenure-track, research-dominated position during this review period, much of my teaching and mentorship efforts have shifted towards building a cohesive lab group with students that are eloquent advocates of their work in sustainable and organic agriculture. While I would say that I am still learning on how best manage a vibrant lab team, I strive to provide opportunities for curiosity-driven scientific exploration and professional development through public presentation of research (conference attendance, speaking at field days, in front of classes, etc.). My near-term focus is, perhaps myopically, on advancement of graduate students toward their graduation and their contributions to my productivity in a pre-tenure position. However, in the long term (3-5 years), I would be keen to develop a Sustainable Agriculture emphasis within the Integrated Plant and Soil Sciences Degree Program.

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Ruth Ann Scott

Education

University of Kentucky, Lexington, Kentucky
- Master of Science Vocational Education August, 2000

Cornell University, Ithaca, New York
- Bachelor of Science Consumer Economics May, 1977

Experience

Fall 2011-Spring 2013, University of Kentucky, College of Agriculture, Lexington, Kentucky
Full-time Faculty
- Taught “Issues in Agriculture” and Introduction to Floral Design”
- Master Gardeners Program.
- Floral design for college events.

2001-2011, University of Kentucky, College of Human Environmental Sciences, Lexington, Kentucky.
Full-time Faculty
- Taught two sections of "Professions in Human Environmental Sciences" each semester.
- Taught two sections of capstone class: “Integration and Application” each semester.
- Presented 101, an academic orientation class for freshmen, three years.
- Prepared lectures, and coordinated guest speakers.
- Selected supporting materials for each session.
- Supervised teaching assistants’ work.
- Revised independent study guide for “Professions in Human Environmental Sciences”
- Provided support to Student Services in areas of student retention, advising, career counseling, and production of college wide event events.
- Faculty advisor for student chapter of Kentucky Association of Family and Consumer Sciences.
- Served on curriculum committee and merger sub-committee.
- Received consistently favorable teaching evaluations from students.
- Served on A.A.F.C.S. accreditation review committee.
- Taught floral design lab class fall 2010.

Fall 2000, Spring 2001
College of Human Environmental Sciences, Lexington, Kentucky
Adjunct Faculty
- Taught “Professions in Human Environmental Sciences".
- Prepared lectures and review sessions.
- Wrote evaluation report for improvement at the request of the department chair.
- Selected supporting materials for each session.
- Supervised teaching assistant's work.

May-July 2000, Operation Educate, University of Kentucky, Lexington, Kentucky
Instructor

- Conducted weekly classes in personal finance.
- Developed curriculum for this pilot program.
- Wrote and produced all class materials and supporting documents including evaluation forms.

1988–2003, various flower shops, Central Kentucky
Consultant and Professional Floral Designer

- Designed arrangements for corporate, nonprofit, and private organizations.
- Provided business and management consultation to store owners.
- Trained employees.
- Designed creative floral arrangements including custom orders.
- Provided customer service specializing in wedding consultation and large event planning.
- Created displays and purchased products.
- Developed and produced newsletter for marketing.

Professional Development

- National conference on First Year Experience and Students in Transition
- Teaching University 101 Conference at Morehead University
- Graduate seminar on Student First Year Success
- District and state meetings for Kentucky Association of Family and Consumer Sciences
- National conferences for the American Association of Family and Consumer Sciences
- National conference for the American Council on Consumer Interests
- Council on Post-secondary Education conference
- Numerous seminars concerning teaching millennial students
- Floral design conferences and professional design classes
- College of Agriculture seminar on Student Success and Retention

Professional Organizations

- American Association of Family and Consumer Sciences
- Kentucky Association of Family and Consumer Sciences
  Executive Board 2003-2005
- American Council on Consumer Interests
- Families, Careers and Community Leaders, Advisory Board 2003-2005

Volunteer and Other Service

- Current board member of University of Kentucky Women's Forum.
- Public Interest Research Group (Research and Consumer Hot Line)
- Motor Voters (helped to get Lemon Law legislation passed)
- University of Kentucky Children's Hospital and Children's Miracle Network
- Home at Last Animal Sanctuary
- Supervised student volunteers for the Kentucky Consumer Hotline.
- Habitat for Humanity
- Scott County Humane Society
- Served as consultant/speaker for leadership of local Girl Scout Council.

JOHN G. STRANG

PERSONAL DATA

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EDUCATION

INSTITUTION	MAJOR	DEGREE	DATES
Oregon State University	Horticulture	Ph.D.	1975-1978
University of Minnesota	Horticulture	M.S.	1972-1975
University of Maryland	Horticulture	B.S.	1970-1972

Ph.D. Dissertation Title: Frost Hardiness of Buds, Flowers, and Fruit of Pear (*Pyrus communis* L.)

EMPLOYMENT AND EXPERIENCE

PLACE	DATES	POSITION
Dept of Horticulture	July 1989-Present	Ext. Prof. of Horticulture
University of Kentucky	July 1982-Aug. 1989	Assoc. Ext. Prof. of Horticulture
Lexington, KY	Aug. 1978-July 1982	Asst. Ext. Prof. of Horticulture

PROFESSIONAL AND INDUSTRY MEMBERSHIPS

American Society for Hort. Science
Southern Region ASHS
Northern Nut Growers Association
Kentucky Vegetable Growers Association
Kentucky State Horticultural Society
Kentucky Vineyard Society
Kentucky Nut Growers Association

HONORS

Outstanding Specialist Award, KY Association of County Agricultural Agents, 2012

Outstanding Program Award, Hort. On-Farm Demo & Consultation Program, KASEP, 2012

SR-ASHS Extension Communication Award for publication, IPM Scouting Guide for Common Pests of Solanaceous Crops in Kentucky, T. Coolong, J. Masabni, J. Strang, T. Jones, R. Bessin, and K. Seebold, 2010.

Kentucky State Horticultural Society, In recognition and appreciation of your dedication and lifetime service to the Kentucky horticultural industry and the Kentucky State Horticultural Society, 2010.

Kentucky Vegetable Growers Association in conjunction with the Kentucky State Horticultural Society, C. R. Roberts Award, In recognition of outstanding contributions to the Kentucky fruit and vegetable industry, 2010..

Extension Publication Award, Disease and Insect Control Programs for Home Grown Fruit in Kentucky Including Organic Alternatives, J. Strang, J. Hartman, R. Bessin, R. Hadad, R. Jones, G. Brown, and M. Witt., American Society for Horticultural Science, Southern Region, 1997.

Award for Outstanding Program, Apple IPM Program, Assoc. of Kentucky Extension Specialists, 1996.

Extension Educational Aids Award, Ginseng Production and Harvesting, Cleaning, Drying and Grading, video tape, T. Jones, J. Strang and M. Eclov, ASHS, Ext. Div., 1995.

DISTRIBUTION OF EFFORT

Extension 100%, 1978-2012

PUBLICATIONS

Refereed Journals

Lowe, J., K. Pomper, S. Crabtree, J. Clark, and J. Strang. 2012. Yield characteristics of thorny primocane-fruiting blackberries from the University of Arkansas breeding program grown under organic growing conditions in Kentucky. J. Amer. Pomological Soc. 66:2-7

Coolong, t. J. Snyder, R. Warner, J. Strang, and S. Surendran. 2012. The relationship between soil water potential, environmental factors and plant moisture statue for poblano pepper grown using tensiometer scheduled irrigation. Int. J. Veg. Sci. 18:137-152

Strang, J., J. Snyder, K. Oakley, and E. Dixon. 2000. Reactions of pumpkin cultivars to powdery mildew, 1999. Biological and Cultural Tests for Control of Plant Diseases. B & C Tests for Control of Plant Diseases. 15:178.

Wolfe, D., J. R. Hartman, G. R. Brown and J. Strang. 1990. The influence of soil fumigation on strawberry yield and economics in black root rot infested fields. Applied Agr. Res. 5:17-20.

Extension Publications (last two years)

Peer reviewed:

Scott, D., M. Williams, D. Archbold, J. Strang, and R. Bessin. 2010. Organic Apple Production Update. Fruit and Veg. Crop Res. Rpt. (PR 608) pp. 17-18

Pomper, K., J. Lowe, S. Crabtree, J. Clark, and J. Strang. 2010. University of Arkansas Thorny and Thornless Primocane-fruiting Blackberry Trial in Kentucky. Fruit and Veg. Crop Res. Rpt. (PR 608) pp. 23-24

Archbold, D., R. Sutapa, J. Strang, A. Poston, and C. Smigell. 2010. Kentucky-Grown Berry Crops are Rich Sources of Health-Beneficial Phytochemicals. Fruit and Veg. Crop Res. Rpt. (PR 608) pp. 26-29

Maynard, E. 2010 (ed). Muskmelon and Specialty Melon Variety Evaluations, 2010. Midwest Veg. Trial Rpt. for 2010. Dept. of Hort., Purdue Univ. pp. 27-33

Smigell, C., J. Strang, J. Snyder, J. Tucker and D. Slone. 2010. Blueberry Variety Evaluations. Fruit and Veg. Crop Res. Rpt. (PR 608) pp. 29-31

Smigell, C. J. Strang, D. Slone, J. Tucker, and J. Snyder. 2010. Muskmelon and Specialty Melon Variety Evaluations. Fruit and Veg. Crop Res. Rpt. (PR 608) pp. 32-34

Strang, J., C. Smigell, P. Kelley, P. Sigler, K. Seebold, S. Bastin, D. Slone, and J. Snyder. 2010. Green Bean Variety Evaluation. Fruit and Veg. Crop Res. Rpt. (PR 608) pp. 38-40

Coolong, T., J. Strang, R. Bessin, and K. Seebold. 2011. An IPM Scouting Guide for Common Pests of Solanaceous Crops in Kentucky (ID-172). 30 pp.

Pomper, K., J. Lowe, S. Crabtree, J. Clark, and J. Strang. 2011. The Prime-Jan® and Prime-Ark 45® Thorny Primocane-fruiting Blackberry Trial at Kentucky State University. Fruit and Veg. Crop Res. Rpt. (PR 626) pp. 18-20

Smigell, C., J. Strang, J. Pfeiffer, J. Snyder and D. Slone. 2011. Eggplant Variety Evaluations. Fruit and Veg. Crop Res. Rpt. (PR 626) pp. 23-24

Strang, J., C. Smigell, J. Pfeiffer, J. Snyder and D. Slone. 2011. Pea Variety Evaluations. Fruit and Veg. Crop Res. Rpt. (PR 626) pp. 21-23

Strang, J., R. Bessin, N. Ward, plus specialists from 9 other states, 2011 & 12. Midwest Tree Fruit Spray Guide (ID-92). 69 pp. Revised. Coordinated revision of hort. section

Strang, J., S. Wight, R. Bessin, N. Ward, plus specialists from 12 other states, 2011 & 12. Midwest Small Fruit and Grape Spray Guide (ID-94). 85 pp. Revised

Coolong, T., R. Bessin, R., S.Wright, J. Strang, and K. Seebold. 2012. Vegetable Production

Guide for Commercial Growers, 2012-13 (ID-36). 13 pp. Revised

Not peer reviewed:

Strang, J. and S. Wright. 2011. Fruit Crop Tissue Analysis. HortFact-3001. 2 pp. Revised

Wolfe, D., J. Strang and S. Wright. 2011. Rootstocks for Kentucky Fruit Trees. (HO-82). 5 pp. Revised

Durham, R., J. Strang, N. Ward, R. Bessin. 2012. Disease and Insect Control Programs for Homegrown Fruit in Kentucky (ID-21). 20 pp. Revised

Durham, R., T. Coolong, R. Jones, J. Strang, M. Williams, S. Wright, R. Bessin and N. Ward. 2012. Home Vegetable Gardening in Kentucky. (ID-128). 48 pp. Revised

Strang, J. 2012. Home Fruit Variety Recommendations. (HortFact -3003). 6 pp. Revised.

Other publications:

Newsletters:

Fruit Facts, editor 2011-12

Kentucky Woodlands Magazine, Kentucky Pecans, 2012; Have You Considered Shagbark and Shellbark Hickories? 2012

APPLIED RESEARCH (Since 2011)

Eggplant cultivar trial, 2011, (PI); English, edible pod and snap pea cultivar trial, 2011, (PI)

Evaluation of ProGibb on blueberry fruit set, 2011, (PI)

Thornless blackberry and three blueberry quasi-pulsed irrigation studies on grower farms, 2011. (Co-PI), R. Warner, T. Coolong

Southern highbush & rabbiteye blueberry cultivar trials, 2011-12 (PI)

Dwarf sour cherry cultivar trial, 2011-12, (PI) Extramurally funded

Organic apple prod., 2011-12, (collaborator), D. Archbold, M. Williams, R. Bessin

Spring turnip cultivar trial, 2012, (PI); Bell pepper race trial, 2012, (PI)

Thorny and thornless blackberry taste eval., 2012, (collaborator) T. Woods and A. Anandappa

Mark A. Williams

Curriculum Vitae

I. Education

- Doctor of Philosophy, Developmental and Cell Biology, University of California, Irvine, 1998. Dissertation Title: RNA Editing Site Recognition in Plant Mitochondria.

- Bachelor of Science, School of Biological Sciences, University of Kentucky, 1989. Major: Botany.

II. Professional Employment

- Associate Professor - Department of Horticulture, University of Kentucky. January 1, 2007-present.

- Assistant Professor - Department of Horticulture, University of Kentucky. January 1, 2001-December 31, 2006.

- Post-Doctoral Scholar - Department of Horticulture, University of Kentucky. August 1999-December 2000.

- Post-Doctoral Scholar - Department of Developmental and Cell Biology, University of California, Irvine. August 1998-July 1999.

- Lecturer - Department of Developmental and Cell Biology, University of California, Irvine. August 1998-June 1999.

III. Honors and Awards

- Teachers Who Made a Difference Award, University of Kentucky College of Education. April, 2012

- NACTA (North American Colleges & Teachers of Agriculture) Teacher Fellow Award. June, 2009.

- Finalist, 2006 University of Kentucky Provost's Award for Outstanding Teaching.

- RNA Society Poster Award. Gordon Conference on RNA Editing. Ventura, California. 1999.

- Regents Dissertation Fellowship. University of California, Irvine. 1998.

- NIH Training Grant: Synthesis and Structure of Biological Macromolecules. University of California, Irvine. 1995-1997.

IV. Research Funding

Extramural Funding, Nationally Competitive

1. Shielding cucurbit crops for resilient agroecosystems. USDA Sprecialty Crops Research Initiative. Overall project PI: Mark Gleason, Iowa State University. University of Kentucky PI: Tim Coolong, Co-PI: **Mark Williams**, Co-PI: Ric Bessin. Total Project funding: $1,552,870. UK subcontract: $164,519 for two years starting October 2012.

2. Incorporating Row Covers into Muskmelon IPM with a Farming Systems Approach. USDA Pest Management Alternatives Program. Multi-state project. Overall project PI: Mark Gleason, Iowa State University. University of Kentucky PI: **Mark Williams**, Co-PI: Tim Coolong, Co-PI: Ric Bessin. Total Project funding: $200,000. UK subcontract: $76,000 for three years starting September 2011.
3. Globalizing Agricultural Education: Sustainable Agriculture, Food and Rural Development. USDA/NIFA International Science and Education Competitive Grants. PI: Keiko Tanaka, Co-PI: **Mark Williams**, Co-PI: Beth Goldstein, Co-PI: Carol Hanley. $150,000. 2010-2013
4. Sustainable Systems for Cucurbit Crops on Organic Farms. USDA Organic Agriculture Research and Extension Initiative. This is a multi-state project. Overall project PI: Mark Gleason, Iowa State University. University of Kentucky PI: **Mark Williams**, Co-PI: Tim Coolong, Co-PI: Ric Bessin. Total Project funding: $1,047.024. UK subcontract: $276,448 for three years starting July 2009.

5. A Training Program in Sustainable Vegetable Production for Extension Personnel in Kentucky and Tennessee. USDA Southern SARE Professional Development Program. PI: Timothy Coolong, Co-PI: **Mark Williams**, Co-PI: Kenny Seebold, Co-PI: Ricardo Bessin, Co-PI: Annette Wszelaki (University of Tennessee), Co-PI: Michael Bomford (Kentucky State University). $59,532 for 1 year starting July 2010.

6. Engaging Agricultural and Non-Agricultural Students in an Interdisciplinary Curriculum for Sustainable Agriculture. United States Department of Agriculture - Higher Education Challenge Grants Program. PI: **Mark Williams**, Co-PI: Mike Mullen, Co-PI: Larry Grabau, Co-PI: Victoria Bhavsar. $141,274 for 3 years, starting July 2005.

7. Chloroplast-Localized N-Terminal Protein Processing by Peptide Deformylase. National Science Foundation. PI: Lynnette Dirk, Co-PI: **Mark Williams**, Co-PI: Robert Houtz, Co-PI: Anne Francis-Miller. $300,000 for 3 years, starting January 2003.

Extramural Funding, Regionally Competitive

1. Optimizing No-Till Vegetable Production Systems for Organic Growers. PI: Krista Jacobsen, Co-PI: Tim Coolong, Co-PI: **Mark Williams**. Kentucky Department of Agriculture Specialty Crops Block Grant Organic Pest Management Program. $20,000. 2010-2012.
2. Optimizing Orchard Management Strategies for Yield, Plant Health, and Fruit Quality in Organic Apple Production. PI: Doug Archbold, Co-PI: **Mark Williams,** Co-PI: John Strang,

Co-PI: Ric Bessin. Kentucky Department of Agriculture Specialty Crops Block Grant Organic Pest Management Program. $73,425. 2010-2012.

3. Developing Diversified High Tunnel Systems to Enhance Food Security and Specialty Crop Production in Kentucky. PI: Krista Jacobsen, Co-PI: Tim Coolong, Co-PI: **Mark Williams.** Kentucky Department of Agriculture Specialty Crops Block Grant Program. $62,834. 2011-2013.
4. Fostering Research in Teaching and Learning in Sustainable Agriculture. Kentucky EPSCoR Conference Award. Kentucky Council on Post-Secondary Education. PI: Krista Jacobsen, Co-PI: Mark Williams. $2,665. 2011.
5. Isolation and Identification of Plant-Specific Peptide Deformylase Inhibitors from Soil Microorganisms for Use as Broad-Spectrum Herbicides and Selectable Markers. Kentucky Science and Engineering Foundation. PI: Robert L. Houtz, Co-PI: **Mark A. Williams**, Co-PI: Robert B. Grossman, Co-PI: Elisa M. D'Angelo, Co-PI: David W. Rodgers. $19,976. 2007-2009.
6. Database Design and Usability Testing for Advanced Digital Information Systems in Horticulture. Kentucky Science and Technology Corporation. PI: **Mark Williams**. $269,018 for 22 months, starting November 2002.

Extramural Funding, Internally Competitive

1. Developing Optimized Sustainable Organic Production Systems for Kentucky. USDA Special Grant: New Crops Opportunity Center, University of Kentucky. PI: **Mark Williams**, Co-PI: Tim Coolong, Co-PI: Krista Jacobsen. $50,003 for 2 years starting January 2010.

2. Developing an Optimized Organic Production System to Control Cucumber Beetles in Cucurbits. USDA Special Grant: New Crops Opportunity Center, University of Kentucky. PI: **Mark Williams**, Co-PI: Tim Coolong, Co-PI: Ric Bessin, Co-PI: Paul Vincelli. $55,000 for 3 years, starting July 2008.

3. Developing an Optimized Production System for Fresh Market Sweet Onion Production in Kentucky. USDA Special Grant: New Crops Opportunity Center, University of Kentucky. PI: Tim Coolong, Co-PI: **Mark Williams**. $33,107 for 3 years starting June 2009

4. Organic Grape Production for Kentucky. USDA Special Grant: New Crops Opportunity Center, University of Kentucky. PI. Patsy Wilson, Co-PI Krista Jacobsen, Co-PI: **Mark Williams**. $20,000 for three years staring June 2011.

5. Developing Optimized Organic Production Systems for Leafy Greens in Kentucky. New Crops Opportunity Center, University of Kentucky. PI: **Mark Williams**, Co-PI: Brent Rowell. $17,000 for 3 years, starting June 2006.

6. Evaluation of Natural Sprays for Control of Economically Important Foliar and Fruit Diseases of Tomato and Cucurbits. New Crops Opportunity Center, University of Kentucky. PI: Paul Vincelli, Co-PI: **Mark Williams**, Co-PI: Ric Bessin, Co-PI: Kenny Seebold. $23,667. 2009-2012.

7. Sustainable/Organic Production Systems. New Crops Opportunity Center, University of Kentucky. PI: **Mark Williams**, Co-PI: Krista Jacobsen. $50,003. 2010-2011.

8. Isolation and Identification of Plant-Specific Peptide Deformylase Inhibitors from Soil Microorganisms for Use as Broad-Spectrum Herbicides and Selectable Markers. University of Kentucky Natural Products Alliance PI: Robert L. Houtz, Co-PI: **Mark A. Williams**, Co-PI: Robert B. Grossman, Co-PI: Elisa M. D'Angelo, Co-PI: David W. Rodgers. $37,500 for 1 year, starting January 2007.

9. Organic Apple Orchard Establishment. New Crops Opportunity Center, University of Kentucky. PI: Douglas Archbold, Co-PI: **Mark Williams**, Co-PI: John Strang, Co-PI: John Hartman, Co-PI: Paul Vincelli, Co-PI: Ric Bessin. $48,800 for 2years, starting April 2007.

10. Evaluating the Sustainability of Two Widely Used Organic Vegetable Production Systems and Their Potential Use in Kentucky. New Crops Opportunity Center, University of Kentucky. PI: **Mark Williams**, Co-PI: Brent Rowell, Co-PI: Elisa D'Angelo, Co-PI: Mike Bomford (Kentucky State University). $70,719 for 3 years, starting June 2005.

11. Developing an Organic Farming Research and Education Center: An Experiential Learning Opportunity. Barnhart Fund for Excellence, University of Kentucky. PI: **Mark Williams**. $500 for 1 year, starting January 2005.

12. Evaluating Crop and Soil Fertility Changes during Transition to an Organic Vegetable Production System. New Crops Opportunity Center, University of Kentucky. PI: **Mark Williams**, Co-PI: Brent Rowell, Co-PI: Mike Mullen. $71,000 for 3 years, starting August 2004.

13. Understanding the Efficacy of and Improving Tolerance to Peptide Deformylase Inhibitors in Transgenic Tobacco. Kentucky Tobacco Research Development Center, University of Kentucky. PI: **Mark Williams**, Co-PI: Lynnette Dirk. $109,041 for 2 years, starting July 2004.

14. Development of Organic Production Systems for Horticultural Crops in Kentucky. New Crops Opportunity Center, University of Kentucky. PI: **Mark Williams**, Co-PI: Brent Rowell. $70,039 for 3 years, starting August 2003.

15. Evaluation of Cultural Practices for Container Production of Tropical Flowering Woody Vines in Kentucky. New Crops Opportunity Center, University of Kentucky. PI: **Mark Williams**, Co-PI: Robert Geneve. $69,020 for 3 years, starting August 2002.

16. Peptide Deformylase in Tobacco: A Novel Herbicide Target Amenable to Genetically Engineered Tolerance. Tobacco and Health Research Institute, University of Kentucky. PI: **Mark Williams**, Co-PI: Robert Houtz, Co-PI: Lynnette Dirk. $102,000 for 2 years, starting July 2001.

17. Comparative Horticultural Performance of Serviceberry (*Amelanchier* sp.) cultivars in Kentucky. University of Kentucky Nursery/Landscape Fund. PI: **Mark Williams**. $4,000 for 2 years, starting June 2003.

18. Examination of Herbicide/Mulch Interactions in Landscape Plantings. University of Kentucky Nursery/Landscape Fund. PI: **Mark Williams**, Co-PI: Robert McNiel. $3,500 for 2 years, starting June 2001.

19. Evaluation of Cultural Practices for Container Production of Passion Flowers. University of Kentucky Nursery/Landscape Fund. PI: **Mark Williams**, PI: Robert Geneve. $1,000 for 1 year, starting May 2001.

Non-competitive Funding

1. Examination of Herbicide/Mulch Interactions in Landscape Plantings. Syngenta Crop Protection. PI: **Mark Williams**. $3,000 for 2 years, starting June 2001.

Hatch Funding

1. Peptide Deformylase: A Novel Herbicide Target Amenable to Genetically Engineered Tolerance. PI: **Mark Williams**. United States Department of Agriculture Cooperative State Research Education and Extension Service - Hatch Project. Funding period: October 2002 – September 2007.

2. Developing Optimized Organic Production Systems for Cucurbits and Apples. PI: **Mark Williams**. United States Department of Agriculture Cooperative State Research Education and Extension Service - Hatch Project. Funding period: October 2008-2013.

V. Patents

1. US Patent Number 7,745,693. Inhibitors of Plant Peptide Deformylase for Use as Broad-Spectrum Herbicides and Method for Identifying the Same. Inventors: Robert L. Houtz, Lynnette M.A. Dirk and **Mark A. Williams**. Issued June 29, 2010.

2. US Patent number 7,445,923. Crystallization and Structure of a Plant Peptide Deformylase. Inventors: Robert L. Houtz, David Rodgers, Lynnette M.A. Dirk, and **Mark A.Williams**. Issued November 4, 2008.

3. US Patent Number 7,419,815 B2. Inhibitors of Plant Peptide Deformylase for Use as Broad-Spectrum Herbicides and Method for Identifying the Same. Inventors: Robert L. Houtz, Lynnette M.A. Dirk and **Mark A. Williams**. Issued September 2, 2008.

VI. Publications

Peer Reviewed Journal Articles

1. Ye Xia, Eliana Greissworth, Curtis Mucci, **Mark A. Williams**, Seth DeBolt. Characterization of culturable bacterial endophytes of switchgrass (Panicum virgatum L.) and their capacity to effect plant growth. *Global Change Biology Bioenergy*. 2012. Published online September 7th. DOI: 10.1111/j.1757-1707.2012.01208.x

2. Krista L. Jacobsen, Kim L. Niewolny, Michelle S. Schroeder-Moreno, Mark Van Horn, Alison H. Harmon, Yolanda H. Chen Fanslow, **Mark A. Williams**, and Damian Parr. 2012. Sustainable Agriculture Undergraduate Degree Programs: A Land Grant University Mission. *Journal of Agriculture, Food Systems, and Community Development.* Vol. 2 (3) pp 13-26.

3. Mark Keating, Victoria Bhavsar, Herbert Strobel, Larry Grabau, Michael Mullen, **Mark Williams.** 2010. Engaging Agriculture and Non-Agriculture Students in an Interdisciplinary Curriculum for Sustainable Agriculture. *NACTA Journal*. Vol. 54 (4) pp 24-29.

4. Dirk, M. A., Schmidt, J., Cai, Y., Barnes, J., Hanger, K., **Williams, M**., Grossman, R., Houtz, R., Rodgers, D. 2008. Insights into substrate specificity of plant peptide deformylase, an essential enzyme with potential for the development of novel biotechnology applications in agriculture. *Biochemical Journal.* Vol. 413(3): 417-427.

5. Derek Law, John Snyder, **Mark Williams.** 2008. Evaluating Solarization and Cultivated Fallow for Johnsongrass (Sorghum halapense) Control and Nitrogen Cycling on an Organic Farm. *Biological Agriculture & Horticulture.* Vol. 26(2): 175-191.

6. **Mark Williams**. 2007. Global Development of Organic Agriculture. Book Review. *Crop Science*, Vol 47. pg. 428

7. Cai-Xia Hou, Lynnette M. Dirk, Sitakanta Pattanaik, Narayan C. Das, Indu B. Maiti, Robert L. Houtz and **Mark A. Williams.** 2007. Plant Peptide Deformylase: A Novel Selectable Marker and Herbicide Target Based on Essential Co-Translational Protein Processing. *Plant Biotechnology Journal.* Vol. 5(2): 275-281. *Cover Article*.

8. Cai-Xia Hou, Lynnette M. Dirk and **Mark A. Williams**. 2006. Metabolism of the Peptide Deformylase Inhibitor Actinonin in *Nicotiana tabacum*. *WeedScience*. Vol. 54(2): 246-254.

9. Derek Law, John Snyder, Brent Rowell and **Mark A. Williams**. 2006. Weed Control Efficacy of Organic Mulches in Two Organically-Managed Bell Pepper Production Systems. *HortTechnology*. Vol. 16(2): 225-232.

10. Stephen Berberich, John Snyder, Robert Geneve and **Mark Williams**. 2006. Growth and Flowering Response of Container Grown Passion Flower Cultivars to Fertilizer and Paclobutrazol. *Journal of Environmental Horticulture*. Vol. 24(2) 109-114.

11. Cai-Xia Hou, Lynnette M.A. Dirk and **Mark A. Williams.** 2004. Inhibition of peptide deformylase leads to a decrease of D1 protein synthesis and a disassembly of PSII complexes in *Nicotiana tobacum. The American Journal of Botany*. 91 (9): 1304-1311.

12. Randy D. Dinkins, Heather M. Conn, Lynnette M.A. Dirk, **Mark A. Williams** and Robert L. Houtz*. 2003. The *Arabidopsis thaliana* peptide deformylase 1 protein is localized to both mitochondria and chloroplast. *Plant Science*. 165:751-758.

13. Lynnette M.A. Dirk, **Mark A. Williams** and Robert L. Houtz. 2002. Specificity of Chloroplast-Localized Peptide Deformylases as Determined with Peptide Analogs of Chloroplast-Translated Proteins. *Archives of Biochemistry and Biophysics*. 406:135-141.

14. Lynnette M.A. Dirk, **Mark A. Williams** and Robert L. Houtz. 2001. Eukaryotic Peptide Deformylases: Nuclear-Encoded and Chloroplast-Targeted Enzymes in Arabidopsis. *Plant Physiology*. 127: 97-107. *This was a featured article.*

15. **Williams M.A.**, Yasuyo Johzuka and R. M. Mulligan. 2000. Addition of Nongenomically Encoded Nucleotides to the 3' Terminus of Maize Mitochondrial mRNAs: Truncated *rps12* mRNAs Frequently Terminate with CCA. *Nucleic Acids Research*. 28(22): 4444-51.

16. Mulligan R.M., **Williams M.A.** and M.T. Shanahan 1999. RNA Editing Site Recognition in Higher Plant Mitochondria. *Journal of Heredity.* 90(3): 338-344.

17. **Williams M.A.**, Tallakson W.A., Phreaner C.G. and R.M. Mulligan. 1998. Editing and Translation of Ribosomal Protein S13 Transcripts: Unedited Translation Products are not Detectable in Maize Mitochondria. *Current Genetics.* 34: 221-226.

18. **Williams M.A.**, Kutcher B.M. and R.M. Mulligan. 1997. Editing Site Recognition in Plant Mitochondria: The Importance of 5' Flanking Sequences. *Plant Molecular Biology* 36: 229-237.

19. Phreaner C.G., **Williams M.A.** and R.M. Mulligan. 1996. Incomplete Editing of *rps12* Transcripts Results in Polymorphic Gene Expression in Maize Mitochondria. *Plant Cell.* 8:107-117. *This was a featured article.*

Invited Book Chapters (Peer Reviewed)

1. Tanaka, K., **M. Williams**, K. Jacobsen, and M. Mullen. 2011. Sustainably Growing Farmers of the Future: Undergraduate Curriculum in Sustainable Agriculture at the University of Kentucky." In K. Bartels and K. Parker (eds.), *Teaching Sustainability and Teaching Sustainably in Higher Education*. Sterling, VA: Stylus Publishing.

2. **Mark Williams** and Audrey Law. 2008. Compost, Neem Oil, Pastured Poultry Production, and *Bacillus thuringiensis*. These sections were written for *The Encyclopedia of Organic, Sustainable and Local Food.* Duram, L (Ed.). Greenwood Press.

3. Cai-Xia Hou and **Mark A. Williams**. 2006. Actinonin-Induced Inhibition of Plant Peptide Deformylase: A Paradigm for the Design of Novel Broad-Spectrum Herbicides In *Natural*

Products for Pest Management. Rimando, A.M.; Duke, S.O. (Eds.), *American Chemical Society Symposium Series*, 927:243-254.

Invited International Conference Proceedings

* denotes who made the presentation

1. **Mark A. Williams*** , Lynnette M. A. Dirk and Robert L. Houtz. 2002. Chloroplast-localized Peptide Deformylase: A New Target for the Development of Novel Broad-Spectrum Herbicides. 10th IUPAC International Congress on the Chemistry of Crop Protection. Basel, Switzerland. August 2002. p. 166.

2. Robert L. Houtz* , Lynnette M.A. Dirk, **Mark A. Williams** and Brent W. Meier. 2000. Primary and Secondary Structural Elements Influence the Susceptibility of the Rubisco Small Subunit to Methylation by Rubisco Small Subunit Methyltransferase. 5th International Jubilee Conference on the Role of Formaldehyde in Biological Systems: Methylation and Demethylation Processes. Sopron, Hungary. p. 31.

Conference Proceedings

1. Berberich, S* ., Geneve, R. and **M. Williams.** 2003. Growth and Flowering of Passion Flower Cultivars Varies in Response to Fertilizer Concentration. Southern Nursery Association Research Conference Proceedings. 48:103-106.

2. Berberich, S.* , **Williams, M.** and R. Geneve. 2002. The Effect of Fertilizer Concentration on Shoot Length, Biomass, and Flower Number in Container Produced Passion Flowers. Southern Nursery Association Research Conference Proceedings. 47:111-114.

3. **Mark A. Williams*** , Lynnette M. A. Dirk and Robert L. Houtz. 2002. Characterization and Inhibition of Chloroplast-localized Peptide Deformylases from *Arabidopsis thaliana.* Proceedings of the Southern Weed Science Society. p. 193.

4. **Williams, M.A**.* , Dirk, L.M.A. and R.L. Houtz. 2000. Characterization of a Chloroplast-Localized Peptide Deformylase from *Arabidopsis thaliana*. Plant Physiology. 123: S-131. Abstract.

Research Reports

1. Mark Williams and Delia Scott. 2011. The Impact of Row-Cover Placement for the Organic Production of Muskmelon and Butternut Squash in Kentucky. *University of Kentucky Fruit and Vegetable Crops Research Report* (PR-626). pp. 36-38.

2. Delia Scott, Mark Williams, Doug Archbold ad John Strang. 2010. Organic Apple Production Update. *University of Kentucky Fruit and Vegetable Crops Research Report* (PR-603). pp. 17-18.

3. Derek Law, Mark Williams and Timothy Coolong. 2008. Producing No-Till Pumpkins with a Rye/Vetch Cover-Crop in Kentucky with Conventional, Low-Input, and Organic Practices. *University of Kentucky Fruit and Vegetable Crops Research Report* (PR-572). pp. 51-53.

4. Derek Law and Mark Williams. 2008. Organic Small Fruit Production Using Haygrove Tunnels: Second-Year Update and Raspberry Production Yield Information. *University of Kentucky Fruit and Vegetable Crops Research Report* (PR-572). pp. 28-30.

5. Derek Law, John Strang, Amy Poston, John Snyder, Mark Williams, Chris Smigell, and Darrell Sloane. 2008. High Tunnel and Field Plasticulture Strawberry Evaluation. *University of Kentucky Fruit and Vegetable Crops Research Report* (PR-572). pp. 27-28.

6. Derek Law[§], and **Mark Williams**. 2007. Optimizing Organic Culture of Select Small Fruits in Kentucky Using Haygrove Tunnels. *University of Kentucky Fruit and Vegetable Crops Research Report* (PR-521). pp. 47-49.

7. Derek Law[§], John Strang, John Snyder, Chris Smigell, Darrell Sloane, and **Mark Williams**. 2007. High Tunnel and Field Plasticulture Strawberry Evaluation. *University of Kentucky Fruit and Vegetable Crops Research Report* (PR-521). pp. 46-47.

8. Derek Law[§], John Strang, Doug Archbold, and **Mark Williams**. 2007. Establishment of an Organic Apple Orchard at the UK Horticulture Research Farm. *University of Kentucky Fruit and Vegetable Crops Research Report* (PR-521). pp. 52-54.

9. Derek Law[§], and **Mark Williams**. 2007. Spring Greens and Lettuce Variety Evaluations. *University of Kentucky Fruit and Vegetable Crops Research Report* (PR-521). pp. 56-61.

10. Derek Law, Brent Rowell, John Snyder and **Mark Williams**. 2005. Solarization and Cultivated Fallow for Weed Control on a Transitioning Organic Farm. *University of Kentucky Fruit and Vegetable Crops Research Report* (PR-521). pp. 81-84.

11. S. Berberich, R. Geneve and **M. Williams**. 2004. Effect of Planting Date and Protective Structures on Finishing Date for Container-Produced Passiflora 'Lady Margaret". *University of Kentucky Nursery and Landscape Program* (PR-502). pp 9-10.

12. Derek Law, John Snyder, Brent Rowell and **Mark Williams**. 2004. Weed Control Management Systems for Organically Grown Bell Peppers. *University of Kentucky Fruit and Vegetable Crops Research Report* (PR-504). pp. 48-49.

13. Derek Law, Brent Rowell and **Mark Williams**. 2003. Development of Organic Production Systems for Kentucky Horticultural Crops. *University of Kentucky Fruit and Vegetable Crops Research Report* (PR-488). p. 94.

14. S. Berberich, R. Geneve and **M. Williams**. 2003. Pinching of Passiflora 'Lady Margaret' and 'Amethyst' Reduces Shoot Number and Delays Flowering. *University of Kentucky Nursery and Landscape Program* (PR-486). pp. 8-9.

15. S. Berberich, **M. Williams** and R. Geneve. 2002. Evaluation of Cultural Practices for Container Production of Passion Flowers. *University of Kentucky Nursery and Landscape Program Research Report* (PR-468). pp.12-13.

16. R. Geneve, **M. Williams** and S. Kester. 2001. Container Production of Passion Flower. *University of Kentucky Nursery and Landscape Program Research Report* (PR-450). pp. 10-11.

Abstracts Presented Before Professional Societies

* denotes who made the presentation

1. Logan M. Minter*, Ricardo T. Bessin, Timothy Coolong, and **Mark A. Williams**. Entomogical Society of America National Conference. Balancing pest and pollinator management in cucurbit production systems. 2011. Nov. 13-16, Reno, NV.

2. Minter, L*., and R Bessin, A. Alesch, D. Scott, **M. Williams**, T. Coolong, and D. Biddinger. ESA National Conference. Results of native pollinator diversity surveys on Kentucky vegetable farms. 2011. Dec. 12-15, San Diego CA.

3. Shawn Lucas*, Elisa D'Angelo, **Mark Williams.** Soil Science Society of America. Organic Soil Amendments and their affect on Soil Microbial and Physical Properties. Long Beach CA. November 2010.

4. **Mark A. Williams**. 2008. Engaging Agriculture and Non-Agriculture Students in an Interdisciplinary Curriculum for Sustainable Agriculture. NACTA/SERD Conference. Logan UT, June 2008.

5. Cai-Xia Hou*, Lynnette M.A. Dirk and **Mark A. Williams.** Metabolism of the Peptide Deformylase Inhibitor Actinonin in *Nicotiana tabacum*. American Society of Plant Biologists Meeting. Seattle, WA. July 16- 20, 2005.

6. Derek Law*, Brent Rowell and **Mark Williams**. Weed Control Efficacy of Organic Mulches in Two Organically Managed Bell Pepper Production Systems. American Society of Horticultural Science National Meeting. Las Vegas, NV. July 18-21, 2005

7. Cai-Xia Hou*, Heather M. Conn, Lynnette M.A. Dirk, Robert L. Houtz and **Mark A. Williams**. Genetically Engineered Tolerance to a Peptide Deformylase Inhibitor in Tobacco. American Society of Plant Biologists Meeting. Lake Buena Vista, Florida. July 2004.

8. Mark **A. Williams**, Robert L. Houtz and Lynnette M.A. Dirk*. Peptide Deformylase: Site-Directed Mutation Directed Towards Engineering Inhibitor Resistance. American Society of Plant Biologists Meeting. Lake Buena Vista, Florida. July 2004.

9. **Mark A Williams***, Lynnette M. A. Dirk and Robert L. Houtz. Production of Transgenic Tobacco with Engineered Resistance to Inhibitors of Plant Peptide Deformylase. International Horticulture Congress. Toronto, Canada. August 2002.

10. Heather Conn*, Randy Dinkins, Lynnette Dirk, Robert Houtz and **Mark Williams**. Subcellular Localization of Plant Peptide Deformylase. Annual Society of Plant Biology Meeting. Denver, CO. August 2002.

11. R. L. Houtz, Dirk*, L.M.A. and **M.A. Williams**. Specificity of Chloroplast-localized Peptide Deformylases as Determined with N-Terminal Peptide Analogs of Chloroplast-Translated Proteins. Annual Society of Plant Biology Meeting. Denver, CO. August 2002.

12. **Mark A. Williams***, Lynnette M. A. Dirk and Robert L. Houtz. 2002. Chloroplast-localized Peptide Deformylase: A New Target for the Development of Novel Broad-Spectrum Herbicides. Weed Science Society of America Annual Meeting. Reno, NV. February 2002.

13. **Mark A. Williams***, Lynnette M. A. Dirk and Robert L. Houtz. 2002. Characterization and Inhibition of Peptide Deformylases from *Arabidopsis thaliana.* Southern Weed Science Society of America Annual Meeting. Atlanta, GA. January 2002.

14. **Mark A. Williams***, Lynnette M. A. Dirk and Robert L. Houtz. Characterization and Inhibition of Chloroplast-localized Peptide Deformylases from *Arabidopsis thaliana.* American Society of Horticultural Science Conference and Exhibition. Sacramento, CA. July 2001.

15. Lynnette M.A. Dirk*, **Mark A. Williams** and Robert L. Houtz. Post-Translational Modifications in the Rubisco SS: Influence of Methionines on the Methylatability of the N-Terminal α-Amino Group. Annual Society of Plant Physiology Meeting. San Diego, CA. July 2000.

16. **Williams, M.A.***, Dirk, L.M.A. and R. L. Houtz. Characterization of a Chloroplast-localized Peptide Deformylase from *Arabidopsis thaliana.* Annual Society of Plant Physiology Meeting. San Diego, CA. July 2000.

17. **Williams, M.A.***, Kutcher, B.M. and R.M. Mulligan. Identification of an Antisense RNA to the 5' Flanking Region of a Maize Mitochondrial Editing Site. Gordon Conference on RNA Editing. Ventura, CA. January 24-29, 1999.

18. **Williams, M.A.***, Kutcher, B.M. and R.M. Mulligan. Recombination Near Editing Sites Affects Editing Site Recognition. Gordon Conference on RNA Editing. Ventura, CA. January 19-24, 1997.

19. Mulligan, R.M.*, Phreaner, C.G., **Williams M.A.** and W. A. Tallakson. Incomplete Editing Results in Polymorphic Gene Expression in Plant Mitochondria. Gordon Conference on RNA Editing. Ventura, CA. January 19-24, 1997.

20. **Williams, M.A.***, Kutcher, B.M. and R. M. Mulligan. Recombination Near Editing Sites Affects Editing Site Recognition. UC Riverside Conference, January 16-18, 1997.

21. Mulligan, R.M.*, Phreaner, C.G., **Williams M.A.** and W. A. Tallakson. Incomplete Editing Results in Polymorphic Gene Expression in Plant Mitochondria. UC Riverside Conference, January 16-18, 1997.

22. Mulligan R.M.*, Phreaner C.G., **Williams M.A.** and W. A. Tallakson. Incomplete Editing Results in Polymorphic Gene Expression in Plant Mitochondria. EMBO Workshop on RNA Editing. Maastricht, Netherlands. September 1996.

23. Phreaner C.G., **Williams M.A.** and R.M. Mulligan*. *rps12* in Maize Mitochondria: One Gene; Six Editing Sites; Many mRNAs; How Many Proteins? Plant Mitochondria; From Gene to Function. Duke University, NC. April 1995.

24. Phreaner C.G., **Williams M.A.** and R.M. Mulligan*. *rps12* in Maize Mitochondria: One Gene; Six Editing Sites; Many mRNAs; How Many Proteins? RNA Editing: An Evolving Mechanism of Gene Regulation at the 1994 Albany Conference. Rensselaerville, NY. October 1994.

VII. Invited Speaker Presentations

International

1. University of Development Studies, Tamale, Ghana Africa. *Sustainable Agriculture Education and Research at the University of Kentucky*. January 2011. Part of the Norman Borlaug Mentor Program.

2. Malang University, Malang, Indonesia. *Development of a Curriculum in Sustainable Agriculture at a United States Land Grant University*, *Community Supported Agriculture: A Novel Marketing Trend*. June 2009.

3. Maejo University, Chiang Mai Thailand. *Sustainable Agriculture and International Internships at the University of Kentucky*. January 2008.

4. Slow Food Terra Madre International Meeting of Food Communities. *Development of a Novel Curriculum in Sustainable Agriculture at the University of Kentucky*. Torino, Italy. October 2006.

5. International Horticulture Congress Meeting. *Chloroplast-localized Peptide Deformylase: A New Target for the Development of Novel Broad-Spectrum Herbicides*. Toronto, Canada. August 2002.

National

1. TN Fruit and Vegetable Conference. *Organic Vegetable Production*. Jan. 21, 2011, Nashville, TN

2. Extension Agent training: Organic and Sustainable Vegetable Production: Weed Management, June 16, Lexington KY, Aug. 19, 2010. Knoxville, TN.

3. ASHS National Meeting, *Engaging Agriculture and Non-Agriculture Related Students in a Multidisciplinary Curriculum in Sustainable Agriculture*. St. Louis, MO. July, 2009

4. Southern SAWG General Conference. *Bettering Black Plastic: Alternative Practices for Reducing Negative Impacts*. Wilhoit, J., Coolong, T., and Williams, M., Jan. 23, 2009, Chattanooga, TN

5. TN Fruit and Vegetable Conference. *Organic Vegetable Production, Organic Weed Management*. Jan. 21, 2009, Nashville, TN

6. Texas A & M, College Station, Texas. *UK Sustainable Agriculture Curriculum: Development and Current Status*. February 2009.

7. UT Knoxville. Knoxville, TN. *UK Sustainable Agriculture Curriculum: Development and Current Status*. March 2009.

8. Southern Weed Science Society Annual Meeting – *Organic Weed Management Symposium. Evaluation of Weed Control Practices in an Organic Bell Pepper Production System*. Memphis, TN. January 27, 2004.

9. American Chemical Society Meeting – Natural Products for Pest Management Symposium. *Actinonin-Induced Inhibition of Plant Peptide Deformylase: A Paradigm for the Design of Novel Broad-Spectrum Herbicides*. Anaheim, CA. March 2004.

10. American Arboretum and Botanical Gardens Association Annual Meeting. *Database Design and Usability Testing for Advanced Digital Information Systems in Horticulture*. Boston, MA. June 2003.

Regional/Local

1. KY Healthy Food Local Farms Conference. *Trends in Sustainable Agriculture in Academic Institutions in Kentucky*. Plenary Panel Moderator. Louisville, KY. November 2011.

2. UK Final Word Seminar Series. *Sustainable Agriculture: The Final Word*. University of Kentucky. November 2011.

3. Girls STEM NSF Collaborative presentation. *Math in Agriculture*. Lexington. August 2010.

4. Keynote Panel Speaker: Campus Community Partnership for Sustainability. *The Future of Agriculture in Kentucky: A Vision of Sustainability*. Lexington, KY. April 2010.

5. Kentucky Environmental Educators Association Conference. *Using the Horticulture Research Farm as a Field Destination*. Shakertown, October 25, 2008.

6. Kentucky Slow Foods Association Annual Meeting. *Reflections on Terra Madre*. Woodford Reserve Distillery. January 13, 2007.

7. Growing Kentucky II Symposium. *Development of the UK Sustainable Agriculture Curriculum*. Lexington. March 13, 2007.

8. Kentucky Fruit and Vegetable Grower's Association Annual Meeting. *Northeast U.S. Commercial Organic Farming Update*. Lexington, KY. January 2006.

9. Live Television Presentation, WKYT. *Status of Organic Agriculture in Kentucky and in the UK College of Agriculture*. Lexington, KY. February 24, 2005.

10. Kentucky Landscape Industries 2005 Winter Trade Show and Conference. *Weed Management in Nursery and Landscape Plantings*. Louisville, KY. January 10, 2005.

11. Kentucky Landscape Industries 2004 Winter Trade Show and Conference. *Weed Management in Nursery and Landscape Plantings*. Louisville, KY. January 7, 2004.

12. Best Management Practices Workshop 4. *Mulch and Herbicides*. Princeton, KY. February 18, 2003.

13. Kentucky Landscape Industries 2003 Winter Trade Show and Conference. *The Biology and Control of Selected Landscape Weeds*. Louisville, KY. January 9, 2003.

14. Kentucky Landscape Industries 2002 Winter Trade Show and Conference. *The Biology and Control of Six Common Winter Annual Weeds*. Lexington, KY. January 10, 2002.

15. Kentucky Landscape Industries 2002 Winter Trade Show and Conference. *Herbicide/Mulch Interactions in Landscape Plantings*. Lexington, KY. January 10, 2002.

16. Turf and Landscape Management Short Course. *Herbicide/Mulch Interactions in Landscape Plantings*. Louisville, KY. February 21, 2002.

17. Kentucky Tobacco Research and Development Center. *Chloroplast-localized Peptide Deformylase: A New Target for the Development of Novel Broad-Spectrum Herbicides*. Lexington, KY. November 8, 2002.

18. Kentucky Landscape Industries 2001 Winter Trade Show and Conference. *The Biology and Control of Six Common Winter Annual Weeds*. Lexington, KY. January 5, 2001.

VIII. Service and Recognition

- Manuscript reviewer for The Journal of Soil Science, Horticulture Science, HortTechnology and Biological Agriculture and Horticulture.

- Co-organizer for the Sustainable Agriculture Education Association (SAEA) national meeting. This meeting was held at UK and attended by over 200 educators and students from across the United States and abroad. August 2011.

- Featured in the *UK at The Half* radio show. Interviewed by Carl Nathe to discuss the future of Kentucky Agriculture and how sustainability fits in. November 2010.

- Conference Steering/Planning Committee Member, Campus Community Partnership for Sustainability Conference. Lexington KY. 2010.

- Organized and lead the effort for the "2010 Chef's Afield Event" at the Organic Farming Research and Education Unit. October.

- Filmed for KET episode: "Chef's Afield and Sustainable Agriculture." October, 2010.

- Elected to the University Senate for a three-year term starting August 2009.

- Filmed for Gourmet Magazine's "Diary of a Foodie." This television show was internationally shown on the National Geographic Network and highlighted my philosophies on organic farming and the SAG curriculum. August 2007.

- Filmed for UK Extension on Air episodes: "Making Farming Tools of the Past, New Again," and "Community Supported Agriculture." October, September 2007.

- Organized and Hosted the 2006 "Chefs Afield" meeting at the University of Kentucky Horticulture Research Farm, October 2006.

- Established a committee to develop a local foods buying program for the University of Kentucky dining services. A pilot program occurred during Fall 2006 where several different produce items were purchased from local growers for a three month period. The program was successful and evolved into the current local foods buying program at the university, which is one of the largest in the United States.

- Featured in the Fall 2006 University of Kentucky College of Agriculture Magazine, "Sustainable Agriculture, So We Can Farm Forever."

- Member, grant review panel for the USDA - CSREES - Integrated Organic Program. Washington, D.C. August 2004. I was also invited to join the panel in 2005 but recused because I had a grant submitted to the program.

- Reviewer, Kentucky Tobacco Research and Development Center grant program, 2002 and 2005.

- Reviewer for the University of Kentucky, College of Agriculture Precision Resource Management Committee grant program, April 2004.

- Reviewer for the University of Kentucky, College of Agriculture Undergraduate Scholarships, 2003.

- Kentucky Arborist Association Education and Research Committee member. August 2004-present.

- Invited Judge for the 2002 Intel International Science and Engineering Fair, Weed Science Section. Louisville, KY. May 18, 2002.

- Invited Judge for the SCAPA Science Fair. Lexington, KY. February, 2008.

- Invited Judge for the Stonewall Elementary Science Fair. Lexington, KY. February 12, 2004.

IX. Research Advising

Graduate Student Advising

Major Advisor

1. Delia Scott, M.S. candidate, Plant and Soil Science Program. Project: Evaluating the Sustainability of Two Widely Used Organic Vegetable Production Systems and Their Potential Use in Kentucky. 2005-present.
2. Shawn Lucas, Ph.D. candidate, Crop Science Program. Project: Evaluation of Soil Microbial and Carbon Sequestration Parameters in Organically Managed Soils. August 2006-present.
3. Robert Caudle, Ph.D. candidate, Crop Science Program. Project: Developing an Optimized Organic Production System to Control Cucumber Beetles in Cucurbits. August 2008-present.
4. Stephen Berberich, M.S., Plant and Soil Science Program. Project: Evaluation of Cultural Practices for Container Production of Tropical Flowering Vines. Started August 2002. Graduated February 2005.
5. Derek Law, M.S.,Plant and Soil Science Program. Project: Development of Organic Production Systems for Horticultural crops in Kentucky. August 2003- Graduated April 2004.
6. Audrey Horrall, Ph.D. candidate, Plant and Soil Science Program. Project: Evaluation of Soil Biodiversity Changes in an Organic Production System. August 2003-Graduated December 2008.

7. Tony Silvernail, Ph.D. candidate, Plant and Soil Science Program. Project: Evaluation of Tillage Effects on Weed Seed Bank Changes in an Organic Production System. August 2003-July 2005 (withdrew for personal reasons).

Committee Member

1. Derrick Hammons, Ph.D. Entomology Program. Graduated October 2009.

2. Merari Feliciano-Rivera, Ph.D., Plant Pathology Program. Graduated May 2011

3. Amy Poston, M.S. , Plant and Soil Science Program. Graduated April 2007.

4. Marta Nosarzewski, Ph.D., Plant Physiology/Biochemistry/Molecular Biology Program. Graduated 2007.

5. Sowmya Sampath, Ph.D. Biochemistry Program. Graduated March 2008.

6. Kyung Myung, Ph.D. , Plant Physiology/Biochemistry/Molecular Biology Program. Graduated June 2007.

7. John Barnes M.S. Chemistry. Graduated June 2006.

8. Dan Kishnick, M.S. candidate, Plant and Soil Science Program. Graduated August 2005.

9. Elizabeth Bisby-Kuhn, M.S. candidate, Plant and Soil Science Program. 2003.

10. Todd Leeson, M.S. candidate, Plant and Soil Science Program. 2003-2004.

11. Brent Meier, Ph.D. candidate, Plant Physiology/Biochemistry/Molecular Biology Program. January 2001.

Other Graduate Advising

- Directed Jamie Dockery (M.S. candidate in Agriculture Education) in a PLS790 Independent Research project during the Spring 2008 semester.

- Directed three graduate students, Michael Hogan, Charlie Neal, and Delia Scott in PLS 790 Independent Research projects during the Fall 2006 semester.

Visiting Scholar Advising

- Directed and Advised Mildred Osei-Kwartang who was a Bourlag Institute Fellow from Ghana. Project: Post Harvest Handling of Organically Grown Sweet Potatoes. Summer-Fall 2009.

Post-Doctoral Scholars

- Major Advisor for Cai-Xia Hou, Ph.D. Project: Characterization and Inhibition of Chloroplast-Localized Peptide Deformylases. From the Department of Plant Physiology and Molecular Biology. University of Turku, Finland. March 1, 2002-June 2006.

X. Undergraduate Advising

Academic Advising

I advise undergraduate students in the Sustainable Agriculture, Agriculture Biotechnology and Horticulture Plant and Soil Science programs.

Undergraduate Research Advising

- Advised and mentored 3 students in Fall 2009 and 1 student in Fall 2010 on independent research projects (SAG 395) related to organic and sustainable farming.

- Advised and mentored Emily Brunner, an undergraduate in the Natural Resource Conservation Program. Project: Developing Precision Irrigation Systems for Organic Apple Orchards. Summer-Fall 2008.

- Advised and mentored Ben Abell, an undergraduate in the Natural Resource Conservation Program. Project: Evaluation of organic and conventional whole-farm management systems. Summer-Fall 2005.

- Advised and mentored Derrick Hammons, an undergraduate in the Plant and Soil Science Program. Project: Evaluation of early season organic cabbage production systems. Fall 2003-Spring 2004.

- Advised and mentored Brian Zamora, an undergraduate in the Agriculture Biotechnology program. Project: Construction and Evaluation of Transformed *Arabidopsis thaliana* Engineered for Resistance to Peptide Deformylase Inhibitors. Mr. Zamora was the recipient of two Undergraduate Research and Creativity Grants of $500 each during this project. January 2001- May 2002.

International Student Advising

- Advised and mentored 1 student from France, AgroSup Dijon (ENESAD), and 2 students from Meijo University in Thailand. These students all worked as Apprentices on our farm. 2009.

- Advised and mentored 1 student from Meijo University in Thailand. This student worked as Apprentices on our farm. 2010.

Other Advising

• Faculty Co-Advisor for 9 undergraduate students competing in the Associated Landscape Contractors of America (ALCA) Student Career Days. Columbus, OH. March 2004.

• Faculty Co-Advisor for 14 undergraduate students competing in the Associated Landscape Contractors of America (ALCA) Student Career Days. Jackson, Mississippi. March 2003.

• Faculty Co-Advisor for 14 undergraduate students competing in the Associated Landscape Contractors of America (ALCA) Student Career Days. Illinois Central College. Peoria, IL. March 20-24, 2002.

• Faculty Co-Advisor for the Horticulture Club Nursery/Arboreta tour in Oregon and Washington. March 8-17, 2002.

• Faculty Co-Advisor for 8 undergraduate students competing in the Associated Landscape Contractors of America (ALCA) Student Career Days. Colorado State University, Fort Collins, CO. March 8-11, 2001.

XI. Teaching and Instruction

Resident Instruction

- *PLS 404 - Integrated Weed Management, PLS 451 - Landscape Installation and Management*, *PLS 386 - Plant Production Systems, SAG 397 - Apprenticeship in Sustainable Agriculture, SAG 490 - Integration of Sustainable Agriculture Principles, SAG 395 - Independent Research in Sustainable Agriculture*

Teaching Improvement Activities

- Nominated to the college's Academy of Teaching and Learning (ATL) Scholars Program. January 2009-December 2010.

- Participated in the 2007 National Conference on Changing Higher Education in Agriculture and Related Sciences: From Dialogue to Action-Reinventing teaching and Learning. June 11-13, Texas A &M University.

- Participated in a workshop designed to teach instructors how to teach novel agriculture courses such as GEN 100 & 200. Workshop was facilitated by Dr. Larry Grabau of the Teaching and Learning Center. Course met weekly for 9 weeks during the fall semester, 2001.

- Participated in the 2006 Facilitating Sustainable Agriculture Education Conference. This conference was the first of its kind and was organized by faculty from the University of California Santa Cruz and University of California Davis. The conference was focused on developing resources for faculty involved in sustainable agriculture education. Asilomar, CA. January 2006.

Invited Teaching Related Presentations

- United States Department of Agriculture Southern Region Teaching Workshop, "Applying the Concepts of Sustainability in the Design and Construction of an Organic Farming Research and Education Center." Lexington, KY. August 10, 2005.

- NACTA-SERD Meeting, "Engaging Agriculture and Non-Agriculture Related Students in a Multidisciplinary Curriculum in Sustainable Agriculture" Logan, Utah. June 11-13, 2008

Other Teaching Related Activities

- Director of Undergraduate Studies for the Sustainable Agriculture Curriculum since its inception in Spring semester 2007.

- Co-lead week-long students trips to Los Angeles (8 students) in Fall 2007, New Mexico (10 students) in Spring 2008, and Arizona (8 students) in Spring 2009 to study sustainable agricultural systems and architecture.
- Co-lead an 18 day student trip to Thailand (11 students) in Summer 2008 as part of the UK education abroad program, and College of Agriculture Ambassador Program.
- Lead or Co-lead students on week –long organic farming and sustainable agriculture study tours to Upper North-East (6 students) in Spring 2011, Upper Mid-West (7 students) in Spring 2009, Southeast (5 students) in Spring 2010.
- Co-advisor: UK Slow Food Student Chapter. November 2010-present
- Committee member: College Undergraduate Curriculum Committee. Fall 2010-present.

XII. Committee Participation

National

- Sustainable Agriculture Education Association (SAEA) steering committee. 2006-2008.

- Sustainable Agriculture Education Association Conference Planning Committee. 2010-2011

State

- Education and Research Committee, Kentucky Arborist Association. August 2004-2006.

- Organic Certification Advisory Panel – Kentucky Department of Agriculture. January 2007-present.

University

- Co-Chair, President's Sustainability Advisory Committee. January 2008-2010.

- President's Sustainability Advisory Committee. January 2011-present.

- Sustainable Scholarly Learning Community Committee. 2009-2010.

College of Agriculture

- **Departmental:** Scholarship Committee (**Chair**), Undergraduate Education Committee, Graduate Studies Committee, Research Project Review Committee, Lexington Farm/Greenhouse Committee, Safety Committee.

- **College of Agriculture:** Sustainable Agriculture Curriculum Steering Committee (**Chair**), October 2005-2010. Associate Member in the Graduate Faculty for the Plant and Soil Science (M.S.) program, October 24, 2001-present. Associate Member in the Graduate Faculty for the Plant Physiology (Ph.D.) program, October 24, 2001-present. Associate Member in the Graduate Faculty for the Crop Science (M.S.) program, August, 2003-present.

XIII. Professional Development

I have made a concerted effort to expand my knowledge on all aspects of landscape management, with a particular emphasis on arboriculture. This information has allowed me to create a class focused on arboriculture (PLS451), and is used in many of my public presentations. As part of my self-edification in arboriculture, I obtained two of the highest internationally-recognized levels of achievement in arboriculture.

• International Society of Arboriculture (ISA) Certified Tree Worker/Climber Specialist. Obtained June 12, 2002.

• International Society of Arboriculture Certified Tree Worker Skills Exam Evaluator. Obtained June 12, 2002.

• Kentucky Arborist Association workshop "Evaluating Tree Defects." Completed June 21, 2002.

• ArborMaster Training Climbing Skills Module. Completed July 13, 2002.

XIV. Professional Affiliations

• Member of the Botanical Society of America (2004-present), American Society of Horticultural Science (2001-2003), Kentucky Arborist Association (2004-present), Weed Science Society of America (2003) International Society of Arboriculture (2002-present) and North American Colleges and Teachers of Agriculture (2006 - 2010).

SHAWN R. WRIGHT

EDUCATION

12/98	Ph.D. Crop Science. North Carolina State University, Raleigh. Co-Advisors: Drs. H. Coble and T. Rufty. Thesis project: Environmental responses of soybean (*Glycine max*), and the competing weed species, Palmer amaranth (*Amaranthus palmeri*), and sicklepod (*Senna obtusifolia*).
12/88	M.S. Botany. The University of Tennessee, Knoxville. Advisor: Dr. Les Hickok Thesis project: Characterization and genetic analysis of aluminum tolerant mutants in the fern, *Ceratopteris*.

EXPERIENCE

'10-Present	Senior Extension Specialist – Horticulture. Robinson Center for Appalachian Resource Sustainability - University of Kentucky. Serve as regional Extension Specialist for eastern Kentucky. Develop research and Extension programming for consumer and commercial horticulture. Serve as member of commodity advisory committees.
'01-'10	Senior Research Associate/Adjunct Assistant Professor - Horticulture and Crop Science Horticulture and Crop Science Graduate Faculty. The Ohio State University Direct research activities at the South Centers and on-farm trials in the southern Ohio. Investigate sustainable agricultural alternatives for the clientele in Appalachia. Serve as a member of The Ohio State University Fruit Team, Advisor for the Ohio Produce Growers and Marketers Association, and Editor of the Ohio Fruit ICM News. Seek out and develop collaborative relationships across institutional and geographic boundaries.
'98 –'01	Postdoctoral Research Scientist. Iowa State University, Department of Agronomy, Ames Conduct research leading to development of cropping systems that optimize factors that negatively influence weed seed persistence and seedling establishment. Wrote grant proposals, and lectures for the Master of Science in Agronomy Distance Education Program.
'95-'98	Lecturer/Graduate Research Assistant. North Carolina State University
'94	Program Director. LORMA Community Development Foundation, San Fernando, L.U., Philippines. Directed the national staff of a non-government organization in a multi-faceted rural community development project.
'89 – '93	Extension Educator, Cornell Cooperative Extension. Responsible for solid waste management education programming in Erie County and the City of Buffalo. Also responsible for consumer horticulture and small fruit production.

PUBLICATIONS (last 5 years)

Published refereed journal articles

'08	Ozgen, M., F.J. Wyzgoski, A.Z. Tulio, Jr., A. Gazula, A.R. Miller, J.C. Scheerens, R. N. Reese, S.R. Wright, "Antioxidant Capacity and Phenolic Antioxidants of Midwestern Black Raspberries Grown for Direct Markets Are Influenced by Production Site" HortScience 2008: 2039–2047.
'08	Ellis, M.A., L.V. Madden, S.R. Wright, and L.L. Wilson. 2008. Efficacy of pre-harvest fungicide applications and cold storage for post-harvest control of botrytis fruit rot (gray mold) on red raspberry. Online. Plant Health Progress doi:10.1094/PHP-2008-1015-01-RS.

Bulletins and Publications

'04-'10 Midwest Commercial Small Fruit and Grape Spray Guide, The Ohio State University, 506B2, B. Bordelon, M. Ellis, R. Bessin, Eds.

Papers, posters and abstracts presented

'08 Mubashir, M., Malik, S.A., Khan, A.A., Ansari, T.M., Wright, S.R. and K.R. Islam (2008) Soil nitrate accumulation in response to agricultural activities. Joint Annual Meetings of American Society of Agronomy/Crop Science Society of America/Soil Science Society of America/ US Geological Society, Houston, TX, Oct. 5-9.

'08 Mubashir, M., Malik, S.A., Khan, A.A., Ansari, T.M., Wright, SR.. and K.R. Islam. Nitrate pollution of drinking water in Pakistan. Joint Annual Meetings of American Society of Agronomy/Crop Science Society of America/Soil Science Society of America/ US Geological Society, Houston, TX, Oct. 5-9.

'08 Wright, S.R., B. Bergefurd, A. Welch, and M.V. Brown. Southern Ohio Black Raspberry (*Rubus occidentalis*) Production. American Society for Horticultural Science. Orlando, FL. July 21-24.

'08 Bergefurd, B., S.R. Wright, and T. Harker. The Evolution of Ohio Strawberry Plasticulture Production. American Society for Horticultural Science. Orlando, FL. July 21-24.

'08 Mubashirm M., S. Malik, A. Khan, T. Ansari, S.R, Wright, and K.R. Islam. Growth, Yield and Nitrate Accumulation of Irrigated Carrot and Okra in Response to Nitrogen Fertilization. American Society for Horticultural Science. Orlando, FL. July 21-24.

Grants Funded (last 5 years)

Funded projects as Principal Investigator

'06 Wright, S. R. "USDA Risk Management - subcontract with Michigan State University" $24,000

'06 Wright, S.R. "Varietal evaluation" Ohio Vegetable and Small Fruit Research Development Program $5,000

Funded projects as co-investigator

'07 Wise, JC. , C. García-Salazar, A. Gómez-Rodas, S.R. Wright, D. Polk, "Crop Risk Management for Berry Production in the Great Lakes Region - IPM Training for Minority and Disadvantaged Specialty Crops Producers" USDA-RMA, $149, 000

Appendix XI Annual Reports for Horticulture

2011-2012 Horticulture Departmental Report--CIP Codes 01119901, 011102, 011199, 011201, 260307

2011-2012 Degrees Awarded

	Total	Female	Male	Minority	African American
Hort/Agronomy & Plant Science/Bachelor's	7	1	6	0	0
Crop Science/Master's	1	0	1	0	0
Crop Science/Doctoral	3	1	2	0	0
Integrated Plant & Soil Sciences/Master's	4	0	4	0	0
Integrated Plant & Soil Sciences/Doctoral	0	0	0	0	0
Plant & Soil Science/Master's	0	0	0	0	0
Plant Physiology/Doctoral	4	2	2	0	0
Soil Science/Doctoral	0	0	0	0	0
Total	19	4	15	0	0

Degrees Awarded Five-Year Trend

	2007-2008	2008-2009	2009-2010	2010-2011	2011-2012
Hort/Agronomy & Plant Science/Bachelor's	26	12	13	12	7
Crop Science/Master's	0	4	1	3	1
Crop Science/Doctoral	1	3	3	0	3
Integrated Plant & Soil Sciences/Master's	0	0	0	0	4
Integrated Plant & Soil Sciences/Doctoral	0	0	0	0	0
Plant & Soil Science/Master's	7	8	2	7	0
Plant Physiology/Doctoral	2	1	3	1	4
Soil Science/Doctoral	1	2	3	2	0
Total	37	30	25	25	19

2011-2012 Enrollment (majors)

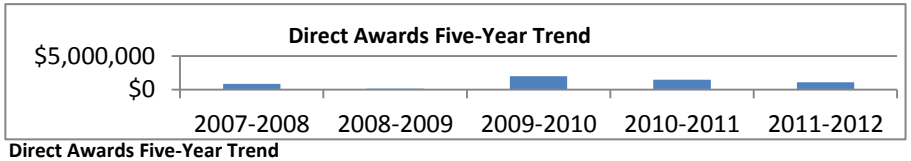
	Total	Female	Male	Minority	African American
Hort/Agronomy & Plant Science/Bachelor's	31	4	27	0	0
Crop Science/Master's	6	1	5	0	0
Crop Science/Doctoral	11	3	8	0	0
Crop Science/Post-doc	7	2	5	0	0
Integrated Plant & Soil Sciences/Master's	20	13	7	0	0
Integrated Plant & Soil Sciences/Doctoral	0	0	0	0	0
Plant & Soil Science/Master's	0	0	0	0	0
Plant & Soil Science/Post-doc	0	0	0	0	0
Plant Physiology/Doctoral	23	9	14	1	1
Plant Physiology/Post-doc	7	2	5	0	0
Soil Science/Doctoral	17	9	8	0	0
Soil Science/Post-doc	1	0	1	0	0
Total	123	43	80	1	1

Enrollment (majors) Five-Year Trend

	2007-2008	2008-2009	2009-2010	2010-2011	2011-2012
Hort/Agronomy & Plant Science/Bachelor's	73	63	44	41	31
Crop Science/Master's	6	7	5	4	6
Crop Science/Doctoral	13	12	14	11	11
Crop Science/Post-doc	7	4	4	9	7
Integrated Plant & Soil Sciences/Master's	0	0	0	0	20
Integrated Plant & Soil Sciences/Doctoral	0	0	0	0	0
Plant & Soil Science/Master's	18	22	15	19	0
Plant & Soil Science/Post-doc	0	0	0	0	0
Plant Physiology/Doctoral	20	17	19	20	23
Plant Physiology/Post-doc	6	12	10	7	7
Soil Science/Doctoral	12	8	9	12	17
Soil Science/Post-doc	0	2	3	3	1
Total	155	147	123	126	123

2011-2012 Student Attempted Credit Hours (shared with Plant and Soil Sciences)

	Total	Summer	Fall	Spring
IPS	28	0	28	0
PLS	2,731	1	1,448	1,282
Total	2,759	1	1,476	1,282



2011-2012 Primary Grant Dollar/Faculty Ratio

	FT Faculty (head count)	FTE Research Faculty
	16	6.36
Total Primary Grant Dollars	$1,077,777	$1,077,777
Average	$67,361	$169,462

Direct Awards Five-Year Trend

2007-2008	2008-2009	2009-2010	2010-2011	2011-2012
$849,109	$131,169	$1,977,736	$1,485,175	$1,077,777

Grant Expenditures Five-Year Trend

2007-2008	2008-2009	2009-2010	2010-2011	2011-2012
$1,417,174	$1,388,865	$1,348,119	$1,721,194	$1,599,413

2011-2012 Fiscal Year Grants

Direct Awards	$1,077,777
Federal Competitive	$122,085
% Federal Competitive	11%
Collaborative	$2,250,719

Research Faculty with Formula Funded Projects as of 6/12

25% or higher research DOE	7
Active Project	6
Percentage	86%

2011 Calendar Year Publications

Books and Chapters	0
Refereed Journal Articles	16
Other Research Articles	4
Total	20

2011 Calendar Year Patents	0

2010-2011 Horticulture Departmental Report
CIP Codes 01119901, 011102, 260307, 011201

2010-2011 Degrees Awarded

	Total	Female	Male	Minority	African American
Crop Science/Doctoral	0	0	0	0	0
Crop Science/Master's	3	1	2	1	1
Hort/Plant & Soil Science/Bachelor's	12	1	11	0	0
Plant Physiology/Doctoral	1	1	0	0	0
Plant & Soil Science/Master's	7	2	5	0	0
Soil Science/Doctoral	2	1	1	0	0
Total	25	6	19	1	1

Degrees Awarded Five-Year Trend

	2006-2007	2007-2008	2008-2009	2009-2010	2010-2011
Crop Science/Doctoral	4	1	3	3	0
Crop Science/Master's	2	0	4	1	3
Hort/Plant & Soil Science/Bachelor's	16	26	12	13	12
Plant Physiology/Doctoral	3	2	1	3	1
Plant & Soil Science/Master's	9	7	8	2	7
Soil Science/Doctoral	2	1	2	3	2
Total	36	37	30	25	25

2010-2011 Enrollment (majors)

	Total	Female	Male	Minority	African American
Crop Science/Doctoral	11	3	8	0	0
Crop Science/Master's	4	1	3	0	0
Crop Science/Post-doc	9	3	6	0	0
Hort/Plant & Soil Science/Bachelor's	41	6	35	0	0
Plant Physiology/Doctoral	20	8	12	1	1
Plant Physiology/Post-doc	7	2	5	0	0
Plant & Soil Science/Master's	19	7	12	0	0
Plant & Soil Science/Post-doc	0	0	0	0	0
Soil Science/Doctoral	12	6	6	0	0
Soil Science/Post-doc	3	0	3	0	0
Total	126	36	90	1	1

Enrollment (majors) Five-Year Trend

	2006-2007	2007-2008	2008-2009	2009-2010	2010-2011
Crop Science/Doctoral	10	13	12	14	11
Crop Science/Master's	4	6	7	5	4
Crop Science/Post-doc	8	7	4	4	9
Hort/Plant & Soil Science/Bachelor's	71	73	63	44	41
Plant Physiology/Doctoral	22	20	17	19	20
Plant Physiology/Post-doc	11	6	12	10	7
Plant & Soil Science/Master's	19	18	22	15	19
Plant & Soil Science/Post-doc	0	0	0	0	0
Soil Science/Doctoral	11	12	8	9	12
Soil Science/Post-doc	2	0	2	3	3
Total	158	155	147	123	126

2010-2011 Student Credit Hours Enrolled (shared with Plant and Soil Sciences)

	Total	Summer	Fall	Spring
PLS	2,793	9	1,511	1,273
Total	2,793	9	1,511	1,273

Direct Awards Five-Year Trend

2006-2007	2007-2008	2008-2009	2009-2010	2010-2011
$2,226,700	$849,109	$131,169	$1,977,736	$1,485,175

Grant Expenditures Five-Year Trend

2006-2007	2007-2008	2008-2009	2009-2010	2010-2011
$1,795,892	$1,417,174	$1,388,865	$1,348,119	$1,721,194

2010-2011 Primary Grant Dollar/Faculty Ratio

	FT Faculty (head count)	FTE Research Faculty
	15	5.98
Total Primary Grant Dollars	$1,485,175	$1,485,175
Average	$99,012	$248,357

Research Faculty with Formula Funded Projects as of 8/11

25% or higher research DOE	8
Active Project	7
Percentage	88%

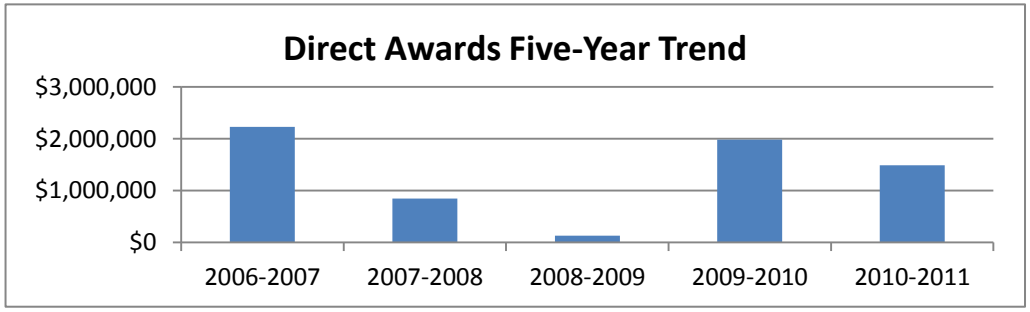
2010-2011 Fiscal Year Grants

Direct Awards	$1,485,175
Federal Competitive	$114,315
% Federal Competitive	8%
Collaborative	$2,842,820

2010 Calendar Year Publications

Books and Chapters	3
Refereed Journal Articles	20
Other Research Articles	1
Total	24

2010 Calendar Year Patents	1



2009-2010 Horticulture
CIP Codes 01119901, 011102, 260307, 011201

2009-2010 Degrees Awarded

		Female	Male	Minority	African American
Crop Science/Doctoral	3	3	0	0	0
Crop Science/Master's	1	1	0	0	0
Hort/Plant & Soil Science/Bachelor's	13	3	10	0	0
Plant Physiology/Doctoral	3	2	1	0	0
Plant & Soil Science/Master's	2	0	2	0	0
Soil Science/Doctoral	3	1	2	0	0
Total	25	10	15	0	0

Degrees Awarded Five-Year Trend

	2005-2006	2006-2007	2007-2008	2008-2009	2009-2010
Crop Science/Doctoral	0	4	1	3	3
Crop Science/Master's	0	2	0	4	1
Hort/Plant & Soil Science/Bachelor's	15	16	27	12	13
Plant Physiology/Doctoral	3	3	2	1	3
Plant & Soil Science/Master's	6	9	7	8	2
Soil Science/Doctoral	1	2	1	2	3
Total	25	36	38	30	25

2009-2010 Enrollment (majors)

		Female	Male	Minority	African American
Crop Science/Doctoral	14	6	8	1	1
Crop Science/Master's	5	3	2	0	0
Crop Science/Post-doc	4	1	3	0	0
Hort/Plant & Soil Science/Bachelor's	44	6	38	0	0
Plant Physiology/Doctoral	19	9	10	1	1
Plant Physiology/Post-doc	10	3	7	1	0
Plant & Soil Science/Master's	15	3	12	0	0
Plant & Soil Science/Post-doc	0	0	0	0	0
Soil Science/Doctoral	9	3	6	0	0
Soil Science/Post-doc	3	1	2	1	0
Total	123	35	88	4	2

Enrollment Five-Year Trend (majors)

	2005-2006	2006-2007	2007-2008	2008-2009	2009-2010
Crop Science/Doctoral	14	10	13	12	14
Crop Science/Master's	4	4	6	7	5
Crop Science/Post-doc	11	8	7	4	4
Hort/Plant & Soil Science/Bachelor's	80	71	73	63	44
Plant Physiology/Doctoral	18	22	20	17	19
Plant Physiology/Post-doc	10	11	6	12	10
Plant & Soil Science/Master's	20	19	18	22	15
Plant & Soil Science/Post-doc	0	0	0	0	0
Soil Science/Doctoral	11	11	12	8	9
Soil Science/Post-doc	3	2	0	2	3
Total	171	158	155	147	123

2009-2010 Student Credit Hours Enrolled*

		SSI	SSII	Fall	Spring
PLS	2778	20	0	1423	1335

Direct Awards Five-Year Trend

2005-2006	2006-2007	2007-2008	2008-2009	2009-2010
$2,157,586	$2,226,700	$849,109	$131,169	$1,977,736

2009-2010 Primary Grant Dollar/Faculty Ratio

	FT Faculty (head count)	FTE Research Faculty
	15	5.89
Total Primary Grant Dollars	$1,977,736	$1,977,736
Average	$131,849	$335,779

Grant Expenditures Five-Year Trend

2005-2006	2006-2007	2007-2008	2008-2009	2009-2010
$1,881,229	$1,795,892	$1,417,174	$1,388,865	$1,348,119

Research Faculty with Formula Funded Projects as of 8/10

25% or higher research DOE	7
Active Project	7
Percentage	100%

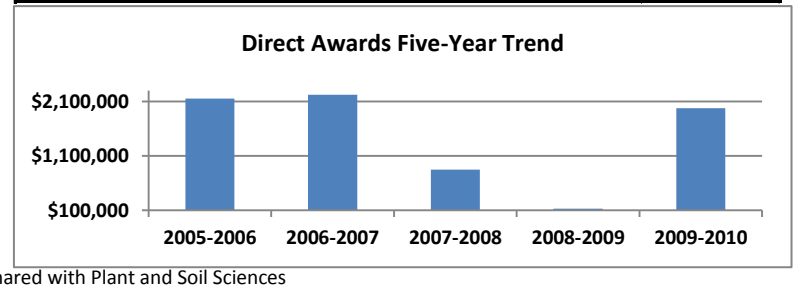
2009-2010 Fiscal Year Grants

Direct Awards	$1,977,736
Federal Competitive	$766,758
% Federal Competitive	39%
Collaborative	$4,176,535

2009 Calendar Year Patents 0

2009 Calendar Year Publications

Books & Chapters	0
Refereed Journal Articles	14
Other Research Articles	2
Total	16



*Programs and courses are shared with Plant and Soil Sciences

2008-2009 Horticulture*

2008-2009 Degrees Awarded

		Male	Female	Minority	African American
Crop Science/Doctoral	3	2	1	0	0
Crop Science/Master's	4	3	1	0	0
Hort/Plant & Soil Science/Bachelor's	12	9	3	0	0
Plant Physiology/Doctoral	1	1	0	0	0
Plant & Soil Science/Master's	8	5	3	0	0
Soil Science/Doctoral	2	2	0	0	0
TOTAL	30	22	8	0	0

Degrees Awarded Five-Year Trend

	2004-2005	2005-2006	2006-2007	2007-2008	2008-2009
Crop Science/Doctoral	3	0	4	1	3
Crop Science/Master's	2	0	2	0	4
Hort/Plant & Soil Science/Bachelor's	23	15	16	27	12
Plant Physiology/Doctoral	6	3	3	2	1
Plant & Soil Science/Master's	9	6	9	7	8
Soil Science/Doctoral	1	1	2	1	2
TOTAL	44	25	36	38	30

2008-2009 Enrollment

		Male	Female	Minority	African American
Crop Science/Doctoral	12	6	6	0	0
Crop Science/Master's	7	5	2	0	0
Crop Science/Post-doc	4	2	2	1	0
Hort/Plant & Soil Science/Bachelor's	63	45	18	0	0
Plant Physiology/Doctoral	17	9	8	1	1
Plant Physiology/Post-doc	12	9	3	4	1
Plant & Soil Science/Master's	22	15	7	1	1
Plant & Soil Science/Post-doc	0	0	0	0	0
Soil Science/Doctoral	8	5	3	0	0
Soil Science/Post-doc	2	1	1	0	0
TOTAL	147	97	50	7	3

Enrollment Five-Year Trend

	2004-2005	2005-2006	2006-2007	2007-2008	2008-2009
Crop Science/Doctoral	13	14	10	13	12
Crop Science/Master's	5	4	4	6	7
Crop Science/Post-doc	11	11	8	7	4
Science/Bachelor's	87	80	71	73	63
Plant Physiology/Doctoral	16	18	22	20	17
Plant Physiology/Post-doc	11	10	11	6	12
Plant & Soil Science/Master's	23	20	19	18	22
Plant & Soil Science/Post-doc	0	0	0	0	0
Soil Science/Doctoral	8	11	11	12	8
Soil Science/Post-doc	4	3	2	0	2
TOTAL	178	171	158	155	147

2008-2009 Student Credit Hours Enrolled**

		SSI	SSII	Fall	Spring
PLS	2636	0	6	1462	1168

Direct Awards Five-Year Trend

2004-2005	2005-2006	2006-2007	2007-2008	2008-2009
$1,666,621	$2,157,586	$2,226,700	$849,109	$131,169

Grant Expenditures Five-Year Trend

2004-2005	2005-2006	2006-2007	2007-2008	2008-2009
$1,577,643	$1,881,229	$1,795,892	$1,417,174	$1,388,865

2008-2009 Primary Grant Dollar/Faculty Ratio

	FT Faculty (head count)	FTE Research Faculty
	14	6.09
Total Primary Grant Dollars	$131,169	$131,169
Average	$9,369	$21,538

Research Faculty With Formula Funded Projects as of 2/09

25% or higher research DOE	8
Active Project	8
Percentage	100%

2008-2009 Fiscal Year Grants

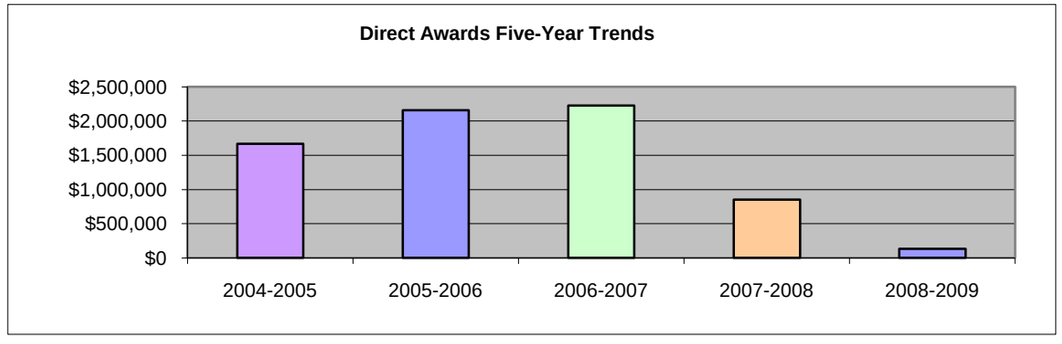
Direct Awards	$131,169
Federal Competitive	$0
% Federally Competitive	0%
Collaborative	$151,869

2008 Calendar Year Patents

2

2008 Calendar Year Publications

Books & Chapters	2
Refereed Journal Articles	23
Other Research Articles	2
Total	27



*Programs and courses are shared with Plant and Soil Sciences

2007-2008 Horticulture*

2007-2008 Degrees Awarded

		Male	Female	Minority	African American
Crop Science/Doctoral	1	1	0	0	0
Crop Science/Master's	0	0	0	0	0
Hort/Plant & Soil Science/Bachelor's	27	22	5	0	0
Plant Physiology/Doctoral	2	1	1	0	0
Plant & Soil Science/Master's	7	4	3	0	0
Soil Science/Doctoral	1	1	0	0	0
TOTAL	38	29	9	0	0

Degrees Awarded Five-Year Trend

	2003-2004	2004-2005	2005-2006	2006-2007	2007-2008
Crop Science/Doctoral	1	3	0	4	1
Crop Science/Master's	0	2	0	2	0
Hort/Plant & Soil Science/Bachelor's	27	23	15	16	27
Plant Physiology/Doctoral	3	6	3	3	2
Plant & Soil Science/Master's	4	9	6	9	7
Soil Science/Doctoral	1	1	1	2	1
TOTAL	36	44	25	36	38

2007-2008 Enrollment

		Male	Female	Minority	African American
Crop Science/Doctoral	13	6	7	0	0
Crop Science/Master's	6	4	2	0	0
Crop Science/Post-doc	7	3	4	1	0
Hort/Plant & Soil Science/Bachelor's	73	53	20	1	1
Plant Physiology/Doctoral	20	10	10	1	1
Plant Physiology/Post-doc	6	5	1	1	0
Plant & Soil Science/Master's	18	12	6	1	1
Plant & Soil Science/Post-doc	0	0	0	0	0
Soil Science/Doctoral	12	9	3	0	0
Soil Science/Post-doc	0	0	0	0	0
TOTAL	155	102	53	5	3

Enrollment Five-Year Trend

	2003-2004	2004-2005	2005-2006	2006-2007	2007-2008
Crop Science/Doctoral	11	13	14	10	13
Crop Science/Master's	2	5	4	4	6
Crop Science/Post-doc	8	11	11	8	7
Hort/Plant & Soil Science/Bachelor's	97	87	80	71	73
Plant Physiology/Doctoral	18	16	18	22	20
Plant Physiology/Post-doc	10	11	10	11	6
Plant & Soil Science/Master's	28	23	20	19	18
Plant & Soil Science/Post-doc	1	0	0	0	0
Soil Science/Doctoral	9	8	11	11	12
Soil Science/Post-doc	2	4	3	2	0
TOTAL	186	178	171	158	155

2007-2008 Student Credit Hours Enrolled**

		SSI	SSII	Fall	Spring
TOTAL	2878	***	12	1605	1261

Direct Awards Five-Year Trend

2003-2004	2004-2005	2005-2006	2006-2007	2007-2008
$3,141,280	$1,666,621	$2,157,586	$2,226,700	$849,109

Research Faculty With Formula Funded Projects as of 2/08

25% or higher research DOE	8
Active Project	8
Percentage	100%

Faculty/Primary Grant Dollar Ratio

	FT Faculty (head count)***	FTE Research Faculty
	15	5.46
Total Primary Grant Dollars	$849,109	$849,109
Average	$56,607	$155,514

2007-2008 Fiscal Year Grants

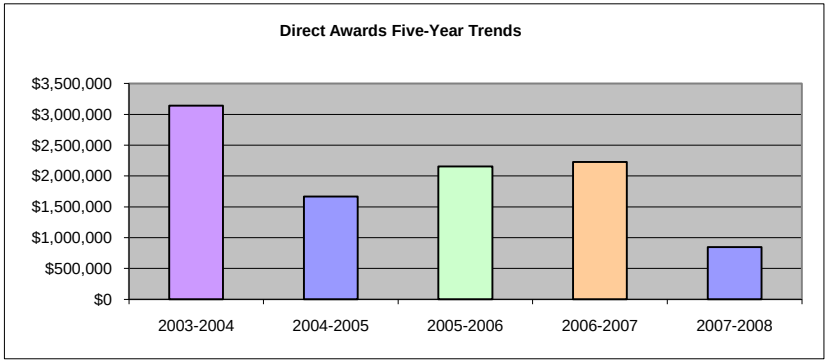
Direct Awards	$849,109
Federal Competitive	$0
% Federally Competitive	0%
Collaborative	$868,111

2007 Calendar Year Patents

0

2007 Calendar Year Publications

Books & Chapters	1
Refereed Journal Articles	20
Other Research	9
Total	30



*Programs are shared with Plant and Soil Sciences

**Courses are shared by Plant and Soil Sciences and Horticulture Faculty

***Data for Summer 1 are not available

Appendix XII College of Agriculture Composite Report

2011-2012 College of Agriculture Composite Report

PUBLICATION

Department	Total All Publications	Books and Chapters	Refereed Articles	Refereed Articles + Chapters per Headcount	Refereed Articles + Chapters per Research FTE
PSS	102	9	58	1.72	2.71
VSC	86	22	51	3.84	4.71
AFS	72	2	46	1.30	3.27
BAE	57	3	17	1.25	2.72
ENT	56	2	49	3.00	4.60
PPA	53	6	25	2.58	4.72
FOR	53	1	10	0.79	2.23
FAM	45	1	15	1.45	5.28
AEC	26	1	18	0.90	2.18
CLD	21	4	9	0.93	3.66
HOR	20	0	16	1.00	2.52
MAT	10	0	10	1.00	3.92
NFS	9	0	9	0.82	4.97
LA	7	3	0	0.50	2.75

FUNDING

Department	Grants (total direct)	Grants (collaborative)	% Federal Competitive	Grants (direct) per Headcount	Grants (direct) per Research FTE
PSS	$3,785,819	$7,012,441	48%	$97,072	$153,086
AFS	$3,550,670	$3,566,806	85%	$95,964	$241,542
BAE	$2,203,659	$4,788,797	70%	$137,729	$299,410
PPA	$1,657,913	$9,395,899	64%	$138,159	$252,346
VSC	$1,217,337	$1,419,388	28%	$64,070	$78,538
HOR	$1,077,777	$2,250,719	11%	$67,361	$169,462
AEC	$936,383	$2,923,023	37%	$44,590	$107,383
FOR	$663,910	$1,072,443	0%	$47,422	$134,667
ENT	$269,695	$3,891,164	320%	$15,864	$24,341
CLD	$209,575	$1,480,206	0%	$14,970	$59,035
NFS	$184,007	$3,631,019	0%	$16,728	$101,661
MAT	$93,353	$93,353	0%	$9,335	$36,609
LA	$30,446	$30,446	0%	$5,074	$27,932
FAM	$0	$0	0%	$0	$0

INSTRUCTION

Degree Program	Enrollment UG Majors	Enrollment Graduate	Post-docs	SCH	SCH per Headcount	Total Enrollment per Headcount
NFS	564	20	0	10,319	938.09	53.09
AFS	482	48	3	4,867	131.54	14.41
CLD	243	30	0	4,570	326.43	19.50
AEC	243	49	0	4,784	227.81	13.90
MAT	175	10	0	3,594	359.40	18.50
FAM	150	41	0	5,114	464.91	17.36
BAE	108	31	0	1,091	68.19	8.69
LA	73	0	0	1,776	296.00	12.17
FOR	69	17	1	2,193	156.64	6.21
HOR	31	77	15	2,759	172.44	7.69
PSS	31	77	15	2,759	70.74	3.15
ENT	0	40	8	1,092	64.24	2.82
PPA	0	20	18	247	20.58	3.17
VSC	0	33	3	305	16.05	1.89

2010-2011 College of Agriculture Composite Report

PUBLICATION

Department	Total All Publications	Books and Chapters	Refereed Articles	Refereed Articles + Chapters per Research FTE	Refereed Articles + Chapters per Headcount
PSS	106	9	50	2.33	1.51
VSC	95	4	43	2.97	2.47
AFS	83	8	64	4.68	1.95
BAE	67	4	19	3.26	1.35
PPA	66	4	41	7.49	4.50
ENT	65	4	51	4.68	3.05
AEC	46	6	20	3.09	1.24
FOR	35	2	25	5.61	1.93
HOR	24	3	20	3.85	1.53
CLD	23	3	6	2.14	0.60
FAM	22	0	7	3.11	0.64
NFS	10	0	10	7.19	0.83
LA	5	1	0	0.63	0.17
MAT	5	1	4	2.04	0.71

FUNDING

Department	Grants (total direct)	Grants (collaborative)	% Federal Competitive	Grants (direct) per Research FTE	Grants (direct) per Headcount
PSS	$8,419,469	$10,193,231	81%	$332,260	$215,884
AFS	$4,411,471	$2,506,035	57%	$286,459	$119,229
ENT	$2,529,559	$6,420,440	53%	$215,465	$140,531
BAE	$2,407,530	$5,233,626	0%	$341,010	$141,619
PPA	$1,832,857	$9,668,387	24%	$304,968	$183,286
HOR	$1,485,175	$2,842,820	8%	$248,357	$99,012
AEC	$1,206,944	$3,028,696	50%	$143,343	$57,474
NFS	$858,035	$4,584,415	0%	$617,291	$71,503
FOR	$829,383	$1,464,803	0%	$172,429	$59,242
VSC	$814,198	$964,492	10%	$51,532	$42,853
CLD	$743,148	$2,058,701	39%	$176,520	$49,543
MAT	$247,275	$247,275	0%	$100,929	$35,325
LA	$8,800	$633,278	0%	$5,570	$1,467
FAM	$0	$0	0%	$0	$0

INSTRUCTION

Degree program	Enrollment UG majors	Enrollment Graduate	Post-docs	SCH	SCH per Headcount	Total Enrollment per Headcount
NFS	520	24	0	9,985	832.08	45.33
AFS	419	52	3	4,441	120.03	12.81
CLD	272	35	0	4,703	313.53	20.47
AEC	244	47	2	5,114	243.52	13.95
MAT	208	11	0	3,564	509.14	31.29
FAM	170	39	0	6,246	567.82	19.00
BAE	95	28	2	1,205	70.88	7.35
LA	77	0	0	1,351	225.17	12.83
FOR	59	16	2	1,876	134.00	5.50
HOR	41	66	19	2,793	186.20	8.40
PSS	41	66	19	2,793	71.62	3.23
ENT	0	29	12	1,012	56.22	2.28
PPA	0	20	26	226	22.60	4.60
VSC	0	31	6	196	10.32	1.95

2009-2010 Horticulture

Department	Research FTE	Books + Chapters	Refereed Articles	Books Plus Refereed	Books+Ref /Res. FTE	SCH	Total Grant $	$/Research FTE
AEC	8.36	14	22	36	4.31	4172	$1,481,516	$177,215
AFS	14.83	5	52	57	3.84	4012	$4,754,157	$320,577
BAE	7.51	2	25	27	3.60	1003	$3,394,482	$451,995
CLD	4.45	3	17	20	4.49	4680	$490,000	$110,112
ENT	11.83	4	60	64	5.41	966	$2,645,806	$223,652
FAM	2.63	0	18	18	6.84	7398	$70,867	$26,946
FOR	4.34	3	14	17	3.92	1222	$714,857	$164,714
HOR	5.89	0	14	14	2.38	2778	$1,977,736	$335,779
LA	1.22	2	1	3	2.46	1394	$0	$0
MAT	2.52	0	6	6	2.38	3791	$38,785	$15,391
NFS	1.89	0	9	9	4.76	9783	$905,114	$478,896
PPA	9.32	4	34	38	4.08	392	$1,684,587	$180,750
PSS	28.73	2	77	79	2.75	2778	$7,587,084	$264,082
VSC	15.95	3	37	40	2.51	342	$1,651,508	$103,543

Department	Ranked by Total Grant $
PSS	$7,587,084
AFS	$4,754,157
BAE	$3,394,482
ENT	$2,645,806
HOR	$1,977,736
PPA	$1,684,587
VSC	$1,651,508
AEC	$1,481,516
NFS	$905,114
FOR	$714,857
CLD	$490,000
FAM	$70,867
MAT	$38,785
LA	$0

Department	Ranked by $/Research FTE
NFS	$478,896
BAE	$451,995
HOR	$335,779
AFS	$320,577
PSS	$264,082
ENT	$223,652
PPA	$180,750
AEC	$177,215
FOR	$164,714
CLD	$110,112
VSC	$103,543
FAM	$26,946
MAT	$15,391
LA	$0

Department	Ranked by Pubs/Res. FTE
FAM	6.84
ENT	5.41
NFS	4.76
CLD	4.49
AEC	4.31
PPA	4.08
FOR	3.92
AFS	3.84
BAE	3.60
PSS	2.75
VSC	2.51
LA	2.46
MAT	2.38
HOR	2.38

Department	Ranked by Refereed Articles
PSS	77
ENT	60
AFS	52
VSC	37
PPA	34
BAE	25
AEC	22
FAM	18
CLD	17
HOR	14
FOR	14
NFS	9
MAT	6
LA	1

Department	SCH	Enrollment (majors)	Ranked by SCH/Enrollment (majors)
FAM	7398	185	39.99
HOR	2778	123	22.59
PSS	2778	123	22.59
ENT	966	48	20.13
NFS	9783	492	19.88
FOR	1222	63	19.40
LA	1394	74	18.84
MAT	3791	217	17.47
CLD	4680	289	16.19
AEC	4172	268	15.57
VSC	342	31	11.03
BAE	1003	94	10.67
AFS	4012	417	9.62
PPA	392	48	8.17

Department	Grant Expenditures
PSS	$6,047,605
ENT	$3,829,226
PPA	$3,105,722
AFS	$2,878,186
BAE	$2,252,334
HOR	$1,348,119
VSC	$1,114,474
AEC	$1,025,757
NFS	$694,011
FOR	$655,423
CLD	$499,016
FAM	$143,473
MAT	$74,022
LA	$56,326

2008-2009 Entomology

Department	Research FTE	Books + Chapters	Refereed Articles	Books Plus Refereed	Books+Ref /Res. FTE	SCH	Total Grant $	$/Research FTE
AEC	8.24	5	22	27	3.28	3594	$444,987	$54,003
AFS	16.33	5	58	63	3.86	3664	$4,206,433	$257,589
BAE	8.22	2	26	28	3.41	889	$2,210,598	$268,929
CLD	3.89	6	12	18	4.63	3837	$56,500	$14,524
ENT	11.25	3	35	38	3.38	1040	$2,280,006	$202,667
FAM	3.48	0	11	11	3.16	9174	$235,882	$67,782
FOR	5.28	2	19	21	3.98	1423	$814,098	$154,185
HOR	6.09	2	23	25	4.11	2636	$131,169	$21,538
LA	1.16	1	1	2	1.72	1451	$48,923	$42,175
MAT	2.06	1	6	7	3.40	3983	$74,498	$36,164
NFS	1.62	2	13	15	9.26	9035	$225,500	$139,198
PPA	9.66	7	30	37	3.83	372	$2,549,645	$263,938
PSS	25.68	10	85	95	3.70	2636	$3,920,885	$152,682
VSC	16.76	13	42	55	3.28	379	$680,199	$40,585

Department	Ranked by Total Grant $
AFS	$4,206,433
PSS	$3,920,885
PPA	$2,549,645
ENT	$2,280,006
BAE	$2,210,598
FOR	$814,098
VSC	$680,199
AEC	$444,987
FAM	$235,882
NFS	$225,500
HOR	$131,169
MAT	$74,498
CLD	$56,500
LA	$48,923

Department	Ranked by $/Research FTE
BAE	$268,929
PPA	$263,938
AFS	$257,589
ENT	$202,667
FOR	$154,185
PSS	$152,682
NFS	$139,198
FAM	$67,782
AEC	$54,003
LA	$42,175
VSC	$40,585
MAT	$36,164
HOR	$21,538
CLD	$14,524

Department	Ranked by Pubs/Res. FTE
NFS	9.26
CLD	4.63
HOR	4.11
FOR	3.98
AFS	3.86
PPA	3.83
PSS	3.70
BAE	3.41
MAT	3.40
ENT	3.38
AEC	3.28
VSC	3.28
FAM	3.16
LA	1.72

Department	Ranked by Refereed Articles
PSS	85
AFS	58
VSC	42
ENT	35
PPA	30
BAE	26
HOR	23
AEC	22
FOR	19
NFS	13
CLD	12
FAM	11
MAT	6
LA	1

Department	SCH	Enrollment	Ranked by SCH/Enrollment
FAM	9174	180	50.97
ENT	1040	46	22.61
FOR	1423	72	19.76
NFS	9035	480	18.82
HOR	2636	147	17.93
PSS	2636	147	17.93
MAT	3983	228	17.47
CLD	3837	236	16.26
AEC	3594	226	15.90
LA	1451	92	15.77
VSC	379	29	13.07
AFS	3664	302	12.13
BAE	889	89	9.99
PPA	372	45	8.27

Department	Grant Expenditures
ENT	$3,920,834
PSS	$3,872,952
BAE	$3,656,941
PPA	$2,681,645
AFS	$2,208,258
HOR	$1,388,865
AEC	$1,233,935
VSC	$739,736
FOR	$715,339
NFS	$551,668
CLD	$328,278
FAM	$148,669
MAT	$31,678
LA	$31,628

Composites 2007-2008

Department	Research FTE	Books + Chapters	Refereed Articles	Books Plus Refereed	Books+Ref /Res. FTE	SCH	Total Grant $	$/Research FTE
AEC	6.19	1	22	23	3.72	3572	$510,644	$82,495
AFS	16.02	6	48	54	3.37	3566	$3,285,677	$205,098
BAE	9.18	2	44	46	5.01	1101	$2,971,839	$323,730
CLD	4.76	3	10	13	2.73	3326	$917,961	$192,849
ENT	10.95	3	40	43	3.93	970	$7,925,776	$723,815
FAM	3.98	4	13	17	4.27	10565	$338,834	$85,134
FOR	5.78	4	17	21	3.63	1252	$783,677	$135,584
HOR	5.46	1	20	21	3.85	2878	$849,109	$155,514
LA	0.76	0	1	1	1.32	1736	$100,000	$100,000
MAT	1.69	0	5	5	2.96	4330	$34,293	$20,292
NFS	1.43	2	6	8	5.59	9171	$453,244	$316,954
PPA	8.15	4	30	34	4.17	357	$2,288,090	$280,747
PSS	24.66	12	70	82	3.33	2878	$3,260,269	$132,209
VSC	17.85	8	40	48	2.69	243	$766,195	$42,924

Department	Ranked by Total Grant $
ENT	$7,925,776
AFS	$3,285,677
PSS	$3,260,269
BAE	$2,971,839
PPA	$2,288,090
CLD	$917,961
HOR	$849,109
FOR	$783,677
VSC	$766,195
AEC	$510,644
NFS	$453,244
FAM	$338,834
LA	$100,000
MAT	$34,293

Department	Ranked by $/Research FTE
ENT	$723,815
BAE	$323,730
NFS	$316,954
PPA	$280,747
AFS	$205,098
CLD	$192,849
HOR	$155,514
FOR	$135,584
PSS	$132,209
LA	$100,000
FAM	$85,134
AEC	$82,495
VSC	$42,924
MAT	$20,292

Department	Ranked by Pubs/Res. FTE
NFS	5.59
BAE	5.01
FAM	4.27
PPA	4.17
ENT	3.93
HOR	3.85
AEC	3.72
FOR	3.63
AFS	3.37
PSS	3.33
MAT	2.96
CLD	2.73
VSC	2.69
LA	1.32

Department	Ranked by Refereed Articles
PSS	70
AFS	48
BAE	44
ENT	40
VSC	40
PPA	30
AEC	22
HOR	20
FOR	17
FAM	13
CLD	10
NFS	6
MAT	5
LA	1

Department	SCH	Enrollment	Ranked by SCH/Enrollment
FAM	10565	195	54.18
ENT	970	47	20.64
FOR	1252	61	20.52
NFS	9171	474	19.35
HOR	2878	155	18.57
PSS	2878	155	18.57
LA	1736	100	17.36
MAT	4330	257	16.85
AEC	3572	244	14.64
CLD	3326	236	14.09
BAE	1101	100	11.01
AFS	3566	326	10.94
PPA	357	37	9.65
VSC	243	27	9.00

Appendix XIII 2012 Feedback on Extension Specialists by County Agents

	2012 Feedback on Extension Specialists by County Agents		Degree of Interaction	Overall Responsiveness	Value of assistance or support	Effectiveness of assistance, program or support
Inst	Department / Unit	Total Number of Responses	3=Extensive 2=Moderate 1=Minimal	3=High 2=Moderate 1=Unresponsive	3=High 2=Moderate 1=Low	3=High 2=Moderate 1=Low
UK	4-H Youth Development	519	2.12	2.71	2.60	2.59
UK	Ag Communications	22	1.86	2.77	2.73	2.77
UK	Agr Economics	277	2.03	2.88	2.88	2.84
UK	Animal and Food Sciences	616	2.06	2.84	2.86	2.85
UK	ANR Programs	33	1.88	2.79	2.88	2.88
UK	Biosystems and Ag Engineering	96	1.86	2.81	2.90	2.79
UK	Community and Leadership Development	84	1.70	2.79	2.81	2.80
UK	Dietetics and Human Nutrition	102	1.74	2.78	2.75	2.69
UK	Entomology	222	2.21	2.97	2.98	2.96
UK	Family and Consumer Sciences	411	2.00	2.82	2.81	2.80
UK	Family Sciences	111	1.90	2.78	2.74	2.75
UK	Forestry	148	1.74	2.82	2.80	2.76
UK	Horticulture	318	2.05	2.90	2.88	2.85
UK	Plant and Soil Sciences	359	2.24	2.88	2.87	2.82
UK	Plant Pathology	251	2.37	2.98	2.96	2.93
UK	Program and Staff Development	84	1.88	2.88	2.79	2.82
UK	Regulatory Services	6	2.50	3.00	3.00	3.00
UK	Veterinary Science	18	2.11	2.72	2.72	2.56

External Review

University of Kentucky
College of Agriculture

Department of Horticulture
Periodic departmental review
Conducted March 4 – 5, 2013

Review Team Report

Review team
Ned Crankshaw, team chair
Chair and Professor, UK Department of Landscape Architecture

Nancy Creamer
Professor, North Carolina State University Center for Environmental Farming Systems

Danielle Treadwell
Associate Professor, University of Florida Department of Horticulture

Ben Abell
Manager, UK Horticulture Research Farm (HRF)

Ric T. Bessin
Professor, UK Department of Entomology

Larry Brandenburg
President of OAK (Organic Association of Kentucky)

Tim Coolong
Assistant Professor, UK Department of Horticulture *ex officio*

Meera Nair
Graduate Student, UK Department of Horticulture

Department of Horticulture Periodic Review

This report summarizes the assessment and recommendations of a committee charged with the 2013 periodic review of the Department of Horticulture, College of Agriculture, University of Kentucky. External review committee members are listed on the cover page of this document.

The department supplied the committee with a self-study report that documented its response to the previous review conducted in 2005, reiterated its strategic plan goals, and explained departmental opportunities and challenges. The committee met with department faculty and staff, college administration, graduate students, and with a small number of department stakeholders and collaborators. These interviews were sufficient to confirm challenges as explained in the department's self-study related to facility location/quality, extension associate funding, undergraduate enrollment, and the continued development of the Horticulture Research Farm. Through the interview process, the external review team identified additional challenges in the areas of departmental identity and communication, graduate education, and departmental planning. The sample of survey responses from industry stakeholders and extension agents was too small to provide definitive information, though they did provide useful anecdotal comments in regard to extension interactions and publications. See survey information at the end of this document.

Overview

The Department of Horticulture at the University of Kentucky is characterized by a wide array of activities relative to the size of the department. This diversity has meant opportunities for the department to be involved in a broad range of research, extension, and educational programs, but it also challenges the department with a level of fragmentation. This is a presence for Horticulture in terms of work locations, undergraduate and graduate programs, and extension programming.

The department's administrative and faculty offices are housed in Agriculture Science North. Research faculty and staff use laboratories in both the Plant Science building and Agriculture Science North, other research activities take place at the South Farm, and the department is represented by a faculty member and staff members at the farm in Princeton.

There is no undergraduate program in the Horticulture department, but faculty teach in the undergraduate program in Plant and Soil Science, the individualized program in Sustainable Agriculture, and the interdisciplinary program in Agricultural Biotechnology. There is also no graduate program specifically in Horticulture and graduate students working with Horticulture faculty are enrolled in the Integrated Plant and Soil Sciences program (IPSS), which is administratively housed in the Department of Plant and Soil Sciences.

Extension programs in Horticulture include landscape horticulture, horticultural crop production, and sustainable agriculture.

The department has recently promoted the concept of sustainable agriculture as a focus area that is important and timely and that has potential to bring a level of unity to the department's diverse efforts. When the external review team met with administration, department personnel, and stakeholders this focus on sustainable agriculture was a recurring topic of discussion. In the course of the interviews it was increasingly clear that this definition of

department mission means many different things to different people and that a clear consensus around it has not yet developed. If this is the direction of the department, there is a continuing need to develop a vision for what that means and how it actually directs research, extension, and educational programs.

The department is perhaps in a transitional period, though this is not universally recognized as such by all faculty and staff. It has existed as a group of research faculty with individualized research interests, a group of extension faculty each responsible to a specific group of horticultural crop producers, and a fairly small number of teaching faculty who teach in multi-department undergraduate degree programs. If a focus on sustainable agriculture continues to strengthen, more coordination within and between research and extension programs could significantly reshape its character as a department. This transition appears to be uncomfortable for some members of the department but could be made less so if all faculty and staff understood how they fit in to the evolving nature of the Department of Horticulture.

Communication

Interviews in the department repeatedly indicated difficulties in communication. These related in some cases to the barriers to casual personal contact between various faculty and staff caused by their separation in location. Most critically, the farm staff are a relatively small group at a remote location and expressed a need to be better connected.

The department has few faculty meetings, which may be viewed by the chair and perhaps others as tedious. It was obvious in meeting with faculty that they had very few occasions in which to discuss department direction relative to the issues it faces or to develop greater coalescence around the stated focus of sustainable agriculture.

Staff, graduate students, and faculty all at times expressed a lack of knowledge of department goals and positions that were presented in the self-study as broadly shared. Communications of a general informational character also appeared to be infrequent in the department, based on many comments in the interviews. This has led to some people feeling “in the dark.” The committee did not attempt to ascertain whether this is an issue that is top down, bottom up, or both, but recommends this is an area for improvement.

Communication is exacerbated by a strained relationship between the chair and the department’s administrative staff associate, along with a poor working relationship between some faculty and administrative staff persons. The committee was not in a position to assign responsibility for this, but does recommend that the issues be dealt with as part of a larger effort to improve communication and collegiality.

Research

The department's research faculty work in both basic and applied areas. As a group, they fall mid-range in the college in regard to productivity, which has increased over the last three years. Research labs are split between Agriculture Science North and the Plant Science building. Faculty and especially the technical staff in Plant Science expressed some perception that this separation functions as a barrier between them and the rest of the department.

Housing the basic researchers with the applied researchers so they can easily interact could improve collaboration and integration of research which is especially important in sustainable agriculture. In addition, with the Department's focus on sustainability, there is the opportunity for enhanced research collaborations with other departments and disciplines. The development of the Horticulture Research Farm (HRF) creates a scenario for interaction which integrates many disciplines in systems research, and that integrates research with extension and academic programming.

More dialogue and discussion around what research is needed from a sustainability standpoint could help the scientists know where they fit, as many weren't sure as of yet. Comments in interviews were along the line of "my research could be called sustainable agriculture." At some point the department may need to strategically decide what broad issues to address from a sustainability standpoint, and then follow with a discussion about what research is needed and is possible (interdisciplinary and a mix of applied and basic) to help solve the problem. Interdisciplinary research with a sustainability focus is a priority for many funding agencies, so has strong potential for the department.

Some concern was expressed by research faculty about a move to evaluate faculty based on the "impact factors" for journals they publish in. It is a valid concern, and the hope is that the administration makes determinations based on the journals that are standard in a particular field as many applied journals have lower impact factors, though the work is important.

Graduate Programs

The Horticulture department does not have a graduate degree program of its own but it supports the Integrated Plant and Soil Sciences program (IPSS) that is functionally housed in the Department of Plant and Soil Sciences. Because graduate students in the Horticulture Department are actually admitted through the Department of Plant and Soil Sciences, few of them identify closely with Horticulture. Graduate students who are working with Horticulture faculty have varied research interests and there is a general lack of cohesion among those students with diverse interests. With the introduction of the IPSS program a series of three mini-symposiums per year has been instituted in which students from various specializations and departments can interact. This gives the graduate students from Horticulture an opportunity to interact with their peers, however, a general sense of association to individual research programs is much stronger than the collective association with the Department of Horticulture. Students expressed disappointment with the lack of cohesion and that this had limited the overall experience of graduate school for many of them. They indicated that in their perception one of the most important parts of graduate school is the camaraderie and peer to peer interactions that come from having a sense of place and ownership in a department.

Graduate students raised additional concerns about the breadth of preparation they were receiving for academic and industry careers. These included the following issues:

- Lack of opportunities for experience in teaching and extension activities
- Lack of critical mass and few opportunities for social and professional interaction with peers and other faculty that would mitigate the limitations caused by the small number of students
- Lack of interaction with other faculty (outside their major advisor) and lack of awareness of the scope of work that other faculty are doing, which is often achieved through seminars in which faculty present their work
- Lack of opportunities to participate in grant writing and scientific meetings and lack of awareness of opportunities to apply for competitive scholarships and travel grants and spectrum of opportunities available to advance careers.

Undergraduate Programs

The Horticulture department directly supports three undergraduate interdisciplinary degree programs, Biotechnology, Sustainable Agriculture (Individualized Programs track), and Horticulture, Plant and Soil Science. The review team did not have access to undergraduate students which was a distinct deficiency in this process. Our observations are based on the self-study and interviews with faculty and administrators.

Sustainable Agriculture

Faculty members in the department are providing leadership and vision to the sustainable agriculture interdisciplinary undergraduate program. Sustainable Agriculture has been growing in enrollment but will need to almost double the number of students to move from an individualized program to a formal major. The program is working to recruit additional faculty from other units to broaden the scope of course offerings and increase hands-on experiential opportunities for its students.

Faculty involved in sustainable agriculture will need to continue to integrate other disciplines and additional courses, integrate sustainable animal agriculture in the program (courses, internships, etc.), and provide internships off the farm. The Sustainable Agriculture Steering Committee should work with College administration to communicate the steps that have been taken to broaden the goals and direction of this multidisciplinary program and to ensure agreement on future direction.

The department will need to increase enrollment in this program through active recruitment efforts to move it toward becoming a formal major. As additional courses develop the department will also need to work within the new budgeting structure at UK so that Horticulture and other departments contributing to this program receive appropriate teaching credit.

Horticulture, Plant and Soil Science

The Horticulture department supports this multidisciplinary undergraduate program through advising and instruction. Of concern to the faculty is the continuing decline in the number of students enrolled in this program, particularly with respect to those interested in landscape management. The horticulture faculty in cooperation with faculty from other units involved in this major needs to develop a strategic plan to revitalize this traditionally strong undergraduate program. Focus should be given to the types of graduates that are needed and effective mechanisms to increase student enrollment.

Biotechnology

Faculty within Horticulture actively support this highly successful interdisciplinary program. There were no specific issues with this program.

Extension Programs

Horticulture Extension programs are developed and delivered by 5.4 FTE faculty, six extension associates, and 22 horticulture extension agents along with ANR agents in the large number of counties without horticulture agents. Extension clientele for horticulture programs include specialty crop producers, vineyards and the wine industry, the landscape and turf industry, and homeowners.

Specialty crop growers are primarily served at the production end. There is a strong emphasis assisting producers with plastic mulch/drip irrigation field systems. Programs to increase adoption of protected agriculture systems (high tunnels, greenhouses) and crop diversification strategies could lead to increased impacts as producers would have access to new market opportunities and increased potential cash flow during seasons with limited local food availability. Extension's role in supporting local food systems has not been formalized, but this is an area with the potential for positive impact at the state level. Direct marketing outlets are a significant opportunity for KY producers, creating new opportunities for research and educational programming to meet the needs of the agricultural industry at the market level.

Vineyards and wine producers are served by one extension faculty and one extension associate. This program covers the range of issues from site selection and grape cultivation to wine production and marketing.

The more densely populated areas surrounding Lexington, Louisville, and the Northern Kentucky counties have the greatest opportunities for the landscape and turf industry and this coincides with the majority of counties that have horticulture agents. The review team had little interaction with representatives from this industry although it is clear that there is significant faculty expertise in this area. The need for a greenhouse and floriculture extension position came up repeatedly with extension faculty and is identified as priority in the department's self-study.

Citizens in the primary population centers have strong relationships with Extension as a provider of information for homeowners and they rely on those services for education on nutrition, food production, and landscape horticulture. Some concern was expressed that homeowner demands were poised to bring an unprecedented demand for extension programming, and that the current staff and program resources were significantly insufficient to meet that demand.

The administrative leadership at the college level has an understanding and appreciation of the current and future potential roles of horticultural sciences faculty, staff and students in advancing Kentucky's horticulture industry. UK's College of Agriculture provides leadership for several centers that benefit many departments on campus including The Crop Diversification and Biofuel Research and Education Center, the Human Nutrition and Food Systems Innovative Center and the Horticultural Research Farm. Programs and initiatives such as Kentucky MarketMaker, Farm to School, Master Gardeners and others are important initiatives that benefit horticulture clientele.

Extension faculty are involved in a number of activities at the university, county, state, and national levels. They serve on committees, are recognized for their efforts by their peers, and benefit from good relationships with county faculty. The evidence of outcomes and impacts of statewide leadership among Horticultural faculty is variable in achieving positive outcomes that are highly visible to the UK community and statewide to stakeholders and the general

public. Discussion of extension outcomes led to two main observations: 1) faculty are evaluating the importance of their programs based on the number of clientele served, and not the knowledge the clients gained, or the rate of adoption of new practices, and 2) the scholarship of extension was poorly defined by the university and not well-integrated into annual faculty assessments and the tenure and promotion process. The value of extension publications was defined at the Department and College level and shared with reviewers in the report but faculty communicated that at the university level that value did not always translate.

A significant amount of funding for extension programs in Horticulture has been made available through the Kentucky Horticulture Council. These funds are primarily managed by a single PI through a process that was not clear to the review team or even the faculty. These funds are currently in a phase-out period and are declining annually. Faculty and staff involved in this program recognized this as a challenge but a plan or process to manage this transition was not evident. This is a primary challenge for the department as a great deal of its program delivery is handled through extension associates.

Surveys and interviews of county agents represented a small slice of the population and so it is not clear if their viewpoints are widely shared. In general, they expressed satisfaction with the responsiveness of extension faculty and staff in the department. Some review participants commented that several key resources were out of date or absent and that there is a need for a stronger web presence for horticulture extension.

Recommendations

1. Communication seems to be difficult from a number of standpoints. People feel out of the loop, and non-faculty (staff, students, etc.) want to be part of the conversation, or at least informed. Listservs, regular faculty meetings, social events, graduate student and staff liaisons at faculty meetings could all be helpful. There is a level of camaraderie that exists on the HRF that appears lacking elsewhere in the department. In addition to internal communications, some focus on external marketing and a stronger web presence for the department and sustainable agriculture program and farm is important.

2. The department needs to develop a long-term vision and strategic plan that is more specific to its needs and goals. This should be done with meaningful input from staff and students. The focus on sustainability seems broadly accepted, though it was also clear that more definition needs to be put around that concept so the department has some consensus on positions, prioritizing resource needs, and coordinating research and extension effort.

3. The department and its stakeholders need to develop a long-term vision and strategic plan for the Horticulture Research Farm. The farm is an extremely valuable asset for the department and can attract students, funding, and community support for its programs. The strategic plan for the farm should include long term collaborations with other departments.

4. Broaden the focus of the extension associates to be more nimble with a range of expertise and support that provides leadership to clientele. To be most effective, extension should engage more broadly with local food systems and a range of sustainable agriculture practices.

5. Consider developing a strategy that integrates academic, extension, and research programs in sustainable agriculture with a focus on the HRF. This has potential for fundraising and would bring clearer focus to the vision, mission, and goals for the farm and program.

6. Sustainable Agriculture should become a degree program. As the program works to become more interdisciplinary, the Steering Committee should work with administration to communicate and agree on goals and direction.

7. The department needs to develop a cohesive graduate education experience. Students expressed a need for informational seminars and the desire to know more about what other faculty are doing and how the work of their labs relate to the work of the department as a whole. Specific recommendations include the following:

- Develop formal teaching or extension experiences, depending on students' interests, as an integral part of the education of graduate students in the Horticulture department.
- Develop a competitive pool of funding for graduate students to attend scientific meetings. This funding would benefit students and allow the department to have a greater presence at conferences.

- Work to create more professional and social interaction through organized departmental activities for faculty and students as well as encouraging students to organize as a group.
- Develop a seminar or short classes that focus on grant writing activities, cross-training on equipment and techniques, and other subjects that would assist graduate students in their career preparation.

Review Schedule

Sunday, March 3

Designated local committee members transport external reviewers to Gratz Park Inn and host dinner and other activities

Monday, March 4

8-8:45 a.m.	Breakfast with review committee at Gratz Park Inn. Local committee members provide transportation to AgN Building
9-10 a.m.	Meeting with Dean Scott Smith and Assistant Dean Lisa Collins, S-301 AgN
10-11 a.m.	Meeting with Dr. Robert Houtz, Chair, Department of Horticulture, S-301 AgN
11 a.m.-12:30 p.m.	Meeting and lunch with Associate Deans, S-301 AgN Dr. Jimmy Henning, Extension Dr. Larry Grabau, Instruction Dr. Nancy Cox, Research
12:30-1 p.m.	Break
1-1:45 p.m.	Meeting with research faculty, S-301 AgN
1:45-2:30 p.m.	Meeting with teaching faculty, S-301 AgN
2:30-3:15 p.m.	Meeting with extension faculty, S-301 AgN
3:15-3:30	Break and move to South Farm. Transportation provided by local review committee members
3:30-6:30 p.m.	South Farm tour and meeting with farm staff
6:30-8 p.m.	Dinner and working session at Nick Ryan's
8:00 p.m.	External review committee members transported to hotel by selected local committee members

Tuesday, March 5

8-8:45 a.m.	Breakfast with review committee at Gratz Park Inn
8:45 a.m.	Selected local committee members transport external members to AgN
9-9:30 a.m.	Meet with administrative staff, S-301 AgN
9:30-10 a.m.	Meet with laboratory staff, S-301 AgN
10-10:15 a.m.	Break and move to 118 Gluck
10:15-11 a.m.	Meet with horticulture extension agents, 118 Gluck
11 a.m-12 p.m.	Meet with industry leaders, 118 Gluck
12 p.m.-1 p.m.	Working lunch session, 118 Gluck
1-1:45 p.m.	Meet with departmental collaborators, 118 Gluck
1:45-2 p.m.	Move to S-301 AgN
2-2:30 p.m.	Meet with graduate students, S-301 AgN
2:30-3:30 p.m.	Working session, S-301 AgN
3:30-4:30 p.m.	Provide summary to Dean Scott Smith, S-301 AgN
4:30 p.m.	External reviewers are transported to the airport by selected committee members

Horticulture Industry Leaders' Survey

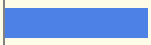
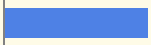
1. What type of operation is your business? (i.e. nursery, vineyard, orchard, other.)

#	Answer		Response	%
1	Commercial vegetables		0	0%
2	Nursery/Greenhouse		2	20%
3	Orchard		0	0%
4	Turfgrass		0	0%
5	Vineyard		2	20%
6	Other (Please identify)		6	60%
	Total		10	100%

Other (Please identify)
Landscape maintenance
Hobby nut and fruit trees
Certified organic: produce, eggs, and meat (chicken and pork)
Combination of the following: Orchard, Commercial vegetables, Greenhouse, Landscape maintenance
Professional tree care service, arboriculture
Trade association

Statistic	Value
Min Value	2
Max Value	6
Mean	5.00
Variance	2.67
Standard Deviation	1.63
Total Responses	10

2. How well does the UK Department of Horticulture provide effective research and extension information to meet your technical information needs and those of your industry? (i.e. websites, fact sheets, face-to-face conversations, etc.) (Please select one.)

#	Answer		Response	%
1	Exceeds expectations		3	30%
2	Meets expectations		3	30%
3	Needs improvement (Please explain)		3	30%
4	Don't know/Don't use/Doesn't apply		1	10%
	Total		10	100%

Needs improvement (Please explain)
Under staffed, no current extension in floriculture crops
Win Dunwell is the only extension Hort professor for the whole state.
I appreciate all the programs, publications and staff. However I feel that the website is difficult to search.

Statistic	Value
Min Value	1
Max Value	4
Mean	2.20
Variance	1.07
Standard Deviation	1.03
Total Responses	10

3. What are other ways in which the UK Department of Horticulture could meet the future needs of your industry? Comments:

Text Response
Make extension hiring a priority
The Hort department is doing an amazing job right now. Just continue to give them the support and encouragement to continue in research and outreach.
By researching specific cultivars for hardiness, disease, crop set, and marketability.
A better understanding of organic agriculture in general would be great.
More classes in regional locations.
In the past plant pathology was under staffed resulting in delays in disease recognition, due to vacations, travel, etc., of personnel resulting in negative economic impacts due to the slow response time. I am not convinced that the situation has improved.
Hire Amy like you should have done in the first place.
Improve website. There is a great deal of out of date information, incomplete information and links that no longer exist. It is a challenge to find extension publications. The Entomology department has done the best job in organizing their area of the site. ENT-facts are often the easiest to find--quickly. The horticulture fact sheets are a jumble between areas of interest. If one has an interest in a specific topic it is not always clear if it will be found as ENT, ID, HORT, FOR..... It would be so helpful to have an index of some sort.
Provide additional course work for undergraduates in the field of Arboriculture.
Currently working with the department to meet future needs.

Statistic	Value
Total Responses	10

4. What types of information and support (workshops, short courses, training programs, etc.) have you or your industry received through the UK Department of Horticulture or Extension Service? Comments:

Text Response
On site visits
Not as many as I would like but the assistance we get with problems or questions is very valuable.
Info on pest, pesticides, Cultivar popularity, diseases prone to, times to apply pesticides, fertilizer requirements, etc.
I have gone through the Master Gardeners' course. I couldn't afford to volunteer all the hours necessary to be a Master Gardener. The course was interesting, and I learned a lot. But it was not very helpful in helping to further my knowledge in relation to organic agriculture. The organic section was 1/2 of one session. The extension agent was not familiar with organic production at all. It was in 2008 or 2009.
Classes for tannins, growing, spraying, wine stabilization
Disease recognition, chemical use, vineyard management, varietal selection, winery management,
I've gone to most of them
We attend as many programs as possible. Thanks to Traci Missun, Win Dunwell and Christi Forsythe. These three individuals consistently send out updates on programs. We especially appreciate program offerings for a full day and during off times -- November through February.
We extensively utilize the plant diagnostic lab to confirm diagnoses of tree issues. We attend some workshops that are either hosted or sponsored by Hort/Extension. Workshops led by Bill Fountain, Julie Beale, John Hartman, and Nicole Ward are ALWAYS incredibly informative.
1. Direct on-farm support 2. Educational Programs 3. Workshops 4. On-farm demonstrations 5. Research projects 6. Economic research and analysis

Statistic	Value
Total Responses	10

5. Please indicate if you find information from the following sources useful, practical, and easy to understand: (Please check all that apply.)

#	Question	Useful	Practical	Easily Understood	Don't Use	Not Applicable	Total Responses
1	Horticulture Publications	8	3	4	1	0	16
2	Hort. Meetings & Conferences	8	2	2	1	0	13
3	Horticulture Website	6	4	2	2	0	14
4	One-on-one Consultations	7	1	2	1	1	12

Statistic	Horticulture Publications	Hort. Meetings & Conferences	Horticulture Website	One-on-one Consultations
Min Value	1	1	1	1
Max Value	4	4	4	5
Total Responses	10	9	9	9

6. Did you know that the following subjects are addressed by Horticulture Extension? (Please check all that apply.)

#	Answer		Response	%
1	Commercial Flowers		6	60%
2	Commercial Fruits & Nuts		8	80%
3	Commercial Nursery & Landscape		8	80%
4	Commercial Vegetable		7	70%
5	Crop Diversification & Biofuel Research & Education		7	70%
6	Research		8	80%
7	Turfgrass Science		8	80%

Statistic	Value
Min Value	1
Max Value	7
Total Responses	10

7. How well is the Department of Horticulture at UK providing your industry with timely and valuable information through its research, education, and extension programs? (Please select one.)

#	Answer		Response	%
1	Exceeds expectations		2	20%
2	Meets expectations		5	50%
3	Needs improvement (Please explain)		2	20%
4	Don't know/Don't use/Doesn't apply		1	10%
	Total		10	100%

Needs improvement (Please explain)
Could be more timely with more help
It is clear that funding is lacking. The breakdown/disappearance of the horticulture staff is apparent.

Statistic	Value
Min Value	1
Max Value	4
Mean	2.20
Variance	0.84
Standard Deviation	0.92
Total Responses	10

8. What changes would you like to see in the Horticulture Department? Comments:

Text Response
More staff
Bring back landscape management degree. The industry needs this now more than ever.
No opinion
The only exposure to the UK extension service is through our local extension office and the Fruit and Vegetable Growers' Conference. Our extension office was helpful when we first got started, but eventually I quit contacting them because they didn't know anything about organic production. We have been to KSU for several events, but we have never attended an event of field day at UK because of the perception that UK specializes with large farms. The push-back that we got from the FSA office, Fish and Wildlife and the NCRS when we first started investigating being organic, combined with the lack of information about organic production that was available when we first got started, forced us to seek help outside of the state. Since becoming certified, we find that we still seek information from other organic farmers rather than asking extension personnel.
More regional classes
Adequate personnel in plant pathology
You need bodies. The staff has been cut too much.
The website does not have an up to date listing of Horticulture staff. It is difficult to learn who to reach out to with specific questions if this information is incorrect.
Again, more course material in Arboriculture.
No recommendations

Statistic	Value
Total Responses	10

9. Is the Horticulture Department responsive to your needs in training, outreach, research, and extension? (Please select one.)

#	Answer		Response	%
1	Exceeds expectations		2	20%
2	Meets expectations		5	50%
3	Needs improvement (Please explain)		2	20%
4	Don't know/Don't use/Doesn't apply		1	10%
	Total		10	100%

Needs improvement (Please explain)
I am lucky to have a local extension agent willing to go above and beyond to help me find either the answer or an individual that can provide the answer.

Statistic	Value
Min Value	1
Max Value	4
Mean	2.20
Variance	0.84
Standard Deviation	0.92
Total Responses	10

10. Do you find departmental staff and faculty courteous and polite in responding to your questions and/or needs? (Please select one.)

#	Answer		Response	%
1	Exceeds expectations		6	60%
2	Meets expectations		3	30%
3	Needs improvement (Please explain)		0	0%
4	Don't know/Don't use/Doesn't apply		1	10%
	Total		10	100%

Needs improvement (Please explain)

Statistic	Value
Min Value	1
Max Value	4
Mean	1.60
Variance	0.93
Standard Deviation	0.97
Total Responses	10

11. Quality of Horticulture Website: (Please select one.)

#	Answer		Response	%
1	Exceeds expectations		0	0%
2	Meets expectations		7	70%
3	Needs improvement (Please explain)		1	10%
4	Don't know/Don't use/Doesn't apply		2	20%
	Total		10	100%

Needs improvement (Please explain)
Out of date, poorly organized

Statistic	Value
Min Value	2
Max Value	4
Mean	2.50
Variance	0.72
Standard Deviation	0.85
Total Responses	10

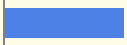
12. Are there any additional comments you would like to make about UK's Department of Horticulture? Comments:

Text Response
I will try to directly respond to email but questions 5 and 6 will not let me check more than one as indicated. Not a good showing really.
Keep up the good work. Thanks.
Consistently my staff reports appreciating talks by Drs. Bessin, Potter, Coolong and Strang. They have the ability to deliver information in both a clear and concise manner without dumbing it down.

Statistic	Value
Total Responses	3

Horticulture County Agents' Survey Results

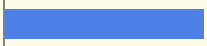
1. Overall quality of the Horticulture program: (Please select one.)

#	Answer		Response	%
1	Exceeds expectations		3	25%
2	Meets expectations		7	58%
3	Needs improvement (Please explain)		1	8%
4	Don't know/Don't use/Doesn't apply		1	8%
	Total		12	100%

Needs improvement (Please explain)
lacks greenhouse support

Statistic	Value
Min Value	1
Max Value	4
Mean	2.00
Variance	0.73
Standard Deviation	0.85
Total Responses	12

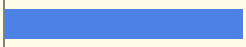
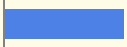
2. Quality of Horticulture presentations: (Please select one.)

#	Answer		Response	%
1	Exceeds expectations		5	42%
2	Meets expectations		6	50%
3	Needs improvement (Please explain)		0	0%
4	Don't know/Don't use/Doesn't apply		1	8%
	Total		12	100%

Needs improvement (Please explain)

Statistic	Value
Min Value	1
Max Value	4
Mean	1.75
Variance	0.75
Standard Deviation	0.87
Total Responses	12

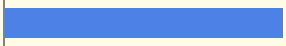
3. Horticulture Department provides materials, training, educational programs, or other resources that agents use in their county programs: (Please select one.)

#	Answer		Response	%
1	Exceeds expectations		6	50%
2	Meets expectations		2	17%
3	Needs improvement (Please explain)		3	25%
4	Don't know/Don't use/Doesn't apply		1	8%
	Total		12	100%

Needs improvement (Please explain)
More exclusives that are circulated in time to get them into newsletters. Time sensitive info that arrives 5 days after newsletters go out is not helpful.
Publications need updating. Lists of plant material are out of date by many years.
Some need updating; some need enhancement and better on-line "presence" and usability, other than just words-links to more info, photos, etc.

Statistic	Value
Min Value	1
Max Value	4
Mean	1.92
Variance	1.17
Standard Deviation	1.08
Total Responses	12

4. Quality of Horticulture publications: (Please select one.)

#	Answer		Response	%
1	Exceeds expectations		1	8%
2	Meets expectations		3	25%
3	Needs improvement (Please explain)		7	58%
4	Don't know/Don't use/Doesn't apply		1	8%
	Total		12	100%

Needs improvement (Please explain)
We lack several Extension publications that I end up having to get from other universities. I realize they take time and aren't top priority, but I feel like we're falling behind on some of them.
Embarrassed by our lack of current pubs, Distribute as much from other universities as our own. Horticulture agents have been demanding a new homeowner fruit pub for years to no avail
The publications we have are top notch; but there are many subjects lacking; having to use other university publications to supplement
See Q3
Lots of good publications that need nothing some need to be brought up to date. would love to see a transition to e publications that feature hot links etc. possible imbedded how to videos etc. I think we could really catch some attention with the younger audiences
Needs up to date information
Fruit pubs need to be updated in such a way that they can be used for homeowners

Statistic	Value
Min Value	1
Max Value	4
Mean	2.67
Variance	0.61
Standard Deviation	0.78
Total Responses	12

5. Horticulture information is current/up-to-date: (Please select one.)

#	Answer		Response	%
1	Exceeds expectations		0	0%
2	Meets expectations		6	50%
3	Needs improvement (Please explain)		5	42%
4	Don't know/Don't use/Doesn't apply		1	8%
	Total		12	100%

Needs improvement (Please explain)
I'd like to see more regularly updated (weekly would be great, monthly would be acceptable) info we can use in newsletters, social media, etc. Current info is excellent.
See Q3
Several need updating, especially Growing Fruit in Kentucky
Some are good, some can be better

Statistic	Value
Min Value	2
Max Value	4
Mean	2.58
Variance	0.45
Standard Deviation	0.67
Total Responses	12

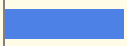
6. Quality of Horticulture Website: (Please select one.)

#	Answer		Response	%
1	Exceeds expectations		0	0%
2	Meets expectations		6	50%
3	Needs improvement (Please explain)		6	50%
4	Don't know/Don't use/Doesn't apply		0	0%
	Total		12	100%

Needs improvement (Please explain)
It's a little stagnant, maybe feature a pub or specialist or something on a regular basis, announce new things in the department, etc.
Most of the information is there but not all; even though turf is a different department, people go to Hort for that info so links would be helpful; also staff listing is a little difficult to navigate
Hard to navigate, type needs to be bigger
Needs to be more dynamic
Feels outdated; needs more "flash" if we expect homeowners and other clientele to use it
For a new user, finding information is somewhat complex.

Statistic	Value
Min Value	2
Max Value	3
Mean	2.50
Variance	0.27
Standard Deviation	0.52
Total Responses	12

7. Do you find Horticulture publications useful? (Please select one.)

#	Answer		Response	%
1	Exceeds expectations		3	25%
2	Meets expectations		8	67%
3	Needs improvement (Please explain)		0	0%
4	Don't know/Don't use/Doesn't apply		1	8%
	Total		12	100%

Needs improvement (Please explain)

Statistic	Value
Min Value	1
Max Value	4
Mean	1.92
Variance	0.63
Standard Deviation	0.79
Total Responses	12

8. Is there a particular publication you find the most useful? Comments:

Text Response
Growing Fruit at Home in Kentucky is a great publication, but really needs an update.
ID-21 is my number 1, second ID-128, third ID-36. Blueberry, bramble, grape pubs are all good but need regular updating with variety changes. I also use the perennials for sun and shade pubs.
There are several I use frequently. ID 128 on Vegetable gardening is the very best I have encountered in vegetable production. Others I use a lot are the ones on lawns and the new Roses publication.
Home Vegetable Gardening in Kentucky ID-128
ID-128. Please revise and circulate HO64 (home fruit production)
ID-36; ID-128; ID-21
Growing Fruit in KY HO-64, ID-21, ID-128
Vegetable gardening in KY and growing fruit in Kentucky
ID-128
ID-128
ID-128, HO-64 (out of print), ID 21

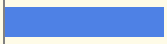
Statistic	Value
Total Responses	11

9. What topics are lacking in Horticulture publications? Comments:

Text Response
1. Home tree fruit and small fruit publication. (I use Cornell's to copy and hand out) 2. Updated tree and shrub with improved pictures. Many offices have color printers so it would have much better impact. 3. Vermi-composting 4. Any pub that is not in pdf with color pictures, needs to be done. 5. Regular update of Vegetable Cultivars for Home Garden (they change fast)
I would like to see a publication on care of Crape Myrtles, information on Tomato hydroponics
Update of Home Fruit Growing in Kentucky is needed. Gardening publications translated into Spanish. Strawberry production for the home gardener
Home fruit production
Apple tree pruning
Organics, home fruit, greenhouse production
Organic and sustainability oriented publications
Comprehensive home fruit production update; house plant update; container garden update
Urban gardening/farming sustainable landscaping
Guidelines for homeowners for growing fruit and individual vegetables.

Statistic	Value
Total Responses	10

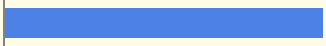
10. Quality of other educational materials (newsletters, presentations, workshops, etc.): (Please select one.)

#	Answer		Response	%
1	Exceeds expectations		4	33%
2	Meets expectations		6	50%
3	Needs improvement (Please explain)		1	8%
4	Don't know/Don't use/Doesn't apply		1	8%
	Total		12	100%

Needs improvement (Please explain)
A department newsletter would be terrific with usable articles for the local level.

Statistic	Value
Min Value	1
Max Value	4
Mean	1.92
Variance	0.81
Standard Deviation	0.90
Total Responses	12

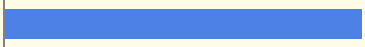
11. Horticulture response to phone calls and emails: (Please select one.)

#	Answer		Response	%
1	Exceeds expectations		8	67%
2	Meets expectations		1	8%
3	Needs improvement (Please explain)		1	8%
4	Don't know/Don't use/Doesn't apply		2	17%
	Total		12	100%

Needs improvement (Please explain)
Depends on specialists

Statistic	Value
Min Value	1
Max Value	4
Mean	1.75
Variance	1.48
Standard Deviation	1.22
Total Responses	12

12. Horticulture Department staff and faculty are courteous and polite in responding to your questions and/or needs: (Please select one.)

#	Answer		Response	%
1	Exceeds expectations		9	75%
2	Meets expectations		2	17%
3	Needs improvement (Please explain)		1	8%
4	Don't know/Don't use/Doesn't apply		0	0%
	Total		12	100%

Needs improvement (Please explain)
Wide range from wonderful to why are you still employed here?

Statistic	Value
Min Value	1
Max Value	3
Mean	1.33
Variance	0.42
Standard Deviation	0.65
Total Responses	12

13. What changes would you like to see in the Horticulture Department? Comments:

Text Response
More money so you can hire more specialists. Or go after grant funds to target one specific crop (commercial) and do concentrated trainings & programs across the state for a short period of time. I'd like to see the greenhouse position filled. We have a lot of growers that need support and the need for more relevant trainings for those folks. It would also be nice if you all had a twitter and/or Facebook feed.
If growing hemp comes to KY, we will need a specialist for hemp, in my opinion.
Need a specialist to cover greenhouse crops and bedding plants. Need to have specialist or associate at Princeton Research station covering vegetable production.
More specialists
More adaptation of technology as it pertains to the communication and program delivery.
Better on-line presence; updated
Specialists aware of the movement of extension into the urban extension. agents have received information and training, though the specialist have not and are unaware. More collaborative work with KSU!

Statistic	Value
Total Responses	7

14. How responsive is the department to your needs in training, outreach, research, and extension? (Please select one.)

#	Answer		Response	%
1	Exceeds expectations		8	67%
2	Meets expectations		3	25%
3	Needs improvement (Please explain)		0	0%
4	Don't know/Don't use/Doesn't apply		1	8%
	Total		12	100%

Needs improvement (Please explain)

Statistic	Value
Min Value	1
Max Value	4
Mean	1.50
Variance	0.82
Standard Deviation	0.90
Total Responses	12

15. What is your preferred delivery method (face-to-face, Web/Lync, workshops, other) for training? Comments:

Text Response
Combination of methods depending on the nature of the training.
Face to face is always preferred but Lync is a good substitute. It would be nice to have a good YouTube library of mini-trainings that we could use as part of various programs we do.
For convenience, Web/Lync are fabulous. Actual face-to-face learning is preferable, but we are a long way away from Lexington and the drive time is a big factor for convenience in training.
A variety is good. Lync saves travel time.
face to face but others acceptable
Prefer face to face; but Lync is working out to be very convenient.
Lync, face-to face,
I prefer a mix of all delivery methods, but I would love to see an increase in the use of Lync
It depends on the situation and the audience. There is no one-size-fits all these days.
Depends on the training, but I learn better from hands on.
Depends on subject matter, some material is fine on Lync, but when possible face to face would be best. But we all understand the limitations of that since there are so few specialists.
Web-orientated

Statistic	Value
Total Responses	12

16. Are there topics not currently offered by the department for which you need educational materials and training? Comments:

Text Response
iPhone/Droid apps for Hort growers specifically, vermicomposting, organic home gardening, basics of cut flower production (or provide some training for those growers), a pub on sustainability at home -- growing much of your own food yourself and putting it up (I know we have a bunch of pubs on preservation that could be handed out along with this pub), edible landscaping pub.
Depending on the outcome of the legalization, information on producing hemp.
Growing plants in school greenhouses. Gardening program or curriculum for school gardens including ideas for maintenance.
Budgets for small farm operations

Statistic	Value
Total Responses	4

17. Additional Comments:

Text Response
I'd like to see even more work in reducing water inputs to vegetable crops. I love our Hort Extension specialists -- they just need to be cloned. I'd like to see less catering to the Mennonites whose costs are less than the average American grower (I have had this said to me multiple times). The produce auctions do serve a purpose and I'm glad they exist. I love the Crop Diversification and Biofuel Research and Education center but I have to go there to see what's new. I need to be made aware that there's a new crop profile on high tunnel brambles (I just looked and didn't know that was there). They also need to find a way to get ALL the produce auction price reports on line, even if someone has to key them in by hand. (love to see this and FM prices as an app I can pull up on my phone quick and easy)
Overall, the department of horticulture is outstanding. The specialists have always met my needs.
We are lucky to have great specialists to help solve problems and to present programs. Turf publications need to be up dated.
Though many of my comments are negative, overall I think the horticulture department does a good job. Just always room for improvement.

Statistic	Value
Total Responses	4

Implementation Plan

UK Program Review Implementation Plan

*This **required** form is described as Appendix A in AR II-I.0.6.*

College/Unit: Agriculture Food and Environment/Horticulture **Date: July 22, 2013**

Recommendation/ Suggestion	Source I/E/H*	Accept/ Reject**	Unit Response (resulting goal or objective)	Actions (including needed resources)	Time Line
1. Communication seems to be difficult from a number of standpoints. People feel out of the loop, and non-faculty (staff, students, etc.) want to be part of the conversation, or at least informed. Listservs, regular faculty meetings, social events, graduate student and staff liaisons at faculty meetings could all be helpful. There is a level of camaraderie that exists on the Horticulture Research Farm (HRF) that appears lacking elsewhere in the department. In addition to internal communications, some focus on external marketing and a stronger web presence for the department and sustainable agriculture program and farm is important.	E	A	The chair and departmental faculty will develop and implement practices that engage a greater number of staff and students in decision-making processes. A new web page will be developed for the department where regular faculty meetings will be posted as well as recent news about students, staff, and faculty.	A student and staff representative will be appointed to attend faculty meetings. Additionally, separate meetings between the chair and all staff will be organized. A new web page has been developed and launched since the review	08/01/13 implemented
2. The department needs to develop a long-term vision and strategic plan that is more specific to its needs and goals. This should be done with meaningful input from staff and students. The focus on sustainability seems broadly accepted, though it was also clear that more definition needs to be put around that concept so the department has some consensus on positions, prioritizing resource needs, and coordinating research and extension effort.	E	A	The department will develop a long-range vision and strategic plan that adds more definition to our focus on sustainable Horticulture.	The department will organize a retreat for all students, staff, and faculty to address this issue	Begin in Fall, 2013 and finish by Fall, 2014
3. The department and its stakeholders need to develop a long-term vision and strategic plan for the Horticulture Research Farm. The farm is an extremely valuable asset for the	E	R	As one of the strategies under goal 3 in the existing strategic plan the department committed to position the Horticulture Research Farm (HRF) as a nationally recognized center of excellence	No action needed	NA

department and can attract students, funding, and community support for its programs. The strategic plan for the farm should include long term collaborations with other departments.			for research and education in sustainable/organic production practices and environmentally sustainable infrastructure. Furthermore the department has always had good collaborations with many other departments in the college.		
4. Broaden the focus of the extension associates to be more nimble with a range of expertise and support that provides leadership to clientele. To be most effective, extension should engage more broadly with local food systems and a range of sustainable agriculture practices.	E	R	The majority of extension associates are on grant funds and have very defined responsibilities according to objectives in the grant which cannot be altered at this time.	No action needed	NA
5. Consider developing a strategy that integrates academic, extension, and research programs in sustainable agriculture with a focus on the HRF. This has potential for fundraising and would bring clearer focus to the vision, mission, and goals for the farm and program.	E	A	The department will work towards developing a long range plan for the HRF aimed at increased visibility and integration of research, teaching, and extension activities	See point 2 above. The department will use the retreat as a platform for moving forward on this objective	Fall, 2013
6. Sustainable Agriculture should become a degree program. As the program works to become more interdisciplinary, the Steering Committee should work with administration to communicate and agree on goals and direction.	E	R	It is not within the authority of the department to make such a decision about the multidisciplinary Sustainable Agriculture program. Moreover, it is important for the future of SAG that the degree program is not regarded as belonging to Horticulture.	No action needed	NA
7. The department needs to develop a cohesive graduate education experience. Students expressed a need for informational seminars and the desire to know more about what other faculty are doing and how the work of their labs relate to the work of the department as a whole. Specific recommendations include the following: • Develop formal teaching or extension experiences, depending on students' interests, as an integral part of the education of graduate students in the Horticulture Department. • Develop a competitive pool of funding for graduate students to attend scientific meetings. This funding would	E	A	The departmental seminar series will be used as an outlet to provide training sessions for graduate students on grant writing and budget development as well as teaching and extension learning opportunities. The department has a competitive pool of funds available for graduate students and they will be made more aware of this resource. There is an opportunity for the graduate students to become part of a larger interdisciplinary graduate student body through the IPSS program. However, faculty will work to identify and create opportunities for more social interactions	Topics will include: How to publish a paper Regardless of data or discipline, what are you trying to do and what story are you trying to tell? The anatomy of a research proposal to NIFA, DOE, NSF, etc., and its essential components such as the budget and its justification Setting up a lab University resources to help you get ahead	Fall, 2013

benefit students and allow the department to have a greater presence at conferences. • Work to create more professional and social interaction through organized departmental activities for faculty and students as well as encouraging students to organize as a group. • Develop a seminar or short classes that focus on grant writing activities, cross-training on equipment and techniques, and other subjects that would assist graduate students in their career preparation.			with students and among faculty.	See point 2 above. A retreat will be used to initiate discussions on how best to address this recommendation.	
8. Increase the departmental budget.	I	R	It is not within the means of the department to increase our recurring state or federal budgets. However, departmental faculty can advocate for increased budgets.	No action needed	NA
9. Leverage existing tobacco settlement funds towards identifying and securing sustainable long-term funding for essential extension related programs.	I	A	The existing programs that utilize tobacco settlement funds all have goals and objectives designed to enhance and secure future sustainable funding mechanisms. Several positions within these programs have been moved onto permanent funding sources through a combination of departmental and higher administration efforts in recognition of their outstanding performance.	The department will continue to identify mechanisms and opportunities to provide sustainable funding mechanisms for these programs.	ongoing
10. Identify under-utilized office and laboratory space in the Plant Science building and lobby administration to move a significant portion (if not all) of the Horticulture Department.	I	A	Underutilized or inefficiently allocated space will be identified and brought to the attention of college administration.	The chair will routinely canvas the existing allocations of basic laboratory and office space in the Plant Science Building and discuss with college administration.	ongoing
11. Develop a staged master plan for the HRF that will culminate with the completion of farm security, communication upgrades, management policies, and the development of new water resources.	I	A	This has been a departmental goal during this year and has recently been completed	No action needed	NA
12. Catalyze the creation of new opportunities to provide modern office and laboratory space for all members in the department.	H	A	See #10 above	See #10 above	ongoing

13. Find ways to provide stable recurring funding for extension associates.	H	A	The department will continue to work with college administration to find ways to move extension associates into permanently-funded positions.	With recent budget cuts this has been difficult but through a combination of college and departmental support at least two associates are now in permanent positions.	ongoing
14. Identify a funding source for the Crop Diversification & Biofuel Research & Education Center.	H	A	Funding has been secured for one year for the Crop Diversification Center from the Kentucky Agricultural Development Board. An additional proposal is pending with the USDA/AFRI program for continuing funds	Future efforts will be devoted to exploring the possibility of developing a multi-state regional project for the Crop Diversification Center.	ongoing
15. Continue efforts to transform the HRF into a nationally recognized center for sustainable horticulture.	H	A	Efforts to improve HRF operations and efficiency are on-going but difficult with the current budget situation.	The immediate focus is to recruit and hire a new farm superintendent and establish a budget for the HRF.	Fall, 2013
16. Identify mechanisms to fill existing vacant faculty positions and, moreover, ways to increase the number of faculty lines in the department.	H	A	The department will strive to identify essential positions and funding sources to fill at least two positions over the next five years.	The department will explore the possibility of partnering with other units within the college to create opportunities to fill positions.	Fall, 2013 to Fall, 2018
17. Identify and implement a solution to the declining enrollment in the Horticulture and Plant Science undergraduate program.	H	A	The department will pursue two routes to increase undergraduate enrollment. 1) Implement new courses that attract more students and 2) Utilize the newly hired academic recruiter in Plant and Soil Science to assist with recruiting Horticulture students.	The department has reinstated a floral design course which has significantly increased the visibility of the department with large increases in enrollment. A second advanced floral design class has also been developed. Both of these classes satisfy new General Education requirements on campus and are proving to be very attractive to undergraduate students across the entire campus. The department is also developing and launching three new courses: Fermentation technology, Viticulture, and Enology. Arrangements will be made with the new academic recruiter to assist with Horticulture undergraduate student recruiting.	Ongoing and Fall, 2013, Spring, 2014, and Fall, 2014
18. Identify mechanisms to reward outstanding faculty and staff.	H	A	Over the next year the department will identify ways to recognize and reward outstanding faculty and staff.	The department will explore the possibility of setting up a specific fund and/or program that will accomplish this objective.	Fall, 2013 to Fall, 2014

* **Source of Recommendation (I = Internal recommendation; E = External Review Committee recommendation; H = Unit Head recommendation)**

** **Accept/Reject Recommendation (A=Accept; R=Reject)**

Unit Head Signature: _____ **Unit Head Supervisor Signature:** _____ **Date:** _____