REVIEW OF EDUCATIONAL UNITS

SELF-STUDY DOCUMENT

Department of Plant Pathology

College of Agriculture

University of Kentucky

October, 2009

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PREAMBLE

The information presented in this dossier was compiled in the summer and early fall of 2009. Over the past twenty years, the department was reviewed in academic years 2003-2004 and 1997-98 by institutional committees. In 1991-92, the department was reviewed by both a University committee and a USDA Cooperative States Research Service team. The material presented here is intended to serve two primary purposes: a.) to inform members of the 2009-2010 review committee and b.) to provide the department a self-study document. It is anticipated that the information presented and the input to be received will clarify the program's strategic planning.

INTRODUCTION

The Department of Plant Pathology at the University of Kentucky was established in 1963, building upon a core of faculty who were primarily members of the Department of Agronomy (now, the Department of Plant and Soil Sciences). Faculty size reached its maximum of 16 in 1982. There are presently 13 regular faculty involved in day-to-day departmental duties. Of these, one is in phased retirement and a second holds a post-retirement appointment. Some seventy other full-time personnel -graduate students, postdoctoral and visiting scientists, technical and secretarial support staff- complete the department's cast, in addition to several part-time employees. The department is widely viewed as providing a collegial and friendly work environment.

The responsibilities of the department are to improve understanding of plant disease through research and, utilizing this knowledge base, to educate students and residents of Kentucky about plant diseases. By these means, the department serves to promote plant health throughout the Commonwealth and encourage the use of science-based, economically practical disease management practices which have the least environmental consequences. Historically, plant diseases have occasioned famine, social upheaval and severe economic hardship. It would be naive to consider modern society secure against such calamities. Indeed, 1996 saw a $175 million loss to Kentucky's tobacco producers from blue mold. Pathogen populations develop resistance to numerous management tools. New diseases emerge perhaps, in part, as a result of global environmental changes. Exotic pathogens are introduced through national and international commerce, or natural events. Vigilance is necessary for, without constant scientific enquiry, indolence would invite misfortune. This is ever more the case in times when agricultural bioterrorism is a legitimate threat.

The department has no intention of resting on its past accomplishments. The disease scenario is ever changing. Likewise, the department's research, public service and instructional efforts must constantly evolve. These constraints place limits upon strategic planning, since demands and resources are uncertain and often unpredictable.

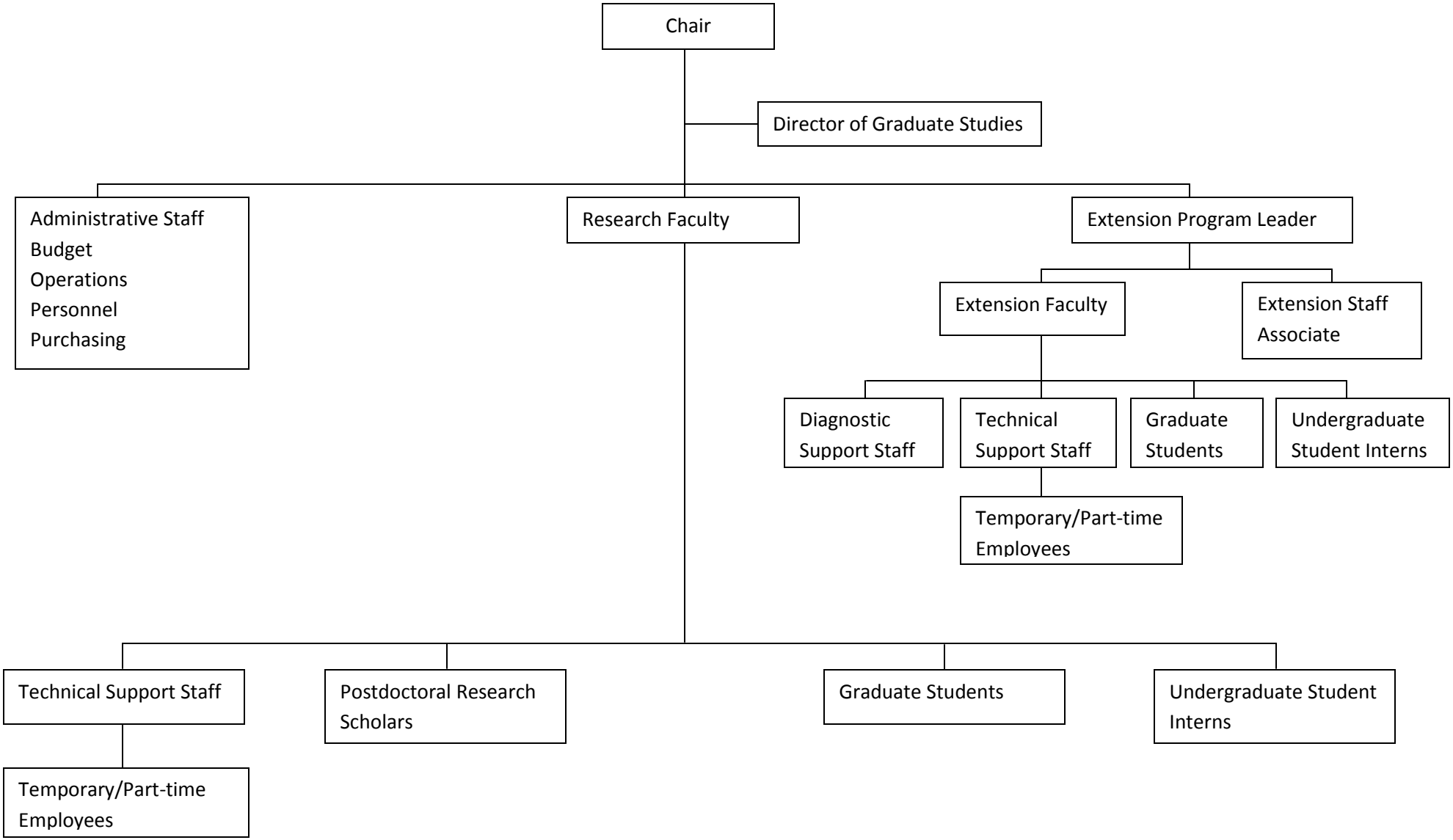
The department has passed through a major transitional phase in its research programs over the past 10-15 years. Four professors -Thomas Pirone, Louis Shain, John Shaw and Malcolm Siegel- entered full retirement most recently. These individuals all directed programs of national prominence, and three were Fellows of the American Phytopathological Society (APS), the nation's -if not the world's- principal professional association of plant pathologists. These retirements followed closely on the heels of those of departmental luminaries, Joseph Kuc and Robert Shepherd, the latter a member of the National Academy of Sciences. The loss to the department was not only direct, but also indirect, in the sense that graduate degree productivity declined

dramatically, since retirees did not enroll graduate students in their programs in the latter years leading up to their retirements. The department, therefore, underwent a major change of faculty. Lisa Vaillancourt, Mark Farman, Michael Goodin, Pradeep Kachroo, Peter Nagy, and Aardra Kachroo joined as “second generation” hires. All are now tenured, save Aardra who was appointed in 2006. Graduate enrollment increased substantially concomitant with the establishment and development of these faculty members’ research programs, as did postdoctoral numbers. In Extension, William Nesmith retired in 2005, and was replaced by Kenneth Seebold. John Hartman also retired, in 2008, but rejoined the program in January 2009 at reduced effort, since the budget crisis frustrated attempts to recruit a full-time replacement.

Separate from these major personnel changes, much of the department also made a major physical relocation, in 2003, into the Plant Science Building from former quarters in the Agricultural Science Building-North. Significant faculty time was devoted to the planning process, over several years, with the actual move disrupting program activities for the better part of six months. Although the quality of the physical environment was enhanced, space was little increased and is now inadequate -both laboratory and office- for the flourishing programs.

The various documentation presented will provide a picture of the diverse activities in which departmental members are professionally engaged, the accomplishments achieved and the challenges faced.

ORGANIZATIONAL CHART



Rules of Procedure
and
Structures of Committees

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Department of Plant Pathology

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May, 1992; Revised October, 1994, January, 2001; March, 2006; July, 2009

These Rules of Procedure are intended to be consistent with the Governing Regulations and the Administrative Regulations of the University of Kentucky and the laws of the Commonwealth of Kentucky and of the United States of America. In the event that these Rules of Procedure are inconsistent or contrary to the above-mentioned regulations and laws, then those regulations and laws control.

I. Organizational Structure.

The Governing Body. The governing body of the department comprises the tenure-track faculty and chair. The governing body will accept input from any and all members of the department, whether transmitted through committees or by individuals.

The Faculty. The faculty of the department consists of the chair and those members of the department who hold tenure-track positions having the rank of assistant professor, associate professor or professor in the regular, extension or special title series in the College of Agriculture. In addition, membership may be extended to any other member of the department who performs research, teaching, extension and/or administrative duties. Any tenure-track faculty member may nominate such individuals for inclusion and membership shall be extended by majority vote of the tenure-track faculty members.

The Chair. The chair provides leadership to the faculty in the development by the department of policies on such matters as instructional and research programs, service functions, and further duties and responsibilities specified in the Governing and Administrative Regulations. The chair presides over all departmental meetings, except as he/she may delegate this function, and is an ex officio member of all departmental committees. The chair has administrative responsibility for implementing the department's program within the limits established by the Governing and Administrative Regulations of the University, the Rules of the University Senate and the directives of the College of Agriculture. The chair manages the day-to-day operations of the department in all matters which do not require joint deliberation. The chair is responsible for recommendations to the Dean of the College of Agriculture on the appointment of new members of the department, promotions, reappointments, terminal appointments, decisions not to reappoint, post-retirement appointments and granting of tenure.

The chair is responsible for administering the periodic evaluation of departmental members by procedures and criteria established by the University, the College of

Agriculture and the tenure-track faculty. The chair shall submit a budget proposal for approval of the faculty.

The Director of Graduate Studies. Under the administrative oversight of the chair, one tenure-track faculty member (who may be the departmental chair) and who is a full member of the Graduate Faculty, will serve as director of graduate studies (D.G.S.) and will have responsibility for matters pertaining to the graduate program. The D.G.S. is appointed by the Dean of the Graduate School upon recommendation of the chair. The D.G.S. nominee shall be selected for a three-year term by a majority vote of the Graduate Faculty. Responsibilities of the D.G.S. will include corresponding with individuals enquiring about the graduate program, chairing the Academic Program Committee and performing all normal activities of a D.G.S. as expected by the Graduate School.

The Recording Secretary. One member of the faculty will act as recording secretary, preparing the minutes of faculty meetings and providing copies of the minutes to the faculty within one week after each faculty meeting.

The Parliamentarian. One member of the faculty will act as parliamentarian for faculty meetings. The parliamentarian will assure that faculty meetings are conducted according to Robert's Rules of Order.

II. Conduct of Meetings.

Notice of date, time, place, and agenda of departmental faculty and committee meetings will be prominently posted just outside the departmental office at least one working day before meetings. All meetings will be open except where closed sessions are permitted and conducted in accordance with current laws and regulations. The chair of the department or committee shall ensure that minutes of meetings are taken and provided to the office of the chair of the department. Minutes of all departmental and committee meetings shall be maintained in the office of the chair of the department and copies shall be available to anyone upon request.

III. Faculty Meetings.

Faculty meetings will be held on the first working Monday of every other month (Jan., Mar., May, Jul., Sep., Nov.) and at other times as deemed appropriate by the chair or a majority of the tenure-track faculty. Individuals encouraged to attend the meetings will include all faculty and a representative from each of the following departmental personnel categories; graduate students, clerical staff, postdoctoral staff and technical staff. These four representatives will be selected by their respective peer groups. Items for the agenda at faculty meetings should be submitted to the chair in advance of the meetings but items may be added to the agenda during the course of each meeting. Voting rights will only extend to faculty members. Absentee voting by faculty will be allowed on agenda items about which previous notice has been given and provided the vote is submitted in writing to the chair. A quorum will require attendance by at least 50% plus one of the faculty.

IV. Departmental Town Meetings.

Two departmental town meetings will be held each year. These will be open to all members of the department. The primary purpose of these meetings will be to allow a free and open exchange of information and ideas concerning any matters affecting the department.

V. Committee Structure.

Academic Program Committee. This committee shall submit recommendations on educational policy to the faculty for approval. The primary responsibility of this committee will be to provide continuing oversight of the academic activities of the department, particularly those concerning the graduate program. Duties will include reviewing applications to the graduate program, determining admission of and/or assistantship support for applicants, providing initial counsel to newly admitted graduate students, orchestrating graduate student recruitment efforts, curriculum planning, course scheduling, screening of syllabi and peer evaluation of teaching. This committee will maintain and distribute to faculty and students a current handbook of degree requirements. This committee will be comprised of the D.G.S., who will serve as committee chair, the department chair, two other faculty members and one graduate student.

Faculty Merit Evaluation Committee. The primary responsibility of this committee will be to provide counsel to the chair on faculty merit evaluations. This committee will be comprised of the department chair, as committee chair, and three other faculty members (one from extension, one from research, and one from either specialty). The three faculty counselors will serve for one biennial evaluation period, and may not succeed themselves. Only tenure-track faculty may vote for the members of, and serve on, the Faculty Merit Evaluation Committee.

Resource Committee. The primary responsibility of this committee will be to provide counsel to the chair concerning the human, fiscal and physical resources of the department with the intent that these be utilized in optimal fashion. Matters for consideration will include staff evaluation protocols, staff recruitment, budget items and the allocation of space and physical facilities (particularly as program priorities and activities change over time). This committee will be comprised of the department chair, as chair of the committee, three other members of the faculty and one non-faculty departmental member.

Safety Committee. The primary responsibility of this committee will be to ensure continual review of safety matters in the department. This committee will be comprised of the departmental chair, two other faculty members and two non-faculty departmental members. A chair will be selected by the committee members.

Committee members will be nominated at faculty meetings and, if willing to serve, elected by majority vote of the faculty. Appointments to committees will normally be for two-year terms, except for student members who will serve for one year. Committee members may be reappointed to the same committees in succession, with the exception of the Faculty Merit Evaluation Committee, following the nomination and voting protocols.

In addition to the four standing committees listed above, the department chair may appoint such additional ad hoc committees as are necessary. Regular and ad hoc (if any are organized) committees will make reports to faculty meetings at least once a year. Recommendations from committees are not binding and must receive a majority vote at faculty meetings for any action to be taken. Exceptional to this requirement will be decisions made by the Academic Program Committee as regards the admission of, and support for, new graduate students. Matters for deliberation outside the purview of standing or ad hoc committees will, if appropriate, be voted upon at faculty meetings with those members attending representing a Committee of the Whole.

VI. Criteria for Appointment, Promotion and Granting of Tenure.

Recommendations regarding appointments, reappointments, terminal reappointments, decisions not to reappoint, post-retirement appointments, promotion, tenure, and tenure progress review are handled in accordance with the procedures and criteria established by the University, the College, and the department faculty. Unit expectations are initially stated in each faculty position announcement. Any subsequent modifications of these expectations (e.g. a new teaching assignment) are addressed through the Distribution of Effort and faculty performance evaluation and review processes. Professional judgment by faculty of the quality and quantity of an individual's accomplishments ultimately drive decisions regarding appointment, as well as recommendations with respect to promotion and tenure.

VII. Merit Evaluation of Faculty.

Following protocols and criteria provided by the College of Agriculture, the department chair will provide a rating of each faculty member to the college administration. In arriving at this departmental rating, the chair will take verbal counsel from the three other members of the Faculty Merit Evaluation Committee, who will review the documentation concerning evaluation prepared in accordance with college directions by each faculty member to be reviewed. Each committee member will also submit a written evaluation to the chair.

Upon request, a faculty member may receive written reasons from the chair for his/her departmental evaluation, following the College's and department's current evaluation criteria. Once the faculty ratings leave the department, the merit evaluation process will follow College of Agriculture and University protocols.

VIII. Guidelines for Assistant Research Professorship Appointments.

(Prepared by Ad Hoc Committee on Assistant Research Professorships and Amended following Faculty Meeting of 11/1/99)

Eligibility. Each applicant for appointment to the Research Title Series must be a postdoctoral fellow/scientist in the Department of Plant Pathology and have been awarded a research grant for which he or she is the Principal Investigator named on the research proposal. The research grant must contain sufficient funds to pay the full salary and fringe benefits of the applicant and to cover the costs of the applicant's research project that cannot be met by the sponsoring faculty member. The sponsoring faculty member may or may not be a co-Principal Investigator on the grant proposal.

Required Documents. Each person who wishes to be considered for appointment to the Research Title Series must submit the documents that are required for applications for regular research faculty positions. The following documents are to be submitted:

- a letter of application
- a comprehensive curriculum vitae
- a statement of purpose and plan of the research to be undertaken
- proof of receipt of a research grant that meets the requirements noted above
- a letter of recommendation from the sponsoring faculty member

The applicant may also submit other materials (including additional letters of reference) in support of his or her qualifications for the position. The application documents should be submitted to the department chair who will have copies distributed to each member of the departmental faculty (tenure-track faculty only). The applicant is encouraged to post the non-confidential parts of these documents on a web server and to publish the address to the departmental faculty.

Seminar. As part of the application process, the candidate must present a departmental seminar in which the current research project and the research to be undertaken (including relevant background information) are described. The seminar presentation must take place prior to the faculty meeting at which the candidate's application will be formally evaluated.

Evaluation. A meeting of the faculty (tenure-track faculty only) of the department will be convened for the purpose of reviewing and evaluating the application. No non-faculty persons will be present at the meeting. A positive vote by a majority of the faculty (tenure-track faculty only) of the department will be required for approval of the application.

Duration. In keeping with the university administrative regulations, appointments to Assistant Research Professor will be for a specific term not to exceed three years. Expiration of grant support will result in termination of the Assistant Research Professor designation. Reappointment of an Assistant Research Professor in the Research Title Series for one or more additional terms is permissible but will require successful

completion of all the application conditions to be met by initial appointees to the Assistant Research Professor rank.

Conditions of Appointment. Conditions of appointment must be agreed upon by the department chair, sponsoring faculty, and the candidate.

IX. Guidelines for Adjunct Faculty Appointments.

(Approved at the Faculty Meeting of July 6, 2009)

Eligibility. Each applicant for appointment to the Adjunct Title Series must hold a Ph.D. in a relevant discipline, be sponsored by at least one Plant Pathology faculty member, and be employed by a non-University agency or by the University with a primary appointment in a non-faculty position.

Required Documents. Each person who wishes to be considered for appointment to the Adjunct Title Series must submit the following documents:

- A letter of application
- A comprehensive curriculum vitae
- A narrative statement describing what advantages the applicant will bring to the department
- Copies of transcripts
- Sample publications
- A letter of recommendation from the sponsoring faculty member

The applicant may also submit other materials (including additional letters of reference) in support of his or her qualifications for the position. The application documents should be submitted to the department chair who will ensure that the information is made available to all tenure-track members of the departmental faculty.

Seminar. As part of the application process, the candidate must present a departmental seminar in which the proposed research, or other relevant activity, to be undertaken (including pertinent background information) is described. The seminar presentation must take place prior to the Faculty Meeting at which the candidate's application will be formally considered.

Evaluation. At a meeting of the tenure-track faculty of the department, the application will be reviewed and evaluated. A positive vote by a majority of the tenure-track faculty will be required for approval of the application. If affirmed, the department chair will subsequently initiate the appointment process through the Dean's Office.

Expectation. An adjunct faculty member must contribute in meaningful fashion to the instructional, research and/or Extension activities of the department.

Duration. The initial appointment shall be for one year. Reappointments will require continuing majority, tenure-track faculty approval.

Notes. Adjunct faculty will have no voting rights in the functions of the Department of Plant Pathology. The department will incur no financial obligation of any type for adjunct faculty. The department will incur no facilities obligation of any type for adjunct faculty. An adjunct faculty position is not tenure-track. Adjunct faculty may co-chair or otherwise serve on graduate student Advisory Committees. If serving as a co-chair, the other co-chair must be a tenure-track member of the Department of Plant Pathology and be a full member of the Graduate Faculty of the University of Kentucky.

X. Revision of the Rules of Procedure

These Rules of Procedure, with a majority vote of the faculty, may be modified at any faculty meeting.

These Rules of Procedure have been created and approved by the faculty of this department pursuant to the authority granted by the Administrative and Governing Regulations of the University of Kentucky. These rules do not become effective until and unless approved by the dean and provost as indicated by their signatures below. Any modifications to these rules must also be approved by the dean and provost before the modifications take effect. These rules contain a total of seven pages, each of which are initialed and dated by the undersigned persons. Current copies of the approved rules for this department are available in the offices of the chair, dean, and provost.

David A. Smith _____ July 8, 2009

Chair (indicating approval by the faculty) Date

_____ _____

Dean, College of Agriculture Date

_____ _____

Provost, University of Kentucky Date

PERSONNEL LIST

Faculty

Mark Farman	-	Professor
Said Ghabrial	-	Professor; in phased retirement (50% effort)
Michael Goodin	-	Associate Professor
John Hartman	-	Extension Professor; on post-retirement appointment (40% effort)
Donald Hershman	-	Extension Professor and Extension Program Coordinator
Aardra Kachroo	-	Assistant Professor
Pradeep Kachroo	-	Associate Professor
Peter Nagy	-	Professor
Christopher Schardl	-	Professor
Kenneth Seebold	-	Assistant Extension Professor
David Smith	-	Professor and Chair
Lisa Vaillancourt	-	Professor and Director of Graduate Studies
Paul Vincelli	-	Extension Professor

Office Staff

Barbara Coughlin; in phased retirement (60% effort)
Shirley Harris
Amanda Rush
Mindy Thompson
Elizabeth Vice

Scientist II

David Thornbury

Ag Research Specialists

Paul Bachi
Julie Beale
Brenda Kennedy
Etta Nuckles
Judit Pogany
Renyuan Wang
Keshun Yu

Principal Research Analysts

Jannine Baker
Edward Dixon
Wendy Havens
Walter Hollin

Research Analysts

Bernadette Amsden
Douglas Brown
Alfred Byrd
Amy Crume
Ludmilla Lapchyk

Computer Support Specialist II

Hannah Draper-Burnett (25% effort)

Diagnostic Assistant

Sara Long

Graduate Students

Gavin Anderson
Sladana Bec
Ester Buite
Bidisha Chanda
Mohamed El-Habbak
Jerome Faulkner
Merari Feliciano
Simona Florea
Qingming Gao
Love Gill
Melanie Heist
Maria Holdcroft
Rae-Dong Jeong
Zuodong Jiang
Eunjung Lee
Hua Li
Sara Long
Mihir Mandal
Kathleen Martin
Juan Pan
Kunj Pathak
Raghuprakash Ragamurthy
Monika Sharma
John Starnes
Maria Torres
Ye Xia
Kai Xu

Postdoctoral Scholars

Anindya Bandypadhyay
Daniel Barajas
Daqi Fu
Susana Garcia
Xiaoyan Gong
Tyng-Shyan Huang
Hannah Jaag
Muhammad Khan
Nikolay Kovalev
Zhenghe Li
Jinghe Liu
Bijoung Min
Padmaja Nagabhyru
Olga Novikova

Suryadevara Rao
Zsuzsanna Sasvari
Ken-Taro Sekine
Devarshi Selote
Ajay Singh
Mendu Venugopal
Junhuan Xu
Shifeng Zhu

Visiting Scientist

Xiaoping Zhu

Part-time Personnel

Jihan Ahmed
James Calder
Andrea Crum
Cheryl Kaiser
Colette Laurent
Audrey Law
Terry Yielding
Various work-study/helper students

COMMENTS ON PERSONNEL

Full-time personnel numbers have increased by over ten percent since the last review in 2003; from about 70 to around 90. This change is largely accounted for by increases in graduate student (18 to 27) and postdoctoral researcher (14 to 22) numbers. The changes in graduate student and postdoctoral scholar enrollments relate, in large measure, to the competitive funding achievements of the faculty.

Reflecting the strong foundation established by the department's "first generation" faculty hires, and the pioneers who preceded them, today's faculty is of a high caliber. Indeed, the years since the last departmental review have seen very substantive recognition of the faculty's accomplishments, in research, instruction, and public service.

In 2004, Christopher Schardl, already a Fellow of APS, was also elected a fellow of the Mycological Society of America. That same year, Paul Vincelli received the Gamma Sigma Delta Master Teacher Award in the college. In 2005, Paul spent six months in Uruguay as a Fulbright Scholar. Also, Peter Nagy's research was amongst those recognized in the 50-years-of-publication celebratory issue of *Virology* and he was invited to present a "State-of-the-Art Lecture" at the Annual Meeting of the American Society of Virology (ASV). In 2006, Donald Hershman, as a member of the Asian Soybean Rust Team, was a co-recipient of the United States Secretary of Agriculture Honor Award. That year saw the College of Agriculture initiate three new awards and two came the department's way: The Bobby Pass Excellence in Grantsmanship Award to Peter Nagy and the Research/Extension Impact Award to Donald Hershman. The very next year, Pradeep Kachroo gained the Prestigious Research Paper Award, making Plant Pathology the first department to have collected all three awards. Indeed, 2007 proved to be a banner year bringing, for one thing, the inaugural release of Academic Analytics' rankings of plant pathology doctoral programs for faculty scholarly productivity. The department placed first in the nation, and fourth in each of the two subsequent releases. The rankings weighed publications, citations, grants and awards. Other notable recognition that year included: Donald Hershman's and Paul Vincelli's receipt of, respectively, APS's Excellence in Extension Award and Excellence in Teaching Award, each being solo, national prizes; Dr. Hershman was also a co-recipient of the USDA-CSREES Partnership Award for Mission Integration; locally, Paul Vincelli was inducted into the inaugural class of Provost's Distinguished Service Professors, and Peter Nagy was accorded University Research Professor status for the academic year as well as being recipient of the college's Thomas Poe Cooper Award for Research; in the college also, Lisa Vaillancourt received the George E. Mitchell, Jr. Faculty Award for Outstanding Service to Graduate Students. Finally, 2007 saw two early promotions: Pradeep Kachroo to Associate Professor and Peter Nagy to Professor. Significant recognition also came the department's

way in 2008: Peter Nagy received APS's Ruth Allen Award which "honors individuals who have made an outstanding, innovative research contribution that has changed, or has the potential to change, the direction of research in any field of plant pathology" and is amongst the society's most coveted awards; John Hartman was recognized with the APS-Southern Division Outstanding Plant Pathologist Award; and, on campus, Christopher Schardl was selected as a faculty winner of the President's Awards for Diversity (Dr. Schardl is presently Major Professor to two African American students and has, for many years, had a major commitment to diversity). The years since the last review have also seen faculty featured for research on the covers of several journals: Said Ghabrial (*Journal of Virology, Molecular Plant-Microbe Interactions* [with Aardra and Pradeep Kachroo], *Phytopathology* and *Virology)*, Michael Goodin (*Journal of General Virology*), Pradeep Kachroo (*Cell Host & Microbe*) and Lisa Vaillancourt (*Mycologia*).

These past half-dozen years have, moreover, witnessed remarkable success by the research faculty in attaining major, competitive, national funding. A sampling of such grants active in 2009 and for which the following faculty were designated Principal Investigator (PI) follows: Mark Farman -USDA ($990,000) and NSF ($335,909); Michael Goodin -NSF ($500,000); Aardra Kachroo -United Soybean Board ($203,512); Pradeep Kachroo -NSF ($473,564); Peter Nagy -NSF ($600,000) and NIH ($374,000); Christopher Schardl -NSF-EPSCOR ($2,310,132); and Lisa Vaillancourt -USDA ($951,260). The individual faculty members' c.v.'s, included later in this self-study document, will make their accomplishments in the funding arena fully clear.

The Extension faculty, likewise, have excelled in meeting their professional responsibilities these past several years. In part, this should be apparent from the recognition indicated above of Dr. Hartman's, Hershman's and Vincelli's efforts. Indeed, the quality of the program as a whole is widely acknowledged. The faculty members have played key roles through a variety of national, regional, and state leadership positions and are held in high regard by specialists outside Kentucky as well as by local colleagues, stakeholders and county agents. The County Agent Survey results presented later in the dossier will emphasize the last point. Then, too, there are the faculty c.v.'s which reveal the Extension Specialists' roles in educating a diverse clientele about plant disease management as well as their activities in pursuing extramural funds to support research concerning their commodity responsibilities. The period since the last review has, however, seen some significant changes in the Extension arena. First, after long years of stability in maintaining key personnel, half of the faculty retired (!); William Nesmith in December, 2004, and John Hartman in June, 2008. While the department was able to conduct a timely and efficient search for Dr. Nesmith's replacement -bringing Kenneth Seebold on board in March, 2005- the same cannot be said for Dr. Hartman's position. The search was frustrated by a mounting budget crisis and, although there was brief hope of a successful outcome, this was ultimately dashed. Only six months retired, John

Hartman returned to duty, at forty percent effort, to help the department address the most pressing issues in his areas of responsibility. It remains unclear if, and when, a new appointee will be on board. Dr. Seebold has fit well into Dr. Nesmith's shoes as well as into the "Three Musketeers" philosophy of "one for all, and all for one" which defines the Extension group. Indeed, these personnel are recognized locally, regionally and nationally for their cohesive and collegial approach. All are talented individuals, yet the whole is greater than the sum of its parts. Beyond the everyday issues of helping Kentucky's agricultural enterprises, three issues merit special mention concerning the past few years. First, responsibilities towards the Homeland Security-related National Plant Diagnostic Network (NPDN) have intensified through Kentucky's role in the Southern Region and a hard-money, full-time Diagnostic Assistant is now employed to help address the activities involved. Second, Asian Soybean Rust demanded immediate attention following its late-2004 introduction into the continental U.S. Donald Hershman quickly assumed a major, national role in helping educate and prepare soybean growers for what was considered at the time as -and may yet be- a costly threat to the industry. First-rate Extension programming was able to prevent unneeded fungicide applications, saving farmers millions of dollars and the environment an unnecessary pesticide load. Third, also still more threat than reality, was Sudden Oak Death. If introduced -say on nursery shipments from the West Coast- this disease is considered highly likely to cause great economic and aesthetic damage to the mountain regions of Eastern Kentucky. Hence, Dr. Hartman lead efforts to survey both nurseries and natural areas for the pathogen. To date, it has not been found in Kentucky.

The above are but highlights. Nonetheless, they make apparent that U.K.'s Plant Pathology faculty are on a par with the very best this nation has to offer. The University should feel well pleased that it has at hand such a valuable and talented resource. Much of the additional information contained in this dossier should emphasize this circumstance.

The graduate students, too, have shown their mettle on the national scene. Cathryn Rehmeyer was awarded a prestigious, NSF Graduate Fellowship, commencing with the academic year 2003-2004, and extending into 2005, when she graduated. As a student, the now Dr. Rehmeyer also obtained a travel award, sponsored by the NSF and the USDA to participate in the Ninth Japan-U.S. Seminar on Plant-Pathogen Interactions, held in Shizuoka, Japan, in November, 2003. Her research was selected for presentation, through national competition, by a committee of U.S. and Japanese scientists. It is also noteworthy that current student Maria Holdcroft holds an Alltech "Margin of Excellence" Fellowship, one of only two on campus. This is a new program which Alltech plans to develop further with the intent of trying to attract and retain the "best and brightest" for Kentucky. Other fellowships presently held by the department's students are Lyman T. Johnson (for minority students; two), Kentucky Opportunity (one), Academic Year (one) and Philip Morris (two). In addition, one international student holds a fellowship from his home country. In

recent times, several students have also received nationally competitive travel awards to attend Annual Meetings of APS or ASV. Two other students were invited to present their research at major conferences; one at the American Society for Plant Biology meeting in 2004 and the other at the International Society of Arboriculture meeting in 2005. Significant as these examples are in illustrating the quality of the graduate students, the most gratifying, recent accomplishment for the department's graduate program is its current enrollment of four minority students, namely two Hispanic females, one African American male, who is expected to defend his doctoral dissertation this fall, and one African American female. While the graduate body has long been diverse in gender (presently, approximately sixty percent female) and international participation, domestic minority involvement has been problematic. There is now hope that a nucleus has been established which will provide role models to help enhance diversity.

Some twenty-two postdoctoral scholars is probably a remarkable number for a department with only eight research faculty, and one of these on a 50% phased retirement appointment. The number bears on two issues. First, it reflects the substantial extramural funding garnered by the faculty. Second, it represents a commitment by the department to advanced training and education. In this day and age in the biological sciences, postdoctoral experience may be viewed as akin to a medical residency and is all but essential for entrée to the best professional opportunities, whether in academia, industry or government. The department's postdoctoral researchers represent a very diverse group, including individuals from Canada, China, Germany, Hungary, India, Japan, Russia, South Korea and Spain. Consequently, these individuals contribute to providing an enriching cultural and intellectual atmosphere for the graduate students.

Table 1 presents the current graduate student and postdoctoral enrollments, as well as those for the first decade of this new century. Over the decade, both graduate student and postdoctoral numbers have doubled. It is unlikely, however, that the numbers of graduate students and postdoctoral scholars will continue to increase in any substantive fashion. Funding and space constraints are major players here, but so too is the recognition of a limited job market for plant pathologists and a sincere belief that one should not educate and train junior professionals if there are not opportunities for them to pursue their ambitions in the field.

Departmental staff support has changed comparatively little, in terms of both absolute numbers and specific individuals, since the last review. The department believes itself ably served by secretarial as well as technical personnel, and feels fortunate for this circumstance. Indeed, the loyalty and consequent accumulated expertise of, particularly, the technical support staff has been a major contributory factor in the success that the department has achieved.

TABLE 1

GRADUATE STUDENT/POSTDOCTORAL ENROLLMENT, 2000-2009

Year	Program	Total	Gender		Citizenship			Minority Status	
			Male	Female	Domestic	(KY)	Int'l	Total	African American
2000-2001	M.S.	3	2	1	3	(2)	0	0	0
	Ph.D.	10	5	5	2	(1)	8	0	0
	Postdoc	10	3	7	2	(0)	8	1	0
2001-2002	M.S.	3	0	3	2	(2)	1	1	0
	Ph.D.	14	8	6	6	(3)	8	0	0
	Postdoc	8	4	4	0	(0)	8	0	0
2002-2003	M.S.	4	0	4	3	(2)	1	2	1
	Ph.D.	15	8	7	6	(4)	9	0	0
	Postdoc	10	6	4	0	(0)	10	0	0
2003-2004	M.S.	2	0	2	2	(2)	0	1	1
	Ph.D.	16	7	9	4	(4)	12	1	1
	Postdoc	14	8	6	1	(1)	13	0	0
2004-2005	M.S.	3	0	3	3	(2)	0	1	1
	Ph.D.	17	7	10	5	(5)	12	1	1
	Postdoc	17	8	9	2	(1)	15	0	0
2005-2006	M.S.	1	0	1	1	(0)	0	0	0
	Ph.D.	17	6	11	6	(5)	11	1	1
	Postdoc	23	10	13	1	(1)	22	0	0
2006-2007	M.S.	3	0	3	3	(2)	0	1	1
	Ph.D.	20	10	10	4	(2)	16	1	1
	Postdoc	18	10	8	1	(1)	17	0	0
2007-2008	M.S.	4	0	4	3	(2)	1	2	1
	Ph.D.	21	10	11	4	(2)	17	1	1
	Postdoc	21	12	9	0	(0)	21	0	0
2008-2009	M.S.	4	0	4	3	(2)	1	2	1
	Ph.D.	22	11	11	4	(2)	18	1	1
	Postdoc	24	17	7	1	(0)	23	0	0
Fall 2009	M.S.	2	0	2	2	(2)	0	1	1
	Ph.D.	25	11	14	5	(3)	20	3	1
	Postdoc	22	14	8	0	(0)	22	0	0

PROGRAM DESCRIPTION

Research Overview

Research efforts in plant pathology have two abiding goals. The first is to continue to improve understandings of the nature of disease in plants; how causal agents initiate disease and how plants naturally resist disease. The second, built upon information gleaned in the first endeavor, is to utilize the scientific knowledge for practical advancement of disease management strategies which are both efficacious and as environmentally benign as possible.

There are presently eight active "Research" faculty (Farman, Ghabrial [half-time appointment], Goodin, A. Kachroo, P. Kachroo, Nagy, Schardl, and Vaillancourt) directing efforts aimed at resolving fundamental aspects of plant-pathogen/parasite interactions. Details of these faculty members' endeavors are summarized in their c.v.'s provided elsewhere in this dossier. Consequently, only a general perspective will be presented here.

Research faculty numbers peaked at 13 twenty-five years ago. Even 13 is a relatively modest number and, in order to achieve the critical mass necessary for national and international recognition, the department focused its efforts in three principal research areas at that time. Virology (four faculty), physiology and biochemistry (six faculty) and soil microbiology (three faculty). Over the intervening years, the department chair's position has grown essentially administrative, allowing no practicable research time, and two positions were lost in soil microbiology (to retirement and to an unanticipated resignation). One other faculty position was not strictly Plant Pathology's, but was held through the then Tobacco and Health Research Institute (now the Kentucky Tobacco Research and Development Center; KTRDC); the incumbent retired. Another position had been inherited from Agronomy, had little bearing on plant pathology, and ceased when the faculty member retired. Despite these and other personnel changes, the department remained desirous of maintaining critical mass in key areas so as to retain established distinction, which is vital to the recruitment of top-of-the-line faculty, as well as talented graduate students and postdoctoral scholars. Though the emphasis has changed somewhat, three areas of research focus remain that are recognized widely as superior programs, namely virology (three faculty), mycology (three faculty), and host biology (two faculty). No emphasis in soil microbiology exists today. The latter five faculty members represent, if you will, an evolution from the "disease biochemistry/physiology" of the 1980's to today's cellular/molecular/genetic/genomic studies of fungal parasites and plant responses to infection. Though each faculty member's program is dynamic and could stand alone, there are also collaborations and overlaps that cross, and enrich, the entire spectrum of enquiries.

Particular areas of investigation include:

- cell biology of viral infection
- developmental transitions in fungal pathogenicity
- evolution of mutualism, parasitism, host specificity, fungi and viruses; coevolution
- fatty acid-mediated defense signaling
- fungal telomere sequencing and function
- gene silencing
- generation of viral vectors
- genetic engineering
- genetics/genomics/metabolomics/proteomics of host-parasite interactions
- genome sequencing
- grass-endophyte phylogenetics
- host factors and viral replication
- host gene expression following infection
- interconnectivity of defense signaling and normal metabolism
- light and resistance
- localization of fungal proteins secreted during infection
- molecular regulators of defense
- molecular systematics
- mycoviruses
- plant disease resistance
- relocalization of host proteins induced by viral infection
- subcellular sites of viral replication
- systems biology
- viral RNA recombination

Research faculty, as has already been alluded to, have been profoundly successful in acquiring major, competitive extramural funding from national agencies. The USDA-National Research Initiative, the National Science Foundation and the National Institutes of Health are all providing significant monies to the department's research programs. The Kentucky Science and Engineering Foundation/Kentucky Science and Technology Corporation, the KTRDC as well as commodity funds are also supporting several investigations.

While the program quality would surely justify growth beyond eight faculty researchers, space constraints in the Plant Science Building prevent research program expansion until the once-envisioned Plant Sciences Complex is extant, providing additional laboratories, or some other resolution is found. Provision of distant laboratory space elsewhere on campus would seem impractical because of the likely-to-be-financially-unsupportable need to duplicate costly instrumentation and the inevitable fracturing of the department.

The faculty ensures that students, postdoctoral researchers, and professional staff publish their research findings in timely fashion. While we do not routinely track such data, information gathered for an earlier document

indicated that, in the 2004-2007 period, students authored 54 refereed journal articles, as well as many more abstracts and non-refereed reports. This is of inestimable value to the students' later professional advancement. When, of course, faculty members' programs publish in prestigious journals, where the standards are rigorous, such publication acts as a magnet for superior personnel recruitment into the research endeavors as well as an asset in renewed funding requests.

Most applied research accomplished in the department is carried out by Extension faculty, in association with their graduate students and technical support personnel. Field testing of cultural, biological, and chemical means for managing diseases of alfalfa, corn, fruits, soybean, tobacco, trees, turfgrass, wheat and vegetables are ongoing activities. The research is conducted primarily for the purposes of maintaining effective disease management recommendations for Kentucky.

Research and Extension faculty in the department are highly supportive of each other. Extension faculty commonly collaborate with the Research faculty on aspects of their applied studies, with the research programs providing technical support and pertinent expertise when necessary. In turn, the Extension personnel alert Research faculty to new circumstances and opportunities which may merit more substantial, basic endeavors. Like their colleagues, the Extension faculty have been very successful in obtaining extramural funding to support their applied research. All in all, there is no doubt that the mutual respect and joint engagements between the two camps has proved a real boon in advancing the department's total research enterprise.

In late 1997, the so-called "Reedy Report", which assessed academic programs University-wide, identified Plant Pathology as one of the "Programs of Excellence – Program Positioned to Achieve National Stature". This recognition came at a time when the department was in the throes of losing several key faculty to retirement and had only recently initiated significant rehiring efforts. The department, though small, had long held a reputation for scientific quality. In the years subsequent to the report's release, the cadre of recruited and continuing talented faculty has pushed into new frontiers, maintaining and enhancing the program's research prestige. Certainly, it has now achieved national stature as, for example, evidenced by the department's high rankings from Academic Analytics mentioned earlier.

Extension Overview

Four Extension plant pathology specialist positions exist within the department. Donald Hershman and Paul Vincelli are Extension Professors and Kenneth Seebold is an Assistant Extension Professor. John Hartman retired in 2008, but was rehired in a part-time appointment. The faculty are assisted by two

plant disease diagnosticians (Bachi and Beale), two research specialists (Dixon and Kennedy), a diagnostic assistant (Long), a laboratory and greenhouse technician (Amsden), a field and laboratory technician (Yielding), a staff assistant (Thompson), two graduate students (Feliciano and Holdcroft) and several part-time student helpers. Hershman, Bachi, Kennedy, and Yielding are located at the Princeton Research and Education Center in Western Kentucky.

The program encompasses a wide range of responsibilities and interests. Hershman is Extension Program Coordinator, as well as the state's Integrated Pest Management-Pest Information Platform for Extension and Education (ipmPIPE) contact; he has commodity responsibilities for small grains and soybean. Vincelli is the department's Homeland Security and NPDN contact; he has responsibilities for corn, forages, and turf. Seebold is Kentucky's Blue Mold Coordinator and has responsibilities for tobacco and vegetable crops. Hartman is maintaining an effective, though reduced, program and is responsible for fruit and ornamental crops. Although each faculty specialist has specific responsibilities, they operate as a team, with each member able to cover for the other, when necessary. The entire Extension group meets weekly via conference call to coordinate activities and maintain cohesion.

All stakeholders with an interest in Kentucky agriculture (such as commercial producers, crop consultants, ag suppliers/dealers, homeowners, government agencies, and commodity groups) are affected by the full complement of plant pathology educational activities and resources, including: Printed and electronic publications (national, regional, and state; inter-departmental, and departmental); articles and data published in general and crop-specific newsletters; radio and TV tapes; press releases, news/update videotapes, and magazine articles; presentations at grower meetings, field days, and advanced educational programs, including Master Gardener; farm demonstrations and research projects; topical and general websites; and communication via phone, e-mail, listservs, hotlines, disease alerts, and Internet-based social media (blogs and Twitter).

Major Extension Plant Pathology programming efforts include the following:

County Extension Agriculture and Natural Resources (ANR) and Horticulture Agent Training: Agents improve their understanding of plant pathology issues and, thus, are able to deal more effectively with local plant disease situations. Training is accomplished through weekly *Kentucky Pest News* updates, ongoing field and laboratory plant disease consulting, telephone and electronic consulting, field days, grower meetings, workshops, informational publications, and internet-based updates and resources. In response to Extension Director Jimmy Henning's interest in expanding professional development opportunities for agents, a distance-learning section of PPA 400G (Principles of Plant Pathology) was initiated during the fall, 2009 semester.

County Horticulture Agent In-depth Plant Pathology Workshops: In addition to the above agent training and support activities, the Extension Plant Pathology group has, at the request of county horticulture agent leaders, provided custom-designed workshops on a range of topics, including: Plant diseases caused by Oomycetes; plant diseases caused by bacteria; plant diseases caused by viruses; soilborne fungal pathogens and their diseases; diseases of conifers; and plant pathogenic nematodes.

Plant Disease Diagnosis: The Plant Disease Diagnostic Laboratory (PDDL) operates with the philosophy that diagnostic activity is also an educational event for the client (commercial or homeowner) as well as for the county ANR and horticulture agents who submit samples. The diagnosticians, located in Lexington and Princeton, handle one of the highest specimen loads in the country, but have been able to keep abreast of, as well as provide leadership in, the use of new plant disease diagnostic technologies, including DNA-based pathogen detection. Although diagnosing a high specimen load is laborious and costly, it does allow for the surveillance of new diseases and pathogens, as well as for monitoring the activity and impact of endemic pathogens/diseases. The 2008 PDDL report is included later in the dossier to provide an example of the specific diagnoses addressed in a year.

Soybean Cyst Nematode (SCN) Analysis Services: The PDDL at Princeton provides SCN analysis for growers, local research personnel, and nursery inspectors. Results support decision-making for various activities ranging from cropping decisions to regulatory action by state and federal agencies.

Southern Plant Diagnostic Network (SPDN): The Extension Plant Pathology group has represented Kentucky in the SPDN/NPDN since their inception, providing timely diagnostics, management of diagnostic records, participation in USDA-led diagnostic training sessions, and offering an annual, hands-on, three-day workshop in real-time PCR diagnostics to NPDN participants and others. The group has also offered multiple NPDN First Detector Trainings on different topics, and has participated on several SPDN committees.

Molecular Diagnostics: Led by Vincelli, the group has been active in applying DNA-based methods for pathogen detection to real-world diagnostics. The group continues to expand the number of protocols available for plant disease diagnosis, and offers the aforementioned PCR workshop, which is held in high esteem nationally. In 2007, Vincelli co-authored a *Plant Disease* Feature Article on real-time PCR which turned out to be the most accessed paper in the journal that year.

Digital Imaging/Consulting: In March 2003, the Extension group, working in conjunction with campus information technology (IT) personnel, developed a web-based plant disease consulting system exclusively for county agents and specialists using digital images. Several hundred cases are handled through the system each growing season.

Kentucky Blue Mold Warning System(KBMWS): The KBMWS, maintained on a college web site, is extensively used in the state to give ANR agents in Kentucky, and in adjacent counties of neighboring states, up-to-date information on the presence of blue mold and the areas likely to be affected by the disease.

The KBMWS relies on information obtained from the North American Plant Disease Forecast Center operated at North Carolina State University.

Integrated Pest Management (IPM): Extension plant pathologists regularly engage in cooperative disease, insect and weed management efforts and educational programs in the promotion of IPM in Kentucky.

Certified Crop Advisor (CCA) Programs: Leadership has been provided to both the International and Kentucky CCA Programs, for planning and implementation, as well as in the development of training and testing materials.

Facilitating Professional Communication: The Extension group, in cooperation with IT personnel and the Kentucky IPM program, manage six listservs. These listservs facilitate communication among professionals on a range of national and international issues having to do with soybean rust, legume pests, fungicide use in corn and soybean, and the ipmPIPE.

Kentucky Pest News (KPN) Leadership: In January 2009, Plant Pathology Extension assumed management of the interdepartmental newsletter, KPN, from Entomology. This newsletter is the flagship pest information vehicle published in Kentucky. It also has widespread distribution outside the state and articles are frequently reprinted in various hard-copy and electronic newsletters and websites by a range of public and private organizations. Since taking over management responsibilities, the Extension group has: Facilitated the formation of a KPN Advisory Committee, which includes stakeholder representatives; revamped the appearance of KPN; developed a new KPN website; generated standardized author guidelines and procedures; and enacted various efficiencies aimed at promoting stakeholder access and use of KPN.

Ongoing Educational and Disease Surveillance Programs: Diseases and/or pathogens such as alfalfa Sclerotinia crown and stem rot, apple fire blight, bluegrass patch diseases, dogwood powdery mildew, SCN, tobacco target spot, and tomato early blight are periodic threats to Kentucky agriculture and require constant attention and educational efforts. Moreover, there are incidences of new and emerging diseases and severe outbreaks of old diseases to contend with. The following disease situations required significant applied research and programming by the Extension plant pathologists in recent years:

- Cucurbit Phytophthora blight; a serious problem for Kentucky's emerging vine crops industry
- Cucurbit yellow vine decline; a new, difficult-to-diagnose bacterial disease which has increased in severity in recent years and threatens fall production of pumpkins, gourds, and squash.
- Pierce's Disease of grape; a new disease requiring specialized tests for diagnosis. This disease is causing significant losses to California growers, and is a major concern here.
- Oak bacterial leaf scorch; Kentucky is one of two, apparent, bacterial leaf scorch disease epicenters in the United States.
- Oak Phytophthora canker (also called Sudden Oak Death); a perceived threat to woody landscape plants and to the Eastern Kentucky forests.
- Asian soybean rust; an impending threat and potential bioterrorist weapon.

- Tobacco blue mold; a moderate epidemic in 2006 was favored by a cool, wet growing season, infected transplant introductions, and resistance of the pathogen to key fungicides.
- Tobacco black shank; a disease that has become more severe in recent years and has caused yield losses approaching 50% in some fields.
- Transplant disease complexes; associated with use of the float system for producing tobacco, vegetable, and ornamental transplants.
- Wheat Fusarium head blight and associated mycotoxin contamination of grain (deoxynivalenol); serious epidemics in 2004 and 2009 resulted in widespread and severe yield losses and seed quality concerns.

Instruction Overview

Plant Pathology has no undergraduate program, offering only research-required M.S. and Ph.D. degrees. The curriculum has been revised substantially since the time of the last review. Revision was felt essential to address what remains a continuing challenge, namely how to provide core, traditional training in the discipline while, on the one hand, keeping abreast of the ever expanding universe of cellular, molecular, genetic, genomic, etc., findings and, on the other, holding to a number of credit hours that is not unmanageable for students. Following an initial roll-out in 2006, further fine-tuning -which took account of student feedback- occurred, leading to the present-day circumstance; see the course list which follows Table 2.

Only one formal undergraduate class is currently offered (PPA 400G, Principles of Plant Pathology), a key course for both plant science majors in the college and our entry-level graduate students. It is expertly instructed by Dr. Vincelli, both the class and the teacher consistently receiving high ratings. Of particular note -and a further sign of the times- is the distance-learning (DL) option for PPA 400G initiated in the fall semester, 2009. Targeted primarily at County Extension Agents, the DL version should both help agents in pursuit of their M.S. degrees, consequently assisting progress along their formal career ladder, and help boost the awareness, understanding and management of plant diseases across the Commonwealth.

The department also contributes significantly to the college's undergraduate program in Agricultural Biotechnology (ABT), a highly successful endeavor. Michael Goodin is presently Co-Director of Undergraduate Studies for the program, and Christopher Schardl has long been a key instructor for ABT 460, Introduction to Molecular Genetics. The ABT program has an experiential requirement for its students, and the faculty have provided significant laboratory training in this regard. When appropriate, and whether through the ABT program or not, undergraduates can enroll in PPA 395, Independent Study in Plant Pathology, to gain credit for research laboratory experiences. Faculty, then, are

considerably engaged with undergraduates, though not generally in formal classroom settings.

Apart from PPA 395 and 400G, all other PPA classes (again, see the following list) are at the graduate level. Required courses are, in addition to 400G, PPA 500, 600, 640, 641, 770 and two of PPA 670, 671, 672, and 673. Beyond these, PPA 650 permits a more in-depth treatment of mycology, for those students wishing such an emphasis. The range of courses available, which primarily involve lectures with some laboratories and limited field work, are intended to provide a broadening experience beyond the necessary focus of thesis and dissertation research. It would be an exaggeration to say that the faculty is content with the current curriculum. The issues of what "must" be taught, information overload and time constraints are conspiring against provision of the ideal curriculum.

It has become de facto departmental policy that Extension faculty instruct the introductory and diagnostic courses, namely PPA 400G and PPA 640 (Identification of Plant Diseases). The experiences of these faculty bring an invaluable, everyday perspective to the classroom which aids students in grasping the "real world" effects and consequences of plant disease. These two courses provide foundational education for Plant Pathology's graduate students. Extension faculty also give guest lectures in allied departments. The significant involvement of these faculty in the department's instructional program does, on occasion, detract from their normal Extension responsibilities. To help with this circumstance, they cover for each other when possible, or non-faculty members of the Extension team will meet essential programming needs if faculty are unavailable.

Graduate students in Plant Pathology, of course, take several classes outside the discipline, the courses being suited to their particular research projects; decisions are made in consultation with the students' Advisory Committees. Classes in plant physiology, biochemistry and molecular biology would frequently be expected of the department's graduate students.

All Lexington-based faculty, Research and Extension alike, are involved in formal instruction and graduate training. (Recently-hired faculty are held essentially free of teaching responsibilities for the first year to allow focus on establishing their primary research or Extension programs). Individual instructional loads vary appreciably, though no faculty member, in comparison with those in most academic departments, has a heavy teaching burden; see individual faculty c.v.'s for details. The department is primarily focused on research and service; the average 2009-2010 instructional Distribution of Effort for Research faculty is 10%; for Extension faculty, 14%.

Lacking large numbers of students, some of the specialty graduate courses are not taught annually but, rather, on an "as needed" basis, usually

about every second year. Quality is the department's mantra, not quantity. The intent is to educate students such that they will be competitive for the first ranks of professional opportunities. This has, in large measure, been accomplished, as the alumni/ae information provided later attests.

The classes offered by the department are not static. Different styles have been pursued, as with PPA 400G (the "Principles" course), to enhance learning outcomes. The advanced classes invariably have to be substantially updated on a continuing basis because of the very rapid advances all across the life sciences in recent times. Faculty are constantly weighing not only course content, but also course needs of graduate students in this fast-changing world, to ensure that quality is maintained in class offerings.

It is worthy of note that Research faculty, in particular, invest considerable time and energy in "capstone" training and instruction of postdoctoral personnel. At least two years' postdoctoral experience is all but essential in today's biological sciences for top-flight career opportunities. Hence, the mentoring provided by the department's faculty to their postdoctoral scholars is a vital, if often little recognized or acknowledged, instructional responsibility which faculty address seriously.

Education of succeeding generations is an obligation and privilege which the department pursues with diligence. The department has a tradition of close interaction between faculty, graduate students, postdoctoral researchers and visiting scientists, which fosters learning. Through formal classroom studies, intensive counseling, and cutting-edge research opportunities, students acquire broad disciplinary skills and special expertise in their areas of focus. The department's commitment to its students enhances prospects for their intended careers and helps ensure successful placement upon graduation.

Recent numbers of graduate degrees awarded average three per year, the great majority doctoral (Table 2). The several faculty programs initiated in the late 1990's and early 2000's are only now fully hitting their stride with respect to degree productivity, since it usually takes a student at least a full five years to gain the Ph.D., the department's primary goal. Degree numbers are expected to rise in the following years, but probably not beyond an annual average of five. Of course, the significant numbers of postdoctoral scholars receiving advanced training are not accounted for in the record, but represent an appreciable contribution to the profession. Although the degree numbers are modest, compared with many disciplines, it is important to bear in mind that the market for plant pathologists is limited, and will likely remain so short of some dire catastrophe occasioned by disease in one or more of the nation's major crops. Hence, it would be unethical to train junior scientists for non-existent job opportunities, thus leaving them frustrated in career ambitions.

TABLE 2

GRADUATE DEGREES AWARDED, 2000-2009

	Masters	Doctorate	Total
2000	3	1	4
2001	0	0	0
2002	2	0	2
2003	0	3	3
2004	0	5	5
2005	1	3	4
2006	0	3	3
2007	1	*1	2
2008	0	2	2
**2009	1	5	6

* Joint with Biology
**Actual and anticipated by December 31, 2009

PPA Plant Pathology

PPA 395 INDEPENDENT STUDY IN PLANT PATHOLOGY. (3-4)
Independent study in Plant Pathology under the supervision of a faculty member. Prereq: Consent of appropriate instructor.

PPA 400G PRINCIPLES OF PLANT PATHOLOGY. (3)
To present students with the principles of plant pathology. The causes, effects, control and nature of plant diseases will be studied; the laboratory will expose students to common diseases and pathogens discussed in lecture. Emphasis will be given to diseases important in Kentucky. Lecture, two hours; laboratory, two hours. Prereq: One semester of botany (e.g. BIO 351) and microbiology (e.g. BIO 108/109) or consent of instructor.

PPA 500 PHYSIOLOGY OF PLANT HEALTH AND DISEASE. (2)
Physiological and molecular aspects of plant biology underlying interactions with microbial pathogens and symbionts. Prereq: PPA 400G can be concurrent.

PPA 600 CRITICAL METHODS IN PLANT-MICROBE INTERACTIONS. (2)
The course will provide instruction on experimental methods commonly used in Plant-Microbe Interaction and will train students in critical thinking, grant writing, scientific ethics and seminar presentation. Prereq: PPA 500.

PPA 601 SPECIAL TOPICS IN MOLECULAR AND CELLULAR GENETICS. (1)
Each semester five distinguished scientists visit the UK campus to deliver a series of three formal lectures each and participate in numerous informal contacts with graduate students. The emphasis is on the presentation of the most current advances (often unpublished) in selected topics in molecular and cellular genetics. May be repeated to a maximum of six credits. (Same as BIO/BCH/MI/PLS 601.)

PPA 609 PLANT BIOCHEMISTRY. (3)
The course will consider the chemical constituents of plants (with emphasis on biologically or nutritionally significant compounds unique to plants), their biosynthesis, contribution to key metabolic and defense processes and the regulation of their synthesis. Included will be discussions of photosynthesis, carbohydrates, lipids, isoprenoids and phenylpropanoids, nitrogen fixation, nitrogen and sulfur reduction and assimilation, alkaloids and additional secondary compounds, frontiers in plant biochemistry. Prereq: BCH 607 or equivalent or consent of instructor. (Same as BCH/PLS 609.)

PPA 640 IDENTIFICATION OF PLANT DISEASES. (3)
Recognition and identification of plant diseases and their causes and development. The course is designed to give students practical experience in dealing with a wide array of plant diseases, symptom expressions, causal agents and interactions with environmental factors encountered in the difficult task of identifying plant diseases. May be repeated to a maximum of nine credits. Lecture, one hour; laboratory, six hours. Prereq: PPA 400G or equivalent or consent of instructor. (Same as PLS 640.)

PPA 641 PLANT DISEASE, POPULATION BIOLOGY, AND BIOTECHNOLOGY. (1)
To understand implications of deployment of biotechnology and other disease management practices at the level of host and pathogen populations. Prereq: PPA 400G.

#PPA 650 FUNGAL BIOLOGY. (2)
This course will introduce basic concepts of fungal biology, including systematics, anatomy, cell biology, metabolism, developmental biology, ecology, population genetics, and reproduction. Students will also learn about the use of fungi in research and biotechnology. Prereq: PPA 400G, PPA 500, PPA 600, PPA 641, undergraduate courses in biology, genetics, and chemistry, or permission of instructor.

PPA 670 PLANT BACTERIOLOGY. (1)
Bacterial mechanisms underlying pathogenesis and virulence in interactions causing plant disease, and symbiotic compatibility in mutualisms. Prereq: PPA 400G, PPA 500, PPA 600, PPA 640 can be concurrent.

PPA 671 ADVANCED PLANT VIROLOGY. (2)
Molecular basis of plant virus infection of plants. Virus replication and spread. Virus control strategies. Prereq: PPA 400G, PPA 500, PPA 600.

PPA Plant Pathology

PPA 672 ADVANCED PLANT MYCOLOGY. (1)
Advanced study of the fungal life cycle and life style (including metabolism, developmental biology, cell biology, ecology, and reproductive processes). Prereq: PPA 400G, PPA 500, PPA 600, PPA 640 can be concurrent.

PPA 673 ADVANCED PLANT DISEASE RESISTANCE. (1)
Bacterial mechanisms underlying pathogenesis and virulence in interactions causing plant disease, and symbiotic compatibility in mutualisms. Prereq: PPA 400G, PPA 500, PPA 600.

PPA 700 PLANT PATHOLOGY LABORATORY VISITS. (1-3)
Semester-long rotations in Plant Pathology laboratories other than the students' "home lab". An opportunity will be provided to apply new approaches that are utilized in those labs to the students' research problems. May be repeated to a maximum of six credit hours.

PPA 748 MASTER'S THESIS RESEARCH. (0)
Half-time to full-time work on thesis. May be repeated to a maximum of six semesters. Prereq: All course work toward the degree must be completed.

PPA 749 DISSERTATION RESEARCH. (0)
Half-time to full-time work on dissertation. May be repeated to a maximum of six semesters. Prereq: Registration for two full-time semesters of 769 residence credit following the successful completion of the qualifying exams.

PPA 767 DISSERTATION RESIDENCY CREDIT. (2)
Residency credit for dissertation research after the qualifying examination. Students may register for this course in the semester of the qualifying examination. A minimum of two semesters are required as well as continuous enrollment (Fall and Spring) until the dissertation is completed and defended.

PPA 768 RESIDENCE CREDIT FOR THE MASTER'S DEGREE. (1-6)
May be repeated to a maximum of 12 hours.

PPA 769 RESIDENCE CREDIT FOR THE DOCTOR'S DEGREE. (0-12)
May be repeated indefinitely.

PPA 770 PLANT PATHOLOGY SEMINAR. (1)
Reports and discussion of problems and investigations of problems in plant pathology. May be repeated to a maximum of four credits.

PPA 784 SPECIAL PROBLEMS IN PLANT PATHOLOGY. (1-3)
May be repeated to a maximum of nine credits. Prereq: PPA 400G or equivalent or consent of instructor.

PPA 794 RESEARCH IN PLANT PATHOLOGY. (1-9)
May be repeated to a maximum of 30 credits. Prereq: PPA 400G or equivalent or consent of instructor.

PPA 799 TEACHING IN PLANT PATHOLOGY. (1-2)
Discussion of, and experience with, various instructional techniques in plant pathology; effective preparation, presentation and evaluation of lectures and laboratories focusing on plant diseases; practical experience in lectures, teaching laboratories and/or mentoring undergraduate research projects. May be repeated to a maximum of four credits. Prereq: PPA 400G or equivalent.

Curriculum Map, Department of Plant Pathology

	PPA 400G	PPA 500	PPA 600	PPA 640	PPA 641	PPA 650	PPA 670	PPA 671	PPA 672	PPA 673	Thesis/Dissertation Research Courses	Comprehensive Exams	PPA 799	Thesis/Dissertation Defense
Outcome 1														
Essential Factual Information														
Historical Context														
Current Literature and Issues														
Practical Applications														
Professional Ethics														
Outcome 2														
Critical Thinking														
Problem Solving														
Collaborative Work														
Effective Use of Technology														
Develop and Carry out High Quality Research														
Outcome 3														
Oral Communication Skills														
Written Communication Skills														

Learning Outcomes for the Graduate Program of the Department of Plant Pathology, University of Kentucky.

1. **Students will demonstrate technical mastery of the core information and principles of the discipline, including essential factual information, historical context, current literature and issues, practical applications, and professional ethics.**
    a. Direct measures:
        i. Coursework grades.
        ii. Advisory Committee meeting performances (S/U).*
        iii. Qualifying Examination pass rates (P/F).*
        iv. Thesis or dissertation defense pass rates (P/F).
    b. Indirect measures:
        i. Placement data.
2. **Students will demonstrate abilities to think critically, solve problems, work collaboratively, use technology (including information technology) effectively, and develop and carry out high quality, hypothesis-driven, independent research.**
    a. Direct measures:
        i. Coursework grades.
        ii. Advisory Committee meeting performances.
        iii. Qualifying Examination pass rates.
        iv. Thesis or dissertation defense pass rates.
    b. Indirect measures:
        i. Placement data.
        ii. Student publication and presentation data.
        iii. Recognition of students based on their academic accomplishments (e.g. fellowships).
        iv. Rankings of department, when available.
3. **Students will demonstrate mastery of oral and written scientific communication.**
    a. Direct measures:
        i. Coursework grades.
        ii. Ratings for departmental seminar presentations.
        iii. Advisory Committee meeting performances.
        iv. Qualifying Examination pass rates.
        v. Thesis or dissertation defense pass rates.
    b. Indirect measures:
        i. Student publication and presentation data.
        ii. Recognition of students based on their scientific writing or presentations (e.g. travel awards to scientific meetings).

*S/U = Satisfactory or Unsatisfactory
P/F = Pass or Fail

2004-2005 Plant Pathology

2004-2005 Degrees Awarded

		Male	Female	Minority	Black
Doctoral	3	1	2	0	0
Master's	0	0	0	0	0
Total	3	1	2	0	0

2004-2005 Enrollment

		Male	Female	Minority	Black
Doctoral	15	6	9	1	1
Master's	3	0	3	1	1
Post-doc	16	10	6	0	0
Total	34	16	18	2	2

2004-2005 Student Credit Hours Enrolled

		SSI	SSII	Fall	Spring
Total	259	0	0	162	97

Faculty/Primary Grant Dollar Ratio

	FT Faculty (head count)	FTE Research Faculty
	12	7
Total Grant Dollars	$1,840,897	$1,840,897
Average	$153,408	$262,985

2004-2005 Grants

Direct Awards	$1,840,897
Federal Competitive	$850,507
% COA Federal Competitive	46%
Collaborative	$2,906,231

2004 Calendar Year Publications

Books & Chapters	5
Refereed Journal Articles	14
Published Abstracts	24
Other Research	8
Total	51

2004 Calendar Patents 1

Degrees Awarded Five-Year Trend

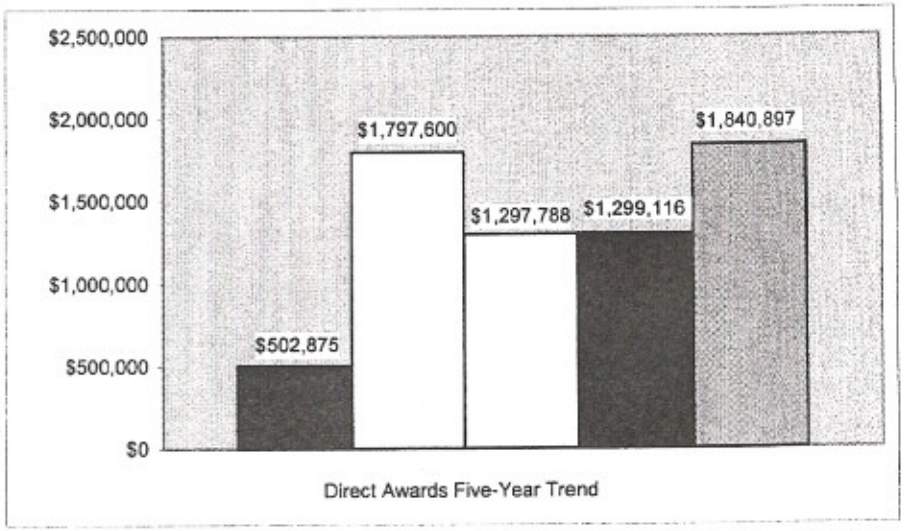
	2000-2001	2001-2002	2002-2003	2003-2004	2004-2005
Doctoral	0	0	1	5	3
Master's	2	1	1	0	0
Total	2	1	2	5	3

Enrollment Five-Year Trend

	2000-2001	2001-2002	2002-2003	2003-2004	2004-2005
Doctoral	10	14	14	17	15
Master's	3	3	3	2	3
Post-doc	10	8	9	13	16
Total	23	25	26	32	34

Direct Awards Five-Year Trend

2000-2001	2001-2002	2002-2003	2003-2004	2004-2005
$502,875	$1,797,600	$1,297,788	$1,299,116	$1,840,897



Sources: EVPR, www.rgs.uky.edu; VP Institutional Research, www.uky.edu/OPIE/;
KAES Annual Report 117, http://www.ca.uky.edu/agc/pubs/respubs.htm

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2005-2006 Plant Pathology

2005-2006 Degrees Awarded

		Male	Female	Minority	African American
Doctoral	3	1	2	0	0
Master's	1	0	1	0	0
Total	4	1	3	0	0

Degrees Awarded Five-Year Trend

	2001-2002	2002-2003	2003-2004	2004-2005	2005-2006
Doctoral	0	1	5	3	3
Master's	1	1	0	0	1
Total	1	2	5	3	4

2005-2006 Enrollment

		Male	Female	Minority	African American
Doctoral	18	7	11	1	1
Master's	1	0	1	0	0
Post-doc	15	6	9	0	0
Total	34	13	21	1	1

Enrollment Five-Year Trend

	2001-2002	2002-2003	2003-2004	2004-2005	2005-2006
Doctoral	14	14	17	15	18
Master's	3	3	2	3	1
Post-doc	8	9	13	16	15
Total	25	26	32	34	34

2005-2006 Student Credit Hours Enrolled

PPA		SSI	SSII	Fall	Spring
Total	283	0	0	196	87

Direct Awards Five-Year Trend

2001-2002	2002-2003	2003-2004	2004-2005	2005-2006
$1,797,600	$1,297,788	$1,299,116	$1,840,897	$2,800,872

Faculty/Primary Grant Dollar Ratio

	FT Faculty (head count)	FTE Research Faculty
	12	6.82
Total Grant Dollars	$2,800,872	$2,800,872
Average	$233,406	$410,709

2005-2006 Number of Research Faculty With Hatch Project as of 5/06

25% or higher research DOE	6
Active Project	6
Percentage	100%

2005-2006 Fiscal Year Grants

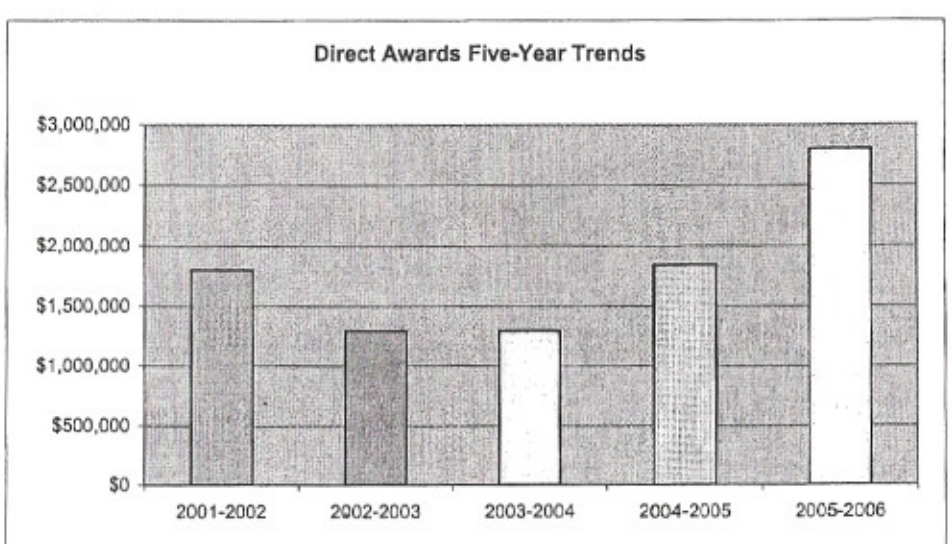
Direct Awards	$2,800,872
Federal Competitive	$1,977,660
% COA Federal Competitive	71%
Collaborative	$3,364,449

2005 Calendar Year Publications

Books & Chapters	6
Refereed Journal Articles	34
Published Abstracts	30
Other Research	10
Total	80

2005 Calendar Year Patents

0



2006-2007 Plant Pathology

2006-2007 Degrees Awarded

		Male	Female	Minority	African American
Doctoral	2	0	2	0	0
Master's	0	0	0	0	0
Total	2	0	2	0	0

Degrees Awarded Five-Year Trend

	2002-2003	2003-2004	2004-2005	2005-2006	2006-2007
Doctoral	1	5	3	3	2
Master's	1	0	0	1	0
Total	2	5	3	4	2

2006-2007 Enrollment

		Male	Female	Minority	African American
Doctoral	19	9	10	1	1
Master's	2	0	2	1	1
Post-doc	13	9	4	1	0
Total	34	18	16	3	2

Enrollment Five-Year Trend

	2002-2003	2003-2004	2004-2005	2005-2006	2006-2007
Doctoral	14	17	15	18	19
Master's	3	2	3	1	2
Post-doc	9	13	16	15	13
Total	26	32	34	34	34

2006-2007 Student Credit Hours Enrolled

PPA		SSI	SSII	Fall	Spring
Total	359	0	0	221	138

Direct Awards Five-Year Trend

2002-2003	2003-2004	2004-2005	2005-2006	2006-2007
$1,297,788	$1,299,116	$1,840,897	$2,800,872	$2,958,089

Research Faculty With Formula Funded Projects as of 3/07

25% or higher research DOE	7
Active Project	7
Percentage	100%

Faculty/Primary Grant Dollar Ratio

	FT Faculty (head count)	FTE Research Faculty
	13	8.0314
Total Grant Dollars	$2,958,089	$2,958,089
Average	$227,545	$368,315

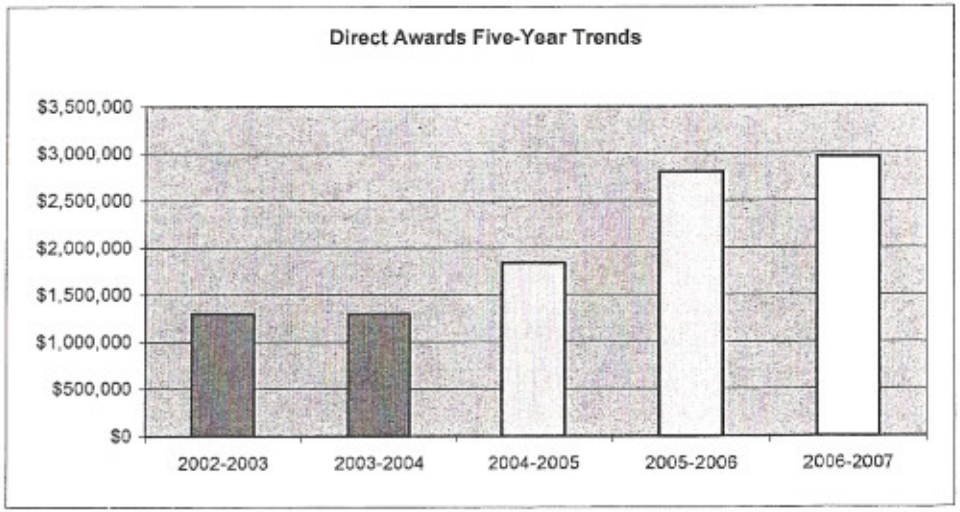
2006-2007 Fiscal Year Grants

Direct Awards	$2,958,089
Federal Competitive	$1,890,480
% Federal Competitive	64%
Collaborative	$3,371,318

2006 Calendar Year Publications

Books & Chapters	7
Refereed Journal Articles	25
Other Research	10
Total	42

2006 Calendar Year Patents 0



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2007-2008 Plant Pathology

2007-2008 Degrees Awarded

		Male	Female	Minority	African American
Doctoral	1	0	1	0	0
Master's	1	0	1	0	0
Total	2	0	2	0	0

Degrees Awarded Five-Year Trend

	2003-2004	2004-2005	2005-2006	2006-2007	2007-2008
Doctoral	5	3	3	2	1
Master's	0	0	1	0	1
Total	5	3	4	2	2

2007-2008 Enrollment

		Male	Female	Minority	African American
Doctoral	21	10	11	2	1
Master's	3	0	3	2	1
Post-doc	13	8	5	2	0
Total	37	18	19	6	2

Enrollment Five-Year Trend

	2003-2004	2004-2005	2005-2006	2006-2007	2007-2008
Doctoral	17	15	18	19	21
Master's	2	3	1	2	3
Post-doc	13	16	15	13	13
Total	32	34	34	34	37

2007-2008 Student Credit Hours Enrolled

PPA		SSI	SSII	Fall	Spring
Total	357	*	0	226	131

Direct Awards Five-Year Trend

2003-2004	2004-2005	2005-2006	2006-2007	2007-2008
$1,299,116	$1,840,897	$2,800,872	$2,958,089	$2,288,090

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
	13	8.15
Total Grant Dollars	$2,288,090	$2,288,090
Average	$176,007	$280,747

2007-2008 Fiscal Year Grants

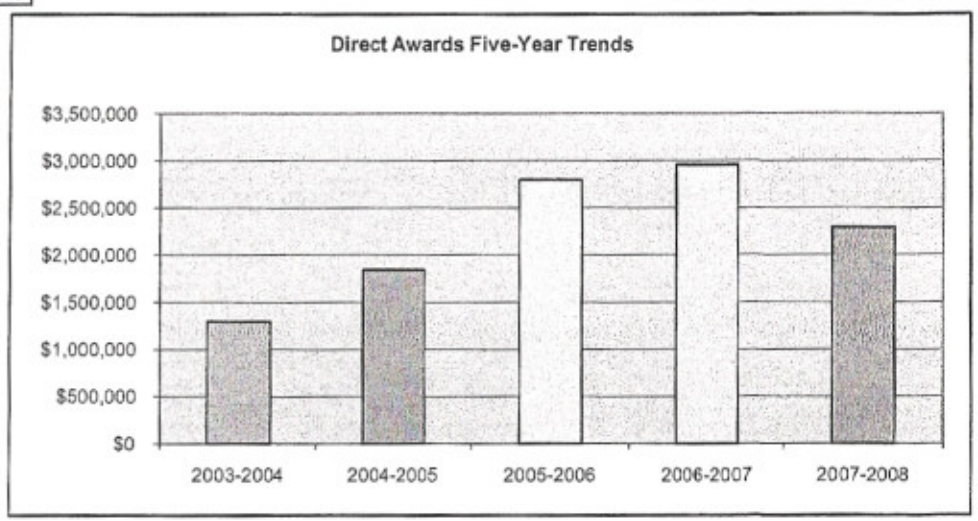
Direct Awards	$2,288,090
Federal Competitive	$1,861,326
% Federal Competitive	81%
Collaborative	$3,256,900

2007 Calendar Year Publications

Books & Chapters	4
Refereed Journal Articles	30
Other Research	18
Total	52

2007 Calendar Year Patents 1

*Data for Summer 1 are not available



12/22/2008

ANALYSIS OF STRENGTHS
AND
RECOMMENDATIONS FOR QUALITY ENHANCEMENT

The information presented in this self-study document provides ample evidence that both Research and Extension faculty are uniformly strong. It is perhaps remarkable that there are no underperformers such that, per capita, the department's faculty would match any in the nation and exceed most. Research is conducted to the highest standards and the Extension program provides superior service to its diverse clientele. Graduate education is "cutting edge", yet also endeavors to provide a sound base in the traditions of the discipline. Postdoctoral training is of a standard that raises each individual's competence and strengthens opportunities for professional advancement. Contributions to the undergraduate endeavor are modest in quantity, but of high merit in what is accomplished, whether through introductory instruction in plant pathology, key contributions to the Agricultural Biotechnology program, or research exposure. All in all, there seems little argument that the Plant Pathology Department is highly regarded locally, regionally, nationally and, even, internationally. For individuals aspiring to be amongst the best in plant pathology, the University of Kentucky is a destination.

There are three major factors which threaten maintenance of this status quo and certainly prohibit any possibility of building further upon the present foundation:

1. Inadequate Budget

   Operating monies to run the department's daily activities, i.e. those monies coming from State allocations and Federal formula funds have *declined in real dollars* over the past ten years, as follows.

Research	$79,237 (1999-2000); $71,000 (2009-2010)
Extension	$23,328 (1999-2000); $21,147 (2009-2010)
Instruction	$ 1,067 (1999-2000); $ 1,067 (2009-2010)

   These are the monies which pay for the likes of office supplies, the copier, telephones, internet connections, insurance, service agreements and emergency repairs. Bear in mind that, beyond the decline in real dollars, there has been a substantial amount of inflation over a 10-year period, absolute costs have gone up for probably almost all purchased items, the University has imposed new fees (e.g. regarding immigration matters), and communication costs (telephone, internet) have been very substantially raised by the University in recent years (600% [!] in one significant aspect; Voice-over Internet Protocol primary line phones went from $3/month in 2006-2007 to $18/month in 2009-2010). The department cannot contain (it has no control) nor sustain the increased costs it has had to bear off a diminishing budget. Beyond this, there seems almost to have been a pattern of the University "dropping-down" additional tasks to the department level, without providing any additional resources to help address

these. Salary savings from vacant positions (if such occur and if left in the department's budget) help the department make ends meet in some years, but they represent an unknown and uncertain reserve. In fiscal year 2008-2009, the department had to stop providing the $3,000 allotments made available to the Research faculty in years past, in order to try to make ends meet. Needless to say, faculty -Research and Extension- are hugely dependent on extramural funds -grants, gifts and contracts- to maintain their programs.

"Hard-money", graduate research assistant funding has increased marginally over the past decade; $187,170 (1999-2000) to $198,723 (2009-2010). Taking inflation into account, this "increase" is a mirage. With unrelenting pressure from the state's Council on Postsecondary Education to increase numbers, the department has been disinclined to raise the base doctoral stipend of $16,500. Indeed, there has been no change in a decade. This cannot continue, for the figure is wholly non-competitive nationally. The stipend must soon be increased to around $20,000, but this will inevitably lead to a decline in graduate enrollment, short of a substantial boost in funding from the college. A dozen of the 27 current graduate students are supported by grants, with the balance almost evenly split between fellowship and department support. The department needs enhanced, "hard-money" funding for its graduate program.

In addition to the decline in "in-house" dollars over the past decade, Extension has also seen a recent, significant loss of IPM funding as a consequence of Washington decision-making. It is imperative that financial resources do not become more limiting. Indeed, were it not for the SPDN/NPDN monies, the Extension operation would be in the most serious straits, for these funds are vital to both the traditional diagnostic program as well as the expanding world of molecular diagnostics. One circumstance leading to increased expenditures in the Extension realm has, ironically, been the decline in the number of tobacco growers. This has led to a concomitant, steady increase in the number of producers who grow high-value horticultural or specialty crops. This trend has significantly increased the number of new crop specimens submitted for diagnosis, since growers are often unfamiliar with the production of new crops, as well as the diseases that impact them. Compared with tobacco, there is about a 10-fold increase in the time and resources needed to complete a diagnosis for every sample of an intensively-grown fruit, vegetable, ornamental or greenhouse crop submitted. This is because of the enormous diversity, both between and within, new crops; the need for more expensive and time-consuming laboratory tests (e.g., ELISA and PCR); and the demand for immediate, accurate diagnostic responses. The additional costs for these diagnostic efforts have been substantial, and further resources are required to deal effectively with new crop diagnostics over the long term.

Beyond doubt, the department absolutely needs an enhanced, realistic, base operating budget.

2. Inadequate Space

   The department is full to the gunwales, and beyond, regarding both laboratory and office space. While relocation from the Agricultural Science Building-North to the Plant Science Building (PSB) provided a better quality of space, it did little to increase square footage. Moreover, in the six years since the move, several of the then junior faculty's programs have truly come of age, with all the equipment and additional personnel -both graduate students and postdoctoral researchers- which that entails. Only a two-year, lend-lease understanding with the Plant and Soil Sciences Department for a 939 sq. ft. laboratory on the fourth floor of the PSB is presently allowing the department to bear the research load. Office space is beyond capacity. Of course, by now, the initially planned extension to the PSB should have been complete or, at least, underway but, instead, represents one more instance of "The best laid schemes…" going awry. Additional laboratory and office space for Plant Pathology had, then, been anticipated, but has come to naught and may remain thus for many years. Perhaps the planned USDA-ARS building, if constructed, might allow some decompression, perhaps not. Certainly, relocating some programs any distance is not a good option, for it necessitates a very expensive -maybe even impractical- duplication of equipment and the loss of the very collegiality the department nurtures and values so highly. Space, then, remains a conundrum. The College of Agriculture should address as a matter of urgency the permanent reassignment of additional space, for, arguably, its best research program. Beyond the problem of research/office space in the PSB, the Lexington-based Plant Disease Diagnostic Laboratory is also severely cramped and inadequate for the demands it faces.

3. Faculty Numbers

   It is imperative that the department at least maintain all of its current positions, counting those of Dr. Ghabrial's and Dr. Hartman's each at the 100% level. The latter position is the single, most pressing faculty requirement. With considerable service, applied research and teaching responsibilities, not to mention contributions to departmental, college, state, regional, and national committees and boards, members of the Extension group are fully committed to over-committed. This situation makes it increasingly more difficult for the Extension faculty and diagnosticians to respond effectively to new initiatives, which are constantly appearing. To continue the excellence in Extension programming, and to avoid "burn out" of key personnel, it is essential that the department maintain its four Extension faculty. The Hartman position must not be lost to budget cuts for, if so, the effort would significantly and negatively impact the total Extension program. This, in turn, would have a negative effect on statewide plant and crop health over the long term, since the department's Extension group is the only significant source of professional plant pathology expertise in Kentucky.

Arguably -as was recommended in the previous review- consideration should be given to expanding the number of faculty, for surely the program has amply demonstrated its national stature and would be a magnet for top-flight faculty candidates. Such a goal, however, evaporates, absent resolution of the dilemmas surrounding space. If space constraints continue to make faculty growth impractical then, certainly, no further faculty positions should be lost. Attrition and other circumstances over the years have taken thirteen Research positions down to nine, in both cases counting the chair. This should drop no further and, as already stated, the Extension faculty positions should hold steady at four. Further drops gravely threaten the critical mass for a viable, internationally recognized department.

Plant pathology

Top Research Universities in the 2005 Faculty Scholarly Productivity Index

	Institution	Faculty Scholarly Productivity Index	Number of faculty	Percentage of faculty with a book publication	Books per faculty	Percentage of faculty with a journal publication	Journal publications per faculty	Percentage of faculty with journal publication cited by another work	Citations per faculty
1	U. of Kentucky	1.79	12	-	-	75%	4.42	67%	35.83
2	U. of Wisconsin at Madison	1.77	15	-	-	87%	7.47	80%	60.07
3	Iowa State U.	1.57	18	-	-	83%	3.67	67%	27.72
4	Cornell U.	1.52	38	-	-	58%	4.55	55%	47.47
5	U. of California at Davis	0.99	32	-	-	69%	3.56	56%	24.44
6	Michigan State U.	0.75	15	-	-	67%	2.67	53%	19.47
7	Purdue U.	0.69	27	-	-	67%	3.19	59%	18.52
8	Oregon State U.	0.65	79	-	-	57%	2.49	56%	26.85
9	U. of Georgia	0.38	14	-	-	71%	1.86	64%	12.79
10	U. of California at Riverside	0.18	27	-	-	48%	2.11	41%	24.00

	Institution	Citations per faculty	Citations per paper	Percentage of faculty getting a new grant	New grants per faculty	Total value of new grants per faculty	Average amount of grant	Percentage of faculty with an award	Awards per faculty
1	U. of Kentucky	35.83	8.11	58%	1.25	$372,378	$297,902	8%	0.08
2	U. of Wisconsin at Madison	60.07	8.04	40%	0.87	$378,290	$436,488	0%	0.00
3	Iowa State U.	27.72	7.56	56%	1.00	$381,264	$381,264	0%	0.00
4	Cornell U.	47.47	10.43	45%	0.76	$278,875	$365,422	3%	0.03
5	U. of California at Davis	24.44	6.86	25%	0.28	$212,397	$755,188	0%	0.00
6	Michigan State U.	19.47	7.30	40%	0.60	$209,104	$348,506	0%	0.00
7	Purdue U.	18.52	5.81	48%	0.56	$122,919	$221,255	0%	0.00
8	Oregon State U.	26.85	10.77	24%	0.32	$109,400	$345,704	0%	0.00
9	U. of Georgia	12.79	6.88	21%	0.21	$103,009	$480,707	0%	0.00
10	U. of California at Riverside	24.00	11.37	15%	0.26	$145,840	$562,524	0%	0.00

- Not applicable

SOURCE: ACADEMIC ANALYTICS</TD< tr>

Top Research Universities Faculty Scholarly Productivity Index

Plant pathology - 2007

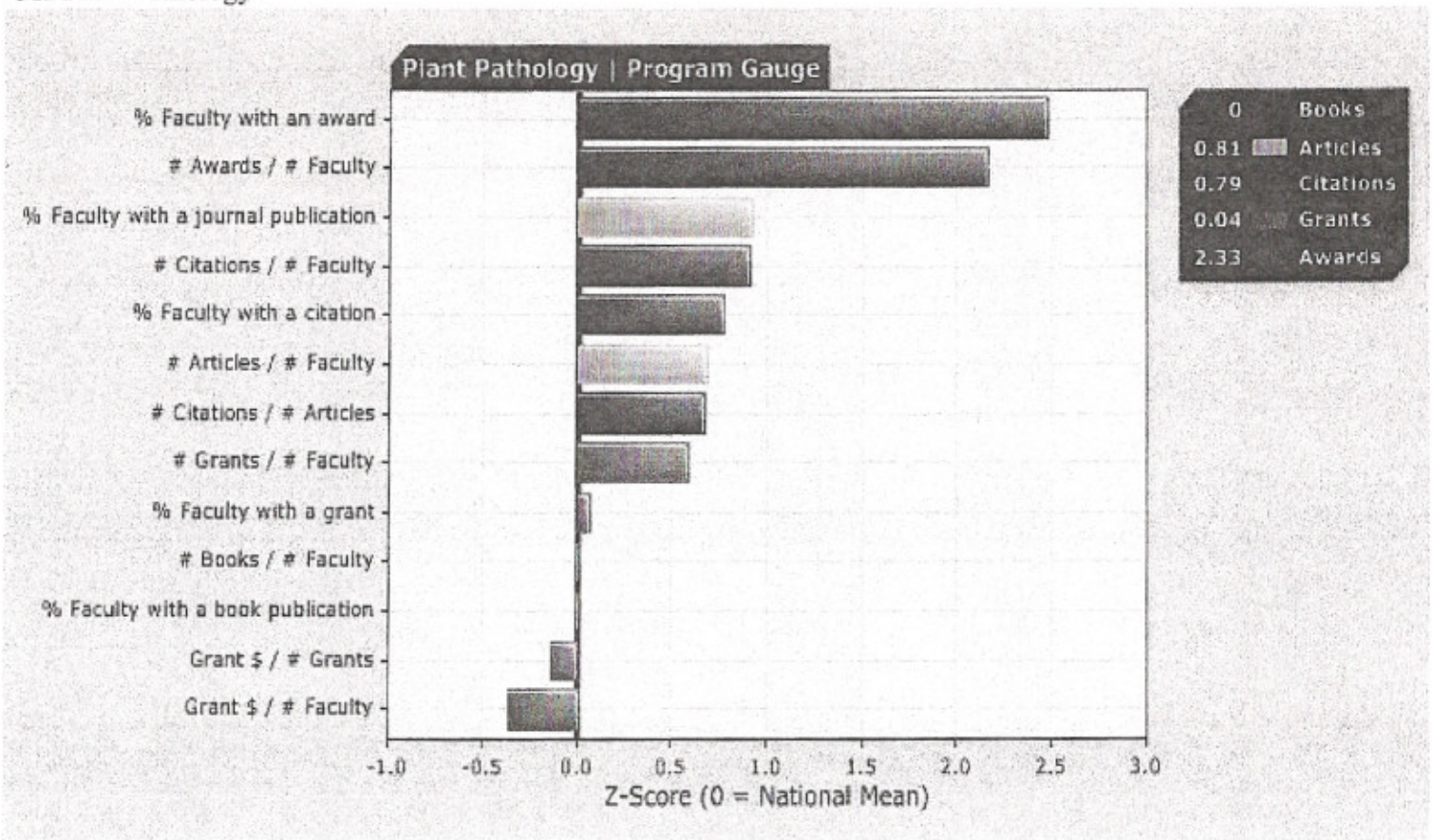
	Institution	Faculty Scholarly Productivity Index	Number of faculty	Percentage of faculty with a book publication	Books per faculty	Percentage of faculty with a journal publication	Journal publications per faculty	Percentage of faculty with journal publication cited by another work	Citations per faculty
1	U. of Arizona	1.75	35	-	-	89%	6.09	80%	74.59
2	U. of California at Davis	1.46	17	-	-	94%	7.12	94%	79.88
3	U. of Wisconsin at Madison	1.44	18	-	-	83%	7.17	78%	80.39
4	U. of Kentucky	1.26	13	-	-	77%	5.38	77%	70.92
5	Oregon State U.	.84	52	-	-	79%	4.17	73%	60.48
6	Cornell U.	.8	31	-	-	58%	4.39	61%	75.32
7	Iowa State U.	.37	17	-	-	76%	3.53	71%	39.82
8	Kansas State U.	.21	19	-	-	68%	4	68%	52.32
9	U. of Minnesota-Twin Cities	.11	23	-	-	74%	3.04	70%	25.17
10	U. of California at Riverside	.1	18	-	-	72%	3.28	61%	58.83

http://chronicle.com/stats/productivity/page.php?bycat=true&primary=9&secondary=24&year=2007 11/15/2007 2:18:49 PM

	Institution	Citations per faculty	Citations per paper	Percentage of faculty getting a new grant	New grants per faculty	Total value of new grants per faculty	Average amount of grant	Percentage of faculty with an award	Awards per faculty
1	U. of Arizona	74.59	10.36	43%	.69	$153706	$224154	11%	.14
2	U. of California at Davis	79.88	8.82	24%	.41	$120021	$291479	6%	.06
3	U. of Wisconsin at Madison	80.39	9.52	28%	.67	$130055	$195083	6%	.06
4	U. of Kentucky	70.92	10.85	38%	.69	$85440	$123413	15%	.15
5	Oregon State U.	60.48	11.96	31%	.42	$69974	$165393	4%	.04
6	Cornell U.	75.32	13.19	29%	.48	$99730	$206109	10%	.1
7	Iowa State U.	39.82	8.36	35%	.53	$55123	$104121	6%	.06
8	Kansas State U.	52.32	10.46	26%	.42	$70947	$168499	0%	-
9	U. of Minnesota-Twin Cities	25.17	6.81	17%	.22	$166169	$764377	4%	.04
10	U. of California at Riverside	58.83	14.12	22%	.44	$56119	$126268	0%	-

2008 Academic Analytics Report

UK Plant Pathology



The UK program's rank is 4 out of 22 programs

AANUM	SCHOOL	PROGNAME	AA1
247	U. Arizona	Plant Pathology	Plant Pathology
252	UC - Davis	Plant Pathology	Plant Pathology
347	U. Wisconsin - Madison	Plant Pathology	Plant Pathology
283	U. Kentucky	Plant Pathology	Plant Pathology
161	Oregon State U.	Botany and Plant Pathology	Plant Pathology
51	Cornell U.	Plant Pathology and Plant Microbe Biology	Plant Pathology
99	Iowa State U.	Plant Pathology	Plant Pathology
132	Michigan State U.	Plant Pathology	Plant Pathology
103	Kansas State U.	Plant Pathology	Plant Pathology
156	Ohio State U.	Plant Pathology	Plant Pathology
255	UC- Riverside	Plant Pathology	Plant Pathology
301	U. Minnesota - Twin Cities	Plant Pathology	Plant Pathology
148	North Carolina State U.	Plant Pathology	Plant Pathology
149	North Dakota State U.	Plant Pathology	Plant Pathology
215	Texas A & M	Plant Pathology	Plant Pathology
354	Virginia Polytechnic Inst.	Plant Pathology, Physiology and Weed Scienc	Plant Pathology
163	Penn State U.	Plant Pathology	Plant Pathology
357	Washington State U.	Plant Pathology	Plant Pathology
273	U. Florida	Plant Pathology	Plant Pathology
109	Louisiana State U.	Plant Pathology and Crop Physiology	Plant Pathology
274	U. Georgia	Plant Pathology	Plant Pathology
158	Oklahoma State U.	Plant Pathology	Plant Pathology

Academic Analytics
BENCHMARKING ACADEMIC EXCELLENCE

Tuesday, April 07, 2009 | 2:10 PM EST

What are the FSP Index and Database?

View our client list to see who is already using FSP to manage and improve their institutions.

Have a question about FSP? Contact us or visit the FSP FAQ.

Get a quick overview of FSP at Wikipedia.

Learn more about FSP in The Chronicle of Higher Education's Nov. 16, 2007 issue.

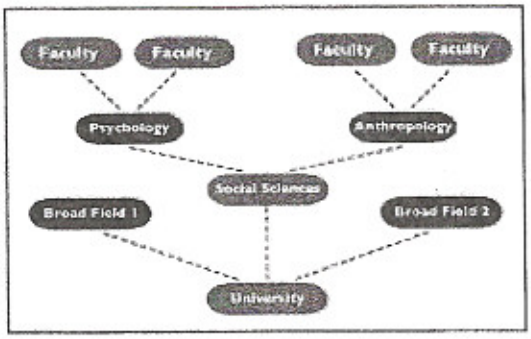
The Faculty Scholarly Productivity Index™ (FSP Index) and FSP Database are methods for evaluating doctoral programs at Research Universities (across all Carnegie research classifications), based on a set of statistical algorithms developed by Lawrence Martin, Ph.D. and Anthony Olejniczak, Ph.D.. The FSP Index measures the annual productivity of faculty on several factors including:

- Publications (books and journal articles)
- Citations of journal publications
- Federal Research Funding
- Awards and Honors

The FSP analysis creates, at the discipline level, a scale based on the cumulative scoring of a program's faculty using these measures compared against national standards. Each program can then be compared to the national mean z-score.

Individual program scores can then be combined to demonstrate the quality of the scholarly work within broad fields as well as the entire university. When analyzed over time, a full picture of the direction of the program or university research can be realized.

By compiling the individual faculty activity into indexes foreach Ph.D. program, one can truly assess the research strength of a university.



FSP Index Details:

- FSP Index Taxonomy
- FSP Index Methodology
- FSP Index Institutions
- FSP Index Ph.D. Programs
- FSP Index Data Elements

The FSP Index is unique in its focus on concrete data relating to faculty scholarly productivity. The FSP Index contains no reputational assessments, and is unrivaled in the depth and detail of its content - even compiling data in areas where other assessments have fallen short (e.g. book publications).

The FSP Database is an in-depth data tool for institutions interested in having even more information at their fingertips. The FSP Database includes the FSP Index, as well as the data underlying it, and much more.

The FSP Index is an ideal tool for:

- program assessment and evaluation
- strategic planning initiatives
- observing trends in faculty productivity
- benchmarking over time and against national standards
- ROI analysis
- guiding allocation decisions
- identifying areas of strength
- institutional researchers

For more on the background on the concepts behind FSP, read "Towards a better way to rate research doctoral programs" a position paper by Joan Lorden & Lawrence Martin.

Academic Analytics, LLC
Long Island High Technology Incubator
25 Health Sciences Drive, Suite 212
Stony Brook, NY 11790,USA

Contact Us

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Weighting Methodology

1. An empirical threshold is defined which determines whether a class of variables will be included (e.g., do grants count for this discipline? awards?).

2. For awards: if the threshold of awarding activity is met which warrants the inclusion of awards variables in the FSP index, then the following weights are used:

- if less than 2.5% of all productivity in the field (includes book publications, papers, grants, citations, and awards) is honorific awards, then they count as 5% of FSP.

- if greater than 2.5% and less than 10% of all productivity in the field (includes book publications, papers, grants, citations, and awards) is honorific awards, then they count as 10% of FSP.
- In rare cases where awards are more than 10% of scholarly productivity, then they count as 20% of FSP.

3. For grants: if the threshold of grant activity is met which warrants the inclusion of grants variables in the FSP index, then the following weights are used:
- if less than 10% of all productivity in the field (includes book publications, papers, grants, citations, and awards) is grants, then they count as 10% of FSP.
- if greater than 10% and less than 15% of all productivity in the field (includes book publications, papers, grants, citations, and awards) is grants, then they count as 20% of FSP.
- In rare cases where grants are more than 15% of scholarly productivity, then they count as 30% of FSP.

4. After the percentage of FSP that is dedicated to awards and grants is calculated, the remaining percentage is allocated to books and journal articles (including citations). For instance, if awards count as 10% and grants count as 20%, the remaining 70% is allocated to books and journal articles (including citations).

5. The remaining percentage (from step #4) is either allocated to journal publications (e.g., in the physical sciences) or divided between books and journal articles (including citations) in those cases where books are a substantial portion of productivity in a given discipline (e.g., social sciences or humanities). In disciplines where books are a substantial portion of productivity, the remaining percentage from step 4 is divided between books and journal articles (including citations) by determining the percentage of all publications that are books, and the percentage of all publications that are journal articles. For instance, if there are 700 books and 300 journal articles in a discipline, then 70% (= 700/1000) of the remaining percentage from step #4 is allocated to books, and 30% of the remaining percentage from step #4 is allocated to journal articles (including citations).

6. For journal publications, the percentage allocated to them is divided in half - one half is allocated to the metrics describing journal publications, and the other half is allocated to the variables describing citations.

7. Finally, the percentage of FSP allocated to each type of variable (books, journal publications, citations, grants, and honorific awards), is divided by the number of variables in that class of metrics. For example, since there are two awards variables, if 10% of FSP is allocated to awards, then each of the two variables counts as 5% of FSP.

An example follows below:

1. Begin with 100% of FSP.
2. Awards count as 10% of FSP (90% remaining).
3. Grants count as 20% of FSP (70% remaining).
4. Books represent 20% of all publications, and thus count as 20% of 70% = 14% of FSP (56% remaining).
5. Publications and citations each equal 56% / 2 = 28% of FSP (0% remaining).
6. So the variables in this case are weighed as

% of faculty w/book - 7%
books/faculty - 7%
% of faculty w/journal publication - 14%
journal articles/faculty - 14%
% faculty w/citation - 9.33%
citations/faculty member - 9.33%
citations/article - 9.33%
% faculty w/grant - 5%
grants/faculty - 5%
grant $/faculty - 5%
$/grant - 5%
% faculty w/award - 5%
awards/faculty - 5%

Student Evaluation of Teaching, Fall 2004
Overall Value of the Course
Overall Quality of Teaching
College, University, Prefix

	Course Mean	Teaching Mean	N
UNIVERSITY	3.2	3.3	55,470
COLLEGE	3.3	3.4	4,616
ABT	3.5	3.7	95
ACE	3.4	3.6	163
AEC	3.3	3.4	395
AED	3.8	3.8	49
AEN	3.3	3.4	27
ASC	3.5	3.6	367
BAE	3.6	3.6	117
DMT	3.6	3.8	11
ENT	3.5	3.6	141
FAM	3.2	3.2	1,033
FOR	3.6	3.5	167
FSC	3.8	3.7	36
GEN	3.4	3.9	81
HEE	3.7	3.5	21
HES	2.9	3.4	184
HMT	2.5	2.2	150
LA	3.2	3.0	134
MAT	3.2	3.2	286
NFS	3.3	3.3	668
NRC	3.9	3.9	16
PLS	3.3	3.5	366
PPA	3.7	3.4	34
RSO	3.0	3.0	42
VS	3.6	3.6	34

Student Evaluation of Teaching, Spring 2005
Overall Value of the Course
Overall Quality of Teaching
College, University (Prefix)

	Course Mean	Teaching Mean	N
UNIVERSITY	3.2	3.4	49,903
COLLEGE	3.3	3.4	4.452
ABT	3.5	3.8	15
ACE	3.6	3.7	161
AEC	3.3	3.4	343
AED	3.7	3.8	86
AEN	3.6	3.4	58
ASC	3.4	3.5	337
BAE	3.6	3.6	148
DMT	3.3	3.4	6
ENT	3.5	3.6	163
FAM	3.4	3.5	944
FOR	3.5	3.6	187
FSC	3.5	3.4	62
GEN	3.4	3.6	138
HEE	3.3	3.1	9
HES	3.3	3.6	217
HMT	2.9	3.1	178
LA	3.2	3.2	177
MAT	3.1	3.1	452
NFS	3.2	3.3	399
NRC	3.4	3.6	68
PLS	3.4	3.5	285
PPA	3.2	3.2	21
RSO			
VS			

Student Evaluation of Teaching
Departmental and Program Means
Overall Value of the Course
Overall Quality of Teaching
Fall 2005

	Course Mean	Teaching Mean	N
UNIVERSITY	3.2	3.4	53,169
COLLEGE	3.3	3.4	4,503
ABT	3.4	3.7	79
ACE	3.5	3.6	149
AEC	3.4	3.6	502
AED	3.6	3.6	48
AEN	2.1	2.6	8
ASC	3.4	3.5	366
BAE	3.5	3.5	138
CLD	3.6	3.7	17
ENT	3.5	3.6	203
FAM	3.3	3.4	867
FOR	3.5	3.6	153
FSC	3.5	3.5	26
GEN	3.0	3.3	182
HEE	3.7	3.8	22
HES	2.8	3.1	210
LA	3.5	3.3	119
MAT	2.9	2.9	252
NFS	3.3	3.4	588
NRC	3.0	3.0	63
PLS	3.4	3.5	369
PPA	3.3	3.4	65

Student Evaluation of Teaching
Course Prefix Means
Overall Value of the Course
Overall Quality of Teaching
Spring 2006

	Course Mean	Teaching Mean	N
UNIVERSITY	3.2	3.4	50,040
COLLEGE	3.3	3.4	4,497
ABT	3.1	3.1	46
ACE	3.5	3.7	173
AEC	3.4	3.5	336
AED	3.6	3.3	54
AEN	3.5	3.3	64
ASC	3.3	3.5	388
BAE	3.5	3.5	114
CLD	3.4	3.6	56
DMT	2.6	2.3	49
ENT	3.6	3.7	141
FAM	3.4	3.4	894
FOR	3.4	3.5	154
FSC	3.5	3.6	33
GEN	3.1	3.4	217
HEE	3.4	3.6	39
HES	2.9	3.4	207
HMT	2.7	2.6	171
LA	3.3	3.3	178
MAT	3.0	3.0	358
NFS	3.1	3.1	433
NRC	3.2	3.6	53
PLS	3.5	3.6	332
PPA	3.0	3.3	8

Student Evaluation of Teaching
Course Prefix Means
Overall Value of the Course
Overall Quality of Teaching
Fall 2006

	Course Mean	Teaching Mean	N
UNIVERSITY	3.2	3.4	55,891
COLLEGE	3.3	3.4	4,837
ABT	3.4	3.5	103
ACE	3.3	3.5	146
AEC	3.3	3.4	473
AED	3.5	3.4	67
AEN	3.4	3.2	13
ASC	3.4	3.5	364
BAE	3.6	3.6	145
CLD	3.2	3.4	79
DMT	3.7	3.6	13
ENT	3.2	3.4	163
FAM	3.4	3.5	954
FOR	3.4	3.5	170
FSC	3.6	3.5	29
GEN	3.3	3.6	129
HEE	3.7	3.8	20
HES	3.8	3.2	210
HMT	2.9	2.9	110
LA	3.1	2.9	155
MAT	3.4	3.4	325
NFS	3.3	3.3	665
NRC	3.2	3.3	73
PLS	3.4	3.5	364
PPA	3.7	3.8	67

Student Evaluation of Teaching
Course Prefix Means
Overall Value of the Course
Overall Quality of Teaching
Spring 2007

	Course Mean	Teaching Mean	N
UNIVERSITY	3.3	3.4	50,772
COLLEGE	3.3	3.4	4,712
ABT	3.4	3.6	37
AEC	3.3	3.4	346
AED	3.5	3.5	32
AEN	3.3	3.0	32
ASC	3.4	3.5	386
BAE	3.3	3.3	166
CLD	3.5	3.5	287
DMT	3.2	3.0	5
ENT	3.5	3.7	153
FAM	3.3	3.4	923
FCS	2.1	1.9	19
FOR	3.5	3.5	166
FSC	3.4	3.5	46
GEN	3.3	3.5	192
HES	2.9	3.3	240
HMT	3.2	3.3	189
LA	3.2	3.1	174
MAT	3.1	3.2	365
NFS	3.3	3.3	538
NRC	3.7	3.7	49
PLS	3.4	3.5	306
PPA	3.4	3.6	26
VS	3.7	3.7	37

Student Evaluation of Teaching
[redacted] Course Prefix Means
Overall Value of the Course
Overall Quality of Teaching
Fall 2007

	Course Mean	Teaching Mean	N
UNIVERSITY	3.3	3.4	56,294
COLLEGE	3.4	3.4	5,048
ABT	3.7	3.8	112
AEC	3.2	3.3	448
AED	3.7	3.7	55
ASC	3.3	3.4	437
BAE	3.4	3.4	127
CLD	3.5	3.6	288
DMT	3.7	3.6	11
ENT	3.4	3.6	152
FAM	3.6	3.6	938
FCS	3.5	3.6	54
FOR	3.6	3.6	174
FSC	3.9	3.9	24
GEN	3.4	3.7	155
HES	2.8	3.4	198
HMT	2.7	2.7	148
LA	3.3	3.1	105
MAT	3.4	3.3	421
NFS	3.4	3.3	783
NRC	3.1	3.2	38
PLS	3.2	3.3	307
PPA	3.6	3.7	73

Student Evaluation of Teaching
Course Prefix Means
Overall Value of the Course
Overall Quality of Teaching
Spring 2008

	Course Mean	Teaching Mean	N
UNIVERSITY	3.3	3.4	47,020
COLLEGE	3.3	3.3	4,032
ABT	3.4	3.3	59
AEC	3.4	3.5	332
AED	3.9	3.9	56
AEN	3.4	3.4	97
ASC	3.4	3.5	153
BAE	3.5	3.5	161
CLD	3.7	3.8	71
DMT	2.9	2.7	40
ENT	3.2	3.5	137
FAM	3.3	3.4	568
FCS	3.8	3.9	12
FOR	3.4	3.5	150
FSC	3.6	3.8	37
GEN	3.1	3.4	255
HES	3.1	3.4	251
HMT	3.1	3.1	206
LA	3.4	3.2	162
MAT	3.1	3.1	333
NFS	3.1	3.1	610
NRC	3.6	3.5	35
PLS	3.3	3.4	279
PPA	3.8	3.6	11
SAG	3.1	3.2	17

Student Evaluation of Teaching
Course Prefix Means
Overall Value of the Course
Overall Quality of Teaching
Fall 2008

	Course Mean	Teaching Mean	N
UNIVERSITY	3.3	3.4	55,644
COLLEGE	3.3	3.4	5,292
ABT	3.3	3.4	126
AEC	3.2	3.3	487
AED	3.8	3.8	106
AEN	3.0	3.2	5
ASC	3.1	3.2	518
BAE	3.4	3.5	109
CLD	3.3	3.5	288
ENT	3.5	3.7	178
FAM	3.3	3.3	739
FCS	3.0	3.2	43
FOR	3.4	3.5	186
FSC	3.8	3.9	25
GEN	3.3	3.5	282
HES	3.1	3.5	204
HMT	3.9	3.0	117
LA	3.5	3.5	107
MAT	3.5	3.5	337
NFS	3.3	3.4	918
NRC	3.0	3.2	71
PLS	3.2	3.4	337
PPA	3.7 3.7*	3.7 3.6*	67 76
SAG	3.8	3.7	12
VS	3.3	3.3	32

* When take in-house (because of small class sizes) evaluations into account. Total N = 76.

Student Evaluation of Teaching
Course Prefix Means
Overall Value of the Course
Overall Quality of Teaching
Spring 2009

	Course Mean	Teaching Mean	N
UNIVERSITY	3.3	3.4	48,152
COLLEGE	3.3	3.4	4,418
ABT	3.3	3.4	64
AEC	3.4	3.5	426
AED	3.3	3.5	40
AEN	3.6	3.7	24
ASC	3.4	3.5	372
BAE	3.2	3.2	104
CLD	3.6	3.7	346
ENT	3.5	3.7	119
EQM	3.5	3.5	42
FAM	3.1	3.1	654
FCS	3.4	3.3	43
FOR	3.5	3.5	139
FSC	3.7	3.8	30
GEN	3.2	3.4	217
HES	2.9	3.2	210
HMT	3.2	3.2	142
LA	3.3	3.3	156
MAT	3.3	3.4	350
NFS	3.4	3.4	641
NRC	3.6	3.7	43
PLS	3.2	3.3	209
PPA	3.2 3.5*	3.3 3.7*	13 26
SAG	3.5	3.4	34

* When take in-house (because of small class sizes) evaluations into account. Total N = 26.

Proposal

2004-2005 FY

I. Research

A. Credit

Research Current Expense Budget

State	56,656
Federal	23,000
Regional	4,900 (?)
	84,556

Graduate Assistant Support

RCTF	147,568 (1% decline)
Possible RCTF Carryover	65,364 (?)
State	5,500
Federal	53,155
	271,587 (?)

B. Debit

i. Departmental Commitments (approx.)

Laboratory Service Agreements	6,000
Communications	15,000
Dry Ice & Liquid Nitrogen	4,000
Job Orders	5,000
Insurance	1,400
Ikon Business	5,000
	36,400

ii. Research Faculty Allotments

Seven, at 3,500 24,500

iii. Graduate Assistant Support (approx.) 200,000

iv. Working Balance

Expenses likely to include office supplies, office printing, emergency repairs, and various miscellaneous items 23,656

II. Extension

A. Credit

State: travel=7,865, supplies=2,358	10,223
Federal: travel=7,270, printing=60,	13,105
Communications=5,100, supplies=675	23,328

B. Debit

Determined by Extension Specialists
with minimal oversight by chair.
Largely for travel, supplies, and telephone.

III. Instruction

A. Credit..... 1,088

B. Debit
Printing.....150
Supplies.....662
Telephone.....276

Proposal

2005-2006 FY

I. Research

A. Credit

Research Current Expense Budget

State	47,904
Federal	23,000
Regional	8,000
	78,904

Graduate Assistants (Stipends / Tuition)

RCTF	147,568
State	14,015
Federal	53,155
	214,738

RCTF Student Professional Development Carryover..... 35,450

B. Debt

i. Department Commitments (approx)

Laboratory Service Agreements	4,000
Communications	16,000
Dry Ice & Liquid Nitrogen	4,200
Job Orders	7,000
Insurance	1,400
Ikon Business (copier)	5,500
	38,100

ii. Research Faculty Allotments

Seven at 3,000 each.....21,000

iii. Graduate Assistants (Stipends / Tuition) approx.....200,000

RCTF Student Professional Development..... ?

iv. Working Balance.....19,804

Expenses likely to include office supplies, office printing, emergency repairs, and various miscellaneous items

II. Extension

A. Credit

State: travel=7,865, supplies=2,358	10,223
Federal: travel=7,270, printing=60,	13,105
Communications=5,100, supplies=675	23,328

B. Debt

Determined by Extension Specialists
with minimal oversight by chair.
Largely for travel, supplies, and telephone.

III. Instruction

A. Credit.....1,088

B. Debt

Printing..... 188
Supplies..... 629
Telephone..... 250

Proposal

2006-2007 FY

I. Research

A. Credit

Research Current Expense Budget

State	48,000
Federal	23,000
Regional	8,000
	79,000

Graduate Assistant Support

RCTF	147,568
State	14,015
Federal	53,155
	214,738

Possible RCTF Carryover..... 6,960

B. Debit

i. Department Commitments (approx)

Laboratory Service Agreements	18,500
Communications	15,000
Dry Ice & Liquid Nitrogen	4,200
Job Orders	5,000
Insurance	1,400
Ikon Business	5,000
	49,100

ii. Research Faculty Allotments

Eight, at 3,000 24,000

iii. Graduate Assistant Support (approx.) 200,000

iv. Working Balance

Expenses likely to include office supplies, office printing, emergency repairs, and various miscellaneous items 5,804.00

II. Extension

A. Credit

State: travel=7,865, supplies=2,358	10,223
Federal: travel=7,270, printing=60,	13,105
Communications=5,100, supplies=675	23,328

B. Debit

Determined by Extension Specialists
with minimal oversight by chair.
Largely for travel, supplies, and telephone.

III. Instruction

A. Credit.....1,088

B. Debit

Printing.....	150
Supplies.....	662
Telephone.....	276

Proposal
FY 2007-2008

1. Research
   A. Credit

Research Current Expense Budget			
State		$ 48,000.	
Federal		23,000.	
Regional		8,000.	
	Sub-Total	$79,000.	
Graduate Assistant Support			
RCTF		$147,568.	
State		14,000.	
Federal		53,155.	
	Sub-Total	$214,738.	
Possible RCTF Carryover		6,100.	
	Sub-Total	$6,100.	
TOTAL			**($299,838)**

   B. Debit

Department Commitments (approx.)			
Service Agreement (Laboratory)		$ 20,000.	
Communications		20,850.	
Dry Ice and Liquid Nitrogen		5,750.	
Job Orders		6,000.	
Insurance		1,500.	
Ikon Business		5,200.	
Computing Hardware/Repair		8,000.	
	Sub-Total	$67,300.	
Research Faculty Allotments			
Eight at $3,000.		24,000.	
	Sub-Total	$24,000.	
Graduate Assistant Support (approx.)		$200,000.	
	Sub-Total	$200,000.	
Working Balance			
Expenses such as office supplies & printing, emergency repairs, etc.		$8,538.	
	Sub-Total	$8,538.	
TOTAL			**$299,838**

2. Extension

A. Credit		
State: Travel = 7,865, Supplies = 2,358	$ 10,223.	
Federal: Travel = 7,270, Printing = 60, Communications = 5,100, Supplies = 675	13,105.	
TOTAL		**($23,328)**
B. Debit		
Determined by Extension Specialists with minimal oversight by chair. Largely for travel, supplies, and telephone.	$23,328.	
TOTAL		**$23,328**

3. Instruction

A. Credit	$1,088.	
TOTAL		**($1,088)**
B. Debit		
Printing	150.	
Supplies	662.	
Telephone	276.	
TOTAL		**$1,088**

Proposal
2008-2009 FY

1. Research
   A. Credit

Research Current Expense Budget			
State		$ 48,000.	
Federal		23,000.	
	Sub-Total		$71,000.
Graduate Assistant Support			
RCTF		$147,568.	
State		14,000.	
Federal		53,155.	
	Sub-Total		$214,723.
Possible RCTF Carryover		$ 5,000.	
TOTAL			**($290,723)**

   B. Debit

Department Commitments (approx.)		
Service Agreement (Laboratory)	$ 22,000.	
Communications	23,000.	
Job Orders	10,000.	
Insurance	1,600.	
Ikon Business	5,500.	
Computing Hardware/Repair	10,000.	
Sub-Total		$72,100.
Graduate Assistant Support (approx.)	$200,000.	
Working Balance		
Expenses such as office supplies, emergency repairs, printing, etc.	$ 18,623.	
TOTAL		**$290,723**

2. Extension
   A. Credit

State: Travel = 7,865, Supplies = 2,240	$10,105.	
Federal: Travel = 6,240, Printing = 60, Communications = 4,067, Supplies = 675	11,042.	
TOTAL		**($21,147)**

   B. Debit

Determined by Extension Specialists with minimal oversight by chair. Largely for travel, supplies, and telephone.	$21,147.	
TOTAL		**$21,147**

3. Instruction
   A. Credit

	$1,067.	
TOTAL		**($1,067)**

   B. Debit

Printing	$ 188.	
Supplies	629.	
Telephone	250.	
TOTAL		**$1,067**

Proposal
2009-2010 FY

1. Research
   A. Credit

Research Current Expense Budget		
State	$ 48,000.	
Federal	23,000.	
Sub-Total	$71,000.	
Graduate Assistant Support		
RCTF	$131,568.	
State	14,000.	
Federal	53,155.	
Sub-Total	$198,723.	
Possible RCTF Carryover	$ 5,000.	
TOTAL		**+ $274,723**

   B. Debit

Department Commitments (approx.)		
Service Agreement (Laboratory)	$ 15,000.	
Communications	23,000.	
Job Orders	10,000.	
Insurance	1,600.	
Ikon Business	5,500.	
Computing Hardware/Repair	10,000.	
Sub-Total	$65,100.	
Graduate Assistant Support (approx.)	$200,000.	
Working Balance		
Expenses such as office supplies, emergency repairs, printing, etc.	$ 9,623.	
TOTAL		**- $274,723**

2. Extension
   A. Credit

State: Travel = 7,865, Supplies = 2,240	$10,105.	
Federal: Travel = 6,240, Printing = 60, Communications = 4,067, Supplies = 675	11,042.	
TOTAL		**+ $21,147**

   B. Debit

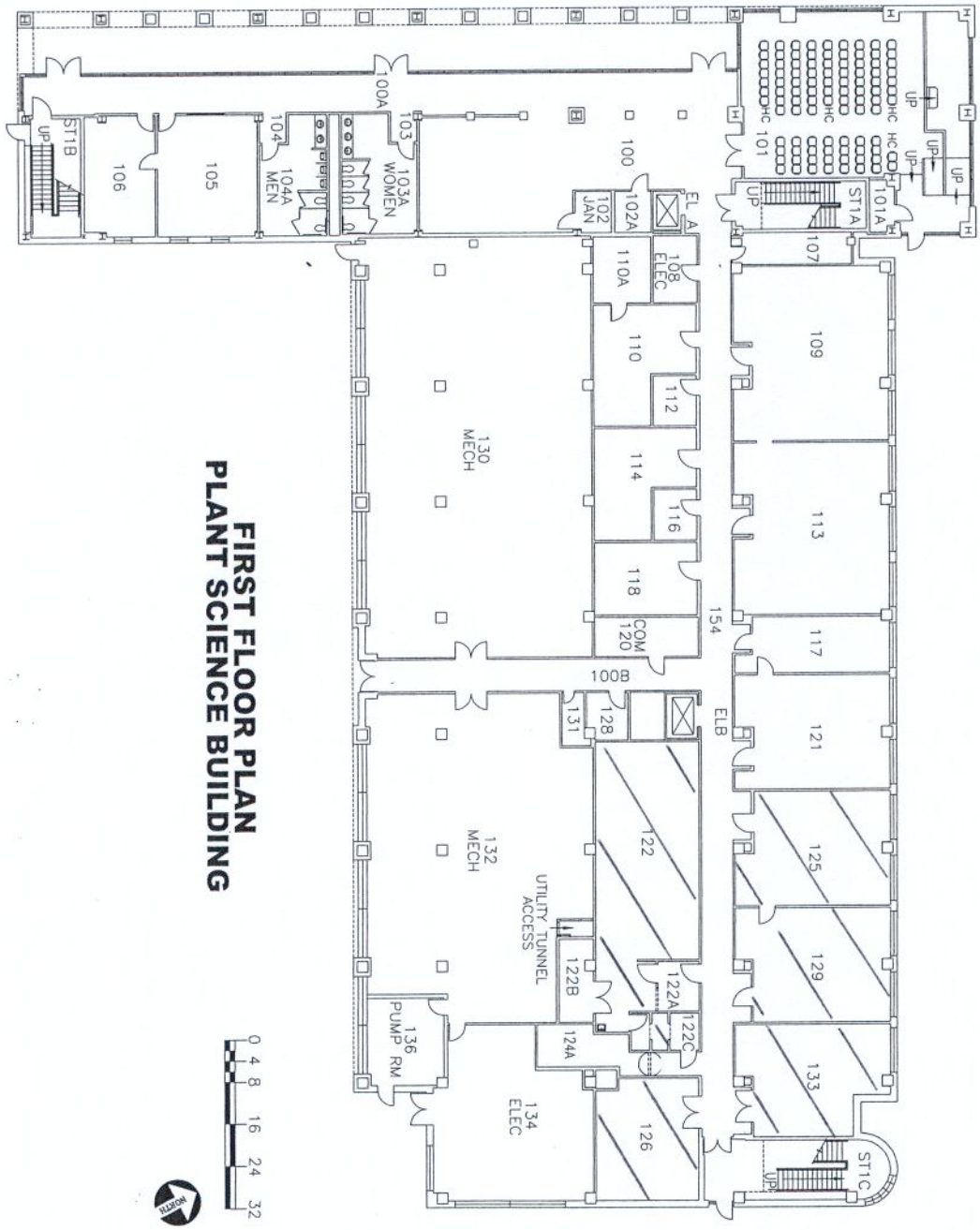
Determined by Extension Specialists with minimal oversight by chair. Largely for travel, supplies, and telephone.	$21,147.	
TOTAL		**- $21,147**

3. Instruction
   A. Credit

	$1,067.	
TOTAL		**+ $1,067**

   B. Debit

Printing	$ 188.	
Supplies	629.	
Telephone	250.	
TOTAL		**- $1,067**



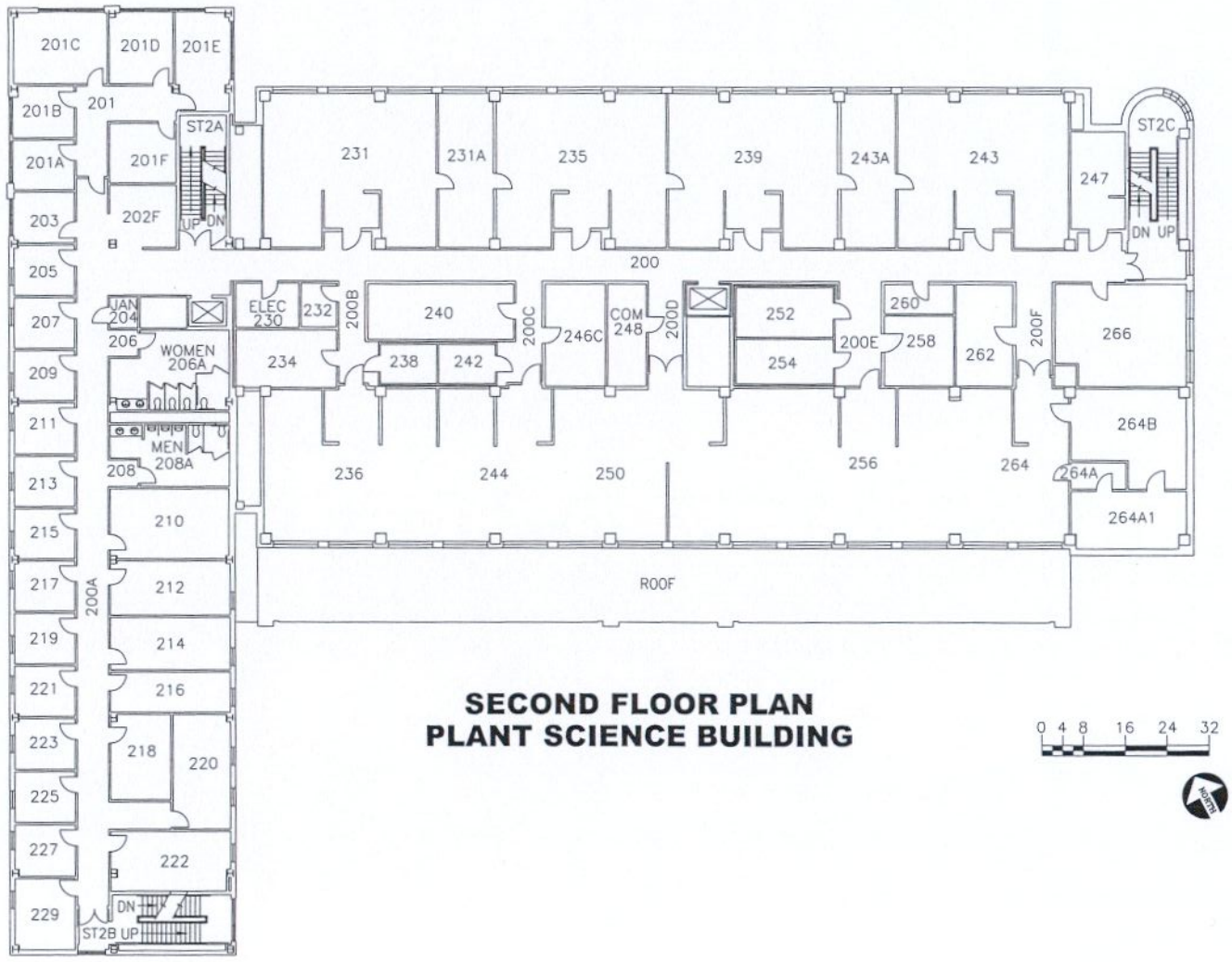
FIRST FLOOR PLAN
PLANT SCIENCE BUILDING

SHEET
1 – 5

PHYSICAL PLANT DIVISION

PLANT SCIENCE BUILDING	BLDG #
KEY DRAWING	0312

DATE
06-20-02
REVISED BY
JCM



SECOND FLOOR PLAN
PLANT SCIENCE BUILDING

0 4 8 16 24 32

NORTH

DATE 06-20-02 REVISED BY JCM

BLDG # 0312

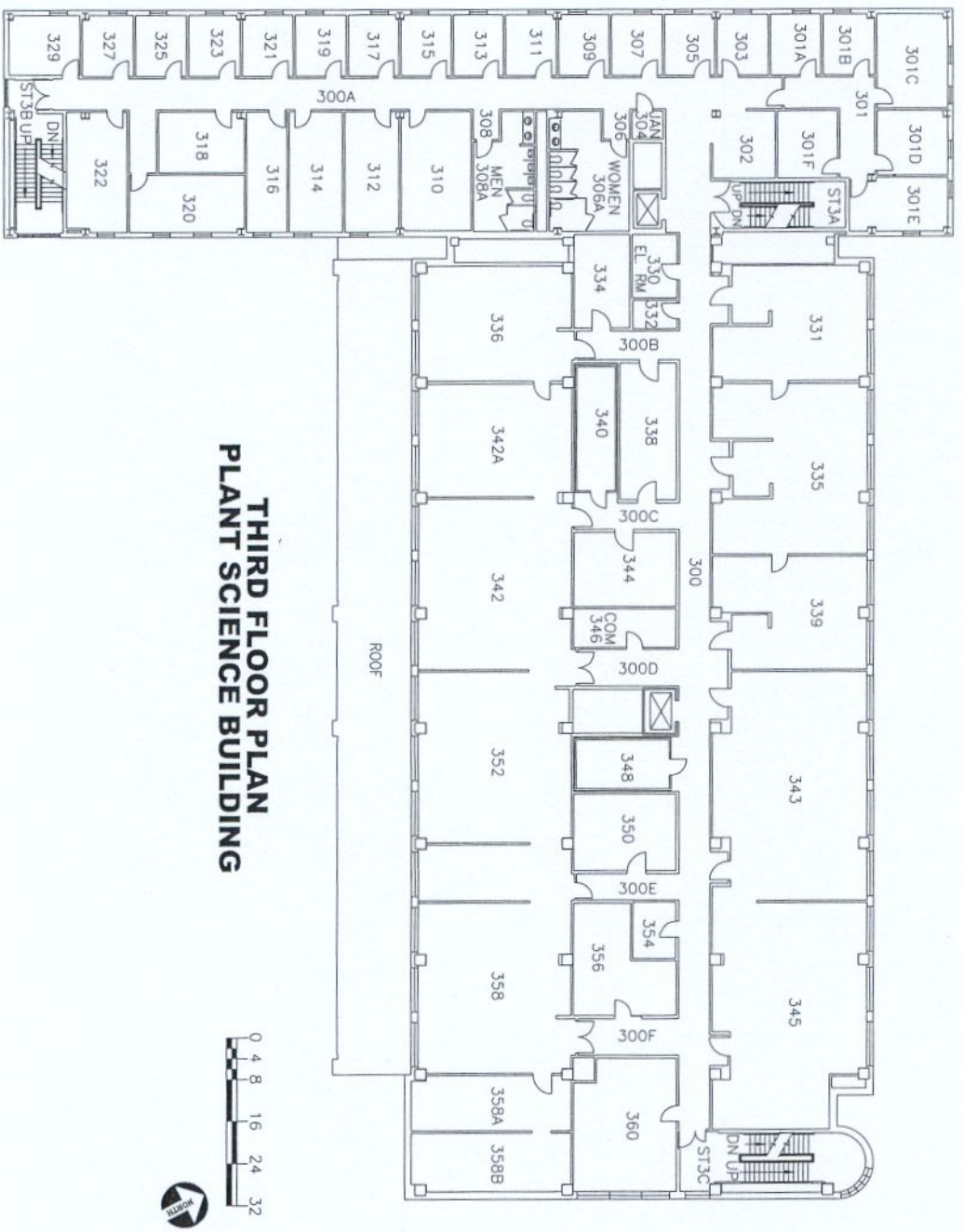
PLANT SCIENCE BUILDING

KEY DRAWING

PHYSICAL PLANT DIVISION

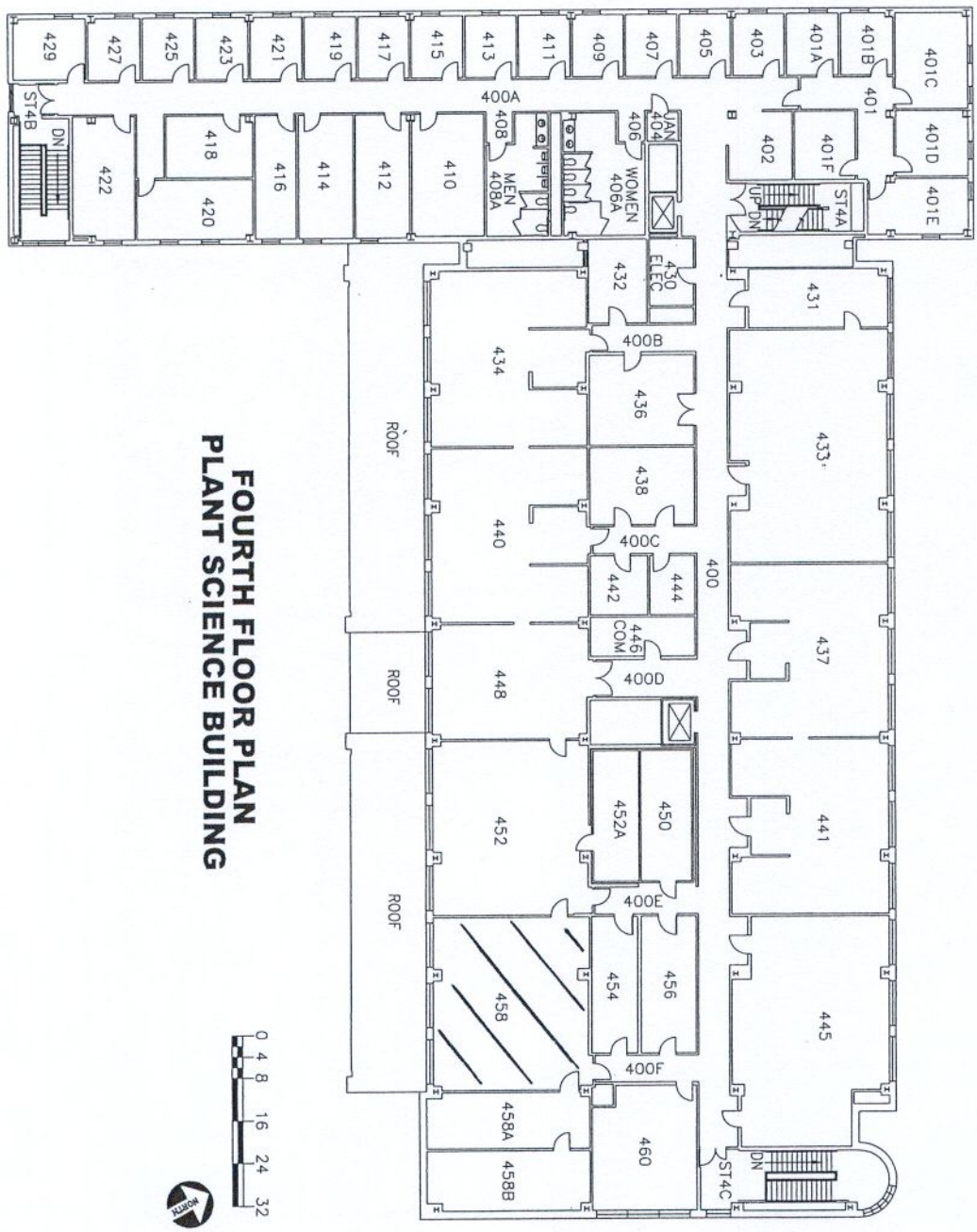
UK

SHEET 2 - 5



THIRD FLOOR PLAN
PLANT SCIENCE BUILDING

SHEET 3 – 5	UK PHYSICAL PLANT DIVISION	PLANT SCIENCE BUILDING KEY DRAWING	BLDG # 0312	DATE 06-20-02 REVISED BY JCM



FOURTH FLOOR PLAN
PLANT SCIENCE BUILDING

SHEET 4 – 5	UK PHYSICAL PLANT DIVISION	PLANT SCIENCE BUILDING KEY DRAWING	BLDG # 0312

DATE
06-20-02
REVISED BY
JCM

PLANT SCIENCE BUILDING 00312

FIRST NUM	SQ FT	FIRST NUM	SQ FT	SECOND NUM	SQ FT	SECOND NUM	SQ FT	THIRD NUM	SQ FT
100	1,011	ST1B	236	200	1,374	238	891	300	1,400
100A	921	ST1C	345	200A	888	240	294	300A	890
100B	367	**NET**	21,800	200B	118	242	81	300B	107
101	1,462	**ASSIGN**	9,144	200C	126	243	894	300C	116
101A	42	**GROSS**	26,362	200D	115	243A	302	300D	134
102	53			200E	173	244	629	300E	97
102A	54			200F	125	246C	224	300F	133
103	28			201	190	247	193	301	190
103A	294			201A	114	248	143	301A	112
104	28			201B	113	250	751	301B	112
104A	259			201C	246	252	177	301C	243
105	430			201D	166	254	159	301D	164
106	301			201E	189	256	1,452	301E	188
107	133			201F	146	258	175	301F	146
108	106			202F	149	260	73	302	149
109	926			203	113	262	208	303	112
110	360			204	31	264	636	304	31
110A	138			205	112	264A	53	305	112
112	78			206	28	264A1	238	306	29
113	914			206A	313	264B	355	306A	312
114	325			207	112	266	470	307	112
116	78			208	29	ST2A	221	308	29
117	283			208A	231	ST2B	287	308A	234
118	269			209	112	ST2C	372	309	112
120	144			210	304	**NET**	20,873	310	304
121	596			211	112	**ASSIGN**	16,195	311	112
122	942			212	238	**GROSS**	23,792	312	235
122A	72			213	112			313	112
122B	99			214	230			314	233
122C	86			215	112			315	112
124A	146			216	175			316	175
125	583			217	112			317	112
126	440			218	184			318	184
128	67			219	112			319	112
129	586			220	238			320	238
130	3,398			221	112			321	112
131	44			222	255			322	258
132	2,390			223	112			323	112
133	525			225	112			325	112
134	872			227	112			327	112
136	238			229	156			329	153
154	1,441			230	103			330	103
EL A	24			231	907			331	590
ELB	28			231A	304			332	46
ST1A	219			232	56			334	189
				234	210			335	888
				235	891			336	635
				236	943			338	278
				238	81			339	580

PLANT SCIENCE BUILDING 00312

THIRD NUM	SQ FT	FOURTH NUM	SQ FT	FOURTH NUM	SQ FT
340	173	400	1,473	440	931
342	941	400A	888	441	899
342A	620	400B	97	442	119
343	1,189	400C	97	444	93
344	273	400D	134	445	1,129
345	1,151	400E	103	446	144
346	142	400F	97	448	627
348	164	401	188	450	231
350	280	401A	112	452	945
352	1,254	401B	112	452A	207
354	86	401C	243	454	222
356	323	401D	164	456	266
358	944	401E	188	458	939
358A	317	401F	146	458A	317
358B	331	402	150	458B	332
360	474	403	112	460	437
ST3A	221	404	31	ST4A	203
ST3B	278	405	112	ST4B	282
ST3C	376	406	29	ST4C	373
NET	20,899	406A	314	**NET**	21,077
ASSIGN	16,077	407	112	**ASSIGN**	16,444
GROSS	23,792	408	29	**GROSS**	23,792
		408A	234		
		409	112		
		410	304		
		411	112		
		412	235		
		413	112		
		414	233		
		415	112		
		416	174		
		417	112		
		418	184		
		419	112		
		420	238		
		421	112		
		422	256		
		423	112		
		425	112		
		427	112		
		429	153		
		430	106		
		431	284		
		432	245		
		433	1,228		
		434	945		
		436	332		
		437	899		
		438	280		

NET AREA TOTAL	84,648
ASSIGNABLE AREA TOTAL	57,859
GROSS AREA TOTAL	97,738

KEY FOR UNASSIGNABLE

REV. 4-14-04

eBARS Electronic Barcoded Assets Resource System

System | Search/View | Space Inventory | Reports | Help/Links

Department level Space Summary

Department: 81120 - Plant Pathology

Completed: Room Totals: 78 | Percent: 100.00 | Completion Status: Complete

Dept Room Update Summary

	Total Room Count	Total Room NSF	Maximum Workstations	Existing Workstations	Unresolved Integrity Warnings	
Beginning Room	78	29499	129	129	total:	16
Current Room	78	29472	129	129	corrected:	16
Change	0	-27	0	0	Remaining:	0

Room Exceptions | Room Usage | Room Changes | Func Area tots | Func Area Chg | Occ Changes | Finalize

Save to Excel

Validation Status: Successful Total Exceptions: 0

Room Exception List

No Errors found

eBARS electronic Barcoded Assets Resource System

System | Search/View | Space Inventory | Reports | Help/Links

List Rooms | Detail | Func Usage | Occupants

Department 81120 - Plant Pathology Building DIMOCK ANIMAL PATH.

Save to Excel

Dept Summary

	RoomID	Usage	NetSqFt	totPCS	totOccs	Warnings	Complete	Locked	Status
Sel	0012	730	223	1	0	☐ 0	☑	☐	Updated
Sel	0023	730	208	1	0	☐ 0	☑	☐	Updated

Transfer

Add New

Delete

Functional Usage Codes for Selected Room

Occupants in Selected Room

Filter Rooms | Room# | Usage | show Warnings only | Hide deletes/Transfers | Hide completeds | Room Status: No Filter | Clear/Reset Filter

Dept 81120 | Bldg 0076 | Room 0012 | Status Complete | Prev | Next | Total Rooms 2

eBARS electronic Barcoded Assets Resource System

System | Search/View | Space Inventory | Reports | Help/Links

List Rooms | Detail | Func Usage | Occupants

Department 81120 - Plant Pathology Building GREENHOUSE NO 1

Save to Excel

Dept Summary

	RoomID	Usage	NetSqFt	totPCS	totOccs	Warnings	Complete	Locked	Status
Sel	0002	580	856	1	0	0	☑	☐	Updated
Sel	0003	580	883	1	0	0	☑	☐	Updated
Sel	0004	580	883	1	0	0	☑	☐	Updated

Transfer

Add New

Delete

Functional Usage Codes for Selected Room

Occupants in Selected Room

Filter Rooms | Room# | Usage | show Warnings only | Hide deletes/Transfers | Hide completeds | Room Status: No Filter | Clear/Reset Filter

Dept 81120 | Bldg 0160 | Room 0002 | Status Complete | Prev | Next | Total Rooms 3

eBARS electronic Barcoded Assets Resource System

System | Search/View | Space Inventory | Reports | Help/Links

List Rooms | Detail | Func Usage | Occupants

Department 81120 - Plant Pathology Building GREENHOUSE NO 4

Save to Excel

Dept Summary

	RoomID	Usage	NetSqFt	totPCS	totOccs	Warnings	Complete	Locked	Status
Sel	0001	580	4121	1	0	☐ 0	☑	☐	Updated

Transfer

Add New

Delete

Functional Usage Codes for Selected Room

Occupants in Selected Room

Filter Rooms | Room# | Usage | show Warnings only | Hide deletes/Transfers | Hide completeds | Room Status: No Filter | Clear/Reset Filter

Dept 81120 | Bldg 0156 | Room 0001 | Status Complete | Prev | Next | Total Rooms 1

eBARS electronic Barcoded Assets Resource System

System | Search/View | Space Inventory | Reports | Help/Links

List Rooms | Detail | Func Usage | Occupants

Department: 81120 - Plant Pathology Building: HEAD HOUSE

Save to Excel

Dept Summary

	RoomID	Usage	NetSqFt	totPCS	totOccs	Warnings	Complete	Locked	Status
Sel	0017	225	504	3	5	0	☑	☐	Updated
Sel	0017A	250	85	3	5	0	☑	☐	Updated
Sel	0017B	255	48	3	5	0	☑	☐	Updated
Sel	0017C	225	44	3	5	0	☑	☐	Updated

Transfer

Add New

Delete

Functional Usage Codes for Selected Room

Occupants in Selected Room

Filter Rooms | Room# | Usage | show Warnings only | Hide deletes/Transfers | Hide completeds | Room Status: No Filter | Clear/Reset Filter

Dept 81120 | Bldg 0154 | Room 0017 | Status Complete | Prev | Next | Total Rooms 4

eBARS electronic Barcoded Assets Resource System

System | Search/View | Space Inventory | Reports | Help/Links

List Rooms | Detail | Func Usage | Occupants

Department 81120 - Plant Pathology Building PLANT SCIENCES

Save to Excel

Dept Summary

Transfer

Add New

Delete

	RoomID	Usage	NetSqFt	totPCS	totOccs	Warnings	Complete	Locked	Status
Sel	0122	255	72	3	38	0	☑	☐	Updated
Sel	0122A	255	942	3	37	0	☑	☐	
Sel	0122B	255	99	1	0	0	☑	☐	
Sel	0122C	255	86	3	37	0	☑	☐	
Sel	0124A	255	146	2	0	0	☑	☐	
Sel	0125	250	583	3	6	0	☑	☐	
Sel	0126	255	432	2	66	0	☑	☐	
Sel	0129	250	586	2	34	0	☑	☐	
Sel	0131	730	44	1	0	0	☑	☐	
Sel	0133	255	525	2	66	0	☑	☐	

1 2 3 4 5 6 7

Functional Usage Codes for Selected Room

Occupants in Selected Room

Filter Rooms | Room# | Usage | show Warnings only | Hide deletes/Transfers | Hide completeds | Room Status: No Filter | Clear/Reset Filter

Dept 81120 | Bldg 0312 | Room 0122 | Status [redacted] | Prev | Next | Total Rooms 66

eBARS electronic Barcoded Assets Resource System

System | Search/View | Space Inventory | Reports | Help/Links

List Rooms | Detail | Func Usage | Occupants

Department 81120 - Plant Pathology Building PLANT SCIENCES

Save to Excel

Dept Summary

Transfer

Add New

Delete

	RoomID	Usage	NetSqFt	totPCS	totOccs	Warnings	Complete	Locked	Status
Sel	0201	310	190	1	0	0	☑	☐	
Sel	0201A	330	114	1	1	0	☑	☐	
Sel	0201B	330	113	1	1	0	☑	☐	
Sel	0201C	320	246	1	1	0	☑	☐	
Sel	0201D	330	166	1	1	0	☑	☐	
Sel	0201E	330	189	1	2	0	☑	☐	
Sel	0201F	315	146	1	0	0	☑	☐	
Sel	0202F	635	149	1	0	0	☑	☐	
Sel	0203	320	113	1	1	0	☑	☐	
Sel	0205	320	112	1	1	0	☑	☐	

1 2 3 4 5 6 7

Functional Usage Codes for Selected Room

Occupants in Selected Room

Filter Rooms | Room# | Usage | show Warnings only | Hide deletes/Transfers | Hide completeds | Room Status: No Filter | Clear/Reset Filter

Dept 81120 | Bldg 0312 | Room 0201 | Status Complete | Prev | Next | Total Rooms 66

eBARS electronic Barcoded Assets Resource System

System | Search/View | Space Inventory | Reports | Help/Links

List Rooms | Detail | Func Usage | Occupants

Department 81120 - Plant Pathology Building PLANT SCIENCES

Save to Excel

Dept Summary

Transfer

Add New

Delete

	RoomID	Usage	NetSqFt	totPCS	totOccs	Warnings	Complete	Locked	Status
Sel	0207	320	112	1	1	0	☑	☐	
Sel	0209	345	112	1	3	0	☑		
Sel	0210	345	304	1	7	0	☑		
Sel	0211	345	112	1	3	0	☑		
Sel	0212	340	238	1	6	0	☑		
Sel	0213	345	112	1	1	0	☑		
Sel	0214	340	230	1	4	0	☑		
Sel	0215	320	112	1	1	0	☑		
Sel	0216	710	175	1	2	0	☑		
Sel	0217	320	112	1	1	0	☑		

1 2 3 4 5 6 7

Functional Usage Codes for Selected Room

Occupants in Selected Room

Filter Rooms | Room# | Usage | show Warnings only ☐ | Hide deletes/Transfers ☐ | Hide completeds ☐ | Room Status: No Filter | Clear/Reset Filter

Dept 81120 | Bldg 0312 | Room 0207 | Status Complete | Prev | Next | Total Rooms 66

List Rooms | Detail | Func Usage | Occupants

Department: 81120 - Plant Pathology

Building: PLANT SCIENCES

Save to Excel

Dept Summary

Transfer

Add New

Delete

	RoomID	Usage	NetSqFt	totPCS	totOccs	Warnings	Complete	Locked	Status
Sel	0218	340	184	1	5	0	☑	☐	
Sel	0219	320	112	1	1	0	☑		
Sel	0220	345	238	1	6	0	☑		
Sel	0221	320	112	1	1	0	☑		
Sel	0222	345	255	1	8	0	☑		
Sel	0223	320	112	1	1	0	☑		
Sel	0225	320	112	1	1	0	☑		
Sel	0227	320	112	1	1	0	☑		
Sel	0229	320	156	1	1	0	☑		
Sel	0231	250	907	2	9	0	☑		

1 2 3 4 5 6 7

Functional Usage Codes for Selected Room

Occupants in Selected Room

nts)

Filter Rooms | Room# | Usage | show Warnings only | Hide deletes/Transfers | Hide completeds | Room Status: No Filter | Clear/Reset Filter

Dept 81120 | Bldg 0312 | Room 0218 | Status Complete | Prev | Next | Total Rooms 66

eBARS electronic Barcoded Assets Resource System

System | Search/View | Space Inventory | Reports | Help/Links

List Rooms | Detail | Func Usage | Occupants

Department 81120 - Plant Pathology Building PLANT SCIENCES

Save to Excel

Dept Summary

Transfer

Add New

Delete

	RoomID	Usage	NetSqFt	totPCS	totOccs	Warnings	Complete	Locked	Status
Sel	0231A	250	304	2	9	0	☑	☐	
Sel	0232	255	56	2	22	0	☑	☐	
Sel	0234	255	210	2	66	0	☑	☐	
Sel	0235	250	891	2	7	0	☑	☐	
Sel	0236	250	943	3	12	0	☑	☐	
Sel	0238	255	81	3	27	0	☑	☐	
Sel	0239	250	891	2	12	0	☑	☐	
Sel	0240	255	294	2	64	0	☑	☐	
Sel	0242	255	81	3	18	0	☑	☐	
Sel	0243	250	894	2	13	0	☑	☐	

1 2 3 4 5 6 7

Functional Usage Codes for Selected Room

Occupants in Selected Room

Filter Rooms | Room# | Usage | show Warnings only ☐ | Hide deletes/Transfers ☐ | Hide completeds ☐ | Room Status: No Filter | Clear/Reset Filter

Dept 81120 | Bldg 0312 | Room 0231A | Status Complete | Prev | Next | Total Rooms 66

eBARS Facilities Assets Resource System

System | Search/View | Space Inventory | Reports | Help/Links

List Rooms | Detail | Func Usage | Occupants

Department 81120 - Plant Pathology Building PLANT SCIENCES

Save to Excel

Dept Summary

Transfer

Add New

Delete

	RoomID	Usage	NetSqFt	totPCS	totOccs	Warnings	Complete	Locked	Status
Sel	0243A	250	302	2	12	0	☑	☐	
Sel	0244	250	629	2	14	0	☑		
Sel	0246C	255	224	2	66	0	☑		
Sel	0247	255	193	3	34	0	☑		
Sel	0250	250	751	2	11	0	☑		
Sel	0252	255	177	2	12	0	☑		
Sel	0254	255	159	2	66	0	☑		
Sel	0256	250	1452	2	6	0	☑		
Sel	0258	255	175	2	66	0	☑		
Sel	0260	255	73	2	7	0	☑		

1 2 3 4 5 6 7

Functional Usage Codes for Selected Room

Occupants in Selected Room

Filter Rooms | Room# | Usage | show Warnings only ☐ | Hide deletes/Transfers ☐ | Hide completeds ☐ | Room Status: No Filter | Clear/Reset Filter

Dept 81120 | Bldg 0312 | Room 0243A | Status Complete | Prev | Next | Total Rooms 66

eBARS electronic Barcoded Assets Resource System

System | Search/View | Space Inventory | Reports | Help/Links

List Rooms | Detail | Func Usage | Occupants

Department: 81120 - Plant Pathology Building: PLANT SCIENCES

Save to Excel

Dept Summary

Transfer

Add New

Delete

	RoomID	Usage	NetSqFt	totPCS	totOccs	Warnings	Complete	Locked	Status
Sel	0262	255	208	4	33	0	☑	☐	
Sel	0264	250	636	2	8	0	☑		
Sel	0264A	255	53	2	20	0	☑		
Sel	0264A1	255	236	2	20	0	☑		
Sel	0264B	255	351	2	20	0	☑		
Sel	0266	350	465	1	0	0	☑		

Functional Usage Codes for Selected Room

Occupants in Selected Room

Filter Rooms | Room# | Usage | show Warnings only | Hide deletes/Transfers | Hide completeds | Room Status: No Filter | Clear/Reset Filter

Dept 81120 | Bldg 0312 | Room 0262 | Status Complete | Prev | Next | Total Rooms 66

eBARS Resource System

System | Search/View | Space Inventory | Reports | Help/Links

List Rooms | Detail | Func Usage | Occupants

Department 81120 - Plant Pathology Building SEED HOUSE

Save to Excel

Dept Summary

	RoomID	Usage	NetSqFt	totPCS	totOccs	Warnings	Complete	Locked	Status
Sel	0003	250	516	3	8	☐ 0	☑	☐	**Updated**
Sel	0011	250	1400	3	5	☐ 0	☑	☐	**Updated**

Transfer

Add New

Delete

Functional Usage Codes for Selected Room

Occupants in Selected Room

Filter Rooms | Room# | Usage | show Warnings only | Hide deletes/Transfers | Hide completeds | Room Status: No Filter | Clear/Reset Filter

Dept 81120 | Bldg 0092 | Room 0003 | Status **Complete** | Prev | Next | Total Rooms 2

Capital Inventory Found

College of Agriculture

Plant Pathology ***81120***

Property#	bldg	Room#	Description	Cost	Serial#	Model#	Class	Cnd	Ins	Avail	Account	Voucher	Acquired MM	Acquired YY	Life	FoundB By	Date of Scan	TypeE entry	Comment
A286794			CHAMBER DEW W/LIGHTS PERCIVAL	$5,607		1-35DL	66360014	P	C	73590C	300000	A33330	07	1977	10	evice0	11/24/08	Scanned	
A411635	0312	00231A	READER MICROPLATE FLOW LABS	$11,080	1104-040	310	66850070	G	C	73590C	256006	A14422	02	1981	10	evice0	11/19/08	Scanned	
A436942	0312	00240	ULTRACENTRIFUGE W-ROTOR BECK	$35,760	4402		70250130	G	C	73590C	256006	078192	02	1986	10	evice0	11/10/08	Scanned	
A446615	0312	00122	INCUBATOR BIOLOGICAL PERCIVAL	$5,692	86C3202	I-60LLVL	66400289	G	C	73590C	256006	093937	04	1986	10	evice0	11/10/08	Scanned	
A463139	0312	00231A	INCUBATOR SHAKER	$10,000		G27	66400289	G	C	73590C	256006	258600	07	1988	10	evice0	11/7/08	Scanned	
A463152	0312	00240	CENTRIFUGE	$15,010		RC5C	66400093	G	C	73590C	256006	255196	03	1988	8	evice0	11/19/08	Scanned	
A463168			PLANT GROWTH CHAMBER	$10,276			66400031	G	C	73590C	532717	273336	05	1988	10	evice0	11/24/08	Scanned	
A463169			MULTI PURPOSE GROWTH CHAMBEF	$51,480			66700289	G	C	73590C	532717	273335	03	1988	10	evice0	11/24/08	Scanned	
A463229	0312	00236	MICROSCOPE OLYMPUS	$7,968			66500073	G	C	73590C	532717	100090	07	1988	19	evice0	11/6/08	Scanned	
A474391			GROWTH CHAMBER 3 COMPARTMER	$57,318		PC1543	66400031	G	C	73590C		086543	07	1988	10	evice0	11/24/08	Manual	Other
A482635	0312	00236	THERMAL CYCLER	$7,525		N8010150	66850000	G	C	73590C	532714	247330	05	1989	10	evice0	11/6/08	Scanned	
A492462	0312	00344	MICROSCOPE ZEISS GBC	$11,953	451701	AX10VERT	66500073	G	C	71079F	770228	202545	02	1990	10	jcalvert	11/24/08	Scanned	
A492499	0312	00264A	FREEZE DRYER W/VACUUM PUMP	$5,995			66400181	G	C	73590C	256006	221606	02	1990	10	evice0	11/19/08	Scanned	
A495899	0154	00017	STERILIZER	$34,612			66400453	G	C	73590C	256006	251619	05	1990	10	evice0	11/24/08	Scanned	
A508543	0091	0S225	HEPA HEAD SECTION W/ELECTRONI	$6,965			66400000	G	C	73590C	256006	109376	08	1990	10	kaarno0	2/2/09	Manual	No barcode
A509109	0312	00256	CABINET / BIOLOGICAL SAFETY NU-A	$5,198			66360027	G	C			297480	02	1992	15	evice0	12/2/08	Scanned	
A515105	0091	0N305	PROGRAMMABLE VARIABLE	$8,860	490007101	490	61050000	G	C		256006	250284	04	1991	10	dmshul0	11/10/08	Scanned	
A532296	0312	00235	THERMAL CYCLER	$4,900			66400000	G	C	73590C	256006	744032	09	1992	10	evice0	11/7/08	Scanned	
A532323	0312	00239	NANOPURE ANALYTEL WALL MTA 12	$2,239	687920689(	D4741	66400000	G	C	73590C	256006	746521	10	1992	10	evice0	11/7/08	Scanned	
A532416	0312	00239	LAMINAR FLOW HOOD	$3,166			66360019	G	C	73590C	256006	752165	10	1992	10	evice0	11/7/08	Scanned	
A540631	0312	00239	PROGENATOR II	$2,240	93021001	PG201-115\	66400000	G	C	73590C	256006	760852	04	1993	10	evice0	11/19/08	Manual	Bad barcode
A540686	0312	00243A	INCUBATOR	$2,151			66400289	G	C	73590C	256006	762844	05	1993	10	evice0	11/19/08	Manual	Bad barcode
A552917	0312	00250	LAMINAR FLOW HOOD	$3,007	48513	E64252	41200002	G	C		256006	746113	11	1993	10	evice0	11/10/08	Scanned	
A552920	0312	00250	POWERPAC 3000 110V	$2,035	154BR4325	1652076	66400000	G	C	73590C	256006	743929	10	1993	10	evice0	11/10/08	Scanned	
A552921	0312	00256	GENE PULSER APPARATUS W/CONTI	$3,531	232BR472	23BR6472	66400000	G	C	73590C	256006	743929	10	1993	10	evice0	11/19/08	Scanned	
A552923	0312	00256	MOBILE CONSOLE	$4,214			66400000	G	C	73590C	256006	745944	11	1993	10	evice0	12/2/08	Scanned	

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Property#	bldg	Room#	Description	Cost	Serial#	Model#	Class	Cnd	Ins	Avail	Account	Voucher	Acquired MM	Acquired YY	Life	FoundB By	Date of Scan	TypeE entry	Comment
A552949	0312	00250	**CENTRIFUGE BENCHTOP REFRIG W/I**	$6,145	GBY93357	GS-6R	66400090	G	C	73590C	256006	747460	12	1993	5	evice0	11/10/08	Scanned	
A552953	0312	00264	**GEL READER**	$4,300	315067	IBI6P7	66400000	G	C	73590C	256006	747460	12	1993	10	evice0	11/19/08	Scanned	
A552954	0312	00250	**CARTRIDGE SYSTEM BARNSTEAD**	$2,473	7479310114	D4751	66400000	G	C	73590C	256006	747460	12	1993	10	evice0	11/10/08	Scanned	
A553164	0312	00236	**COMPLETE CHEF-DR II SYSTEM**	$7,298			66400000	G	C	73590C	256006	763417	06	1992	10	evice0	12/2/08	**Manual**	No barcode
A566261	0312	00231A	**PC POWERMAC 7100 W/700 MB HARI**	$5,466	FC5252E24		70100001	G	C		356405	612813	06	1995	5	evice0	11/7/08	Scanned	
A572206	0215	00106	**MICROSCOPE,ALPHAPHOT2,BINOCU**	$3,082	179399		66500000	G	C		200363	724450	05	1996	7	evice0	11/20/08	Scanned	
A572207	0215	00106	**MICROSCOPE,ALPHAPHOT2,BINOCU**	$3,082	179728		66500000	G	C		200363	724450	05	1996	7	evice0	11/20/08	Scanned	
A572208	0215	00106	**MICROSCOPE,ALPHAPHOT2,BINOCU**	$3,083	178413		66500000	G	C		200363	724450	05	1996	7	evice0	11/20/08	Scanned	
A572211	0312	00231	**MICROCENTRIFUGE W.ROTOR**	$2,137	03629	5417	66400090	G	C	73590C	541124	724451	05	1996	7	evice0	11/7/08	Scanned	
A573184	0312	00246C	**BALANCE**	$4,157	1114341832	AT261	66700048	G	C	73590C	256006	723703	04	1996	10	evice0	11/6/08	Scanned	
A574525	0312	00231	**CENTRIFUGE W/ROTOR/TRAP, SPEEI**	$5,885	ISS1106F25		66400000	G	C	73590C	206026	730012	06	1996	7	evice0	11/7/08	Scanned	
A575900	0312	00231	**CIRCULATOR**	$2,198			66400000	G	C	73590C	541124	727417	06	1996	10	evice0	11/7/08	Scanned	
A576352	0215	00106	**MICROSCOPE,ALPHAPHOT2,BINOCU**	$3,082	569911		66500000	G	C		200363	724450	05	1996	7	evice0	11/20/08	Scanned	
A576353	0215	00106	**MICROSCOPE,ALPHAPHOT2,BINOCU**	$3,082	570104		66500000	G	C		200363	724450	05	1996	7	evice0	11/20/08	Scanned	
A576364	0215	00106	**MICROSCOPE,ALPHAPHOT2,BINOCU**	$3,083	570084		66500000	G	C		200363	724450	05	1996	7	evice0	11/20/08	Scanned	
A582309	0312	00246C	**MICROSCOPE TETRAD 2 AXIOSKOP F**	$26,925	451406	MC80	66500000	G	C	73590C	206026	711027	11	1996	7	evice0	11/6/08	Scanned	
A582770	0312	00125	**TOBACCO SPRAYER W/TANK 3PT HIT**	$2,680			37400030	G	F		532706	726410	05	1997	10	evice0	11/6/08	Scanned	
A582807	0312	00264A	**GENEAMP PCR SYSTEM 9700 PERKIN**	$7,233	805N70526	N8050200	66400000	G	C	73590C	256006	728722	06	1997	10	evice0	11/19/08	Scanned	
A582808	0312	00264	**REFRIGERATOR W/GLASS DOOR FOI**	$2,678	64094684	3771	66400000	G	C	73590C	256006	727021	06	1997	10	evice0	11/10/08	Scanned	
A582809	0312	00264A	**MICROSCOPE BINOCULAR LEICA**	$8,297	280597708	445387	66500000	G	C	73590C	256006	728835	06	1997	7	evice0	11/19/08	Scanned	
A582896	0215	00106	**VIDEO CAMERA F/ALPHAPHOT MICR**	$3,077	36460218		66500000	G	C		200363	701948	07	1997	7	evice0	11/20/08	Scanned	
A582919	0312	00256	**MICROSCOPE NIKON E400 PHASE CC**	$5,551	650444	E400	66500000	G	C	73590C	256006	700358	07	1997	7	evice0	11/10/08	Scanned	
A582978	0312	00109	**GENETIC ANALYZER PERKIN ELMER**	$61,388	100000102	310-00	66400000	G	C	73590C	256006	710086	11	1997	10	jcalvert	12/12/08	Scanned	
A582979	0312	00239	**GENEAMP PCR SYSTEM 2400 PERKIN**	$2,974	8035709232		66400000	G	C	73590C	256006	710086	11	1997	10	evice0	11/19/08	Scanned	
A585132	0312	00264A	**TABLE/BIO SAFETY CABINET NUAIRE**	$6,691	73103	NU-425-600	66360027	G	C	73590C	256006	728842	06	1997	10	evice0	11/19/08	Scanned	
A585133	0312	00133	**FREEZER KELVINATOR SCIENTIFIC**	$4,557			41100011	G	C		256006	727684	06	1997	10	evice0	11/10/08	Scanned	

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A585188	0312	00264A	DYNA QUANT 200 FLUOROMETER	$2,366	20005757	DQ200-115	66400000	G	C		256006	725347	05	1997	10	evice0	11/19/08	Scanned	
A585192	0312	0264A1	PC W/COLOR MON POWERTOWER PF	$3,757	L6JATX422	PRO200	70100001	G	C		256006	725359	05	1997	5	evice0	11/10/08	Scanned	
A588684	0312	00264B	WATER BATH W/PLATFORM	$3,795	790655484	C76	66400538	G	C	73590C	256006	700359	07	1997	7	evice0	11/10/08	Scanned	
A588687	0312	00256	SHAKER W/PLATFORM	$6,351	791045282	C25	66400435	G	C	73590C	256006	700359	07	1997	8	evice0	11/10/08	Scanned	
A588691	0312	00260	MICROSONIC DISRUPTOR W/MICROT	$2,018	25598C	TMS-50	66400000	G	C	73590C	256006	700372	07	1997	10	evice0	11/10/08	Scanned	
A588692	0312	00247	OVEN	$2,727	69913-6	FBH1DQ	66400359	G	C	73590C	256006	700359	07	1997	10	evice0	12/3/08	Manual	Other
A589341	0312	00227	PC W/CD-ROM APPLE POWERBOOK 3	$3,907	TY74206R9		70100001	G	C		256006	S23737	11	1997	5	evice0	11/5/08	Scanned	
A589397	0312	00246C	50 MERCURY SYSTEM ZEISS	$3,790	094943	H910759	66500000	G	C	73590C	256006	715320	01	1998	10	evice0	11/19/08	Scanned	
A589514	0312	00256	PC W/MON APPLE POWERMAC G3 23	$1,937	XA8191YH	MAC G-3	70100001	G	C		541152	S36301	06	1998	5	evice0	11/10/08	Scanned	
A589558	0312	00247	HYBRIDIZATION OVEN	$3,078	79127-8	FHB1DQ	66400359	G	C	73490C	541156	727878	05	1998	10	evice0	11/26/08	Scanned	
A589570	0312	00231A	MICROPLATE READER	$6,154	J38430		66400000	G	C	73590C	541156	728388	06	1998	10	evice0	11/7/08	Scanned	
A589571	0312	00231	INCUBATOR SHAKER REFRIGERATEI	$9,729	890266139	4330	66400435	G	C	73590C	541153	727490	06	1998	10	evice0	11/7/08	Scanned	
A589613	0312	00239	PLANT TISSUE CULTURE CHAMBER I	$7,255	3036	CU-36L5	66400497	G	C	73590C	541156	731826	06	1998	10	evice0	12/3/08	Manual	No barcode
A589614	0312	00133	PLANT TISSUE CULTURE CHAMBER I	$7,256	3836	CU-36L5	66400497	G	C	73590C	541156	731826	06	1998	10	evice0	11/10/08	Scanned	
A589629	0312	00231	BIOLOGICAL SAFETY CABINET TABL	$4,955	78065AFS	NU-424-400	66360027	G	C	73590C	541156	731821	06	1998	15	evice0	11/7/08	Scanned	
A595140	0312	00256	CENTRIFUGE AVANTI J-25 HIGH PERF	$16,071	JHY98C04	J25	66400092	G	C	73590C	256006	722256	03	1998	7	evice0	11/10/08	Scanned	
A595181	0312	00256	ROTOR JA-18.1 FIXED ANGLE	$2,192	97V-1272	J25	66400091	G	C	73590C	256006	722256	03	1998	7	evice0	11/10/08	Scanned	
A595182	0312	00256	ROTOR JS-13.1 SWINGING BUCKET	$5,110	98V3356		66400091	G	C	73590C	256006	722256	03	1998	7	evice0	11/10/08	Scanned	
A595183	0312	00256	ROTOR JLA-16.250 HIGH PERFORMAI	$3,577	97V-530	J25	66400091	G	C	73590C	256006	722256	03	1998	7	evice0	11/10/08	Scanned	
A598869	0312	00234	CHEMIMAGER FLUORESCENCE IMAG	$24,236	980105		66400000	G	C	73590C	541156	510302	10	1998	10	evice0	11/10/08	Scanned	
A604174	0312	00243A	DNA SPEEDVAC W/ACC SAVANT	$4,559	DMA1109C	DNA110	66400000	G	C	73590C	207267	521565	04	1999	7	evice0	11/19/08	Scanned	
A604196	0312	00264A	PC APPLE MACINTOSH POWERBOOK	$1,880		MAC POWE	70100001	G	C		537350	S59284	04	1999	5	evice0	11/19/08	Scanned	
A604225	0312	00216	PC APPLE POWER MACINTOSH G3 M	$1,880	XA91323LG	MACG3MT/	70100001	G	C		256006	S59622	05	1999	5	evice0	11/19/08	Scanned	
A604263	0312	00240	FREEZER DOUBLE DOOR FORMA UPI	$6,234	21566-3876	923	41100011	G	C		541156	702063	05	1999	10	evice0	11/10/08	Scanned	
A604265	0312	00231	HYBRIDIZATION OVEN	$2,277	10951	1000	66400359	G	C	73590C	541156	702526	05	1999	10	evice0	11/7/08	Scanned	
A604312			FLUID COLLER KRACK AIR COLLED	$6,514		FCVB-2410	66400000	G	C	73590C	541156	704072	06	1999	10	evice0	11/24/08	Manual	Other

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A604346	0091	0S225	**PC GATEWAY SOLO 9150XL LAPTOP**	$2,874	001416078(	S0L09150	70100001	G	C		258756	S62554	06	2000	3	kaarno0	12/2/08	Scanned	
A604404	0312	00231	**CHROMATOGRAPHY REFRIGERATOF**	$2,207	12344993	GDM41	66300029	G	C	73590C	541156	700073	07	1999	10	evice0	11/7/08	Scanned	
A604406	0312	00264B	**MICROSCOPE TRINOCULAR**	$3,311			66500088	G	C	73590C	541156	710342	07	1999	7	evice0	11/10/08	Scanned	
A606162	0312	00231A	**PRINTER HP LASERJET 5000N**	$2,012	USB104210	C4111A	70250130	G	C		256006	S60169	05	1999	5	evice0	11/7/08	Scanned	
A606163	0312	00231	**PC W/MON APPLE POWERMAC G3 MT**	$3,753	8G9138AC(	G3	70100001	G	C		256006	S60169	05	1999	5	evice0	11/7/08	Scanned	
A606164	0312	00250	**MICROCENTRIGUGE REFRIGERATED**	$3,267	3592F0824	RF	66400095	G	C	73590C	256006	702433	05	1999	5	evice0	11/10/08	Scanned	
A610461	0312	00256	**PC APPLE POWERMAC G4 MT 350MH**	$1,482	XB0030V4H	G4MT	70100001	G	C		256516	S80569	01	2000	5	evice0	11/10/08	Scanned	
A610509	0312	00113	**PC DELL DIMENSION XPS MT PIII 550I**	$1,803	3872E808	M780	70100001	G	C		256006	S85276	03	2000	5	evice0	11/10/08	Scanned	
A610512	0312	00210	**PC DELL OPTIPLEX GX110 MT PIII 60(**	$2,222		M990	70100001	G	C		541153	S88571	03	2000	5	evice0	11/5/08	Scanned	
A611357	0312	00133	**PLANT GROWTH CHAMBER**	$11,244	G10-65-3K1		65150000	G	C		256006	503597	12	1999	10	evice0	11/10/08	Scanned	
A611373			**ENVIRONMENTAL ROOM NOMINAL 9)**	$54,669			66360000	G	C		256006	503768	12	1999	10	evice0	11/24/08	Scanned	
A611374	0312	00133	**PLANT GROWTH CHAMBER**	$11,244	G10-64-3K1		65150000	G	C		256006	503597	12	1999	10	evice0	11/10/08	Scanned	
A611375	0312	00133	**PLANT GROWTH CHAMBER**	$11,244	G10-66-3K1		65150000	G	C		256006	503597	12	1999	10	evice0	11/10/08	Scanned	
A613761	0312	00252	**ROTOR FIXED ANGLE BECKMAN 70.1**	$8,400			66400091	G	C	73590D	256006	718888	03	2000	7	evice0	11/19/08	Scanned	
A613762	0312	00252	**ROTOR FIXED ANGLE BECKMAN 50.2**	$8,400			66400091	G	C	73590D	256006	718888	03	2000	7	evice0	11/19/08	Scanned	
A613763	0312	00252	**ROTOR SWINGING BUCKET SW-28 BE**	$8,400			66400091	G	C	73590D	256006	718888	03	2000	7	evice0	12/2/08	Manual	Other
A613764	0312	00252	**ROTOR SWINGING BUCKET SW-55TI I**	$8,400			66400091	G	C	73590D	256006	718888	03	2000	7	evice0	12/2/08	Manual	Other
A613782	0312	00240	**CHEST FREEZER**	$4,307	01021036	C85-12	41100011	G	C		256006	731719	09	2002	10	evice0	11/19/08	Scanned	
A616291	0312	00133	**FREEZER -86 12.7 CU. FT. CHEST TYP**	$6,638	804569-202	939	41100011	G	C		256006	744329	05	2003	10	evice0	11/10/08	Scanned	
A616292	0312	00133	**FREEZER -86 12.7 CU. FT. CHEST TYP**	$6,638	804569-201	939	41100011	G	C		256006	744329	05	2003	10	evice0	11/14/08	Scanned	
A616313	0312	00240	**FREEZER -86 UPRIGHT ULTRALOW**	$6,449	20708686	MDF-U71V(	41100011	G	C		256006	746367	05	2003	10	evice0	11/10/08	Scanned	
A616314	0312	00244	**VERTICAL LAMINAR FLOW BENCH**	$7,072	77451	SG-403	66360027	G	C		256006	746937	05	2003	15	evice0	11/19/08	Scanned	
A616318	0312	00244	**SHAKER FLOOR MODEL**	$5,777	300343379	C-25	66400435	G	C		256006	745923	05	2003	8	evice0	11/10/08	Scanned	
A616319	0312	00244	**CENTRIFUGE WITH ROTOR EPPENDC**	$2,357			66400090	G	C		256006	746447	05	2003	7	evice0	11/10/08	Scanned	
A616320	0312	00244	**WATER PURIFICATION SYS MILLIQ S'**	$3,202	F3CN94296	QUANTUM[	46100001	G	C		256006	747665	05	2003	10	evice0	11/19/08	Scanned	
A616321	0312	00244	**SPECTROPHOTOMETER BIOMATE 5**	$6,335	085111		66500141	G	C		256006	747666	05	2003	8	evice0	11/10/08	Scanned	

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A616322	0312	00240	**CIRCULATER LAUDA RT106**	$2,200	A05095	RE106	66400539	G	C		256006	745923	05	2003	10	evice0	11/10/08	Scanned	
A616323	0312	00244	**CENTRIFUGE WITH ROTOR EPPENDC**	$2,357			66400090	G	C		256006	746447	05	2003	7	evice0	11/19/08	Scanned	
A616324	0312	00244	**CENTRIFUGE WITH ROTOR EPPENDC**	$2,357			66400090	G	C		256006	746447	05	2003	7	evice0	11/10/08	Scanned	
A616331	0312	00244	**DNA THERMAL CYCLER WITH 30/48 W**	$6,367	AL058883	PTC-200	66400000	G	C		256006	746424	05	2003	10	evice0	11/10/08	Scanned	
A617106	0312	00264A	**SPECTROPHOTOMETER GENEQUANT**	$4,051	79742	80210998	66500141	G	C	73590C	541152	723564	06	2000	8	evice0	11/19/08	Scanned	
A617176	0312	00124A	**PC DELL DIMENSION B933 PIII 128MB**	$2,488	VS/NNV-08	P991	70100001	G	C		256006	S16036	09	2000	5	evice0	11/10/08	Scanned	
A617179	0312	00213	**PC W/17 IN MON APPLE POWERMAC**	$3,257	XB03259EJ		70100001	G	C		256006	S18243	09	2000	5	evice0	11/5/08	Scanned	
A617237	0312	00239	**SPECTROPHOTOMETER DU640 UV/VI**	$15,761	4321298	DU640	66500141	G	C		256006	758215	01	2001	8	evice0	11/7/08	Scanned	
A617262			**FREEZER -86C 17.1 CU FT. 230V**	$4,328	Z13K50890	ULJ790303	41100011	G	C		256006	758241	04	2003	8	evice0	11/24/08	Scanned	
A617399	0312	00231A	**THERMAL CYCLER W/HOT BONNET P**	$4,822	23450		66400000	G	C		541153	763913	04	2001	10	evice0	11/7/08	Scanned	
A617969	0312	00236	**SHAKER BENCH TOP DIG**	$2,809	000787962	C10	66400435	G	C		256006	751777	08	2000	10	evice0	11/6/08	Scanned	
A621041	0312	00246C	**PC APPLE G4 1.25GHZ 1GB 160GB**	$2,248	SXB3361CM	G4	70100001	G	C		256006	S43220	09	2003	5	evice0	11/10/08	Scanned	
A627523	0312	00210	**PC DELL DIMENSION 4300 P4 1.6GHZ**	$1,750	1702FP606I	4300P4166I	70100001	G	C		532706	S65209	11	2001	5	evice0	11/5/08	Scanned	
A627536	0312	00219	**PRINTER HP LASERJET 5000**	$1,329	JPB308556	C4110A	70250130	G	C		256006	S64456	11	2001	5	evice0	11/5/08	Scanned	
A627539	7858	00184	**PREVACUUM STERILIZER STERIS AM**	$32,260	R81235010	3013	66400453	G	C		256006	703802	12	2001	10	dLdAvis	11/14/08	Scanned	
A627540	0312	00243A	**INCUBATOR SHAKER W/PLATFORM**	$5,523			66400289	G	C		256006	708053	12	2001	10	evice0	11/7/08	Scanned	
A627544	0312	00225	**PC APPLE POWERBOOK G4 LAPTOP**	$2,699	QT1461U3K	G4	70100001	G	F		538134	S69978	12	2001	3	evice0	11/21/08	Manual	Other
A627619	0312	00125	**SMART CYCLER STARTER SYSTEM**	$26,365	900723	SC1000-1	66400000	G	C		256006	707970	03	2002	10	evice0	11/10/08	Scanned	
A627666	0312	00231	**PC APPLE POWERMAC G4 1GHZ DP**	$3,407	W2705483	G41GLZDP	70100001	G	C		256006	S80896	04	2002	5	evice0	11/7/08	Scanned	
A628010	0312	00250	**PC APPLE POWERMAC G4 466 128ME**	$1,574	XB1132GBH	M5183	70100001	G	C		256006	S39143	04	2001	5	evice0	11/10/08	Scanned	
A628062	0312	00243	**CENTRIFUGE W/ROTOR MICROMAX**	$3,100	MFA01K096	100-120V4A	66400090	G	C		256006	708804	02	2002	7	evice0	12/2/08	Scanned	
A630657	0312	00236	**FLUOROMETER DYNAQUANT 200**	$2,051	20076433	DQ200	66400551	G	C		316915	769537	06	2001	10	evice0	11/19/08	Scanned	
A630714	0312	00256	**PC APPLE POWERMAC G4 733MHZ 1**	$1,529	G4733MNZ		70100001	G	C		256006	S50939	07	2001	5	evice0	11/10/08	Scanned	
A632123	0312	00229	**PC APPLE POWERBOOK GR 1.25GHZ**	$2,749	SV73479WH		70100001	G	F		537879	S49418	11	2003	3	evice0	12/5/08	Scanned	
A632473	0312	00240	**FREEZER -86C UPRIGHT ULTRALOW**	$7,703	20708429	MDF-U71V0	41100011	G	C		256006	748883	06	2003	10	evice0	11/10/08	Scanned	
A632654	0312	00246C	**CAMERA AXIOCAM HI-RES DIGITAL W**	$15,324	2934		66500088	G	C		256006	765787	06	2001	7	evice0	11/10/08	Scanned	

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A634013	0312	00262	**PLANT TISSUE CULTURE CHAMBER I**	$9,113	25620101F	C1136L5	66400497	G	C		256006	769116	06	2001	10	evice0	11/10/08	Scanned	
A635392	0312	00236	**PC APPLE POWERBOOK G4 LAPTOP**	$2,699	SQT2150X0	M8623LL	70100001	G	C		316915	I38875	05	2002	3	evice0	12/5/08	Scanned	
A635393	0312	00243A	**AMINO ACID SAMPLER W/ACC RTS 5(**	$6,075	1001268	RTS500	66400000	G	C		256006	717110	05	2002	10	evice0	11/7/08	Scanned	
A635491	0312	00227	**PC APPLE POWERMAC G4 933MHZ 51**	$2,644	SXB2220K0	G3	70100001	G	F		256006	S87530	06	2002	5	evice0	11/5/08	Scanned	
A636289	0312	00231	**FREEZER THERMO FORMA 27.3 CU. F**	$3,070	778592358	3801	41100011	G	C		256006	718008	06	2002	10	evice0	11/7/08	Scanned	
A638664	0312	00258	**GLASSWARE WASHER WITH ACCESS**	$46,805	001530846	G7825	66400535	G	C		256006	738915	06	2003	10	evice0	11/10/08	Scanned	
A638665	0312	00122A	**STERILIZER DOUBLE DOOR 24X24X3(**	$67,285			66400453	G	C		256006	745290	06	2003	10	evice0	11/10/08	Scanned	
A638666	0312	00258	**STERILIZER SINGLE DOOR 20X20X38**	$38,663	1031903	SSR-3AMC	66400453	G	C		256006	745290	06	2003	10	evice0	11/19/08	Scanned	
A638667	0312	00258	**STERILIZER SINGLE DOOR 20X20X38**	$22,189	022703	ASSR-3A-P	66400453	G	C		256006	745290	06	2003	10	evice0	11/10/08	Scanned	
A639247	0312	00244	**PC APPLE IMAC 1GHZ 512MB 80GB D**	$1,998			70100001	G	C		256006	S32914	06	2003	5	evice0	11/10/08	Scanned	
A639248	0312	00217	**PC APPLE POWERMAC G4 1.25GHZM**	$2,934	SXB32301X		70100001	G	C		256006	S33982	06	2003	5	evice0	11/5/08	Scanned	
A639697	7858	00171	**PC DELL DIMENSION 4100 PIII 933MH**	$1,520	7JS2001	DIM 4100	70100001	G	C		256006	I05622	02	2001	5	dLdAvis	11/14/08	Scanned	
A640609	0312	00235	**PRINTER HP LASERJET 4100DTN**	$1,878	SJPLGD324	4100	70250130	G	C		256006	S99840	09	2002	5	evice0	11/7/08	Scanned	
A641266	0312	00235	**PC DELL PRECISION WORKSTATION**	$2,672	895N221	PRECISION	70100001	G	C		256006	S15062	11	2002	5	evice0	11/7/08	Scanned	
A642020	0312	00235	**PC DELL LATITUDE C640 P4 LAPTOP**	$1,504		LAT C640 P	70100001	G	C		256006	I53559	02	2003	3	evice0	11/19/08	Scanned	
A642021	0312	00231A	**CENTRIFUGE AVANTI J-25 HIGH PERI**	$28,550	449948	J25I	66400090	G	C		256006	741224	03	2003	7	evice0	11/7/08	Scanned	
A642027	0312	00235	**GRADIENT FRACTIONATOR BASE ST.**	$15,003	14	153	66400109	G	C		256006	743173	03	2003	7	evice0	11/7/08	Scanned	
A642085	0312	00223	**PC APPLE POWERBOOK 1GHZ G4**	$4,148			70100001	G	F		256006	S18897	01	2003	3	evice0	12/3/08	**Manual**	Other
A642086	0312	00239	**PROTEOMASTER INSTRUMENT RTS**	$4,000			66400000	G	C		256006	742932	02	2003	10	evice0	12/2/08	Scanned	
A642087	0312	00235	**ULTRACENTRIFUGE W/ROTORS OPTI**	$42,000	449412	13X	66400090	G	C		256006	736694	02	2003	7	evice0	11/7/08	Scanned	
A642103	0312	00235	**THERMAL CYCLER ICYCLER**	$6,583	582BR0084	008424	66400000	G	C		256006	744520	03	2003	8	evice0	11/7/08	Scanned	
A642731	0312	00220	**PC W/ACC APPLE POWERBOOK G4 L**	$3,052	AT2330EVL	G4	70100001	G	C		256006	S11002	09	2002	3	evice0	11/19/08	Scanned	
A642732	0312	00220	**PC APPLE POWERMAC G4 867MHZ 51**	$2,870	CY1314LVT		70100001	G	C		256006	S63764	11	2001	5	evice0	11/19/08	Scanned	
A642734	0312	00246C	**MICROSCOPE ZEISS BINOCULAR**	$53,685	351100114	1078-233	66500088	G	C		537879	740732	02	2003	7	evice0	11/6/08	Scanned	
A642735	0312	00236	**BIOLOGICAL SAFETY CABINET 6 FT**	$6,916	818690122(	NU-425-600	66360027	G	C		537879	742358	02	2003	15	evice0	11/14/08	Scanned	
A642736	0312	00244	**PC DELL OPTIPLEX GX260SM P4 2.40**	$1,880		OPTI GX26(	70100001	G	C		537879	S13485	10	2002	5	evice0	11/10/08	Scanned	

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A642737	0154	00017	PC DELL INSPIRON 4100 PIII LAPTOP	$2,092	JTPJ311	INSPIRON 4	70100001	G	C		532706	S69541	01	2002	3	evice0	11/24/08	Manual	Other
A642738	7858	00183	PC DELL INSPIRON 4100 PIII LAPTOP	$2,091	4TPJ311	INSPIRON 4	70100001	G	C		532706	S69541	01	2002	3	dLdAvis	11/14/08	Scanned	
A643821	0312	00201E	PC DELL LATITUDE C840 P4 LAPTOP	$2,441	CJVXN21	LAT C840 P	70100001	G	C		537879	S29296	04	2003	3	evice0	12/1/08	Scanned	
A645239	0312	00247	HYBRIDIZATION INCUBATOR	$4,126	126810-20	HB-1D	66400289	G	C		541184	701194	08	2003	10	evice0	11/26/08	Scanned	
A645318	0312	00246C	PC DELL OPTIPLEX GX270SM P4 2.40	$1,434	2GX9B31	OPTI GX27(	70100001	G	C		256006	S42292	08	2003	5	evice0	11/10/08	Scanned	
A645484	0312	00129	PC DELL DIMENSION 8300 P4 3GHZ 5'	$2,108	4NYSH31	8300	70100001	G	C		532706	S44203	09	2003	5	evice0	11/10/08	Scanned	
A645492	0312	00125	LAMINAR FLOW BENCH STERI-GARD	$6,684	78706	SG403	66360025	G	C		537463	703365	09	2003	10	evice0	11/10/08	Scanned	
A645844	0312	00220	MONITOR APPLE 20" CINEMA	$1,169	SN53121BN		70250006	G	C		256006	S48083	10	2003	5	evice0	11/19/08	Scanned	
A645845	0312	00220	PC APPLE POWERMAC G5 1.5GHZ 51	$2,199	SXB3362E4		70100001	G	C		256006	S48083	10	2003	5	evice0	11/19/08	Scanned	
A646005	0312	00243A	PURIFIER VERTICAL CLEAN BENCH L	$3,132	030705686E	3750001	66360019	G	C		316915	700694	10	2003	10	evice0	11/7/08	Scanned	
A646144	0312	00210	PC W/18" FP MON DELL DIMENSION 8	$2,105	34R6N31	DIMENSION	70100001	G	C		537879	S49138	10	2003	5	evice0	11/5/08	Scanned	
A646145	0312	00129	PC DELL OPTIPLEX GX270MT P4 2.26	$2,027	F4LNN31	OPTI GX27(	70100001	G	C		537879	S49481	10	2003	5	evice0	11/10/08	Scanned	
A646373	0312	00244	ICYCLER SYSTEM WITH MODULES BI	$7,105	581BR1207	ICYCLER	66400000	G	C		256006	745986	12	2003	10	evice0	11/10/08	Scanned	
A646375	0312	00246C	DIGITAL CAMERA AXIO CAM W/SOFT	$9,876	122030755	AXIO	67200003	G	C		256006	702224	12	2003	5	evice0	11/10/08	Scanned	
A648308	0312	00239	PC APPLE IMAC 17 G4 1.25GHZ W/ZIP	$1,770	SW84021D'	G4	70100001	G	C		256006	S61960	02	2004	5	evice0	11/7/08	Scanned	
A648315	0312	00239	CENTRIFUGE ALLEGRA 25R SYSTEM	$13,145	463422	25R	66400090	G	C		256006	712166	03	2004	7	evice0	11/7/08	Scanned	
A648424	0312	00220	PC APPLE IMAC 1GHZ 15" W/ZIP DRIV	$1,270	SW8405008	G4	70100001	G	C		256006	S62879	03	2004	5	evice0	11/19/08	Scanned	
A648799	0312	00236	CENTRIFUGE EPENDORF 5415R	$4,140	542609362	5415R	66400090	G	C		537879	711149	04	2004	7	evice0	11/6/08	Scanned	
A648942	0312	00239	INCUBATOR SHAKER I 2500KC W/PLA	$10,474	301263077	I2500KC	66400289	G	C		256006	708758	04	2004	10	evice0	11/7/08	Scanned	
A648950	0312	00243	MICROPLATE READER W/ACC SPECT	$41,257	D02143		66400000	G	C		256006	710383	04	2004	10	evice0	11/7/08	Scanned	
A649775	0312	00215	PC APPLE POWERBOOK G4 1.5GHZ 1	$3,227	SW84200N4	G4	70100001	G	C		256006	S72306	05	2004	3	evice0	11/5/08	Scanned	
A650035	0154	00017	MICROSCOPE NIKON SMZ-1000 STER	$8,916	1006447	SMZ-1000	66500088	G	C		537463	716876	06	2004	7	evice0	11/24/08	Scanned	
A650157	0312	00231	PC W/20" MON APPLE POWERMAC G	$2,883	G84224XTN		70100001	G	C		256066	S74568	06	2004	5	evice0	11/7/08	Scanned	
A650158	0312	00250	MONITOR APPLE 20" CINEMA DISPLA	$1,169	SN54191HZ		70250006	G	C		256316	S74247	06	2004	5	evice0	11/10/08	Scanned	
A650159	0312	00250	PC DELL DIMENSION 8300 P4 3.0GHZ	$1,566	2XB9051	DIMENSION	70100001	G	C		256316	S75171	06	2004	5	evice0	11/10/08	Scanned	
A650160	0312	00212	PC APPLE POWERBOOK G4 15.2" LAI	$3,825	SW84220NI		70100001	G	F	OFFCMI	256006	S74559	06	2004	3	evice0	11/19/08	Scanned	

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A650161	0312	00216	PC W/20" MONITOR APPLE POWERM/	$4,413	G8422BVV(		70100001	G	C		256006	S74245	06	2004	5	evice0	11/19/08	Scanned	
A650162	0312	00250	PC W/20" MONITOR APPLE POWERM/	$4,413	G84231LZQ		70100001	G	C		256006	S74245	06	2004	5	evice0	11/10/08	Scanned	
A650992	0312	00225	PC APPLE POWERBOOK G4 1.5GHZ 1	$2,299	SW842036V		70100001	G	F		538134	S76845	06	2004	3	evice0	11/5/08	Scanned	
A650993	0312	00209	PC APPLE POWERBOOK G5 1.33GHZ	$1,979	SW84250EE		70100001	G	C		316915	S76780	06	2004	3	evice0	12/8/08	Scanned	
A651900	0312	00113	DNA ANALYZER APPLIED BIOSYSTEI	$60,625		3730S	66400000	G	C		468270	732000	12	2006	1	evice0	11/10/08	Scanned	
A652130	0312	00225	POWERMAC G5 DUAL 2GHZ RADEON	$4,811	G84324W4(	9600XT	70100001	G	C		538134	S85121	09	2004	5	evice0	11/5/08	Scanned	
A652336	0154	00017	PC DELL OPTIPLEX GX280MT P4 3.20	$1,314	BT7QP51	GX280MT	70100001	G	C		256006	S87032	09	2004	5	evice0	11/24/08	Scanned	
A652337	0154	00017	PC DELL OPTIPLEX SX280USFF P4 3.:	$1,835	95CRP51	SX280USFF	70100001	G	C		256006	S87032	09	2004	5	evice0	11/24/08	Manual	Other
A652557	7858	00183	PC DELL OPTIPLEX GX280MT P4 3.20	$1,314	5T7QP51	OPTI GX28(	70100001	G	C		256006	S87038	10	2004	5	dLdAvis	11/14/08	Scanned	
A653293	0312	00320	PC DELL LATITUDE D505 CELERON L	$1,464	GMDL561	D505	70100001	G	F		256006	S93637	12	2004	3	evice0	11/6/08	Scanned	
A653372	7858	00149	PC DELL INSPIRON 8600 P4 LAPTOP	$1,928	5Y77961	INSPIRON {	70100001	G	F		532706	S94957	12	2004	3	dLdAvis	11/14/08	Scanned	
A654193	0312	00213	PC APPLE POWERBOOK G4 17" 1.5GI	$2,499	W8445OLP(		70100001	G	F		256006	S95122	01	2005	3	evice0	12/4/08	Scanned	
A654194	0312	00212	PC APPLE POWERBOOK G4 1.5GHZ	$2,299	SW843764H		70100001	G	F		256006	S97789	01	2005	3	evice0	11/19/08	Scanned	
A654195	0312	00212	PC APPLE POWERBOOK G4 1.5GHZ 5	$2,299	SW85020AE		70100001	G	F		256006	S97789	01	2005	3	evice0	11/19/08	Scanned	
A654212	0312	00244	ICYCLER SYSTEM 2 X 48 X 0.2 ML	$9,063			66400000	G	C		538134	736738	02	2005	10	evice0	11/10/08	Scanned	
A654213	0312	00244	INCUBATOR REF SHAKER NEW BRUI	$5,172			66400289	G	C		537879	740221	02	2005	10	evice0	11/10/08	Scanned	
A654242	0312	00207	PC DELL INSPIRON 8600 PM LAPTOP	$1,786	G6FSR61	INSPIRON {	70100001	G	C		532706	S99222	02	2005	3	evice0	11/5/08	Scanned	
A654425	0312	00244	ICYCLER SYSTEM 2 X 48 X 0.2 ML	$8,750	528BR-0102		66400000	G	C		256016	742062	03	2005	10	evice0	11/10/08	Scanned	
A654445	0312	00216	PRINTER HP LASERJET 4250DTN	$1,607	SCNBXG06	4250DNT	70250130	G	C		256006	S11661	03	2005	5	evice0	11/5/08	Scanned	
A654464	0312	00256	ICYCLER SYSTEM 2 X 48 X 0.2 ML	$8,750	582BR0122		66400000	G	C		256016	742062	03	2005	10	evice0	11/10/08	Scanned	
A654863	0312	00212	PC DELL LATITUDE D810 PM LAPTOP	$3,065	8GLK571	LAT D810	70100001	G	F		256006	S14103	04	2005	3	evice0	11/19/08	Scanned	
A654924	0312	00205	MONITOR DELL ULTRA SHARP 2405 2	$1,079	34663353R(	DELL 24"	70250006	G	C		256006	S14103	04	2005	5	evice0	11/17/08	Scanned	
A655581	0312	00205	PROJECTOR EPSON POWERLITE 745	$2,157	F4WG5405	746C	58200562	G	C		256006	S15952	04	2005	5	evice0	11/5/08	Scanned	
A655671	7858	00179	MEIJI EMZ-13 STEREO MICROSCOPE	$2,100			66500088	G	C		532706	744383	05	2005	7	dLdAvis	11/21/08	Scanned	
A656029	7858	00183	BIOLOGICAL SAFETY CABINET STER	$8,757			66360027	G	C		532706	744706	06	2005	15	dLdAvis	11/14/08	Scanned	
A656933	0312	00260	SPEX CERTIPREP FREEZER MILL W/A	$9,022	05024	6850	66400000	G	C		537879	746558	06	2005	10	evice0	11/10/08	Scanned	

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A657081	7858	00149	EPSON POWERLITE 745C XGA PROJE	$2,157	F4WG5405	EMP-745	58200562	G	C		256006	S15949	06	2005	5	dLdAvis	11/14/08	Scanned	
A657475	0312	00236	NEW BRUNSWICK INCUBATOR SHAK	$5,300	500685720	25R	66400435	G	C		537879	700009	07	2005	8	evice0	11/6/08	Scanned	
A657476	0312	00236	9800 FAST THERMAL CYCLER	$5,847	298000825	9800	66400000	G	C		537879	700626	07	2005	10	evice0	11/6/08	Scanned	
A657527	0312	00236	ALLEGRA 25R REFRIGERATED CENT	$11,841	VBQ-19370	25R	66400089	G	C		537879	701399	08	2005	5	evice0	11/6/08	Scanned	
A660950	0312	00262	TISSUE CULTURE INCUBATOR	$9,735			66400496	G	C			7013201	09	2005	10	evice0	11/10/08	Scanned	
A661263	0312	00236	APPLIED BIOSYSTEMS 2720 THERMA	$4,395	272S50727		66400000	G	C		537879	7021541	09	2005	10	evice0	11/6/08	Scanned	
A661406	0312	00222	PC APPLE POWERMAC G5 2.7 DP 512	$2,599			70100001	G	C			770011367	12	2005	5	evice0	11/19/08	Scanned	
A661407	0312	00222	APPLE CIN HD DISPLAY 23" FLAT PA	$1,099			70250006	G	C			770011367	12	2005	5	evice0	12/3/08	Scanned	
A661943	0312	00234	IMAGEQUANT TYPHOON 9400 IMAGE	$107,237	1185398	9400	66400000	G	C			190001470	10	2005	10	evice0	11/10/08	Scanned	
A662126	0312	00236	TS-5.1-500 ROTOR BUCKET BECKMA	$2,810			66400091	G	C			190001901	11	2005	7	evice0	11/6/08	Scanned	
A662137	0312	00211	PC APPLE POWERBOOK G4 15 1.67 C	$1,979	W854320X	G4	70100001	G	C			770006722	11	2005	3	evice0	11/6/08	Scanned	
A662318	0312	00243A	APPLIED BIOSYSTEMS THERMAL CY	$4,395		2720	66400000	G	C			7025591	09	2005	10	evice0	11/19/08	Scanned	
A662670	0312	00232	OLYMPUS 21" FLAT PANEL MONITOR	$1,885	A220443006		70250006	G	C			190006061	02	2006	7	evice0	11/10/08	Scanned	
A662671	0312	00232	OLYMPUS SYSTEM DESK	$4,212	138P0126		66500088	G	C			190006061	02	2006	7	evice0	11/19/08	Scanned	
A662672	0312	00232	OLYMPUS FV1000 COMPUTER W/SOF	$33,722	P212813		70100001	G	C			190006061	02	2006	7	evice0	11/10/08	Scanned	
A662673	0312	00232	OLYMPUS FV1000 SPECTRAL CORE S	$164,906	5616393		66500088	G	C			190006061	02	2006	7	evice0	11/10/08	Scanned	
A662674	0312	00232	OLYMPUS FV1000 LASER DIODE SET	$90,028			66500088	G	C			190006061	02	2006	7	evice0	11/10/08	Scanned	
A662675	0312	00232	OLYMPUS FV100 SPECTRAL SIM SCA	$72,117	5H16664		66500088	G	C			190006061	02	2006	7	evice0	11/10/08	Scanned	
A662676	0312	00232	OLYMPUS 21" FLAT PANEL MONITOR	$1,885	A220443006		70250006	G	C			190006061	02	2006	7	evice0	11/10/08	Scanned	
A662677	0312	00232	OLYMPUS UNIV. CONDENSER 8-POS	$4,535	4L18626		66500088	G	C			190006061	02	2006	7	evice0	11/6/08	Scanned	
A662678	0312	00232	OLYMPUS FV1000 BX61 MICROSCOPI	$61,939	4M06349		66500088	G	C			190010871	02	2006	7	evice0	11/19/08	Scanned	
A662849	0312	00239	PC APPLE IMAC 17" 1.83 MHZ 512MB	$2,636			70100001	G	C			770022847	03	2006	5	evice0	11/7/08	Scanned	
A663332	0312	00133	VIRTIS FREEZER MOBILE W/ACC	$14,848			66400000	G	C			500001106	05	2006	10	evice0	11/14/08	Scanned	
A663494	0312	00203	PC DELL LATITUDE D810 PM 770 LAP	$2,512	3W8KM91	LAT D810 P	70100001	G	C			770031586	05	2006	3	evice0	11/5/08	Scanned	
A663495	0156	00001	PC APPLE IMAC 17" 1.83 SD CTO	$1,343			70100001	G	C			770035137	05	2006	5	evice0	11/24/08	Scanned	
A663630	0312	00260	PC DELL 5150C P4 930 3.00GHZ	$1,423	DZRL5B1	5150C P4	70100001	G	C			100271074	06	2006	5	evice0	11/10/08	Scanned	

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Property#	bldg	Room#	Description	Cost	Serial#	Model#	Class	Cnd	Ins	Avail	Account	Voucher	Acquired MM	Acquired YY	Life	FoundB By	Date of Scan	TypeE entry	Comment
A663631	0312	00235	PC APPLE IMAC 17" 1.83 SD CTO	$1,437			70100001	G	C			100271074	06	2006	5	evice0	11/7/08	Scanned	
A663632	0312	00217	PC APPLE POWERMAC G5 DUAL 2.0 (	$2,074			70100001	G	C			100271074	06	2006	5	evice0	11/5/08	Scanned	
A664093	0312	00260	BIOCHEMI CAMERA	$14,450		590301	66400000	G	C			500001996	06	2006	10	evice0	11/19/08	Scanned	
A664120	0312	00113	ALLEGRA 25R CENTRIFUGE 60HZ	$13,103		497076	66400089	G	C			500001996	06	2006	5	evice0	11/10/08	Scanned	
A664347	0312	00205	DELL LE1600 1.5GHZ MOTION TABLE	$2,812	00163226	LE1600	70100001	G	C			770047863	06	2006	3	evice0	11/5/08	Scanned	
A664606	0312	00256	MAX Q 5000 SHAKER	$7,499			66400435	G	C			510002677	07	2006	10	evice0	11/10/08	Scanned	
A664620	0312	00113	GENEAMP PCR SYSTEM	$21,111	805S60529	9700	66400000	G	C			510002664	07	2006	10	evice0	11/10/08	Scanned	
A664970	0312	00250	ICYCLER THERMAL CYCLER	$6,472	582BR0168		66400000	G	C			500003207	09	2006	10	evice0	11/10/08	Scanned	
A665087	0312	00244	APPLE IMAC 20" 2.16 SD CTO	$2,016			70100001	G	C			770063770	10	2006	5	evice0	11/10/08	Scanned	
A665092	0312	00223	APPLE MACBOOK PRO 15" 2.16 CTO	$2,699		MAC BOOK	70100001	G	C			770064430	10	2006	3	evice0	11/5/08	Scanned	
A665187	0312	00221	APPLE MAC PRO 2.66QX W/MONITOR	$3,019	G863725QL	MAC PRO 2	70100001	G	C			770070486	12	2006	5	evice0	11/5/08	Scanned	
A665227	0312	00113	AB 3730 48 CAP DNA ANALYZER	$265,350	18126-010	625-0010	66400000	G	C			510004471	10	2006	10	evice0	11/10/08	Scanned	
A665378	0312	00244	ICYCLER WITH 96 X .02ML RX MO	$5,833	582BR0168	ICYCLER	66400000	G	C			500004334	12	2006	10	evice0	11/10/08	Scanned	
A665379	0312	00244	ICYCLER WITH 96 X .02ML RX MO	$5,833	582BR0167	ICYCLER	66400000	G	C			500004334	12	2006	10	evice0	11/10/08	Scanned	
A665406	0312	00244	GP SCREEN & CASSETTE	$4,581			66400000	G	C			500004334	12	2006	10	evice0	11/19/08	Scanned	
A665605	0312	00222	APPLE MAC BOOK PRO 15" 2.33 CTO	$2,479	W86520XF\	MAC BOOK	70100001	G	C			770078028	01	2007	3	evice0	12/8/08	Scanned	
A665606	0312	00222	APPLE MAC BOOK PRO 15" 2.33 CTO	$2,996	W865207JV	MAC BOOK	70100001	G	C			770078029	01	2007	3	evice0	12/5/08	Manual	Bad barcode
A665799	0312	00125	SMARTCYCLER	$13,017			66400000	G	C			500004994	02	2007	10	evice0	11/10/08	Scanned	
A666322	0312	00262	SHAKER INCUBATOR W/ACC	$7,877			66400289	G	C			510008471	05	2007	10	evice0	11/10/08	Scanned	
A666327	0154	00017	BIOLOGICAL SAFETY CABINET	$7,867			66360027	G	C			500006485	05	2007	15	evice0	11/24/08	Scanned	
A666523	7858	00183	NIKON ECLIPSE MICROSCOPE	$25,351	250204	eclipse 80i	66500088	G	C			500006955	06	2007	7	dLdAvis	11/14/08	Scanned	
A666536	0312	00250	MICROROTORFOR CELLS 100/120V V	$4,224	308B1145		66400091	G	C			510009005	06	2007	7	evice0	11/20/08	Scanned	
A666537	0312	00205	RESEARCH MULTI SPRAY BOOM	$8,988			37400030	G	C			510008964	06	2007	10	evice0	11/17/08	Scanned	
A666549	0312	00205	SPIDER 4WD DL BOOM SPRAYER	$48,214			37400030	G	C			500006893	06	2007	10	evice0	11/17/08	Scanned	
A666639	0312	00129	FISHER ISOTEMP UNDERCOUNTER IN	$2,524			66400289	G	C			500006895	06	2007	10	evice0	11/14/08	Scanned	
A666663	0312	00262	DIONEX ION CHROMATOGRAPHY SY	$94,979		ICS-3000	66300000	G	C			500006894	06	2007	10	evice0	11/19/08	Scanned	

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A666664	0312	00236	REAL TIME 96 WELL PCR SYSTEM	$72,500	279000959	7900HT	66400000	G	C			500006955	06	2007	10	evice0	11/6/08	Scanned	
A666667	0312	00243	SHAKER	$9,954		E25R	66400435	G	C			510009360	06	2007	10	evice0	11/7/08	Scanned	
A666668	0312	00243A	PURIFIER STEROLE HOOD	$3,667			66400000	G	C			500007334	06	2007	10	evice0	11/7/08	Scanned	
A666674	0312	00243A	AVANTI J-301 CENTRIFUGE W/ROTOF	$33,000			66400090	G	C			500006896	06	2007	7	evice0	11/7/08	Scanned	
A666694	0312	00243A	THERMAL CYCLER	$7,196	299020120	9902	66400000	G	C			500006895	06	2007	10	evice0	11/19/08	Scanned	
A666704	0312	00231A	THERMAL CYCLER	$7,196	299020158	9902	66400000	G	C			510008962	06	2007	10	evice0	11/7/08	Scanned	
A666838	0312	00243A	HT HOMOGENIZER-TROEMMER	$5,900			66400553	G	C			500007152	06	2007	10	evice0	11/7/08	Scanned	
A666992	0312	00205	DELL CORE 2 DUO PROCESSOR E66(	$1,636	4HMYYC1	OPTI E660(	70100001	G	C			770101454	06	2007	5	evice0	11/5/08	Scanned	
A667033	0312	00129	DELL DUO PROCESSOR E6600 2.4GH	$1,244	BC733D1	DIMENSION	70100001	G	C			770106319	06	2007	5	evice0	11/10/08	Scanned	
A667146	0312	00219	APPLE MAC BOOK PRO 15" 2.4GHZ	$2,974		MAC BOOK	70100001	G	C			770111330	08	2007	3	evice0	11/5/08	Scanned	
A667202	0312	00243	REICHERT SR7000DC SPECTROPHOT	$61,050			66500141	G	C			500007669	07	2007	8	evice0	11/14/08	Scanned	
A667308	0312	00236	DELL PRECISION M65 LAPTOP PC	$2,131	1R1B6D1	PRECISION	70100001	G	C			770109931	07	2007	3	evice0	11/6/08	Scanned	
A667537	0312	00240	UPRIGHT FREEZER - 80	$7,650	U25-241826	ULT2186	41100011	G	C			500008674	09	2007	10	evice0	11/10/08	Scanned	
A667740	0312	00122	MULTI-TIER PLANT PRODUCTION RO(	$99,999	070115	MTPS-144	66360000	G	C			510011291	10	2007	10	evice0	11/10/08	Scanned	
A667764	0312	00236	20.2 CU. FT. FREEZER	$7,650	X035-24386	ULT 2186	41100011	G	C			500009552	10	2007	10	evice0	11/6/08	Scanned	
A668157	0312	00256	THERMO SCIENTIFIC RT TC 28/48 CEI	$8,377			66400090	G	C			500010673	12	2007	7	evice0	11/10/08	Scanned	
A668228	0312	00243A	EPPENDORF 5417R REFRIGERATED I	$5,202	0024085	5417R	66400089	G	C			500010814	12	2007	5	evice0	11/7/08	Scanned	
A668229	0312	00243	GENEAMP 2720 THERMAL CYCLER	$2,988	272S71002	2720	66400000	G	C			500010868	12	2007	10	evice0	11/17/08	Scanned	
A668230	0312	00239	GENEAMP 2720 THERMAL CYCLER	$2,988	272S71203	2720	66400000	G	C			500010970	12	2007	10	evice0	11/7/08	Scanned	
A668241	0312	00211	APPLE MAC BOOK PRO 15" CTO	$2,929	W880119Y	MAC BOOK	70100001	G	C			770136906	01	2008	3	evice0	11/6/08	Scanned	
A668277	0312	00239	FASTPREP 24 INSTRUMENT W/ACC	$8,862	7100736		66400000	G	C			500011118	01	2008	10	evice0	11/17/08	Scanned	
A668334	0312	00238	EXCELLA E-10 DIGITAL SHAKER	$3,937	800129574		66400435	G	C			500011492	01	2008	8	evice0	11/19/08	Scanned	
A668400	0312	00221	APPLE MACBOOK AIR 13 CTO	$2,868	W881004U1	MAC BOOK	70100001	G	C			770146611	03	2008	3	evice0	11/5/08	Scanned	
A668510	0154	00017	NIKON BINOCULAR MICROSCOPE	$25,319			66500088	G	C			500012254	02	2008	7	evice0	11/24/08	Scanned	
A668756	0312	00239	EPPENDORF 5415R REFRIGERATED I	$3,856	0022378	5415R	66400089	G	C			510015232	03	2008	5	evice0	11/7/08	Scanned	
A668813	0312	00239	HP 4250N LASER JET PRINTER	$1,191	JPRFH0393	HP4259	70250130	G	C			770147795	03	2008	5	evice0	11/7/08	Scanned	

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Property#	bldg	Room#	Description	Cost	Serial#	Model#	Class	Cnd	Ins	Avail	Account	Voucher	Acquired MM	Acquired YY	Life	FoundB By	Date of Scan	TypeE entry	Comment
A668828	0312	00223	**APPLE MAC PRO CTO**	$3,274	G88073PCX	MAC BOOK	70100001	G	C			770143861	03	2008	5	evice0	11/5/08	Scanned	
A669414	0312	00431	**DIGITAL SONIC DISMEMBER**	$2,500		500	6640000	G	C			500014243	05	2008	10	evice0	11/6/08	Scanned	
A669505	0312	00205	**ACCESSORIES FOR A SPRAYER**	$17,551			37400030	G	C			500014394	06	2008	10	evice0	11/17/08	Scanned	
A669676	0312	00133	**21 CU. FT. -86C UPRIGHT FREEZER**	$7,900	0125652201	ULT2186-4-	41100011	G	C			500014734	06	2008	10	evice0	11/10/08	Scanned	
A669677	0312	00238	**EXCELLA E10 DIGITAL SHAKER**	$3,392			66400435	G	C			500014865	06	2008	8	evice0	11/19/08	Scanned	
A669678	0312	00431	**EXCELLA E5 DIGITAL SHAKER**	$2,595			66400435	G	C			500014865	06	2008	8	evice0	11/6/08	Scanned	
A669747	0312	00244	**SORVALL RC-6 PLUS CENTRIFUGE W**	$16,546			66400090	G	C			510017599	06	2008	7	evice0	11/10/08	Scanned	
A670431	0312	00236	**CHEF MAPPER XA CHILLER SYSTEM**	$27,071			66400000	G	C			500016347	08	2008	10	evice0	11/14/08	Scanned	
B032357	0312	00236	**MICROMANIPULATOR W-ACC LEITZ D**	$5,747	520137		66500085	G	C	73369B	252006	K82505	02	1983	10	evice0	12/2/08	Scanned	
B046602	0312	00231	**CIRCULATOR, REFRIGERATED**	$2,966	P42009	TI5A	66400000	G	C	73590C	256006	764476	06	1993	10	evice0	11/10/08	Scanned	
B046808	0312	00235	**RNA/DNA CALCULATOR GENE QUAN**	$2,535	54719	802-103-98	66400000	G	C	73590C	256006	741037	09	1992	10	evice0	11/19/08	Scanned	
B048204	0312	00243	**PHOSPHOR SCREEN KIT, 35X43 W/CA**	$2,414			66400000	G	C	73590C	206026	753160	02	1995	10	evice0	12/2/08	Scanned	
B054115	0312	00235	**DIURNAL GROWTH CHAMBER FORM/**	$4,444	28875-795	3740	66400000	G	C	73590C	462984	714013	10	1999	10	evice0	11/7/08	Scanned	
B056242	0312	00264A	**BIO SAFETY CABINET LABGARD**	$4,660	135231221(		66360027	G	C		465244	709418	06	2006	11	evice0	11/19/08	Scanned	
B056348	0312	00264B	**PLANT TISSUE CULTURE CHAMBER I**	$5,618		CU-36L5	66400000	G	C		465244	714794	06	2006	6	evice0	11/10/08	Scanned	
B056801	0312	00240	**FREEZER UPRIGHT DOUBLE DOOR**	$3,401	803228	983	41100011	G	C		465244	733050	06	2006	6	evice0	11/10/08	Scanned	
B057281	0312	00236	**BATH SHAKER 50 120V 1550W W/PIPE**	$2,730	602031134	51221081	66400538	G	C		256006	721260	11	2003	9	evice0	11/6/08	Scanned	
B057285	0312	0264A1	**GENO GRINDER W/ ACCESSORIES**	$9,493	02931		73200002	G	C		256006	736795	11	2003	9	evice0	11/10/08	Scanned	
B057290	0312	00113	**GENETIC ANALYSIS SYSTEM CEQ800**	$43,572	3066987	CEQ8000	66400000	G	C		256006	735308	12	2004	5	evice0	11/10/08	Scanned	
B057373	0312	00264B	**STEREO MICROSCOPE WILD MZ12.5**	$3,061	10445367		66500088	G	C		465244	709019	06	2006	3	evice0	11/10/08	Scanned	
B057437	0312	00250	**GENEQUANT SPECTROMETER**	$3,179	87640		66400000	G	C		466225	743787	08	2006	7	evice0	11/10/08	Scanned	
B057455	0312	00250	**INCUBATOR SHAKER I 2400 W/PLATF**	$3,485	300142276	12400	66400435	G	C		466225	746474	08	2006	7	evice0	11/10/08	Scanned	
B057903	0312	00113	**GENETIC ANALYSIS SYSTEM CEQ800**	$43,572	3066986	CEQ8000	66400000	G	C		256006	735308	12	2004	5	evice0	11/10/08	Scanned	
B058025	0312	00201E	**ELECTROMAGNETIC ORBITAL SHAKI**	$7,337			66400435	G	C		256006	714701	12	2004	7	evice0	12/4/08	Scanned	
B058138	0312	00113	**WATER PURIFICATION SYSTEM**	$3,968	119304026	D11931	66400000	G	C		256006	735308	12	2004	9	evice0	11/10/08	Scanned	
B058644	0154	00017	**STERIS STEAM BOILER 208VAC 30KV**	$7,837	011079009		66400453	G	C		467106	747729	06	2005	10	evice0	11/24/08	Scanned	

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B058687	0312	00113	**UPGRADE 3730-3730XL 50CM ARRAY**	$100,068			66400000	G	C		468270	746649	12	2006	9	evice0	11/10/08	Scanned	
C040471	0312	00231A	**MICROSCOPE UNIT MORGAN INSTRU**	$5,212			66500085	G	C	73590C	300000	B01191	11	1976	10	evice0	11/19/08	Scanned	
C040472	0312	00231A	**PHOTOMICROSCOPE W-ACC MORGA**	$11,997			66500090	G	C	73590C	300000	B00404	08	1976	10	evice0	11/19/08	Scanned	
C045367	0312	00231A	**SPECTROPHOTOMETER**	$6,021			66500139	G	C	73590C	356402	740853	08	1992	10	evice0	11/7/08	Scanned	
C045568	0312	00231	**GENE PULSER II W/EXTENDER/CONT**	$7,522	339BR0288	165 2110	66400000	G	C	73590C	356405	706311	09	1995	10	evice0	11/7/08	Scanned	
C045766	0312	00210	**PC W/17 IN COLOR MON/SPEAKERS (**	$2,466	7254892	CPD 1723	70100001	G	C		356006	705733	09	1996	5	evice0	11/5/08	Scanned	
C045768	0312	00231	**MICRO CENTRIFUGE W/ROTOR**	$2,137	4339	5417C	66400090	G	C	73590C	356406	705900	09	1996	7	evice0	11/7/08	Scanned	
C045786	0312	00231A	**LUMINOMETER W/INJECTORS MONO**	$8,925	1375	2010	66400000	G	C	73590C	356406	709850	11	1996	10	evice0	11/19/08	Scanned	
C045834	0312	00201E	**PC APPLE MAC POWERBOOK G3 266**	$3,338		MAC POWE	70100001	G	F	73590C	356408	S43480	09	1998	5	evice0	12/1/08	Scanned	
C045909	0312	00210	**PC APPLE POWERMAC G4 128MB 40(**	$1,714	GA128MB4(	SXA9392X	70100001	G	C		356309	S69950	09	1999	5	evice0	11/5/08	Scanned	
C045912	0312	00222	**PC APPLE IMAC 333MHZ STRAWBERI**	$1,132	333MHZ/32	74324025	70100001	G	C		356319	S69256	09	1999	5	evice0	11/19/08	Scanned	
C045915	0312	00216	**PC W/MON DELL OPTIPLEX G1/T+ 40(**	$1,270	222A3H	OPTI GX1/T	70100001	G	C		356349	S69683	09	1999	5	evice0	11/5/08	Scanned	
C046089	0312	00210	**PC DELL OPTIPLEX GX240 P4 2.0 GHz**	$1,538	7435 1538	GX240 P4	70100001	G	C		356002	S93241	07	2002	5	evice0	11/5/08	Scanned	
C046130	0312	00201B	**PC W/18" MON DELL DIMENSION 830(**	$1,812	F6GTH31	8300	70100001	G	C		356003	S46283	09	2003	5	evice0	11/5/08	Scanned	
C046131	0312	00201E	**PC W/18" MON DELL DIMENSION 830(**	$1,813	C6GTH31	8300	70100001	G	C		356003	S46283	09	2003	5	evice0	11/5/08	Scanned	
C046132	0312	00201D	**PC W/18" MON DELL DIMENSION 830(**	$1,813	D6GTH31	8300	70100001	G	C		356003	S46283	09	2003	5	evice0	11/5/08	Scanned	
C046240	0312	00250	**MICROTOME W/ACC VIBRATOME**	$6,331	V73915010I	100PLUS	66400347	G	C		356355	741312	02	2005	7	evice0	11/10/08	Scanned	
J001006	0312	00234	**PC DELL OPTIPLEX GX620 P4 650 3.4(**	$1,109	31JV591	OPTI GX62(	70100001	G	C			770022019	03	2006	5	evice0	11/10/08	Scanned	
J001797	7858	00149	**PC DELL OPTIPLEX GX620 P4 650 3.4(**	$1,086	BX8FM91	OPTI GX62(	70100001	G	C			770031943	04	2006	5	dLdAvis	11/14/08	Scanned	
J004681	0312	00209	**DELL LATITUDE D820 T2500 LAPTOP**	$1,592	5JJCXB1	LAT D820	70100001	G	C			770065661	11	2006	3	evice0	12/15/08	Scanned	
J009947	0312	00231	**DELL OPTIPLEX 745 MINITOWER PC**	$1,580	14SC7D1	OPTI 745 M	70100001	G	C			770111122	08	2007	5	evice0	11/7/08	Scanned	
J013132	0312	00229	**DELL LATITUDE XT DUO U7600 LAPT(**	$2,950	6RM3TF1		70100001	G	C			770147590	03	2008	3	evice0	11/5/08	Scanned	
J014388	0312	00201A	**DELL OPTIPLEX 755 MINITOWER PC**	$1,864	H4FYCG1		70100001	G	C			770160787	06	2008	5	evice0	11/5/08	Scanned	

Sub-Total: 335 Cost: $3.686.463

Capital Inventory Found

College of Agriculture

Plant Pathology ***81120***

Property#	bldg	Room#	Description	Cost	Serial#	Model#	Class	Cnd	Ins	Avail	Account	Voucher	Acquired MM	Acquired YY	Life	FoundB By	Date of Scan	TypeE entry	Comment

Grand Total:	**335**	**Cost:**	**$3,686,463**

Capital Inventory Found

Agriculture/Human Env. Sc

Plant Pathology - RCTF ***81121***

Property#	bldg	Room#	Description	Cost	Serial#	Model#	Class	Cnd	Ins	Avail	Account	Voucher	Acquired MM	Acquired YY	Life	FoundB By	Date of Scan	TypeE entry	Comment
A598965	0312	00222	PC W/MONITOR APPLE POWERMAC	$2,806	S69044YPJ		70100001	G	C	73590C	207267	S52794	02	1999	5	evice0	11/5/08	Scanned	
A604237	0312	00240	FREEZER CABINET SO-LOW	$4,699	9899508	U85-18	41100011	G	C	73590C	207267	524605	05	1999	10	evice0	11/10/08	Scanned	
A604266	0312	00243A	CENTRIFUGE W/ROTORS AVANTI S-2	$21,805	JY99D18	J-25	66400092	G	C	73590C	207267	702690	06	1999	7	evice0	11/7/08	Scanned	
A604289	0312	00243A	LAB SHAKER NEW BRUNSWICK W/PL	$3,712			66400435	G	C	73590C	207267	526723	06	1999	8	evice0	11/7/08	Scanned	
A604290	0312	00133	DIURNAL GROWTH CHAMBER	$3,173	G600199	2016	66400000	G	C	73590C	207267	700076	06	1999	10	evice0	11/10/08	Scanned	
A604291	0312	00239	CENTRIFUGE W/ROTORS ROTINA BE	$4,728			66400090	G	C	73590C	207267	703329	06	1999	7	evice0	11/7/08	Scanned	
A604313	0312	00239	GENE PULSER II APPARATUS	$2,846			66400000	G	C	73590C	207267	703014	06	1999	10	evice0	11/7/08	Scanned	
A604319	0312	00243A	AUTOMATED BIOLOGIC SYSTEM	$20,291	VCDTS214(	VCDTS214(	66400000	G	C	73590C	207267	526174	06	1999	10	evice0	11/7/08	Scanned	
A604408	0312	00243A	GEL DRYING SYSTEM HYDRO TECH	$2,591			66400000	G	C	73590C	207267	500310	07	1999	10	evice0	11/7/08	Scanned	
A604409	0312	00243A	SPECTROPHOTOMETER SMARTSPEC	$3,563			66400000	G	C	73590C	207267	500310	07	1999	8	evice0	11/7/08	Scanned	
A610481	0312	00243A	DCODE SYSTEM DGGE 16 CM 120V	$3,956			66400000	G	C	73590C	207267	719040	02	2000	10	evice0	11/26/08	Scanned	
A610491	0312	00246C	PC APPLE MAC POWERBOOK G3 LAF	$2,316	QT9511ANE	POWERBO(	70100001	G	C	73590C	207268	S83778	02	2000	3	evice0	11/6/08	Scanned	
A610534	0312	00246C	PROJECTOR EIKI SUPER BOARD RO(	$4,088	G9Y01956	LC-SVGA87	58200000	G	C	73590C	207268	719391	03	2000	5	evice0	11/6/08	Scanned	
A610575	0312	00243A	FLUOROMETER W/STANDARD PM TU	$4,816	71009-CE		66400551	G	C	73590C	207267	722113	05	2000	10	evice0	11/7/08	Scanned	
A610661	0312	00243A	MICROSCOPE BINOCULAR AXIOSKOI	$11,485	123131		66500088	G	C	73590C	207267	724765	06	2000	7	evice0	11/7/08	Scanned	
A610697	0312	00243	PC W/20 IN MON APPLE POWERMAC	$2,167	CY0207536		70100001	G	C	73590C	207267	S95234	06	2000	5	evice0	11/7/08	Scanned	
A617419	0312	00239	PC APPLE IMAC G3 400 64MB 10GB C	$1,012	YM1091BVF		70100001	G	C		207268	S40991	04	2001	5	evice0	11/7/08	Scanned	
A630563	0312	00210	PC APPLE IMAC DV+ IN INDIGO 450 6	$1,304	XA0350MG		70100001	G	C		207268	S40935	04	2001	5	evice0	11/5/08	Scanned	
A630564	0312	00201E	PC DELL INSPIRON 4000 PIII LAPTOP	$2,212	436DMA00	PP01L	70100001	G	C		207268	S41975	04	2001	3	evice0	11/17/08	Scanned	
A630565	0312	00225	PC DELL INSPIRON 4000 PIII LAPTOP	$1,910	99123	PP01L	70100001	G	C		207268	S41978	04	2001	3	evice0	12/4/08	Scanned	
A641681	0312	00216	PRINTER HP DESIGNJET 800PS	$6,474	S53AE3104	C7780C	70250130	G	C		207268	S24953	03	2003	5	evice0	11/5/08	Scanned	
A642739	0312	00212	PC APPLE POWERBOOK G4 867MHZ	$2,224			70100001	G	F		207268	S24694	03	2003	3	evice0	12/2/08	Scanned	
A642740	0312	00201E	PC DELL LATITUDE C840 P4 LAPTOP	$1,995		LAT C840 P	70100001	G	C		207268	S24694	03	2003	3	evice0	11/17/08	Scanned	
A642741	0312	00201E	PC APPLE POWERBOOK G4 867MHZ	$2,224			70100001	G	F		207268	S24694	03	2003	3	evice0	11/17/08	Scanned	
A642742	0312	00214	PC APPLE POWERBOOK G4 867MHZ	$2,224			70100001	G	F		207268	S24694	03	2003	3	evice0	12/3/08	Scanned	
A642744	0312	00201E	PC DELL LATITUDE C840 P4 LAPTOP	$1,996	6KBDG21	LAT C840 P	70100001	G	F		207268	S24694	03	2003	3	evice0	12/2/08	Scanned	

Capital Inventory Found

Agriculture/Human Env. Sc

Plant Pathology - RCTF ***81121***

Property#	bldg	Room#	Description	Cost	Serial#	Model#	Class	Cnd	Ins	Avail	Account	Voucher	Acquired MM	Acquired YY	Life	FoundB By	Date of Scan	TypeE entry	Comment
A642745	0312	00218	**PC DELL LATITUDE C840 P4 LAPTOP**	$1,995		LAT C840 P	70100001	G	F		207268	S24694	03	2003		3 evice0	12/3/08	Scanned	
A642746	0312	00201E	**PC DELL LATITUDE C840 P4 LAPTOP**	$1,995		LAT C840 P	70100001	G	F		207268	S24694	03	2003		3 evice0	11/17/08	Scanned	
A642748	0312	00250	**PC APPLE POWERBOOK G4 867MHZ**	$2,224			70100001	G	C		207268	S24694	03	2003		3 evice0	12/2/08	Scanned	
A642750	0312	00222	**PC APPLE POWERBOOK G4 867MHZ**	$2,224			70100001	G	F		207268	S24694	03	2003		3 evice0	12/1/08	Scanned	
A642751	0312	00201E	**PC APPLE POWERBOOK G4 867MHZ**	$2,224			70100001	G	F		207268	S24694	03	2003		3 evice0	12/3/08	**Manual**	Other
A642752	0312	00214	**PC APPLE POWERBOOK G4 867MHZ**	$2,224			70100001	G	F		207268	S24694	03	2003		3 evice0	11/25/08	Scanned	
A642753	0312	00201E	**PC APPLE POWERBOOK G4 867MHZ**	$2,224			70100001	G	F		207268	S24694	03	2003		3 evice0	11/20/08	Scanned	
A642754	0312	00201E	**PC APPLE POWERBOOK G4 867MHZ**	$2,224			70100001	G	F		207268	S24694	03	2003		3 evice0	11/17/08	Scanned	
A642755	0312	00264	**PC APPLE POWERBOOK G4 867MHZ**	$2,224			70100001	G	C		207268	S24694	03	2003		3 evice0	12/2/08	Scanned	
A642756	0312	00201E	**PC APPLE POWERBOOK G4 867MHZ**	$2,224			70100001	G	F		207268	S24694	03	2003		3 evice0	11/17/08	Scanned	
A646369	0312	00247	**CENTRIFUGE WITH ROTOR MICROMA**	$4,198	3592F1935	RF	66400090	G	C		541192	703954	12	2003		7 evice0	11/10/08	Scanned	
A647606	0312	00212	**PC APPLE POWERBOOK G4 15.2GHZ**	$1,799	SV740550G		70100001	G	F		207268	S59546	02	2004		3 evice0	11/19/08	Scanned	
A648252	0312	00218	**PC DELL INSPIRON 1100 P4 LAPTOP**	$1,552	J7X9941	INSPIRON	70100001	G	F		207268	S61006	02	2004		3 evice0	11/7/08	Scanned	
A650708	0312	00201F	**PC APPLE IMAC 1.25GHZ 160 GB 17"**	$2,236	SQP5250X		70100001	G	C		207268	S76027	06	2004		5 evice0	12/3/08	**Manual**	Other
A651025	0312	00256	**PC APPLE POWERBOOK G4 1.5GHZ 1**	$2,299	SW842534V		70100001	G	F		207268	S77300	06	2004		3 evice0	11/10/08	Scanned	
A651026	0312	00212	**PC APPLE POWERBOOK G4 1.5GHZ 1**	$2,299	SW84252S1		70100001	G	F		207268	S77300	06	2004		3 evice0	12/2/08	Scanned	
A656684	0312	00212	**PC APPLE POWERBOOK G4 15 1.67G**	$2,099	SW85167P2		70100001	G	C		207268	S20314	06	2005		3 evice0	12/3/08	Scanned	
A656685	0312	00214	**PC APPLE POWERBOOK G4 15 1.67G**	$2,099	SW85167SH		70100001	G	C		207268	S20314	06	2005		3 evice0	12/2/08	**Manual**	No barcode
A656686	0312	00201F	**PC APPLE POWERBOOK G4 15 1.67G**	$2,099	SW85192G3		70100001	G	C		207268	S20314	06	2005		3 evice0	12/11/08	**Manual**	Not scanable
A657261	0312	00243A	**EPPENDORF 5415R REF CENTRIFUGE**	$3,999	13271	5415R	66400089	G	C		207268	747669	06	2005		5 evice0	11/7/08	Scanned	
A665206	0312	00243A	**EPPENDORF 5415R MICROFUGE**	$3,999			66400089	G	C			500003556	10	2006		5 evice0	11/7/08	Scanned	
A665607	0312	00212	**APPLE MAC BOOK PRO 15" 2.16 CTO**	$1,799	W87020B2V	MAC BOOK	70100001	G	C			770079690	02	2007		3 evice0	11/19/08	Scanned	
A665608	0312	00214	**APPLE MAC BOOK PRO 15" 2.16 CTO**	$1,799	W87020B3V	MAC BOOK	70100001	G	C			770079690	02	2007		3 evice0	11/25/08	Scanned	
A665609	0312	00212	**APPLE MC ABOOK PRO 15" 2.16 CTO**	$1,799	70100001		70100001	G	C			770084832	02	2007		3 evice0	11/19/08	Scanned	
A667492	0312	00214	**APPLE MAC BOOK PRO 15" 2.2 CTO**	$1,799	W87320AZ	MAC BOOK	70100001	G	C			770114153	08	2007		3 evice0	12/2/08	Scanned	
A667493	0312	00256	**APPLE MAC BOOK PRO 15" 2.2 CTO**	$1,799	W87320B0	MAC BOOK	70100001	G	C			770114153	08	2007		3 evice0	12/4/08	Scanned	

Capital Inventory Found

Agriculture/Human Env. Sc

Plant Pathology - RCTF ***81121***

Property#	bldg	Room#	Description	Cost	Serial#	Model#	Class	Cnd	Ins	Avail	Account	Voucher	Acquired MM	Acquired YY	Life	FoundB By	Date of Scan	TypeE entry	Comment
A667716	0312	00218	**APPLE MAC BOOK PRO 15 2.20 CTO**	$1,799	W87342CB3	MAC BOOK	70100001	G	C			770118307	09	2007	3	evice0	12/3/08	Scanned	
A668100	0312	00125	**DELL INSPIRON 1420 LAPTOP PC**	$1,695	HTZY3F1		70100001	G	C			770131889	11	2007	3	evice0	12/2/08	**Manual**	No barcode
B058739	0312	00239	**INCUBATOR REFRIGERATED SHAKEI**	$10,419	500685626	MI2841011	66400289	G	C		469109	7019661	08	2005	10	evice0	11/7/08	Scanned	

Sub-Total:	**55**	**Cost:**	**$195.986**

Grand Total:	**55**	**Cost:**	**$195,986**

UNIVERSITY OF KENTUCKY

STRATEGIC PLANNING AND REPORTING SYSTEM

Annual Review Report 2004-2005 APPROVED

Area:	**Provost**	**College/Unit:**	**College of Agriculture**
Department:	**Plant Pathology**	**Degree:**	**MS**
Data Entry	**Kelly D Davis**	**Approver**	**David Smith**
Unit Mission:	The mission of the department is to improve humankind's understanding of plant disease through research and, utilizing this knowledge base, to educate students and residents of Kentucky about plant diseases. By these means, the department serves to promote plant health throughout the Commonwealth and encourage the use of science-based, economically practical disease management practices which seek to minimize environmental consequences.		

Unit Goals and Specific Strategies

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 Measure of Progress			
01	To provide focused, high quality, graduate education in plant pathology.	Maintain M.S. productivity at 1-2 per year.* Assess employment of alumni/ae, with the goal of 95% obtaining suitable employment or gaining entry into the next level of education. *Utilize 2000 calendar year as base (=3); documentation of summer graduate degrees is problematic, since they could be counted in either the relevant calendar or fiscal (July-June) years.	Year 2003: No M.S. graduates.	In a graduate research program, such as Plant Pathology's, the number of degrees awarded will fluctuate from year to year. Conducting research is not akin to following a precise course schedule, and time-to-degree is variable. Shifts in degree productivity per year are expected, and normal.	Instructional	2. Outstanding Students	1.1	5.1	0	0
02	To recruit and retain high caliber graduate students.	Maintain at least 25% of M.S. students on fellowship support.	In 2003, two M.S. students were enrolled in the department's graduate program. Both of these students held fellowships, one a Lyman T. Johnson Minority Fellowship and the other a Kentucky Opportunity Fellowship. Therefore, in 2003, 100% of the department's M.S. students had fellowship support.	Fellowships help attract superior students and the department will continue to strive to maximize fellowship holders amongst its student body. In addition, the department will seek to enhance diversity among domestic student enrollment. In 2003, one of the department's M.S. students was African-American. Diversity is already considerable amongst the	Instructional	2. Outstanding Students	1.1	2.6	5.1	0

				department's international student contingent.						
03	To comprehend, more completely, the complex interrelationships of plants and their parasites through study of the pertinent biochemistry, physiology, molecular biology, genetics, genomics, proteomics, epidemiology and ecology. To pursue applied research to provide prompt, environmentally sound management recommendations for plant diseases presenting immediate problems in Kentucky.	Assess quality and quantity of basic research publications, external funding awards, patents, and products. Assess indicators of national and international recognition of the faculty and their programs.	Nineteen articles in major journals were published in 2003, a 46% increase over the base year (2000). Members of the department also published 36 abstracts, a 64% increase over 2000. In 2003, 14 other research papers were published with the intent of more immediate, applied benefit to producers, doubling 2000's seven. In 2003, a patent was awarded to one of the department's research programs, and one accession was made to the Genbank Register. Faculty held major competitive grants from the National Science Foundation, the National Institutes of Health, the United States Department of Agriculture and the Kentucky Science and Technology Center. In 2003, Professor Christopher Schardl was elected a Fellow of the American Phytopathological Society.	Continued receipt of competitive funding from federal agencies reflects the strong research base in Plant Pathology which, in turn, helps to assure high recognition and support for the program. Likewise, publication of scientific findings in nationally-regarded, peer-reviewed journals, and patent development, reflect excellence in research, an abiding goal for the department. Research is also targeted to the needs, and for the benefit, of local growers.	Research	4. New Knowledge	1.1	4.1	4.4	6.4
04	To inform county agents, farmers, agribusiness personnel, producers, and homeowners about plant diseases, improving their ability to recognize, understand and manage the diseases in as economical and environmentally benign manners as practical.	Track county agent training activities, presentations to county meetings (both rural and urban), electronic information, radio and television broadcasts, and written publications by Extension personnel.	Department members are in near daily contact by phone and/or email with county agents, farmers, producers, other agribusiness personnel and homeowners with regard to plant diseases and their management. A web-based digital-image consulting system has been established to aid department members to assist county agents in prompt plant disease identification.	As in all good educational endeavors, it is not only the "students" (in this case, county agents, farmers, producers, agribusiness personnel and homeowners) who benefit, but also the instuctors. Information is gained about local and state-wide problems, as well as about implementation of optimal disease management practices.	Service	6. Quality of Life	1.1	6.1	6.6	0
05	To monitor and investigate plant diseases -whether naturally occuring or deliberately incited- in Kentucky and to evaluate their importance to the resources and economy of the state.	Maintain annual computer records of plant disease diagnoses to track disease prevalence and effectiveness of control.	Accurate records allow precise monitoring of disease outbreaks and how they change. Also, unanticipated disease outbreaks are thoroughly investigated. In 2003, in compliance with federal initiatives centered on Homeland Security, the department became an integral part of the Southern Region Plant Diagnostic Laboratory Network, one of five such national entities.	Knowledge of the plant disease situation in the Commonwealth aids current management recommendations and allows for continuing improvement for future disease control strategies. The Homeland Security-related endeavors help agricultural producers through enhanced communication and diagnostic infrastructure. The department coordinates state-wide efforts to monitor potential agricultural bioterrorism affecting the Commonwealth's plant industries. There may be	Research	4. New Knowledge	1.1	6.2	6.3	6.6

				secondary benefits which accrue, since regional awareness of serious plant disease issues -whether of a terroristic source or not- should occur more expeditiously than in the past.						
06	To provide plant disease diagnostic services statewide.	Facilities at Lexington and Princeton will maintain timely disease diagnosis.	In 2003, the total number of diagnoses was 3,626, a one-quarter fall-off from the 2000 base year reflecting, in no small part, the decline in the tobacco industry. In this case, however, numbers do not tell the whole story as departmental personnel have had to learn new disease scenarios occurring as a more diversified agriculture develops, as well as meet the intense demands of the Homeland Security endeavors.	Accurate diagnosis of major plant diseases in the Commonwealth provides substantial economic benefit through rational and timely management decisions. Departmental members' understanding of current or emerging plant disease problems is improved. Education of graduate students concerning the prevalence, variety and diagnosis of plant diseases is accomplished through formal classwork, involving time devoted to field visits as well as diagnostic examinations in the laboratory	Service	6. Quality of Life	1.1	1.3	6.1	6.2

UNIVERSITY OF KENTUCKY

STRATEGIC PLANNING AND REPORTING SYSTEM

Annual Review Report 2004-2005 APPROVED

Area:	**Provost**	**College/Unit:**	**College of Agriculture**
Department:	**Plant Pathology**	**Degree:**	**PhD**
Data Entry	**Kelly D Davis**	**Approver**	**David Smith**
Unit Mission:	The mission of the department is to improve humankind's understanding of plant disease through research and, utilizing this knowledge base, to educate students and residents of Kentucky about plant diseases. By these means, the department serves to promote plant health throughout the Commonwealth and encourage the use of science-based, economically practical disease management practices which seek to minimize environmental consequences.		

Unit Goals and Specific Strategies

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 Measure of Progress			
01	To provide focused, high quality, graduate education in Plant Pathology.	Maintain Ph.D. productivity at 3-5 per year.* Assess employment of alumni/ae, with the goal of 95% being hired into appropriate professional positions (such as postdoctoral researchers, college/university faculty, government scientists, industrial scientific or administrative positions). *Utilize 2000 calendar year as base (=1); documentation of summer graduate degrees is problematic, since they could be counted in either the relevant calendar or fiscal (July-June) years.	Year 2003: Three Ph.D. graduates. Following relatively short postdoctoral experiences in the department, two of the graduates were hired as faculty at Pikeville College School of Osteopathic Medicine. The third individual is a postdoctoral scholar at North Carolina State University.	Graduate degree productivity of a basic research program necessarily fluctuates from year to year. Only over a period of at least five years would a meaningful pattern be apparent. It says much for the quality of training received in the department that graduates were hired into a medical school, to teach biochemistry and microbiology, as well as pursue research. In these days of moleuclar genetics there are, of course, considerable parallels at the genome level which influence pathogenesis in quite different hosts. The department will strive to continue to provide diverse opportunities for its graduates.	Instructional	2. Outstanding Students	1.1	2.6	4.3	5.1
02	To recruit and retain high caliber graduate students.	Maintain at least 30% of Ph.D. students on fellowship support.	Sixteen Ph.D. students were enrolled in 2003, a 14% increase over the preceeding year, futher confirming the resurgence in student numbers as newly hired faculty continue to develop and expand their research programs. Of these 16 doctoral students, six had fellowship support; two held	Fellowships help attract superior students and the department will continue to endeavor to maximize fellowship holders amongst its student body. One doctoral fellowship holder was an African-American male. The department will seek to enhance diversity	Instructional	2. Outstanding Students	1.1	2.6	4.3	5.1

			Dissertation Year Fellowships, one held a Lyman T. Johnson Fellowship, one held a Philip Morris Fellowship, with the balance having departmental Research Challenge Trust Fund Fellowships. Therefore, one quarter of the doctoral students held externally competitive fellowships with, overall, some 37% receiving some kind of fellowship support.	among domestic student enrollment. Diversity is already considerable amongst the department's international student contingent.						
03	To comprehend, more completely, the complex interrelationships of plants and their parasites through the study of the pertinent biochemistry, physiology, molecular biology, genetics, genomics, proteomics, epidemiology and ecology. To pursue applied research to provide prompt, environmentally sound management recommendations for plant diseases presenting immediate problems in Kentucky.	Assess quality and quantity of basic research publications, external funding awards, patents, and products. Assess indicators of national and international recognition of the faculty and their programs.	Nineteen articles in major journals were published in 2003, a 46% increase over the base year (2000). Members of the department also published 36 abstracts, a 64% increase over 2000. In 2003, 14 other research papers were published with the intent of more immediate, applied benefit to producers, doubling 2000's seven. In 2003, a patent was awarded to one of the department's research programs, and one accession was made to the Genbank Register. Faculty held major competitive grants from the National Science Foundation, the National Institutes of Health, the United States Department of Agriculture and the Kentucky Science and Technology Center. In 2003, Professor Christopher Schardl was elected a Fellow of the American Phytopathological Society.	Continued receipt of competitive funding from federal agencies reflects the strong research base in Plant Pathology which, in turn, helps to assure high recognition and support for the program. Likewise, publication of scientific findings in nationally-regarded, peer-reviewed journals, and patent development, reflect excellence in research, an abiding goal for the department. Research is also targeted to the needs, and for the benefit, of local growers.	Research	4. New Knowledge	1.1	4.1	4.4	6.4
04	To inform county agents, farmers, agribusiness personnel, producers, and homeowners about plant diseases, improving their ability to recognize, understand and manage the diseases in as economical and environmentally benign manners as practical.	Track county agent training activities, presentations to county meetings (both rural and urban), electronic information, radio and television broadcasts, and written publications by Extension personnel.	Department members are in near daily contact by phone and/or email with county agents, farmers, producers, other agribusiness personnel and homeowners with regard to plant diseases and their management. A web-based digital-image consulting system has been established to aid department members to assist county agents in prompt plant disease identification.	As in all good educational endeavors, it is not only the "students" (in this case, county agents, farmers, producers, agribusiness personnel and homeowners) who benefit, but also the instructors. Information is gained about local and state-wide problems, as well as about implementation of optimal disease management practices.	Service	6. Quality of Life	1.1	6.1	6.6	0
05	To monitor and investigate plant diseases - whether naturally occuring or deliberately incited -in	Maintain annual computer records of plant disease diagnoses to track disease prevalence and effectiveness of	Accurate records allow precise monitoring of disease outbreaks and how they change. Also, unanticipated disease outbreaks are thoroughly investigated. In	Knowledge of the plant disease situation in the Commonwealth aids current management recommendations and allows for continuing	Research	4. New Knowledge	1.1	6.2	6.3	6.6

	Kentucky and to evaluate their importance to the resources and economy of the state.	control.	2003, in compliance with federal initiatives centered on Homeland Security, the department became an integral part of the Southern Region Plant Diagnostic Laboratory Network, one of five such national entities.	improvement for future disease control strategies. The Homeland Security-related endeavors help agricultural producers through enhanced communication and diagnostic infrastructure. The department coordinates state-wide efforts to monitor potential agricultural bioterrorism affecting the Commonwealth's plant industries. There may be secondary benefits which accrue, since regional awareness of serious plant disease issues - whether of a terroristic source or not - should occur more expeditiously than in the past.						
06	To provide plant disease diagnostic services statewide.	Facilities at Lexington and Princeton will maintain timely disease diagnosis.	In 2003, the total number of diagnoses was 3,626, a one-quarter fall-off from the 2000 base year reflecting, in no small part, the decline in the tobacco industry. In this case, however, numbers do not tell the whole story as departmental personnel have had to learn new disease scenarios occurring as more diversified agriculture develops, as well as meet the intense demands of the Homeland Security endeavors.	Accurate diagnosis of major plant diseases in the Commonwealth provides substantial economic benefit through rational and timely management decisions. Departmental members' understanding of current or emerging plant disease problems is improved. Education of graduate students concerning the prevalence, variety and diagnosis of plant diseases is accomplished through formal classwork, involving time devoted to field visits as well as diagnostic examinations in the laboratory.	Service	6. Quality of Life	1.1	1.3	6.1	6.2

UNIVERSITY OF KENTUCKY

STRATEGIC PLANNING AND REPORTING SYSTEM

Annual Review Report 2005-2006 APPROVED

Area:	**Provost**	**College/Unit:**	**College of Agriculture**
Department:	**Plant Pathology**	**Degree:**	**MS**
Data Entry	**Patricia Yancey**	**Approver**	**Rebecca Scott**
Unit Mission:	The mission of the department is to improve humankind's understanding of plant disease through research and, utilizing this knowledge base, to educate students and residents of Kentucky about plant diseases. By these means, the department serves to promote plant health throughout the Commonwealth and encourage the use of science-based, economically practical disease management practices which seek to minimize environmental consequences.		

Unit Goals and Specific Strategies

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 Measure of Progress			
01	To provide focused, high quality, graduate education in plant pathology.	Maintain M.S. productivity at 1-2 per year.* Assess employment of alumni/ae, with the goal of 95% obtaining suitable employment or gaining entry into the next level of education. *Utilize 2000 calendar year as base (=3); documentation of summer graduate degrees is problematic, since they could be counted in either the relevant calendar or fiscal (July-June) years.	Year 2004: No M.S. graduates.	In a graduate research program, such as Plant Pathology's, the number of degrees awarded will fluctuate from year to year. Conducting research is not akin to following a precise course schedule, and time-to-degree is variable. Shifts in degree productivity per year are expected, and normal.	Instructional	2. Outstanding Students	1.1	5.1	0	0
02	To recruit and retain high caliber graduate students.	Maintain at least 25% of M.S. students on fellowship support.	In 2004, three M.S. students were enrolled in the department's graduate program. All three held fellowships, one a Lyman T. Johnson Minority Fellowship, one a Kentucky Opportunity Fellowship, and the third a Research Challenge Trust Fund Fellowship. Therefore, in 2004, 100% of the department's M.S. students had fellowship support.	Fellowships help attract superior students, and the department will continue to strive to maximize fellowship holders amongst its student body. In addition, the department will seek to enhance diversity among domestic student enrollment. In 2004, one of the department's	Instructional	2. Outstanding Students	1.1	2.6	5.1	0

				M.S. students was African-American, and all three were women. Diversity is already considerable amongst the department's international student contingent.						
03	To comprehend, more completely, the complex interrelationships of plants and their parasites through study of the pertinent biochemistry, physiology, molecular biology, genetics, genomics, proteomics, epidemiology and ecology. To pursue applied research to provide prompt, environmentally sound management recommendations for plant diseases presenting immediate problems in Kentucky.	Assess quality and quantity of basic research publications, external funding awards, patents, and products. Assess indicators of national and international recognition of the faculty and their programs.	Thirteen articles in major journals were published in 2004, as in the base year (2000). Members of the department also published 24 abstracts, a 10% increase over 2000. In 2004, eight other research papers were published with the intent of more immediate, applied benefit to producers, representing another 10% increase over the 2000 figure. In 2004, a patent was awarded to one of the department's research faculty, reflecting a collaborative endeavor with a University of Wisconsin scientist. Over 100 accessions were made to the Genbank Register. Faculty held major competitive grants from the National Science Foundation, the National Institutes of Health, the United States Department of Agriculture and the Kentucky Science and Engineering Foundation. Sponsored project awards received by the department totalled $1,840,897 for fiscal year 2004-2005, a more than $1 million increase from 2000-2001.	Continued receipt of competitive funding from federal agencies reflects the strong research base in Plant Pathology which, in turn, helps to assure high recognition and support for the program. Likewise, publication of scientific findings in nationally-regarded, peer-reviewed journals, and patent development, reflect excellence in research, an abiding goal for the department Research is also targeted to the needs, and for the benefit, of local growers.	Research	4. New Knowledge	1.1	4.1	6.3	6.4
04	To inform county agents, farmers, agribusiness personnel, producers, and homeowners about plant diseases, improving their ability to recognize, understand and manage the diseases in as economical and environmentally benign manners as practical.	Track county agent training activities, presentations to county meetings (both rural and urban), electronic information, radio and television broadcasts, and written publications by Extension personnel.	Department members are in near daily contact by phone and/or email with county agents, farmers, producers, other agribusiness personnel and homeowners with regard to plant diseases and their management. A web-based digital-image consulting system, developed by the department in consultation with computer experts in Agricultural Communications Services, allows department members to assist county agents in prompt plant disease identification.	As in all good educational endeavors, it is not only the "students" (in this case, county agents, farmers, producers, agribusiness personnel and homeowners) who benefit, but also the instructors. Information is gained about local and state-wide problems, as well as about implementation of optimal disease management practices.	Service	6. Quality of Life	1.1	6.1	6.6	0
05	To monitor and investigate plant diseases -whether naturally occuring or deliberately incited- in Kentucky and to evaluate their importance to the resources and	Facilities at Lexington and Princeton conduct timely disease diagnoses to track disease prevalence and effectiveness of control practices.	Accurate records allow precise monitoring of disease outbreaks and how they change. Also, unanticipated disease outbreaks are thoroughly investigated. The department is a member of the Southern Plant Diagnostic Network, one of five such national entities created as a result of federal initiatives centered on	Knowledge of the plant disease situation in the Commonwealth aids current management recommendations and allows for continuing improvement of future disease control strategies. The Homeland Secuirty-related endeavors help	Research	4. New Knowledge	1.1	6.2	6.3	6.6

	economy of the state.		Homeland Security. In 2004, significant surveying was undertaken across the Commonwealth to try to resolve if Sudden Oak Death had been introduced. This exotic disease, which has had major deletrious consequences on the West Coast, was not found in Kentucky. The disease is a continuing concern because of the economic and aesthetic tolls it could exact if it became established in the state.	agricultural producers through enhanced communication and diagnostic infrastructure. The department coordinates state-wide efforts to monitor potential agricultural bioterrorism affecting the Commonwealth's plant industries. There may be secondary benefits which accrue, since regional awareness of serious plant disease issues - whether of a terroristic source or not- should occur more expeditiously than in the past.						
06	To provide plant disease diagnostic services statewide.	Maintain annual computer records of plant disease diagnoses.	In 2004, the total number of diagnoses was 4,665, a decline of 5% from the base year (2000), but still a large number. Yet numbers, in this case, do not tell the whole story for, as the tobacco industry contracts, new enterprises develop, requiring departmental personnel to familiarize themselves with new disease scenarios. The demands of Homeland Security endeavors relating to agriculture have also brought additional expectations.	Accurate diagnosis of major plant diseases in the Commonwealth provides substantial economic benefit through rational and timely management decisions. Departmental members' understanding of current or emerging plant disease problems is improved. Education of graduate students concerning the prevalence, variety and diagnosis of plant disease is accomplished through formal classwork, involving time devoted to field visits as well as diagnostic examinations in the laboratory.	Service	6. Quality of Life	1.1	1.3	6.1	6.2

UNIVERSITY OF KENTUCKY

STRATEGIC PLANNING AND REPORTING SYSTEM

Annual Review Report 2005-2006 APPROVED

Area:	**Provost**	**College/Unit:**	**College of Agriculture**
Department:	**Plant Pathology**	**Degree:**	**PhD**
Data Entry	**Patricia Yancey**	**Approver**	**Rebecca Scott**
Unit Mission:	The mission of the department is to improve humankind's understanding of plant disease through research and, utilizing this knowledge base, to educate students and residents of Kentucky about plant diseases. By these means, the department serves to promote plant health throughout the Commonwealth and encourage the use of science-based, economically practical disease management practices which seek to minimize environmental consequences.		

Unit Goals and Specific Strategies

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 Measure of Progress			
01	To provide focused, high quality, graduate education in plant pathology.	Maintain Ph.D. productivity at 3-5 per year.* Assess employment of alumni/ae, with the goal of 95% being hired into appropriate professional positions (such as postdoctoral researchers, college/university faculty, government scientists, industrial scientific or administrative positions). *Utilize 2000 calendar year as base (=1); documentation of summer graduate degrees is problematic, since they could be counted in either the relevant calendar or fiscal (July-June) years.	Year 2004: Five Ph.D. graduates. All five became postdoctoral researchers, two at Harvard.	Graduate degree productivity of a basic research program necessarily fluctuates from year to year. Only over a period of at least five years would a meaningful pattern be apparent. It says much for the quality of training received in the department that two of the graduates were recruited into postdoctoral positions at Harvard, one into the Medical School there and one into the associated Dana Farber Cancer Institute. In these days of molecular genetics there are, of course, considerable parallels at the genome level which influence pathogenesis in quite different hosts.	Instructional	2. Outstanding Students	1.1	2.6	4.3	5.1
02	To recruit and retain high caliber graduate students and postdoctoral scholars.	Maintain at least 30% of Ph.D. students on fellowship support.	Fifteen Ph.D. students were enrolled in 2004. Of these, one held a particularly prestigious National Science Foundation Fellowship, one a Dissertation Year Fellowship, one a Lyman T. Johnson Fellowship, three	Fellowships help attract superior students, and the department will continue to endeavor to maximize fellowship holders amongst its student body. One doctoral fellowship holder was an	Instructional	2. Outstanding Students	1.1	4.3	4.4	5.1

			held Philip Morris Fellowships, and the remaining two had departmental Research Challenge Trust Fund Fellowships. Therefore, 40% of the doctoral students held externally competitive fellowships with overall, more than half receiving some kind of fellowship support. In addition to the doctoral students, 17 post doctoral scholars were also in research programs in the department in 2004. This is an exceptionally high number, given that there were only eight full-time research faculty.	African-American male. Nine of the 15 doctoral students were female, from varied cultural backgrounds. The department will seek to enhance diversity among domestic student enrollment. Diversity is already considerable amongst the department's international student contingent. High-quality postdoctoral training is now all but essential for entry into top-flight research positions in academia, industry or government. Indeed, the postdoctoral scholar these days is rather equivalent to a medical resident. Hence, the department puts great store in its postdoctoral body, striving to ensure a superior, advanced learning experience for this cohort.						
03	To comprehend, more completely, the complex interrelationships of plants and their parasites through the study of the pertinent biochemistry, physiology, molecular biology, genetics, genomics, proteomics, epidemiology and ecology. To pursue applied research to provide prompt, environmentally sound management recommendations for plant diseases presenting immediate problems in Kentucky.	Access quality and quantity of basic research publications, external funding awards, patents, and products. Assess indicators of national and international recognition of the faculty and their programs.	Thirteen articles in major journals were published in 2004, as in the base year (2000). Members of the department also published 24 abstracts, a 10% increase over 2000. In 2004, eight other research papers were published with the intent of more immediate, applied benefit to producers, representing another 10% increase over the 2000 figure. In 2004, a patent was awarded to one of the department's research faculty, reflecting a collaborative endeavor with a University of Wisconsin scientist. Over 100 accessions were made to the Genbank Register. Faculty held major competitive grants from the National Science Foundation, the National Institutes of Health, the United States Department of Agriculture and the Kentucky Science and Engineering Foundation. Sponsored project awards received by the department totalled $1,840,897 for fiscal year 2004-2005, a more than $1 million increase from 2000-2001.	Continued receipt of competitive funding from federal agencies reflects the strong research base in Plant Pathology which, in turn, helps to assure high recognition and support for the program. Profound evidence of the very substantial extramural support from national funding sources is the large number of postdoctoral scholars in the department. Without such monies, a postdoctoral program would not exist. Publicatioin of scientific findings in nationallly-regarded, peer-reviewed journals, and patent development, also reflect excellence in research, an abiding goal for the department. Research is also targeted to the needs, and for the benefit, of local growers.	Research	4. New Knowledge	1.1	4.1	6.3	6.4
04	To inform county agents, farmers, agribusiness	Track county agent training activities, presentations to	Department members are in near daily contact by phone and/or email with county	As in all good educational endeavors, it is not only the "students" (in this case,	Service	6. Quality of Life	1.1	6.1	6.6	0

	personnel, producers, and homeowners about plant diseases, improving their ability to recognize, understand and manage the diseases in as economical and environmentally benign manners as practical.	county meetings (both rural and urban), electronic information, radio and television broadcasts, and written publications by Extension personnel.	agents, farmers, producers, other agribusiness personnel and homeowners with regard to plant diseases and their management. A web-based digital-image consulting system, developed by the department in consultation with computer experts in Agricultural Communications Services, allows department members to assist county agents in prompt plant disease identification.	county agents, farmers, producers, agribusiness personnel and homeowners) who benefit, but also the instructors. Information is gained about local and state-wide problems, as well as about implementation of optimal disease management practices.						
05	To monitor and investigate plant diseases - whether naturally occuring or deliberately incited -in Kentucky and to evaluate their importance to the resources and economy of the state.	Facilities at Lexington and Princeton conduct timely disease diagnoses to track disease prevalence and effectiveness of control practices.	Accurate records allow precise monitoring of disease outbreaks and how they change. Also, unanticipated disease outbreaks are thoroughly investigated. The department is a member of the Southern Plant Diagnostic Network, one of five such national entities created as a result of federal initiatives centered on Homeland Security. In 2004, significant surveying was undertaken across the Commonwealth to try to resolve if Sudden Oak Death had been introduced. This exotic disease, which has had major deliterious consequences on the West Coast was not found in Kentucky. The disease is a continuing concern because of the economic and aesthetic tolls it would exact if it became established in the state.	Knowledge of the plant disease situation in the Commonwealth aids current management recommendations and allows for continuing improvement of future disease control strategies. The Homeland Security-related endeavors help agricultural producers through enhanced communication and diagnostic infrastructure. The department coordinates state-wide efforts to monitor potential agricultural bioterrorism affecting the Commonwealth's plant industries. There may be secondary benefits which accrue, since regional awareness of serious plant disease issues - whether of a terroristic source or not - should occur more expeditiiously than in the past.	Research	4. New Knowledge	1.1	6.2	6.3	6.6
06	To provide plant disease diagnostic services statewide.	Maintain annual computer records of plant disease diagnoses.	In 2004, the total number of diagnoses was 4,665, a decline of 5% from the base year (2000), but still a large number. Yet numbers, in this case, do not tell the whole story for, as the tobacco industry contracts, new enterprises develop, requiring departmental personnel to familiarize themselves with new disease scenarios. The demands of Homeland Security endeavors relating to agriculture have also brought additional expectations.	Accurate diagnosis of major plant diseases in the Commonwealth provides substantial economic benefit through rational and timely management decisions. Departmental members' understanding of current or emerging plant disease problems is improved. Education of graduate students concerning the prevalence, variety and diagnosis of plant diseases is accomplished through formal classwork, involving time devoted to field visits as well as diagnostic examinations in the laboratory.	Service	6. Quality of Life	1.1	1.3	6.1	6.2

UNIVERSITY OF KENTUCKY

STRATEGIC PLANNING AND REPORTING SYSTEM

Annual Review Report 2006-2007

Area:	**Provost**	**College/Unit:**	**College of Agriculture**
Department:	**Plant Pathology**	**Degree:**	**MS**
Data Entry	**Mindy Thompson**	**Approver**	
Unit Mission:	The mission of the department is to improve humankind's understanding of plant disease through research and, utilizing this knowledge base, to educate students and residents of Kentucky about plant diseases. By these means, the department serves to promote plant health throughout the Commonwealth and encourage the use of science-based, economically practical disease management practices which seek to minimize environmental consequences.		

Unit Goals and Specific Strategies

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 Measure of Progress			
01	To provide focused, high quality, graduate education in plant pathology.	Maintain M.S. productivity at one-two per year.* Assess employment of alumni/ae with the goal of 95% obtaining suitable employment or gaining entry into the next level of education. *Utilize 2000 calendar year as base (=three); documentation of summer graduate degrees is problematic, since they could be counted in either the relevant calendar or fiscal (July-June) years.	Year 2005: One M.S. graduate. Year 2006: No M.S. graduates. The one 2005 M.S. graduate is professionally employed in the plant sciences.	In a graduate research program, such as Plant Pathology's, the number of degrees awarded will fluctuate from year to year. Conducting research is not akin to following a precise course schedule, and time-to-degree is variable. Shifts in degree productivity per year are expected, and normal.	Instructional	2. Prepare Students	7	13	0	0
02	To recruit and retain high caliber graduate students.	Maintain at least 25% of M.S. students on fellowship support.	In 2005, the one M.S. student received a Kentucky Opportunity Fellowship (KOF). In 2006, the two M.S. students both held fellowships, one a Lyman T. Johnson Fellowship and the other a KOF. In 2005 and 2006, 100% of the department's M.S. students had fellowship support.	Fellowships help attract superior students, and the department will continue to strive to maximize fellowship holders amongst its student body. In addition, the department will seek to enhance diversity among domestic student	Instructional	4. Nurture Diversity	7	13	0	0

				enrollment. One of the department's M.S. students was African-American; both were women, and U.S. citizens. Diversity is already considerable amongst the department's international student contingent.						
03	To comprehend, more completely, the complex interrelationships of plants and their parasites through study of the pertinent biochemistry, physiology, molecular biology, genetics, genomics, proteomics, epidemiology and ecology. To pursue applied research to provide prompt, environmentally sound management recommendations for plant diseases presenting immediate problems in Kentucky.	Assess quality and quantity of basic research publications, external funding awards, patents, and products. Assess indicators of national and international recognition of the faculty and their programs.	Thirty-four articles in major journals appeared in 2005, and 25 in 2006, representing dramatic increases from the base year (2000) figure of 13. In both 2005 and 2006, ten other research papers were published with the general intent of providing applied benefit to producers, a 40% increase over 2000. Competitive grants from federal agencies totaled $3,439,113 in calendar year 2005 and $1,318,585 in 2006. Grants are often multi-year, and the apparent "decline" is somewhat artificial, a function of start dates. On a fiscal year basis, awards were $2,800,872 in 2005-2006 and $2,958,089 in 2006-2007, substantially beyond the $502,875 of base fiscal year 2000-2001. Putting these accomplishments in context, the department was ranked number one in the nation amongst Plant Pathology programs in the 2005 Faculty Scholarly Productivity Index (www.AcademicAnalytics.com). The assessment involved publications, citations, grants and awards. 2006 rankings have not been released.	Continued receipt of very substantial competitive funding from federal agencies reflects the strong research base in Plant Pathology which, in turn, helps to assure high recognition and support for the program. The department’s #1 national ranking is ample testimony to its stature, reflecting the excellence in research which is an abiding goal for the department. Research is also targeted to the needs, and for the benefit, of local growers, a responsibility the department holds high.	Research	3. Expand Research	12	13	14	15
04	To inform county agents, farmers, agribusiness personnel, producers, and homeowners about plant diseases, improving their ability to recognize, understand and manage the diseases in as economical and environmentally benign manners as practical.	Track county agent training activities, presentations to county meetings (both rural and urban), electronic information, radio and television broadcasts, and written publications by Extension personnel.	In fiscal year 2005-2006, the department documented 47,014 contacts; in 2006-2007, there were 49,849. A web-based digital image counsulting system, developed by the department in consultation with computer experts in Agricultural Communications Services, allows department members to assist county agents in prompt plant disease identification.	As in all good educational endeavors, it is not only the "students" (in this case, county agents, farmers, producers, agribusiness personnel and homeowners) who benefit, but also the instructors. Information is gained about local and statewide problems, as well as about implementation of optimal disease management practices.	Service	5. Quality of Life	13	16	17	0
05	To monitor and investigate plant diseases -whether naturally occuring or deliberately incited- in Kentucky, and to evaluate their importance to the	Facilities at Lexington and Princeton conduct timely disease diagnoses to track disease prevalence and effectiveness of control practices.	Accurate records allow precise monitoring of disease outbreaks and how they change. Also, unanticipated disease outbreaks are thoroughly investigated. The department is a member of the Southern Plant Diagnostic Network, one of five such national entities created as a result of federal initiatives centered on Homeland Security. In 2005 and 2006, significant surveying was	Knowledge of the plant disease situation in the Commonwealth aids current management recommendations and allows for continuing improvement of future disease control strategies. The Homeland Security-	Research	5. Quality of Life	12	13	16	17

	resources and economy of the Commonwealth.		conducted for Asian Soybean Rust, an exotic disease recently introduced to this country and with the potential to cause major economic hardship to Kentucky's agricultural enterprise. The department is a national leader in orchestrating the response to this disease, as was reflected in a faculty member being a co-recipient of the United States Secretary of Agriculture 2006 Honor Award as a member of the Asian Soybean Rust Team. The team was recognized in the area of "Enhancing Protection and Safety of the Nation's Agriculture and Food Supply".	related endeavors help agricultural producers through enhanced communication and diagnostic infrastructure. The department coordinates statewide efforts to monitor potential agricultural bioterrorism affecting the Commonwealth's plant industries. There may be secondary benefits which accrue, since regional awareness of serious plant disease issues -whether of a terroristic source or not- should occur more expeditiously than in the past.						
06	To provide plant disease diagnostic services statewide.	Maintain annual computer records of plant disease diagnoses.	In 2005 and 2006, the total numbers of diagnoses were 3,884 and 4,779, representing 20% and 2% declines, respectively, from the base year (2000) figure of 4,865. The 2005 and 2006 numbers are still large, variances in part reflecting the different disease pressures of specific growing seasons. Yet numbers do not tell the whole story for, as the tobacco industry contracts, new enterprises develop, requiring departmental personnel to familarize themselves with new disease scenarios. The demands of Homeland Security endeavors relating to agriculture have also brought additional expectations.	Accurate diagnosis of major plant diseases in the Commonwealth provides substantial economic benefit through the rational and timely mangement decisions which it drives. Departmental members' understanding of current or emerging plant disease problems is improved. Education of graudate students concerning the prevalence, variety and diagnosis of plant diseases is accomplished through formal classwork, involving time devoted to field visits as well as diagnostic examinations in the laboratory.	Service	2. Prepare Students	13	16	17	0

UNIVERSITY OF KENTUCKY

STRATEGIC PLANNING AND REPORTING SYSTEM

Annual Review Report 2006-2007

Area:	**Provost**	**College/Unit:**	**College of Agriculture**
Department:	**Plant Pathology**	**Degree:**	**PhD**
Data Entry	**Mindy Thompson**	**Approver**	
Unit Mission:	The mission of the department is to improve humankind's understanding of plant disease through research and, utilizing this knowledge base, to educate students and residents of Kentucky about plant diseases. By these means, the department serves to promote plant health throughout the Commonwealth and encourage the use of science-based, economically practical disease management practices which seek to minimize environmental consequences.		

Unit Goals and Specific Strategies

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 Measure of Progress			
01	To provide focused, high quality, graduate education in plant pathology.	Maintain Ph.D. productivity at 3-5 per year.* Assess employment of alumni/ae, with the goal of 95% being hired into appropriate professional positions (such as postdoctoral researchers, college/university faculty, government scientists, industrial scientific or administrative positions). *Utilize 2000 calendar year as base (=1); documentation of summer graduate degrees is problematic, since they could be counted in either the relevant calendar or fiscal (July-June) years.	Year 2005: Three Ph.D. graduates. Year 2006: Three Ph.D. graduates. Of the three 2005 graduates, two are college/university faculty, and the other is a postdoctoral researcher. Of the three 2006 graduates, one holds a college/university faculty position, one is a postdoctoral researcher, and one is deceased.	Graduate degree productivity of a basic research program necessarily fluctuates from year to year. Only over a period of at least five years would a meaningful pattern be apparent. It says much for the quality of training received in the department that three of the graduates reported already hold college/university faculty positions. The two postdoctoral researchers are at major Land-Grant Universities.	Instructional	2. Prepare Students	6	7	13	0
02	To recruit and retain high caliber graduate students and postdoctoral scholars.	Maintain at least 30% of Ph.D. students on fellowship support.	Seventeen Ph.D. students were enrolled in 2005; 18 in 2006. In 2005, one student held a prestigious National Science Foundation Fellowship, three held Philip Morris (PM), one a	Fellowships help attract superior students, and the department will continue to endeavor to maximize student fellowship holders. One	Instructional	2. Prepare Students	3	6	7	13

			Kentucky Opportunity (KO), one a Lyman T. Johnson (LTJ), one an Academic Year (AY), one a Dissertation Year (DY), and three had departmental Research Challenge Trust Fund (RCTF) Fellowships. In 2006, students held three PM, one KO, one LTJ, one AY and two RCTF Fellowships. In addition, in 2006, one international student had a fellowship from his government. Therefore, in 2005, 47% of the doctoral students held externally competitive fellowships; 39% in 2006. In both years, at least half received some kind of fellowship. In addition to the doctoral students, the department also had a significant postdoctoral scholar contingent; in 2005, there were 23, and in 2006, 18. These are remarkable -indeed, exceptionally high- numbers, given that there were only seven full-time research faculty in 2005, and eight in 2006.	doctoral fellowship holder was an African-American male. Twelve of the 17 doctoral students (2005) and nine of the 18 (2006) were female, from varied cultural backgrounds. The department will seek to enhance diversity among domestic student enrollment. Diversity is already considerable amongst the department's international student contingent. High-quality postdoctoral training is now all but essential for entry into top-flight research positions in academia, industry or government. Indeed, the postdoctoral scholar these days is rather equivalent to a medical resident. Hence, the department puts great store in its postdoctoral body, striving to ensure a superior, advanced learning experience for this cohort. The large numbers of postdoctoral scholars are one reflection of the faculty's success in winning major competitive funding from federal agencies.							
03	To comprehend, more completely, the complex interrelationships of plants and their parasites through the study of the pertinent biochemistry, physiology, molecular biology, genetics, genomics, proteomics, epidemiology and ecology. To pursue applied research to provide prompt, environmentally sound management recommendations for plant diseases presenting immediate problems in Kentucky.	Assess quality and quantity of basic research publications, external funding awards, patents, and products. Assess indicators of national and international recognition of the faculty and their programs.	Thirty-four articles in major journals appeared in 2005, and 25 in 2006, representing dramatic increases from the base year (2000) figure of 13. In both 2005 and 2006, ten other research papers were published with the general intent of providing applied benefit to producers, a 40% increase over 2000. Competitive grants from federal agencies totaled $3,439,113 in calendar year 2005 and $1,318,585 in 2006. Grants are often multi-year, and the apparent "decline" is somewhat artificial, a function of start dates. On a fiscal year basis, awards were $2,800,872 in 2005-2006 and $2,958,089 in 2006-2007, substantially beyond the $502,875 of base fiscal year 2000-2001. Putting these accomplishments in context, the department was ranked number one in the nation amongst Plant Pathology programs in the 2005 Faculty Scholarly Productivity Index (www.AcademicAnalytics.com). The assessment involved publications, citations, grants and awards. 2006 rankings have not been released.	Continued receipt of very substantial competitive funding from federal agencies reflects the strong research base in Plant Pathology which, in turn, helps to assure high recognition and support for the program. Profound evidence of the very substantial extramural support from national funding sources is the large number of postdoctoral scholars in the department. Without such monies, a postdoctoral program would not exist. The department’s #1 national ranking is ample testimony to its stature, reflecting the excellence in research which is an abiding goal for the department. Research is also targeted to the needs, and for the benefit, of local growers, a responsibility the department holds high.	Research	3. Expand Research	12	13	14	15
04	To inform county	Track county agent	In fiscal year 2005-2006, the	As in all good educational	Service	5.	13	16	17	0

	agents, farmers, agribusiness personnel, producers, and homeowners about plant diseases, improving their ability to recognize, understand and manage the diseases in as economical and environmentally benign manners as practical.	training activities, presentations to county meetings (both rural and urban), electronic information, radio and television broadcasts, and written publications by Extension personnel.	department documented 47,014 contacts; in 2006-2007, there were 49,849. A web-based digital image counsulting system, developed by the department in consultation with computer experts in Agricultural Communications Services, allows department members to assist county agents in prompt plant disease identification.	endeavors, it is not only the "students" (in this case, county agents, farmers, producers, agribusiness personnel and homeowners) who benefit, but also the instructors. Information is gained about local and statewide problems, as well as about implementation of optimal disease management practices.		Quality of Life				
05	To monitor and investigate plant diseases - whether naturally occuring or deliberately incited -in Kentucky and to evaluate their importance to the resources and economy of the Commonwealth.	Facilities at Lexington and Princeton conduct timely disease diagnoses to track disease prevalence and effectiveness of control practices.	Accurate records allow precise monitoring of disease outbreaks and how they change. Also, unanticipated disease outbreaks are thoroughly investigated. The department is a member of the Southern Plant Diagnostic Network, one of five such national entities created as a result of federal initiatives centered on Homeland Security. In 2005 and 2006, significant surveying was conducted for Asian Soybean Rust, an exotic disease recently introduced to this country and with the potential to cause major economic hardship to Kentucky's agricultural enterprise. The department is a national leader in orchestrating the response to this disease, as was reflected in a faculty member being a co-recipient of the United States Secretary of Agriculture 2006 Honor Award as a member of the Asian Soybean Rust Team. The team was recognized in the area of "Enhancing Protection and Safety of the Nation's Agriculture and Food Supply".	Knowledge of the plant disease situation in the Commonwealth aids current management recommendations and allows for continuing improvement of future disease control strategies. The Homeland Security-related endeavors help agricultural producers through enhanced communication and diagnostic infrastructure. The department coordinates statewide efforts to monitor potential agricultural bioterrorism affecting the Commonwealth's plant industries. There may be secondary benefits which accrue, since regional awareness of serious plant disease issues -whether of a terroristic source or not- should occur more expeditiously than in the past.	Research	5. Quality of Life	12	13	16	17
06	To provide plant disease diagnostic services statewide.	Maintain annual computer records of plant disease diagnoses.	In 2005 and 2006, the total numbers of diagnoses were 3,884 and 4,779, representing 20% and 2% declines, respectively, from the base year (2000) figure of 4,865. The 2005 and 2006 numbers are still large, variances in part reflecting the different disease pressures of specific growing seasons. Yet numbers do not tell the whole story for, as the tobacco industry contracts, new enterprises develop, requiring departmental personnel to familarize themselves with new disease scenarios. The demands of Homeland Security endeavors relating to agriculture have also brought additional expectations.	Accurate diagnosis of major plant diseases in the Commonwealth provides substantial economic benefit through the rational and timely mangement decisions which it drives. Departmental members' understanding of current or emerging plant disease problems is improved. Education of graudate students concerning the prevalence, variety and diagnosis of plant diseases is accomplished through formal classwork, involving time devoted to field visits as well	Service	2. Prepare Students	13	16	17	0

				as diagnostic examinations in the laboratory.						

UNIVERSITY OF KENTUCKY

STRATEGIC PLANNING AND REPORTING SYSTEM

Annual Review Report 2007-2008 APPROVED

Area:	**Provost**	**College/Unit:**	**College of Agriculture**
Department:	**Plant Pathology**	**Degree:**	**MS**
Data Entry	**Mindy Thompson**	**Approver**	**Linus R Walton**
Unit Mission:	The mission of the department is to improve humankind's understanding of plant disease through research and, utilizing this knowledge base, to educate students and residents of Kentucky about plant diseases. By these means, the department serves to promote plant health throughout the Commonwealth and encourage the use of science-based, economically practical disease management practices which seek to minimize environmental consequences.		

Unit Goals and Specific Strategies

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 Measure of Progress			
01	To provide focused, high quality, graduate education in plant pathology.	Maintain M.S. productivity at one-two per year*. Assess employment of alumni/ae with the goal of 95% obtaining suitable employment or gaining entry into the next level of education. *Utilize 2000 calendar year as base (=three); documentation of summer graduate degrees is problematic, since they could be counted in either the relevant calendar or fiscal (July-June) year.	Year 2007: One M.S. graduate. This individual is now employed by the United States Department of Agriculture-Agricultural Research Service. Faculty member Paul Vincelli received the 2007 Excellence in Teaching Award from the American Phytopathological Society, the principal, professional, international association of plant pathologists.	In a graduate research program, such as Plant Pathology's, the number of degrees awarded will fluctuate from year to year. Conducting research is not akin to following a precise course schedule, and time-to-degree is variable. Shifts in degree productivity per year are expected, and normal. It says much for the quality of training provided in the department that Dr. Vincelli's teaching excellence received national recognition.	Instructional	Prepare Students	12	13	0	0
02	To recruit and retain high caliber graduate students.	Maintain at least 25% of M.S. students on fellowship support.	In 2007, three of five M.S. students (i.e. 60%) received fellowship support. One held a Kentucky Opportunity Fellowship and two had Lyman T. Johnson Fellowship funding.	Fellowships help attract superior students, and the department will continue to strive to maximize fellowship holders amongst its student body. In addition, the department will seek to enhance diversity among domestic student enrollment. Two of the department's M.S.	Instructional	Nurture Diversity	3	13	0	0

				students were minority, one African-American and one Hispanic; both were women and U.S. citizens. Diversity is already considerable amongst the department's international student contingent.					
03	To comprehend, more completely, the complex interrelationships of plants and their parasites through study of the pertinent biochemistry, physiology, molecular biology, genetics, genomics, proteomics, epidemiology and ecology. To pursue applied research to provide prompt, environmentally sound management recommendations for plant diseases presenting immediate problems in Kentucky.	Assess quality and quantity of basic research publications, external funding awards, patents, and products. Assess indicators of national and international recognition of the faculty and their programs.	Thirty articles in major journals appeared in 2007, representing a dramatic increase from the base year (2000) figure of 13. In 2007, eighteen other research papers were published with the general intent of providing applied benefit to producers, an 80% increase over the preceding year. Competitive grants from federal agencies totaled $2,076,184 in calendar year 2007, componed with $1,318,585 a year earlier. On a fiscal year basis, awards were $2,288,090 in 2007-2008, substantially beyond the $502,875 of base fiscal year 2000-2001. Putting these accomplishments in context, the department was ranked number four in the nation amongst Plant Pathology programs in the 2007 Faculty Scholarly Productivity Index (www.AcademicAnalytics.com). The assessment involved publications, citations, grants and awards.	Continued receipt of very substantial competitive funding from federal agencies reflects the strong research base in Plant Pathology which, in turn, helps to assure high recognition and support for the program. The department's significant national ranking is ample testimony to its stature, reflecting the excellence in research which is an abiding goal for the department. Research is also targeted to the needs, and for the benefit, of local growers, a responsibility the department holds high.	Research	Enhance Stature	12	13	14	15
04	To inform county agents, farmers, agribusiness personnel, producers, and homeowners about plant diseases, improving their ability to recognize, understand and manage the diseases in as economical and environmentally benign manners as practical.	Track county agent training activities, presentations to county meetings (both rural and urban), electronic information, radio and television broadcasts, and written publications by Extension personnel.	In fiscal year 2007-2008, the department documented 45,869 contacts, an 8% decline from the previous year, but still a very substantial number. A web-based digital image consulting system, developed by the department in consultation with computer experts in Agricultural Communications Services, allows department members to assist county agents in prompt plant disease identification. Faculty member Donald Hershman received the 2007 Excellence in Extension Award from the American Phytopathological Society, the principal, professional, international association of plant pathologists.	As in all good educational endeavors, it is not only the "students" (in this case, county agents, farmers, producers, agribusiness personnel and homeowners) who benefit, but also the instructors. Information is gained about local and statewide problems, as well as about implementation of optimal disease management practices. It says much for the quality of service provided by the department that Dr. Hershman's excellence in Extension activities received national recognition.	Service	Quality of Life	12	13	0	0
05	To monitor and investigate plant diseases -whether naturally occuring or deliberately incited- in Kentucky, and to evaluate their importance to the	Facilities at Lexington and Princeton conduct timely disease diagnoses to track disease prevalence and effectiveness of control practices.	Accurate records allow precise monitoring of disease outbreaks and how they change. Also, unanticipated disease outbreaks are thoroughly investigated. The department is a member of the Southern Plant Diagnostic Network, one of five such national entities created as a result of federal initiatives centered on Homeland Security. In 2007, continued	Knowledge of the plant disease situation in the Commonwealth aids current managment recommendations and allows for continuing improvement of future disease control strategies. The Homeland Security-	Research	Expand Research	13	0	0	0

	resources and economy of the Commonwealth.		surveying was conducted for Asian Soybean Rust, an exotic disease recently introduced to this country and with the potential to cause major economic hardship to Kentucky's agricultural enterprise. The department is a national leader in orchestrating the response to this disease.	related endeavors help agricultural producers through enhanced communication and diagnostic infrastructure. The department coordinates statewide efforts to monitor potential agricultural bioterrorism affecting the Commonwealth's plant industries. There may be secondary benefits which accrue, since regional awareness of serious plant disease issues- whether of a terroristic source or not- should occur more expeditiously than in the past.					
06	To provide plant disease diagnostic services statewide.	Maintain annual computer records of plant disease diagnoses.	In 2007, the total number of diagnoses was 3,631, representing a 25% decline from the base year (2000) figure of 4,865. The 2007 number was still large, variance in part reflecting the different disease pressures of specific growing seasons as well as the earlier demands of what had been an appreciably larger tobacco industry. Numbers do not tell the whole story for, as tobacco contracts, other enterprises develop, requiring departmental personnel to familarize themselves with new disease scenarios. The demands of Homeland Security endeavors relating to agriculture have also brought additional expectations.	Accurate diagnosis of major plant diseases in the Commonwealth provides substantial economic benefit through the rational and timely management decisions which it drives. Departmental members' understanding of current or emerging plant disease problems is improved. Education of graduate students concerning the prevalence, variety and diagnosis of plant diseases is accomplished through formal classwork, involving time devoted to field visits as well as diagnostic examinations in the laboratory.	Service	Prepare Students	13	0	0	0

UNIVERSITY OF KENTUCKY

STRATEGIC PLANNING AND REPORTING SYSTEM

Annual Review Report 2007-2008

Area:	**Provost**	**College/Unit:**	**College of Agriculture**
Department:	**Plant Pathology**	**Degree:**	**PhD**
Data Entry	**Mindy Thompson**	**Approver**	
Unit Mission:	The mission of the department is to improve humankind's understanding of plant disease through research and, utilizing this knowledge base, to educate students and residents of Kentucky about plant diseases. By these means, the department serves to promote plant health throughout the Commonwealth and encourage the use of science-based, economically practical disease management practices which seek to minimize environmental consequences.		

Unit Goals and Specific Strategies

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 Measure of Progress			
01	To provide focused, high quality, graduate education in plant pathology.	Maintain Ph.D. productivity at 3-5 per year*. Assess employment of alumni/ae, with the goal of 95% being hired into appropriate professional positions (such as postdoctoral researchers, college/university faculty, government scientists, industrial scientific or administrative positions). *Utilize 2000 calendar year as base (=1); documentation of summer graduate degrees is problematic, since they could be counted in either the relevant calendar or fiscal (July-June) year.	Year 2007: One Ph.D. graduate, shared with Biology. The individual took a position as college/university faculty out of state. Faculty member Paul Vincelli received the 2007 Excellence in Teaching Award from the American Phytopathological Society, the principal, professional, international association of plant pathologists.	Graduate degree productivity of a basic research program necessarily fluctuates from year to year. Only over a period of at least five years would a meaningful pattern be apparent. It says much for the quality of training provided in the department that Dr. Vincelli's teaching excellence received national recognition.	Instructional	Prepare Students	6	12	13	0
02	To recruit and retain high caliber graduate students and postdoctoral scholars.	Maintain at least 30% of Ph.D. students on fellowship support.	Twenty-one Ph.D. students were enrolled in 2007. Two held Philip Morris Fellowships and two others had Lyman T. Johnson Fellowships. One was awarded a Kentucky Opportunity, one an Academic Year,	Fellowships help attract superior students, and the department will continue to endeavor to maximize student fellowship holders. One doctoral fellowship holder was	Instructional	Nurture Diversity	3	13	14	0

			and three had departmental Research Challenge Trust Fund Fellowships. In addition, one international student held a fellowship from his government. Therefore, in 2007, almost 30% of the doctoral students held externally competitive fellowships. In addition, to the doctoral students, the department also had a significant postdoctoral scholar contingent. In 2007, there were 21 postdocs, an exceptionally high number, given that there were only eight full-time research faculty.	an African-American male. Eleven of the 21 doctoral students were female, from varied cultural backgrounds. The department will seek to enhance diversity among domestic student enrollment. Diversity is already considerable amongst the department's international student contingent. High-quality postdoctoral training is now all but essential for entry into top-flight research positions in academia, industry or government. Indeed, the postdoctoral scholar these days is rather equivalent to a medical resident. Hence, the department puts great store in its postdoctoral body, striving to ensure a superior, advanced learning experience for this cohort. The large numbers of postdoctoral scholars are one reflection of the faculty's success in winning major competitive funding from federal agencies.						
03	To comprehend, more completely, the complex interrelationships of plants and their parasites through the study of the pertinent biochemistry, physiology, molecular biology, genetics, genomics, proteomics, epidemiology and ecology. To pursue applied research to provide prompt, environmentally sound management recommendations for plant diseases presenting immediate problems in Kentucky.	Assess quality and quantity of basic research publications, external funding awards, patents, and products. Assess indicators of national and international recognition of the faculty and their programs.	Thirty articles in major journals appeared in 2007, representing a dramatic increase from the base year (2000) figure of 13. In 2007, eighteen other research papers were published with the general intent of providing applied benefit to producers, an 80% increase over the preceding year. Competitive grants from federal agencies totaled $2,076,184 in calendar year 2007, compared with $1,318,515 a year earlier. On a fiscal year basis, awards were $2,288,090 in 2007-2008, substantially beyond the $502,875 of base fiscal year 2000-2001. Putting these accomplishments in context, the department was ranked number four in the nation amongst Plant Pathology programs in the 2007 Faculty Scholarly Productivity Index (www.AcademicAnalytics.com). The assessment involved publications, citations, grants and awards.	Continued receipt of very substantial competitive funding from federal agencies reflects the strong research base in Plant Pathology which, in turn, helps to assure high recognition and support for the program. Profound evidence of the very substantial extramural support from national funding sources is the large number of postdoctoral scholars in the department. Without such monies, a postdoctoral program would not exist. The department’s significant national ranking is ample testimony to its stature, reflecting the excellence in research which is an abiding goal for the department. Research is also targeted to the needs, and for the benefit, of local growers, a responsibility the department holds high.	Research	Expand Research	12	13	14	15
04	To inform county agents, farmers, agribusiness personnel,	Track county agent training activities, presentations to county meetings	In fiscal year 2007-2008, the department documented 45,869 contacts, an 8% decline from the previous year, but still a very	As in all good educational endeavors, it is not only the "students" (in this case, county agents, farmers, producers,	Service	Quality of Life	12	13	0	0

	producers, and homeowners about plant diseases, improving their ability to recognize, understand and manage the diseases in as economical and environmentally benign manners as practical.	(both rural and urban), electronic information, radio and television broadcasts, and written publications by Extension personnel.	substantial number. A web-based digital image consulting system, developed by the department in consultation with computer experts in Agricultural Communications Services, allows department members to assist county agents in prompt plant disease identification. Faculty member Donald Hershman received the 2007 Excellence in Extension Award from the American Phytopathological Society, the principal, professional, international association of plant pathologists.	agribusiness personnel and homeowners) who benefit, but also the instructors. Information is gained about local and statewide problems, as well as about implementation of optimal disease management practices. It says much for the quality of service provided by the department that Dr. Hershman's excellence in Extension activities received national recognition.						
05	To monitor and investigate plant diseases - whether naturally occurring or deliberately incited -in Kentucky and to evaluate their importance to the resources and economy of the Commonwealth.	Facilities at Lexington and Princeton conduct timely disease diagnoses to track disease prevalence and effectiveness of control practices.	Accurate records allow precise monitoring of disease outbreaks and how they change. Also, unanticipated disease outbreaks are thoroughly investigated. The department is a member of the Southern Plant Diagnostic Network, one of five such national entities created as a result of federal initiatives centered on Homeland Security. In 2007, continued surveying was conducted for Asian Soybean Rust, an exotic disease recently introduced to this country and with the potential to cause major economic hardship to Kentucky's agricultural enterprise. The department is a national leader in orchestrating the response to this disease.	Knowledge of the plant disease situation in the Commonwealth aids current management recommendations and allows for continuing improvement of future disease control strategies. The Homeland Security-related endeavors help agricultural producers through enhanced communication and diagnostic infrastructure. The department coordinates statewide efforts to monitor potential agricultural bioterrorism affecting the Commonwealth's plant industries. There may be secondary benefits which accrue, since regional awareness of serious plant disease issues -whether of a terroristic source or not- should occur more expeditiously than in the past.	Research	Expand Research	13	0	0	0
06	To provide plant disease diagnostic services statewide.	Maintain annual computer records of plant disease diagnoses.	In 2007, the total number of diagnoses was 3,631, representing a 25% decline from the base year (2000) figure of 4,865. The 2007 number was still large, variance in part reflecting the different disease pressures of specific growing seasons, as well as the earlier demands of what had been an appreciably larger tobacco industry. Numbers do not tell the whole story for, as tobacco contracts, other enterprises develop, requiring departmental personnel to familarize themselves with new disease scenarios. The demands of Homeland Security endeavors relating to agriculture have also brought additional expectations.	Accurate diagnosis of major plant diseases in the Commonwealth provides substantial economic benefit through the rational and timely management decisions which it drives. Departmental members' understanding of current or emerging plant disease problems is improved. Education of graduate students concerning the prevalence, variety and diagnosis of plant diseases is accomplished through formal classwork, involving time devoted to field visits as well as diagnostic examinations in the laboratory.	Service	Prepare Students	13	0	0	0

UNIVERSITY OF KENTUCKY

STRATEGIC PLANNING AND REPORTING SYSTEM

Annual Review Report 2008-2009

Area:	**Provost**	**College/Unit:**	**College of Agriculture**
Department:	**Plant Pathology**	**Degree:**	**MS**
Data Entry	**Mindy Thompson**	**Approver**	
Unit Mission:	The mission of the department is to improve humankind's understanding of plant disease through research and, utilizing this knowledge base, to educate students and residents of Kentucky about plant diseases. By these means, the department serves to promote plant health throughout the Commonwealth and encourage the use of science-based, economically practical disease management practices which seek to minimize environmental consequences.		

Unit Goals and Specific Strategies

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 Measure of Progress			
01	To provide focused, high quality, graduate education in plant pathology.	Maintain M.S. productivity at one-two per year.* Assess employment of alumni/ae with the goal of 95% obtaining suitable employment or gaining entry into the next level of education. *Utilize 2000 calendar year as base (=three); documentation of summer graduate degrees is problematic, since they could be counted in either the relevant calendar or fiscal (July-June) year.	Year 2008: No M.S. graduates. Of the four M.S. students enrolled in 2008, two were advanced directly into the doctoral program without formally completing the M.S. and two continued their studies towards the M.S.	In a graduate research program, such as Plant Pathology's, the number of degrees awarded will fluctuate from year to year. Conducting research is not akin to following a precise course schedule, and time-to-degree is variable. Shifts in degree productivity per year are expected, and normal. It says much for the quality of the M.S. student body that Advisory Committees allowed two students to transfer into the doctoral program on the basis of their academic accomplishments.	Instructional	Prepare Students	12	13	0	0
02	To recruit and retain high caliber graduate students.	Maintain at least 25% of M.S. students on fellowship support.	In 2008, two of the four M.S. students (i.e. 50%) received fellowship support. Both were awarded Lyman T. Johnson Fellowship funding. Christopher Schardl was recognized in the faculty category of the 2008 U.K. President's Awards for Diversity.	Fellowships help attract superior students, and the department will continue to strive to maximize fellowship holders amongst its student body. In addition, the department will seek to enhance diversity among domestic student enrollment. Two of the department's M.S. students were minority,	Instructional	Nurture Diversity	3	13	0	0

				one African-American and one Hispanic; both were women and U.S. citizens. One of these students transferred into the doctoral program. Diversity is already considerable amongst the department's international student contingent.					
03	To comprehend, more completely, the complex interrelationships of plants and their parasites through study of the pertinent biochemistry, physiology, molecular biology, genetics, genomics, proteomics, epidemiology and ecology. To pursue applied research to provide prompt, environmentally sound management recommendations for plant diseases presenting immediate problems in Kentucky.	Assess quality and quantity of basic research publications, external funding awards, patents, and products. Assess indicators of national and international recognition of the faculty and their programs.	As in the preceding year, 30 articles in major journals appeared in 2008, again representing a dramatic increase from the base year (2000) figure of 13. In 2008, 20 other research papers were published with the general intent of providing applied benefit to producers, an 11% increase over the previous year. Extramural funding totaled $3,146,165 in calendar year 2008, compared with $2,076,184 a year earlier. On a fiscal year basis, awards were $2,549,645 in 2008-2009, substantially beyond the $502,875 of base fiscal year 2000-2001. Faculty member Peter Nagy received the 2008 Ruth Allen Award from the American Phytopathological Society (APS). This award is one of the society's most distinguished for recognizing research excellence. Moreover, faculty member John Hartman received the 2008 Outstanding Plant Pathologist Award from the APS - Southern Division. The APS is the principal, professional, international association of plant pathologists.	Continued receipt of very substantial competitive funding from federal agencies reflects the strong research base in Plant Pathology which, in turn, helps to assure high recognition and support for the program. The department's significant national ranking is ample testimony to its stature, reflecting the excellence in research which is an abiding goal for the department. Research is also targeted to the needs, and for the benefit, of local growers, a responsibility the department holds high.	Research	Enhance Stature	12	13	14	15
04	To inform county agents, farmers, agribusiness personnel, producers, and homeowners about plant diseases, improving their ability to recognize, understand and manage the diseases in as economical and environmentally benign manners as practical.	Track county agent training activities, presentations to county meetings (both rural and urban), electronic information, radio and television broadcasts, and written publications by Extension personnel.	In fiscal year 2008-2009, the department documented 54,425 contacts, a 19% increase from the previous year, and a very substantial number. A web-based digital image consulting system, developed by the department in consultation with computer experts in Agricultural Communications Services, allows department members to assist county agents in prompt plant disease identification.	As in all good educational endeavors, it is not only the "students" (in this case, county agents, farmers, producers, agribusiness personnel and homeowners) who benefit, but also the instructors. Information is gained about local and statewide problems, as well as about implementation of optimal disease management practices. It says much for the quality of service provided by the department that Dr. Hartman's excellence in Extension activities received major recognition (see Objective 03).	Service	Quality of Life	12	13	0	0
05	To monitor and investigate plant diseases -whether naturally occuring or deliberately incited- in	Facilities at Lexington and Princeton conduct timely disease diagnoses to track disease prevalence	Accurate records allow precise monitoring of disease outbreaks and how they change. Also, unanticipated disease outbreaks are thoroughly investigated. The department is a member of the Southern Plant	Knowledge of the plant disease situation in the Commonwealth aids current management recommendations and allows for continuing improvement	Research	Expand Research	13	0	0	0

	Kentucky, and to evaluate their importance to the resources and economy of the Commonwealth.	and effectiveness of control practices.	Diagnostic Network, one of five such national entities created as a result of federal initiatives centered on Homeland Security. In 2008, surveying continued for Asian Soybean Rust, an exotic disease recently introduced to this country and with the potential to cause major economic hardship to Kentucky's agricultural enterprise. The department is a national leader in orchestrating the response to this disease. Although some rust was found in Kentucky in 2008, the occurrences were too late in the season and too few to be of a significant financial consequence.	of future disease control strategies. The Homeland Security-related endeavors help agricultural producers through enhanced communication and diagnostic infrastructure. The department coordinates statewide efforts to monitor potential agricultural bioterrorism affecting the Commonwealth's plant industries. There may be secondary benefits which accrue, since regional awareness of serious plant disease issues- whether of a terroristic source or not- should occur more expeditiously than in the past.						
06	To provide plant disease diagnostic services statewide.	Maintain annual computer records of plant disease diagnoses.	In 2008, the total number of diagnoses was 3,645, representing essentially no change from the previous year but a 25% decline from the base year (2000) figure of 4,865. The 2008 number was still large, variance in part reflecting the different disease pressures of specific growing seasons as well as the earlier demands of what had been an appreciably larger tobacco industry. Numbers do not tell the whole story for, as tobacco contracts, other enterprises develop, requiring departmental personnel to familiarize themselves with new disease scenarios. Furthermore, additional time and resources are needed to address specimen diagnosis of new or expanding crops, such as fruits and vegetables. The demands of Homeland Security endeavors relating to agriculture have also brought additional expectations.	Accurate diagnosis of major plant diseases in the Commonwealth provides substantial economic benefit through the rational and timely management decisions which it drives. Departmental members' understanding of current or emerging plant disease problems is improved. Education of graduate students concerning the prevalence, variety and diagnosis of plant diseases is accomplished through formal classwork, involving time devoted to field visits as well as diagnostic examinations in the laboratory.	Service	Prepare Students	13	0	0	0

UNIVERSITY OF KENTUCKY

STRATEGIC PLANNING AND REPORTING SYSTEM

Annual Review Report 2008-2009

Area:	**Provost**	**College/Unit:**	**College of Agriculture**
Department:	**Plant Pathology**	**Degree:**	**PhD**
Data Entry	**Mindy Thompson**	**Approver**	
Unit Mission:	The mission of the department is to improve humankind's understanding of plant disease through research and, utilizing this knowledge base, to educate students and residents of Kentucky about plant diseases. By these means, the department serves to promote plant health throughout the Commonwealth and encourage the use of science-based, economically practical disease management practices which seek to minimize environmental consequences.		

Unit Goals and Specific Strategies

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 Measure of Progress			
01	To provide focused, high quality, graduate education in plant pathology.	Maintain Ph.D. productivity at three-five per year*. Assess employment of alumni/ae, with the goal of 95% being hired into appropriate professional positions (such as postdoctoral researchers, college/university faculty, government scientists, industrial scientific or administrative positions). *Utilize 2000 calendar year as base (=one); documentation of summer graduate degrees is problematic, since they could be counted in either the relevant calendar or fiscal (July-June) year.	Year 2008: Two Ph.D. graduates. One individual is now an industrial scientist; the other is a postdoctoral researcher.	Graduate degree productivity of a basic research program necessarily fluctuates from year to year. Only over a period of at least five years would a meaningful pattern be apparent. It says much for the quality of training provided in the department that one of the graduates was directly hired into a commercial staff scientist position in a life sciences company without additional postdoctoral experience being required.	Instructional	Prepare Students	6	12	13	0
02	To recruit and retain high caliber graduate students and postdoctoral	Maintain at least 30% of Ph.D. students on fellowship support.	Twenty-three Ph.D. students were enrolled in 2008. Two held Philip Morris Fellowships and two others had Lyman T. Johnson Fellowships. One	Fellowships help attract superior students, and the department will continue to endeavor to maximize student	Instructional	Nurture Diversity	3	13	14	0

	scholars.		was awarded a Kentucky Opportunity, and one an Academic Year, Fellowship. In addition, one international student held a fellowship from his government. Therefore, in 2008, 30% of the doctoral students held externally competitive fellowships. In addition to the doctoral students, the department also had a significant postdoctoral scholar contingent. In 2008, there were 24 postdoctoral researchers, an exceptionally high number, given that there were only eight full-time research faculty. Christopher Schardl was recognized in the faculty category of the 2008 U.K. President's Awards for Diversity.	fellowship holders. One doctoral fellowship holder was an African-American male and one an Hispanic female. Eleven of the 23 doctoral students were female, from varied cultural backgrounds. The department will seek to enhance diversity among domestic student enrollment. Diversity is already considerable amongst the department's international student contingent. High-quality postdoctoral training is now all but essential for entry into top-flight research positions in academia, industry or government. Indeed, the postdoctoral scholar these days is rather equivalent to a medical resident. Hence, the department puts great store in its postdoctoral body, striving to ensure a superior, advanced learning experience for this cohort. The large numbers of postdoctoral scholars are one reflection of the faculty's success in winning major competitive funding from federal agencies.						
03	To comprehend, more completely, the complex interrelationships of plants and their parasites through the study of the pertinent biochemistry, physiology, molecular biology, genetics, genomics, proteomics, epidemiology and ecology. To pursue applied research to provide prompt, environmentally sound management recommendations for plant diseases presenting immediate problems in	Assess quality and quantity of basic research publications, external funding awards, patents, and products. Assess indicators of national and international recognition of the faculty and their programs.	As in the preceding year, 30 articles in major journals appeared in 2008, again representing a dramatic increase from the base year (2000) figure of 13. In 2008, 20 other research papers were published with the general intent of providing applied benefit to producers, an 11% increase over the previous year. Extramural funding totaled $3,146,165 in calendar year 2008, compared with $2,076,184 a year earlier. On a fiscal year basis, awards were $2,549,645 in 2008-2009, substantially beyond the $502,875 of base fiscal year 2000-2001. The department was again ranked fourth in the nation amongst Plant Pathology doctoral programs in the latest Faculty Scholarly Productivity Index (www.AcademicAnalytics.com). The assessment involved publications, citations, grants and awards. Peter Nagy received the 2008 Ruth Allen Award for research excellence from the American Phytopathological Society (APS). John Hartman received the 2008 Outstanding Plant Pathologist Award	Continued receipt of very substantial competitive funding from federal agencies reflects the strong research base in Plant Pathology which, in turn, helps to assure high recognition and support for the program. Profound evidence of the very substantial extramural support from national funding sources is the large number of postdoctoral scholars in the department. Without such monies, a postdoctoral program would not exist. The department's significant national ranking is ample testimony to its stature, reflecting the excellence in research which is an abiding goal for the department. Research is also targeted to the needs, and for the benefit, of local growers, a responsibility the department holds high.	Research	Expand Research	12	13	14	15

	Kentucky.		from the APS-Southern Division.							
04	To inform county agents, farmers, agribusiness personnel, producers, and homeowners about plant diseases, improving their ability to recognize, understand and manage the diseases in as economical and environmentally benign manners as practical.	Track county agent training activities, presentations to county meetings (both rural and urban), electronic information, radio and television broadcasts, and written publications by Extension personnel.	In fiscal year 2008-2009, the department documented 54,425 contacts, a 19% increase from the previous year, and a very substantial number. A web-based digital image consulting system, developed by the department in consultation with computer experts in Agricultural Communications Services, allows department members to assist county agents in prompt plant disease identification.	As in all good educational endeavors, it is not only the "students" (in this case, county agents, farmers, producers, agribusiness personnel and homeowners) who benefit, but also the instructors. Information is gained about local and statewide problems, as well as about implementation of optimal disease management practices. It says much for the quality of service provided by the department that Dr. Hartman's excellence in Extension activities received major recognition (see Objective 03).	Service	Quality of Life	12	13	0	0
05	To monitor and investigate plant diseases -whether naturally occurring or deliberately incited- in Kentucky and to evaluate their importance to the resources and economy of the Commonwealth.	Facilities at Lexington and Princeton conduct timely disease diagnoses to track disease prevalence and effectiveness of control practices.	Accurate records allow precise monitoring of disease outbreaks and how they change. Also, unanticipated disease outbreaks are thoroughly investigated. The department is a member of the Southern Plant Diagnostic Network, one of five such national entities created as a result of federal initiatives centered on Homeland Security. In 2008, surveying continued for Asian Soybean Rust, an exotic disease recently introduced to this country and with the potential to cause major economic hardship to Kentucky's agricultural enterprise. The department is a national leader in orchestrating the response to this disease. Although some rust was found in Kentucky in 2008, the occurrences were too late in the season and too few to be of a significant financial consequence.	Knowledge of the plant disease situation in the Commonwealth aids current management recommendations and allows for continuing improvement of future disease control strategies. The Homeland Security-related endeavors help agricultural producers through enhanced communication and diagnostic infrastructure. The department coordinates statewide efforts to monitor potential agricultural bioterrorism affecting the Commonwealth's plant industries. There may be secondary benefits which accrue, since regional awareness of serious plant disease issues -whether of a terroristic source or not- should occur more expeditiously than in the past.	Research	Expand Research	13	0	0	0
06	To provide plant disease diagnostic services statewide.	Maintain annual computer records of plant disease diagnoses.	In 2008, the total number of diagnoses was 3,645, representing essentially no change from the previous year but a 25% decline from the base year (2000) figure of 4,865. The 2008 number was still large, variance in part reflecting the different disease pressures of specific growing seasons, as well as the earlier demands of what had been an appreciably larger tobacco industry. Numbers do not tell the whole story for, as tobacco contacts, other enterprises develop, requiring departmental personnel to familiarize themselves	Accurate diagnosis of major plant diseases in the Commonwealth provides substantial economic benefit through the rational and timely management decisions which it drives. Departmental members' understanding of current or emerging plant disease problems is improved. Education of graduate students concerning the prevalence, variety and diagnosis of plant diseases is	Service	Prepare Students	13	0	0	0

			with new disease scenarios. Furthermore, additional time and resources are needed to address specimen diagnosis of new or expanding crops, such as fruits and vegetables. The demands of Homeland Security endeavors relating to agriculture have also brought additional expectations.	accomplished through formal classwork, involving time devoted to field visits as well as diagnostic examinations in the laboratory.						

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Patents Issued

Sally A. Leong and co-inventor *Mark L. Farman* received a patent for "Cultivar specificity gene from the rice pathogen *Magnaporthe grisea*, and methods of use." Patent No. 6,794,176B1. Issued Sept. 21, to the University of Wisconsin.

Genbank Register

Farman, M.L. *Magnaporthe grisea* isolate GG3H 5-1 cytochrome b *(cytb*) gene ACCESSION AY245427

Farman, M.L. *Magnaporthe grisea* isolate LpMD01-1 cytochrome b *(cytb)* gene ACCESSION AY245426

Farman, M.L. *Magnaporthe grisea* isolate CHW cytochrome b *(cytb)* gene ACCESSION AY245425

Farman, M.L. *Magnaporthe grisea* isolate Guy11 cytochrome b *(cytb)* gene ACCESSSION AY 245424

Schardl, C. L. Evolution of Epichloe and Neotyphodium species, fungal symbionts of grasses.
ACCESSIONS AF457466-AF457545, AF532922-AF532924, AY137610-AY163835, AY166645-AY166649, AY723749, AY723750, AY724686

Zhang, C., and S.A. Ghabrial. Characterization of an intermolecular recombinant RNA1 from a partial diploid strain of Bean pod mottle virus. Genomic RNA1 (subgroup 1), RNA1 (subgroup II) and RNA2 (subgroup1), complete cds.
ACCESSIONS AY44931, AY44932, AY44933, respectively

Books and Book Chapters

Ghabrial, S.A., and K.W. Buck. *Rhizidiovirus.* pp.229-230. IN: C.M. Fauqeut, M.A. Mayo, J. Maniloff, U. Desselberger, and L.A. Ball, eds. *Virus Taxonomy, VIIIth Report of the ICTV.* Elsevier/Academic Press, London.

Ghabrial, S.A., K.W. Buck, B.I. Hillman, and R.G. Milne. *Partitiviridae.* pp. 581-590. IN: C.M. Fauquet, M.A. Mayo, J. Maniloff, U. Desselberger, and L.A. Ball, eds. *Virus Taxonomy, VIIIth Report of the ICTV.* Elsevier/Academic Press, London.

Ghabrial, S.A., D. Jiang, and J.R. Caston. *Chrysoviridae*. pp. 591-595. IN: C.M. Fauquet, M.A. Mayo, J. Maniloff, U. Desselberger, and L.A. Ball, eds. *Virus Taxonomy, VIIIth Report of the ICTV*. Elsevier/Academic Press, London.

Schardl, C.L., J.D. Blankenship, M.J. Spiering, and C. Machado. Loline and ergot alkaloids in grass endophytes. pp 427-448. IN: Z. An, ed. *Handbook of Industrial Mycology*, Marcel-Dekker, Inc., New York and Basel.

Schardl, C.L., A. Leuchtmann, and M.J. Spiering. Symbioses of grasses with seedborne fungal endophytes. pp. 315-340. IN: D.P. Delmer and S. Merchant, eds. *Annual Review of Plant Biology*, Volume 55. Annual Reviews, Palo Alto.

Refereed Journal Articles

Bashir, N.S., M. Sanger, U. Jarlfors, and S.A. Ghabrial. Expression of *Peanut stunt virus* coat protein gene is essential and sufficient for production of host-dependent ribbon-like inclusions in infected plants. Phytopathology 94: 722-729.

Boonrod, K., D. Galetzka, P.D. Nagy, U. Conrad, and G. Krczal. Single chain antibodies against a plant viral RNA-dependent RNA polymerase confer virus resistance. Nature Biotechnology 22: 856-862.

Chandra-Shekara, A.C., D. Navarre, A. Kachroo, H.-G. Kang, D.F. Klessig, and P. Kachroo. Signaling requirements and role of salicylic acid in *HRT*- and *rrt*-mediated resistance to turnip crinkle virus in Arabidopsis. Plant Journal 41: 647-659.

Heist, E.P., D. Zaitlin, D. L. Funnell, W. C. Nesmith, and C.L. Schardl. Necrotic-lesion resistance induced by *Peronospora tabacina* on leaves of *Nicotiana obtusifolia*. Phytopathology 94: 1178-1188.

Hesse, U., M. J. Christensen, and C.L. Schardl. Tissue specificity of endophyte development in *Epichloe/Neotyphodium* symbioses with grasses. Proceedings of the XI Molecular Plant-Microbe Interactions Congress, St. Petersburg, Russia: 448-452.

Jiang, D., and S.A. Ghabrial. Molecular characterization of *Pennicillium chrysogenum virus*: Reconsideration of the taxonomy of the genus *Chrysovirus*. Journal of General Virology 85: 2111-2121.

Kachroo, A., C.V. Srivathsa, L. Lapchyk, D. Falcone, D. Hildebrand, and P. Kachroo. Oleic acid levels regulated by glycerolipid metabolism modulate defense gene expression in Arabidopsis. Proceedings of the National Academy of Sciences USA. 101: 5152-5257.

Moon, C.D., K.D. Craven, A. Leuchtmann, S.L. Clement, and C.L. Schardl. Prevalence of interspecific hybrids amongst asexual fungal endophytes of grasses. Molecular Ecology 13: 1455-1467.

Panaviene, A., T. Panavas, S. Serva, and P.D. Nagy. Purification of the Cucumber necrosis virus replicase from yeast: The role of co-expressed viral RNA in stimulation of replicase activity. Journal of Virology 78: 8254-8263.

Rajendran, K.S., and P.D. Nagy. Interaction between the replicase proteins of Tomato Bushy Stunt Virus in vitro and in vivo. Virology 326: 250-261.

Shapka, N., and P.D. Nagy. The AU-rich RNA recombination hot spot sequence of Brome mosaic virus is functional in tombusviruses: Implications for the mechanism of RNA recombination. Journal of Virology 78: 2288-2300.

Vincelli, P. Simulations of fungicide runoff following applications for turfgrass disease control. Plant Disease 88: 391-396.

Wang, J., C. Machado, D.G. Pannaccione, H.-F. Tsai, and C.L. Schardl. The determinant step in ergot alkaloid biosynthesis by an endophyte of perennial ryegrass. Fungal Genetics and Biology 41: 189-198.

White, K.A., and P.D. Nagy. Advances in the Molecular Biology of Tombusviruses: Gene Expression, Genome Replication and Recombination. Progress in Nucleic Acid Research and Molecular Biology 78: 187-226.

In addition, members of the department published 24 abstracts.

Other Research Publications

Vincelli, P., and E. Dixon. Evaluation of spray programs for controlling Q◦I-resistant strains of *Pyricularia grisea* on perennial ryegrass, 2003. Fungicide and Nematicide Tests, 59: T010.

Vincelli, P., E. Dixon, E. Williams, and P. Burrus. Efficacy of fungicides for control of dollar spot of creeping bentgrass managed as a fairway, 2003. Fungicide and Nematicide Tests, 59: T007.

Vincelli, P., E. Dixon, D. Williams, and P. Burrus. Efficacy of fungicides for the control of dollar spot and brown patch of creeping bentgrass on a sand-based green, 2003. Fungicide and Nenaticide Tests, 59: T008.

Vincelli, P., E. Dixon, D. Williams, and P. Burrus. Influence of spray programs with phosphate fungicides on turf quality in a mixed creeping bentgrass/*Poa annua* soil-based green, 2003. Fungicide and Nematicide Tests, 59: T009.

Vincelli, P., E. Dixon, D. Williams, and P. Burrus. Efficacy of fungicides for control of dollar spot in a mixed creeping bentgrass/*Poa annua* soil-based green, 2003. Fungicide and Nematicide Tests, 59: T019

Vincelli, P., E. Dixon, D. Williams, and P. Burrus. Influence of fungicides on turf quality in a mixed creeping bentgrass/*Poa annua* soil-based green, 2003. Fungicide and Nematicide Tests, 59: T020.

Vincelli, P., E. Dixon, D. Williams, and P. Burrus. Efficacy of fungicides for control of gray leaf spot of perennial ryegrass, 2003. Fungicide and Nematicide Tests, 59: T011.

Vincelli, P., R. Spitaleri, and E. Dixon. Evaluation of selected alfalfa cultivars and breeding lines for resistance to Sclerotinia crown and stem rot, 2002-2003. Biological and Cultural Tests, 19: FC014.

Ph.D. Dissertations

Blankenship, Jimmy D. Loline alkaloid biosynthesis in *Neotyphodium uncinatum*, a fungal endophyte of *Lolium pretense.*

Gu, Hongcang. Genetic diversity and symptom severity determinants of Bean pod mottle virus.

Lushia, Warren A. Investigation of the disassembly of tobacco mosaic virus in protoplasts inoculated by electroporation. (2003)

Machado, Caroline. Studies of ergot alkaloid biosynthesis genes in clavicipitaceous fungi.

Panaviene, Zivile S. The role of tombusvirus replicase proteins and RNA in replicase assembly, replication and recombination.

Rajendran, Kottampatty S. Dissecting the functions of carmovirus and tombusvirus replicase proteins.

Personnel

Smith, D.A., Chair and Professor

Bachi, P.R., Ag. Research Specialist

Beale, J.W., Ag. Research Specialist

Farman, M.L., Associate Professor (R)

Ghabrial, S.A., Professor (R)

Goodin, M.M., Assistant Professor (R)

Hartman, J.R., Extension Professor

Hendrix, J.W., Professor (R)

Hershman, D.E., Extension Professor

Kachroo, P.R., Assistant Professor (R)

Kachroo, A.P., Ag. Research Specialist

Nagy, P.D., Associate Professor (R)

Nesmith, W.C., Extension Professor

Nuckles, E.M., Ag. Research Specialist

Pogany, J., Ag. Research Specialist

Schardl, C.L., Professor (R)

Thornbury, D.W., Scientist II

Vaillancourt, L.J., Associate Professor (R)

Vincelli, P., Extension Professor

Wang, R., Ag. Research Specialist

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Patents Issued

Genbank Register

Goodin, M.M. *Sonchus* yellow net virus truncated phosphoprotein gene.
ACCESSION AY971951

Schardl, C.L. The loline alkaloid biosynthesis gene clusters in fungal endophytes of grasses. ACCESSION AY7237493, AY7237503, AY7246861

Schardl, C.L. Ergot alkaloid biosynthesis genes in ergot fungi.
ACCESSION AY836771, AY836772

Schardl, C.L. Phylogenetic analysis of *Xylella fastidiosa,* causative agent of scorch disease of shade trees and Pierce's disease of grapes.
ACCESSSION DQ021503-DQ021541, DQO22617-DQ022655, DQ022848-DQ022862, DQ026285-DQ02691

Vaillancourt, L.J. Parameters affecting the efficiency of *Agrobacterium tumefaciens*-mediated transformation of *Colletotrichum graminicola.*
ACCESSION DQ00536-DQ005637, DQ002814-DQ002845, DQ002847-DQ002869, DQ003083-DQ003101, DQ003103-DQ003123, DQ003125-DQ003133

Books and Book Chapters

Ghabrial, S. A., K.W. Buck, B.I. Hillman and R.G. Milne. *Partitiviridae*. pp 581-590. IN: C.M. Fauquet, M.A. Mayo, J. Maniloff, U. Desselberger, and L.A. Ball, eds. *Virus Taxonomy, VIIIth Report of the International Committee on Taxonomy of Viruses.* Elsevier/Academic Press, London.

Ghabrial, S. A., D. Jiang and J.R. Castón. *Chrysoviridae*. pp. 591-595. IN: C.M. Fauquet, M.A. Mayo, J. Maniloff, U. Desselberger, and L.A. Ball, eds. *Virus Taxonomy, VIIIth Report of the International Committee on Taxonomy of Viruses*. Elsevier/Academic Press, London.

Ghabrial, S. A. and K.W. Buck. *Rhizidiovirus*. pp. 229-230. IN: C.M. Fauquet, M.A. Mayo, J. Maniloff, U. Desselberger, and L.A. Ball, eds. *Virus Taxonomy, VIIIth Report of the International Committee on Taxonomy of Viruses.* Elsevier/Academic Press, London.

Jackson A.O., R.G. Dietzgen, M. M. Goodin, J.N. Bragg, and M. Deng. Biology of Plant Rhabdoviruses. pp. 623-660. IN: *Annual Review of Phytopathology*, volume 43. Annual Reviews, Palo Alto, California.

Schardl, C.L. and A. Leuchtmann. The *Epichloë* endophytes of grasses and the symbiotic continuum. pp. 475-503. IN: J. Dighton, J. F. White, Jr., and P. Oudemans, eds. *The Fungal Community: Its Organization and Role in the Ecosystem.* CRC Press, Boca Raton, Florida.

Schardl, C.L. and D.G. Panaccione. Biosynthesis of ergot and loline alkaloids. pp 75-92. IN: C.A. Roberts, C.P. West, and D.E. Spiers, eds. *Neotyphodium in Cool-season Grasses.* Blackwell, Ames, Iowa.

Refereed Journal Articles

Blankenship, J.D., J.B. Houseknecht, S. Pal, L.P. Bush, R.B. Grossman, and C.L. Schardl. Biosynthetic precursors of fungal pyrrolizidines, the loline alkaloids. Chembiochem 6: 1016-1022.

Cheng, C. P., T. Panavas, G. Luo, and P. D. Nagy. Heterologous RNA replication enhancer stimulates in vitro RNA synthesis and template-switching by the carmovirus, but not by the tombusvirus, RNA-dependent RNA polymerase: Implication for modular evolution of RNA viruses. Virology 341:107-21.

Damrongkool, P., A.B. Sedlock, C.A. Young, R.D. Johnson, K.E. Goetzl, B. Scott, C.L. Schardl, and D. G. Panaccione. Structural analysis of a peptide synthetase gene required for ergopeptine production in the endophytic fungus *Neotyphodium lolii*. DNA Sequence 16: 379-385.

Dean R., N. Talbot, D. Ebbole, M. Farman, T. Mitchell, M. Orbach, M. Thon, R. Kulkarni, J.-R. Xu, H. Pan, N. Read, Y.-H. Lee, I. Carbone, D. Brown, Y. Oh, N. Donofrio, J. Jeong, D. Soanes, S. Djonovic, E. Kolomiets, C. Rehmeyer, W. Li, M. Harding, S. Kim, M-H Lebrun, H. Bohnert, S. Coughlan, J. Butler, S. Calvo, L.-J. Ma, R. Nicol, S. Purcell, C. Nusbaum, J. Galagan, and B. Birren. Analysis of the genome sequence of the plant pathogenic fungus *Magnaporthe grisea*, the causal agent of rice blast disease. Nature 434: 980-986.

Donofrio N., R. Rajagopalan, D. Brown, S. Diener, D. Windham, S. Nolin, A. Floyd, T. Mitchell, N. Galadima, S. Tucker, M. Orbach, G. Patel, M. Farman, V. Pampanwar, F. Soderlund, Y.-H. Lee and R. Dean. PACLIMS: A component LIM system for high-throughput functional genomic analysis. BMC Bioinformatics 6: 94.

Du, M., C.L. Schardl, E.M. Nuckles, and L.J. Vaillancourt. Using mating-type gene sequences for improved phylogenetic resolution of *Colletotrichum* species complexes. Mycologia 97(3):641-658.

Farman, M., and Y.-S. Kim. Telomere hypervariability in *Magnaporthe oryzae*. Molecular Plant Pathology 6: 287-298.

Flowers, J.L., and L.J. Vaillancourt. Parameters affecting the efficiency of *Agrobacterium tumefaciens*-mediated transformation of *Colletotrichum graminicola.* Current Genetics 48: 380-388.

Funnell, D.L., C.B. Lawrence, J.F. Pedersen, and C.L. Schardl. Expression of the tobacco beta-1,3-glucanase gene PR-2d, following induction of SAR with *Peronospora tabacina*. Physiological and Molecular Plant Pathology 65(6): 285-296.

Galagan, J., S. Calvo, C. Cuomo, L.-J. Ma, J. Wortman, S. Batzoglou, S. Lee, M. Bastürkmen, C. Spevak, J. Clutterbuck, V. Kapitonov, J. Jurka, C. Scazzocchio, M. Farman, J. Butler, S. Purcell, S. Harris, G. Braus, O. Draht, S. Busch, C. D'Enfert, C. Bouchier, G. Goldman, D. Bell-Pedersen, S. Griffiths-Jones, J. Doonan, J. Yu, K. Vienken, A. Pain, M. Freitag, E. Selker, D. Archer, M. Peñalva, B. Oakley, M. Momany, T. Tanaka, T. Kumagai, K. Asai, M. Machida, W. Nierman, D. Denning, M. Caddick, M. Hynes, M. Paoletti, R. Fischer, B. Miller, P. Dyer, M. Sachs, S. Osmani, and B. Birren. Sequencing of *Aspergillus nidulans* and comparative analysis with *A. fumigatus* and *A. oryzae.* Nature 438:1105-1115.

Gentile, A., M.S. Rossi, D. Cabral, K.D. Craven, and C.L. Schardl. Origin, divergence, and phylogeny of epichloë endophytes of native Argentine grasses. Molecular Phylogenetics and Evolution 35:196-208.

Gu, H. and S.A. Ghabrial. The *Bean pod mottle virus* proteinase cofactor and putative helicase are symptom severity determinants. Virology 333:271-283.

Haarmann, T., C. Machado, Y. Lübbe, T. Correia, C.L. Schardl, D.G. Panaccione, and P. Tudzynski. The ergot alkaloid gene cluster in *Claviceps purpurea*: extension of the cluster sequence and intra species evolution. Phytochemistry 66: 1312-1320.

Iriarte, F.B., H.C. Wetzel III, J.D. Fry, D.L. Martin, P. Vincelli, E.W. Dixon, and N.A. Tisserat. Aggressiveness of spring dead spot pathogens to bermudagrass. International Turfgrass Research Society Journal 10:258-264.

Kachroo, P., C.V. Srivathsa, D.A. Navarre, L. Lapchyk, and A. Kachroo. Role of salicylic acid and fatty acid desaturation pathways in ssi2-mediated signaling. Plant Physiology 139: 1717-1735.

Li W., C. Rehmeyer, C. Staben, and M. Farman. TERMINUS - Telomeric End Read Mining IN Unassembled Sequences. Bioinformatics 21: 1695-1698.

Li W., C. Rehmeyer, C. Staben, and M. Farman. TruMatch – A BLAST post-processor for identifying and reporting bona fide sequence matches. Bioinformatics 21: 2097-2098.

Luo, C.-X., L.-F. Yin, S. Koyanagi, M.L. Farman, M. Kusaba, and H. Yaegashi. Genetic mapping and chromosomal assignment of *Magnaporthe oryzae* avirulence genes AvrPik, AvrPiz, and AvrPiz-t controlling cultivar specificity on rice. Phytopathology 95: 640-647.

Monkewich, S., H.-X. Lin, M.R. Fabian, W. Xu, H. Na, D. Ray, O.A. Chernysheva, P.D. Nagy, and K.A. White. p92 Polymerase coding region contains an internal RNA element required at an early step in tombusvirus genome replication. Journal of Virology 79:4848-58.

Nandi, A., W. Moeder, P. Kachroo, D. Klessig and J. Shah. The Arabidopsis ssi2-conferred susceptibility to *Botrytis cinerea* is dependent on EDS5 and PAD4. Molecular Plant-Microbe Interactions 18: 363-370.

Nierman W., A. Pain, M. Anderson, J. Wortman, H. Kim, J. Arroya, M. Berriman, K. Abe, D. Archer, C. Bermejo, J. Bennett, P. Bowyer, D. Chen, M. Collins, R. Coulsen, R. Davies, P. Dyer, M. Farman, N. Fedorova, T. Feldblyum, R. Fischer, N. Fosker, A. Fraser, J. Garcia, M. Garcia, A. Goble, G. Goldman, K. Gomi, S. Griffith-Jones, R. Gwilliam, H. Haas, D. Harris, H. Horiuchi, J. Huang, S. Humphrey, J. Jimenez, N. Keller, H. Khouri, K. Kitamoto, T. Kobayashi, R. Kulkarni, T. Kumagai, A. Lafton, J.-P. Latge, A. Lord, C. Lu, W. Majoros, G. May, B. Miller, Y. Mohamoud, M. Molina, M. Monod, I. Mouyna, S. Mulligan, L. Murphy, S. O'Neil, I. Paulsen, M. Penalva, M. Pertea, C. Price, B. Pritchard, M. Quail, E. Rabbinowitsch, N. Rawlins, M.-A. Rajandream, U. Reichard, H. Renauld, G. Robson, S. de Cordoba, J. Rodrigues-Pena, C. Ronning, S. Rutter, S. Salzberg, M. Sanchez, J. Sanchez-Ferrero, D. Saunders, K. Seeger, R. Squares, S. Squares, M. Takeuchi, F. Tekaia, G. Turner, C. Vasquez de Aldana, J. Weidman, O. White, J. Woodward, J.-H. Yu, C. Fraser, J. Galagan, K. Asai, M. Machida, N. Hall, B. Barrell, and D. Denning. Genomic sequence of the pathogenic and allergenic *Aspergillus fumigatus.* Nature 438:1151-1156.

Panaviene, Z., T. Panavas, and P. D Nagy. Role of an internal and two 3'-terminal RNA elements in assembly of tombusvirus replicase. Journal of Virology 79: 10608-18.

Panavas, T., C. M. Hawkins, Z. Panaviene, and P. D. Nagy. The role of the p33:p33/p92 interaction domain in RNA replication and intracellular localization of p33 and p92 proteins of Cucumber necrosis tombusvirus. Virology 338: 81-95.

Panavas, T. and P. D. Nagy. Mechanism of stimulation of plus-strand synthesis by an RNA replication enhancer in a tombusvirus. Journal of Virology 79:9777-85.

Panavas, T., E. Serviene, J. Brasher, and P. D Nagy. Yeast genome-wide screen reveals dissimilar set of host genes affecting replication of RNA viruses. Proceedings of the National Academy of Sciences U.S.A. 102:7326-31.

Pogany, J., K.A. White, and P.D. Nagy. Specific binding of the tombusvirus replication protein p33 to an internal replication element in the viral RNA is essential for replication. Journal of Virology 79:4859-69.

Senthil, G., H. Liu, V.G. Puram, A. Clark, A. Stromberg, and M.M. Goodin. Specific and common changes in *Nicotiana benthamiana* gene expression in response to infection by enveloped viruses. Journal of General Virology 86:2615-2625.

Serviene, E., N. Shapka, C.-P. Cheng, T. Panavas, B. Phuangrat, J. Baker, and P. D Nagy. Genome-wide screen identifies host genes affecting viral RNA recombination. Proceedings of the National Academy of Sciences U.S.A. 102:10545-10550.

Shapka, N., J. Stork, and P. D. Nagy. Phosphorylation of the p33 replication protein of Cucumber necrosis tombusvirus adjacent to the RNA binding site affects viral RNA replication. Virology 343:65-78.

Spiering, M.J., C.D. Moon, H.H. Wilkinson, and C.L. Schardl. Gene clusters for insecticidal loline alkaloids in the grass-endophytic fungus *Neotyphodium uncinatum*. Genetics 169: 1403-1414.

Stork, J., Z. Panaviene, and P. D. Nagy. Inhibition of in vitro RNA binding and replicase activity by phosphorylation of the p33 replication protein of Cucumber necrosis tombusvirus. Virology 343:79-92.

Tsai, C.W., M.G. Redinbaugh, K.J. Willie, S. Reed, M.M. Goodin, and S.A. Hogenhout. Complete genome sequence and in planta subcellular localization of maize fine streak virus proteins. Journal of Virology 79:5304-5314.

Vincelli, P. An Inquiry-Based Approach to Teaching Disease Cycles. The Plant Health Instructor - published online.

Zhang, C. and S.A. Ghabrial. Development of *Bean pod mottle virus* based vectors for stable protein expression and sequence-specific virus-induced gene silencing in soybean. Virology: published online.

Donald Hershman also contributed to one publication listed under another department.

Christopher Schardl also contributed to one publication listed under another department.

Paul Vincelli also contributed to one publication listed under another department.

In addition, members of the department published 30 abstracts.

Other Research Publications

Dorrance, A.E., M. A. Draper, and D.E. Hershman, eds. Using foliar fungicides to manage soybean rust. Ohio State University Extension Bulletin SR-2005. 50pp.

Dorrance, A.E., D.E. Hershman, and M.A. Draper. Introduction. Ohio State University Extension Bulletin SR-2005:8-15.

Tenuata, A.U., D.E. Hershman, M.A. Draper, and A.E. Dorrance. Fungicide basics. Ohio State University Extension Bulletin SR-2005: 22-29.

Vincelli, P., E. Dixon, D. Williams and P. Burrus. Influence of spray program with phosphite (= phosphonate) fungicides on turf quality in a mixed creeping bentgrass/*Poa annua* soil-based green, 2004. Fungicide and Nematicide Tests 60:T001.

Vincelli, P., E. Dixon, D. Williams and P. Burrus. Efficacy of fungicides for control of gray leaf spot of perennial ryegrass, 2004. Fungicide and Nematicide Tests 60:T002.

Vincelli, P., E. Dixon, D. Williams and P. Burrus. Efficacy of fungicides for control of dollar spot of creeping bentgrass on a sand-based green, 2004. Fungicide and Nematicide Tests 60:T003.

Vincelli, P., E. Dixon, D. Williams and P. Burrus. Efficacy of fungicides for control of brown patch of creeping bentgrass on a sand-based green, 2004. Fungicide and Nematicide Tests 60:T004.

Vincelli, P., E. Dixon, D. Williams and P. Burrus. Efficacy of fungicides and nozzle coverage for control of dollar spot on a creeping bentgrass sand-based green, 2004. Fungicide and Nematicide Tests 60:T005.

Vincelli, P., E. Dixon, D. Williams and P. Burrus. Efficacy of fungicides and nozzle coverage for control of dollar spot on a creeping bentgrass fairway, 2004. Fungicide and Nematicide Tests 60:T006.

Vincelli, P., E. Dixon, B. Jones, D. Williams, and P. Burrus. Efficacy of fungicides for control of dollar spot in a mixed creeping bentgrass/*Poa annua* soil-based green, 2004. Fungicide and Nematicide Tests 60:T007.

Ph.D. Dissertations

Cheng, Chi-Ping. Viral RNA elements and host genes affecting RNA recombination in Tombusviruses.

Zhang, Chunquan. Genetic diversity of bean pod mottle virus (BPMV) and development of BPMV as a vector for gene expression in soybean.

Rehmeyer, Cathryn J. Richardson. Sequencing of chromosome ends and characterization of a telomere-linked Helicase gene family in the rice blast fungus *Magnaporthe oryzae.*

M.S. Theses

Mundell, Jaclyn Nicole. Phylogenetic analysis of Kentucky strains of *Xylella fastidiosa*.

Personnel

Smith, D.A., Chair and Professor

Bachi, P.R., Ag. Research Specialist

Beale, J.W., Ag. Research Specialist

de Sa Guimaraes, P., Ag. Research Specialist

Farman, M.L., Associate Professor (R)

Ghabrial, S.A., Professor (R)

Goodin, M.M., Assistant Professor (R)

Hartman, J.R., Extension Professor

Hershman, D.E., Extension Professor

Kachroo, P.R., Assistant Professor (R)

Kachroo, A.P., Ag. Research Specialist

Nagy, P.D., Associate Professor (R)

Nuckles, E.M., Ag. Research Specialist

Pogany, J., Ag. Research Specialist

Schardl, C.L., Professor (R)

Seebold, K. W., Jr., Assistant Extension Professor

Thornbury, D.W., Scientist II

Vaillancourt, L.J., Associate Professor (R)

Vincelli, P., Extension Professor

Wang, R., Ag. Research Specialist

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Patents Issued

None.

Genbank Register

None.

Books and Book Chapters

Kachroo, A., S.C. Venugopal, D.A. Navarre, L. Lapchyk, and P. Kachroo. Metabolite signaling; role of fatty acids in plant defense. pp. 195-201. IN: F. Sanchez, C. Quinto, I.M. Lopez-Lara, and O. Geiger, eds. Biology of Molecular Plant-Microbe Interactions, Volume 5. International Society for Molecular Plant-Microbe Interactions, St. Paul, Minnesota.

Kachroo, P. Host gene-mediated virus resistance mechanisms and signaling in Arabidopsis. pp. 147-164. IN: G. Loebenstein and J.P. Carr, eds. Natural Resistance Mechanisms of Plants to Viruses. Kluwer Academic Publishers, The Netherlands.

Kachroo, P., A.C. Chandra-Shekara, and D. Klessig. Plant signal transduction and defense against viral pathogens. pp. 161-191. IN: Advances in Viral Research, Volume 66. Elsevier, Amsterdam.

Panaccione, D.G., C.L. Schardl, and C.M. Coyle. Pathways to diverse ergot alkaloid profiles in fungi. pp. 23-52. IN: J.T. Romeo, ed. Recent Advances in Phytochemistry, Volume 40. Elsevier, Amsterdam.

Schardl, C.L., D.G. Panaccione, and P. Tudzynski. Ergot alkaloids-biology and molecular biology. pp. 45-86. IN: G.A. Cordell, ed. The Alkaloids: Chemistry & Biology, Volume 63. Academic Press, Amsterdam.

Seebold, K.W. Occurrence and management of diseases of tobacco transplants. IN: Proceedings of the 27th Annual Meeting of the Colombian Phytopathological Society (ASCOLFI), Bogota, Columbia.

Seebold, K.W. Prospects and progress in the management of black shank in burley tobacco. IN: Proceedings of the 27th Annual Meeting of the Colombian Phytopathological Society (ASCOLFI), Bogota, Columbia.

Refereed Journal Articles

Caston, J.R., D. Luque, B.L. Trus, , G. Rivas, C. Alfonso, R. Roca, J.M. Gonzalez, J.L. Carrascosa, P. Annamalai, and S.A. Ghabrial. Three-dimensional structure and stoichiometry of Helminthosporium victoriae190S totivirus. Virology 347:323-332.

Chandra-Shekara, A.C., M. Gupte, D.A. Navarre, R. Raina, D.F. Klessig, and P. Kachroo. Light-dependent hypersensitive response and resistance signaling against the Turnip Crinkle Virus in Arabidopsis. The Plant Journal 45:320-335.

Cheng, C.-P., E. Serviene, and P.D. Nagy. Suppression of viral RNA recombination by a host exoribonuclease. Journal of Virology 80:2631-2640.

Faulkner, J.R., S.R. Hussaini, J.D. Blankenship, S. Pal, B.M. Brannan, R.B. Grossman, and C.L. Schardl. On the sequence of bond formation in loline alkaloid biosynthesis. Chembiochem 7:1078-1088.

Flowers, J.L., J.R. Hartman, and L.J. Vaillancourt. Histology of *Diplodia pinea* in diseased and latently infected *Pinus nigra* shoots. Forest Pathology 36:447-459.

Hershman, D.E., P.R. Bachi, C.L. Harmon, P.F. Harmon, M.E. Palm, J.M. McKemy, K.A. Zeller and L. Levy. First report of soybean rust caused by Phakopsora pachyrhizi on kudzu (*Pueraria montana* var. *lobata*) in Kentucky. Plant Disease 90:834.

Jiang, Y., E. Serviene, J. Gal, T. Panavas and P.D. Nagy. Identification of essential host factors affecting tombusvirus RNA replication based on the yeast yTHC collection. Journal of Virology 80:7394-7404.

Kämper, J., R. Kahmann, M. Bölker, L.J. Ma, T. Brefort, B. Saville, F. Banuett, J. Kronstad, S. Gold, O. Müller, M. Perlin, H. Wösten, R. deVries, J. Ruiz-Herrera, C. Reynaga-Peña, K. Snetselaar, M. McCann, J. Pérez-Martín, M. Feldbrügge, C. Basse, G. Steinberg, J. Ibeas, W. Holloman, P. Guzman, M. Farman, J. Stajich, R. Sentandreu, J. González-Prietro, J. Kennell, L. Molina, J. Schirawski, A. Mendoza-Mendoza, D. Greilinger, K. Münch, N. Rössel, M. Scherer, M. Vranes, O. Ladendorf, V. Vincon, U. Fuchs, B. Sandrock, S. Meng, E. Ho, M. Cahill, K. Boyce, J. Klose, S. Klosterman, H. Deelstra, L. Ortiz-Castellanos, W. Li, P. Sanchez-Alonso, P. Schreier, I. Häuser-Hahn, M. Vaupel, E. Koopmann, G. Friedrich, H. Voss, T. Schlüter, D. Platt, C. Swimmer, A. Gnirke, F. Chen, V. Vysotskaia, G. Mannhaupt, U. Güldener, M. Münsterkötter, D. Haase, M. Oesterheld, H.W. Mewes, E. Mauceli, D. DeCaprio, C. Wade, J. Butler, S. Young, D. Jaffe, S. Calvo, C. Nusbaum, J. Galagan, and B. Birren. Insights from the genome of the biotriophic fungal pathogen *Ustilago maydis*. Nature 444:97-101.

Nagy, P.D., and J. Pogany. Yeast as a model host to dissect functions of viral and host factors in tombusvirus replication. Virology 344:211-220.

Panaccione, D.G., J.R. Cipoletti, A.B. Sedlock, K.P. Blemings, C.L. Schardl, C. Machado, and G.E. Seidel. Effects of ergot alkaloids on food preference and satiety in rabbits, as assessed with gene-knockout endophytes in perennial ryegrass (*Lolium perenne*). Journal of Agricultural and Food Chemistry 54:4582-4587.

Panaccione, D.G., J.B. Kotcon, C.L. Schardl, R.D. Johnson, and J.B. Morton. Ergot alkaloids are not essential for endophytic fungus-associated population suppression of the lesion nematode, *Pratylenchus scribneri*, on perennial ryegrass. Nematology 8:583-590.

Panavas, T., J. Stork, and P.D. Nagy. Use of double-stranded RNA templates by the tombusvirus replicase in vitro: Implications for the mechanism of plus-strand initiation. Virology 352:110-120.

Paul, P.A., P.E. Lipps, D.E. Hershman, M.P. McMullen, M.A. Draper, and L.V. Madden. A quantitative review of tebuconazole effect on Fusarium head blight and deoxynivalenol content in wheat. Phytopathology 97:211-220.

Peyyala, R.P., and M.L. Farman. Magnaporthe oryzae isolates causing gray leaf spot of perennial ryegrass possess a functional copy of the *AVR1-CO39* avirulence gene. Molecular Plant Pathology 7:157-165.

Rajendran, K.S., and P.D. Nagy. Kinetics and functional studies on interaction between the replicase proteins of Tomato Bushy Stunt Virus: Requirement of p33:p92 interaction for replicase assembly. Virology 345:270-279.

Rehmeyer, C., W. Li, M. Kusaba, Y.S. Kim, D. Brown, C. Staben, R. Dean and M. Farman. Organization of chromosome ends in the plant pathogenic fungus *Magnaporthe oryzae.* Nucleic Acids Research 34:4685-4701.

Serva, S. and P.D. Nagy. Proteomics analysis of the Tombusvirus replicase: Hsp70 molecular chaperone is associated with the replicase and enhances viral RNA replication. Journal of Virology 80:2162-2169.

Serviene, E., Y. Jiang, C.-P. Cheng, J. Baker, and P.D. Nagy. Screening of the Yeast yTHC collection identifies essential host factors affecting Tombusvirus RNA recombination. Journal of Virology 80:1231-1241.

Soderlund, C., K. Haller, V. Panpanwar, D. Ebbole, M. Farman, M. Orbach, G.L.Wang, R. Wing, J.R. Xu, D. Brown, T. Mitchell and R. Dean. MGOS: A resource for studying *Magnaporthe grisea* and *Oryza sativa* interactions. Molecular Plant-Microbe Interactions 10:1055-1061.

Wang, R.Y., A. Kritzman, D.E. Hershman, and S.A. Ghabrial. *Aphis glycines* as a vector of persistently and nonpersistently transmitted viruses and potential risks for soybean and other crops. Plant Disease 90:920-926.

Whitham, S.A., C. Yang, and M.M. Goodin. Global impact: Elucidating plant responses to viral infection. Molecular Plant-Microbe Interactions 19:1207-1215.

Xie, J., D. Wei, D. Jiang, Y. Fu, G. Li, S.A. Ghabrial, and X. Yi. Characterization of debilitation-associated mycovirus infecting the plant pathogenic fungus *Sclerotinia sclerotiorum*. Journal of General Virology 87:241-249.

Yoshioka, K., W. Moeder, H.G. Kang, P. Kachroo, K. Masmoudi, G. Berkowitz, and D. Klessig. The chimeric Arabidopsis CYCLIC NUCLEOTIDE-GATED ION CHANNEL 11/12 activates multiple pathogen resistance responses. The Plant Cell 18:747-763.

Zhang, C., and S.A.Ghabrial. Development of *Bean pod mottle virus*-based vectors for stable protein expression and sequence-specific virus-induced gene silencing in soybean. Virology 344:401-411.

Zhao, T., W.M. Havens, and S.A. Ghabrial. The disease phenotype of virus-infected *Helminthosporium victoriae* is independent of overexpression of the cellular alcohol oxidase/RNA-binding protein Hv-p68. Phytopathology 96:326-332.

Other Research Publications

Bateman, A., J. Hartman, L. Vaillancourt, N. Godbert, and C. Moser. Preliminary evaluation of the transmissibility of *Diplodia pinea* during the shearing of Scots pine Christmas tree. Nursery and Landscape Program 2005 Research Report, U.K. Agricultural Experiment Station PR-520:29-30.

Flowers, J., L. Vaillancourt, and J. Hartman. Cytology of *Diplodia pinea* in diseased and latently infected *Pinus nigra* shoots. Nursery and Landscape Program 2005 Research Report, U.K. Agricultural Experiment Station PR-520:28-29.

Schardl, C.L. Commentary: A global view of metabolites. Chemistry & Biology 13:5-6.

Seebold, K.W. and E. Dixon. Use of host resistance and fungicides to manage downy and powdery mildew of summer squash, 2005. Biological and Cultural Tests for Control of Plant Diseases 21:V023.

Seebold, K.W. and E. Dixon. Evaluation of fungicides for control of blue mold, target spot, and frogeye on burley tobacco, 2005. Fungicide and Nematicide Tests 61:FC052.

Seebold, K.W. and G.K. Palmer. Evaluation of Quadris for control of target spot on burley tobacco, 2005. Fungicide and Nematicide Tests 61:FC053.

Seebold, K.W. and E. Dixon. Use of Previcur Flex to control Pythium root rot on tobacco seedlings in a float-bed system, 2005. Fungicide and Nematicide Tests 61:FC054.

Vincelli, P., E. Dixon, D. Williams and P. Burrus. Efficacy of fungicides for

control of dollar spot of creeping bentgrass on a sand-based green, 2005. Fungicide and Nematicide Tests 61:T019.

Vincelli, P., E. Dixon, D. Williams and P. Burrus. Efficacy of fungicides for control of brown patch of creeping bentgrass on a sand-based green, 2005. Fungicide and Nematicide Tests 61:T020.

Vincelli, P., E. Dixon, D. Williams and P. Burrus. Efficacy of fungicides for control of dollar spot in a mixed creeping bentgrass/*Poa annua* soil-based green, 2005. Fungicide and Nematicide Tests 61:T021.

Vincelli, P., E. Dixon, D. Williams and P. Burrus. Influence of spray programs with phosphate (=phosphonate) fungicides on turf quality in a mixed creeping Bentgrass/*Poa annua* soil-based green, 2005. Fungicide and Nematicide Tests 61:T022.

Vincelli, P., E. Dixon, D. Williams and P. Burrus. Efficacy of nozzle coverage and fungicide control of dollar spot on a creeping bentgrass sand-based green, 2005. Fungicide and Nematicide Tests 61:T023.

Ph.D. Dissertations

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

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

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

M.S. Thesis

None.

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Genbank Register

Ghabrial, S.A., P.B. de Sa, and W.M. Havens. Characterization of a broad spectrum anti-fungal polypeptide from virus-infected *Helminthosporium (Cochliobolus) victoriae*, complete cds gi. Accession EF587239.

Goodin, M.M. Potato yellow dwarf virus nucleocapsid protein (N) mRNA, complete cds gi. Accession EU183122.

Goodin, M.M. Potato yellow dwarf virus phosphoprotein (P) mRNA, complete cds gi. Accession EU183123.

Books and Book Chapters

Fowler, T.J., and L.J. Vaillancourt. Pheromones and pheromone receptors in *Schizophyllum commune* mate recognition: retrospective of a half-century of progress and a look ahead. Chapter 18, pp. 301-315. IN: J. Heitman et al., ed. Sex in Fungi: Molecular Determinations and Evolutionary Implications. ASM Press, Washington D.C.

Kachroo, A. Plant defences against fungal attack: Perception and signal transduction. IN: John Wiley and Sons, Ltd. Encyclopedia of Life Sciences. Published online: DOI: 10.1002/9780470015902.a0003438.pub2. http://www.els.net/. Chichester, United Kingdom.

Kachroo, A., and P. Kachroo. Salicylic acid-, jasmonic acid- and ethylene-mediated regulation of plant defense signaling. Chapter 28, pp.55-83. IN: Jane Setlow, ed. Genetic Engineering, Principles, and Methods. Springer, Heidleberg, Germany.

Refereed Journal Articles

Betts, M., S. Tucker, N. Galadima, Y. Meng, G. Patel, L. Li, N. Donofrio, N. Brown, T. Mitchell, J.-R. Xu, R. Dean, M.L. Farman, and M. Orbach. Development of a high throughput transformation system for insertional mutagenesis in *Magnaporthe oryzae.* Fungal Genetics and Biology 44:1035-1049.

Chakrabarty, C., R. Banerjee, S.M. Chung, M. Farman, V. Citovsky, S.A. Hogenhout, T. Tzfira, and M.M. Goodin. pSITE vectors for stable integration or transient expression of autofluorescent protein fusions in plants: Probing *Nicotiana benthamiana*-virus interactions. Molecular Plant-Microbe Interactions 20:740-750.

Chandra-Shekara, A.C., S.C. Venugopal, A. Kachroo, and P. Kachroo. Plastidial fatty acid levels regulate resistance gene-dependent defense signaling in Arabidopsis. Proceedings of the National Academy of Sciences USA 104:7277-7282.

Cheng, C.P., H.M. Jaag, M. Jonczyk, E. Serviene, and P.D. Nagy. Expression of the Arabidopsis Xrn4p 5'-3' exoribonuclease facilitates degradation of tombusvirus RNA and promotes rapid emergence of viral variants in plants. Virology 368:338-248.

Deng, M., J.N. Bragg, S. Ruzin, D. Schichnes, D. King, M.M. Goodin, and A.O. Jackson. Role of the sonchus yellow net virus N protein in formation of nuclear viroplasms. Journal of Virology 81:5362-5374.

Farman, M. Telomeres in the rice blast fungus *Magnaporthe oryzae*: the world of the end as we know it. FEMS Microbiology Letters 273:125-132.

Florea, S., C. Machado, D. Zhang, D.G. Panaccione, and C.L.Schardl. Towards the elimination of ergot alkaloid biosynthesis genes in *Neotyphodium coenophialum*. New Zealand Grassland Association: Endophyte Symposium. pp. 477-479.

Goodin, M.M., R. Chakrabarty, R. Banerjee, S. Yelton, and S. DeBolt. Update on live-cell imaging in plant cells: New Gateways to discovery. Plant Physiology 145:1100-1109.

Goodin, M.M., R. Chakrabarty, S. Yelton, K. Martin, A. Clark, and R. Brooks. Membrane and protein dynamics in live plant nuclei infected with Sonchus yellow net virus, a plant-adapted rhabdovirus. Journal of General Virology 88:1810-1820.

Gu, H., C. Zhang, and S.A. Ghabrial. Novel naturally occurring Bean pod mottle virus reassortants with mixed heterologous RNA1 genomes. Phytopathology 97:79-86.

Hesse, U., P. Maynard, S. Macmil, G. Wiley, K. Andreeva, W.E. Beech, E. Arnaoudova, B.T. Willey, V.-G. Puram, J. Wiseman, J. Webb, L. Gill, M.L. Farman, J.W. Jaromczyk, B.A. Roe, and C.L. Schardl. The genome and the genes of *Epichloë festucae*. New Zealand Grassland Association: Endophyte Symposium. pp. 461-465.

Jaag, H.M., J. Stork, and P.D. Nagy. Host transcription factor Rpb11p affects tombusvirus replication and recombination via regulating the accumulation of viral replication proteins. Virology 368:388-404.

Jonczyk, M., K.B. Pathak, M. Sharma, and P.D. Nagy. Exploiting alternative subcellular location for replication: Tombusvirus replication switches to the endoplasmic reticulum in the absence of peroxisomes. Virology 362:320-30.

Kachroo, A., J. Shanklin, E. Whittle, L. Lapchyk, D. Hildebrand, and P. Kachroo. The Arabidopsis stearoyl-acyl carrier protein-desaturase family and the contribution of leaf isoforms to oleic acid synthesis. Plant Molecular Biology 63:257-271.

Kanneganti, T.D., X. Bai, C.W. Tsai, J. Win, T. Meulia, M.M. Goodin, S. Kamoun, and S.A. Hogenhout. A functional genetic assay for nuclear trafficking in plants. The Plant Journal 50:149-58.

Kutil, B.L., C. Greenwald, G. Liu, M.J. Spiering, C.L. Schardl, and H.H. Wilkinson. Comparison of loline alkaloid gene clusters across fungal endophytes: predicting the co-regulatory sequence motifs and the evolutionary history. Fungal Genetics and Biology 44:1002-1010.

Lorenz, N., E.V. Wilson, C. Machado, C.L. Schardl, and P. Tudzynski. Comparison of ergot alkaloid biosynthesis gene clusters in *Claviceps* species indicates loss of late pathway steps in evolution of *C. fusiformis*. Applied and Environmental Microbiology 73:7185-7191.

Meng, Y., G. Patel, M. Heist, M. Betts, S. Tucker, N. Galadima, N. Donofrio, D. Brown, T. Mitchell, L. Li, J.-R. Xu, M. Orbach, M. Thon, R. Dean, and M.L. Farman. A systematic analysis of T-DNA insertion events in *Magnaporthe oryzae*. Fungal and Genetics Biology 44:1050-1064.

Moon, C.D., J.-J. Guillaumin, C. Ravel, C. Li, K.D. Craven, and C.L. Schardl. New *Neotyphodium* endophyte species from the grass tribes Stipeae and Meliceae. Mycologia 99:895-905.

Schardl, C.L., K.D. Craven, K.K. Schweri, W. Hollin, S.L. Clement, J. Schmid, C.P. West, and T.D. Phillips. Endophytes of the tall fescue ploidy series in Europe, North Africa and the Mediterranean. New Zealand Grassland Association: Endophyte Symposium. p 456.

Schardl, C.L., R.B. Grossman, J.D. Blankenship, M.J. Spiering, and J.R. Faulkner. Biosynthesis of loline alkaloids by epichloë endophytes of grasses. New Zealand Grassland Association: Endophyte Symposium. p. 482.

Schardl, C.L., R.B. Grossman, P. Nagabhyru, J.R. Faulkner, and U.P. Mallik. Loline alkaloids: currencies of mutualism. Phytochemistry 68:980-996.

Schardl, C.L., A. Leuchtmann, and B.A. McDonald. Relationships of *Epichloë typhina* isolates from different host grasses. New Zealand Grassland Association: Endophyte Symposium. pp. 451-455.

Schardl, C.L., D.G. Panaccione, D.A. Potter, S. Florea, U. Hesse, E. Konnova, M. Liu, C. Machado, and J.T. Stokes. Genetic tests of ecological roles of ergot alkaloids produced by an epichloë endophyte of ryegrass. New Zealand Grassland Association: Endophyte Symposium. p. 172.

Selosse, M.-A., and C.L. Schardl. Fungal endophytes in grasses: hybrids rescued by vertical transmission? An evolutionary perspective. New Phytologist 173:452–458.

Sullivan, T.J., J. Rodstrom, J. Vandop, J. Librizzi, C. Graham, C.L. Schardl, and T.L. Bultman. Symbiont-mediated changes in *Lolium arundinaceum* inducible defenses: evidence from changes in gene expression and leaf composition. New Phytologist 176:673-679.

Venard, C., and L. Vaillancourt. Penetration and colonization of unwounded maize tissues by the maize anthracnose pathogen *Colletotrichum graminicola*, and by the related non-pathogen *C.*

sublineolum. Mycologia 99:368-377.

Venard, C., and L. Vaillancourt. Colonization of fiber cells by *Colletotrichum graminicola* in wounded maize stalks. Phytopathology 97:438-444.

Vincelli, P., and E. Dixon. Does spray coverage influence fungicide efficacy against dollar spot? Applied Turfgrass Science. Published online: doi:10.1094/ATS-2007-1218-01-RS. http://www.plantmanagementnetwork.org/ats/element/sum2.asp?id=6740.

Zhang, C., H. Gu, and S.A. Ghabrial. Molecular characterization of naturally occurring RNA1 recombinants of the comovirus Bean pod mottle virus. Phytopathology 97:1245-1254.

Other Research Publications

Bomford, M.K., P.C. Vincelli, E.W. Dixon, and B.A. Geier. Evaluation of solarization and Contans WG for control of *Sclerotinia sclerotiorum* in high tunnels, 2006. Plant Disease Management Reports 1:V163. Published online: doi: 10.1094/PDMR01. http://plantmanagementnetwork.org/pub/trial/pdmr/volume1/abstracts/v163.asp.

Jurick, W. M., C.L. Harmon, J. Marois, D.L. Wright, K. Lamour, A. Vitoreli, T. Creswell, D.E. Hershman, C. Estevez, B. Kemerait, C. Balbalian, and P.F. Harmon. A comparative analysis of diagnostic protocols for detection of the Asian Soybean Rust pathogen, *Phakopsora pachyrhizi*. Plant Health Progress. Published online: doi:10.1094/PHP-2007-0531-01-RS. http://www.plantmanagementnetwork.org/php/elements/sum2.asp?id=6286.

Hershman, D., and P. Bachi. Fungicide control of Fusarium head blight and leaf diseases of soft red winter wheat in Kentucky, 2006. Plant Disease Management Reports 1:CF002. Published online: doi:10.1094/PDMR01. http://www.plantmanagementnetwork.org/pub/trial/pdmr/volume1/abstracts/cf002.asp.

Hershman, D., T. Yielding, and P. Bachi. Evaluation of fungicides for control of foliar and stem diseases of soybean in Kentucky, 2006. Plant Disease Management Reports 1:FC086. Published online: doi: 10.1094/PDMR01. http://www.plantmanagementnetwork.org/pub/trial/pdmr/volume1/abstracts/fc086.asp.

Hershman, D., T. Yielding, and P. Bachi. Evaluation of fungicides for control of foliar and stem diseases in late-planted soybean in Kentucky, 2006. Plant Disease Management Reports 1:FC019. Published online: doi: 10.1094/PDMR01. http://www.plantmanagementnetwork.org/pub/trial/pdmr/volume1/abstracts/fc019.asp.

Seebold, K.W. Effectively manage target spot. pp. 10-12 IN: W. Harr and P. Golden, eds. Tobacco Trends. Farm Progress, Carol Stream IL. 22 pp.

Seebold, K.W., and E. Dixon. Evaluation of experimental fungicides for control of Phytophthora crown rot of bell pepper, 2006. Plant Disease Management Reports 1:V100. Published online:

doi: 10.1094/PDMR01.
http://www.plantmanagementnetwork.org/pub/trial/pdmr/volume1/abstracts/v100.asp.

Seebold, K.W., and E. Dixon. Evaluation of experimental fungicides and strobilurins for control of downy and powdery mildew on winter squash, 2006. Plant Disease Management Reports 1:V101. Published online: doi: 10.1094/PDMR01.
http://www.plantmanagementnetwork.org/pub/trial/pdmr/volume1/abstracts/v101.asp.

Seebold, K.W., and E. Dixon. Evaluation of fungicides for management of downy and powdery mildew on winter squash (IR-4 performance trial), 2006. Plant Disease Management Reports 1:V102. Published online: doi: 10.1094/PDMR01.
http://www.plantmanagementnetwork.org/pub/trial/pdmr/volume1/abstracts/v102.asp.

Seebold, K.W., and E. Dixon. Effect of potassium phosphite and fungicides on Phytophthora crown and fruit rot of summer squash, 2006. Plant Disease Management Reports 1:V103. Published online: doi: 10.1094/PDMR01.
http://www.plantmanagementnetwork.org/pub/trial/pdmr/volume1/abstracts/v103.asp.

Seebold, K.W., and G.K. Palmer. Evaluation of Quadris for control of target spot on burley tobacco, 2006. Plant Disease Management Reports 1:FC117. Published online: doi: 10.1094/PDMR01.
http://www.plantmanagementnetwork.org/pub/trial/pdmr/volume1/abstracts/fc117.asp.

Seebold, K.W., and G.K. Palmer. Evaluation of Quadris and V-10161 for control of blue mold on burley tobacco, 2006. Plant Disease Management Reports 1:FC121. Published online: doi: 10.1094/PDMR01.
http://www.plantmanagementnetwork.org/pub/trial/pdmr/volume1/abstracts/fc121.asp.

Seebold, K.W., and G.K. Palmer. Evaluation of V-10161, Ridomil Gold, and Quadris for control of black shank on burley tobacco, 2006. Plant Disease Management Reports 1:FC119. Published online: doi: 10.1094/PDMR01.
http://www.plantmanagementnetwork.org/pub/trial/pdmr/volume1/abstracts/fc119.asp.

Seebold, K.W., and P.Sizemore. Effect of application timing on the efficacy of Quadris against target spot on burley tobacco, 2006. Plant Disease Management Reports 1:FC118. Published online: doi: 10.1094/PDMR01.
http://www.plantmanagementnetwork.org/pub/trial/pdmr/volume1/abstracts/fc118.asp.

Vincelli, P., E. Dixon, D. Williams, and P. Burrus. Influence of spray programs with phosphate (=phosphonate) fungicides on turf quality in a mixed creeping bentgrass/*Poa annua* soil-based green, 2006. Plant Disease Management Reports 1:T001. Published online: doi: 10.1094/PDMR01.
http://www.plantmanagementnetwork.org/pub/trial/pdmr/volume1/abstracts/t001.asp.

Vincelli, P., E. Dixon, D. Williams, and P. Burrus. Efficacy of fungicides for control of dollar spot in a mixed creeping bentgrass/*Poa annua* soil-based green, 2006. Plant Disease

Management Reports 1:T002. Published online: doi: 10.1094/PDMR01. http://www.plantmanagementnetwork.org/pub/trial/pdmr/volume1/abstracts/t002.asp.

Vincelli, P., E. Dixon, D. Williams, and P. Burrus. Efficacy of fungicides for control of dollar spot of creeping bentgrass on a sand-based green, 2006. Plant Disease Management Reports 1:T003. Published online: doi: 10.1094/PDMR01. http://www.plantmanagementnetwork.org/pub/trial/pdmr/volume1/abstracts/t003.asp.

Vincelli, P., E. Dixon, D. Williams, and P. Burrus. Efficacy of fungicides for control of brown patch of creeping bentgrass on a sand-based green, 2006. Plant Disease Management Reports 1:T004. Published online: doi: 10.1094/PDMR01. http://www.plantmanagementnetwork.org/pub/trial/pdmr/volume1/abstracts/t004.asp.

Vincelli, P., and M.L. Farman. Update on fungicide resistance in gray leaf spot. Golf Course Management 75:124-127.

Ph.D. Dissertation

Debashish, Ghosh. (Biology/Plant Pathology). Cloning, characterization and subcellular localization of the N (nucleocapsid) and P (phosphoprotein) protein of the SYDV (Potato yellow dwarf virus Sanguinolenta strain).

M.S. Thesis

Bateman, Amy. The role of shearing in the transmission of *Diplodia pinea* in Scots pine Christmas trees in Kentucky.

Plant Pathology
College Annual Report, 2008

Genbank Register

Farman, M.L. *Neurospora crassa* OR74A Tel-IL, complete cds gi. Accession FJ589751.
Farman, M.L. *Neurospora crassa* OR74A Tel-IR, complete cds gi. Accession FJ589752.
Farman, M.L. *Neurospora crassa* OR74A Tel-IIL, complete cds gi. Accession FJ589753.
Farman, M.L. *Neurospora crassa* OR74A Tel-IIR, complete cds gi. Accession FJ589754.
Farman, M.L. *Neurospora crassa* OR74A Tel-IIIL, complete cds gi. Accession FJ589755.
Mark Farman had 19 additional accessions.

Kachroo, A.P. *Glycine max* RAR1 protein mRNA, complete cds gi. Accession FJ222386.
Kachroo, A.P. *Glycine max* SGT1-1 mRNA, complete cds gi. Accession FJ222387.
Kachroo, A.P. *Glycine max* SGT1-2 mRNA, complete cds gi. Accession FJ222388.
Kachroo, A.P. *Glycine max* heat shock protein 90-2 mRNA, complete cds gi. Accession FJ222389.
Kachroo, A.P. *Glycine max* heat shock protein 90-1 mRNA, complete cds gi. Accession FJ222390.

Books and Book Chapters

Foster, G.D., I.E. Johansen, Y. Hong, and P.D. Nagy. Plant Virology Protocols: From Viral Sequence to Protein Function. Second Edition. Humana Press/Springer, New York. 677pp.

Ghabrial, S.A. Chrysoviruses. Pp. 503-513. IN: B.W.J. Mahy and M.H.V. Van Regenmortel, ed. Encyclopedia of Virology. Third edition, volume 1. Academic Press/Elsevier, Oxford, U.K.

Ghabrial, S.A. Totiviruses. Pp.163-174. IN: B.W.J. Mahy and M.H.V. Van Regenmortel, ed. Encyclopedia of Virology. Third edition, volume 1. Academic Press/Elsevier, Oxford, U.K.

Ghabrial, S.A., and N. Suzuki. Fungal Viruses. Pp. 284-291. IN: B.W.J. Mahy and M.H.V. Van Regenmortel, ed. Encyclopedia of Virology. Third edition, volume 1. Academic Press/Elsevier, Oxford, U.K.

Ghabrial, S.A., W. Ochoa, T.B. Baker, and M. Nibert. Partitiviruses: General features. Pp. 68-75. IN: B.W.J. Mahy and M.H.V. Van Regenmortel, ed. Encyclopedia of Virology. Third edition, volume 1. Academic Press/Elsevier, Oxford, U.K.

Hollier, C.A., and D.E. Hershman. Integrated Pest Management. Chapter 35, pp. 437-445. IN: R. N. Trigano, M. T. Windham, and A. S. Windham, ed. Plant Pathology Concepts and Laboratory Exercises. Second Edition. CRC Press, Boca Raton.

Langston, D.B., and K.W. Seebold. Sections on onion diseases. Pp. 10, 11-12, 18-22, 50-51, and 53-54. IN: H.F. Schwartz and S.K. Mohan, ed. Compendium of Onion Diseases. APS Press, St. Paul.

Refereed Journal Articles

Chanda, B., S.C. Venugopal, S. Kulshrestha, D. Navarre, B. Downie, L. Vaillancourt, A.P. Kachroo, and P. Kachroo. Glycerol-3-phosphate levels are associated with basal resistance to the hemibiotrophic fungus *Colletotrichum higginsianum* in Arabidopsis. Plant Physiology 147:2017-2029.

de Sá, P.B., K.W. Seebold, and P. Vincelli. First report of *Tomato yellow leaf curl virus* in greenhouse tomatoes in Kentucky. Plant Health Progress. Published online: doi:10.1094/PHP-2008-0819-01-RS.

Ghabrial, S. A., and M.L. Nibert. *Victorivirus*, a new genus of fungal viruses in the family *Totiviridae*. Archives of Virology. Published online: doi:10.1007/s00705-008-0272-x

Ghosh, D., R.E. Brooks, R. Wang, J. Lesnaw, and M.M. Goodin. Cloning and subcellular localization of the phosphoprotein and nucleocapsid proteins of *Potato yellow dwarf virus*, type species of the genus Nucleorhabdovirus. Virus Research 135:26-35.

Goodin, M.M., D. Zaitlin, R.A. Naidu, and S.A. Lommel. *Nicotiana benthamiana*: its history and future as a model for plant-pathogen interactions. Molecular Plant-Microbe Interactions 21:1015-1026.

Hajimorad, M. R., S.A. Ghabrial, and M.J. Roossinck. *De novo* emergence of a novel satellite RNA of *Cucumber mosaic virus* following serial passages of the virus derived from RNA transcripts. Archives of Virology. Published online: doi:10.1007/s00705-008-0280-x.

Hershman, D.E., R.D. Heinz and B.S. Kennedy. Soybean cyst nematode, *Heterodera glycines*, populations adapting to resistant soybean cultivars in Kentucky. Plant Disease 92:1475.

Jeong, R.-D., A.C. Chandra-Shekara, A.P. Kachroo, D. Klessig, and P. Kachroo. HRT-mediated hypersensitive response and resistance to *Turnip crinkle virus* in Arabidopsis does not require the function of TIP, the presumed guardee protein. Molecular Plant-Microbe Interactions 21:1316-1324.

Kachroo, A., D.-Q. Fu, W. Havens, D. Navarre, P. Kachroo, and S.A. Ghabrial. Virus-induced gene silencing of stearoyl-acyl carrier protein-desaturase in soybean results in constitutive defense and enhanced resistance to pathogens. Molecular Plant-Microbe Interactions 21:564-575.

Kang, H.-G., J.C. Kuhl, P. Kachroo, and D.F. Klessig. *Turnip crinkle virus* resistance in Arabidopsis requires CRT1, a new member of GHKL ATPase family. Cell Host & Microbe 3:48-57.

Kendell, A., M. McDonald, W. Bian, T. Bowles, S.C Baumgarten, J. Shi, P.L. Stewart, E. Bullitt, D. Gore, T.A. Irving, W.M. Havens, S.A. Ghabrial, J.S. Wall, and G. Stubbs. Structure of flexible filamentous plant viruses. Journal of Virology 82:9546-9554.

Li, H., Y. Fu, D. Jiang, G. Li, S.A. Ghabrial, and X. Yi. Down-regulation of *Sclerotinia sclerotiorum* gene expression in response to infection with *Sclerotinia sclerotiorum debilitation-associated RNA virus.* Virus Research 135:95-106.

Li, Z., D. Barajas, T. Panavas, D.A. Herbst, and P.D. Nagy. Cdc34p ubiquitin-conjugating enzyme is a component of the tombusvirus replicase complex and ubiquitinates p33 replication protein. Journal of Virology 82:6911-6926.

Liu, H., Y. Fu, D. Jiang, G. Li, J. Xie, Y. Peng, X. Yi, and S.A. Ghabrial. A novel mycovirus that is related to the human pathogen *Hepatitis E virus* and rubi-like viruses. Journal of Virology. Published online: doi:10.1128/JVI.01897-08.

Nagy, P.D. Yeast as a model host to explore plant virus-host interactions. Annual Review of Phytopathology 46:217-242.

Nagy, P.D., and J. Pogany. Multiple roles of viral replication proteins in plant RNA virus replication. Methods in Molecular Biology 451:55-68.

Ochoa, W. F., W.M. Havens, R.S. Sinkovits, M.L. Nibert, S.A. Ghabrial, and T.S. Baker. Partitivirus structure reveals a 120-subunit, helix-rich capsid with distinctive surface arches formed by quasisymmetric coat-protein dimers. Structure 16:776-786.

Panavas, T., E. Serviene, J. Pogany, and P.D. Nagy. Genome-wide screens for identification of host factors in viral replication. Methods in Molecular Biology 451:615-624.

Pathak, K.B., Z. Sasvari, and P.D. Nagy. The host Pex19p plays a role in peroxisomal localization of tombusvirus replication proteins. Virology 379:294-305.

Paul, P.A., P.E. Lipps, D.E. Hershman, M.P. McMullen, M.A. Draper, and L.V. Madden. Efficacy of triazole-based fungicides for FHB and deoxynivalenol content in wheat: A multi-variate meta analysis. Phytopathology 98:999-1011.

Pogany, J., and P.D. Nagy. Authentic replication and recombination of *Tomato bushy stunt virus* RNA in a cell-free extract from yeast. Journal of Virology 82:5967-5980.

Rajendran, K.S., and P.D. Nagy. Surface plasmon resonance analysis of interactions between replicase proteins of *Tomato bushy stunt virus*. Methods of Molecular Biology 451:267-277.

Schardl, C.L., K.D. Craven, S. Speakman, A. Stromberg, A. Lindstrom, and R. Yoshida. A novel test for host-symbiont codivergence indicates ancient origin of fungal endophytes in grasses. Systematic Biology 57:483-498.

Spiering, M.J., J.R. Faulkner, C. Machado, D.-X. Zhang, R.B. Grossman, and C.L. Schardl. Role of the LolP cytochrome P450 in biosynthesis of *N*-formylloline. Fungal Genetics and Biology 45:1307-1314.

Tang, J., W.F. Ochoa, R.S. Sinkovits, B.T. Poulos, S.A. Ghabrial, D.V. Lightner, T.S. Baker, and M.L. Nibert. *Infectious myonecrosis virus* has a totivirus-like, 120-subunit capsid, but with fiber complexes at the fivefold axes. Proceedings of the National Academy of Sciences USA 105:17526-17531.

Vincelli, P., E. Dixon, and M.L. Farman. Gray leaf spot of annual ryegrass: susceptibility of selected cultivars of forage grasses and relatedness of the pathogen to strains from other grasses. Forage and Grazinglands. Published online: doi:10.1094/FG-2008-0226-01-RS.

Vincelli, P. and N. Tisserat. Nucleic acid-based pathogen detection in applied plant pathology. Plant Disease 92:660-669.

Wang, R.Y., and P.D. Nagy. *Tomato bushy stunt virus* co-opts the RNA-binding function of a host metabolic enzyme for viral genomic RNA synthesis. Cell Host & Microbe 3:178-187.

C.L. Schardl contributed to one publication in Entomology.

Other Research Publications

Canaday, C., B. Ownley, K. Gwinn, C. Rothrock, A. Keinath, and K.W. Seebold. Effects of biocontrol agents versus a fungicide on growth, yield, and diseases of broccoli in Tennessee, 2007-2008. Plant Disease Management Reports 2:V145. Published online: doi:10.1094/PDMR02.

Lee, C., P. Vincelli, and E. Dixon. Evaluation of fungicides for control of gray leaf spot in corn, 2007. Plant Disease Management Reports, 2:FC096. Published online: doi:10.1094/PDMR02.

Ownley, B., K. Gwinn, M. Dee, C. Canaday, A. Keinath, C. Rothrock, and K.W. Seebold. Effects of biocontrol agents on growth, yield, and root disease of broccoli in East Tennessee, 2007-08. Plant Disease Management Reports 2:V155. Published online: doi:10.1094/PDMR02.

Seebold, K.W. Evaluation of fungicides for management of foliar diseases on burley tobacco, 2007. Plant Disease Management Reports 2:FC100. Published online: doi:10.1094/PDMR02.

Seebold, K.W. Evaluation of fungicides for management of target spot on burley tobacco, 2007. Plant Disease Management Reports 2:FC099. Published online: doi:10.1094/PDMR02.

Seebold, K.W. Evaluation of Ridomil Gold applied at different timings for management of black shank, 2007. Plant Disease Management Reports 2:FC103. Published online: doi:10.1094/PDMR02.

Seebold, K.W. Evaluation of Ridomil Gold, Quadris, and Revus for management of black shank, 2007. Plant Disease Management Reports 2:FC102. Published online: doi:10.1094/PDMR02.

Seebold, K.W., and E. Dixon. Evaluation of kiralaxyl (IR 6141) on Phytophthora crown and fruit rot of summer squash, 2007. Plant Disease Management Reports 2:V004. Published online: doi:10.1094/PDMR02.

Seebold, K.W., and J. Henderson. Evaluation of Quadris applied at different timings for control of target spot on burley tobacco, 2007. Plant Disease Management Reports 2:FC098. Published online: doi:10.1094/PDMR02.

Seebold, K.W., and F.J. Louwes. Relative effectiveness of alternative management for disease control in pepper. P. 196. IN: G. Holmes and J. Kemble, ed. 2008 Vegetable Crop Handbook for the Southeastern U.S., North Carolina Vegetable Growers Association.

Seebold, K.W., A. Holdcroft, and E. Dixon. Effect of potassium phosphite and fungicides on Phytophthora crown and fruit rot of summer squash, 2007. Plant Disease Management Reports 2:V005. Published online: doi:10.1094/PDMR02.

Seebold, K.W., G.K. Palmer, and S.P. Smith. Evaluation of burley cultivars for resistance to black shank, 2007. Plant Disease Management Reports 2:FC101. Published online: doi:10.1094/PDMR02.

Sikora, E. J., and D. E. Hershman. Soybean rust in review. Pp. 20-28. IN:
A. E. Dorrance, M. A. Draper, and D. E. Hershman, ed. Using Foliar Fungicides to Manage Soybean Rust. The Ohio State University Extension Bulletin SR-2008.

Tenuta, A., D. Hershman, M. A. Draper, and A. E. Dorrance. Fungicide basics.
Pp. 48-56. IN: A. E. Dorrance, M. A. Draper and D. E. Hershman, ed. Using Foliar Fungicides to Manage Soybean Rust. The Ohio State University Extension Bulletin SR-2008.

Vincelli, P., and E. Dixon. Improving spray coverage improves dollar spot control. Golf Course Management 76:114-116.

Vincelli, P., E. Dixon, D. Williams, and P. Burrus. Efficacy of fungicides for control of brown patch of creeping bentgrass on a sand-based green, 2007. Plant Disease Management Reports, 2:T020. Published online: doi:10.1094/PDMR02.

Vincelli, P., E. Dixon, D. Williams, and P. Burrus. Efficacy of fungicides for control of dollar spot of creeping bentgrass on a sand-based green, 2007. Plant Disease Management Reports, 2:T021. Published online: doi:10.1094/PDMR02.

Vincelli, P., E. Dixon, D. Williams, and P. Burrus. Efficacy of fungicides for control of dollar spot in a mixed creeping bentgrass/*Poa annua* soil-based green, 2007. Plant Disease Management Reports, 2:T022. Published online: doi:10.1094/PDMR02.

Vincelli, P., E. Dixon, D. Williams, and P. Burrus. Influence of fungicide spray programs on turf quality in a mixed creeping bentgrass/*Poa annua* soil-based green, 2007. Plant Disease Management Reports, 2:T023. Published online: doi:10.1094/PDMR02.

Ph.D. Dissertation

Venugopal, Srivathsa C. Molecular, genetic, and biochemical characterization of oleic acid- and glycerol-mediated signaling in plant defense.

Zhang, Dong-Xiu. Loline alkaloid biosynthesis gene expression in *Epichloë* endophytes of grasses.

Statistical Contacts

Fiscal Year: 2004

Report to View: Plant Pathology

FY 2004 Statistical Contacts - Plant Pathology											
Planning Unit	Employee Name	Days Reported	Number of Contacts								
			White	Black	Asian	Hispanic	Native American	Other	Total	Female	Youth
Plant Pathology	Hartman, John R	215.0	1,528	43	4	32	0	11,624	13,231	372	0
Plant Pathology	Hershman, Donald E	176.0	2,349	3	0	2	0	43,200	45,554	278	0
Plant Pathology	Nesmith, William C	280.0	1,790	17	1	25	0	52,852	54,685	371	0
Plant Pathology	Smith, David A	34.0	400	15	27	8	0	0	450	50	0
Plant Pathology	Vincelli, Paul	270.0	1,084	13	2	1	0	10,007	11,107	110	0
	TOTAL:	975.0	7,151	91	34	68	0	117,683	125,027	1,181	0

Statistical Contacts

Fiscal Year: 2005

Report to View: Plant Pathology

FY 2005 Statistical Contacts - Plant Pathology											
Planning Unit	Employee Name	Days Reported	Number of Contacts								
			White	Black	Asian	Hispanic	Native American	Other	Total	Female	Youth
Plant Pathology	Hartman, John R	216.0	655	40	0	8	0	7,030	7,733	205	0
Plant Pathology	Hershman, Donald E	231.0	0	0	0	0	0	11,014	11,014	0	0
Plant Pathology	Seebold, Kenneth W	280.0	224	0	0	0	0	8,204	8,428	28	0
Plant Pathology	Smith, David A	34.0	400	15	27	8	0	0	450	50	0
Plant Pathology	Vincelli, Paul	185.0	2,339	39	7	2	0	6,981	9,368	375	0
	TOTAL:	946.0	3,618	94	34	18	0	33,229	36,993	658	0

Statistical Contacts

Fiscal Year: 2006

Report to View: Plant Pathology

FY 2006 Statistical Contacts - Plant Pathology											
Planning Unit	Employee Name	Days Reported	Number of Contacts								
			White	Black	Asian	Hispanic	Native American	Other	Total	Female	Youth
Plant Pathology	Hartman, John R	216.0	1,496	73	0	0	0	6,000	7,569	420	0
Plant Pathology	Hershman, Donald E	220.0	3,736	3	0	3	0	15,963	19,705	157	0
Plant Pathology	Seebold, Kenneth W	240.0	2,104	41	12	1	0	6,792	8,950	364	0
Plant Pathology	Smith, David A	34.0	400	15	27	8	0	0	450	50	0
Plant Pathology	Vincelli, Paul	255.0	2,439	42	10	5	0	7,844	10,340	375	0
	TOTAL:	965.0	10,175	174	49	17	0	36,599	47,014	1,366	0

Statistical Contacts

Fiscal Year: 2007

Report to View: Plant Pathology

FY 2007 Statistical Contacts - Plant Pathology											
Planning Unit	Employee Name	Days Reported	Number of Contacts								
			White	Black	Asian	Hispanic	Native American	Other	Total	Female	Youth
Plant Pathology	Hartman, John R	216.0	1,171	14	0	64	0	7,632	8,881	330	0
Plant Pathology	Hershman, Donald E	237.0	3,676	3	5	4	2	14,400	18,090	188	4
Plant Pathology	Seebold, Kenneth W	240.0	2,236	91	2	106	0	10,068	12,503	608	0
Plant Pathology	Smith, David A	34.0	400	15	27	8	0	0	450	50	0
Plant Pathology	Vincelli, Paul	262.0	1,880	24	10	3	0	8,008	9,925	151	0
	TOTAL:	989.0	9,363	147	44	185	2	40,108	49,849	1,327	4

Statistical Contacts

Fiscal Year: 2008

Report to View: Plant Pathology

FY 2008 Statistical Contacts - Plant Pathology											
Planning Unit	Employee Name	Days Reported	Number of Contacts								
			White	Black	Asian	Hispanic	Native American	Other	Total	Female	Youth
Plant Pathology	Hartman, John R	216.0	1,664	58	0	36	0	5,000	6,758	350	0
Plant Pathology	Hershman, Donald E	243.0	4,175	2	0	8	0	13,086	17,271	189	0
Plant Pathology	Seebold, Kenneth W	240.0	2,255	88	0	20	0	9,523	11,886	599	0
Plant Pathology	Smith, David A	34.0	400	15	27	8	0	0	450	50	0
Plant Pathology	Vincelli, Paul	357.0	2,711	39	4	0	0	6,750	9,504	311	0
	TOTAL:	1,090.0	11,205	202	31	72	0	34,359	45,869	1,499	0

Statistical Contacts

Fiscal Year: 2009

Report to View: Plant Pathology

FY 2009 Statistical Contacts - Plant Pathology											
Planning Unit	Employee Name	Days Reported	Number of Contacts								
			White	Black	Asian	Hispanic	Native American	Other	Total	Female	Youth
Plant Pathology	Hershman, Donald E	246.0	3,597	5	0	6	0	31,609	35,217	269	11
Plant Pathology	Seebold, Kenneth W	240.0	2,442	42	0	13	0	5,622	8,119	669	0
Plant Pathology	Smith, David A	34.0	400	15	27	8	0	0	450	50	0
Plant Pathology	Vincelli, Paul	220.0	1,684	43	4	0	0	8,908	10,639	284	0
	TOTAL:	740.0	8,123	105	31	27	0	46,139	54,425	1,272	11

MARK LEWIS FARMAN
CURRICULUM VITAE

CURRENT POSITION

Professor, University of Kentucky, Department of Plant Pathology, July 1st, 2009-present.

EDUCATION

University of Wisconsin-Madison
Assistant Researcher, 1993 - 1997.

University of Wisconsin-Madison
Research Associate, 1990 - 1993.

University of East Anglia, Norwich, United Kingdom
Ph.D. in Molecular Biology, 1986 - 1990.
Thesis title: A study of transformation in *Leptosphaeria maculans.*

University of East Anglia, Norwich, United Kingdom
B.Sc. Hons. in Biological Sciences, 1983 - 1986.

RESEARCH EXPERIENCE

Associate Professor, University of Kentucky, Department of Plant Pathology, July 1st, 2003 - present. Molecular genetics of host-pathogen interactions. Molecular genetics of genome instability. Pathogen population biology. Fungal genomics.

Assistant Professor, University of Kentucky, Department of Plant Pathology (March 1st, 1997 - June 30, 2003).

Full Member of the Graduate Faculty of the University of Kentucky
Admitted to full membership, September 24th, 2001

Assistant Researcher, University of Wisconsin-Madison
Identification of disease resistance genes in non-host plants. Physical mapping and isolation of an avirulence gene in the rice blast fungus, *Magnaporthe grisea.*

Research Associate, University of Wisconsin-Madison
Physical mapping and isolation of an avirulence gene in the rice blast fungus, *Magnaporthe grisea.*

Postgraduate Research Assistant, University of East Anglia, Norwich, United Kingdom
Molecular biology and genetic transformation of *Leptosphaeria maculans.*

Honors Research Project, University of East Anglia, Norwich, United Kingdom
Construction of a genomic library of *Cladosporium fulvum*.

EXTRAMURAL FUNDING

United States Department of Agriculture (USDA) - Functional Genomics of Microbes program, National Research Initiative 2008-35600-18809. Localization of secreted proteins during penetration and invasive growth of the rice blast fungus *Magnaporthe oryzae*. **M. Farman (Principle Investigator - PI),** M. Goodin (Co-PI), B. Valent (Co-PI), C. Soderlund (Co-PI), 1/15/2008 - 1/14/2011, **$990,000** (nationally competitive).

National Science Foundation (NSF) - Molecular and Cellular Biology program, MCB 0653930. Telomere hypervariability in the model fungal pathogen, *Magnaporthe oryzae*. **M. Farman (PI)**, 4/1/07 - 3/31/10, **$335,909** (nationally competitive).

USDA/NSF Microbial Genome Sequencing program, EF 0523661. Genome of *Epichloë festucae*: a model endophyte of grasses. C. Schardl (PI), **M. Farman (Co-PI)** B. A. Roe, 10/1/05 to 9/30/07, **$771,075** (nationally competitive).

NSF - Major Research Instrumentation Program DBI 500710. Acquisition of a laser scanning confocal microscope for Plant Science Research P. Nagy, **M. Farman (Co-PI)**, M. Goodin and S. Perry. 5/1/05 to 4/30/08, **$314,552** (nationally competitive).

Kentucky Science and Engineering Foundation (KSEF), KSEF-943-RDE-008**.** Protein secretion by fungal pathogens: delivery into the host cell cytoplasm. **M. Farman (PI),** and M. Goodin, 11/1/05 to 05/31/07, **$49,651** (state-wide competition).

USDA/NSF Microbial Genome Sequencing program, MCB 0135462. Comparative genomics of telomeres in pathogenic and saprophytic fungi. **M. Farman (PI)**, C. Schardl, C. Staben, M. Sachs, and R. Dean, 10/1/01 to 9/30/03, **$792,999** (nationally competitive).

NSF Plant Genome program, DBI 0115642. Whole genome analysis of host -pathogen interaction and subsequent responses in the rice blast pathosystem. R. Dean, D. Ebbole, **M. Farman** (Co-PI), M. Orbach, C. Soderlund, G.-L. Wang, R. Wing, B. Wojnowski, and J-R. Xu, 10/1/01 to 9/30/05, **$5,860,000** (Farman portion = **$456,096**) (nationally competitive).

USDA-Special Research Grants program, 2001-34457-10343 - Advanced Genetic Technologies. C. Schardl, E. Bailey, J. Chappell, **M. Farman (Co-PI)**, S. Gan, S. Perry, and B. Webb, **$444,320**, 1/26/01 to 1/25/02 (non-competitive).

Syngenta Crop Protection - Population biology of a mutation conferring resistance to QoI fungicides in *Pyricularia grisea*. **M. Farman (PI)**, 1/1/02, **$53,000** (unrestricted gift).

United States Golf Association, MIS 9910141322 - Development of gray leaf spot-resistant perennial ryegrass through breeding and biotechnological approaches. **M. Farman (PI)**, T. Phillips, D. Williams, 5/1/00 to 4/30/03, **$75,000** (nationally competitive).

March of Dimes Birth Defects Foundation - Basil O' Connor Starter Scholar Award, FY98-749 - Factors affecting *de novo* meiotic chromosome deletions. **M. Farman (PI)**, 2/1/99 to 1/31/01, **$100,000** (nationally competitive).

Mycogen. Genetic studies of pathogen-host interactions. **M. Farman (PI)**, **$6,000**, 7/1/97 (unrestricted gift).

EXTRAMURAL FUNDING FOR UNDERGRADUATE STUDENT RESEARCH

NSF - Research Experience for Undergraduates (REU): supplement to MCB 0653930. Telomere hypervariability in the model fungal pathogen, *Magnaporthe oryzae*, 7/1/08 to 6/30/09, **$12,000.**

NSF - REU: supplement to DBI 0115642. Whole genome analysis of host - pathogen interaction and subsequent responses in the rice blast pathosystem, 6/1/04 to 8/10/04, **$10,000.**

NSF - REU: supplement to DBI 0115642. Whole genome analysis of host - pathogen interaction and subsequent responses in the rice blast pathosystem, 6/1/03 to 8/9/03, **$20,000.**

NSF - REU: supplement to DBI 0115642. Whole genome analysis of host - pathogen interaction and subsequent responses in the rice blast pathosystem, 6/1/02 to 8/9/02, **$20,000.**

NSF - REU: supplement to MCB 0135462. Comparative genomics of telomeres in pathogenic and saprophytic fungi, 6/1/02 to 8/9/02, **$10,000.**

INTRAMURAL FUNDING

Tobacco and Health Research Institute (THRI) - Use of molecular markers for epidemiological and population studies of *Peronospora tabacina.* **M. Farman (PI)**, 7/1/98 to 4/30/01, $**126,000** (regionally competitive).

THRI - Cloning of blue mold resistance genes from wild *Nicotiana* based on conserved resistance gene motifs. Q. Li and **M. Farman (Co-PI)**, 7/1/98 to 6/30/01, **$150,000** (regionally competitive).

Office of the Vice President for Research

UK Research Equipment Initiative. Typhoon 9400 imaging system. **M. Farman (PI)**, P. Nagy, P. Kachroo, C. Schardl, S. Ghabrial, M. Goodin, A. Hunt, J. Chappell, D. Hildebrand, S. Perry, R. Houtz, and R. Palli, 2005, **$50,000** (UK campus competition).

UK Research Equipment Initiative. Cryo-preservation freezers with liquid nitrogen backup systems, **M. Farman (PI)**, C. Schardl, and L. Vaillancourt, 2003, **$13,276** (UK campus competition).

UK Research Equipment Initiative. A digital imaging system for fluorescence microscopy and other microscopy applications. L. Vaillancourt, **M. Farman (Co-PI)**, and S. Perry, 2001, **$17,000** (UK campus competition).

UK Minigrant to **M. Farman** to cover page charges related to publication of two research manuscripts, 2002, **$1,380**.

UK Research Equipment Initiative. Confinement plant growth units for research with genetically-engineered and imported microorganisms, 1999, **M. Farman (PI)**, **$17,000** (UK campus competition).

INTRAMURAL STUDENT TRAVEL AWARD

Commonwealth Research Award – for Rebecca Peyyala to attend the 21st Fungal Genetics Conference to present her work in a poster presentation, **$ 800**, 2001.

PROPOSALS SUBMITTED BUT NOT FUNDED

NSF – Microbial Genome Sequencing program. Fungal telomere sequencing. **M. Farman (PI)**, and J. Jaromczyk, submitted, March, 2008.

NSF – Microbial Genome Sequencing program. Fungal telomere sequencing. **M. Farman (PI)**, J. Jaromczyk, F. Trail, submitted, March, 2007..

KSEF. Function genomics and live-cell imaging of plant colonization by a pathogenic fungus, **M. Farman (PI),** submitted October 2006.

NSF - Genes and Genome Systems program. Telomere hypervariability in the model fungal pathogen *Magnaporthe oryzae*. **M. Farman (PI),** January 2006.

NSF - Major Research Instrumentation program. Acquisition of a laser confocal scanning microscope for plant science research P. D. Nagy, **M. Farman (Co-PI)**, M. Goodin, and S. E. Perry. October 2004.

NSF - Multi-User Research Instrumentation program. Acquisition of a laser confocal scanning microscope for plant science research P. D. Nagy, **M. Farman (Co-PI)**, M. Goodin, and S. E. Perry. January 2004.

NSF - Microbial Genetics program. Frequent *de novo* deletions during the sexual cycle of the fungus *Magnaporthe grisea*. **M. Farman,** (KY-EPSCoR), July 2000.

NSF - Microbial Genetics program. Frequent *de novo* deletions during the sexual cycle of the fungus *Magnaporthe grisea*. **M. Farman**, January 1999.

USDA - Initiative For Agriculture and Food Systems. Genome analysis of a model fungal endophyte of forage grasses. C. Schardl, R. Dean, D. Pannacione, **M. Farman (Co-PI)**. May 2000.

NSF - KY-EPSCOR. DNA sequencing center for functional genomics. C. Staben, C. Schardl, L. Vaillancourt and **M. Farman (Co-PI)**, January 2000.

NSF - Plant Genome Research program. Genome-wide analysis of fungal pathogenesis of plants – rice blast as a case study. R. Dean, D. Ebbole, **M. Farman (Co-PI)**, M. Orbach, J.-R. Xu, January 2000.

NSF - Microbial Genetics program. Collaborative project: Genetic mapping, cloning and characterization of centromeric DNA from *Magnaporthe grisea*. R. Dean, **M. Farman (Co-PI)**, G. Presting. January 1999.

NSF - Microbial Genetics program. Genetic and molecular analysis of a high frequency deletion occurring during meiosis in the fungus *Magnaporthe grisea*. **M. Farman (PI)**, January 1998.

USDA - NRI. Genetic analysis and mapping of factors controlling quantitative virulence phenotypes in *Magnaporthe grisea*. **M. L. Farman (PI)**, January 1998.

United Soybean Board. Preproposal**.** Genetic and molecular analysis of pathogenicity in *Phytophthora sojae*. **M. L. Farman (PI)**, March 1998.

COLLABORATIVE AGREEMENTS

The following are collaborations that were not related to any of the funded projects listed above:

Dr. Jerzy Jaromczyk, University of Kentucky. Development of a novel algorithm for the *de novo* identification of repeated sequences in genomes.

Dr. Ralph A. Dean, North Carolina State University. Mapping centromeres in *Magnaporthe grisea*.

Dr. Said A. Ghabrial, University of Kentucky. Construction of a cosmid library of the fungus *Helminthosporium victoriae*.

INSTRUCTION

Faculty Affiliations: Plant Pathology, Plant Physiology

Instructor, University of Kentucky, Department of Plant Pathology. PPA 600: Critical Methods in Plant-Microbe Interactions (Spring, 2007; Spring, 2008): two-credit lecture course focusing on essential laboratory techniques, writing, research ethics, experimental methods and critical evaluation of scientific papers.

Instructor, University of Kentucky, Department of Plant Pathology. PPA 661: Plant-Microbe Interactions II (Spring, 2000; Spring, 2002; Spring 2004): three-credit lecture course focusing on the genetics, biochemistry and molecular biology of plant disease resistance.

Coordinator, University of Kentucky, Department of Plant Pathology. PPA 770: Plant Pathology Seminar (Fall 1999 to Spring 2001): The instructor is responsible for arranging the seminar schedule; counseling and grading student presenters; and inviting and hosting guest speakers.

Co-Instructor, University of Kentucky, Department of Plant Pathology. PPA 660: Plant-Microbe Interactions I (Fall, 1999; Fall, 2003): three-credit lecture course focusing on the genetics, biochemistry and molecular biology of plant pathogenesis.

Guest lectures: " Scientific Hypotheses and Experimentation: What Makes a Valid Experiment?" and "Bioinformatic Resources, NCBI, Genbank, etc." presented in PPA 784-002: Special Problems in Plant Pathology, taught by C. Schardl (Spring, 2008).

Guest lecture: " Scientific Hypotheses and Experimentation: What Makes a Valid Experiment?" presented in PPA 784-002: Special Problems in Plant Pathology, taught by C. Schardl (Spring, 2007).

Guest lectures: **"**Nematode-Plant Interactions," presented in PPA 500: Physiology of Plant Health and Disease, taught by C. Schardl (two lectures, Fall, 2007).

Guest lectures: "Nematode-Plant Interactions," presented in PPA 500: Physiology of Plant Health and Disease, taught by C. Schardl (two lectures, Fall, 2005).

Guest lecture: "Bioinformatic Analysis," presented in PPA 652: Plant Pathogenic Fungi, taught by L. Vaillancourt (Fall, 2003).

Guest lecture: "Fungal Genomics," presented in ABT 201: Scientific Method In Biotechnology, taught by R. Houtz (Fall 2004).

Guest Lectures, "Fungal Avirulence Genes," presented in PPA 660: Plant-Microbe Interactions I, taught by C. Schardl (two lectures, Fall, 2001).

Guest Lectures, "Fungal Population Genetics," presented in PPA 695: Epidemiology and Management of Plant Diseases, taught by P. Vincelli (two lectures, Spring, 1999).

Guest Lab Organizer, "UV Mutagenesis," PPA 652: Plant Pathogenic Fungi, taught by L. Vaillancourt (two lab classes, Spring, 1999).

Curriculum Development: conceived and designed a new Plant Pathology course: PPA 600: Critical Methods in Plant-Microbe Interactions.

Other teaching: While on sabbatical at Cornell, I participated in the Plant Pathology (PLPA) 649 course, "Fungal Biology," taught by Kathie Hodge and Gillian Turgeon. This was a "journal club"-style class in which we discussed current papers that contained new and exciting fungal research. I participated in all of the classes and led the discussion for three of them.

Undergraduate Advising

Undergraduate Student Advising

Erica Namay	Agricultural Biotechnology student	Fall, 2005
Jordan Moore	Agricultural Biotechnology student	Fall, 2005
Mark Adams	Agricultural Biotechnology student	Fall, 2005
Anthony Jones	Agricultural Biotechnology student	Fall, 2004 – Fall, 2005
Rachel Brightwell	Agricultural Biotechnology student	Fall, 2001 – 2002
Leslie Mutter	Agricultural Biotechnology student	Fall, 1999 – 2003
Kasey Knight	Agricultural Biotechnology student	Fall, 1999 – Spring, 2000

Undergraduate Researchers Mentored

Joy Priest	University of Kentucky (REU)

Brandon Owen	University of Kentucky
Jason Nehmer	University of Kentucky
Joshua Moore	University of Kentucky (REU)
Jessica Maciejewski	University of Kentucky
Angela Martin	University of Kentucky
Michael Sampson	Fayetteville State University (REU)
Sasiwong Akkisopa	Kasetsart University, Thailand
Katie Dahlen	University of Kentucky
Melanie Crawford	University of Kentucky
Jessica Ninefeldt	Minnesota State University (REU)
Darnell Braynen	Mount Olive College (REU)
Ashley Milks	University of Kentucky
Jessica Stiffler	University of Kentucky
Wendy Walker	University of Kentucky
Beth Bloom	University of Kentucky (REU)
Love Gill	Morehead State University (REU)
Jennifer Jones	University of Kentucky (REU)
Brian King	University of Kentucky
Sherri Schwartz	University of Kentucky
Amy Taylor	University of Kentucky
Alexis Meironen	ENESAD,* France
Claire Collins	University of Kentucky
Christopher Vires	University of Kentucky
Samuel Gillespie	University of Kentucky
Pradeep Kachroo	University of Wisconsin
Scott Breunig	University of Wisconsin
Christopher Wooley	University of Wisconsin
Mary Warriner	University of Wisconsin
Kimberly Johnson	University of Wisconsin
Paige Taylor	University of Wisconsin

* Etablissement Nationale d'Enseignment Superieure D'Agronomique de Dijon, France

Postgraduate advising

Major Professor

Melanie R. Heist	Ph.D.	Plant Pathology	2006 - present
John H. Starnes	Ph.D.	Plant Pathology	2005 - present
Cathryn J. Rehmeyer	Ph.D.	Plant Pathology	2002 - 2005
Rebecca Peyyala	Ph.D.	Crop Science	2000 - 2006
F. Ameena Nalim	Ph.D.	Plant Pathology	1997 - 2000

(transferred to The Pennsylvania State University due to spouse's change of job)

Co-Advisor

Weixi Li	Ph.D.	Biology	2002 - present

Member of Advisory Committee

Kai Xu	Ph.D.	Plant Pathology	2008
Julie Peterson	Ph.D.	Entomology	2007 - present
Brian Hilker	Ph.D.	Plant & Soil Sciences	2007 - present
Claire Venard	M. S., Ph.D.	Plant Pathology	2004 - 2007
Stephanie Deborde	M.S.	Entomology	2002 - 2004
Samantha A. Brooks	Ph.D.	Veterinary Science	2002 - 2005
Jennifer Flowers	Ph.D.	Plant Pathology	2002 - 2006
E. Patrick Heist	M.S.	Plant Pathology	1998 - 2000
Kelly D. Craven	M.S., Ph.D.	Plant Pathology	1998 - 2004
Kottampatty Rajendran	Ph.D.	Plant Pathology	2000 - 2001
Jennifer L. Chaky	M.S.	Plant Pathology	1997 - 2000
Warren Lushia	Ph.D.	Plant Pathology	2001 - 2002
Yuehui He	Ph.D.	Agronomy	1999 - 2001

Adhoc Member of Advisory Committee

Yushu Liu	Ph.D.	Statistics, UK	October 2004

Adhoc Member of Final Defense Committee

Walaikorn Rattanadechakul	Ph.D.	Entomology, UK	September 2004

Postdoctoral Scholar advising:

Dr. Shouan Zhang	PhD.	Auburn Univ.	April-September, 2007
Dr. Yan Meng	Ph.D.	Northeast Agric. Univ.	2002 - 2005
Dr. Motoaki Kusaba	Ph.D.	Saga Univ., Japan	2002 - 2003
Dr. Yun-Sik Kim	Ph.D.	Univ. of Wisconsin	1999 - 2004
Dr. Serenella Sukno	Ph.D.	Univ. of Cordoba, Spain	1998 - 2001

Postdoctoral Co-advisor:

Dr. Hongyan Xing	Ph.D.	Chinese Academy of Science	2000 - 2001
Dr. Qunxing Ding	Ph.D.	China Agric. Univ., China	1999 - 2000
Dr. Songhai Shen	Ph.D.	Zhejiang Agric. Univ., China	1998 - 2000

Miscellaneous advising

Visitors who came to the lab to learn specialized techniques

Phaedra Poh	Mount Olive College, NC	July, 2002
Cleo Gill	North Carolina State University	July, 2002
Laura Budde	North Carolina State University	July, 2002
Dominic Lazaro	University of Wisconsin	July, 2000

High School Teacher Intern mentored

Debra Britten	Christian Co. High School, Hopkinsville, KY	July, 1997

High School Students Mentored

Jordan Brock	Henry Clay High School, Lexington, KY	June - July, 2001
Brian Bride	Oregon High School, Oregon, WI	1994 - 1996

PUBLICATIONS

Journal rankings:

Data were obtained from the website www.journal-ranking.com and were adjusted to provide rankings relative to other journals that publish peer-reviewed, research papers.

Nature is ranked No.1 out of 50 journals in multidisciplinary sciences.

Genetics is ranked No. 4 out of 118 journals in genetics and heredity.

Current Genetics is ranked No. 25 out of 118 journals in genetics and heredity**.**

Theoretical and Applied Genetics is ranked No. 44 out of 118 journals in genetics and heredity**.**

Molecular Genetics and Genomics (formerly **Molecular and General Genetics**) is ranked No. 63 out of 118 journals in genetics and heredity.

Fungal Genetics and Biology is ranked No. 2 out of 16 journals in Mycology.

Bioinformatics is ranked No. 4 out of 90 journals in computer science interdisciplinary applications.

BMC Bioinformatics is ranked No. 43 out of 139 journals in biotechnology and applied microbiology.

Molecular Plant-Microbe Interactions is ranked No. 1 out of 9 journals in Plant Pathology.

Phytopathology is ranked No. 2 out of 9 journals in Plant Pathology.

Molecular Plant Pathology is ranked No. 6 out of 9 journals in Plant Pathology.

Nucleic Acids Research is ranked No. 22 out of 285 journals in biochemistry and molecular biology.

FEMS Microbiology Letters is ranked No. 30 out of 89 journals in microbiology.

Refereed Journal Articles:

Schwartz S and Farman M (2009) Systematic over-representation of DNA termini and under-representation of subterminal regions among sequencing templates derived from hydrodynamically sheared linear DNA molecules. BMC Genomics (submitted)

Stajich J, Wilke S, Ahrén D, Au C, Birren B, Borodovsky M, Burns C, Canbäck B, Casselton L, Cheng C, Deng J, Dietrich F, Fargo D, Farman M, Gathman A, Goldberg J, Guigo R, Hoegger P, Hooker J, Huggins A, James T, Kamada T, Kilaru S, Kodira C, Kues U, Kwan H, Lomsadze A, Li W, Lilly W, Ma L-J, Mackey A, Manning G, Martin F, Muraguchi H, Palmerini H, Ramesh M, Rehmeyer R, Shenoy N, Stanke M, Ter-Hovhannisyan V, Tunlid A, Velagapudi R, Vision T, Zeng Q, Zolan M, and Pukkila P (2009) Genome evolution in mushrooms: insights from the assembled chromosomes of the basidiomycete *Coprinopsis cinerea* (*Coprinus cinereus*). Science (submitted)

Coleman J, Rounsley SD, Rodriguez-Carres M, Kuo A, Wasmann C, Grimwood J, Schmutz, J, Taga M, White G, Zhou S, Schwartz D, Freitag M, Ma L-J, Danchin E, Henrissat B, Coutinho P, Nelson D, Straney D, Napoli C, Barker B, Gribskov M, Rep M, Kroken S, Molnar In, Rensing C, Kennell J, Zamora J, Farman M, Selker E, Salamov A, Shapiro H, Pangilinan J, Lindquist E, Lamers C, Grigoriev I, Geiser D, Covert S, Temporini E and VanEtten H (2009) The genome of *Nectria haematococca*: contribution of supernumerary chromosomes to gene expansion. PLoS Genetics, **5**, e1000618.

Wu, C, Kim Y-S, Smith K, Li W, Hood H, Staben C, Selker E, Sachs M, and **Farman M** (2009) Characterization of chromosome ends in the filamentous fungus *Neurospora crassa*. Genetics **181**: 1129-1145 (corresponding author).

Rehmeyer C, Kusaba M, and **Farman M** (2009) The telomere-linked helicase (TLH) gene family in *Magnaporthe oryzae*: Revised gene structure reveals a novel TLH-specific protein motif. Current Genetics **55**: 2153-262 (corresponding author)

Vincelli P, Dixon E, and **Farman M** (2008) Gray leaf spot of annual ryegrass: susceptibility of selected cultivars of forage grasses and relatedness of the pathogen to strains from other grasses. Forage and Grazinglands, doi:10.1094/FG-2008-0226-01-RS.

Meng Y, Patel G, Heist M, Betts M, Tucker S, Galadima N, Donofrio N, Brown D, Mitchell T, Li L, Xu J-R, Orbach M, Thon M, Dean R, and **Farman M** (2007) A systematic analysis of T-DNA insertions in *Magnaporthe oryzae*. Fungal Genetics and Biology **44**: 1050-1064 (corresponding author).

Betts M, Tucker S, Galadima N, Meng Y, Patel G, Li L, Donofrio N, Brown N, Mitchell T, Xu J-R, Dean R, **Farman M**, and Orbach M (2007) Development of a high throughput transformation system for insertional mutagenesis in *Magnaporthe oryzae.* Fungal Genetics and Biology **44**: 1035-1049.

Chakrabarty, R, Banerjee, R, Chung, S-M, **Farman, M**, Citovsky, V, Tzfira, T, and Goodin, M (2007) pSITE Vectors for Stable Integration or Transient Expression of Autofluorescent Protein Fusions in Plants: Probing *Nicotiana benthamiana*-Virus Interactions. Molecular Plant-Microbe Interactions **20:** 740-750.

Rehmeyer C, Li W, Kusaba M, Kim Y-S, Brown D, Staben C, Dean R, and **Farman M** (2006) Organization of chromosome ends in the plant pathogenic fungus *Magnaporthe oryzae.* Nucleic Acids Research, **34**: 4685-4701 (corresponding author).

Peyyala, R, and **Farman, M** (2006) *Magnaporthe oryzae* isolates causing gray leaf spot of perennial ryegrass possess a functional copy of the *AVR1-CO39* avirulence gene. Molecular Plant Pathology, **7**: 157-165 (corresponding author).

Kämper J, Kahmann R, Bölker M, Ma L-J, Brefort T, Saville B, Banuett F, Kronstad J, Gold S, Müller O, Perlin M, Wösten H, deVries R, Ruiz-Herrera J, Reynaga-Peña C, Snetselaar K, McCann M, Pérez-Martín J, Feldbrügge M, Basse1 C, Steinberg G, Ibeas J, Holloman W, Guzman P, **Farman M**, Stajich J, Sentandreu R, González-Prietro J, Kennell J, Molina L, Schirawski J, Mendoza-Mendoza A, Greilinger D, Münch K, Rössel N, Scherer M, Vranes M, Ladendorf O, Vincon V, Fuchs U, Sandrock B, Meng S, Ho E, Cahill M, Boyce K, Klose J, Klosterman S, Deelstra H, Ortiz-Castellanos L, Li W, Sanchez-Alonso P, Schreier P, Häuser-Hahn I, Vaupel M, Koopmann E, Friedrich G, Voss H, Schlüter T, Platt D, Swimmer C, Gnirke A, Chen F, Vysotskaia V, Mannhaupt G, Güldener U, Münsterkötter M, Haase D, Oesterheld M, Mewes H-W, Mauceli E, DeCaprio D, Wade C, Butler J, Young S, Jaffe D, Calvo S, Nusbaum C, Galagan J, and Birren B (2006) Insights from the genome of the biotrophic fungal pathogen *Ustilago maydis*. Nature, **444**: 97-101.

Soderlund, C, Haller K, Panpanwar V, Ebbole D, **Farman M**, Orbach M, Wang G-L, Wing R, Xu J-R, Brown D, Mitchell T, and Dean R (2006) MGOS: A resource for studying *Magnaporthe grisea* and *Oryza sativa* interactions. Molecular Plant-Microbe Interactions **10:** 1055-1061.

Nierman W, Pain A, Anderson M, Wortman J, Kim H, Arroya J, Berriman M, Abe K, Archer D, Bermejo C, Bennett J, Bowyer P, Chen D, Collins M, Coulsen R, Davies R, Dyer P, **Farman M,** Fedorova N, Fedorova N, Feldblyum T, Fischer R, Fosker N, Fraser A, Garcia J, Garcia M, Goble A, Goldman G, Gomi, K, Griffith-Jones S, Gwilliam R, Haas H, Harris D, Horiuchi H, Huang J, Humphrey S, Jimenez J, Keller N, Khouri H, Kitamoto K, Kobayashi T, Kulkarni R, Kumagai T, Lafton A, Latge J-P, Lord A, Lu C, Majoros W, May G, Miller B, Mohamoud Y, Molina M, Monod M, Mouyna I, Mulligan S, Murphy L, O'Neil S, Paulsen I, Penalva M, Pertea M, Price C, Pritchard B, Quail M, Rabbinowitsch E, Rawlins N, Rajandream M-A, Reichard U, Renauld H, Robson G, de Cordoba S, Rodrigues-Pena J, Ronning C, Rutter S, Salzberg S, Sanchez M, Sanchez-Ferrero J, Saunders D, Seeger K, Squares R, Squares S, Takeuchi M, Tekaia F, Turner G, Vasquez de Aldana C, Weidman J, White O, Woodward J, Yu J-H, Fraser C, Galagan J, Asai K, Machida M, Hall N, Barrell B, Denning D (2005) Genomic sequence of the pathogenic and allergenic *Aspergillus fumigatus*. Nature, **438**:1151-1156.

Galagan, J, Calvo, S, Cuomo C, Ma L-J, Wortman J, Batzoglou S, Lee S, Baştürkmen M, Spevak C, Clutterbuck J, Kapitonov V, Jurka J, Scazzocchio C, **Farman M,** Butler J, Purcell S, Harris S, Braus G, Draht O, Busch S, D'Enfert C, Bouchier C, Goldman G, Bell-Pedersen D, Griffiths-Jones S, Doonan J, Yu J, Vienken K, Pain A, Freitag M, Selker E, Archer D, Peñalva M, Oakley B, Momany M, Tanaka T, Kumagai T, Asai K, Machida M, Nierman W, Denning D, Caddick M, Hynes M, Paoletti M, Fischer R, Miller B, Dyer P, Sachs M, Osmani S, and Birren B (2005) Sequencing of *Aspergillus nidulans* and comparative analysis with *A. fumigatus* and *A. oryzae*. Nature, **438**:1105-1115.

Dean R, Talbot N, Ebbole D, **Farman M,** Mitchell T, Orbach M, Thon M, Kulkarni R, Xu J-R, Pan H, Read N, Lee Y-H, Carbone I, Brown D, Oh Y, Donofrio N, Jeong J, Soanes D, Djonovic S, Kolomiets E, Rehmeyer C, Li W, Harding M, Kim S, Lebrun M-H, Bohnert H,

Coughlan S, Butler J, Calvo S, Ma L-J, Nicol, R, Purcell S, Nusbaum C, Galagan J, Birren B (2005). Analysis of the genome sequence of the plant pathogenic fungus *Magnaporthe grisea*, the causal agent of rice blast disease. Nature **434:** 980-986.

Li W, Rehmeyer C, Staben C, and **Farman M** (2005) TERMINUS - Telomeric End Read Mining IN Unassembled Sequences. Bioinformatics **21:** 1695-1698 (corresponding author).

Li W, Rehmeyer C, Staben C, and **Farman M** (2005) TruMatch – A BLAST post-processor for identifying and reporting *bona fide* sequence matches. Bioinformatics **21:** 2097-2098 (corresponding author).

Farman M, and Kim Y-S (2005) Telomere hypervariability in *Magnaporthe oryzae*. Molecular Plant Pathology **6:** 287-298 (corresponding author).

Luo C-X, Yin L-F, Koyanagi S, **Farman M**, Kusaba M. and Yaegashi H. (2005) Genetic mapping and chromosomal assignment of *Magnaporthe oryzae* avirulence genes *AvrPik*, *AvrPiz*, and *AvrPiz-t* controlling cultivar specificity on rice. Phytopathology **95**: 640-647.

Donofrio N, Rajagopalan R, Brown D, Diener S, Windham D, Nolin S, Floyd A, Mitchell T, Galadima N, Tucker S, Orbach M, Patel G, **Farman M,** Pampanwar V, Soderlund C, Lee Y-H and R Dean (2005) PACLIMS: A component LIM system for high-throughput functional genomic analysis. BMC Bioinformatics **6:** 94.

Kim, Y-S, Dixon, E, Vincelli, P, and **M Farman** (2003) Field resistance to strobilurin (Q_oI) fungicides in *Pyricularia grisea* caused by mutations in the mitochondrial cytochrome b gene. Phytopathology **93:** 891-900 (corresponding author).

Sukno S, Taylor A, and **M Farman** (2002) Development of contaminant-free RFLP probes for the tobacco blue mold pathogen, *Peronospora tabacina*. Phytopathology **92:** 1227-1235 (corresponding author).

Sukno S., Taylor A. and **M Farman** (2002) Genetic uniformity among isolates of *Peronospora tabacina*, the tobacco blue mold pathogen. Phytopathology **92:** 1236-1244 (corresponding author).

Chauhan R, **Farman M**, Ronald P, Zhang H-B, and S Leong (2002) Genetic and physical mapping of a rice blast resistance locus, *Pi-CO39(t)*, corresponding to *AVR1-CO39* of *Magnaporthe grisea*. Molecular Genetics and Genomics **267**: 603-612.

Farman M (2002) *Pyricularia grisea* isolates causing gray leaf spot of perennial ryegrass (*Lolium perenne*) in the United States: Relationship to *P. grisea* isolates from other host plants. Phytopathology **92**: 245-254 (corresponding author).

Farman M (2002) Meiotic deletion at the *Magnaporthe grisea BUF1* locus is controlled by interaction with the homologous chromosome. Genetics **160**: 137-148 (corresponding author).

Farman M, Eto Y, Nakao T, Tosa Y, Nakayashiki H, Mayama S, and S Leong (2002) Analysis of the structure of the *AVR1-CO39* avirulence locus in virulent rice-infecting isolates of *Magnaporthe grisea*. Molecular Plant-Microbe Interactions **15**: 6-16.

Thornbury D, and **M Farman** (2000) Re-use of nylon membranes for radioactive hybridizations. Biotechniques **29:** 1250-1254 (corresponding author).

Farman M, and S Leong (1998) Chromosome walking to the *AVR1-CO39* gene of *Magnaporthe grisea*. Discrepancy between the genetic and physical maps. Genetics **150:** 1049-1058.

Nitta N, **Farman M,** and S Leong (1997) Genome organization of *Magnaporthe grisea*: Integration of genetic maps, clustering of transposable elements and occurrence of genome duplications and rearrangements. Theoretical and Applied Genetics **95**: 20-32.

An Z, **Farman M**, Budde A, Taura S, and S Leong (1996) New cosmid vectors for library construction, chromosome walking and restriction mapping in filamentous fungi. Gene **176**: 93-96.

Farman M, Tosa Y, Nitta N, and S Leong (1996) MAGGY, a retrotransposon in the genome of the rice blast fungus, *Magnaporthe grisea*. Molecular and General Genetics **251**: 665-674.

Farman M, Taura S, and S Leong (1996) The *Magnaporthe grisea* DNA fingerprinting probe, MGR586, contains the 3' end of an inverted repeat transposon. Molecular and General Genetics **251**: 675-680.

Farman M, and S Leong (1995) Genetic and physical mapping of telomeres in the rice blast fungus, *Magnaporthe grisea.* Genetics **140:** 479-492.

Farman M, and S Leong (1995) Restriction maps of telomeres of *Magnaporthe grisea*. Fungal Genetics Newsletter **42:** 24-25.

Skinner D, Budde A, **Farman M**, Smith J, Leung H. and S Leong (1993). Genome organization of the rice blast fungus: Genetic map, electrophoretic karyotype and occurrence of repeated DNAs. Theoretical and Applied Genetics **87**: 545-557.

Oliver R, **Farman M,** Hammond-Kosack K, and J Jones (1993). Use of fungal transformants expressing ß-glucuronidase activity to detect infection and measure hyphal biomass in infected plant tissues. Molecular Plant-Microbe Interactions **6**: 521-525.

Farman M, and R Oliver (1992) Transformation frequencies are enhanced and DNA is targeted during retransformation of *Leptosphaeria maculans*. Molecular and General Genetics **231:** 243-247.

Farman M, and R Oliver (1988) Efficient transformation of protoplasts of *Leptosphaeria maculans* to hygromycin B resistance. Current Genetics **13**: 327-330.

Invited Publication (non-refereed)

Vincelli P, and **Farman M** (2007) Update on fungicide resistance in gray leaf spot. Golf Course Management **75:** 124-127.

Farman M (1997) RecA-AC for genome studies of plants and microbes. Molecular Plant-Microbe Interactions Reporter **Fall** 1997.

Book Chapters/Reviews:

Farman M (2009) Targeted cloning of fungal telomeres. In: "Methods in Molecular Biology – Fungal Genomics," edited by J-R Xu, submitted.

Clutterbuck J, and **Farman M** (2008) *Aspergillus nidulans* linkage map and genome sequence: closing gaps and adding telomeres. In: "The Aspergilli: genomics, medicine, biotechnology and research methods" edited by G. Goldman and S. Osmani. pp. 57-73.

Farman M (2007) Telomeres in the rice blast fungus *Magnaporthe oryzae*: The world of the end as we know it. FEMS Microbiology Letters **273:** 125-132.

Farman M (2001) Genome analysis in filamentous fungi. In "Molecular and cell biology of filamentous fungi: A practical approach" Ed. N. J. Talbot, Oxford University Press, United Kingdom.

Farman M, and S Leong (1996) Genetic analysis and mapping of avirulence genes in *Magnaporthe grisea*. In "Fungal Genetics: Principles and Practice" Ed. C. Bos, Academic Press, San Diego. pp. 295-315.

Leong S, **Farman M,** Chauhan R, Punekar N, Mayama S, Nakayashi H, Eto Y, Tosa Y, Ronald, P. and H.-B. Zhang, (2000) Progress on understanding the molecular basis of cultivar specificity in the interaction of the *Magnaporthe grisea AVR1-CO39* with rice cultivar CO39. in Advances in Rice Blast Research, Proceedings of the 2nd International Rice Blast Conference, Montpelier, France 4-8 August, 1998.

Leong S, **Farman M,** and N Nitta (1996) Genetic and molecular analysis of a cultivar specificity locus from the rice blast fungus *Magnaporthe grisea*. In: Rice Genetics III (G. S. Khush, ed.), Proceedings of the Third International Rice Genetics Symposium, Island Harbor Press, Manila. pp. 846-852.

Leong S, **Farman M**, Smith J, Budde A, Tosa Y. and N Nitta (1994) A Molecular genetic approach to the study of cultivar specificity in the rice blast fungus. In: Rice Blast Disease (R. Zeigler, S. A. Leong, and P. Teng, eds.), Proceedings of the First Rice Blast Disease Conference CABI, London. pp. 87-110.

Protocol Reports (non-refereed):

Dall C, Corcoran M, and **M Farman** (1997) Purifying Cosmid DNA using Flexiprep kit. Science Tools Pharmacia Biotech **2**: 22.

Farman M (1997-2002) Ready-To-Go DNA labeling beads (-dCTP) Pharmacia Biotech Catalog, p414 (1999 issue).

UK PUBLICATION

The Case of the Missing Gene: Plant Pathologist Helps March of Dimes with Research. Article in "the mAGgazine," written by Randy Weckman, Fall edition, 2003.

PROCEEDINGS

Hesse, U., P. Maynard, S. Macmil, G. Wiley, K. Andreeva, W.E. Beech, E. Arnaoudova, B.T. Willey, V.-G. Puram, J. Wiseman, J. Webb, L. Gill, M.L. Farman, J.W. Jaromczyk, B.A. Roe, and C.L. Schardl (2007). The genome and the genes of Epichloë festucae. New Zealand Grassland Association: Proceedings of the 6th International Symposium on Fungal Endophytes of Grasses. pp. 461-465.

Farman M, Gilkerson J, Jaromczyk J, and C Staben. RepeatAssembler: A package for annotation of full-length repetitive DNA sequences in fungal genomes. A poster presented at the IEEE Computational Systems Bioinformatics Conference, Stanford, CA, pp. 464 – 467, 2004.

ABSTRACTS

Farman M, Valent B, Goodin M, and C Soderlund. Localization of secreted proteins during penetration and invasive growth of the rice blast fungus *Magnaporthe oryzae*. Poster presented at the USDA-NRI - Microbial Functional Genomics Program Awardee Workshop Washington DC, 2008.

Hesse U, Maynard P, Macmil S, Wiley G, Andreeva K, Beech W, Van Horn C, Bumgardner V, Gopal- Puram V, Wiseman J, Webb J, Gill L, Alluri S, Arnaoudova E, **Farman M**, Jaromczyk J, Roe B, and C Schardl. The grass endophyte *Epichloë festucae*: genome, unigenes, and gene expression. Poster presented at the 24th Fungal Genetics Conference, Asilomar, CA, 2007.

Mallareddy S, Perry D, **Farman M**, and P Mirabito. Telomeres, telomere crisis and telomere-linked RecQ helicases in *Aspergillus nidulans*. Poster presented at the 47th annual meeting of the American Society for Cell Biology, Washington D.C., 2007.

Betts M, Tucker S, Galadima N, Li L, Meng Y, Patel G, Donofrio N, Xu J-R, Mitchell T, **Farman M**, Dean R, and M Orbach. Whole genome mutagenesis in *Magnaporthe grisea*, insertional mutant analysis and recovery of DNA regions flanking the insert. Poster presented at the 23rd Fungal Genetics Conference, Asilomar, CA, 2005.

Rehmeyer C, Kusaba M, Li W, Staben C, Birren B, and M **Farman** (2005) Structure and dynamics of *Magnaporthe grisea* telomeres. Poster presented at the 23rd Fungal Genetics Conference, Asilomar, 2005.

Rehmeyer C, Li W, Staben C, Schardl C, and M **Farman.** Telomere-association of pathogenicity genes in *Magnaporthe grisea*-a novel mechanism for pathogenic adaptation? Poster presented at the American Phytopathological Society (APS) Meeting, Anaheim, CA, 2004, Phytopathology **94:** S87.

Tucker S, Figueroa M, Galadima N, Soderlund C, Meng Y, **Farman M**, Li L, Xu J-R, Donofrio N, Mitchell T, Dean R, and M Orbach. A genomics approach to pathogenicity: Saturation insertional mutagenesis in *Magnaporthe grisea*. Poster presented at the American Phytopathological Society (APS) Meeting, Anaheim, CA, 2004, Phytopathology **94:** S135.

Reymeyer C, Kusaba M, Gopal-Puram V, Li W, Schwartz S, Staben C, Schardl C, and **M Farman**, Analysis of telomere-associated sequences in *Magnaporthe grisea*. Poster presented at the 22nd Fungal Genetics Conference, Asilomar, CA, 2003.

Wu C, Mitchell J, **Farman M**, and M Sachs. Cloning of telomeric regions from *Neurospora crassa*. Poster presented at the 22nd Fungal Genetics Conference, Asilomar, CA, 2003.

Tucker S, Meng Y, Patel G, Kaczkurkin N, Lee Y-H, Donofrio N, Mandel M, LeMaster C, Figueroa M, King B., Gill L. Brock J, Rajagopalan R, Brown D, Mitchell T, Dean R, **Farman M**, and M Orbach. Saturation mutagenesis of *Magnaporthe grisea* using DNA insertions - a genomic approach. Poster presented at the 22nd Fungal Genetics Conference, Asilomar, CA, 2003.

Kim Y-S, Vincelli P, and **M Farman**. Population biology of mutations conferring resistance to QoI fungicides in *Pyricularia grisea*. Poster presented at the 22nd Fungal Genetics Conference, Asilomar, CA, 2003.

Mitchell T, Brown D, Donofrio N, Ebbole D, **Farman M**, Lee Y-H, Orbach M, Soderlund C, Wang G-L, Wing R, Xu J-R, and R Dean. Whole genome analysis of host - pathogen interaction and subsequent responses in the rice blast pathosystem,. Poster presented at the 22nd Fungal Genetics Conference, Asilomar, CA, 2003.

Farman M. The molecular basis of field resistance to Q_oI fungicides in *Pyricularia grisea*. Abstract for the American Phytopathological Society (APS)/Society of Nematology/Mycological Society of America Joint Meeting, Salt Lake City, UT, 2001, Phytopathology **91:** S110.

Farman M. Meiotic deletion at the *BUF1* locus of the fungus *Magnaporthe grisea* is controlled by interaction with the homologous chromosome. Poster presented at the 21st Fungal Genetics Conference, Asilomar, CA, 2001.

Kim Y-S, and **M Farman.** Factors affecting the meiotic stability of the *BUF1* gene in *Magnaporthe grisea.* Poster presented at the 21st Fungal Genetics Conference, Asilomar, CA, 2001.

Peyyala R, and **Farman M.** Identification of a functional homolog of the *AVR1-CO39* avirulence gene in *Pyricularia grisea* isolates causing gray leaf spot of perennial ryegrass. Poster presented at the 21st Fungal Genetics Conference, Asilomar CA, 2001

Sukno S, Taylor A, and **M Farman.** Analysis of genetic variation in *Peronospora tabacina* using RFLPs. Poster presented at the 21st Fungal Genetics Conference, Asilomar CA, 2001.

Sukno S, Taylor A, and **M Farman.** RFLP markers for population studies of the blue mold pathogen *Peronospora tabacina*. Poster presented at the APS Annual meeting, New Orleans, 2000, Phytopathology **90**: S75.

Nalim F, and **M Farman.** Molecular and cytological studies of early stages of infection caused by strains of *Magnaporthe grisea* transformed with an avirulence gene, *AVR1-CO39.* Poster presentation, APS Annual meeting, 2000. Phytopathology **90**: S55.

Rauyaree P, **Farman M,** Correll J, and S Kang. Re-evaluation of the population structure of *Magnaporthe grisea* in the United States. Poster presentation, APS Annual meeting, New Orleans, 2000, Phytopathology **90**: S64.

Farman M, and S Leong. A molecular genetic approach to the study of cultivar specificity in the rice blast fungus *Magnaporthe grisea.* Poster presented at the 3rd International Conference on Rice Biotechnology, Rockefeller Foundation, Bali, Indonesia, 1994.

Farman M, and S Leong. MAGGY, a retrotransposon in the genome of the rice blast fungus, *Magnaporthe grisea*. Poster presented at the 2nd International Conference on Rice Biotechnology, Rockefeller Foundation, Chiang Mai, Thailand, 1992.

Farman M, and S Leong. Molecular techniques for analysis of pathogenesis in *Magnaporthe grisea.* Poster presented at the 16th Fungal Genetics Conference, Asilomar, CA, 1991.

INVITED ORAL PRESENTATIONS AT PROFESSIONAL MEETINGS

Mechanisms of telomere instability in *Magnaporthe oryzae*. Presentation at the 4th International Rice Blast Conference, Changsha, China, 2007.

Telomere instability in *Magnaporthe oryzae* caused by highly mobile, telomere-targeted retrotransposons. Presentation at the 23rd Fungal Genetics Conference, Asilomar, CA, 2007.

Structure and dynamics of *Magnaporthe grisea* telomeres. Presentation by C. Rehmeyer at the 23rd Fungal Genetics Conference, Asilomar, CA, 2005.

Structure and dynamics of *Magnaporthe oryzae* telomeres. Presentation by C. Rehmeyer (graduate student advisee) at the Mycological Society of Japan and Myclological Society of America Joint Meeting, Hilo, HI, 2005 (awarded "Best oral presentation" out of 27 speakers).

RepeatAssembler: A package for annotation of full-length repetitive DNA sequences in fungal genomes. Presentation by J. Gilkerson (undergraduate co-advisee) at the OT-ORNL-KBRIN Bioinformatics Summit, Cadiz, KY, 2005.

TERMINUS: Telomeric End Reads Mining IN Unassembled Sequences. Presentation by W. Li (graduate student co-advisee) at the OT-ORNL-KBRIN Bioinformatics Summit, Cadiz, KY, 2005

Population biology of QoI fungicide resistance in *Pyricularia grisea.* Bayer/Chipco Turfgrass Disease Seminar, Fort Lauderdale, FL, 2003.

Identification and population biology of mutations conferring resistance to QoI fungicides in *Pyricularia grisea.* Workshop on Fungicide Resistance, sponsored by Syngenta Crop Protection, Rutgers University, 2002.

Molecular genetics and population biology of mutations to Q_oI resistance in *Pyricularia grisea*. Northeastern Division APS meeting, Montreal, Canada, 2002.

Molecular genetics and population biology of mutations to Q_oI resistance in *Pyricularia grisea*. APS Annual meeting, Milwaukee, WI, 2002.

Physical mapping and sequence analysis of the *BUF1* locus of *Magnaporthe grisea.* The First International Workshop on *Magnaporthe* Pathogenicity and Genomics. Madison, WI, 2001.

Identification of a functional homolog of the *AVR1-CO39* avirulence gene in *Pyricularia grisea* isolates causing gray leaf spot of perennial ryegrass. The 21st Fungal Genetics Conference, Asilomar, CA, 2001.

Molecular and genetic characterization of *Pyricularia grisea* isolates causing gray leaf spot of perennial ryegrass. Gray Leaf Spot Symposium, Rutgers University, New Brunswick, NJ, 2000.

Meiotic misbehavior in *Magnaporthe*. The 20th Fungal Genetics Conference, Asilomar, CA, March, 1999.

Genetic and molecular characterization of *Magnaporthe grisea* isolates causing gray leaf spot of perennial ryegrass. The Northeastern-Potomac Division APS Meeting on gray leaf spot. Annapolis, MD, 1999.

Chaired the "Fungal Genome" session at the 20th Fungal Genetics Conference, Asilomar CA, 1999.

INVITED LECTURES

Mechanisms of telomere instability in the rice blast fungus, *Magnaporthe oryzae*. Oregon State University, October, 2007.

Telomeres and adaptive evolution in *Magnaporthe oryzae*. Cornell University, April, 2006.

Comparative genomics of fungal telomeres. University of Cincinnati, January, 2005.

Meiotic chromosome instability in the rice blast fungus *Magnaporthe grisea*. North Carolina State University, April, 2002.

Meiotic chromosome instability in the rice blast fungus *Magnaporthe grisea*. Texas A & M University, November, 2001.

Fungicide resistance and host specificity in *Pyricularia grisea* isolates causing gray leaf spot of perennial ryegrass. Purdue University, October, 2001.

Paramutation in the rice blast fungus *Magnaporthe grisea*. Purdue University, October, 2001.

PATENT ACTIVITY

P98067US: Leong S and **M Farman**, University of Wisconsin
Cultivar specificity gene from the rice pathogen *Magnaporthe grisea*, and methods of use. Patent issued to Wisconsin Alumni Research Foundation.

DNA SEQUENCES SUBMITTED TO DATABASES

DQ493941-DQ493955: *Magnaporthe oryzae* telomeres, 2005

AY245427 *Magnaporthe grisea* isolate GG3H 5-1 cytochrome b (*cytb*) gene, 2003

AY245426 *Magnaporthe grisea* isolate LpMD01-1 cytochrome b (*cytb*) gene, 2003

AY245425 *Magnaporthe grisea* isolate CHW cytochrome b (*cytb*) gene, 2003

AY245424 *Magnaporthe grisea* isolate Guy11 cytochrome b (*cytb*) gene, 2003

AF463528: DNA region containing *AVR1-CO39* avirulence gene, 2002

AF463527: *Magnaporthe grisea AVR1-CO39* null allele avirulence locus, 2002

L76273: Cloning vector pMLF2, 1997

L35053: *Magnaporthe grisea* LTR retrotransposon MAGGY, 1996

U60989: *Magnaporthe grisea* transposon Pot3, 1996

L38999: *Magnaporthe grisea* (clone pTEL1.8B) DNA, 1995

WEBSITES CREATED

Farman Lab homepage:

http://www.ca.uky.edu/agcollege/plantpathology/farman/farman.htm

The *Magnaporthe oryzae* Gene Knockout Design Tool:

http://128.163.192.197/MoryzaeKOtool.htm

The *Magnaporthe oryzae* Gene Fusion Design Tool:

http://128.163.192.197/MoryzaeGeneFusions.htm

Comparative Genomics of Telomeres in Fungi:

http://genome.kbrin.uky.edu/fungi_tel/index.html

SERVICE AND RECOGNITION

Awards and Honors

Basil O'Connor Starter Scholar, March of Dimes Birth Defects Foundation, 1999 - 2001.

Editorship

Member of the Editorial Board of the journal Phytopathology .

Member of the Editorial Board of the journal Molecular Plant Pathology.

Review panels and reviewer service

Panel Member: NSF Eukaryotic Genetics program, 2007.

Panel member, USDA-CSREES - National Research Initiative Competitive Grants Program, Plant-Microbe Interactions program, 2002.

Panel member, Tobacco and Health Research Institute Competitive Research Grant program, 1998, 1999.

Ad hoc Grant Reviewer for the following agencies: NSF - Microbial Genetics, USDA-CREES - Plant Pathology, Tobacco and Health Research Institute Competitive Research Grant Program.

Ad hoc Manuscript Reviewer for the following journals: Proceedings of the National Academy of Sciences USA, Genetics, Fungal Genetics and Biology, Molecular Plant-Microbe Interactions, Phytopathology, The Plant Cell, Current Genetics, Plant

Physiology, Molecular and General Genetics, Physiological and Molecular Plant Pathology, Phytoparasitica, Molecular Microbiology, New Phytologist, Plant Disease, Phytopathology, Current Genetics, Mycologia.

Additional external service

Member, Advisory committee for the *Colletotrichum graminicola* genome sequencing project, 2006 - present.

Member, *Magnaporthe* Policy Committee, 2001 - present.

Member, Advisory committee for the *Magnaporthe grisea* genome sequencing project at the Whitehead Institute Center for Genomic Research, 2001 - 2002.

Committees

University of Kentucky:

Institutional Biosafety Committee	2004 - present
Radiation Safety Committee	2001 – 2003.
Department of Plant Pathology Resource Committee,	2006 - present

Department of Biological Sciences Faculty Search and Screening Committee, Functional Genomics and Bioinformatics Positions, Spring 2002.

Department of Plant Pathology Faculty Search and Screening Committee, Forest Pathology Position, Fall 1999.

Department of Plant Pathology Faculty Search and Screening Committee, Virology Position, Fall 1998.

School of Agriculture Plant Science Building Committee, 1999 - 2000.

Department of Plant Pathology Academic Program Committee, 1999 - 2005.

Department of Plant Pathology Safety Committee, 2000 - 2001.

Department of Plant Pathology Faculty Merit Evaluation Committee, 2000 - 2002.

Other Service to University of Kentucky:

Outside Examiner Jeremiah Smith Ph.D. Biology 2007

Represented the UK Advanced Genetic Technologies Center at the opening of the Plant Science Building, May 22, 2003. This involved:

Providing a tour of the facility to Joseph Jen, USDA Undersecretary for Research, Education and Economics.

Gave an interview to reporter Greg Stotelmyer. This was broadcast on the WTVQ 36 television news program.

Gave an interview for "Extension Today on the Air" on Plant Science Research, August, 2003.

Represented the UK Advanced Genetic Technologies Center during a visit from Britt Byers, a representative from Senator Mitch McConnell's office. October, 2003.

Gave an interview for "Extension Today on the Air" on the High School Teacher Biotechnology Workshop that was run in August, 2003.

Community Outreach Activities

Presented a talk entitled, "Factors Affecting *de novo* Chromosome Deletions" at the March of Dimes Volunteer Leadership Conference, October 21, 2000, Lexington, KY.

Manned the Plant Pathology Department Booth at the UK College of Agriculture Ag Roundup, 1999, 2001, 2002, 2007

Manned the Plant Pathology Booth at the Minorities in Agriculture, Natural Resources and Related Sciences (MANRRS) Conference, Lexington, KY, March 30, 2000.

PROFESSIONAL DEVELOPMENT

Sabbatical Leave:

I spent Jan. 2006 to July 2006 at the Boyce Thompson Institute for Plant Sciences, Cornell University. There, I performed research in Dr. Maria Harrison's laboratory, so that I could learn modern cytological techniques such as immunolocalization of proteins in fixed tissues, and the visualization of autofluorescent protein fusions through live-cell imaging and confocal microscopy.

RESEARCH NARRATIVE

As a postdoctoral scholar in Sally Leong's lab at the University of Wisconsin, I employed long-range physical mapping and chromosome walking techniques to isolate the *AVR1-CO39* avirulence gene from the rice blast fungus *Magnaporthe oryzae* (formerly *M, grisea*). As a result, I developed a keen interest in two quite different areas: genome organization and evolution; and the molecular basis for host specificity. These have been the foci of my research program for the past nearly dozen years.

The cross that was used to map *AVR1-CO39* produced a large number of progeny (~25%) that carried a mutation affecting the *BUF1* pigment gene. Interestingly, some backcrosses also produced abundant *buf1*$^{-}$ progeny while others produced none at all. Upon analysis of the available data, I noticed that the mutations were affecting only one of the parental *BUF1* alleles and that mutations only occurred when the "unstable" allele was paired with a "stable" one. Such genetic behavior was unprecedented, and this suggested to me that a novel mechanism was involved. Therefore, the first project that I started as an independent researcher involved determining the genetic and molecular basis for high frequency *BUF1* mutations. The initial work on this project was supported by a prestigious Basil O'Connor Starter Scholar Research Award from the March of Dimes Birth Defects Foundation and resulted in the discovery of a new pre-meiotic process which causes deletion of sequences flanked by repeats. However, deletions occur only when the repeats are in a heteroallelic condition. Intriguingly, the nature of the deletions suggested that they occurred before pre-meiotic DNA replication which, in *M. oryzae*, is supposed to occur prior to karyogamy. Therefore, at this point, the homologous *BUF1* loci ought not to be in the same nucleus. This discrepancy suggests that karyogamy occurs

prior to pre-meiotic S-phase in *M. oryzae*, or that some loci remain unreplicated until after nuclear fusion takes place (Farman, 2002, Genetics). Unfortunately, despite numerous grant submissions, I have been unable to procure additional funding for these studies and, therefore, we have been unable to address this fascinating phenomenon.

In 1996, one year before I arrived in Kentucky, a local golf course experienced an outbreak of gray leaf spot - a devastating disease of perennial ryegrass caused by *M. oryzae*. The disease was also found sporadically at a few other locations in the US. The following years saw widespread, major epidemics throughout the central US region. In order to determine why the disease emerged so suddenly, I used molecular markers to characterize the pathogen population. This revealed that gray leaf spot is caused by a distinct, host-specialized form of *M. oryzae* and the limited genetic diversity within the pathogen suggested that this form had a recent evolutionary origin (Farman, 2002, Phytopathology).

In order to combat gray leaf spot, my colleague Paul Vincelli (Extension Professor) developed highly effective control strategies based on the use of strobilurin (QoI) fungicides. However, within one year of these fungicides being used in the field, he documented that resistance had arisen in the gray leaf spot pathogen population. This was significant because it represented the first case of QoI resistance in the US. In early 2001, my group started collaborating with Paul to characterize resistant isolates. This led to the identification of two types of mutations in the cytochrome b gene, which encodes ubiquinol:cytochrome c reductase, the target enzyme of the QoI fungicides (Kim et al 2003).

Current perennial ryegrass cultivars have little or no resistance to gray leaf spot. This disease is, therefore, an ideal test case for applying basic knowledge of host-pathogen recognition toward developing resistant plants. Fungal isolates from perennial ryegrass do not infect rice. From a practical standpoint, this suggests that rice may have resistance genes that potentially could be used to control gray leaf spot in perennial ryegrass turf. Indeed, we have now shown that rice cultivar CO39 has a resistance gene [*Pi-CO39(t)*] (Chauhan et al 2002) that recognizes the product of an avirulence gene ($AVR1\text{-}CO39^{Lp}$) in isolates of *M. oryzae* from perennial ryegrass (Peyyala & Farman 2006). We are now attempting to identify the *Pi-CO39(t)* gene, so that we can introduce it into perennial ryegrass. The hope is that it will retain its resistance function when introduced into a new host plant species.

While using molecular markers to study *M. oryzae* isolates that infect perennial ryegrass, we discovered that the chromosome tips (telomeres) are highly polymorphic, yet there is very little genetic variation in the internal regions of the genome (Farman & Kim, 2005). It is known that cultivar specificity genes tend to reside near chromosome tips in *M. oryzae* (reviewed in Farman, 2007). Furthermore, in all microbes whose telomeres had been studied up to that point, the subtelomere regions contain large families of genes with roles in niche adaptation. Therefore, we wondered if the *M. oryzae* chromosome ends might contain large families of avirulence genes and that, perhaps, the observed variation was an adaptive mechanism. As a first test of this hypothesis, we sequenced all fourteen of the *M. oryzae* telomeres, making this the first organism to have all of its chromosome ends sequenced. These studies revealed that *M. oryzae* resembles the previously-studied microbes in its possession of a distinct subtelomere region. However, it was also unique among organisms studied up to that date, in that there is very little evidence of terminal gene duplication and, moreover, very few of the genes in these regions are predicted to have roles in pathogenesis (Rehmeyer et al 2006). Naturally, we were quite disappointed to find that the terminal gene content in itself provides very little insight into pathogenic adaptation in *M. oryzae*. Recently, however, a Chinese group has identified two avirulence genes residing

within the regions we sequenced. Therefore, it seems that the *M. oryzae* telomere regions may yet play important roles in pathogenic adaptation, and we simply lack the tools to identify the genes involved using bioinformatics alone.

Sequencing of telomeres from additional *M. oryzae* strains (from rice and other grasses) revealed that the terminal regions of the chromosomes are highly polymorphic and frequently harbor novel sequences that are strain-specific (manuscript in preparation). These comparative sequencing studies also identified a novel class of telomeric transposon in *M. oryzae* isolates from perennial ryegrass (Farman, 2007). One of the major efforts in the lab is focused on examining the roles of these transposons in telomere instability and maintenance. I expect that this exciting project will be sustainable for many years to come.

A large part of the telomere sequencing was performed at the University of Kentucky's Advanced Genetic Technologies Center (AGTC), which opened at the same time our project started. I was a major consultant for the development of the Laboratory Information Management System (LIMS) and sequence analysis pipeline, both of which were developed to serve the needs of our project. These tools are now used on a day-to-day basis for all of the projects that come through the AGTC.

Another goal of the telomere project was to sequence chromosome ends from the model fungus *Neurospora crassa*. This was performed in collaboration with the groups of Matthew Sachs (Oregon Health & Science University, Texas A&M University) and Eric Selker (University of Oregon). Neurospora telomeres were identified using TERMINUS (see below), and restriction fragment length polymorphism mapping and sequencing studies were performed to link each one to the genome assembly. We were also successful in determining the sequences for all fourteen chromosome ends in this fungus. Interestingly, the structure of the Neurospora chromosome ends is completely different from what has been observed in all other organisms studied thus far. As was the case in *M. oryzae*, the Neurospora chromosome termini contained few genes with obvious adaptive roles. Analysis of telomeres in a second strain revealed that, in many cases, the sequences at the chromosome ends of one strain were completely absent from the genome of the other (manuscript in preparation).

Telomeres are very poorly represented in genome assemblies, yet we discovered that they are often abundantly present among the raw sequence data. To address this deficiency, we developed a program (TERMINUS) to mine telomere sequences from Trace Archive files, assemble them into contigs representing individual chromosome ends and, finally, link them up to the genome sequence (Li et al 2005a, b). TERMINUS has now been used to assemble and map telomeric sequences in more than fifteen fungal genomes. As a result, various members of the Farman group are listed as co-authors on a number of "genome" papers (Dean et al 2005; Galagan et al 2005; Nierman et al, 2005; Kämper et al 2006).

A second major genomics project concurrent with the telomere sequencing was a high-throughput, saturation mutagenesis of *M. oryzae*. This was performed as part of a large collaborative project funded by the NSF-Plant Genome program. Together with Marc Orbach's group at the University of Arizona, we used *Agrobacterium tumefacians*-mediated transformation (ATMT) to create and analyze over 50,000 insertion mutants - an effort that was aided by the development of a high-throughput insertional mutagenesis platform (Betts et al. 2007), and a custom built laboratory information management system (Donofrio et al 2005). The resulting transformants were screened for defects in colony morphology (*cmo*), pigment (*pig*), appressorium formation (*app*), sporulation (*spo*) and pathogenicity (*pat*). T-DNA flanking sequences were rescued for nearly all of the *app*$^-$ and *pat*$^-$ mutants and the disrupted genes were

identified. My group also characterized a number of random insertions in order to examine the distribution of T-DNA in the Magnaporthe genome. This revealed that ATMT results in non-random insertion in *M. oryzae*, with a strong bias for promoter regions (Meng et al. 2007). All mutants and their phenotypes were recorded in the MGOS (*Magnaporthe grisea*:*Oryza sativa*) database, which was developed as part of the project (Soderlund et al 2006). MGOS allows the *M. oryzae*/rice research communities to search for strains that are deficient in phenotypes of interest to them. Cultures of all mutants were sent to the Fungal Genetics Stock Center, where they are kept in storage, and ready for distribution to the Magnaporthe research community. We are currently following up on a number of particularly interesting insertional mutants to identify other research directions that could be especially fruitful.

Finally, I have had a long-standing interest in understanding how the *AVR1-CO39* gene product triggers resistance in rice. However, I felt that it was important and necessary first to visualize the protein, in order to determine when and where it acts during the interaction. Until recently, cytological methods required to detect weakly expressed proteins in infected rice cells were lacking. Furthermore, I had no cytological experience. These facts provided an inertia which caused me to procrastinate in this endeavor. However, the arrival in the department of an expert cytologist, in the form of my colleague Michael Goodin, provided the necessary momentum for me to start moving in this exciting direction. To prepare myself for entering the "new world" of cytology, I spent the first six months of 2006 on sabbatical leave in Maria Harrison's laboratory at the Boyce Thompson Institute, Cornell University. There, I gained valuable experience learning protein immunolocalization, and live-cell imaging with confocal microscopy. Upon returning to the University of Kentucky, and encouraged by results from Barbara Valent's lab, we were soon able to detect AVR1-CO39 protein in infected rice cells, using methods that her group optimized. Further experiments to understand AVR1-CO39p secretion are on-going.

Dr. Goodin has developed vectors for high throughput protein localization in plants and we have now adapted these vectors for use in fungi. The USDA recently awarded us a grant to localize all of the *M. oryzae*-secreted proteins during penetration and infection of rice. Barbara Valent is an important collaborator on this project, as is Cari Soderlund (University of Arizona), who will provide us with bioinformatic support.

TEACHING NARRATIVE

Teaching life sciences to graduate students is truly challenging because, unlike Physics and Chemistry, there are few biological laws that govern the behavior of natural systems - even Mendel's "laws" of heredity are frequently broken. In the absence of such laws, our understanding of biological function is founded largely on hypotheses, all of which are capable of being disproven. Consequently, as one disseminates biological "knowledge" in a graduate level class, one continually has to encourage and remind the students to question the validity of that "knowledge."

In my experience, almost every graduate student that has entered my class has been completely unaware that what they read in a text book, or a research paper, is not fact; and the idea that they can (and should) challenge published information is entirely foreign to them. Therefore, throughout my teaching career, I have made it my number one goal to help students develop their critical thinking abilities. Initially, when I started teaching Plant-Microbe Interactions II (a course focused on disease resistance), I structured the course around the major topics in the field (genetics of resistance, resistance function, signaling, systemic acquired

resistance, etc.). Then, in each lecture, I would present data from one or two of the most significant studies that were responsible for current thinking in each field. With each piece of data presented, I would challenge the students to evaluate its validity by asking them to see if they can come up with alternative interpretations, identify missing controls, detect false logic, etc. In these forums, the students quickly became comfortable with criticizing published work, and they started to develop powerful scientific insight. Indeed, feedback from students indicated that the course challenged them to think about research in ways they had never done so before.

However, with the recent explosion in the amount of exciting information in the plant-microbe interactions field, it became increasingly difficult to cover the new data without compromising the development of critical thinking. Personally, I believe it is much more important for graduate students to be taught skills that are essential for the practice and publication of good science, than simply lecturing to them on information that can be gathered just as easily (and much more comprehensively) by reading books, review articles and research papers. Therefore, after extensive discussion of these issues in faculty meetings, I volunteered to develop a new course (PPA 600: Critical Methods in Plant-Microbe Interactions) the purpose of which is to teach students essential skills that underpin the practice of science.

Part I of the course covers skills that benefit the students in their day-to-day work. I start out by covering the scientific method and how to develop hypotheses, and describe why hypothesis-driven research is so vital to the advancement of science. Following lectures provide guidance with scientific writing, describe how to take good laboratory notes, and discuss scientific ethics. The remainder of the course focuses on providing students with the skills needed to conduct experimental research, as well as to read and evaluate scientific literature with a critical eye. Based on my previous experiences with discussing research articles in class, it was apparent that the students often finished reading papers without fully understanding the experiments described therein. Consequently, they have no choice but to accept that the methods used were appropriate, performed correctly, that the necessary controls were included, and that the authors' interpretations were valid. Therefore, to address this deficiency, Part II focuses on explaining methods (especially molecular ones) that are widely used in studies of plant-microbe interactions. Here, the students learn the principles of each method, their advantages and disadvantages, and most importantly, the types of controls that should be included. Finally, we discuss how to interpret the results of different types of experiments and, especially, possible alternative interpretations. Part III involves critical discussions of research papers covering "hot topics" in plant-microbe interactions. I include papers on viral, bacterial, fungal, oomycete and nematode pathogens, as well as on plant disease resistance. The papers are typically high-profile ones in leading journals. For each class, all students are assigned the same article, along with a list of study questions that they must be prepared to answer orally during the class discussion. Typically, the students are asked to identify the hypothesis that is being tested in the paper (this is often not so simple because hypotheses are rarely stated). They must then address: i) whether each experiment described is capable of testing the hypothesis; ii) were the experiments performed correctly, with all necessary controls?; iii) are the authors' interpretations correct, and/or are there alternative interpretations that were not considered?; and iv) what kinds of additional experiments should the authors have performed to test the hypothesis further? In addition to these standard questions, I also pose questions that draw their attention to experiments/issues that require careful scrutiny. I find that this framework for critical review is useful because it works regardless of subject matter or the experimental approaches taken. It also illustrates to the students the dangers one can face if one does not follow the scientific method.

The course has one major writing assignment, for which each student is required to prepare a short manuscript describing one or two results from their own work. Every two to three weeks, they submit a portion of the manuscript (Introduction, Materials and Methods, Results, Discussion and, finally, the complete, corrected manuscript). After each submission, I return an edited version and meet one-on-one with the students to provide feedback. I find that this is perhaps one of the most useful exercises in the course. When I sit down with a student and read back to them what they have written, they understand their mistakes much better than if I had simply added a comment in the text.

The first time the course was offered, I was not sure how the students would react, given that the format is very different to what they previously experienced. I was, therefore, delighted to find that the students really appreciated the course - so much so, that many approached me outside of class to say how much they were enjoying the course and that they really appreciated learning (and were benefiting from) the skills that I was teaching.

A separate, very important area of instruction is the mentoring of graduate students. To date, two students have received their Ph.D.s under my direction and I am currently Major Professor for two others, one of whom should graduate next year. My main goal in this capacity is to foster the students' development as independent scientists, while instilling in them the importance of critical thinking and maintaining the highest integrity in their research. So, as they conduct their research, I continually encourage them to question the validity of their findings, and to seek alternative interpretations. I remind them that experiments should be designed to try and test hypotheses - not support them. Accordingly, when their experiments yield unexpected or undesirable results, I stress that these results cannot be ignored and, instead, point out that perhaps the hypothesis is wrong. Overall, I hope that my students adopt my own philosophy about research, which is that we should seek "the truth" in science and not our own version of it.

Curriculum vitae

NAME: Michael M. Goodin

CURRENT STATUS: Associate Professor

APPOINTED: July 1, 2002

DISTRIBUTION OF EFFORT

2002-2003	97% Research,	3% Teaching
2003-2004	90% Research,	10% Teaching
2004-2005	91% Research,	9% Teaching
2005-2006	92% Research,	8% Teaching
2006-2007	91% Research,	9% Teaching
2007-2008	94% Research,	6% Teaching

EDUCATION

Ph.D. (Plant Pathology)	1992-1996. The Pennsylvania State University, USA
M.S. (Plant Pathology)	1989-1992. The Pennsylvania State University, USA
B.S. (Biology and Chemistry)	1985-1989. Brock University, Canada

PROFESSIONAL POSITIONS

July 1, 2008-present	Associate Professor, University of Kentucky (Plant Pathology)
2002-July 1, 2008	Assistant Professor, University of Kentucky (Plant Pathology)
1996-2002	Postdoctoral Scholar, University of California-Berkeley

RESEARCH

Primary Research Projects

Plant-Virus interactions

Goals: (i) To elucidate which factors are required by rhabdoviruses to establish successful infections in host plants.

(ii) To study the membrane and protein dynamics in virus-infected cells.

Novel vectors for protein expression in plants

Goal: To develop facile expression systems to support systems biology applications in the "model" plant, *Nicotiana benthamiana*.

Collaborative Projects

Plant-Fungus interactions
Goal: To identify and characterize fungal proteins required for pathogenesis, with emphasis on proteins secreted into plant cells from fungal hyphae.

Plant Systems Biology
Goal: To characterize the plant "nucleome", defined as all proteins that enter and exit the nucleus via - or are components of - the nuclear pore.

Current Extramural Support

1. A host protein interaction and localization map for a plant rhabdovirus. Principal Investigator (PI): Michael Goodin. Total award: $500,000. Funding agency: National Science Foundation-Division of Integrative Organismal Systems (NSF-IOS). Funding Period: June, 2008 – May, 2011. **(Of 114 proposals submitted to this program, 21 were funded)**

2. **Localization of secreted proteins during penetration and invasive growth of the rice blast fungus *Magnaporthe oryzae*.** PI: Mark Farman, Co-PIs: Michael Goodin, Carol Soderlund, Barbara Valent. Total award: $990,000. Funding agency: United States Department of Agriculture- National Research Initiative (USDA-NRI). Funding Period: January, 2008 – December, 2011.

3. Genome sequencing and subcellular localization of *Potato yellow dwarf virus proteins*. PI: Michael Goodin. Total award: $60,000. Funding agency: Kentucky Tobacco Research and Development Center. Funding Period: January, 2008 – December, 2008.

4. **Rhabdovirus phosphoproteins: RNA silencing and complex formation.** PI: Michael Goodin. Total award: $136,000. Funding agency: National Institutes of Health- National Institute for Allergy and infectious Diseases (NIH-NIAID). Funding Period: March, 2007 – February, 2009.

5. **Acquisition of a laser scanning confocal microscope for plant science research.** PI: Peter Nagy, Co-PIs: Mark Farman, Michael Goodin, Sharyn Perry. Total award: $307, 616. Funding agency: National Science Foundation- Multiuser Equipment program (NSF-MUE). Funding Period: March, 2005 – February, 2008.

Past Nationally-Competitive Extramural Support

1. **Nuclear membrane dynamics in rhabdovirus-infected cells.** PI: Michael Goodin. Total Award: $100,000. Funding agency: USDA-NRI. Funding Period: September, 2005 – September, 2007.

Past Regionally-Competitive Extramural Support

1. **Protein secretion by plant pathogenic fungi: delivery into the host cell cytoplasm.** PI: Mark Farman, Co-PI: Michael Goodin. Total Award: $49,651. Funding agency: Kentucky Science and Education Foundation. (KSEF). Funding Period: January, 2006 - January, 2007.

2. Expression vectors derived from plant negative-strand viruses. PI: Michael Goodin. Source of Support: Kentucky Tobacco Research and Development Center (KTRDC). Total Award: $110,976. Funding Period: July, 2005 – June, 2007.

3. Packaging lines for *in-planta* recovery of vectors from a plant rhabdovirus. PI: Michael Goodin. Funding Agency: KTRDC. Total Award: $112,000. Funding Period: July, 2005 – June, 2007

4. **Construction of a plant expression vector derived from a negative-strand RNA virus.** PI: Michael Goodin. Total Award: $52,000. Funding Agency: KTRDC. Funding Period: July, 2003 – June, 2004

5. **Changes in host gene expression in response to viral infection**. PI: Michael Goodin. Source of Support: KTRDC. Total Award: $97,000. Funding Period: July, 2002 – June, 2004

Intramural Support

1. Research Activity Award (College of Agriculture; CoA) to cover page and color charges for one manuscript, $1,500 (2007).

2. Research Activity Award (CoA) to cover page and color charges for one manuscript, $2,300 (2005).

3. Research Activity Award (CoA) to travel to the 8th International Congress of Plant Pathology, $3,000 (2003).

Pending Proposals

1. **BREAD: Project Preview – preventing viral epidemics worldwide.** PI: Michael Goodin. CoPI/Collaborators: Lava Kumar (International Institute for Tropical Agriculture, *Nigeria*); Naidu A. Rayapati (CoPI; Washington State University); Christine Rey (CoPI; University of the Witwatersrand, *South Africa*); John Agure (Maseno University, *Kenya*); Randy Allen (David H Murdock Research Institute); Ainsley Archer

(Ministry of Agriculture, *Jamaica*); William O. Dawson (University of Florida, IFAS); Elisabeth Knapp (Fraunhofer USA-Center for Molecular Biotechnology); Christopher Schardl (University of Kentucky); Sue Tolin (Virginia Tech University). Total Requested: $1,798,251. Funding agency: NSF/Bill&Melinda Gates Foundation. Funding Period: September, 2010 – September, 2013.

2. Novel interaction and localization domains in Potato yellow dwarf virus proteins. PI: Michael Goodin. Total Requested: $ $633,359.00. Funding agency: NSF. Funding Period: January, 2010 – December, 2013.

Submissions Not Funded

1. **Arabidopsis 2010: Protein networks in plant nucleocytoplasmic transport.** PI: Michael Goodin. Co-PIs: Vitaly Citovsky (State University of New York-Stony Brook), Sondra Lazarowitz (Cornell University), Iris Meier (Ohio State University) Total Requested: $ 2,151,216. Funding agency: NSF 2010 Project. Funding Period: October, 2008 – September, 2011.

2. A host protein interaction and localization map for a plant rhabdovirus. PI: Michael Goodin. Total Requested: $680,000. Funding agency: NSF.

3.**TRPGR. Nb-GFP:** ***Nicotiana benthamiana*****-genomics and functional proteomics.** PI: Michael Goodin. Co-PIs: Peter Nagy, Steven Lommel, Arnold Stromberg, David Zaitlin. Total Requested: $ 3,000,000. Funding Agency: NSF. Collaborators; Saskia Hogenhout, Judith Brown, Naidu Rayapati, Christopher Schardl. Submitted twice.

4. Rhabdovirus phosphoproteins: RNA silencing and complex formation. PI: Michael Goodin. Total Requested: $136, 000. Funding Agency: NIH.

5. Rhabdovirus-mediated nuclear protein and membrane dynamics in live cells. PI: Michael Goodin. Total Requested: $415, 160. Funding Agency: NSF.

6. **Acquisition of a laser scanning confocal microscope for plant science research.** PI: Peter Nagy. Co-PIs: Mark Farman, Michael Goodin, Sharyn Perry. Total Requested: $371,502. Funding Agency: NSF.

7. Integrated cell biology and genomics of plant and enveloped-virus interactions. PI: Michael Goodin. Total Requested: $307,404. Funding Agency USDA-NRI.

8. **Functional genomics of plant enveloped viruses.** PI: Michael Goodin. Co-PI: Arnold Stromberg. Total Requested: $919, 509. Funding Agency: NSF.

9. **Identification of viral pathogenesis-related genes controlled by microRNAs.** PI:

Michael Goodin. Co-PIs: Peter Nagy, Arnold Stromberg. Total Requested: $908,124. Funding Agency: NSF.

10. **Control of gene expression by plant rhabdoviral proteins.** PI: Michael Goodin. Co-PI: Bert Lynn. Total Requested: $136,000. Funding Agency: NIH-NIAID.

11. **RNA profiling of Bunyavirus-infected plants.** PI: Michael Goodin. Co-PI: Arnold Stromberg. Total Requested: $275, 000. Funding Agency: NIH.

12. **Control of gene expression by plant rhabdoviral proteins.** PI: Michael Goodin. Total Requested: $136, 000. Funding Agency: NIH.

PUBLICATIONS

Please note: in the sciences, the order of authors is not typically an indicator of their relative contributions to the research. The principal investigator (lab director) is often the last author listed. The first name listed is often the person (typically student or postdoctoral scholar) that conceived and/or conducted the experiments reported in the manuscript. Authors that made the least significant contributions to the experiments and/or preparation of the manuscript are listed in the middle of the author list. The corresponding author (indicted by an asterisk) *is the one responsible for submitting the manuscript, and for corresponding with journal editors during the review process.*

Refereed Journal Articles (Goodin lab and his members in bold)

Martin, K., Kopperud, K., Chakrabarty, R., Banerjee, R., Brooks, R., and *Goodin, M.M. (2009) Transient expression in *Nicotiana benthamiana* fluorescent marker lines provides enhanced definition of protein localization, movement and interactions in planta. Plant Journal 59:150-162

Ghosh, **D.**, **Brooks**, **R. E.**, **Wang**, **R.**, Lesnaw, J., and ***Goodin, M.M.** (2008) Cloning and subcelluar localization of the phosphoprotein and nucleocapsid proteins of *Potato yellow dwarf virus*, type species of the genus *Nucleorhabdovirus*. Virus Research. *In press*.
(Of 23 virology journals, Virus Research has the fourteenth highest cumulative impact factor [www.journal-ranking.com])

Chakrabarty, **R.**, **Banerjee**, **R.**, Chung, S.M., Farman, M., Citovsky, V., Hogenhout, S.A., Tzfira, T., and ***Goodin, M.M.** (2007) pSITE vectors for stable integration or transient expression of autofluorescent protein fusions in plants: Probing *Nicotiana benthamiana*-virus interactions. Molecular Plant-Microbe Interactions. 20:740-750
(Of 145 plant science journals, Molecular Plant-Microbe Interactions has the fifth highest cumulative impact factor [www.journal-ranking.com])

***Goodin, M.M.**, **Chakrabarty**, **R.**, **Yelton**, **S.**, **Martin**, **K.**, **Clark**, **A.**, and **Brooks**, **R.** (2007) Membrane and protein dynamics in live plant nuclei infected with Sonchus yellow net virus, a plant-adapted rhabdovirus. Journal of General Virology. 88:1810-

1820. (**Micrographs from this study were printed on the cover of the June, 2007 issue**. **Of 23 virology journals, Journal of General Virology has the fifth highest cumulative impact factor [www.journal-ranking.com])**

Deng, M., Bragg, J.N., Ruzin, S., Schichnes, D., King, D., **Goodin, M.M.**, and *Jackson, A.O. (2007) Role of the sonchus yellow net virus N protein in formation of nuclear viroplasms. Journal of Virology. 81:5362-5374.
(Of 23 virology journals, Journal of Virology has the second highest cumulative impact factor [www.journal-ranking.com])

Kanneganti, T.D., Bai, X., Tsai, C.W., Win, J., Meulia, T., **Goodin, M.M.**, Kamoun, S., and *Hogenhout, S.A. (2007) A functional genetic assay for nuclear trafficking in plants. The Plant Journal. 50:149-158.
(Of 145 plant science journals, The Plant Journal has the sixth highest cumulative impact factor [www.journal-ranking.com])

Senthil, **G.**, Liu, H., Puram, V.G., **Clark**, **A.**, Stromberg, A., and ***Goodin, M.M**. (2005) Specific and common changes in *Nicotiana benthamiana* gene expression in response to infection by enveloped viruses. Journal of General Virology. 86:2615-2625.

***Goodin, M.**, **Yelton**, **S.**, **Ghosh**, **D.**, **Mathews**, **S.**, and Lesnaw, J. (2005) Live-cell imaging of rhabdovirus-induced morphological changes in plant nuclear membranes. Molecular Plant-Microbe Interactions. 18:703-709.

Tsai, C.W., Redinbaugh, M.G., Willie, K.J., Reed, S., **Goodin, M**., and *Hogenhout, S.A. (2005) Complete genome sequence and in planta subcellular localization of maize fine streak virus proteins. Journal of Virology. 79:5304-5314.

Goodin, M.M., Dietzgen, R.G, Schichnes, D., Ruzin, S., and *Jackson, A.O. (2002) pGD vectors: versatile tools for the expression of green and red fluorescent protein fusions in agroinfiltrated plant leaves. The Plant Journal 31:375-383

Goodin, M.M., Austin, J., Tobias, R., Fujita, M., Morales. C., and *Jackson, A.O. (2001) Interaction and nuclear import of the N and P proteins of sonchus yellow net virus. Journal of Virology. 75:9393-9406.

Goodin, M.M., Weir, T., Schlagnhaufer, B., and *Romaine, C.P. (1997) Characterization of an RNA-dependent RNA polymerase associated with La France Isometric Virus Journal of Virology: 71:2264-2269

*Romaine, C.P., Schlagnhaufer, B., and **Goodin, M.M.** (1994) Vesicle-associated double-stranded ribonucleic acid genetic elements in *Agaricus bisporus*. Current Genetics: 25:128-134.

(Of 125 genetics journals, Current Gentics has the thirty-fourth highest cumulative impact factor [www.journal-ranking.com])

Goodin, M.M., *Biggs, A.R., and Castle, A.M. (1993) Changes in levels and isozymes of peroxidase in wounded peach bark. Fruit Varieties Journal: 47:185-192
(Of 59 agronomy journals, Fruit Varieties Journal has the fifty-first highest cumulative impact factor [www.journal-ranking.com])

Goodin, M.M., Schlagnhaufer, B., and *Romaine, C.P. (1992) Encapsidation of the La France disease-specific double-stranded RNAs in 36 nm virus-like particles. Phytopathology 82:286-290.
(Of 145 plant sciences journals, Phytopathology has the fourteenth highest cumulative impact factor [www.journal-ranking.com])

Book Chapters/Reviews (Goodin and his lab members in bold)

***Goodin, M.M.,** Zaitlin, D., Naidu, R. A., Lommel, S. A. (2008) *Nicotiana benthamiana*: its history and future as a model for plant-microbe interactions. Molecular Plant-Microbe Interactions. *Accepted for publication (4/11/2008).*

***Goodin, M.M.**, **Chakrabarty**, **R.**, **Banerjee**, **R.**, **Yelton**, **S.**, and DeBolt, S. (2007) Update on live-cell imaging in plant cells: New Gateways to discovery. Plant Physiology 145:1100-1109.
(Of 145 plant sciences journals, Plant Physiology has the eighth highest cumulative impact factor [www.journal-ranking.com])

Goodin, M. M**., **Chakrabarty**, **R**., and **Yelton**, **S.** Membrane and protein dynamics in virus-infected plant cells. *In;* Plant Virology Protocols Volume 2 : From viral sequence to protein function. ***Eds. *G. Foster, Y. Hong, E. Johansen, and P. Nagy.* The Humana Press Inc., *in press*.

*Whitham, S.A., Yang, C., and **Goodin, M.M.** (2006) Global impact: elucidating plant responses to viral infection. Molecular Plant-Microbe Interactions. 19:1207-1215.

*Jackson, A.O., Dietzgen, R.G., **Goodin, M. M**., Bragg, J. N., and Deng, M. (2005) Biology of plant rhabdoviruses. Annual Review of Phytopathology. 43:623-660.
(Of 145 plant science journals, Annual Review of Phytopathology has the third highest cumulative impact factor [www.journal-ranking.com])

PUBLICATIONS IN PREPARATION (Goodin and his lab members in bold)

Chakrabarty, **R.**, **Banerjee**, **R.**, and ***Goodin, M.M.** A set of transgenic *Nicotiana benthamiana* expressing autofluorescent markers targeted to cellular loci. Transgenic

Research.

Martin, **K**., and *__Goodin, M.M.__ pSITE-II vectors for protein tracking and interaction mapping in plant cells. The Plant Journal.

Martin, **K.**, and *__Goodin, M.M.__ Mapping subcellular targeting domains in the glycoproteins of plant-adapted rhaboviruses. Virology.

TEACHING AND ADVISING

Graduate Students

- Gavin Anderson (Ph.D. - Plant Pathology). 2008-present. Major Professor.

- Debashish Ghosh (Ph.D. - Biology). 2003-2007. ***Successfully defended dissertation October, 2007.*** Dr. Ghosh's thesis research focused on the cloning, characterization and subcellular localization of the phosphoprotein and nucleocapsid proteins of *Potato yellow dwarf virus*. Co-Major Professors; Michael Goodin and Judith Lesnaw. All research relevant to the dissertation was conducted in the Goodin Lab.

- Kathleen Baumann Martin (Ph.D. - Plant Pathology). 2005-present. Major Professor.

- Sharon Yelton (M.S. - Plant Pathology). 2003-2007. Major Professor. Ms. Yelton has completed the research required for her thesis and is currently writing. She is currently employed in the laboratory of Dr. David Watt (Department of Biochemistry).

- Stephanie Mathews (M.S. - Plant Pathology). 2002-2004. Major Professor. Did not defend; voluntarily left department to pursue job opportunity.

Postdoctoral Scholars and Research Associate

- Dr. Byoung-Eun Min (2008-present)
- Dr. Anindya Bandyopadhyay (2008 – present)
- Dr. Romit Chakrabarty (2005-2007)
- Ms. Rituparna Banerjee, Research Associate (2005-2007)
- Dr. Anthony Clark (2004-2005)
- Dr. Warren Lushia (2003-2004)
- Dr. Geetha Senthil (2003-2005)

Service on Graduate Student Advisory Committees

Current:

- Tonja Fisher, Ph.D. candidate (Webb Lab)
- Yi Jang, Ph.D. candidate (Nagy Lab)
- Kunj Pathak, Ph.D. candidate (Nagy Lab)
- Andreea Popa, Ph.D. candidate ((Dutch Lab)
- Everet C. Smith, Ph.D. candidate (Dutch Lab)
- Monika Sharma, Ph.D. candidate (Nagy Lab)
- Dongxiu Zhang, Ph.D. candidate (Schardl Lab)

Former:
- Zivile Panaviene, Ph.D. awarded 2004 (Nagy Lab)
- Chunquan Zhang, Ph.D. awarded 2005 (Ghabrial Lab)

External Examiner for Ph.D. Defenses

- Mark Wurth (2006) - Dutch Lab; Department of Molecular & Cellular Biochemistry, University of Kentucky
- Shannon Whitman (2007) - Dutch Lab.

Undergraduate Research Advising (present students)

- Robert Earl Brooks (work-study intern; U.K. Agricultural Biotechnology Program). 2006-present. Mr. Brooks is a co-author on two publications.

- Kristin Kopperud (work-study intern; U.K. Agricultural Biotechnology Program). 2008-present. Awarded "Eureka" summer research fellowship for 2008.

- John Wigginton (research project; U.K. Agricultural Biotechnology Program). 2008-present. Mr. Wigginton is undertaking his ABT 395 research project in my lab as part of the independent research requirement for the ABT program.

Visiting Scientists

- Dr. Ioan Zagrai, from the Fruit Research and Development Center, Bistrita, Romania, was a Norman E. Borlaug International Science and Technology Fellow. March-April, 2006.

- Dr. Ralf Dietzgen (The University of Queensland, Australia), with support from the Australian Academy of Sciences, conducted a study leave in my lab during July, 2008.

Undergraduate Student Advising
(All students are enrolled in the U.K. Agricultural Biotechnology Program)

- James Frazier
- Hilda Guerra
- Laura Hayman
- Alyson Humphrey
- Whitney Roberts
- Sarah-Paige Thayer
- Robert Mark Thomas
- Jordan Leigh Welte

Courses Taught

Fall 2007

PPA 641: **Plant Disease, Population Biology, and Biotechnology.** A one-credit course taught together with Dr. Paul Vincelli.

PPA 500: **Physiology of Plant Health and Disease.** Organized by Drs. Aadra Kachroo, Pradeep Kachroo and Christopher Schardl. Provided two lectures covering the areas of plant cell biology and plant genome organization.

ABT 201: **Scientific Methods in Biotechnology.** Organized by Drs. Sharyn Perry and Bruce Webb. Presented one lecture on plant functional genomics, with emphasis on live-cell microscopy using the confocal microscope housed in the Plant Science Building.

ABT 101: **Introduction to Biotechnology.** Organized by Drs. Sharyn Perry and Robert Houtz. Presented one lecture on plant functional genomics, with emphasis on the role of art in science.

Spring 2007

PPA 671: **Advanced Plant Virology.** A one-credit course taught together with Dr. Peter Nagy.

Fall 2006

PPA 641: **Plant Disease, Population Biology, and Biotechnology** (new title) . A one-credit course taught together with Dr. Paul Vincelli.

PPA 500: **Physiology of Plant Health and Disease.** Organized by Dr. Christopher Schardl. Provided two lectures covering the areas of plant cell biology; plant genomics; control of gene expression; micro-RNA; negative-strand RNA virus replication and DNA virus replication).

ABT 201: **Scientific Methods in Biotechnology.** Organized by Drs. Sharyn Perry and Bruce Webb. Presented one lecture on plant functional genomics, with emphasis on live-cell microscopy using the confocal microscope housed in the Plant Science Building.

Spring 2006

PPA 671: **Advanced Plant Virology.** A one-credit course taught together with Dr. Peter Nagy.

Fall 2005

PPA 641: **Essentials of Plant Disease Epidemiology.** A one-credit course taught together with Dr. Paul Vincelli.

PPA 500: **Physiology of Plant Health and Disease.** Organized by Dr. Christopher Schardl. Provided four lectures covering the areas of plant cell biology; plant genomics; control of gene expression; micro-RNA; negative-strand RNA virus replication and DNA virus replication)

Spring 2005

PPA 656: **Plant Virology.** A three-credit course taught together with Drs. Said Ghabrial and Peter Nagy.

Teaching prior to Spring 2005

I was the coordinator for the Plant Pathology Seminar course (**PPA 770**) for three semesters (**Fall, 2003-Fall, 2004**).

Provided two guest lectures in Plant Virology (**PPA 656**: Fall 2002), taught by with Drs. Said Ghabrial and Peter Nagy.

Provided one guest lecture in Introduction to Biotechnology (**ABT 101**: Spring 2003), organized by Dr. Glenn Collins (Spring 2003).

ABSTRACTS PRESENTED

At the 26th Annual Meeting of the American Society for Virology held at the Oregon State University (July, 2007).

At the 25th Annual Meeting of the American Society for Virology held at the University of Wisconsin-Madison (June, 2006).

At the 24th Annual Meeting of the American Society for Virology held at the Pennsylvania State University (June, 2005). Served as a convener.

At 23rd Annual Meeting of the American Society for Virology held in Montreal, Canada (July, 2004).

At the 8th International Congress of Plant Pathology held in Christchurch, New Zealand (January, 2003).

At the 21st Annual Meeting of the American Society for Virology held at the University of Kentucky (July, 2002).

My graduate student, Kathleen B. Martin, presented a poster at the 2nd Pan American Plant Membrane Biology Workshop, South Padre Island, Texas (May, 2006).

My graduate student, Sharon Yelton, presented a poster at the 96th Annual Meeting of the American Phytopathological Society (APS) in Anaheim, California (June, 2004).

SERVICE AND RECOGNITION

At the request of Dr. Michael Mullen, I have accepted a three-year appointment to serve as Co-Director of Undergraduate Studies for the University of Kentucky-Agricultural Biotechnology Program. Dr. Sharyn Perry is the other Co-Director.

In order to identify the best state-of-the-art laser scanning confocal microscope (LSCM) to meet the needs of research labs housed in the Plant Science Building (PSB), I organized in-house demonstrations by each of the three leading manufacturers of LSCMs. The first demonstration was hosted by Leica Microsystems (December, 2003). Subsequent presentations were made by Carl Zeiss Microimaging Incorporated (February, 2004) and Olympus (May, 2004).

As *ad hoc* Director of the University of Kentucky-Plant Science Biological Imaging Facility, I oversee the operation of the confocal microscope housed in the Plant Science Building. I have trained all users of this instrument and provide technical support when needed. To date, I have trained 22 users from 14 labs. Additionally, I conduct all routine maintenance of the microscope and coordinate with Olympus technicians when advanced training sessions or repairs are required.

At the invitation of Drs. Hartman, Nesmith and Vincelli, I participated in the workshop "Training on Plant Viruses" for Cooperative Extension Service Horticultural Agents, Versailles, November 2003. My four 15 minute lectures for the workshop were videotaped and subsequently recorded on DVDs for distribution to County Extension Agents. All presenters were given an "Outstanding Project" award by the Kentucky Association of State Extension Professionals.

Summers 2004, 2005, and 2007. At the invitation of Dr. Sharyn Perry (Department of Plant and Soil Sciences), I participated in the "Girls in Science" Summer program. "Hands-on" demonstrations were set up so that ~60 7th-graders each year could learn how to isolate DNA from plant material.

Summers 2004, 2005, and 2007. At the invitation of Dr. Peter Mirabito (Department of Biology), I participated in the Summer Research Program sponsored through the Kentucky Biomedical Research Infrastructure Network (KBRIN). Students were introduced to concepts in agricultural biotechnology via my novel lecture "Shakespeare speaks on Biotechnology" (http://www.ca.uky.edu/agcollege/plantpathology/goodin/biotech.htm).

EDITORSHIPS, REVIEW PANELS, REVIEWER SERVICE

2009-2012: Editorial board for the journal Molecular Plant Pathology

2008:

Reviewed four manuscripts submitted to Virology (2), and Journal of Virological Methods (1), Phytopathology (1). Additionally, I reviewed one grant proposal for the Kansas State University Ecological Genomics Institute: Competitive Seed Grants. I was invited to review one proposal for the NSF, but had to turn down the opportunity to do so, as I had recently entered a collaboration with the PI.

2007:

Reviewed ten manuscripts for a variety of journals including Plant Physiology (7), Virology (1), Journal of General Virology (1), Archives of Virology (1).

Additionally, I reviewed one grant proposal for the USDA.

2002-2006:

Reviewed thirteen manuscripts for journals including FEBS Letters (1), Journal of Virology (1), Journal of General Virology (3), Journal of Molecular Biology (1), Journal of Virological Methods (1), Molecular Plant-Microbe Interactions (2), Molecular Plant Pathology (1), Plant Physiology (1) and Virus Research (2).

Additionally, I reviewed one proposal for the Deutsche Forschungsgemeinschaft (German Research Foundation) and two proposals for the NSF.

INVITED LECTURES, SPEECHES

November 2009.	Invited by Dr. Anne Simon, University of Maryland
October 2009.	Invited by Dr. Mike Deom, University of Georgia
April 2009.	Invited by Dr. Marilyn Roosinck, Noble Foundation
March 2009.	Invited by Dr. William O. Dawson, University of Florida, Citrus Research and Education Center
February 2008.	Invited by Dr. Stephen Streatfield, Fraunhofer Center for Molecular Biotechnology.
November 2007.	Invited by Dr. A.L.N. Rao, Department of Plant Pathology, University of California-Riverside.
February 2007.	Invited by Drs. Steven Lommel and Thomas Mitchell, Department of Plant Pathology, North Carolina State University.
March 2006.	Invited by Dr. Indu Maiti, KTRDC.
April 2005.	Invited by Dr. Kris Lambert, Department of Crop Science, University of Illinois at Urbana-Champaign.
January 2005.	Invited by Dr. Juergen Polle to be a "special speaker" at the New York Area Plant Biologist Meeting.
August 2004.	Invited by Dr. Indu Maiti, KTRDC.
October 2004.	Invited by Dr. Matthew Turnbull, Department of Entomology, Clemson University.
October 2003.	Invited by Mimi Sen, Western Institute for Food Safety and Security (WIFSS) /California Department of Food and Agriculture.
October 2003.	Invited by Dr. Bryce Falk, Department of Plant Pathology, University of California at Davis.
May 2003.	Invited by Saskia Hogenhout, Department of Entomology, The Ohio State University-OARDC.

May 2003. Invited by Dr. Indu Maiti, KTRDC.

April 2003. Invited by Drs. Tzvi Tzfira and Vitaly Citovsky, Department of Biochemistry and Cell Biology, State University of New York, Stony Brook.

UNIVERSITY COMMITTEES

1. *Ad hoc* committee to advise the College administration on reorganization of graduate programs in plant sciences and environmental/natural resource sciences.

2. Agricultural Biotechnology Coordinating Committee.

3. Advisory Committee on Appointment , Promotion and Tenure

DEPARTMENTAL COMMITTEES

1. Academic Program Committee

2. *Ad hoc* Committee for revision of the Plant Pathology curriculum

3. Resource Committee

Research Narrative

Research in my laboratory is focused, primarily, on the cell biology and genomics of Nucleorhabdoviruses, which are the plant-adapted members of the family *Rhabdoviridae* that contains enveloped viruses with monopartite, minus-sense, single-stranded RNA genomes. Collectively, these viruses represent some of the greatest threats to human, animal, and plant health. Due in large part to their emerging threat to agricultural production for a wide variety of crops, there has been greatly renewed interest in plant rhabdovirus research, resulting in a rapid increase in the identification and characterization of new viruses. Most of these newly characterized viruses, however, replicate in plant hosts that are not easily tractable from the standpoint of cell biology. In contrast, my research is conducted with two rhabdoviruses that replicate in *Nicotiana benthamiana*, a wild relative of tobacco native to Australia, which has emerged as a critically important "model" plant host for agriculturally important pathogens, particularly viruses. Furthermore, since it can be infected by a genetically diverse array of viruses, *N. benthamiana* has become *the* host-of-choice in plant virology. In terms of functional genomics research, *N. benthamiana*, more so than other model plants, is amenable to high-throughput methods, especially virus-induced gene silencing and agroinfiltration. In total, the research in my program represents the premier system for investigation of rhabdoviruses with contrasting cell biology. The broader impact of my long-term studies will be in the translation

from basic research to technologies that can be deployed to protect a wide variety of crops from diseases caused by rhabdoviruses and, in addition, perhaps, to an increasingly diverse group of novel plant viruses with negative-strand RNA genomes. Additionally, plant rhabdoviruses hold great promise for the development of viral-vectors that can be used in a variety of biotechnological applications, such as the production of pharmaceutical proteins in plants.

My research can be divided into three major areas:

1. Plant-Virus interactions
Goals: (i) To understand virus-induced relocalization of host proteins in terms of establishing compatible interactions
(ii) To study the trafficking of viral proteins in virus-infected cells.

2. Plant-Fungus interactions
Goal: To identify and characterize fungal proteins required for pathogenesis, with emphasis on proteins secreted into plant cells from fungal hyphae.

3. Novel vectors for protein expression in plants
Goal: To develop facile expression systems to support systems biology applications in the "model" plant, *Nicotiana benthamiana*.

Plant functional proteomics research is increasingly dependent upon vectors that facilitate high-throughput gene cloning and expression of fusions to autofluorescent proteins. We have recently constructed the pSITE family of plasmids, a new set of *Agrobacterium* binary vectors, suitable for the stable integration or transient expression of various autofluorescent protein fusions in plant cells. The pSITE vectors permit single-step Gateway-mediated recombination cloning for construction of binary vectors that can be used directly in transient expression studies or for the selection of transgenic plants on media containing kanamycin. These vectors can be used to express native proteins or ECFP, EGFP, EYFP, or RFP fusions to either the carboxy- or amino-termini of proteins of interest. We have validated the vectors for use in transient expression assays and for the generation of transgenic plants. Additionally, we have generated markers for fluorescent highlighting of actin filaments, chromatin, endoplasmic reticulum, and nucleoli. Finally, we show that pSITE vectors can be used for targeted gene expression in virus-infected cells, which should facilitate high-throughput characterization of protein dynamics in host-virus interactions.

Cell biology of plant-rhabdovirus interactions

It is in the arena of plant rhabdovirus cell biology where research in the Goodin lab has made the greatest scientific contribution. Currently, major projects are aimed at elucidating the relationship between the localization patterns of viral proteins in infected cells and their effect on host nuclear membranes and proteins. We have recently reported that transgenic *N. benthamiana* plants that express green fluorescent protein (GFP) targeted to the endoplasmic reticulum (ER) accumulate GFP within nuclei of rhabdovirus-infected cells. In order to advance these studies, a novel set of plasmid vectors was developed in my lab for the expression of

proteins or RNA in plant cells. Using these vectors we have revealed substructure within viral replication complexes that explains, in part, their association with intranuclear membranes. Further, using confocal microscopy in conjunction with photobleaching, we have shown that these membranes retain their connectivity with the ER and additionally, we have demonstrated, using total internal reflectance microscopy, that the ER proliferates extensively in virus-infected cells. We are now investigating whether rhabdoviral protein/RNA complexes utilize these membranes in order to move cell to cell. In addition, we have begun to test the hypothesis that the mechanism by which pathogens trigger changes in host gene expression in a compatible interaction is related to both the cellular localization of pathogen-encoded proteins as well as the differential expression of host gene products in response to infection. To this end, we have shown that infection of rhabdoviruses causes amplification of the number of nucleoli in infected nuclei. With the availability of our new vectors that facilitate high-throughput protein localization in plant cells, in addition to the results of microarray experiments that identified greater than 1400 genes that are differentially expressed in response to rhabdovirus infection, we seek to identify those plant genes that enable rhabdoviruses to infect plants successfully. Characterization of these genes will contribute to knowledge of the molecular and cell biology of plant-rhabdovirus interactions, as well as providing potential targets for development of transgenic plants that are either resistant to rhabdoviruses, for crop protection purposes, or serve as enhanced hosts for viral vectors used for pharmaceutical production.

Development of plant expression vectors derived from negative-strand RNA viruses.

Despite their apparent genetic simplicity, viruses exhibit an amazing sophistication in terms of their evolution of highly efficient mechanisms for infecting cells, expression of their genetic material and replication of their genomes. The development of recombinant DNA techniques has made it possible to exploit and manipulate these viral properties, resulting in not only detailed insight into viral replication and viral-host interactions but also the development of a wide variety of tools with application to the pharmaceutical and biotechnological industries. Plant viral vectors have found applications in gene therapy, vaccine production and the development of novel pharmaceuticals. The advantage of viral vectors, in general, includes the speed with which they can be manipulated for the expression of foreign genes. In agricultural biotechnology, plant virus vectors offer an attractive alternative to the expense of development, as well as environmental and social implications, of transgenic plants. Viral vectors derived from rhabdoviruses, such as *Sonchus yellow net virus* (SYNV), offers the potential to produce vectors with increased stability, reduced propensity to recombine, the ability to express two or more genes from the same vector and a facile mechanism for regulating the amount of foreign gene expression. Based on results obtained with vectors derived from animal rhabdoviruses, vectors derived from plant rhabdoviruses should offer significantly greater utility than current plant viral vectors.

Genomics of plant-rhabdovirus interactions:

The comprehensive determination of the host's genetic response to an invading virus is of critical importance to our understanding of the establishment of compatible interactions between plant hosts and viral pathogens. In addition to providing insight into the changes in plant gene expression in response to infection by enveloped viruses, our research aims to identify the function of novel genes in viral pathogenesis. The intellectual merit of this research lies in the identification and characterization of plant genes that underlie how virus infection impacts the biochemistry and physiology of host cells, a situation that currently represents a large gap in our knowledge of plant virology. An extensive series of microarray experiments

conducted by my program members has allowed us to identify a large number of novel genes that are uniquely up-regulated in response to infection by SYNV or *Impatiens necrotic spot tospovirus* (INSV), another devastating negative-strand RNA virus of great agricultural importance.

Curriculum Vitae for John R. Hartman

Birthdate and Birthplace:
May 2, 1943, Bellerose, NY, but was raised in Manitowoc, Wisconsin from a very young age.

Contact:
Plant Pathology Department, University of Kentucky, Lexington, KY 40546-0312
Telephone: 859/257-7445 ext 80720; Fax: 859/323-1961; e-mail: jhartman@uky.edu

Education:
B.S. in Biochemistry, University of Wisconsin-Madison, 1966
M.S. in Plant Pathology, University of Wisconsin-Madison, 1970
Ph.D. in Plant Pathology, (Botany minor) University of Wisconsin-Madison, 1971

Employment:
1966 - 1971: Graduate Research Assistant, Department of Plant Pathology, University of Wisconsin
1971 - 2008: University of Kentucky Department of Plant Pathology
Assistant Extension Professor - 1971, Associate Extension Professor - 1975, and Extension Professor - 1982; Associate member of the Graduate Faculty, 1978.
2009: Professor - 40% post-retirement appointment.
Sabbatic year study leaves during employment:
Department of Plant Pathology, University of California - Davis, 1980-81
Agricultural Development and Advisory Service - Wye, Ashford, Kent, England, 1988-89
INRA, Institute National de la Recherche Agronomique, Station Pathologie Végétale, Centre de Recherches d'Angers, Angers, France, 1996-97
Typical annual distribution of effort:
Cooperative Extension, 90%
Resident Instruction, 10%

COOPERATIVE EXTENSION RESPONSIBILITIES:

University of Kentucky Extension Plant Pathology programs for nursery, forest, greenhouse and landscape plants; for urban horticulture; and for fruit crops. Extension Plant Pathology programs for vegetable crops, 1971-1980; corn, 1974-1975; and turfgrasses, 1974-1985. Extension Plant Pathology program coordinator since 1975.

1) Plant Pathology Education of U.K. Extension Personnel
Area-wide and state-wide Extension Agent training, ongoing.
State Extension Specialist training at State Extension Conference for Specialists.
Plant Pathology training for Extension Area Program Directors.
4-H Agent training in vegetable diseases and forest pathology.
New Extension Agent training, multiple years.

Horticultural Extension Agent training, ongoing.
Extension Agent training in plant disease diagnosis ongoing.
On-the-job County Extension Agent training occurs with most county visits, ongoing.
Weekly Kentucky Pest News for Agents and Specialists - over 1,000 timely articles written, 1976 - 2009.
Monthly radio tape updates for Agents and Specialists (total number of radio tapes, about 1,000).
Extension publications on fruit, forest, urban horticulture and landscape plant pathology topics, ongoing.
Two instructional DVD's developed for Agent training.

2) Plant Pathology Educational Programs for non-U.K. Clients

A. Landscape, Nursery, and Greenhouse Disease Management

Presentations were made to statewide audiences of professionals attending:

- Kentucky Urban Forestry Conference, annually.
- Kentucky Landscape Industries Conference, annually.
- Turf and Landscape Management Short Course, annually 1992 - 1996.
- Central Kentucky Ornamental and Turf Association Horticulture Conference, annually from 1992.
- Regional landscape maintenance and pest management (Plant Health Care) workshops for arboricultural professionals, (1987-2005, one to three annually), begun by me.
- Kentucky Nursery and Landscape Association, Nursery Best Management Practices Workshops, Louisville, 2005, 2006.
- Nursery Integrated Pest Management field days, 2005, 2006.
- Buckeye (Ohio) Landscape Diagnostic Workshops, 2005 - 2009.
- Eastern Kentucky Greenhouse Growers workshop, 2006.
- Kentucky Greenhouse Growers Association, periodically.
- Turf and Landscape Field Days, periodically.
- Kentucky Arborists Association Certification Workshops, periodically.

Presentations were also made at scores of field days, county, and area grower meetings.
Weekly Kentucky Pest News, monthly radio tapes, videotapes, and Extension landscape plant disease publications.

B. Fruit Crop Diseases

Presentations were made to statewide audiences of growers attending:

- Apple IPM workshops (three or four annually) from 1992, for commercial growers.
- Kentucky Vegetable Growers Association and Kentucky Horticultural Society Meetings, annually, from 1971.
- Grape and Wine Short Course, Ky Vineyard Society, annually, from 1993.
- Kentucky Strawberry School, 1993.
- Presentations were also made at scores of state and regional field days, county, and area grower meetings.

Weekly Kentucky Pest News, monthly radio tapes, videotapes, training manuals, and

Extension fruit disease publications.

C. Plant Pathology for Urban Audiences

Presentations were made and workshops were conducted for the following urban audiences:

County and Regional Master Gardener training meetings, several annually from 1992.

Presentations were also made for a dozen local urban garden groups since 1992.

Food Quality/Safety Task Force Media Expo, 1992.
Backyard Apple IPM training workshops series of five meetings, 1994.
Arbor Day at the Arboretum, annually since 1994.
Louisville and Lexington Rose Societies, twice, each since 1992.
Bluegrass Rhododendron Society, 1995.
Tri-state Master Gardeners Conference, 1996.
U.K. Arboretum Friends Founders Lecture, on sudden Oak Death, 2005.

Weekly Kentucky Pest News, Plant Digest radio programs, a backyard apple IPM manual, and Extension publications.

D. Forest Tree Diseases

Presentations were made and workshops were conducted for the following groups:

Kentucky Christmas Tree Growers, periodically 1992 - 2005.
Pesticide Applicator Training for Foresters, 1992.
Wood Preservative Workshop, 1992.
Sudden oak death update for professional foresters, 2005
Kentucky Forest Health Task Force, 2005 - 2009.
4-H forest pathology workshop and contest, several times starting in 1994.

Weekly Kentucky Pest News, Forest tree disease training videotape.

<u>3) Plant Disease Diagnosis</u>

Supervision of Plant Disease Diagnostic Laboratory which diagnoses approximately 4,000 specimens annually, 1975-2008.

Diagnose specimens in Plant Disease Diagnostic Laboratory, 1971-2009.

Statewide bacterial leaf scorch, dogwood anthracnose, pine wilt nematode, thread blight, Pierce's disease, and *Phytophthora ramorum* surveys.

On-site diagnoses are made during field visits with Agents.

<u>4) Development of Plant Disease Control Recommendations</u>

See activities listed under applied research and Extension publications.

<u>5) Integrated Pest Management</u>

See activities listed under fruit crops, grants received, educational materials produced, and publications.

<u>Other Extension work</u>

Program leader for U.K. Extension plant pathology 1975-2008.

Weekly conference call, plant pathology Extension group.
Extension plant pathology administrative report preparation.
Food Safety and Quality Task Force 1993-1996.
Pesticide Applicator Training and IPM programs.
Association of Kentucky Extension Specialists, 1995-96 program chairman.
Epsilon Sigma Phi, area contact and liaison for Specialists, 1992-1995.

Involvement with Other Professionals:

The following activities involved interdepartmental and inter-institutional collaboration:

- Apple IPM, three departments, eight universities.
- Landscape Plant Health Care workshops, three departments.
- Plant pathology pesticide applicator training, three departments.
- Food Safety/Quality Task Force, agriculture, home economics, and 4-H program areas.
- Ky./Tenn. Plant Pathologists Workshop, 1993 & 1994.
- Tree fruit and small fruit pest management manuals and annually revised spray schedules, 10 states, three disciplines.
- NCR-193 Elm cultivar evaluation project, 20 states, 2 disciplines.

Use or Development of Visual or Audio Teaching Aids:

Television Programs, Bowling Green, Lexington, 136 live or recorded, 1975-2005.
Radio Programs, U.K. Agricultural Communications tapes, 1010 recorded, 1971-2008.
Construction damage to trees in wooded lots, ISA videotape, 30:00, 1988.
Avoiding damage to trees in wooded lots during construction, ISA videotape, 30:00, 1989.
Integrated Pest Management for Midwest Apple Growers, videotape, 17:35, 1992.
4-H Forest Pathology, a 60:00 training videotape, 1993.
Landscape Plant Diseases, a 30 minute pesticide training videotape, 1995, 1997.
Home Landscape IPM, a 30 minute videotape, 1999.
IPM for Woody Plants on the Golf Course, a 20 minute pesticide training videotape, 2000.
Instructional DVDs for County Agent training, Understanding Bacterial Diseases, Understanding Plant Virus Diseases, 2002-2003.

Publications:

<u>Extension Publications</u>

Backyard Apple IPM Training Manual 1994.
Kentucky Apple Crop Management Scout Manual 1996 (revised).
Kentucky Commercial Tree Fruit Spray Guide. (multiple authors) ID-92 (revised annually).
Kentucky Commercial Small Fruit Spray Guide. (multiple authors) ID-94 (revised annually).
The following Extension publications involving diseases of landscape plants and fruit crops were created or revised during 1971 - 2009 (some involved multiple

authors):
IP-9, Pesticide residues in food.
PAT 1-6, Ornamental and turf pesticide applicator training.
Interdepartmental (ID) publications including ID-8, Strawberry insect and disease control; -10, Apple Spray schedule; -11, Stone Fruit Spray Schedule; -21, Home fruit pest management; -35, Grape insect and disease control; -36, Commercial vegetable crop recommendations; -37, Commercial tree fruit spray schedule; -50, Shade tree decline; -51, Leaf scorch; -52, What's wrong with my taxus?; -55, Tree topping; -60, Growing ginseng; -67, Flowering dogwood; -68, Flowering crabapple; -71, Woody plants under stress; -72, Principles of home landscape fertilization; -75, Pimiento pepper production; -80, Transplanting trees and shrubs; -84, Iron deficiency; -85, Conifer needle diseases; -87, Control of herbaceous ornamental diseases; -88, Control of woody ornamental diseases; -89, Dry seasons and landscape plants; -105, Home lawn diseases; -110, SCN in nurseries; -118, Roses; and -126, Growing grapes.
ID tabloids - Home vegetable gardening; Home landscapes.
Plant Pathology (PPA) department publications including PPA-1, Chemical control of turfgrass diseases; -2, Guide for chemical control of vegetable diseases; -4, Home vegetable garden disease control; -5, Shrub and tree disease control; -6, Seed treatment for grains; -7, Kentucky vegetable diseases; -9, Collecting plant specimens for diagnosis; -13, Bean diseases; -14, Potato blackleg; -15, Pepper and tomato bacterial spot; -16, Pine diseases; -17, Shade tree anthracnose; -18, Verticillium wilt; -20 root knot nematode; -23, Apple rusts; -24, apple scab; -33, Corn Stewart's wilt; and -34, fire blight.
Horticulture (HO) Department publications including Ho-58, Vegetable cultivars for Kentucky gardens.
PPFS (plant pathology fact sheets on a wide variety of landscape and fruit disease topics), 53 different fact sheets, (titles not listed here) were authored.
Midwest Small Fruit Pest Management Handbook (multiple authors) 1997.

Popular Articles:
Extension - Kentucky Pest News (weekly articles April-September, biweekly October-March, 1976 - 2009); Kentucky Fruit Facts Newsletter, ongoing, 6-10 articles annually; Vegetables and Dollars Newsletter; Greenhouse Growers Newsletter; Hints and Facts Newsletter; Green Thumb Newsletter; Kentucky Urban IPM newsletter; Kentucky Nursery Inspector; U.K. Extension Agricultural Communications Exclusives and News Releases; U.K. Nursery and Landscape Program Research Report (annually); and U.K. Fruit and Vegetable Program Research Report (annually).
Other press - Kentucky Arborists Association Newsletter; Kentucky Farmer; Kentucky Division of Forestry "Tree Line"; Great Lakes Fruit Grower News; American Nurseryman; and Landscape Management.

Books
Hartman, J. R. 1990. Thread Blight, In: *Compendium of Apple and Pear Diseases*, APS Press, St. Paul, MN. 100 pp.
Hartman, J. R., C. Hodges, and E. Barnard. 1999. Chapter 68, Pine Diseases, pp280-297 In: *A Compendium of Nursery Crop Diseases*. APS Press, St. Paul,

MN.

Gleason, M., and J. R. Hartman. 2001. Chapter 60, Maple diseases, pp 236-241, In: *A Compendium of Nursery Crop Diseases*. APS Press, St. Paul, MN.

Hartman, J. R. 1999. Chapter 79, Sycamore and plane tree diseases, pp. 355-359 In: *A Compendium of Nursery Crop Diseases*. APS Press, St. Paul, MN.

Pirone, P.P., J. R. Hartman, M. A. Sall, and T. P. Pirone. 1988. *Tree Maintenance, 6th Edition*. Oxford University Press, N. Y. 514 pp.

Hartman, J. R., M. A. Sall, and T. P. Pirone. 1999. *Pirone's Tree Maintenance, 7th Edition*. Oxford University Press, N. Y. 545 pp.

Journal Articles

Copeman, R. J., J. R. Hartman, and J. C. Watterson. 1969. Tobacco Mosaic Virus concentration in Inoculated and Systemically Infected Tobacco Leaves. Phytopathology 59:1012-1013.

Hartman, J. R., and A. Kelman. 1973. An Improved Method for the Inoculation of Corn with Erwinia spp. Phytopathology 63:658 - 663.

Hartman, J. R., A. Kelman, and C. D. Upper. 1975. Differential inhibitory activity of a corn extract to *Erwinia* spp. causing soft rot. Phytopathology 65:1082-1088.

Rupe, J. C., M. R. Siegel, and J. R. Hartman. 1982. Influence of environment and plant maturity on gray leaf spot of corn caused by *Cercospora zea-maydis*. 1982. Phytopathology 72:1587-1591.

MacDonald, J. D., J. R. Hartman, and J. D. Shapiro. 1984. Pathogens of Ice Plant in California. Plant Disease 68:965-967.

Hartman, J. R., J. L. Gerstle, M. Timmons, and H. Raney. 1986. Urban integrated pest management in Kentucky - a case study. Journal of Environmental Horticulture 4:120-124.

Kaiser, C. A., M. L. Witt, J. R. Hartman, R. E. McNiel, and W. C. Dunwell. 1986. Warning: Topping is hazardous to your tree's health! Journal of Arboriculture 12:50-52.

Wolfe, D., J. Hartman, J. Brown, and J. Strang. 1990. The influence of soil fumigation on strawberry yield and economics in black root rot infested fields. Applied Agricultural Research 5:17-20.

Hartman, J. R. and J. T. Fletcher. 1991. Fusarium crown and root rot of tomatoes in the UK. Plant Pathology 40:85-92.

Hartman, J.R., B.C. Eshenaur, and U.E. Jarlfors. 1995. Bacterial Leaf Scorch Caused By *Xylella fastidiosa*: A Kentucky survey; a unique pathogen; and bur oak, A New Host. Journal of Arboriculture 21:77-82.

Hartman, J.R., R.T. Bessin, G.R. Brown, R.T. Jones, et J.G. Strang. 1997. La protection intégrée en verger de pommiers dans le Kentucky. Phytoma 495:45-47.

Hartman, J. R., L. Parisi, and P. Bautrais. 1999. Effect of leaf wetness duration, temperature, and conidial inoculum dose on apple scab infections. Plant Disease 83:531-534.

Hartman, J. R., Paulin, J.-P., Parisi, L., and S. Thompson. 2000. INRA and apple disease research in the Loire Valley Region of France. Plant Disease 84:928-936.

Johnson, M. P., Hartman, J. R. McNiel, R. E., and Fountain, W. J. 2001. Evaluation of dogwood and birch species and cultivars for resistance to key insect pests and diseases. Journal of Environmental Horticulture 19:73-77.

Flowers, J., E. Nuckles, J. Hartman, and L. Vaillancourt. 2001. Latent infection of Austrian and Scots pine tissues by *Sphaeropsis sapinea*. Plant Disease 85:1107-1112.

Flowers, J., J. Hartman, and L. Vaillancourt. 2003. Detection of latent *Sphaeropsis sapinea* infections in Austrian pine tissues using nested-polymerase chain reaction. Phytopathology 93:1471-1477.

Flowers, J.L., Hartman, J.R., and Vaillaincourt, L.J. 2006. Histology of *Diplodia pinea* in diseased and latently infected *Pinus nigra* shoots. Forest Pathology 36:447-459.

Hartman, J., L. Vaillancourt, J. Flowers, and A. Bateman. 2009. Managing Diplodia tip blight of landscape Austrian pines. Arboriculture & Urban Forestry 35:27-32.

Bateman, A., J. Hartman, and L. Vaillancourt. 2009. The role of shearing in the management of Diplodia tip blight. American Christmas Tree Journa 53, No. 4, July 2009:20-24.

Diaz, M., J. Batzer, T. Harrington, A. Wong, S. Bost, D. Cooley, M. Ellis, J. Hartman, D. Rosenberger, G. Sundin, T. Sutton, J. Travis, M. Wheeler, K. Yoder and M. Gleason. 2009. Diversity and biogeography of sooty blotch and flyspeck fungi on apple in the eastern and midwestern United States. Phytopathology (in press).

Hartman, J., E. Dixon, and S. Bernick. 2009. Evaluation of therapeutic treatments to manage oak bacterial leaf scorch. Arboriculture & Urban Forestry (submitted).

Notes, Short Reports, Instructional material and abstracts

Author or co-author of 45 reports in APS Fungicide & Nematicide Tests publication.
Author of co-author of 27 reports in APS Biological and Cultural Tests publication.
Co-author of 2 Plant Disease Notes.
Vaillancourt, L.J. and J.R. Hartman. 2000. Apple scab. The Plant Health Instructor. DOI:
10.1094/PHI-I-2000-1005-01
Author or co-author of dozens of conference proceedings.
Author or co-author of dozens of professional meeting abstracts.

Professional Recognition and Service:

Member of:

American Phytopathological Society.
- Diseases of Ornamentals and Turfgrasses Committee, 1979-1981.
- Extension Committee, 1981-1985.
- Chair, Ad-hoc Committee, Feasibility of Publishing Reports on Non-Chemical Controls of Plant Diseases, 1983-1984.
- Editor-in-Chief, Biological and Cultural Tests for Control of Plant Diseases (B & C Tests), 1986-1988.
- Public Relations Committee Chair and Past Chair, 1994, 1995.

Ad-hoc Committee on APS Publications for external audiences, 1995-6.
Plant Disease Associate Editor, 1982-1984, 2001-2003.
Diseases of Ornamentals Committee, 2004-2009.
Southern Division APS.
International Society of Arboriculture (ISA).
Publications Committee, 1980.
Annual Conference Educational Exhibits Committee, 1980-1982; Chair, 1982.
Education Program Committee, 1982-1985.
Journal of Arboriculture Editorial Review Board, 1986-1988, 1995-7.
Arboricultural Research & Education Academy, Vice President, President, 1985, 1986.
International Committee, 2000-2002
ISA, Kentucky Chapter, formerly Kentucky Shade Tree Association (KSTA).
Editor, KSTA newsletter, 1974-1979.
Vice-president, President-elect, President, 1980-1982.
Arboricultural Association (Britain).
Kentucky Forest Health Task Force, 2004-2009.

Departmental and Grants Review Panels, Book Reviews:
U.S.D.A. Forest Service Review of Kentucky Urban Forestry Programs, 1992.
N.C. State University Department of Plant Pathology Extension Programs Review, 1992.
CSRS Comprehensive Review, Department of Plant Pathology, University of Arkansas, 1993.
Northcentral Region IPM Grants, 1994, Indianapolis.
CSRS Comprehensive Review, Department of Botany and Plant Pathology, Purdue University 1994.
Diseases of Trees and Shrubs, for Cornell University Press, 1997, 2005.
Reviewer, National Sudden Oak Death training materials for Master Gardeners, 2004
Northeast Region IPM Grants, 2003, 2004, St. Louis.

Editorial Committee for:
"Novel Approaches to Integrated Pest Management", 1995, Lewis Publ., editor: Reuven Reuveni. 369 pp.

Ad hoc reviewer:
APS Compendium of Cranberry and Blueberry Diseases
Southern Region Urban Forestry Manual
USDA/SBA Innovative Grants Program.
ISA Arborists Certification Plant Health Care Manual.
Journal of Arboriculture
Arboriculture & Urban Forestry
Canadian Journal of Forest Research.
Hortscience.
Plant Health Progress

Invited out-of-state presentations:
American Phytopathological Society, Mexico City, 1972 - Ewinia soft rot of corn.
Ohio Greenhouse Grower's Association, Columbus, 1979 - Geranium diseases.
Department of Plant Pathology, University of California, Davis, 1980 - Landscape IPM
Triennial Extension Workshop, Orlando, FL, 1981 - Landscape IPM
North Central Branch, Entomological Society, Sioux Falls, SD, 1982 - Landscape IPM
Minnesota Horticultural Industries St. Paul, 1985 - Landscape plant diseases.
Indiana Arborists Association, Indianapolis, 1986 & 2005 - Tree Diseases.
Ohio Florists Association Annual Conference, Columbus, 1988 - Poinsettia diseases.
Tomato Growers and Advisors, Kent, England, 1989 - Growing tomatoes in Kentucky.
Ornamental Pathologists Working Group, London, England, 1989 - Kentucky nursery diseases.
Botany Department, Oxford University, Oxford, England, 1989 - KY landscape plant diseases.
Southeast British Plant Pathologists, Jealott's Hill, England, 1989 - Tomato crown and root rot.
CIBA-GEIGY research, Basel, Switzerland, 1989 - Biological and cultural control of diseases.
American Rose Society Annual Meeting, Columbus, OH, 1992 - Rose diseases.
Indiana Horticultural Congress, 1993, Indianapolis - Apple IPM.
Ohio Nursery Short Course, Wooster, 1993 - Woody plant diseases.
Tennessee Arborists, Kingsport, 1993 - Tree diseases.
Ohio Arborists Association Annual Conference, Columbus, 1994 - Tree diseases.
New Jersey Landscape IPM Symposium, Toms River, 1994 - Landscape IPM,
Plant Pathology Department, Rutgers University, New Brunswick, NJ, 1994 - Tree diseases.
Kansas Fruit Growers, Kansas City, 1995, 2005 - Tree fruit diseases, Tree fruit fungicides.
Michigan Apple IPM School, Grand Rapids, 1996 - Apple IPM in Kentucky.
INRA station, Angers, France, 1996 - Plant diseases in Kentucky.
Missouri Turfgrass Conference, Columbia, 1999 - Landscape plant diseases.
Ohio Christmas Tree Growers Association, Dublin, 1999 - Christmas tree diseases.
Tree Maintenance Seminar, Dayton, OH, 2000 - Landscape tree diseases.
Iowa Shade Tree Short Course, Ames, 2001 - Tree diseases.
Tennessee Arborists Association, Knoxville, 2001 - Tree diseases.
Ohio Nursery and Landscape Association short course, Columbus, 2005 - Landscape fungicides.
Michigan Green Industry Association, Novi, 2005 - Landscape plant disease management school.
Indiana Arborists Association, Indianapolis, 2005 - Tree diseases.
Tri-state Landscape Professionals landscape school, Evansville, Indiana, 2006 - Tree diseases.
American Society of Consulting Arborists, Nashville, 2007 - Abiotic diseases of trees.
U.S. Forest Service Sudden Oak Death Task Force, Portland, 2007 - Kentucky survey results.
Virginia Horticulture Foundation, Virginia Beach, 2008 - 3 presentations, woody plant

diseases
Virginia Tech Research Station, Norfolk, 2008 - Bacterial leaf scorch, Diplodia tip blight
Rainbow Treecare Scientific Advancements, Dallas & Austin, 2008 - Bacterial leaf scorch

Symposium session moderator:
La Plante dans la Ville, Angers, France, 1996.
Oak Wilt Symposium, American Phytopathological Society, Austin, TX, 2005

Awards
Outstanding Agricultural Program Award, Integrated Pest Management (shared with 10 co-workers) - Association of Kentucky Extension Specialists, 1979
Outstanding Extension Specialist Award - Association of Kentucky Extension Specialists, 1986.
Gold Leaf Award for Outstanding Arbor Day Activities - International Society of Arboriculture, 1986.
Award of Distinction - Kentucky Turfgrass Council, 1987.
Outstanding Extension Publication Awards (shared with numerous co-workers) - American Society for Horticultural Science and American Society for Horticultural Science, Southern Region, 1988, 1989, 1997, 2001, 2002,
Award for Outstanding Program - Kentucky Association of Extension Specialists, 1995.
Team Achievement Award, 1st place, Food Safety and Quality Task Force (shared with 15 co-workers) - Epsilon Sigma Phi, 1994.
Outstanding Program Award, Apple Integrated Pest Management (shared with 5 co-workers) - Association of Kentucky Extension Specialists, 1996.
Outstanding Project Award, In-Depth Plant Disease Workshops (shared with 7 co-workers) - Kentucky Association of State Extension Professionals, 2004.
American Phytopathological Society - Fellow award recipient, 2006.

Professional Self-Improvement Activities:

American Phytopathological Society Annual Meetings.
Midwest Fruit Specialists Annual Conferences, Indianapolis.
International Society of Arboriculture Annual Conferences (when it doesn't conflict with APS).
Southern Region Triennial Extension Plant Pathology Workshops 1970's, 80's and early 90's.
Ornamental Disease and Insect Workshops every other year from 1982 to present, Crossnore and Kanuga, NC.
Dogwood Anthracnose Workshops, 1992-1994, 1997.
La Société Française d'Arboriculture, Versailles, France, September, 1995.
Groupament d'Interêt Scientifique et Technique de la Vigne en Bourgogne, A Grape Study Tour of Wine Regions of Eastern France, 1996, (with Kentucky wine makers).
Congrès de la Société Française de Phytopathologie, 1996, Nice, France.
Mediterranean Phytopathological Union, 1997, Montpellier, France.

Southern Plant Conference, 2005, Louisville.

Attracting External Funding for Extension and Applied Research:

USDA-funded projects

USDA IPM Educational Grant - Application of Pest Predictive Technology for Widely Scattered Apple Growers (co-P.I. with Iowa State University and U.K. colleagues), 1991-1992, $35,600.

USDA IPM Educational Grant - Application of IPM for Urban Backyard Apples,1994 (co-P.I. in cooperation with U.K. entomology and horticulture colleagues), $16,500.

USDA IPM Education and Research Planning grant - Implementing Apple IPM in the Midwest, 1995 (co-P.I. in cooperation with U.K. and other Midwest university plant pathology, entomology and horticulture colleagues), $6,500.

Eastern Viticulture Consortium (USDA) funding - Pierce's Disease of Grapes Caused by *Xylella fastidiosa*: A Survey for the Pathogen, Identification of Reservoir Hosts, and Identification of Insect Vectors in Kentucky Vineyards, 2002-2005. (Co-P.I. with U.K. horticulture and entomology specialists and plant pathology research faculty and staff, J. Hartman, initiating P.I.), $25,000.

USDA/APHIS - Survey for sudden oak death disease, 2003. J. Hartman, B. Amsden, and J. Flowers, $ 10,000.

USDA/APHIS - National nursery survey for sudden oak death Disease, 2004. J. Hartman, $ 20,000.

USDA/Forest Service & Kentucky Division of Forestry - Kentucky forest survey for *Phytophthora ramorum*, 2005, 2006. J. Hartman and P. de Sá, $50,000 each year.

USDA/APHIS - National Nursery Survey for Sudden Oak Death Disease, 2005, 2006. J. Hartman, P. de Sá, and B. Amsden, $ 11,400 two-year total.

USDA/Forest Service & Kentucky Division of Forestry - Stream baiting pilot project of a forest survey for *Phytophthora ramorum*, 2006. J. Hartman and P. de Sá, $10,000.

IPM-funded projects

U.K. IPM, Program Enhancement, Water Quality, and Ky. Horticultural Society grant - Implementing Apple IPM in Kentucky, 1996 (co-P.I. with U.K. horticulture and entomology specialists), 1996, total $17,000.

U.K. IPM grant - Implementing apple IPM in Kentucky, 1997-98 (Co-P.I. in cooperation with U.K. horticulture and entomology specialists), $16,000.

U.K. IPM grant - Implementing apple IPM in Kentucky, 1999-2002. (Co-P.I. with U.K. horticulture and entomology specialists, R. Bessin; initiating P.I.), $32,760.

U.K. IPM grant - Addressing the needs of the Kentucky IPM program through the activities of the Plant Disease Diagnostic and Soybean Cyst Nematode Lab, 1999-2005. (Co-P.I. with Extension Plant Pathology specialists and diagnosticians; D. Hershman initiating P.I.), $ 55,110.

U.K. IPM grant - Educating the general public concerning IPM practices in the home landscape, 2000. (Co-P.I. with U.K. Extension horticulture and entomology

specialists; R. Durham, initiating P.I.), $ 7,920.

U.K. IPM grant - Development and Implementation of Real-Time PCR for Plant Diagnosis, 2002. (Co-P.I. with Plant Pathology specialists and diagnosticians; P. Vincelli, initiating P.I.), $6,000.

Commodity organization-funded projects

International Society of Arboriculture competitive grant - Effect of construction damage on tree health videotape, 1988, $5,000.

International Society of Arboriculture - Thyronectria canker disease and predisposition of honey locust to insect attack, 1990, (co-P.I. with entomology colleague) $1,500.

Horticultural Research Foundation - Cultivar selections for urban landscape IPM, 1991 (co-P.I. with U.K. entomology and horticulture colleagues), $2,000.

Kentucky Division of Forestry grant - National dogwood anthracnose survey, 1992, $3,000.

Kentucky Division of Forestry grant - Urban forestry, 1992-1993 (co-P.I.with U.K. horticulture colleagues), $60,000.

Videotapes and Books for Ky. Arborists, Ky. Div. of Forestry grant, 1994, $2,000.

Pôle de Recherche et d'Innovation à Angers grant - Etude de l'Influence des parametres climatiques sur la contamination par *Venturia inaequalis*, agent de la tavelure du pommier, 1996-1997 In cooperation with INRA scientists in France, equivalent to $20,000 for sabbatical studies.

Kentucky landscape Industries Fund - Dogwood and pine disease studies, 1998, $1,000.

New Crops Opportunity Funds - Blackberries as an additional crop, 2000 - 2002. (Co-P.I. with faculty colleagues; Brown, Strang, Jones, Bessin, Hartman, Woods). $ 33,000 yearly.

Nursery/Landscape Fund Grants - Efficacy of injected fungicides on prevention of Austrian pine tip blight caused by the fungus *Sphaeropsis sapinea* and eradication of the causal fungus from symptomless pine tissues, 1999-2002. (Co-P.I. with research colleague, graduate student, local certified arborist, and U.K. Physical Plant Division; J. Hartman, initiating P.I.), $ 6,500.

Nursery/Landscape Fund Grant - Relationship of Xylellia fastidiosa in landscape weed and ornamental reservoir hosts to the pathogen causing landscape tree bacterial leaf scorch and Pierce's disease, 2001-2002. J. Hartman, N. Inman, J. Beale, B. Amsden, and C. Schardl. $3,500

Nursery-Landscape Fund Grant - Bacterial DNA analysis to differentiate strains of *Xylella fastidiosa*, cause of Bacterial leaf scorch. John Hartman, Nicki Mundell, and Chris Schardl, 2004, $1700.

Nursery-Landscape Fund Grant - Effect of Cambistat treatments of Austrian pine on tip blight disease caused by *Sphaeropsis sapinea* and on detection of the pathogen in symptomless shoots. J. Hartman, J. Flowers, L. Vaillancourt, and J. Hart, 2004, 2005, $4,500.

New Crops Opportunities Fund - Sustainable management of insect pests and diseases of nursery grown maples in Kentucky, D.A. Potter, B. Miller, A. Fulcher, D. Hayden, R.M. McNiel, K.F. Haynes, J. Hartman, & C. Redmond, 2005, $75,000.

Nursery-Landscape Fund Grant - Transmission of pine tip blight while pruning Scots pines and RNA analysis to find latency and pathogenicity signals in Austrian pines infected with *Sphaeroposis sapinea.* J. Hartman, A. Bateman and L. Vaillancourt, 2005, $2,000.

Nursery-Landscape Fund Grant - Resistance and susceptibility of nursery-grown maples to major insect pest and diseases. Bonny Miller, Daniel Potter, John Hartman, Robert McNiel, Amy Fulcher and Dava Hayden, 2005, $2,500.

Nursery-Landscape Fund - Effect of Cambistat treatments of Austrian pine on tip blight disease caused by *Diplodia pinea* and on detection of the pathogen in symptomless shoots. J. Hartman, J. Flowers, A. Bateman, L. Vaillancourt, and J. Hart, 2005, 2006, $5,000.

Nursery-Landscape Fund Grant - Forest and nursery survey for *Phytophthora ramorum*. J. Hartman and P. De Sá, 2005, 2006, $5,000.

<u>Industry-funded projects</u>

ICI Corp. - Fungicides for turf, bedding plants, and cucumber disease control, 1973, $550.

Dow Chemical - Nurelle fungicide for bedding plants, 1973, 1974, $500.

American Hoechst Corp. - Fungicides for cucurbit powdery mildew, 1975, 1976, $1,500.

Mobay Corp. - Fungicides for ornamentals powdery mildew, 1977, $350.

CIBA-GEIGY Corp. - Fungicides for bedding plant damping-off, 1977, 1978, $1,000.

BASF-Wyandotte Corp. - Fungicides for strawberry fruit rots, 1978, $1,000.

Mobay Chemical Co. - Fungicides for corn, turf, and ornamental diseases, 1978, $800.

Diamond-Shamrock Co. - Fungicides for corn and turf diseases, 1978, $500.

DuPont chemical Co. - Fungicides for corn gray leaf spot, 1978, $400.

Kalo Laboratories - Bactericide for pepper disease, 1979, $500.

Dupont Chemical Co. - Fungicides for corn and turfgrass diseases, 1979, $500.

Merck and Co. - Fungicides for crabapple diseases, 1979, 1980, $1,000.

Rhone-Poulenc, Inc. - Fungicides for control of turfgrass diseases, 1979, 1980, $1,000.

Mobay Chemical Co. - Fungicides for corn and turfgrass diseases, 1979, 1980, $2,000.

O.M. Scott and Sons Co. - Fungicides for turfgrass diseases, 1980, $250.

Diamond Shamrock Co. - Fungicides for crabapple, corn and turfgrass, 1979, 1980, $1,500.

CIBA-GEIGY Corp. - Fungicides for turfgrass diseases, 1980, $500.

Miscellaneous industry support - various projects, 1981 - 1982, N.A.

Miscellaneous industry support - various projects, 1983 - 1984, $15,000.

Miscellaneous industry support - various projects, 1985 - 1986, $13,000.

Miscellaneous industry support - various projects, 1987 - 1988, $31,000.

Miscellaneous industry support - various projects, 1989 - 1998, N.A.

Zeneca Corp. - Fungicides for dogwood powdery mildew control, 1998, $2,000.

J.J. Mauget company - Pine tip blight research, 1999 - 2001. (Co-P.I. with research colleague, local arborist, and U.K. Physical Plant Division; J. Hartman, initiating P.I.), $ 8,100.

Bayer Corp. - Use of Lynx to manage hawthorn rust diseases, 2000. $ 3,000.

Zeneca Corp. - Evaluation of phytotoxicity of Heritage on flowering crabapples, 2000. $ 2,000

Mannatech Co. - An experimental biocontrol for dogwood powdery mildew, 2000. $ 4,000.
Rainbow Research, Inc. Efficacy of Cambistat treatments for oak bacterial leaf scorch, pine tip blight, and dogwood powdery mildew, 2003, $ 5,000; 2004, $2,200; 2005, $2,200.
Rainbow Research, Inc. Efficacy of Pentra-Bark in delivery of antibiotics to oaks via trunk sprays, 2005, $2,500.
Rainbow TreeCare Scientific Advancements, Inc. Efficacy of oak root-flare injections of antibiotics for bacterial leaf scorch, 2006, $7,000.

Specially-funded projects
U.K. College of Agriculture Extension Program Enhancement Grant - Displaying microscopic images to the public, 1990, (Co-P.I.), $2,800.
U.K. College of Agriculture Extension Program Enhancement Grant - Reducint pesticide use for widely scattered apple orchards, 1990, (Co-P.I. with eight other colleagues), $5,000.
U.K. College of Agriculture Funds - Food safety and HASSP programs for commercial fruit and vegetable producers, 2000 - 2001 2 years, (Co-P.I. with U.K. entomology, horticulture, and food science colleagues; R. Bessin, initiating P.I.), $ 28,000 each year.
Urban and Community Forestry Grant Program - A Children's Brochure for a Self-guided Tour of the Demonstration Gardens in the Arboretum, 2000. (Co-P.I. with U.K. Arboretum Education Committee; J. Hartman, initiating P.I.), $ 2,575.
University of Kentucky Major Equipment grant funding - Use of rapid-cycling real-time PCR for detection of plant pathogens in Kentucky, 2002. (Co-P.I. with U.K. horticulture and entomology specialists and plant pathology research and extension faculty and staff, J. Hartman, initiating P.I.), $24,000.

Applied Research Activities:

Vegetable diseases; evaluations of:
Cultivars for bean rust tolerance.
Cultural practices for bean yellow mosaic virus.
Fungicides for pole bean Rhizoctonia damping-off and root rot.
Cultivars for sweet corn Stewart's wilt tolerance.
Fungicides for cucurbit powdery mildew.
Insecticides for cucurbit bacterial wilt.
Fungicides for cucumber belly rot.
Fungicides for ginseng damping-off.
Fungicides for ginseng blight.
Bactericides for of pepper bacterial leaf spot.
Cultivars for pepper bacterial spot and tobacco etch virus tolerance.
Cultural practices for pepper tobacco etch virus.
Nematicides for potato root knot nematode.
Fungicides for tomato early blight.

Cultivars for tomato early blight tolerance.

Corn diseases; evaluations of:
Hybrids for corn gray leaf spot tolerance.
Fungicides for corn gray leaf spot.
Hybrids for corn virus complex tolerance.
Soil-applied insecticides for corn virus complex.
Turfgrass diseases; evaluations of:
Fungicides for Kentucky bluegrass leaf spot and red thread.
Fungicides for Kentucky bluegrass summer patch/necrotic ring spot.
Fungicides for perennial ryegrass brown patch, red thread, and rust.
Cultivars for perennial ryegrass rust tolerance.
Fungicides for creeping bentgrass brown patch, red leaf spot and dollar spot.
Fungicides for bermudagrass spring dead spot.

Tree fruit diseases; evaluations of:
Fungicides for apple thread blight.
Leaf wetness detection devices for Apple IPM programs.
Reduced fungicides for apple sooty blotch and flyspeck diseases.
The MARYBLYT forecasting system for apple fire blight.
Apple scab inoculum concentration effect on apples under controlled environments.
Multi-layer fruit bags to manage apple fruit diseases.
Fungicides for peach brown rot and scab.
Water relations and peach Phytophthora root rot.
Fungicides for peach leaf curl.
Differentiating sooty blotch and flyspeck fungi from apples grown in the eastern U.S., a collaborative multi-state research project led by Iowa State University.

Small fruit diseases; evaluations of:
Soil fumigation for strawberry black root rot and yield and economics.
Fungicides for strawberry fruit rots.
Treatments for grape crown gall.

Herbaceous ornamentals; evaluations of:
Fungicides for greenhouse bedding plant damping-off.
Cultivars for Zinnia powdery mildew, leaf spot, and bacterial spot tolerance.
Fungicides for Zinnia powdery mildew.
Soil solarization treatments for geranium bacterial blight.
Fungicides for pachysandra Volutella blight.

Shrubs; evaluations of:
Fungicides for Euonymus powdery mildew.
Water relations and taxus Phytophthora root rot.
Fungicides for holly black root rot.
Cultivars for Juniper tip blight tolerance.

Trees; evaluations of:
Wound dressings and wound closure following shade tree pruning.
Sewer construction and long-term tree health.
Fungicides for ash anthracnose.
Cultivars for birch foliar disease tolerance.
Cultivars for flowering crabapple foliar diseases.
Soil-applied treatments for dogwood powdery mildew.
Fungicides for dogwood powdery mildew.
Cultivars for dogwood powdery mildew tolerance.
Cultivars for elm disease and insect tolerance.
Fungicides for hawthorn rust.
Cultivars for honeylocust Thyronectria canker.
Fungicides for pin oak powdery mildew.
Treatments for oak bacterial leaf scorch.
DNA extracts of *Xylella fastidiosa*, cause of shade tree bacterial leaf scorch disease.
Variously aged Austrian pines to tip blight disease.
Potential latent infections of Austrian pines by *Sphaeropsis sapinea*.
Nurseries for presence of sudden oak death (*Phytophthora ramorum*).
Selected parks and natural areas for sudden oak death (*Phytophthora ramorum*).
Selected forests for sudden oak death (*Phytophthora ramorum*).
The cause of a yellowwood new foliar disease.

Service to the University, College, and Department:

U.K. outreach activity: taught middle school children about landscape plants and diseases, Winburn Middle School, Lexington, 1994.
College of Agriculture Advisory Committee on Promotion and Tenure, 1991-1993.
College Sustainable Agriculture Seminar Planning Comm., 1991-1992.
College Food Safety/Quality Task Force site coordinator and discussion leader, 1993 satellite training**.**
County Extension Program reviews for five counties, 1996.
Departmental Graduate Curriculum Review ad hoc Committee, 1992.
Departmental Resources Committee, 1992-1996.
Departmental Ad hoc Rules Revision Committee, 1994.
Departmental Seminars: Managing Apple Diseases Using IPM, 1993; Dogwood Anthracnose in Kentucky, 1993; Infection Caused by Apple Scab Conidia, 1997.
Arranged departmental seminars (Dr. W. Wilcox, 1992, Dr. M. Gleason, 1995, Dr. J. Fletcher, 1996, Dr. H. Hoitink, 2002, Mr. B. Webb, 2008).
Departmental fungal biology group seminar: Apple sooty blotch and flyspeck diseases, 1996.
Department of Horticulture periodic review team, 2005.
University-wide Extension Promotion and Tenure Committee, 2005 - 2007.

Service to Local and Statewide Commodity Groups, Boards, Committees:

Shade tree preservation efforts: As a member of the Land and Nature Trust of the

Bluegrass, I headed the committee which drafted Lexington's shade tree ordinance (passed by the Urban-County Council, February 1979). I helped this committee develop and publish a bulletin on protecting shade trees from sewer construction, an important issue following the merger of the city and county. I organized a shade tree protection workshop for Lexington's sewer construction inspectors. As chairman of the Urban-County Tree Commission, I coordinated the writing of guidelines for planting and preserving trees into the new subdivision rules and regulations guidelines.

Shady Lane Woods (pre-Arboretum Committee) informal study group, 1984.
Friends of the U.K. Arboretum Education Committee, 1992-2009.
Friends of the U.K. Arboretum tree planting and work days, 1992 - 2005.
Friends of the U.K. Arboretum Arbor Day Educational Display Coordinator, 1993 & 1994.
Friends of the U.K. Arboretum, organized plant exchanges, 1994-2005.
Friends of the U.K. Arboretum Board, 2009.
Kentucky Arborists Association: President, vice president, 1982-1983; Executive Board advisory member, 1993 - 1996.
Lexington Arbor Day Committee, 1995.
Central Kentucky Ornamental and Turf Association, executive board advisor, 2003 -2009.

RESIDENT INSTRUCTION RESPONSIBILITIES

Courses Taught

PPA 640 - Identification of Plant Diseases (3 credits, graduate level course given annually).

Course sections taught as invited lecturer:

PPA 400 G, Introductory Plant Pathology; PPA 410, Forest Pathology; PPA 545, Epidemiology and Plant Disease Control; PPA 652, Plant Pathogenic Fungi; Hor 203, Home Horticulture; HOR 300, Principles of Horticultural Production, HOR 330, Annuals and Perennials; HOR 402, Fruit Crops; HOR 450, Landscape Installation; HOR 451, Landscape Maintenance; HOR 515, Turf Management; HOR 524, Floriculture; ENT 320, Horticultural Entomology; Plant Protection Program, Ecole National des Ingénieurs des Travaux Horticole et du Paysage, Angers, France, 1996.

Graduate Student Examination Committees: (8 - 10)

Advisor to visiting French students: one to three each summer, 1992-2009.

Other Instructional Activity: Organized Mycological Foray with PPA faculty, students, and staff with the Kentucky Natural History Society, 1993, Natural Bridge State Park.

NARRATIVES

Extension Narrative

Educational Programs for Extension Agents and Specialists.

Training County Agents and Specialists is a high priority for plant pathology. County Agent training in plant disease diagnosis reminded the Agents of their role in plant disease diagnosis on the local level. We were able to reach 80% of the Agents in eight Extension areas using the remote video classroom. The backyard apple IPM program allowed intensive Agent training in a specialized subject area. My area of plant disease interests impacts the programs of the County Horticulture Agents, and it was especially useful to have separate sessions with them. My colleagues and I provided in-depth training in such topics as diseases caused by Oomycetes, soilborne diseases, bacterial diseases, nematode diseases and virus diseases. Extension Area Program Director training provided a unique perspective for both Extension administration and Extension pathologists. I also provide fruit, urban horticulture, and landscape disease information useful to Agents and Specialists through newsletters, workshops, Master Gardener activities, conferences, disease surveys, and applied research.

Educational Programs for Public Clients.

Landscape professionals are provided plant disease assistance with annual landscape workshops for arborists, nurserymen, and landscape maintenance persons by providing plant disease updates and participation in their professional associations. Fruit growers benefit from workshops, grower meetings, pest management manuals, and IPM activities. Home horticulture is served through publications and mass media as well as through trained agents and horticulture professionals. I also provide fruit, landscape, forest, and nursery disease information in videotapes, newsletters and Extension publications.

Plant Disease Diagnosis.

I help supervise operation of the U. K. Plant Disease Diagnostic Laboratory. I have supervised four different diagnosticians in my career and provided on-the-job training for each of them. Laboratory observations form the basis for further surveys and research on new diseases. Field diagnosis and Agent consultation is an ongoing activity.

Applied Research.

My applied research efforts are aimed at solving Kentucky plant disease problems through plant disease survey, testing chemical, biological and cultural controls, IPM, and host plant resistance approaches. Most of the work is interdisciplinary. From these applied research activities, I have been able to develop better plant disease control recommendations for Kentucky growers and homeowners.

IPM.

Commercial and backyard Apple IPM activities have also been described

elsewhere in this document. Apple IPM benefits commercial apple growers in Kentucky. We teach growers to scout their apple orchards and make spray decisions for themselves based on IPM. I helped growers use apple scab models and taught them to run a fire blight prediction model on their home computers, or arranged for growers to have access to County Extension computers. Apple IPM is making an impact not only in Kentucky, but also in the region, as illustrated by our success in obtaining a USDA IPM program planning grant on behalf of Kentucky and 8 other midwestern states. In addition, states with greater apple production such as Michigan are looking to Kentucky for advice on implementing apple IPM. Apple IPM is making an impact as illustrated by the following:

From the U.S. Senate Committee on Agriculture, Nutrition, and Forestry Report on Pesticide Use Reduction Assessment: *"In 1992-1993, approximately 65 apple growers, representing 25% of the Kentucky apple production adopted a pest predictive program to manage their orchards. Adopters were able to eliminate 1 fungicide and 3 insecticide applications in 1992 (compared to non-IPM blocks), and 3 fungicide and 4 insecticide applications in 1993. Based on typical application rates, this represents a reduction of approximately 5,200 lbs of active ingredients (3,000 lbs fungicides and 2,200 lbs insecticides), and an increase to profitability of $35,000."*

Plant Pathology Extension Administration.

I try to manage plant pathology Extension as a team effort. Each specialist has his own area of expertise but is expected to be able to back up or cover for the others as needed. Industry grant moneys are shared, and we all share in Agent training. Weekly conference calls are time well spent in our program.

Acknowledgements. During my sabbatic leave absences, my Extension colleagues in Plant Pathology thankfully filled in to handle my Kentucky Extension plant pathology responsibilities. I also appreciate the support of the plant pathology department, the U.K. College of Agriculture, and the host institutions where I was able to live the sabbatic experiences.

Teaching Narrative

PPA 640, Identification of Plant Diseases

PPA 640 gives graduate students a practical exposure to plant pathology. They learn how to diagnose diseases, understand well the common diseases of at least one crop, and are exposed to the Kentucky agricultural industry and the Cooperative Extension Service. This is the only exposure to applied plant pathology for many of our students.

I try to expose students to a wide variety of Kentucky crop diseases and to learn to diagnose them using appropriate traditional and modern diagnostic techniques. Students see the diseases and their impacts first-hand through field trips. Students are taught the principles of plant disease diagnosis, the major diseases of Kentucky crops, and the broad spectrum of diseases occurring on a single crop. They learn the value of experience.

PPA 640, offered as a fall-semester course, is actually taught during the

summer, May through September. The class meets for 2 hours weekly and includes several short field trips plus two major overnight or day-long field trips to examine diseases of crops in eastern and western Kentucky. Each class consists of lectures, demonstrations, or field trips, with discussion time led by the instructor. Each student chooses two major crop areas (of 10 available) for specialization, and becomes an instructor for part of several class periods.

The class meets in the greenhouse classroom where students examine and culture specimens. Students have access to the Plant Disease Diagnostic Laboratory reference books and to a cold room for specimen storage. Students are expected to diagnose specimens from their crop specialization outside of the regularly scheduled class time. The students collect specimens for themselves and are given specimens to them by the instructor. These collections and diagnoses form the basis of their class report. Weekly issues of the *Kentucky Pest News* are required reading. Students are graded on the quality of their oral report, on three examinations, and attendance and participation.

Other resident instruction.

I have also served as substitute or invited lecturer for other courses in plant pathology, horticulture, and entomology. As invited lecturer, I taught three classes in the plant protection program at the Ecole National des Ingénieurs des Travaux Horticole et du Paysage, Angers, France, in 1996. I also serve on graduate student advisory and examination committees (co-major advisor to students - 2 PhD and 1 MS), and have been faculty advisor to 20 visiting summer student interns from France.

Part-time post-retirement priorities

Post-retirement work activity has emphasized teaching the summer plant disease diagnosis course and only a portion of the usual extension responsibility. I am continuing to write weekly articles for the Kentucky Pest News; presenting plant pathology topics at statewide meetings including those for fruit growers, arborists, and nursery workers; conducting master gardener training; assisting in the Plant Disease Diagnostic Laboratory; and conducting workshops and updates for County Extension Agents.

CURRICULUM VITAE

DONALD E. HERSHMAN
Department of Plant Pathology
University of Kentucky
Princeton, KY 42445

EDUCATION:

- B.A. - West Chester State College - Biology, 1978
- M.S. - Rutgers University - Plant Pathology, 1981
- Ph.D. - Rutgers University - Plant Pathology, 1983

PROFESSIONAL POSITIONS HELD:

- Extension Professor (100% Extension) University of Kentucky, 1995-present.
- Associate Extension Professor (100% Extension) University of Kentucky, 1989-95.
- Assistant Extension Professor (100% Extension) University of Kentucky, 1984-89.
- Senior Technical Advisor, Davey Environmental Services, Kent, OH, 1983-84.

PROFESSIONAL AFFILIATIONS:

- American Phytopathological Society: National and Southern Division
- Midsouth Association of Wheat Scientists
- NCERA-184 Small Grains Wheat Disease Committee
- NCERA-208 Soybean Rust Committee (Formerly NC-504)
- Southern Soybean Disease Workers

AWARDS AND RECOGNITION:

2009-Kentucky Association of State Extension Professionals M. D. Whiteker Award for Excellence in Extension.

2008-Co-recipient, Southern Region IPM Center Friend of Extension Award.

2007- Co-recipient, CSREES Partnership Award for Mission Integration
-American Phytopathological Association Excellence in Extension Award
-Co-recipient, American Society of Agronomy Extension Education Materials Award (Publication Category).

2006 -Co-recipient, United States Secretary of Agriculture 2006 Honor Award
- Co-recipient, American Society of Agronomy 2006 Educational Materials Award (Poster category)
-University College of Agriculture 2006 Research/Extension Impact Award

2005 -Kentucky Soybean Association Distinguished Service Award
-Co-recipient, Kentucky Association of State Extension Professionals (KASEP) Outstanding Program Award

2004 -International Certified Crop Adviser Program, Outstanding Service Award
-Co-recipient, KASEP Outstanding Project Award.
-Co-recipient, American Society of Agronomy 2004 Educational Materials Award (Newsletter category).

2000 -Co-recipient, American Society of Agronomy Extension Publication Award

1999 -Co-recipient, KASEP Outstanding Project Award

1998 -Co-recipient, American Society of Agronomy Extension Publication Award

1997 -KASEP Outstanding Program Award

1991 -Southern Soybean Disease Workers (SSDW) Presidential Service Award

1990 -Co-recipient of Southern Region American Society of Horticultural Science Extension Publication Award

1988 -AKES Outstanding New Extension Specialist Award

1987 -SSDW Junior Distinguished Service Award

NATIONAL AND REGIONAL ELECTED/APPOINTED OFFICES/POSITIONS HELD:

- **American Phytopathological Society**
  -Coordinator, 2006 National Soybean Rust Symposium.
  -Senior Editor, *Plant Disease*, 2004; Associate Editor, 2000-02.
  -Chairman, New Fungicide and Nematicide Data Committee, 1992-93; Vice-Chair, 1991-92.

- **International Certified Crop Adviser Program**
  -Chairman, Exam and Procedures Committee, 1998-2004.

- **ipmPIPE (Pest Information Platform for Extension and Education)**
  -Chairman, ipmPIPE Steering and Executive Committees, 2007-09.

- **Midsouth Association of Wheat Scientists**
  Annual Meeting Program Chairman, 1998.

- **Southern Soybean Disease Workers**
  -President, 1990-91; President-Elect, 1989-90; Vice-President, 1988-89.
  -Annual Meeting Program Chairman, 1988.

- **U.S. Wheat and Barley Scab Initiative**
  -Vice-Chair, Chemical and Biological Control Research Area Committee, 2001-05.

NATIONAL COMMITTEE SERVICE:

- **American Phytopathological Society**
  -Technical (planning) Committee 2006, 2007, 2009 National Soybean Rust Symposium.
  -*Plant Disease* Editorial Board, 2004 and 2000-02.
  -Section Editor, *Biological and Cultural Control of Plant Diseases,* 2002-04.
  -Section Editor, *Fungicide and Nematicide Tests*, 1990-94.
  -Extension Committee, 1998-01.
  -New Fungicide and Nematicide Data Committee, 1986-94.

- **International Certified Crop Adviser Program**
  -Advisory Council, 2004-06.
  -Performance Objective Module Review Committee, 2000, 2002, 2003, 2004, 2005, 2006.
  -Board of Directors and Finance Committee, 1999-04.
  -Extension CCA/ICM Task Force, 1994-95.
  -Exam and Procedures Committee, 1993-04.

- **ipmPIPE (Pest Information Platform for Extension and Education)**
  -Steering Committee, 2006-present.
  -Southern Coordinator, Soybean Rust Sentinel Network, 2005-present.

- **National Agricultural Pesticide Impact Assessment Program**
  -Committee Member, 1990-93.

- **U. S. Wheat and Barley Scab Initiative.**
  -2008 National FHB Forum Program Committee.
  -2008 Management Grants Review Panel.
  -Biological and Chemical Control Research Area Committee, 2001-06.

- **United Soybean Board**
  -Soybean State and Federal Technical Soybean Rust Working Group, 2002-06.

MISCELLANEOUS SERVICE ACTIVITIES

Ad Hoc Reviewer:

*36 Plant Disease manuscripts.
*22 Disease Note manuscripts.
*12 Biological and Cultural Control of Plant Disease Manuscripts.
*7 Plant Health Progress manuscripts.
*11 Plant Disease Management Report manuscripts.
*8 Journal of Nematology manuscripts.
*4 Crop Science manuscripts.
*2 Agronomy Journal manuscripts.
*2 Canadian Journal of Plant Pathology Manuscripts.
*Compendium of Soybean Diseases (1998).

Grant Review Panels:

*North Central Region IPM Grants Program, 2000, 2005, 2008.

*USDA-CSREES Critical Issues Grants Program, 2008.

Kentucky Certified Crop Adviser Program:

*Board Chairman, 2006-07.
*Past Chairman, 2007-08.
*Secretary/Treasurer, 2004-06.
*Board of Directors, 1995-present.

Program Reviews and Prioritization Activities:

*****USDA-CSREES Review of LSU Department of Plant Pathology and Crop Physiology (2008).
*USDA-ARS Phytophthora Root and Stem Rot Program (2003).
* Southern Regional Research Grants Prioritization Panel (2006).
* USDA-T-STAR Program Review (1999).

UK College Of Agriculture:

*College of Agriculture Committee on Appointment, Promotion, and Tenure (1997-98 and 2003-04).
*Department of Plant Pathology Faculty Review Committee (2000-01, 2006-07).
*UKREC All Commodity Field Day Chairman, (1996-97 and 2004-05).
*UKREC Moderator, 1994-95.
*UKREC Land Use Committee, 1995-present.
*AKES Awards Committee Chairman, 1989.

NATIONAL AND REGIONAL GRANTS RECEIVED *(DH=PI except where indicated)*:

- **U.S. Department of Agriculture** *(Total Support: $183,323)*

2008 -Continued Development of the ipmPIPE Risk Management Tool, 2008 (USDA-CSREES), $48,050.

2007 -National Legume Pest Survey (USDA-CSREES), $39,598.

2006 -National Legume Pest Survey (USDA-CSREES), $42,675.

2006 –Soybean Rust Crop Insurance Meetings and Regional Coordination, (USDA-RMA), $28,000.

2005 -National Soybean Rust Survey (USDA-APHIS), $25,000.

- **U.S. Wheat and Barley Scab Initiative** *(Total Support: 178,702)*

2009 -National Uniform Trials for Integrated FHB Management, $5,250.
Accelerating the Development of FHB-Resistant Soft Red Winter Wheat Varieties (Co-PI), $52,900.

2008 -National Uniform Trials for Integrated FHB Management, $7,600.

-Accelerating the Development of FHB-Resistant Soft Red Winter Wheat Varieties (Co-PI), $51,754.

2007-National Uniform Trials for Integrated FHB Management, $10, 600.
-Accelerating the Development of FHB-Resistant Soft Red Winter Wheat Varieties (Co-PI), $50,598.

1998-03 -Fusarium Head Blight Uniform Trials, $29,000.

- **North Central Soybean Research Project** *(Total Support: $2,161,750)*

2005-09- National SBR Monitoring Grants (Co-PI), $1.73 M.

2009-Soybean Rust Sentinel Coordination and Monitoring KY, $30,000.

2008-Soybean Rust Sentinel Coordination and Monitoring KY, $19,625.

2007-Soybean Rust Sentinel Coordination and Monitoring KY, $19,625.

2006-Soybean Rust Sentinel Monitoring and Coordination, $36,000.
-Fungicide Management for Soybean Rust (Collaborator), $125,000.

2005-Fungicide Management for Soybean Rust (Collaborator), $175,000.

2002-North Central Region Sudden Death Syndrome Variety Testing Program, $14,800.

1997-2000-Effects of New Soybean Production Practices on Soybean Cyst Nematode and Associated Soybean Yield Losses, $11,700.

- **Southern Region Integrated Pest Management Grants Program** *(Total Support: $166,082)*

2007-08 -Testing and deployment of a web-based yield loss prediction tool for risk management of soybean rust (Co-PI), $25,000.

2006-07- Participation in Regional Survey for Corn Cyst Nematode, $7,000.

2001-02 -Development of a Soybean Aphid Management Plan for the Southern Region (Co-PI), $134,082.

- **Southern Soybean Research Program**

2005-06 -Yield Loss Prediction Tool for Asian Soybean Rust (Co-PI), $22,000.

COMPETITIVE STATE GRANTS RECEIVED *(DH=PI except where indicated:*

- **Kentucky Small Grain Grower's Association** *(Total Support: $49,750)*

2000-Support of Wheat Virus Testing Activities by the University of Kentucky Plant Disease Diagnostic Laboratories, $1,600.

1999-Wheat Head Scab Survey (Co-PI), $2,000.

1998-Wheat Head Scab Survey (Co-PI), $2,000.

1997-Wheat Head Scab Survey (Co-PI), $2,000.

1995-Effect of Barley Yellow Dwarf on Yield and Test Weights of Ten Soft Red Winter Wheat Varieties, $5,400.
-Demonstration of Selected Pest Management and Nitrogen Fertility Options in Wheat Production, $4,000.
-Yield Potential and Long Term Effects of No-Tillage on Wheat Production (Co-PI), $6,000.

1994-Epidemiology and Insecticidal Control of Barley Yellow Dwarf of Wheat, $5,000.
-Yield Potential and Long Term Effects of No-Tillage on Wheat Production (Co-PI), $6,000.

1993-Incidence and Insecticidal Control of Barley Yellow Dwarf Virus (BYDV) in Wheat in Kentucky, $7,950.

1992-Epidemiology and Insecticidal Control of Barley Yellow Dwarf of Wheat, $7,800.

- **Kentucky Soybean Promotion Board** *(Total Support: $391,885)*

2009- Kentucky Soybean Rust Monitoring and Early Warning System, $31,246.
-SCN Fungicide Study, $9,061
-Use of Novel Virus-Based Vector in the Search for Resistance to the Soybean Cyst Nematode (Co-PI), $30,563.

2008-Impact of Newly Recognized HG-Type 2 Populations of Soybean Cyst Nematode, $9,100.
-Evaluation of Fungicide Products and Application Timing for Control of Asian Soybean Rust on Soybean (Co-PI), $18,000.
-Epidemiology of Bean Pod Mottle Virus and Resistance to Major Pathogens of Soybean (Co-PI), $15,000.

2007-Evaluation of Fungicide Products and Application Timing for Control of Asian Soybean Rust on Soybean (Co-PI), $21,000.
-Epidemiology of Bean Pod Mottle Virus and Resistance to Major Pathogens of Soybean (Co-PI), $15,000.

2006- Survey and Epidemiology of Soybean Mosaic Virus and Bean Pod Mottle Virus in Late-Planted Soybean in Kentucky (Co-PI), $10,000.

2005-Studies on Quadris Fungicide and Warrior Insecticide Use on Soybean in Kentucky, $10,000.
-Survey and Epidemiology of Soybean Mosaic Virus and Bean Pod Mottle Virus in Late-Planted Soybean in Kentucky (Co-PI), $10,000.

2004-Studies on Quadris Fungicide and Warrior Insecticide Use on Soybean in Kentucky, $10,000.
-Survey and Epidemiology of Soybean Mosaic Virus and Bean Pod Mottle Virus in Late-Planted Soybean in Kentucky (Co-PI), $10,000.
-Incidence and Epidemiology of Major Virus Diseases in Soybean in Kentucky (Co-PI), $10,000.

2003-Survey and Epidemiology of Soybean Mosaic Virus and Bean Pod Mottle Virus in Late-Planted Soybean in Kentucky (Co-PI), $10,000.

2002-Survey and Epidemiology of Soybean Mosaic Virus and Bean Pod Mottle Virus in Late-Planted Soybean in Kentucky (Co-PI), $10,000.

2001-Performance of Blends of Soybean Cyst Nematode-Resistant and Susceptible Soybean Varieties in Kentucky, $3,200.
-Survey and Epidemiology of Soybean Mosaic Virus and Bean Pod Mottle Virus in Late-Planted Soybean in Kentucky (Co-PI), $10,000.

1999-Effect of Various Cropping Sequences on SCN Population Densities and Associated Soybean Yields, $5,000.
-Survey and Epidemiology of Soybean Mosaic Virus and Bean Pod Mottle Virus in Late-Planted Soybean in Kentucky (Co-PI), $10,000.

1998-Effect of Various Cropping Sequences on SCN Population Densities and Associated Soybean Yields, $5155.

1997-Effect of Various Cropping Sequences on SCN Population Densities and Associated Soybean Yields, $9,610.
-Soybean Cyst Nematode Workshop for Agricultural Educators and Crop Consultants, $2,197.

1996- Effect of Various Cropping Sequences on SCN Population Densities and Associated Soybean Yields, $9,010.

1995- Effect of Various Cropping Sequences on SCN Population Densities and Associated Soybean Yields, $9,010.

1994- Effect of Various Cropping Sequences on SCN Population Densities and Associated Soybean Yields, $10,840.

1993-Studies into the Source of Soybean Cyst Nematode (SCN) Suppression in Wheat-Soybean Doublecropping Systems, $5,985.

1992-Effect of Wheat Residue and Tillage on Soybean Cyst Nematode Cyst Development and Soybean Yield in Doublecrop Soybean, $5,060.
-Assessment of the Soybean Cyst Nematode Problem in Kentucky: Project Awareness, $3,500.

1991-Effect of Wheat Residue and Tillage on Soybean Cyst Nematode Cyst Development

and Soybean Yield in Doublecrop Soybean, $4,850.

1990-Effect of Wheat Stubble on Soybean Cyst Nematode Reproduction and Soybean Yield in Doublecrop Soybeans Under Various Tillage Regimes, $2,995.
-Effect of Soybean Row Spacing on Soybean Sudden Death Syndrome Development, $3,280.

1989-Performance of Selected Soybean Cultivar Resistance to the Soybean Cyst Nematode (SCN) Under Heavy SCN Pressure in Kentucky, $6,000.
-Primary Sources of Bean Pod Mottle Virus Inoculum in Soybean Fields in Kentucky (Co-PI), $5,000.

1988-Effect of Cropping and Tillage Practices on the Survival of Soybean Cyst Nematode, $4,125.
-Cause and Control of Soybean Sudden Death Syndrome, $13,830.

1987-Effect of Cropping and Tillage Practices on the Survival of Soybean Cyst Nematode, $4,500.
-Cause and Control of Soybean Sudden Death Syndrome, $15,030.
-Epidemiology and Biological Control of Bean Pod Mottle Virus in Kentucky (Co-PI), $12,000.

1986- Cause and Control of Soybean Sudden Death Syndrome, $15,000.

1985-The Influence of Soil Fumigation and Soybean Varieties on Development of Soybean Sudden Death Syndrome, $2,725.
-Effect of Cropping and Tillage Practices on the Survival of Soybean Cyst Nematode, $4,320.
-Detection and Control of Bean Pod Mottle Virus in Soybean in Kentucky (Co-PI), $13,000.
-Factors Affecting Survival of Soybean Cyst Nematodes from Field to Laboratory (Co-PI), $3,720.

- **Governor's Office of Energy Policy**
  2007-08 – Canola and Sunflower for Oil/Biofuel Production in Kentucky (Co-PI), $57,487.

INVITED PRESENTATIONS (1999-Present)

2009 -North Central Soybean Research Program Board, Grapevine, TX and Quincy FL.
-Pennsylvania Professional Crop Producer's Conference, State College, PA.
-Midsouth Association of Wheat Scientists, Olive Branch, MS.
-4th National Soybean Rust Symposium, New Orleans, LA.

2008 -60th Annual Crop Production Meeting, Raleigh, NC.
-Industry Pest Information Platform (iPIPE) Stakeholder's Meeting, Raleigh, NC.
-Great Plains Soybean IPM Forum, Fargo, SD and Brookings, ND.
-Eastern Ontario Crop Conference, Ottawa, CN.
-Secretary of Agriculture's ipmPIPE Summit, Washington, DC.
-4th National Soybean Cyst Nematode Conference, Tampa, FL.
-35th SSDW Annual Meeting, Pensacola Beach, FL.

-Purdue University Diagnostic Training Center, West Lafayette, IN and Vincennes, IN.
-Monsanto Technology Showcase, Union City, TN.
-NCERA-208 Annual Meeting, Baton Rouge, LA.
-BayerValue Crop Protection Update Meeting, London, Ontario, CN.
-Plant Management Network Focus on Soybean Web Training.
-North Central Soybean Research Program Board Meeting presentation, Nashville, TN.
-American Phytopathological Society *Focus on Soybean* Presentation.

2007 -American Chemists Society Issues in Integrated Pest Management Symposium, Boston, MA.
-American Phytopathological Society Symposium, Information Technologies for Multi-scale Disease Forecasting and Surveillance, San Diego, CA.
-Illinois Yield Summit, Urbana, IL.
- 3rd National Soybean Rust Symposium, Louisville, KY.

2006 -American Seed Trade Association, Corn & Sorghum and Soybean, Chicago, IL.
-Legume Pest Platform for Extension and Education Meeting, St. Louis, MO.
-Northeast Regional Soybean Rust Satellite Broadcast, State College, PA.
-5th National Integrated Pest Management Symposium, St. Louis, MO.
-Seed Research Conference and Seed Expo, Chicago, IL.
-Southern Division APS Soybean Rust Symposium, Orlando, FL.
-Southwest Ontario Ag. Technology Conference, Ridgetown, Ontario, Canada.
-Soybean Breeders Workshop, St. Louis, MO.
-Diversified Services Workshop, Cincinnati, OH.
-NCERA-208 Annual Meeting, Quincy, FL.

2005 -APS National Soybean Rust Symposium, Nashville, TN.
-Illinois Certified Crop Advisor Annual Meeting, Springfield, IL.
-Illinois Crop Protection and Technology Conference, Urbana, IL.

2004 -Indiana Certified Crop Advisor Annual Meeting, Indianapolis, IN.
-Mid-Atlantic Crop Conference, Ocean City, MD.
-Missouri Certified Crop Advisor Annual Meeting, Columbia, MO.

2001 -Missouri Association of Wheat Growers, Sikeston, MO.

1999 -American Society of Agronomy Certified Crop Adviser Soybean Workshop, Indianapolis, IN.
-Joint Eastern and Southern Small Grain Workers Conference, Williamsburg, VA.

EXTENSION AND RESEARCH PUBLICATIONS AND COMMUNICATIONS

EXTENSION

Multi-State, Regional, and National Publications:

Dorrance, A. E., M. A. Draper, and **D. E. Hershman,** eds. 2008. Using Foliar Fungicides to Manage Soybean Rust. The Ohio State University Extension Bulletin SR-2008.

Dorrance, A., **D. Hershman**, and M. Draper. 2008. Economic Importance of Soybean Rust. Pages 11-19 in: Using Foliar Fungicides to Manage Soybean Rust. Dorrance, A.E., M. A. Draper, and D. E. Hershman, eds. Ohio State University Extension Bulletin SR-2008.

Dorrance, A. E., **D. E. Hershman**, and M. A. Draper, 2005 Introduction. Pages 8-15 in: Using Foliar Fungicides to Manage Soybean Rust, A. E. Dorrance, M. A. Draper, and D. E. Hershman, eds. The Ohio State University Extension Bulletin SR-2005.

Dorrance, A. E., D. Mills, **D. E. Hershman** and M. A. Draper. 2005. 2005 Soybean Rust Fungicide Use Guidelines for Ohio. Ohio State University Ext. Fact Sheet. On-line publication: www2.sbrusa.net/sbr/uploads/OH/OHIO%20SBR%20guidelines%2006.pdf.

Dorrance, A., D. Mills, **D. Hershman** and M. Draper. 2005. 2005 Soybean Rust Fungicide Use Guidelines for Ohio. Ohio State University Ext. Fact Sheet. On-line publication: www2.sbrusa.net/sbr/uploads/OH/OHIO%20SBR%20guidelines%2006.pdf

Hershman, D. A. Dorrance, and M. Draper. 2006 Soybean Rust Fungicide Use Guidelines. On-line Pub: www.sbrusa.net

Hershman, D. 1989. Bacterial Blights of Soybeans. IN: Soybean Disease Atlas (2nd Ed.). P. Colyer, ed. Southern Soybean Disease Workers.

Hollier, C. A. and **D. E. Hershman**. 2008. Integrated Pest Management. Chapter 35 in: Plant Pathology Concepts and Laboratory Exercises (2nd Edition). R. N. Trigano, M. T. Windham, and A. S. Windham, eds. CRC Press, Boca Raton, FL.

Hollier, C., **D. Hershman,** C. Overstreet and B. Cunfer. 2001. Management of Wheat Diseases in the Southeastern United States. Louisiana State University Press, Pub no. 2824.

Rupe, J., M. Hirrel, and **D. Hershman**. 1989. Sudden Death Syndrome. In Compendium of Soybean Diseases (2nd ed.), J.B. Sinclair and P.A. Backman, eds. The American Pathologocal Society Press.

Sikora, E. J., and **D. E. Hershman**. 2008. Soybean Rust in Review. Pages 20-28 in: Using Foliar Fungicides to Manage Soybean Rust. A. E. Dorrance, M. A. Draper, and D. E. Hershman, eds. The Ohio State University Extension Bulletin SR-2008.

Tenuta, A., **D. E. Hershman**, M. A. Draper, and A. E. Dorrance. 2008 Fungicide Basics. Pages 48-56 in: Using Foliar Fungicides to Manage Soybean Rust. A. E. Dorrance, M. A. Draper, and D. E. Hershman, eds. The Ohio State University

Extension Bulletin SR 2008.

Tenuta, A., **D. Hershman**, M. Draper, and A. Dorrance. 2005 Fungicide Basics. Pages 22-29 in: Using Foliar Fungicides to Manage Soybean Rust.Dorrance, A., Draper, M., and Hershman, D., eds. Ohio State University Extension Bulletin SR-2005.

Weibold, W., **D. Hershman,** et. al. 2001. U.S. Soybean Diagnostic Guide and CDROM. U.S. soybean Board, University of Missouri Press.

Wrather, J. A. and **D. Hershman**. 2000. Management of Grain Sorghum Diseases in Missouri. Missouri Coop. Ext. Svs. Pub. G4356.

UK Department of Plant Pathology Publications (Primary Author):

Hershman, D. 2009. Sampling Soybean Fields for Soybean Cyst Nematode Analysis. PPFS-AG-S-09.

Hershman, D. 2009. The Value of Wheat Residue in Soybean Cyst Nematode Management Programs. PPFS-AG-S-08.

Hershman, D. 2008. Winter Decline Syndrome of Canola. PPFS-AG-R-01

Hershman, D. and P. R. Bachi. 2008. Southern Blight of Soybeans. PPFS-AG-S-06

Hershman, D.. 2008 KY Soybean Rust Spray Decision Aid. On-line publication: www2.sbrusa.net/sbr/uploads/KY/2006%20KY%20Fungicide%20SBR%20Aid.pdf

Hershman, D. 2008. 2008 Soybean Cyst Nematode Management Recommendations for Kentucky. PPFS-AG-S-24.

Hershman, D.. 2007 KY Soybean Rust Spray Decision Aid. On-line publication: www.sbrusa.net

Hershman, D and P Bachi. 2007. Charcoal Rot of Soybean. PPFS-AG-S-2.

Hershman, D. 2005. 2005 Soybean Rust Fungicide Use Guidelines. PPFS-AG-S-23.

Hershman, D. and P. Bachi. 2004**.** Soybean Disease Relationships with Early Planting. PPFS-AG-S-22.

Hershman, D. and P. Bachi. 2004. Wheat Foliar Fungicides: Past, Present and Future. PPFS-AG-SG-10.

Hershman, D. 2003. Australasian Soybean Rust: An Exotic Pest Threat. PPFS-AG-S-21.

Hershman, D. 2002. Soybean Cyst Nematode "Races" Soon to be a Thing of the Past. PPFS-AG-S-20.

Hershman, D. 2002. Soybean Foliar Spots and Blights. PPFS-AG-S-19.

Hershman, D. 2002. Soybean Disease Control Series: Are We Missing Opportunities? Part 6: Fungal and Pod Diseases of Soybean. PPFS-AG-S-18.

Hershman, D. 2002. Soybean Disease Control Series: Are We Missing Opportunities? Part 5: Virus Diseases of Soybean. PPFS-AG-S-17.

Hershman, D. 2002. Soybean Disease Control Series: Are We Missing Opportunities? Part 4: Foliar Diseases Caused by Bacteria and Fungi. PPFS-AG-S-16.

Hershman, D. 2002. Soybean Disease Control Series: Are We Missing Opportunities? Part 3: Root and Lower Stem Diseases. PPFS-AG-S-15.

Hershman, D. 2002. Soybean Disease Control Series: Are We Missing Opportunities? Part 2: Soybean Sudden Death Syndrome. PPFS-AG-S-14.

Hershman, D. 2002. Soybean Disease Control Series: Are We Missing Opportunities? Part 1: Soybean Cyst Nematode. PPFS-AG-S-13.

Hershman, D. 2001. Leaf Spots and Blights of Soybean. PPFS-AG-S-12.

Hershman, D. 2001. Sampling Soybean Fields for Soybean Cyst Nematode Analysis. PPFS-AG-S-9.

Hershman, D. 2000. Wheat Streak Mosaic Virus in Kentucky. PPFS-AG-SG-8.

Hershman, D. 2000. Effect of Tillage and Previous Crop on Wheat Head Scab. PPFS-AG-SG-9.

Hershman, D. 1997. Soybean Cyst Nematode: Soybean Thief and Public Enemy Number One. PPA-42.

Hershman, D. 1996. Fungicide Seed Treatments for Wheat. PPFS-AG-SG-8.

Hershman, D. 1996. Foliar Fungicide Use in Wheat. PPFS-AG-SG-5.

Hershman, D. 1996. Seed Treatment Fungicides for Soybean. PPFS-AG-S-11.

Hershman, D. 1994. Sampling Soybean Fields for Soybean Cyst Nematode Analysis. PPFS-AG-S-9.

Hershman, D. 1994. Use of Soybean Blends in Soybean Cyst Nematode Management Programs. PPFS-AG-S-10.

Hershman, D. 1994. Foliar Fungicides to Protect Seed Quality in Soybean. PPFS-AC-

S-11.

Hershman, D. 1994. Fungicide Seed Treatment in Soybean. PPFS-AG-S-12.

Hershman, D. 1994. Foliar Fungicide Use in Wheat. PPFS-AG-SG-5.

Hershman, D. 1994. Preplant Decisions Greatly Impact Disease Potential in Wheat. PPFS-AG-SG-6.

Hershman, D. 1994. Black 'Sooty' Head Mold of Wheat. PPFS-AG-SG-7.

Hershman, D. 1993. Kentucky Plant Disease Management Guide for Soybeans. PPA-106.

Hershman, D. and P. Vincelli. 1993. Kentucky Plant Disease Management Guide for Small Grains. PPA-10c.

Hershman, D. 1992. Septoria Diseases of Wheat. PPA-39.

Hershman, D. 1992. Head Scab of Small Grains in Kentucky. PPA-38.

Hershman, D. and P. Bachi. 1992. Take-All of Wheat. PPFS-AG-SG-1.

Hershman, D. and P. Bachi. 1992. Wheat Bacterial Streak. PPFS-AG-SG-2.

Hershman, D. and P. Bachi. 1992. Barley Yellow Dwarf. PPFS-AG-SG-3.

Hershman, D. and P. Bachi. 1992. Wheat Spindle Streak Mosaic. PPFS-AG-SG-4.

Hershman, D. and P. Bachi. 1992. Brown Spot of Soybean. PPFS-AG-S-1.

Hershman, D. and P. Bachi. 1992. Downy Mildew of Soybean. PPFS-AG-S-3.

Hershman, D. and P. Bachi. 1992. Phytophthora Root and Stem Rot of Soybean. PPFS-AG-S-4.

Hershman, D. and P. Bachi. 1992. Root and Lower Stem Diseases of Soybean. PPFS-AG-S-5.

Hershman, D. and P. Bachi. 1992. Stem Canker of Soybeans. PPFS-AG-S-7.

Hershman, D. 1990. The Soybean Cyst Nematode. PPA-3.

Hershman, D. 1990. Soybean Sudden Death Syndrome in Kentucky. PPA-37.

Hershman, D., R. Stuckey, and J. Hartman. 1988. Gray Leaf Spot of Corn. PPA-35.

Hershman, D., J. Hartman, and R. Stuckey. 1988. Stewart's Wilt of Corn. PPA-33.

Hershman, D. and R. Stuckey. 1988. Black Rot of Grapes. PPA-27.

Hershman, D., J. Hartman, and R. Stuckey. 1987. Fire Blight. PPA-34.

Hershman, D. 1987. Anthracnose of Bramble Fruits. PPA-32.

Hershman, D. 1987. Gray Mold of Strawberry. PPA-31.

Hershman, D. and R. Stuckey. 1985. Diseases of Grain Sorghum. PPA-29.

UK Department of Plant Pathology Publications (Secondary Author):

Eshenaur, B., P. Bachi, W. Nesmith, J. Hartman, **D. Hershman**, P. Vincelli, and C. Kaiser 1992. Submitting Plant Disease Specimens for Diagnosis. PPA-9.

Hartman, J., P. Vincelli, K. Seebold, and **D. Hershman.** 2006. Systemic Fungicide Resistance – A Threat to Kentucky Agriculture. PPFS-Misc-02.

Nesmith, W., J. Smiley, and **D. Hershman**. 1986. Chemical Controls for Tobacco Diseases. PPA-21.

Stuckey, R., and **D. Hershman**. 1988. Fungicides to Control Leaf Diseases in High Yield Wheat. PPA-36.

Stuckey, R., and **D. Hershman**. 1987. Fungicide Seed Treatment for Control of Grain Diseases. PPA-6.

Stuckey, R., W. Nesmith, and **D. Hershman**. 1986. Kentucky Plant Disease Control Guide for Field Crops. PPA-10.

Stuckey, R. and **D. Hershman**. 1985. Corn Stalk Rots. PPA-26.

Vincelli, P. and **D. Hershman**. 2008. Diseases of Concern in Continuous Corn. PPFS-AG-C-01.

Vincelli, P. and **D. Hershman**. 1993. Kentucky Plant Disease Management Guide for Corn and Sorghum. PPA-10a.

Vincelli, P. and **D. Hershman**. 1996. Gray Leaf Spot of Corn. PPA-35.

Vincelli, P. and **D. Hershman**. 1997. Controlling Phytophthora Root Rot in Greenhouse Ornamentals. PPFS-OR-H-9.

Chapters in UK Inter-Departmental Publications:

Hershman, D. and D. Johnson. 2009. Disease Management. Pages 42-54 in: A Comprehensive Guide to Wheat Management in Kentucky. ID-125.

Hershman, D. 1998. Scouting Procedures for Diseases in Soybeans. in: Kentucky Integrated Crop Management Manual for Field Crops: Soybeans. IPM-3.

Hershman, D. 1997. Small Grain Diseases. in: Kentucky Integrated Crop Management Manual for Field Crops: Small Grains. IPM-4.

Hershman, D. 1997. Disease Management. in: A Guide to Wheat Management: An Informational Resource. ID-125.

Hershman, D. 1997. Soybean Cyst Nematode. in: Factors to Consider When Bringing Conservation Reserve Program (CRP) Land or Idle Land Back into Production. ID-24.

Hershman, D. 1992. Scouting Procedures for Diseases in Canola. in: Kentucky Integrated Crop Management Manual for Field Crops. IPM-8.

Hershman, D. 1992. Disease chapter in: Canola Production and Management. ID-114.

Co-Authored UK Interdepartmental Publications:

Brown, G., R. Jones, J. Strang, L. Weston, J. Hartman, **D. Hershman**, R. Bessin, and D. Johnson. 1993. 1993 Kentucky Commercial Tree Fruit Spray Guide. ID-92.

Brown, G.., R. Jones, J. Strang, L. Weston, J. Hartman, **D. Hershman**, R. Bessin, and D. Johnson. 1993. 1993 Kentucky Commercial Small Fruit Spray Guide. ID-94.

Dunwell, W., **D. Hershman**, J. Hartman, and R. Scheibner. 1992. Soybean Cyst Nematode: A Potential Problem for Nurseries. ID-110.

Grove, J., J. Herbek, **D. Hershman**, D. Johnson, J, Martin, S. McNeill, L. Murdock, R. Trimble, D. VanSanford, and W. Witt. 2000. No-Till Small Grain Production in Kentucky. ID-36.

Hartman, J., M. Witt, **D. Hershman**, and R. McNiel. 1995. Woody Plant Disease Control Guide for Kentucky. ID-88.

Herbek, J. L. Murdock, J. Grove, L. Grabau, D. VanSanford, J. Martin, J. James, D. Call, **D. Hershman**, and D. Johnson. 2009. Comparing No-Till and Tilled Wheat in Kentucky. ID-177.

Johnson, D.W., L. Townsend, and **D.E. Hershman**. 1996. Wheat Streak Mosaic Virus and the Wheat Curl Mite. Entfact-117.

Jones, R., J. Strang, M. Witt, G. Brown, J. Hartman, **D. Hershman**, J.D. Green, and D.

Johnson. 1990. Pest Control Program for Home Grown Fruit in Kentucky. ID-21.

Roberts, C., J. Strang, W. Dunwell, R. Jones, L. Townsend, J. Hartman, **D. Hershman**, J. Martin, J.D. Green, and B. Thom. 1987. Commercial Vegetable Crop Recommendations. ID-36.

Roberts, C., R. Jones, D. Knavel, J. Strang, M. Witt, J. Hartman, **D. Hershman**, R. Scheibner, L. Townsend, and K. Wells. 1985. Home Vegetable Gardening in Kentucky. HO-63.

Strang, J., G. Brown, R. Jones, L. Townsend, R. Scheibner, and **D. Hershman**. 1987. Nut Tree Growing in Kentucky. ID-77.

Websites Developed and Maintained:

Soybean Rust (www.uky.edu/soybeanrust) established May 2005.

Soybean Cyst Nematode (www.uky.edu/SCN) established April, 2009.

UK Computer Programs:

Hershman, D. and D. Hou. 1992. SOYSPRAY—The Foliar Fungicide Management Program for Soybean Seed Producers (ASK Module).

UK Instructional Videos/DVD's:

Hershman, D., and M. Eclov. 1994. Wanted: Soybean Cyst Nematode (VPP-0723; runs 10 min).

Johnson, D., J. Martin, **D. Hershman**, and M. Eclov. 1991. Safely Applying Pesticides in Lawns and Gardens (VII-ENT-0431; runs 21 min).

Nesmith, W., J. Hartman, P. Vincelli, **D. Hershman**, P. Bachi. J. Beale and M. Eclove. 2004. Viral Diseases of Horticultural Plants (multi-disc DVD set).

Nesmith, W., J. Hartman, P. Vincelli, **D. Hershman**, P. Bachi. J. Beale and M. Eclove. 2004. Bacterial Diseases of Horticultural Plants (multi-disc DVD set).

Magazine Articles:

2001-2009: Wrote 22 articles for *Mid-American Farmer Grower*.

1990-2001: Primary source of information for 30 articles appearing in *Kentucky Prairie Farmer*.

1984-2009: Primary source for 38 articles appearing in regional and national periodicals such as *AG Professional National Tillage Digest*, *Corn and Soybean Digest*, *Southern farmer*, and *The Magazine* (UK College of Agriculture).

Hershman. D. 2003. Exam and Procedures Committee Update. *CCA Advantage*.

Hershman, D. 1990. Use of Baytan 30 in soft red winter wheat production. Wheat Technology, Vol. 5(5).

Hershman, D., J. Hartman, and R. Stuckey. Stewart's wilt of corn. *The Kentucky Farmer.* August 1987.

Hershman, D. and J. Hartman. Fire blight in perspective. *The Kentucky Farmer*. April 1987.

Hershman, D. Soybean seed quality problems in Kentucky. *Regional Farmer*. November 19, 1986.

Hershman, D. Peach perennial canker control should begin now. *Regional Farmer.* November 19, 1986.

Hershman, D. It's time to scout your wheat. *Regional Farmer.* November 19, 1986.

Hershman, D. Apple fire blight in perspective. *Regional Farmer*. February 13, 1987.

Hershman, D. Wheat foliar disease control - begin planning now. *Regional Farmer*. March 6, 1987.

Hershman, D. Wheat-early season diseases. *Regional Farmer*. April 1, 1987.

Hershman, D. and R. Stuckey. Grain sorghum diseases. *The Kentucky Farmer*. May 1985.

Hershman, D., and R. Stuckey. The soybean cyst nematode in Kentucky. *The Kentucky Farmer*. October 1985.

UK Newsletters:

Kentucky Pest News (1984-2009): Primary or secondary author of 575 articles.

UK Wheat Science Group Newsletter (1997-2009): Primary author of 34 articles

UK Corn & Soybean Science Newsletter (2002-2009): Primary author of 13 articles

IPM Newsletter (1984-1990): Primary or secondary author of 100 articles.

Kentucky Fruit Facts (1984-1988): Primary author of 38 articles.

Grain Gleanings (1993-1994): -Primary author of 3 articles.

KY CCA Newsletter (2005-2006): Primary author of 5 articles.

Electronic Communications and Publications:

Commercial Television:

-Ag Day Soybean Rust Interview (National Syndication), 2005

-Today's Ag Soybean Rust Interview (South Dakota State University, with Syndication across the Midwest, 2005.

-T.V. 13 - Bowling Green: 140 five-minute tapes on various topics from May 1984-2009.

-T.V. 12 – Cape Girardeau, MO: Soybean Rust Interview, 2006

-T.V. 6 - Paducah: Interviewed 17 times for various news segments.

-T.V. 44 - Evansville, IN: Interviewed for 4 news segments.

Satellite/Remote Broadcasts:

-Northeast Soybean Rust Satellite Conference guest, 2006 (Organized by Penn State University and Cornell University; uplinked from PSU).

-Southwest Ontario Ag. Technology Conference guest (participated by remote technology), 2006

-National Video Conference - Participated in video conference on 1991 Soft Red Winter Wheat Quality, sponsored by Extension Service and other state and federal agencies, September 1991.

UK Radio-TV-Press Service Releases:

-Jack Crowner (syndication throughout KY) Radio Tapes: 21 programs taped, 2002-2007.

-UK Radio: 53 radio programs have been taped, 1984 - 2002.

-UK TV Tapes: 11 video segments taped by UK Communication Specialists for release to TV stations.

-UK Press Releases: Primary resource for 155 press releases, 1984 - present.

World Wide Web and Telecommunications:

-Assisted in development, evaluation, and adoption of USDA Soybean Rust Public website (www.sbrusa.net), 2004-present.

-Maintain Kentucky soybean rust commentary and KY-specific documents on USDA Soybean Rust Public Website, 2005-present.

-Developed and Maintain Kentucky Soybean Rust Web Page (www.uky.edu/soybeanrust), 2005-present.

-Soybean Rust Updates:
*Developed and use a one-way e-mail push list to send out SBR updates, 2005-present.
*Twitter SBR updates http://twitter.com/KYsbrUpdate. established 2009.
*SBR updates made using KY Soybean Promotion Board Toll-Free Hotline, 2005-present.

Provide grain crop updates via UK Grains Crop Blog, http://graincrops.blogspot.com/ established 2009.

-Manage National Listservs to facilitate communication of various professional groups
*SBR general, established 2005.
*SBR Sentinel, established 2005.
*ipmPIPE Legume, established 2006
*Plant Health, established 2007
*ipmPIPE Steering Committee, established 2009
*SBR Sentinel Spanish, established 2009.

Section 18 (Emergency Use) Applications to EPA:
-Folicur use for management of Fusarium Head Blight and DON (2004-2007).
-Benlate use for management of canola white mold (1991).

RESEARCH PUBLICATIONS

Refereed Journal Articles:

An, Z. Q., J. W. Hendrix, **D. E. Hershman**, R. S. Ferriss, and G. T. Henson. 1993. The Influence of Crop Rotation and Soil Fumigation on a Mycorrhizal Fungal Community Associated with Soybean. Mycorrhiza 3:171-182.

An, Z. Q., J. W. Hendrix, **D. E. Hershman**, and G. T. Henson. 1990. Evaluation of the Most Probable Number (MPN) and Wet-Seiving Methods for Determining Soilborne Populations of Endogonaceous Mycorrhizal Fungi. Mycologia 82(5)576-581.

An, Z. Q., J. W. Hendrix, **D. E. Hershman**, and G. T. Henson. 1990. Vertical Distribution of Endogonaceous Mycorrhizal Fungi Associated with Soybeans as Affected by Soil Fumigation. Soil Biol. Biochem. 22(5)715-719.

Argyris, J., TeKrony, **D. Hershman,** D. VanSanford, D., Hall, M., Kennedy, B., Rucker, M. and Edge, C. 2005. Fusarium head blight following point inoculation in the greenhouse compared with movement of *Fusarium graminearum* in seed and floral components. Crop Science 45:626-634.

Ghabrial, S. A., **D. E. Hershman**, and D. W. Johnson. 1990. Distribution of Bean

Pod Mottle Virus in Soybeans in Kentucky. Plant Dis.74:132-134.

Hershman, D. E. and D. M. Perkins. 1995. Etiology of Canola Blackleg in Kentucky and Seasonal Discharge Patterns of *Leptosphaeria maculans* Ascospores from Infested Canola Stubble. Plant Dis. 79:1225-1229.

Hershman, D. E. and P. R. Bachi. 1995. Effect of Wheat Residue and Tillage on *Heterodera glycines* and Yield of Doublecrop Soybean in Kentucky. Plant Dis. 79:631-633.

Hershman, D. E., J. W. Hendrix, R. E. Stuckey, P. R. Bachi, and G. Henson. 1990. Influence of Planting Date and Cultivar on Soybean Sudden Death Syndrome in Kentucky. Plant Dis. 74:761-766.

Hershman, D. E., E. H. Varney, and S. A. Johnston. 1986. Etiology of Parsley Damping-Off and the Influence of Temperature On Its Development and Severity. Plant Dis. 70:927-930.

Hershman, D. E., and E. H. Varney. 1982. Alfalfa Mosaic Virus in *Pachysandra terminalis*. Plant Dis. 66:1195-1196.

Johnson, D. W. and **D. E. Hershman**. 1996. Survey of Cereal Aphids in Kentucky Wheat Fields: Common Species and Distribution. Trans. Ky. Acad. Sci. 57:15-17.

Jurick, W. M., C. L. Harmon, J. Marois, D. L. Wright, K. Lamour, A. Vitoreli, T. Creswell, **D. E. Hershman**, C. Estevez, B. Kemerait, C. Balbalian, and P. F. Harmon. 2007. A Comparative Analysis of Diagnostic Protocols for Detection of the Asian Soybean Rust Pathogen, *Phakopsora pachyrhizi*. Online. Plant Health Progress doi:10.1094/PHP-2007-0531-01-RS.

Paul, P. A., P. E. Lipps, **D. E. Hershman**, M. P, McMullen, M. A. Draper, and L. V. Madden. 2008. Efficacy of triazole-based fungicides for Fusarium head blight and deoxynivalenol content in wheat: A multivariate meta-analysis Phytopathology, 98:999-1011.

Paul, P. A., P. E. Lipps, **D. E. Hershman**, M. P, McMullen, M. A. Draper, and L. V. Madden. 2006. A Quantitative Review of Tebuconazole Effect on Fusarium Head Blight and Deoxynivalenol Content in Wheat. Phytopathology 97: 211-220

Pearce, W. L., D. A. VanSanford, and **D. E. Hershman**. 1996. Heritability of Powdery Mildew Resistance in Soft Red Winter Wheat. Plant Dis. 80:1359-1362.

Roy, K.W., J.C. Rupe, **D.E. Hershman**, and T.S. Abney. 1997. Sudden Death Syndrome of Soybean. Plant Dis. 81:1100-1110.

Wang, R. Y., A. Kritzman, **D. E. Hershman**, and S. A. Ghabrial. 2006. *Aphis glycines* as a Vector of Persistently and Non-persistently Transmitted Viruses and Potential Risks for Soybean and Other Crops. Plant Dis. 90:920-926.

Disease Notes in Refereed Journals or Newsletters:

An, Z.Q., J. W. Hendrix, **D. E. Hershman**, and G. T. Henson. 1990. Endogonaceous Mycorrhizal Community Associated With Soybean as Affected by Crop Rotation and Soil Fumigation. Mycological Society of America Newsletter 41:3.

Baird, R. E., **D. E. Hershman**, and E. P. Christmas. 1994. Occurrence of *Macrophomina phaseolina* on Canola in Indiana and Kentucky. Plant Dis. 78:316.

Hendrix, J. W., Z. Q. An, J. H. Grove, **D. E. Hershman**, and G. T. Henson. 1990. Soil Fumigation Effects on Vertical Distribution of Endogonaceous Mycorrhizal Fungi Associated with Soybean. Mycological Society of America Newsletter 41:17.

Hershman, D. E., R. D. Heinz, and B. S. Kennedy. 2008. Soybean cyst nematode, *Heterodera glycines*, populations adapting to resistant soybean cultivars in Kentucky. Plant Dis. 92:1475.

Hershman, D. E., P. R. Bachi, C. L. Harmon, P. F. Harmon, M. E. Palm, J. M. McKemy, K. A. Zeller and L. Levy. 2006. First report of soybean rust caused by Phakopsora pachyrhizi on kudzu (*Pueraria montana* var *lobata*) in Kentucky. Plant Dis. 90:834.

Hill, C. B., D. V. Phillips, and **D. E. Hershman**. 1991. Canola Winter Decline Syndrome. Plant Dis. 76:861.

Lamey, H. A., and **D. E. Hershman**. 1993. Blackleg of Canola (*Brassica napus*) Caused by *Leptosphaeria maculans* in North Dakota. Plant Dis. 77:1263.

Mengistu, A., P. H. Williams, **D. E. Hershman**, and D. W. Sippell. 1990. Blackleg of Canola (*Brassica napus* var. *oleifera*) in Kentucky. Plant Dis. 74:938.

VanSanford, D. A., W. L. Pearce, C. S. Swanson, C. R. Tutt, L. J. Tomes, and **D. E. Hershman**. 1995. Registration of KY83C-16-2 Wheat Germplasm. Crop Sci. 35:1719.

Research Reports in National Peer-Reviewed Technical Publications:

Hershman, D., B Kennedy, T. Yielding, P. Bachi, and G. Kelly. 2009. Evaluation of seed treatments for management of soybean cyst nematode in Hopkins County, Kentucky, 2008. Plant Disease Management Reports 3:NO41.

Hershman, D., B Kennedy, T. Yielding, P. Bachi, and G. Kelly. 2009. Performance of five soybean cultivars and three blends when subjected to moderate to high

populations of *Heterodera glycines*, Hopkins County, Kentucky, 2008. Plant Disease Management Reports 3:NO42.

Hershman, D. and P. Bachi. 2007. Fungicide Control of Fusarium Head Blight and Leaf Diseases of Soft Red Winter Wheat in Kentucky, 2006. Plant Disease Management Reports (PDMR) Vol 1, on-line publication: http://www.plantmanagementnetwork.org/pub/trial/pdmr/volume1/abstracts/cf002.asp

Hershman, D., T. Yielding, and P. Bachi. 2007. Evaluation of fungicides for control of foliar and stem diseases of soybean in Kentucky, 2006. PDMR Vol 1, on-line publication: http://www.plantmanagementnetwork.org/pub/trial/pdmr/volume1/abstracts/fc086.asp

Hershman, D., T. Yielding, and P. Bachi. 2007. Evaluation of fungicides for control of foliar and stem diseases in late-planted soybean in Kentucky, 2006. PDMR Vol 1, on-line publication: http://www.plantmanagementnetwork.org/pub/trial/pdmr/volume1/abstracts/fc019.asp

Hershman, D. E. and P. R. Bachi. 1998. Reaction of Wheat Varieties to Wheat Spindle Streak Mosaic Virus. Biological and Cultural Tests for Control of Plant Diseases (B & C Tests) 13:131.

Hershman, D. E., D. M. Perkins, D. C. Morgan, and P.R. Bachi. 1994. Effect of Foliar Fungicides on Foliar and Head Disease, Yield and Test Weight of a Soft Red Winter Wheat Cultivar. Fungicide and Nematicide (F & N) Tests 49:211.

Hershman, D. E., D. M. Perkins, D. C. Morgan and P. R. Bachi. 1994. Performance of Growth Stage and Threshold-based Foliar Fungicide Treatment for the Soft Red Winter Wheat Cultivar Clark. F & N Tests 49:212.

Hershman, D. E., D. M. Perkins, and P. R. Bachi. 1993. Effect of Foliar Fungicides on Disease Development and Yield of a Soft Red Winter Wheat Cultivar. F & N Tests 48:218.

Hershman, D. E., D. M. Perkins, and P. R. Bachi. 1993. Control of White Mold of Canola with Foliar Fungicides. F & N Tests 48:239.

Hershman, D. E., D. M. Perkins, P. R. Bachi, D. M. Tekrony, and M. F. Rucker. 1993. Effect of Seed Treatment Fungicides on Seed Quality, Stand, Disease Development and Yield of a Soft Red Winter Wheat Cultivar. F & N Tests 48:301-302.

Hershman, D. E., D. M. Perkins, and P. R. Bachi. 1992. Effect of Foliar Fungicides on

Yield and Disease Development in a Soft Red Winter Wheat Cultivar. F & N Tests 47:190.

Hershman, D. E., and D. M. Perkins. 1992. White Mold Control in Canola. F & N Tests 47:217.

Hershman, D. E., D. M. Perkins, and P. R. Bachi. 1992. Effect of Seed and Foliar Fungicides on Yield and Disease Development in a Soft Red Winter Wheat Cultivar. F & N Tests 47:266.

Hershman, D. E., D. M. Perkins, and P. R. Bachi. 1992. Effect of Seed Treatment Fungicides on Yield and Disease Development in a Soft Red Winter Wheat Cultivar. F & N Tests 47:267.

Hershman, D. E., D. M. Perkins, and P. R. Bachi. 1991. Effect of Foliar Fungicides on Yield and Disease Development in the Soft Red Winter Wheat Cultivar Pike. F & N Tests 46:205.

Hershman, D. E., D. M. Perkins, and P. R. Bachi. 1991. Effect of Seed Treatment and Foliar Fungicides on Yield and Disease Development in the Soft Red Winter Wheat Cultivar Becker. F & N Tests 46:206.

Hershman, D. E., and P. R. Bachi. 1989. Soybean Cyst Nematode Reproduction and Yield Response of Selected Soybean Cultivars. B & C Tests 4:47.

Hershman, D. E., and P. R. Bachi. 1989. Effect of Soybean Cultivar and Planting Date on Soybean Sudden Death Syndrome Development and Soybean Cyst Nematode Reproduction. B & C Tests 4:49.

Hershman, D. E., W. Clinton, and R. E. Stuckey. 1988. Evaluation of Foliar Fungicides for Control of Leaf Rust and Powdery Mildew in Wheat, 1987. F & N Tests 43:187.

Hershman, D. E., C. R. Tutt, and D. A. VanSanford. 1988. Reaction of Wheat Cultivars to Leaf Rust, Powdery Mildew, Septoria Glume Blotch and Leaf Blotch and Wheat Spindle Streak Mosaic Virus-1987. B & C Tests 3:48.

Hershman, D. E., P. R. Bachi, R. E. Stuckey, J. W. Hendrix, and G. Henson. 1988. Effect of Soybean Cultivar on Sudden Death Syndrome Incidence and Severity and Soybean Cyst Nematode Reproduction-1987. B & C Tests 3:40.

Hershman, D. E., P. R. Bachi, and T. Curtsinger. 1988. Soybean Cyst Nematode Reproduction and Yield Response of Six Soybean Cultivars-1987. B & C Tests 3:37.

Hershman, D. E., and J. Herbek. 1988. Influence of Nitrogen Fertility and Cover Crop on Anthracnose Severity in Grain Sorghum-1987. B & C Tests 3:35.

Hershman, D. E., P. R. Bachi, R .E. Stuckey, and W. Clinton. 1987. Effect of Reduced Rates of Temik 15G and Soybean Cultivar on Soybean Yield and Soybean Cyst Nematode Populations. F & N Tests 42:91.

Hershman, D. E., P. R. Bachi, R. E. Stuckey, J. W. Hendrix, and G. Henson. 1987. Effect of Soybean Cultivars and Planting Date on Development of Soybean Sudden Death Syndrome (SDS) and Soybean Cyst Nematode (SCN) Populations-1986. B & C Tests 2:38.

Hershman, D. E., J. Herbek, L. Murdock, and P. R. Bachi. 1986. Control of Seed Decay and Damping-Off of No-till Field Corn in a Poorly Drained Soil. F & N Tests 41:130.

Hershman, D. E., and S. A. Johnston. 1986. Greenhouse Evaluation of Fungicides for Control of Damping-Off of Parsley. F & N Tests 41:132.

Hershman, D. E., P. R. Bachi, and R. E. Stuckey. 1986. The Effect of Foliar Fungicides, Ethrel, and Timing of Application on Leaf Rust, Plant Height, Lodging and Yield of Wheat. F & N Tests 41:90.

Hershman, D. E., P. R. Bachi, R. E. Stuckey, W. Clinton, and G. Henson. 1986. Efficacy of Nematicides and Method of Application on Soybean Yield and Soybean Cyst Nematode Populations. F & N Tests 41:79.

Hershman, D. E., P. R. Bachi, and R. E. Stuckey. 1986. Evaluation of Foliar Applied Fungicides for Disease Control and Yield Response of Soybeans. F & N Tests 41:118.

Hershman, D. E., P. R. Bachi, R. E. Stuckey, and G. Henson. 1986. Evaluation of Soybean Cultivars for Susceptibility to Soybean Sudden Death Syndrome-1985. B & C Tests 1:31.

Hershman, D. E., C. Tutt, R. E. Stuckey, and D. A. VanSanford. 1986. Reaction of Wheat Cultivars to Leaf Rust, Powdery Mildew, Head Scab, and Wheat Spindle Streak Mosaic Virus-1985. B & C Tests 1:41.

Hershman, D. E., J. H. Herbek, and L. W. Murdock. 1986. Effect of Nitrogen Fertility on Stalk Rot Incidence and Yield of Field Corn, 1984-85. B & C Tests 1:27.

Hershman, D. E., R. E. Stuckey, and P. R. Bachi. 1985. Evaluation of Foliar Fungicides for Control of Septoria Leaf Blotch and Leaf Rust. F & N Tests 40:130.

Hershman, D. E., R. E. Stuckey, and P. R. Bachi. 1985. Effect of Foliar Fungicides on Brown Spot, Anthracnose, Pod and Stem Blight, and Yield of Soybeans. F & N Tests 40:155.

Hershman, D. E., and S. A. Johnston. 1985. Greenhouse Evaluation of Fungicides for Parsley Damping-Off Control. F & N Tests 40:77.

Nesmith, W., M. Wiglesworth, G. Henson, **D. Hershman**, and B. Clinton. 1986. Evaluation of Several Ridomil Applications for Black Shank Control on Susceptible and Resistant Dark Tobacco in Western Kentucky, 1984. F & N Tests 41:122.

Perkins, D. M., **D. E. Hershman**, D. C. Morgan, and C. R. Tutt. 1993. Reaction of Wheat Cultivars to Wheat Spindle Streak Mosaic Virus and Barley Yellow Dwarf Virus. B & C Tests 9:131.

Stuckey, R. E., **D. E. Hershman**, P. R. Bachi, and W. Clinton. 1987. Evaluation of Fungicides for Control of Foliar Diseases of Wheat. F & N Tests 42:110.

Stuckey, R. E., W. Clinton, **D. E. Hershman**, and D. A. VanSanford. 1986. Evaluation of Foliar Fungicides for Control of Leaf Rust in Wheat, 1985. F & N Tests 41:93.

Stuckey, R. E., W. Clinton, **D. E. Hershman**, and P. R. Bachi. 1985. Effectiveness of Nematicides and Application Method on the Soybean Cyst Nematode and Soybean Yield. F & N Tests 40:110.

Abstracts in Refereed Journals or Society Publications:

Atibalentja, N., G. Noel, P. Donald, H. Melakeberhan, T. Anderson, S. Chen, J. Faghihi, J. Ferris, C. Grau., **D. Hershman**, A MacGiidwin, T. Niblack, R. Riggs, W. Stienstra., G. Tylka., W. Walacky. 2001. Soybean Yield and Heterodera glycines population dynamics in the Midwestern U. S. and Ontario, Canada. Phytopathology Vol. 91:S 130.

Brown, G. R., D. W. Johnson, **D. E. Hershman**, and J. E. Strang. 1987. KAMP-An IPM Program for Widely Scattered Apple Orchards. HortScience 22:714.

Donald, P., G. Noel, H. Melakeberhan, T. Anderson, J. Atibalentja, S. Chen , J. Faghihi, J. Ferris, C. Grau, **D. Hershman,** A. MacGuidwin, T. Niblack, R. Riggs, W. Stienstra, G. Tylka, T. Welacky. 2000. Effects of tillage and row spacing on soybean yield and soybean cyst nematode reproduction. J. of Nematology Vol. 32:427.

Donald, P., G. Noel, H. Melakeberhan, N. Atibalentja, T. Anderson, S. Chen, J. Faghihi, J. Ferris, C. Grau, **D. Hershman**, A. MacGuidwin, T. Niblack, R. Riggs, W. Stienstra, G. Tylka, T. Welacky. 1999. Ten-State Evaluation of Selected Agronomic Practices on Soybean Cyst Nematode. J. of Nematology Vol 31:551.

Ghabrial, S., **D. Hershman**, and D. Johnson. 1989. Epidemiology of Bean Pod Mottle Virus in Soybean in Kentucky. Phytopathology 79:1106.

Hershman, D. E. and L. J. Giesler. 2006. Overview of the Asian Soybean Rust Sentinel Network for 2005. On-line publication: http://www.apsnet.org/meetings/div/so06abs.asp

Hershman, D. E. 1995. Timing of Apothecial Production by *Sclerotinia sclerotiorum* in Kentucky. Phytopathology 85:1044.

Hershman, D. E., and P. R. Bachi. 1992. Effect of Wheat Residue and Tillage on *Heterodera glycines* Cyst Development in Doublecrop Soybeans in Kentucky. J. of Nematology 24:597.

Hershman, D. E., D. M. Perkins, and P. R. Bachi. 1992. Pathogenicity Characterization and Seasonal Patterns of Ascospore Release of *Leptosphaeria maculans* Associated With Blackleg of Canola in Kentucky. Phytopathology 82:1106.

Hershman, D. E., J. W. Hendrix, R. E. Stuckey, P. R. Bachi, and J. H. Grove. 1987. Effect of Soybean Cultivars and Planting Date on Development of Soybean Sudden Death Syndrome. Phytopathology 78:321.

Hershman, D. E., E. H. Varney, and S. A. Johnston, 1983. Etiology and Control of Damping-Off in Parsley in Southern New Jersey. Phytopathology 73:367.

Johnson, D. W., and **D. E. Hershman**. 1994. Use of Various Insecticidal Treatments Against Aphids for Control of Barley Yellow Dwarf Virus in Kentucky Grown Wheat. North Central Branch, Ent. Soc. of America Abstracts.

Pearce, W. L., D. A. VanSanford, and **D. E. Hershman**. 1993. Growth Stage Determination of Powdery Mildew and Associated Yield Loss. Agronomy Abstracts, p. 97.

Stuckey, R. E., J. C. Zadoks, **D. E. Hershman**, and W. P. Clinton. 1989. A Comparison of the EPIPRE and Kentucky Decision Guide Predictive Systems for Scheduling Fungicide Applications to Control Leaf Diseases of Wheat in the Netherlands and in Kentucky. Phytopathology 79:1141.

Abstracts in Professional Conference Proceedings:

Hershman, D. E. 2008. SCN Extension Education Needs: Points South. Pages 36-37 in: Proceedings, 4th National Soybean Cyst Nematode Conference, March 6-7, Tampa, FL.

Hershman, D. E. 2007. The ipmPIPE: What does it do to enhance IPM? Page 79 in: Program Book, AGRO Session of American Chemical Society's 234 National Meeting. Boston, MA, Aug 2007.

Hershman, D. E. 2006. Plant Health Applications of Fungicides in Soybean: A Paradox to the Integrated Pest Management Paradigm? Page 40 in: Program Book for 5th National Integrated Pest Management Symposium. St. Louis, MO, Apr 2006.

Hershman, D. E. and Draper, M. 2004. Analysis of 2004 Uniform Wheat Fungicide Trials Across Locations and Wheat Classes. Pages 318-322 in: Proc. of the 2004 International Symposium on Fusarium Head Blight. Orlando, FL, Dec, 2004.

Hershman, D. E. and Milus, E. A. 2003. Analysis of the 2002 Uniform wheat fungicide trials across locations and wheat classes. Pages 76-80 in: Proc. of the 2003 Nat. FHB Forum, Bloomington, MN, Dec 2003.

Hershman, D. E. and Milus, E. A. 2003. Performance of Folicur in FHB uniform fungicide trials, 1998-2003. 2003. Pages 81-82 in: Proc. of the 2003 Nat FHB Forum, Bloomington, MN, Dec 2003.

Hershman, D. E. and Milus, E. A.. 2002. Analysis of the 2002 uniform wheat fungicide and biocontrol trials across locations. Pages 82-87 in: Proc. 2002 Nat. FHB Forum, Erlanger, KY, Dec 2002.

Hershman, D. E., Bachi, P. R., TeKrony, D. M., and VanSanford, D. A. 2002. Management of Fusarium head blight in wheat using selected biological control agents and foliar fungicides. Pages 88-90 in: Proc. of Nat. FHB Forum, Erlanger, KY, Dec 2002.

Hershman, D., P.R. Bachi, D.M. TeKrony , and D.A. VanSanford. 2001. Management of Fusarium Head Blight in Wheat Using Selected Biological Control Agents and Foliar Fungicides. In: Proc. of National Fusarium Head Blight Forum, Dec. 2001, Erlanger, KY.

Hershman, D. 2001. NCR-184 Kentucky State Report. In: Proce of 2001 National Fusarium Head Blight Forum, Dec 2001, Erlanger, KY.

Hershman, D. 2000. NCR-184 Kentucky State Report. In: Proceedings of 2000 National Fusarium Head Blight Forum, Dec 2000, Erlanger, KY.

Hershman, D. and D. VanSanford. 1999. NCR-184 1999 Kentucky State Report. Page 200. In: Proc. of National Fusarium Head Blight Forum, Dec 5-7, Sioux Falls, SD.

Hershman, D.E. 1999. Fusarium Head Blight of Wheat. Current and Prospective Management Strategies. In: Proc. of 1999 Joint Research Conference of the Eastern and Southern Small Grain Workers, Williamsburg, VA, May 2-4, 1999.

Hershman, D., C. Bowley, P. Needham, P. Vincelli, and D. Johnson. 1999. Fusarium Head Blight Survey, 1997-98. In: Proc. of 2nd Annual National Wheat Industry

Research Forum, Nashville, TN, Feb 4-5, 1999.

Hershman, D.E., P.R. Bachi, and D. Morgan. 1999. Effect of Various Crop Sequences on SCN Population Densities and Soybean Yield. In: Proc. of National Soybean Cyst Nematode Conference, Orlando, FL, Jan 7-8, 1999.

Hershman, D.E. and T.S. Abney. 1997. Results of a Preliminary *Phytophthora sojae* Survey in Kentucky. In: Proc. of the 24th Annual Meeting of the Southern Soybean Disease Workers, Fort Walton Beach, FL, Mar 15-16, 1997.

Hershman, D.E. 1996. Soybean Sudden Death Syndrome. In: Proc. of 1st International Symposium on Tropical Savannas. Mar 24-29, 1996, Brasilia DF, Brazil.

Hershman, D.E., and W.C. Dunwell. 1994. Integrating Soybean Cyst Nematode Management Programs in Kentucky. In: Proc. 2nd National IPM Symposium/Workshop, Las Vegas, NV, Apr 19-22, 1994.

Hershman, D.E., and P.R. Bachi. 1993. Effect of Wheat Residue and Tillage on Soybean Cyst Nematode and Soybean Yield in Doublecrop Soybeans in Kentucky. In: Proc. of 20th Annual Meeting of the Southern Soybean Disease Workers, Fort Walton Beach, FL, Mar 28-30, 1993.

Hershman, D.E. 1992. Update on Blackleg of Canola in the United States. In: Proc. 1992 U.S. Canola Conference, Washington, D.C., Mar 5-6, 1992.

Hershman, D.E. 1991. Presidential Address. In: Proc. of the 18th Annual Meeting of the Southern Soybean Disease Workers, Lexington, KY, Mar 20-21, 1991.

Hershman, D.E. 1990. Integrated Pest Management for Disease Control in Winter Canola in Kentucky. In: Proc. of International Canola Conf., Atlanta, GA, Apr 2-6, 1990.

Hershman, D.E. 1990. Diseases of Canola Important in Kentucky. In: Proc. of Canola Crop Protection Symposium, Memphis, TN, Aug 1, 1990.

Hershman, D.E. 1988. Summary of the Southern Soybean Disease Workers Standardized Foliar Fungicide Tests, 1979-1986. In: Proc. of 15th Annual Meeting of the Southern Soybean Disease Workers, Nashville, TN, Mar 20-22, 1988.

Hershman, D.E. 1987. Southern Soybean Disease Workers Standardized Foliar Fungicide Test-1986. In: Proc. of 14th Annual Meeting of the Southern Soybean Disease Workers, Savannah, GA, Mar 24-26, 1987.

Hershman, D.E. and R.E. Stuckey. 1986. Report of Southern Soybean Disease Workers Standardized Foliar Fungicide Test. In: Proc. of the 13th Annual Meeting of the Southern Soybean Disease Workers, Baton Rouge, LA, Mar 25-27, 1986.

Hershman, D.E., R.E. Stuckey and P.R. Bachi. 1986. Soybean Cyst Nematode Recovery as Influenced by Various Handling Regimes from Field to Laboratory. In: Proc. of the 13th Annual Meeting of the Southern Soybean Disease Workers, Baton Rouge, LA, Mar 25-27, 1986.

An, Z.-Q., J.W. Hendrix, **D.E. Hershman**, G.T. Henson, and R.S. Ferriss. 1990. Influence of Crop Rotation and Soil Fumigation on Populations of the Endogonaceous Mycorrhizal Community Associated with Soybean. Abstracts, 8th North American Conf. on Mycorrhizae, Jackson Hole, Wyoming.

An, Z.-Q., J.W. Hendrix, and **D.E. Hershman**. 1989. Mycorrhizal Fungi in Soybean Rhizospheres in Relation to Crop Rotation, Soil Fumigation, and Sudden Death Syndrome. In: Proc of 16th Annual Meeting of the Southern Soybean Disease Workers, Montgomery, AL, Mar 20-22, 1989.

Donald, P., G. Noel, H. Melakberhan, A. Ndeme, T. Anderson, S. Chen, J. Faghini, J. Ferris, C. Grau, **D. Hershman**, A. MacGuidwin, R. Niblack, W. Stienstra, G. Tylka, T. Welacky. 1999. Effects of New Soybean Production Practices on SCN and Associated Yield Losses. In: Proc. of the World Soybean Conf., Chicago, IL, Aug 8-12, 1999.

Donald, P., G. Noel, H. Melakberhan, A. Ndeme, G. Tylka, S. Chen, R. Riggs, T. Niblack, **D. Hershman**, J. Faghihi, A. MacGuidwin, T. Welacky, T. Anderson. 1999. Effects of New Soybean Production Practices on Soybean Cyst Nematode and Associated Soybean Yield Losses. In: Proc. of National Soybean Cyst Nematode Conf., Orlando, FL, Jan 7-8, 1999.

dos Anjos, J.R., S.A. Ghabrial, **D.E. Hershman**, and D.W. Johnson. 1990. Role of Overwintering Bean Pod Mottle Virus in Soybean in Kentucky. In: Proc. of 17th Annual Meeting of the Southern Soybean Disease Workers, Biloxi, MS, Mar 20-22, 1990.

Dunwell, W., **D. Hershman**, J. Hartman, and R. Scheibner. 1990. Soybean Cyst Nematode Testing Program for Kentucky Nurseries. In: Proc. of Southern Nurserymen Assoc. Res. Conf., Vol. 35: 195.

Giesler, L. J. and **D. E. Hershman**. 2005. An Overview of the Sentinel Monitoring System for 2005: How Well Did We Do? In: Proc. National Soybean Rust Symposium, Dec 14-16, 2005, Nashville, TN. The American Phytopathological Society on-line publication: http://www.plantmanagementnetwork.org/infocenter/topic/soybeanrust/symposium/presentations/Giesler.pdf

Johnson, D., **D. Hershman**, and J. Herbek. 2004 Application of Quadris + Warrior for Soybean Yield Enhancement. Ann. In: Proc. of the 2004 Ent. Soc. Assoc. Annual Meeting.

Johnson, D., **D. Hershman**, and J. Herbek. 2004. Application of Quadris + Warrior for Soybean Yield Enhancement. Ann. Meet. In: Proc. of the 2004 North Central Branch, Ent. Soc**.**

Johnson, D.W. and **D.E. Hershman**. 1994. Use of Various Insecticidal Treatments Against Aphids for Control of Barley Yellow Dwarf Virus in Kentucky Grown Wheat. In: Proc. of the 1994 Meeting of the North Central Branch, Ent. Soc.

Martin, J.R., et al. 1995. Results of CRP Survey in Kentucky. In: Proc. of North Central Weed Sci. Soc. Dec 5-7, Omaha, NE.

Milus, E. A., **D.E. Hershman,** and M.C. McMullen. 2001. Analysis of the 2001 Uniform Wheat Fungicide and Biocontrol Trials Across Locations. In: Proc. of National Fusarium Head Blight Forum, Erlanger, KY.

Mundell, N., D. Hershman, C. Lee, and D. VanSanford. 2007. Evaluation of FHB profiles of advanced wheat breeding lines treated with a fungicide. Page 212, IN: Proceedings of the 2007 National Fusarium Head Blight Forum, Dec 2-4,2007, Kansas City, MO.

Paul, P. A., P. E. Lipps, D. E. Hershman, M. P, McMullen, M. A. Draper, and L. V. Madden. 2007. A quantitative synthesis of the relative efficacy of triazole-based fungicides for FHB and DON control in wheat. Pages 115-116, IN: Proceedings of the 2007 National Fusarium Head Blight Forum, Dec 2-4, 2007, Kansas City, MO.

Paul, P. A., L. V. Madden, M. P. McMullen, D. E. Hershman, L. Sweets, S. Wegulo, W. Bockus, S. Halley, and K. Ruden. 2007. An integrated approach to managing FHB and DON in wheatL Uniform Trials 2007. Pages 117-122, IN: Proceedings of the 2007 National Fusarium Head Blight Forum, Dec 2-4, 2007, Kansas City, MO.

Paul, P., D. E. **Hershman**, M. Draper and L. Madden. 2005. Effect of fungicide on FHB and DON in Wheat – 2005 Uniform Fungicide Trials. Pages 225-229 in: Proc. of the 2005 National Fusarium Head Blight Forum, Milwaukee, WI.

Pearce, W.L., D.A. VanSanford, and **D.E. Hershman**. 1993. Growth Stage Determination of Powdery Mildew and Associated Yield Loss. Agronomy Abstracts, p. 97.

Prior, E., B. Kennedy, **D. Hershman,** J. Omielan, C. Godoy, R. Boerma, and S. Kumudini. 2007. The impact of soybean rust on leaf photosynthetic rate: the role of lesion age and resistance gene. On-line proceedings, 2007 National Soybean Rust Symposium, Dec. 12-14, Louisville, KY.

Nesmith, W.C., J.R. Hartman, R.E. Stuckey, **D.E. Hershman**, C.A. Kaiser, and P.R. Bachi. Highlights of Kentucky's Extension Plant Pathology program, 1981-84. In: Proc. of the 1984 Triennial Extension Entomology/Plant Pathology Workshop

for the Southern Region, Lexington, KY.

Sama, M. P., P. Needham, **D. E. Hershman**, T. Stombaugh, S. G. McNeill. 2005. An analysis of sprayer droplets using matlab. In: Proc. National Soybean Rust Symposium, Dec 14-16, 2005, Nashville, TN. The American Phytopathological Society, on-line publication: http://www.plantmanagementnetwork.org/infocenter/topic/soybeanrust/symposium/posters/48.asp.

Stuckey, R.E., **D.E. Hershman**, J.H. Grove, and D.A. VanSanford. 1986. Pages 157-164 in: Proc. of 1986 British Crop Protection Conference, Brighton, England.

Kentucky Experiment Station Reports:

Hershman, D., B. Kennedy, and P. Bachi. 2009. Evaluation of Fungicides for Control of Foliar Diseases of Soft Red Winter Wheat in Kentucky. Pages 51-52 in: Wheat Sci. Res. Report, 2007-2008.

Hershman, D. and B. Kennedy. 2009. Evaluation of Kocide for Foliar Disease Control in Soft Red Winter Wheat in Kentucky. Pages 53-54 in: Wheat Sci. Res. Report, 2007-2008.

Hershman, D. 2007. 2006 Wheat Fusarium Head Blight Fungicide Test. Pages 11-12 in: Wheat Sci. Res. Report, 2005-2006.

Hershman, D, P. Bachi, D. Call, and J, James. 2004. Effect of Timing of Foliar Fungicide Applications on Fusarium Head Blight and DON. Pages 7-9 in: 2003-2004 University of Kentucky Wheat Sci. Res. Report.

Hershman, D, P. Bachi, D. Call, and J, James. 2004. Effect of Foliar Fungicide Applications on Fusarium Head Blight, DON and Leaf Rust. Pages 10-11 in: 2003-2004 University of Kentucky Wheat Sci. Res. Report.

Hershman, D. 2003. 2003 Wheat foliar fungicide test, Morganfield, KY. Pages 5-6 in: 2003-2004 University of Kentucky Wheat Sci. Res. Report.

Hershman, D. , Bachi, P., TeKrony, D., and D. VanSanford. 2002. Management of Fusarium head blight in wheat using selected biological control agents and foliar fungicides. Pages 30-31 in: 2001-2002 UK Wheat Sci. Res. Report.

Hershman, D., P. Bachi, D. TeKrony, and D. VanSanford. 2001. Management of Fusarium head Blight in Wheat Using Selected Biological Control Agents and Foliar, 2001. Pages11-15 in: 2000-2001 University of Kentucky Wheat Sci. Res. Report.

Hershman, D., S. Jones and S. VanSickle. 2000. National Fusarium Head Blight Uniform Fungicide Test for Kentucky. Pages 39-42 in: 1999-2000 University of Kentucky Wheat Sci. Res. Report.

Hershman, D.E., C. Bowley, P. Needham, D. Johnson and P. Vincelli. Fusarium Head Blight Survey. 1999. Pages 25-26 in: 1997-1998 University of Kentucky Wheat Sci. Res. Report.

Hershman, D.E. and P.R. Bachi. 1998. Fusarium Head Blight and Foliar Disease Fungicide Test. 1999. In: 1997-1998 University of Kentucky Wheat Sci. Res. Report.

Hershman, D.E., and J. H. Herbek. 1992. Soybean Cyst Nematode Soil Testing Program. In: 1992 University of Kentucky Agronomy Res. Report.

Murdock, L., D. **Hershman**, and D. Call**.** 2002. Head scab in tilled and no-tilled wheat. Pages 28-29 in: 2001-2002 UK Wheat Sci. Res. Report.

Murdock, L., J. Herbek, J. Martin, **D. Hershman**, D. Johnson, and J. James. 1998. No-Till Wheat. Pages 46-47 in: University of Kentucky 1998 Agronomy Res. Report (Progress Report 402).

Van Sanford, D., and B. Kennedy, M. Hall, S. Swanson, **D. Hershman** and P. Bachi. 2001. Breeding for Resistance to Fusarium Head Blight in Soft Red Winter Wheat. Pages 16-18, in: University of Kentucky Wheat Sci. Res. Report.

Narrative

I joined the faculty of the University of Kentucky (UK), Department of Plant Pathology on May 1, 1984. My position is located at the UK Research and Education Center (UKREC) in Princeton, KY. Currently, I am the Extension Plant Pathology Coordinator and have statewide responsibilities for small grain and soybean disease programs. I also perform some Extension activities for corn, but Paul Vincelli has primary responsibility for that crop. I am the immediate supervisor of the Plant Disease Diagnostic Laboratory at Princeton, and am the faculty representative for Plant Pathology at the UKREC. As of July 1, 2009 my appointment is 95% Extension and 5% administration; however, I have held a 100% Extension appointment most of my career. My primary program objective is to positively impact Kentucky agriculture by providing stakeholders with cutting-edge, scientifically-sound programs, information, and recommendations on soybean and wheat disease management. Another objective is to fulfill service and leadership functions in national, regional, and state commodity and professional organizations, as well as in the UK College of Agriculture and Department of Plant Pathology. I believe my CV clearly indicates that I have maintained an upward trajectory during my career and that I have had a significant impact in Kentucky, regionally, and nationally. This impact is evidenced by the various awards I have received.

Despite engaging in a large number of national, regional, and state professional leadership and service activities, I have consistently served Kentucky stakeholders at a very high level. For example, a 2008 survey of Kentucky county agriculture and natural resource agents gave me high marks for responsiveness (2.96 out of 3) and the quality (3) and value (3) of assistance and

support I provide (College means were 2.07, 2.78, and 2.79, respectively). I have maintained very productive and diverse Extension and applied research programs since coming to Kentucky. Activities have been pursued both on an individual basis and as a member of numerous national, regional and state research and Extension teams. Extramural funding received by my Extension and research activities exceeds $3.2M since 1984.

My Extension philosophy has always been to use diverse methods to reach stakeholders, realizing that I would have limited effectiveness and impact if I took a "one size fits all" approach to programming. I have invested a great deal of time and energy in print media. Publications have ranged from team efforts aimed at national and regional audiences (15 publications), to interdepartmental publications aimed at Kentucky audiences (18 publications), and departmental publications focusing on specific topics (68 publications). I have written hundreds of articles for various newsletters and magazines. Personal contacts made during my career are in the hundreds of thousands as a result of presentations I have given county and regional grower meetings, field days and farm visits, in addition to telephone conversations, e-mails, faxes, blog and Twitter updates, and letters. During the past decade, I have increasingly utilized the internet and other means of electronic communication in Extension programming. I now maintain two websites (Soybean Rust and Soybean Cyst Nematode), make soybean rust updates via Twitter, blogspot, and a one-way listserv; and manage four professional listservs that facilitate professional communication. I have also fully utilized numerous other means of electronic communication throughout my career, including TV, radio, press releases, etc.

The focus of my applied research program is to improve existing disease control recommendations and develop new recommendations in keeping with the University of Kentucky's Land Grant mission. Unlike many universities who do not encourage or even allow faculty with 100% Extension appointments to conduct applied research, our administration has always expected us to have an active research program. Since 1984, I have conducted well over 100 experiments, most addressing some aspect of disease control in soybean and wheat. Some experiments have been conducted as stand-alone projects, but many were conducted as part of an inter-departmental team effort or multi-state project. All research projects have been carried out in response to specific stakeholder needs and concerns. In addition to receiving significant grant awards from several national and regional sources, my program has been well supported by Kentucky commodity groups ($396,300) and industry ($379,000). I have placed a high value on publishing the results of my research activities. Consequently, I have published a wealth of notes, reports, abstracts, and articles in a range of proceedings, technical publications, and refereed journals. My applied research program has gained the attention and respect of my peers, which is evidenced by the many editorial and review functions I have performed. I believe these professional activities benefit Kentucky stakeholders in that they help me to be a better scientist and allow me to maintain essential professional connections with colleagues outside of Kentucky.

Below are some examples of activities and programming efforts I have undertaken in recent years. The intent is to give you a flavor of the diversity and impact I have had:

From 1998-2004, I was Chairman of the Exam and Procedures Committee, and a member of the Board of Directors for the 13,600-member International Certified Crop Adviser Program (ICCA). As Chairman, I was responsible for the development and maintenance of International Exams and Performance Objective Modules. In addition, I oversaw the implementation of Standard Operating Procedures for exam maintenance for 37 "Local Boards" throughout the United States and Canada. Locally, I have been on the Kentucky CCA Board since 1996 and

was Chairman of the Board from 2006-08. I also served as Chair of the KY CCA Exam and Procedures Committee from 1996-2008. My decision to devote so much time to ICCA and KY CCA was deliberate. The CCA programs have a an important continuing education requirement and I decided the best way to make sure the Cooperative Extension Service continued to be the primary provider of educational opportunities was to become involved.

During 2001-2005, I played a significant role in the U.S. Wheat and Barley Scab Initiative (USWBSI) , for which I served as Vice-Chair of the Chemical and Biological Control Research Area Committee (CBCRAC). I worked closely with the CBCRAC Chairs to review and recommend funding (ca. $400,000+ annually) of research proposals to the USWBSI Executive Committee. I was also responsible for data collection, analysis, and summarization for the multi-state Uniform Fusarium Head Blight (FHB) Fungicide Trials. Data from these trials were used to defend multiple successful FHB-fungicide section 18 requests to the EPA in Kentucky, as well as numerous other states. Much of my local wheat Extension program has been done as a member of the UK Wheat Science Group. My specific role in this group is to address the plant disease needs of stakeholders. I have done this through a range of coordinated research activities and educational programs. Throughout my career, I have made wheat disease management presentations at over 300 stakeholder meetings (grain days, field days, CCA meetings, etc) and have written a large number of newsletter articles and Extension publications.

In 2005, I assumed various leadership roles in a range of national and regional soybean rust (SBR) activities. This includes serving as one of two national SBR sentinel network Co-Coordinators. I was Co-PI on grants to the North Central Soybean Research Program and United Soybean Board totaling $1.73M in support of national SBR monitoring activities. As Co-Coordinator, I helped to plan the network and develop a national budget each year. I have moderated weekly or bi-weekly national SBR teleconferences (31 participating states) and have troubleshot for 13 southern states in my role as Southern Regional SBR Coordinator. I have maintained two national SBR communication listservs and have worked with the Northern SBR Coordinator to develop, implement, and summarize annual surveys of the sentinel network. I have played a significant role in maintaining the funding base needed to carry out national SBR monitoring and stakeholder communication efforts since 2005. Other activities related to SBR include co-editing and authoring portions of the first and second editions of a national SBR fungicide manual, sitting on the Planning Committees for the 2005, 2006, 2007 and 2009 National Soybean Rust Symposia, and serving as Program Chair for the 2006 Symposium. Local SBR activities have not been sacrificed on the altar of national activity. As such, I have consistently provided Kentucky stakeholders with needed SBR information using diverse methods (UK-based SBR website, toll-free hotline, weekly e-mail, Twitter, and Blogspot updates, numerous radio and TV interviews, a large number of grower meetings and field days, UK press releases, KY commentary on the public SBR website maintained by the ipmPIPE, and many phone calls and e-mails). In 2005, I was given the Kentucky Soybean Association's highest award – the Distinguished Service Award – as an affirmation of my soybean program activities.

During 2006-08, a great deal of time was devoted to serving as Chairman of the ipmPIPE (Pest Information Platform for Extension and Education) Steering Committee (SC). The SC has national representation comprised of 22 prominent public and private stakeholder groups, including four USDA agencies and two national grower organizations. My being elected as SC Chairman had its origin in my leadership activities for SBR. The ipmPIPE SC provides leadership over four active components, each of which represent different crops and/pests,

including SBR. The SC is responsible for planning and implementing a range of activities aimed at developing the ipmPIPE. The ipmPIPE had an annual budget of nearly $5 million during the time I was Chairman. Additionally, I organized and chaired monthly meetings (face to face and by teleconference) and helped to guide the SC through a strategic planning process and a review of ipmPIPE information technology. I played a prominent role in planning and implementing the USDA Secretary's ipmPIPE Summit held in Washington, DC in April 2008 (attended by the USDA Secretary of Agriculture). I also represented the ipmPIPE in various interviews by national and regional print and broadcast media.

Each of the above national activities have resulted in significant benefits for local stakeholders. The activities keep me sharp and connected, both of which are essential for sustaining an effective and relevant Extension program. Furthermore, by participating in different national/regional organizations and groups, I am frequently among the first to know about certain initiatives, happenings, and available resources. This has greatly enhanced my ability to give Kentucky stakeholders the best possible information as I carried out my Extension program, locally.

AARDRA KACHROO

CURRENT STATUS

Assistant Professor (Appointed-July 1st 2006)
Distribution of Effort: 2006-2007 100% Research
2007-2008 92% Research 8% Teaching
2008-2009 93% Research 7% Teaching
2009-2010 93% Research 7% Teaching

EDUCATION AND TRAINING

Bombay University, India	Microbiology	B.S., 1991
M. S. University of Baroda, India	Biotechnology	M.S., 1993
M. S. University of Baroda, India and Salk Institute, San Diego, CA	Microbiology	Ph.D., 1999
Duke University, Durham, NC	DNA replication	1999–2000
Cornell University, Ithaca, NY	Pollen-pistil interaction	2000–2002
University of Kentucky, Lexington, KY	Plant defense signaling	2003–present

RESEARCH AND PROFESSIONAL EXPERIENCE

2006–present Assistant Professor, Department of Plant Pathology, University of Kentucky
2003–2006 Research Specialist, Department of Plant Pathology, University of Kentucky
2000–2002 Postdoctoral Associate, Department of Plant Biology, Cornell University
1999–2000 Postdoctoral Associate, Duke University Medical Centre, Duke University

RESEARCH

Projects

1. Identifying components of soybean signaling pathways mediating defense against viral, bacterial and oomycete pathogens.
2. Characterizing the roles of transcription factors modulating low oleic acid-mediated defense signaling in plants.
3. Examining the role of glycerol and its metabolites in plant defense to fungi.

Current Extramural Support

1. Enhancing soybean yield by manipulating the expression of seed trait-determining genes. PI-**Aardra Kachroo**, CO-PI-Said Ghabrial. $333,827; **United Soybean Board** (1/1/08–12/31/10)

2. Dissecting soybean defense pathways using virus-induced gene silencing. PI-**Aardra Kachroo**, CO-PI-Said Ghabrial. $187,321; **United States Department of Agriculture-National Research Initiative** (8/1/06–7/31/10)

3. Molecular and biochemical analysis of a hemibiotrophic interaction. PI-Pradeep Kachroo, CO-PIs-Lisa Vaillancourt, **Aardra Kachroo**. $510,000; **National Science Foundation (NSF)** (5/15/08–5/14/12)

Past Extramural Support

1. Fatty acid signaling and its role in plant defense. PI-Pradeep Kachroo, CO-PI-**Aardra Kachroo**. $473,564; **NSF** (9/1/04–8/31/09)

2. Molecular and biochemical analysis of a hemibiotrophic interaction. PI-Pradeep Kachroo, CO-PI-**Aardra Kachroo**. $6,050; **NSF-Research Experience for Undergraduates (REU)** (5/15/08–5/14/09)

3. Developing glycerol as a protective agent against soybean diseases prevalent in Kentucky. PI-**Aardra Kachroo**. $22,443; **Kentucky Soybean Promotion Board** (4/1/08–3/31/09).

4. Light-mediated regulation of plant defense signaling. PI-Pradeep Kachroo, CO-PI-**Aardra Kachroo**. $99,924; **Kentucky Science and Engineering Foundation (KSEF)** (1/1/07–12/31/08)

5. Fatty acid signaling and its role in plant defense. PI-Pradeep Kachroo, CO-PI-**Aardra Kachroo**. $23,475; **NSF-REU** (5/1/07–8/31/08)

6. Detection, quantification and, identification of carbohydrates and phosphorylated sugars involved in modulating plant responses to pathogens. PI-**Aardra Kachroo**. $40,000; **Dionex Research/Technology Grants for Academic Research Program**, Dionex Corporation, IL (7/1/07)

7. Fatty acid signaling and its role in plant defense. PI-Pradeep Kachroo, CO-PI-**Aardra Kachroo**. $15,800; **NSF-REU** (5/1/06–8/31/07)

8. Genome-wide search of oleate-responsive genes in Arabidopsis. PI-Pradeep Kachroo, Co-PI-**Aardra Kachroo**. $14,960; **KSEF** (10/1/04–1/31/06)

9. Identification of signals modulating cross talk between defense signaling pathways. PI-Pradeep Kachroo, CO-PI-**Aardra Kachroo**. $14,850; **KSEF** (1/1/04–6/31/05)

Pending Support

1. Characterizing the mechanisms of light-dependent activation of plant defense. PI- **Aardra Kachroo**. Amount requested-$749,719; **Department of Energy** (1/1/10–12/31/14)

2. Towards understanding the mechanism of plant extreme resistance to viruses. PI- **Aardra Kachroo**. Amount requested-$380,011; **NSF** (1/1/10–12/31/12)

3. Molecular and biochemical characterization of low oleate-induced defense signaling in plants. PI-Pradeep Kachroo, CO-PI-**Aardra Kachroo**. Amount requested-$831,872; **NSF** (1/1/10–12/31/13)

Intramural Support

1. **Research Activity Award** (total three) in support of innovation and excellence in the College of Agriculture, $5475 **University of Kentucky** (2009)

2. **Research Activity Awards** (total two) in support of innovation and excellence in the College of Agriculture, $3900 **University of Kentucky** (2008)

3. **Hatch project**-Dissecting defense signaling pathways in soybean and Arabidopsis. **University of Kentucky** (2007)

4. **Research Activity Award** in support of innovation and excellence in the College of Agriculture. $1300 **University of Kentucky** (2007)

5. **Travel award** to attend the 2007 USDA Grant Writing Workshop, Washington, DC. $2000 **University of Kentucky** (2007)

Non-Funded Proposals

1. Identification of the soybean resistance gene *Rsv1* and its downstream components mediating defense against soybean mosaic virus. PI-**Aardra Kachroo**. Amount requested-$500,000; **NSF-Faculty Early Career Development Program (CAREER)** (1/1/09–12/31/13)

2. Molecular, genetic and biochemical characterization of oleate-regulated defense gene expression in plants. PI-Pradeep Kachroo, CO-PI-**Aardra Kachroo**. Amount requested-$796,750; **NSF** (9/1/08–8/31/12)

3. Functional genomics in soybean: A reverse genetics approach to identify defense-signaling components. PI-**Aardra Kachroo**, CO-PI-Said Ghabrial. Amount requested-$399,727; **USDA-NRI** (8/1/08–7/31/11)

4. Development of genetically encoded nanosensors to monitor the real-time flux of metabolites during host-pathogen interactions. PI-**Aardra Kachroo**. Amount requested-$300,000; **Beckmann Foundation** (1/1/08–12/31/11)

5. Functional analyses of soybean transcripts using virus-induced gene silencing. PI-**Aardra Kachroo**, CO-PI-Said Ghabrial. Amount requested-$20,000; **KSEF** (1/1/08–12/31/10)

6. A reverse genetics approach to increase soybean seed yield. PI-**Aardra Kachoo**, CO-PI-Said Ghabrial. Amount requested-$119,375; **Kentucky Tobacco Research and Development Centre** (1/1/07–12/31/09)

7. Manipulating gene activities in soybean to enhance seed yield for increased biodiesel production. PI-**Aardra Kachroo**, CO-PI-Said Ghabrial. Amount requested-$94,228; **Governor's Office of Energy R&D Program**; (08/01/07–09/30/09)

8. Role of fatty acids in regulating the defense-related activity of WRKY transcription factors. PI-**Aardra Kachroo**, CO-PI-Pradeep Kachroo. Amount requested-$99,413; **KSEF** (01/01/07-12/31/08)

9. A novel virus-induced gene silencing approach for functional analyses of soybean genes. PI-Said Ghabrial, CO-PI-**Aardra Kachroo.** Amount requested-$15,000; **KSEF** (01/01/07-12/31/08)

PUBLICATIONS

Journal Articles (*Corresponding Author; Corresponding co-author indicates 50% credit for conceptual & experimental contributions; Underlined names indicate primary advisees of AK)

From University of Kentucky

1. Venugopal SC, Chanda B, Vaillancourt L, **Kachroo A**, Kachroo P. (2009) The common metabolite glycerol-3-phosphate is a novel regulator of plant defense signaling. ***Plant Signaling and Behaviour*** 4:746-749

2. Venugopal SC, Jeong R-D, Mandal MK, Zhu S, Chandra-Shekara AC, Xia Y, Hersh M, Stromberg AJ, Navarre D, **Kachroo A**, Kachroo P. (2009) Enhanced Disease Susceptibility 1 and salicylic acid act redundantly to regulate resistance gene expression and low OLEATE-induced defense signaling. ***PLoS Genetics*** 5:e1000545

3. Xia Y, Gao Q-M, Yu K, Lapchyk L, Navarre DA, Hildebrand D, **Kachroo A***, Kachroo P*. (2009) An intact cuticle in distal tissues is essential for the induction of systemic acquired resistance in plants. ***Cell Host and Microbe*** 5:151-165

4. Fu D-Q, Ghabrial S, **Kachroo A***. (2009) GmRAR1 and GmSGT1 are required for basal, *R* gene-mediated and systemic acquired resistance in soybean. ***Molecular Plant-Microbe Interactions*** 22:86-95

5. Jeong R-D, Chandra-Shekara AC, **Kachroo A**, Klessig D, Kachroo P. (2008) HRT-mediated hypersensitive response and resistance to Turnip Crinkle Virus in Arabidopsis does not require the function of TIP, the presumed guardee protein. ***Molecular Plant-Microbe Interactions*** 21:1316-1324.

6. Chanda B, Venugopal SC, Kulshrestha S, Navarre DA, Downie B, Vaillancourt L, **Kachroo A**, Kachroo P. (2008) Glycerol-3-phosphate levels are associated with basal resistance to the hemibiotrophic fungus *Colletotrichum higginsianum* in Arabidopsis. ***Plant Physiology*** 147:2017-2029

7. **Kachroo A***, Fu D-Q, Havens W, Navarre DA, Kachroo P, Ghabrial SA. (2008) An oleic acid-mediated pathway induces constitutive defense signaling and enhanced resistance to multiple pathogens in soybean. ***Molecular Plant-Microbe Interactions*** 21:564-575 (**Cover feature**)

8. Chandra-Shekara AC, Venugopal SC, Barman SR, **Kachroo A***, Kachroo P*. (2007) Plastidial fatty acid levels regulate resistance gene-dependent defense signaling in Arabidopsis. ***Proceedings of the National Academy of Sciences USA*** 104:7277-7282

9. **Kachroo A***, Shanklin J, Whittle E, Lapchyk L, Hildebrand D, Kachroo P*. (2007) The Arabidopsis stearoyl-acyl carrier protein-desaturase family and the contribution of leaf isoforms to oleic acid synthesis. ***Plant Molecular Biology*** 63:257-271

10. Kachroo P*, Venugopal SC, Navarre DA, Lapchyk L, **Kachroo A*.** (2005) Role of salicylic acid and fatty acid desaturation pathways in *ssi2*-mediated signaling. ***Plant Physiology*** 139:1717-1735

11. **Kachroo A**, Venugopal SC, Lapchyk L, Falcone D, Hildebrand D, Kachroo P. (2004) Oleic acid levels regulated by glycerolipid metabolism modulate defense gene expression in Arabidopsis. ***Proceedings of the National Academy of Sciences USA***. 101:5152-5257

12. Chandra-Shekara AC, Navarre DA, **Kachroo A**, Kang H-G, Klessig D, Kachroo P. (2004) Signaling requirements and role of salicylic acid in *HRT*- and *rrt*-mediated resistance to turnip crinkle virus in Arabidopsis. ***The Plant Journal*** 40:647-659

13. **Kachroo A**, Lapchyk L, Fukushigae H, Hildebrand D, Klessig D, Kachroo P. (2003) Plastidal fatty acid signaling modulates salicylic acid- and jasmonic acid-mediated pathways in the Arabidopsis *ssi2* mutant. ***The Plant Cell*** 15:2952-2965

14. Kachroo P, **Kachroo A**, Lapchyk L, Hildebrand D, Klessig D. (2003) Restoration of defective cross talk in *ssi2* mutants: Role of salicylic acid, jasmonic acid and fatty acids in *SSI2*-mediated signaling. ***Molecular Plant-Microbe Interactions*** 16:1022-1029

Prior to University of Kentucky

15. Chookajorn T[§], **Kachroo A**[§], Ripoll DR, Clark AG, Nasrallah JB. (2004) Specificity determinants and evolvability of the *Brassica* self-incompatibility pollen ligand. ***Proceedings of the National Academy of Sciences USA*** 101:911-917 ([§]first co-author)

16. **Kachroo A**, Zuhua H, Zhu Q, Zhong J, Patkar R, Li D, Lamb CJ, Chattoo BB. (2003) Induction of H_2O_2 production leads to cell death and enhances disease resistance to both bacterial and fungal pathogens in transgenic rice. ***Transgenic Research*** 12:577-586

17. **Kachroo A**, Nasrallah ME, Nasrallah JB (2002) Self-incompatibility, receptor-ligand signaling, and cell-cell communication in the *Brassica* species. ***Plant Cell*** 14:S227-S238

18. **Kachroo A**, Schopfer CR, Nasrallah ME, Nasrallah JB. (2001) Allele-specific receptor-ligand interactions in *Brassica* self-incompatibility. ***Science*** 293:1824-1826

19. Sharma R, **Kachroo A**, Bastia D. (2001) Mechanistic aspects of DnaA-RepA interaction as revealed by yeast forward and reverse two-hybrid analysis. ***EMBO Journal*** 20:4577-4587

20. Mulugu S, **Potnis, A$^{\Psi}$**, Shamsuzzaman, Taylor J, Bastia D. (2001) Mechanism of termination of DNA replication of *Escherichia coli* involves helicase-contrahelicase interaction. ***Proceedings of the National Academy of Sciences USA*** 98:9569-9574 ($^{\Psi}$ maiden name)

21. Lamb CJ, Zhu Q, Dabi T, Zhong J, **Potnis A**. (1998) Enhanced resistance and yield. ***Rice Biotechnology Quarterly*** 33:15

22. Kachroo P, **Potnis A**, Chattoo BB. (1997) Transformation of the rice blast fungus *Magnaporthe grisea* to benomyl resistance. ***World Journal of Microbiology and Biotechnology*** 13:185-187

Book Chapters/ Reviews

1. **Kachroo A***, Ghabrial SA (2009) Virus-induced gene silencing in soybean. In ***Methods in Molecular Biology***. Ed. J.M. Walker. Humana Press Inc. (in press)

2. **Kachroo A***, Kachroo P. (2009) Fatty acid derived signals in plant defense. ***Annual Review of Phytopathology*** 47:153-176 **(most accessed article of the issue)**

3. **Kachroo A*** (2007) Plant defences against fungal attack: Perception and Signal Transduction. In: ***Encyclopedia of Life Sciences***. John Wiley & Sons, Ltd: Chichester, http://www.els.net/ [DOI: 10.1002/9780470015902.a0003438.pub2]

4. **Kachroo A**, Kachroo P. (2007) Salicylic Acid-, Jasmonic Acid- and Ethylene-Mediated Regulation of Plant Defense Signaling. In: ***Genetic Engineering, Principles, and Methods***. Ed. Jane Setlow. Plenum Press, NY. 28:55-83

5. **Kachroo A**, Venugopal SC, Navarre DA, Lapchyk L, Kachroo P. (2006) Metabolite signaling; role of fatty acids in plant defense. In ***Biology of Molecular Plant-Microbe Interactions*** 5: 195-201

Manuscripts In Review/Preparation

1. Selote D, Fu D-Q, Kastoori RP, Ghabrial SA, **Kachroo A***. (2009) RIN4-like proteins are required for Rpg-1b-mediated defense to *Pseudomonas syringae pv glycinea*. (In review)

2. Jeong R-D, Chandra-Shekara AC, Barman SR, Navarre DA, **Kachroo A**, Kahroo P (2009) Blue-light photoreceptors are required for the stability and function of a resistance protein mediating viral defense. (In review)

3. Gao Q-M, **Kachroo A***. (2009) WRKY transcription factors mediate jasmonic acid-derived signaling and defense to necrotrophic pathogens under low oleic acid conditions.

4. Fu D-Q, Yu K, **Kachroo A***. (2009) Salicylic acid and jasmonic acid participate in soybean defense to *Phytophthora sojae*.

5. Singh A, Ghabrial SA, **Kachroo A***. (2009) Fatty acid desaturase activity modulates defense signaling and seed size in soybean.

Patents

1. **Kachroo A**, Kachroo P. Overexpression of a glycerol-3-phosphate dehydrogenase confers enhanced resistance to *Colletotrichum*–Filed (**US Patent No. 11/458,344**).

2. Kachroo P, **Kachroo A**, Chandra-Shekara AC. Oleic acid levels modulate expression of resistance gene and confer enhanced resistance–Pending.

TEACHING AND ADVISING

Personnel Supervised

Postdoctoral Scholars

- Da-Qi Fu (2006-present) [**Two publications**, first author (1), second author (1)]
- Devarshi Selote (2008-present)

Graduate Students

- Qing-Ming Gao (2006-present) [**One second authored publication**]
- Raghuprakash Kastoori (2009-present)
- Lili Xi (2006) Ms. Xi returned to her home country for personal reasons.
- Serving on five other graduate advisory committees (Bidisha Chanda, Rae-Dong Jeong, Mohammed El-Habak, Monica Sharma, Mihir Mandal)

Undergraduate Students

- Ms. Caroline Butts (2009-present) Supported by NSF-REU

- Mr. Steven Bliss (2008-present) Supported by NSF-REU
- Ms. Hilda Guerra (Fall 2007-present). Supported by the **Appalachian and Minority, Science, Technology Engineering and Mathematics Majors (AMSTEMM) program** (Spring, Summer and Fall 2008) and a **University of Kentucky Undergraduate Summer Research Grant** (2008). *Ms. Guerra conducted her research project for the Agricultutral Biotechnology Program (ABT) under my supervision (Summer 2008)*
- Mr. Lev Orlov (Summer 2006–Spring 2008). Supported by NSF-REU and **University of Kentucky Undergraduate Summer Research Grant** (2007). *Mr. Orlov presented a research poster at the 2007 annual meeting for the American Society of Plant Biologists, Chicago, IL. Mr. Orlov's research was also highlighted in Kaleidoscope (journal of undergraduate research from UK) 2007 6:110*

High School Students

- Ms. Polinda Mosendz (Summer 2006 and 2007)

Classroom Teaching

1. PPA 500 Physiology of Plant Health and Disease, Credits-2 (2006-present)
2. PPA 784-002 Special Problems in Plant Pathology, Credits-1 (2006-present)
3. Post-graduate courses in the Department of Biotechnology, M. S. University, India
   - Yeast genetics, Masters level course (Fall 1997 and 1998)
   - Techniques in Molecular Biology, Masters level course (Fall 1998 and 1999)

Non-Classroom Activities

1. Serving on the Faculty Evaluation Committee, Department of Plant Pathology (Fall 2009-present)
2. Procured funding from College of Agriculture to restore and upgrade the multiuser GC-MS system (Summer 2009)
3. Coordinated efforts to acquire additional temporary research space for Plant Pathology (Spring 2009)
4. Coordinating departmental seminars in Plant Pathology (Spring 2009-present)
5. Serving on the Academic Programs Committee, Department of Plant Pathology (Fall 2008-present)
6. Serving as a research mentor for undergraduate students registered in the Agricultural Biotechnology Program (Summer 2007-present)
7. Supervised the post-graduate dissertation research of Ms. Ghosh S, (1994), Ms. Patel H, Ms. Sharma R, (1998) and Mr. Burman S. (1999) at M. S. University, India.

NOMINATIONS AND AWARDS

1. Young Women Investigator Travel Award by the American Society of Plant Biologists (2009)

2. Nominated to represent the College of Agriculture in the selection of one University of Kentucky applicant for the Searle Scholars Program (2007)

3. Nominated (one of two applicants) to represent the University of Kentucky for the Beckman Young Scholars Program (2007)

4. Rockefeller Foundation Graduate Fellowship (1994-1996). *Award funded graduate studies in the laboratory of Chris Lamb at the Salk Institute for Biological Studies*.

5. University Grants Commission Graduate Fellowship (1993-1999). *A merit-based graduate fellowship awarded by the Government of India*.

6. V. V. Modi Gold Medal (1993) *for securing the highest rank in MS studies.*

7. Department of Biotechnology Fellowship for MS studies (1991-1993). *A national merit-based fellowship awarded to 0.2% of the total applicants by the Government of India.*

REVIEWER SERVICE

Funding Agencies
- United States Department of Agriculture
- National Science Foundation

Peer-Reviewed Journals
- Proceedings of the National Academy of Sciences USA
- The Plant Journal
- Plant Physiology
- Plant Molecular Biology
- BMC Plant Biology
- Journal of Experimental Botany
- Tree Physiology
- Molecular Plant-Microbe Interactions
- Journal of General Virology
- Biotechnology Progress
- Plant Cell Reports

PROFESSIONAL DEVELOPMENT

- Member: American Society of Plant Biologists (ASPB), American Phytopathological Society (APS), International Society of Molecular Plant-Microbe Interaction (IS-MPMI), American Soybean Association (ASA).
- Attended the USDA Granstmanship Workshop in Washington DC, October 2007

PRESENTATIONS AND ABSTRACTS

Invited Presentations

1. Plant pathology research, an exciting scientific career. Georgetown College, KY. *Part of a seminar series on science careers for an HHMI-funded program to enhance science education and increase student participation in the sciences at Georgetown.* October 2009

2. GmRAR1 and GmSGT1-2 participate in various modes of soybean immunity against microbial pathogens. APS annual meeting, Portland, OR. August 2009

3. Resistance gene-mediated defense signaling pathways in soybean. Maharaja Sayajirao University, India. February 2009

4. Virus-induced silencing of stearoyl-ACP-desaturase induces constitutive defense signaling and enhanced resistance to multiple pathogens in soybean. International Working Group on Legume and Vegetable Viruses, 3rd Conference, Lubljana, Slovenia. August 2008

5. Functional genomics in soybean: Elucidating the molecular components of soybean defense signaling pathways. APS annual meeting, CA. July 2007

6. Fatty acid levels modulate plant defense signaling. Maharaja Sayajirao University, India. November 2006

7. Self-Incompatibility in Brassica, 13th Crucifer Genetics Workshop, UC Davies, CA. March 2002

Abstracts

1. Fu DQ, Selote D, Ghabrial SA, **Kachroo A**. GmRAR1 and GmSGT1 participate in multiple modes of resistance in soybean. APS annual meeting, August 2009 (**oral presentation**)

2. Gao Q-M, Xia Y, Yu K, Lapchyk L, Navarre DA, Hildebrand D, **Kachroo A**, Kachroo P. An intact cuticle in distal tissues is essential for the induction of systemic acquired resistance in plants. APS annual meeting, August 2009 (**oral presentation by Gao Q-M**)

3. Mandal M, Zhu S, Gao Q-M, Xia Y, Jeong R-D, Yu K, Venugopal SC, **Kachroo A**, Kachroo P. Oleic acid levels modulate defense signaling by regulating expression of resistance genes. APS annual meeting, August 2009 (**oral presentation**)

4. Chanda B, Dotson P, Sekine K, Kulshrestha S, Venugopal SC, Kulshrestha S, Navarre DA, **Kachroo A**, Vaillancourt L, Kachroo P. Corresponding metabolic reactions in host and pathogen modulate opposing functions of defense and virulence. APS annual meeting, August 2009 (**oral presentation**)

5. Fu DQ, Selote D, Ghabrial SA, **Kachroo A**. Understanding the mechanisms of basal and resistance gene-mediated immunity in soybean. ASPB annual meeting, July 2009

6. Fu DQ, Selote D, Ghabrial SA, **Kachroo A**. Identifying the components of resistance signaling pathways in soybean. IS-MPMI annual meeting, July 2009

7. Singh A, **Kachroo A**, Ghabrial SA. Virus-induced gene silencing of omega-3 fatty acid desaturase (*FAD3*) genes alters responses to plant pathogens and increases seed size in soybean. American Society of Virology (ASV), annual meeting, July 2009 (**oral presentation**)

8. Jeong R-D, Chandra-Shekara AC, **Kachroo A**, Klessig DF, Kachroo P. TIP is required for basal resistance but not for HRT-mediated hypersensitive response or resistance to turnip crinkle virus in Arabidopsis. APS Centennial Meeting, July 2008 (**oral presentation**)

9. Jeong R-D, Chandra-Shekara AC, **Kachroo A**, Kachroo P. Molecular and genetic characterization of hypersensitive response and resistance to Turnip Crinkle Virus in Arabidopsis. Annual Kentucky EPSCOR conference, April 2008

10. Gao Q-M, Ye X, Venugopal, SC, Chandra-Shekara, AC, Kachroo P, **Kachroo A**. Molecular, genetic and biochemical characterization of oleic acid-regulated defense signaling in plants. Annual Kentucky EPSCOR conference, April 2008

11. Chanda B, Srivathsa VC, Kulshrestha S, Gao Q-M, Navarre DA, Downie B, **Kachroo A**, Valliancourt L, Kachroo P. The role of glycerol metabolism in the Arabidopsis-*Colletotrichum higginsianum* interaction. APS centennial meeting, July 2008 (**oral presentation**)

12. Muse T, Orlov L, Lapchyk L, **Kachroo A**, Kachroo P. Role of glycerol-3-phosphate dehydrogenase in plant defense signaling. ASPB annual congress, July 2007

13. Chandra-Shekara AC, Ye X, Venugopal SC, Burman SR, **Kachroo A**, Kachroo P. Plastidial fatty acid levels regulate resistance gene-dependent defense signaling in Arabidopsis. 18th International Conference on Arabidopsis Research, June 2007

14. **Kachroo A**, Venugopal SC, Shanklin J, Whittle E, Lapchyk L, Kachroo P. A role for fatty acid metabolism in host defense signaling. APS annual meeting, July 2006

15. **Kachroo A**, Lapchyk L, Hildebrand D, Kachroo P. Stearoyl-acyl carrier protein-desaturase and its role in plant defense. IS-MPMI annual congress, December 2005

16. Kachroo P, Venugopal SC, **Kachroo A**, Lapchyk L, Navarre DA. Fatty acid signaling and its role in plant defense. IS-MPMI annual congress, December 2005

17. Venugopal SC, **Kachroo A**, Navarre DA, Lapchyk L, Kachroo P. Oleic acid-mediated signaling and its role in plant defense. Plant Lipid-Mediated Signaling meeting, October 2005

18. Venugopal SC, **Kachroo A**, Lapchyk L, Navarre DA, Kachroo P. Oleic acid mediated signaling and its role in plant defense. ASPB annual congress, July 2005 (**oral presentation**)

19. Venugopal SC, **Kachroo A**, Lapchyk L, Hildebrand D, Kachroo P. Fatty acid signaling pathway and its role in plant defense. ASPB annual congress, July 2004 (**oral presentation**)

20. Chattoo BB, **Potnis A**. Engineering blast resistance in transgenic rice, National Rice Biotechnology Network India, November 1999

21. Chattoo BB, **Potnis A**. Molecular analysis of the rice blast disease, National Rice Biotechnology Network India, November 1997

22. **Potnis A,** Chattoo BB. Studying the rice-blast interaction using differential display, Society of Biological Chemists, October 1996

NARRATIVE

RESEARCH

Plant diseases have a major negative impact on all crop plants. The development of novel strategies for providing protection against a broad spectrum of pathogens requires a fair knowledge of the host defense-signaling mechanisms. My laboratory studies defense signaling mechanisms against viruses, bacteria and oomycete pathogens, in the "model" plant Arabidopsis and the crop plant soybean. Our aim is to identify key molecular regulators of defense in soybean and manipulate their activities to enhance the plant's ability to eventually resist a wide variety of pathogens.

The main focus of studies in soybean is the identification of molecular components important for mediating defense against two major pathogens, *Phytophthora sojae* and Soybean Mosaic Virus (SMV). We have thus far identified several downstream components of resistance (*R*) gene-mediated signaling against SMV. We have also identified components of basal defense to *P. sojae*. Furthermore we have characterized the roles of the phytohormones salicylic acid and jasmonic acid in soybean defense to *P. sojae*. Current efforts are directed towards identifying soybean components that associate with the virulence effectors of SMV and *P. sojae* and characterizing their roles in plant defense.

A second project in the lab involves characterizing the interconnection between defense signaling and normal metabolic pathways in plants. Increasing evidence suggests that plants often employ factors derived from normal metabolic pathways to fine-tune defense responses. Thus, altered levels of a metabolite might signal the plant to impose a defense response. Pathogens in turn may have evolved to prevent these metabolic alterations and thereby evade the host defense machinery. For example, we recently showed that although reduced levels of oleic acid confer *R* gene-dependent resistance to turnip crinkle virus (TCV) in Arabidopsis this pathway is not normally employed by the plant. We use genetic, biochemical and molecular approaches to identify and characterize components of this novel fatty acid-mediated defense-signaling pathway primarily in Arabidopsis. However, we have shown that this pathway is conserved amongst diverse plants including soybean. We have also shown that similar to Arabidopsis, glycerol metabolism feeds into this fatty acid-mediated defense pathway of soybean and that exogenous application of glycerol can be used as a pharmacological approach to alter fatty acid levels and thereby defense responses in plants.

A third study involves examining the role of glycerol and its metabolites in mediating defense against hemibiotrophic pathogens. For this study we utilize the newly described Arabidopsis-*Colletotrichum higginsianum* pathosystem in collaboration with Drs. Pradeep Kachroo and Lisa Vaillancourt. Analysis of glycerol metabolic mutants implies a role for glycerol derivatives in mediating pathogenesis. We showed that plants increase the levels of endogenous glycerol-3-phosphate (G3P) in response to *C. higginisanum* and this increase is essential for defense. These studies were extended to other pathosystems in my laboratory. We find that G3P is important for defense against necrotrophic pathogens as well. Furthermore, our studies in soybean indicate that G3P metabolism might be important for defense against *P. sojae*. However, we find that the role of various G3P metabolizing enzymes in soybean defense might differ significantly from those in Arabidopsis.

TEACHING AND ADVISING

In the fall of 2006 and 2007, I shared responsibilities for instructing the PPA 500 course. I also shared responsibilities for designing class assignments/exam-related questions, as well as evaluating student performance for this course (fall 2007). Although I continue to be responsible for 1/3rd of the instruction for PPA-500, I have taken over primary responsibility for the course since fall 2008. This includes designing/executing class assignments and exams as well as grading.

Graduate student and postdoctoral advising involve weekly individual meetings, formal presentations at regularly scheduled group meetings and daily interactions. Advising involves planning, execution and trouble shooting of day-to-day experiments. I attempt to train my personnel in critical thinking, scientific ethics, manuscript writing and scientific presentations. Students and postdoctoral researchers are encouraged to generate good quality and reliable data that can be presented at scientific meetings and eventually published in high quality journals.

I am also involved in advising undergraduate students. I currently serve as mentor for students enrolled in the Agricultural Biotechnology (ABT) program. I was also the ABT

research mentor for Ms. Hildacia Guerra, a minority junior at University of Kentucky (UK). Ms. Guerra has been working in my laboratory since fall 2007. The AMSTEMM program supported her research in summer and fall 2008. Ms. Guerra will be presenting her work at the 2010 Annual Showcase of Undergraduate Scholars at the UK and had submitted an abstract tor the Posters-At-Capitol in spring 2009. A former lab member, Mr. Tom Orlov presented his research at the American Society of Plant Biologists annual meeting (July, 2007) and his work was highlighted in Kaleidoscope (2007, vol.6, pg.110). Mr. Orlov first joined my laboratory as a high school student and continued as a UK undergraduate.

Curriculum Vitae

NAME
Pradeep Kachroo

Current Status
Associate Professor
Distribution of Effort:

2002-2003	100% Research
2003-2004	100% Research
2004-2005	97% Research, 3% Teaching
2005-2006	86% Research, 14% Teaching
2006-2007	93% Research, 7% Teaching
2007-2008	94% Research, 6% Teaching
2008-2009	92% Research, 8% Teaching

Education

Ph.D.	Maharaja Sayajirao (M. S) University of Baroda, Baroda, India (part of the Ph.D. dissertation research was carried out at the University of Wisconsin, Madison, USA), 1989-1995.
M.S. (Biotechnology)	M. S. University of Baroda, Baroda, India, 1987-1989.
B.S. (Honours)	University of Delhi, India, 1984-1987.

Professional Positions

2007-present	Associate Professor, University of Kentucky
2003-2007	Assistant Professor, University of Kentucky.
2000-2002	Senior Research Associate, Boyce Thompson Institute, Cornell University.
1999-2000	Research Associate, Waksman Institute, Rutgers University.
1997-1999	Post-doctoral Associate, Waksman Institute, Rutgers University.
1996-1997	Senior Scientist, M. S. University, Baroda, India.
1995-1996	Visiting Scientist, Institute of Biotechnology, ETH, Zurich, Switzerland.

RESEARCH

Projects

1. Fatty acid signaling and its role in plant defense.
2. Characterization of resistance gene-mediated signaling to Turnip Crinkle Virus in *Arabidopsis*.
3. Characterization of the interaction between *Arabidopsis* and the hemibiotrophic fungus *Colletotrichum*.

Current Extramural Support

1. Molecular and biochemical analysis of a hemibiotrophic interaction. PI - Pradeep Kachroo, Co-PIs - Aardra Kachroo, Lisa Vaillaincourt. Total award - $510,000; National Science Foundation (NSF) (05/15/08-05/14/12).

2. Genetic, molecular and biochemical basis of resistance to Turnip Crinkle Virus in *Arabidopsis*. PI - Daniel Klessig (Boyce Thompson Institute, Cornell University), Co-PI - Pradeep Kachroo. Total award - $680,000; to UK- $344,526; NSF (04/01/07-03/31/11).

3. Light-mediated regulation of plant defense signaling. PI - Pradeep Kachroo, Co-PI - Aardra Kachroo. Total award - $99,924; Kentucky Science and Engineering Foundation (KSEF) (01/01/07-12/31/09).

4. Molecular and biochemical analysis of a hemibiotrophic interaction; PI - Pradeep Kachroo, Co-PI - Aardra Kachroo. Total award - $12,000 NSF-Research Experience for Undergraduates (REU) (05/15/09-05/14/10).

5. Investigating the Role of the Cuticle in Resistance to Foliar Plant Pathogens; PI-Kenny Seebold, Co-PI-Pradeep Kachroo. Total award - $80,000; KSEF (07/01/09-06/30/11)

Past Support

1. Fatty acid signaling and its role in plant defense; PI - Pradeep Kachroo, Co-PI - Aardra Kachroo. Total award - $473,564; NSF (9/1/04-8/31/09).

2. Tall fescue endophyte effects on environmental stress tolerances; PI - Chris Schardl, Co-PIs - Pradeep Kachroo, Jimmy Blankenship, Lowell Bush. Total award - $118,627; United States Department of Agriculture (USDA)-Agricultural Research Service (ARS) (06/01/05-2/28/07).

3. Characterization of HRT-mediated resistance to Turnip Crinkle Virus. PI - Daniel Klessig, Co-PI - Pradeep Kachroo. Total award - $300,000; to UK - $127,839; USDA-NRI (7/1/03-7/30/06).

4. Fatty acid signaling and its role in plant defense; PI - Pradeep Kachroo, Co-PI - Aardra Kachroo; Total award - $7,650; NSF-REU (9/1/05-8/31/06).

5. Fatty acid signaling and its role in plant defense; PI - Pradeep Kachroo, Co-PI - Aardra Kachroo. Total award - $14,100 NSF-Research Experience for Undergraduates (REU) (9/1/06-8/31/07).

6. Genome-wide search of oleate-responsive genes in *Arabidopsis*; PI - Pradeep Kachroo, Co-PI - Aardra Kachroo. Total award - $14,960; KSEF (10/1/04-30/1/06).

7. Characterization of signaling pathway(s) required for resistance to viral and oomycete pathogens; PI-Pradeep Kachroo. Total award - $14,960; KSEF (6/1/04-5/31/05).

8. Identification of signals modulating cross talk between defense signaling pathways. PI - Pradeep Kachroo, Co-PI - Aardra Kachroo. Total award $14,850; KSEF, (1/1/04- 04/30/05).

9. Molecular and biochemical analysis of a hemibiotrophic interaction; PI - Pradeep Kachroo, Co-PI - Aardra Kachroo. Total award - $6,050 NSF-REU (05/15/08-05/14/09).

10. Understanding the molecular mechanisms underlying interactions of plants with hemibiotrophic pathogens; PI - Lisa Vaillancourt, Co-PI - Pradeep Kachroo. Total award - $101,634; KSEF (4/1/05-12/31/07).

11. Glycerolipid metabolism and its role in plant defense; PI - Pradeep Kachroo; Total award - $100,000; USDA- NRI (1/15/05-1/14/09).

12. Fatty acid signaling and its role in plant defense; PI - Pradeep Kachroo, Co-PI - Aardra Kachroo. Total award - $23,475 NSF- REU (9/1/06-8/31/08).

Intramural Support

1. Research Activity Award (College of Agriculture; CA) to cover page and color charges for one manuscript, $2,500 (2008).
2. Research Activity Award (CA) to attend International conference, $1900 (2007).
3. Genome-wide analysis of fatty acid-regulated genes in *Arabidopsis*, $5,000. UK-Microarray Facility pilot program (2006-2007).
4. Research Activity Award (CA) to purchase plant growth incubator, $7,000 (2005).
5. Research Activity Award (CA) to cover page and color charges for one manuscript, $2,500 (2005).
6. Research Activity Award (CA) to cover page and color charges for two manuscripts, $3,500 (2004).

Other

1. Characterization of resistant gene-mediated signaling and cross talk between defense signaling pathways. 2008-2013, Hatch Project.

Proposals Submitted

1. Molecular and biochemical characterization of low oleate-induced defense signaling in plants. PI-Pradeep Kachroo, Co-PI-Aardra Kachroo. NSF, Amount requested-$811,750 (1/1/10–12/31/13).

<u>Present Lab Members</u>

Graduate Students

- Ye Xia Ph.D. Fourth year, serving as Major Professor.
- Mihir Mandal Ph.D. third year, serving as Major Professor.
- Rae-Dong Jeong Ph.D. Third year, serving as Major Professor.
- Bidisha Chanda Ph.D. Third year, serving as Major Professor.

- Served or serving on six other Graduate Advisory Committees.

Postdoctoral Scholars

- Kentaro Sekine Serving as primary advisor (2008-present).
- Shifeng Zhu Serving as primary advisor (2007-present).

Research Specialists

- Ludmila Lapchyk — Serving as primary advisor (2003-present).
- Keshun Yu — Serving as primary advisor (2007-present).

Undergraduate students

- Mr. Stefen Bliss- 2008-present, Supported primarily by NSF-REU.
- Ms. Caroline Butts- 2008-present, Supported primarily by NSF-REU.

Past Members

Graduate Students

- Srivathsa C. V. — Ph.D. Graduated in 2008
- Manisha Gupte — M.S. Nutrition, Worked in my laboratory for one year.

Postdoctoral Scholars

- Subhankar Roy Barman — Served as primary advisor (2006-2007).
- Saurabh Kulshrestha — Served as co-advisor (2006-2008).
- A.C. Chandra-Shekara — Served as primary advisor (2003-2006).
- Ella Konnova — Served as primary advisor (2005-2006).

Undergraduate students

- Mr. Lev Orlov- 2005 to 2008, Supported primarily by NSF-REU.
- Thomas Muse- 2005 to 2008, Supported primarily by NSF-REU.
- Mr. Aaron Lewis- 2004 to 2005
- Ms. Dorothy Higgins- 2004, Supported by a fellowship from the Kentucky Young Scientist Summer Research Program (for undergraduate diverse groups, women, and low-income students).
- Ms. Racine Gue- 2004
- Mr. Christopher Reeves- 2003
- Mr. Anil Pisipat- 2003

TEACHING AND ADVISING

Courses taught

Courses taught

2009 (Fall) PPA 500- Physiology of Plant Health and Disease- 8 Lectures
Number of credits- 2, Number of students enrolled- 4
PPA 673- Advanced Plant Disease Resistance- Principal Instructor- 14 Lectures, Number of credits-1, Number of students enrolled- 4

2008 (Fall) PPA 500- Physiology of Plant Health and Disease- 8 Lectures
Number of credits- 2, Number of students enrolled- 3
PPA 673- Advanced Plant Disease Resistance- Principal Instructor- 12 Lectures, Number of credits-1, Number of students enrolled- 6

2007 (Fall) PPA 500- Physiology of Plant Health and Disease- 8 Lectures

Number of credits- 2, Number of students enrolled- 7
PPA 673- Advanced Plant Disease Resistance- Principal Instructor- 12 Lectures, Number of credits-1, Number of students enrolled- 6

2006 (Fall) PPA 500- Physiology of Plant Health and Disease- 4 Lectures
Number of credits- 2
Number of students enrolled- 7
PPA 673- Advanced Plant Disease Resistance- Principal Instructor- 12 Lectures
Number of credits-1
Number of students enrolled- 6

2006 (Spring) PPA 770- Plant Pathology Seminar- Served as Seminar Coordinator
Number of credits-1
Number of students enrolled- 2

2005 (Fall) PPA 784-002 (temporary listing)- Special Problems in Plant Pathology- Physiology of Plant Health and Disease- 4 Lectures
Number of credits-2
Number of students enrolled- 14
PPA 784-004- (temporary listing)- Special Problems in Plant Pathology- Advanced Plant Disease Resistance- Principal Instructor- 12 Lectures
Number of credits-1
Number of students enrolled- 6
PPA 770- Plant Pathology Seminar- Served as Seminar Coordinator
Number of credits-1
Number of students enrolled- 4

2005 (Spring) PPA 770- Plant Pathology Seminar- Served as Seminar Coordinator
Number of credits-1
Number of students enrolled- 3

2004 (Spring) PPA 661- Plant-Microbe Interactions II- 4 Lectures
Number of credits-3
Number of students enrolled- 5

Non-classroom activities

Served as Chair, Ad hoc departmental Curriculum Committee

As the chair of the Plant Pathology ad hoc departmental curriculum committee, I arranged five different faculty meetings to discuss content, impact, relevance and overlap among the various courses offered by the department. A revised curriculum was developed and approved as a result of this process, taking more than a year to complete.

PUBLICATIONS

Refereed Journal Articles (* indicates corresponding author)

1. Jeong, R.-D., Chandra-Shekara, A.C., Barman, S. Navarre, D., Klessig, D., Kachroo, A., **Kachroo, P*.** (2009) Blue-light photoreceptors are required for the stability and function of a resistance protein mediating viral defense. In review.

2. Venugopal, S. C., Chanda, B., Vaillancourt, L., Kachroo, A., **Kachroo, P***. (2009) Glycerol metabolism and plant defense. **Plant Signaling and Behaviour**, 4, 746-749.

3. Venugopal, S.C., Jeong, R-D., Zhu, S., Chandra-Shekara, A. C., Navarre, D., Kachroo, A., **Kachroo, P***. (2009) ENHANCED DISEASE SUSCEPTIBILITY 1 and SALICYLIC ACID act redundantly to regulate resistance gene expression and low OLEATE-induced defense signaling. **PLOS Genetics,** 5:e1000545.

4. Xia, Y., Gao, Q-M., Navarre, D., Hildebrand, D., Kachroo, A*., **Kachroo, P*.** (2009). An intact cuticle in distal tissues is essential for the induction of systemic acquired resistance in plants. Under revision, **Cell Host and Microbe,** 5:151-165.

5. Jeong, R.-D., Chandra-Shekara, A.C., Kachroo, A., Klessig, D., **Kachroo, P*.** (2008) HRT-mediated hypersensitive response and resistance to Turnip Crinkle Virus in Arabidopsis does not require the function of TIP, the presumed guardee protein. **Molecular Plant-Microbe Interactions,** 21:1316-1324.

6. Chanda, B., Venugopal, S.C., Kulshrestha, S., Navarre, D., Downie, B, Vaillancourt, L., Kachroo, A., **Kachroo, P***. (2008) Glycerol-3-phosphate levels are associated with basal resistance to the hemibiotrophic fungus *Colletotrichum higginsianum* in Arabidopsis. **Plant Physiology**, 147:2017-2029.

7. Kachroo, A., Daqi, F., Havens, W., Navarre, R., **Kachroo, P**., Ghabrial, S. (2008) Virus-induced gene silencing of stearoyl-acyl carrier protein-desaturase in soybean results in constitutive defense and enhanced resistance to pathogens. **Molecular Plant-Microbe Interactions**, 21:564-575. **COVER ARTICLE**

8. Kang, H.-G., Kuhl, J.C., **Kachroo P**., Klessig, D.F. (2008) Turnip Crinkle Virus resistance in Arabidopsis requires CRT1, a new member of GHKL ATPase family. **Cell-Host and Microbe**, 3:48-57. **COVER ARTICLE**

9. Chandra-Shekara, A.C, Venugopal, S.C., Barman, S.R., Kachroo, A., **Kachroo, P*.** (2007) Plastidial fatty acid levels regulate resistance gene-dependent defense signaling in Arabidopsis. **Proceedings of the National Academy of Sciences USA,** 104:7277-7282.

10. Kachroo, A., Shanklin, J., Lapchyk, L., Whittle, E., Hildebrand, D., **Kachroo, P***. (2007) The Arabidopsis stearoyl-acyl carrier protein-desaturase family and the contribution of leaf isoforms to oleic acid synthesis. **Plant Molecular Biology,** 63: 257-271**.**

11. Yoshioka, K., Moeder, W., Kang, H.-G., **Kachroo, P.**, Masmoudi, K., Berkowitz, G., Klessig, D. (2006) The chimeric Arabidopsis CYCLIC NUCLEOTIDE-GATED ION

CHANNEL 11/12 activates multiple pathogen resistance responses. **Plant Cell,** 18: 747-763.

12. Chandra-Shekara, A. C, Gupte, M., Navarre D.A., Raina, R., Klessig D. F., **Kachroo, P*.** (2006) Light-dependent hypersensitive response and resistance signaling against the Turnip Crinkle Virus in Arabidopsis. **Plant Journal,** 45: 320-335.

13. **Kachroo, P***., Srivathsa C. V., Navarre, D.A., Lapchyk, L., Kachroo, A. (2005) Role of salicylic acid and fatty acid desaturation pathways in *ssi2*-mediated signaling. **Plant Physiology,** 139: 1717-1735.

14. Nandi, A., Moeder, W., **Kachroo, P**., Klessig, D., Shah, J. (2005) The Arabidopsis *ssi2*-conferred susceptibility to *Botrytis cinerea* is dependent on *EDS5* and *PAD4*. **Molecular Plant-Microbe Interactions,** 18: 363-370.

15. Chandra-Shekara, A. C, Navarre D., Kachroo, A., Kang, H.-G., Klessig D. F., **Kachroo, P***. (2004) Signaling requirements and role of salicylic acid in *HRT*- and *rrt*-mediated resistance to turnip crinkle virus in Arabidopsis. **Plant Journal,** 40: 647-659.

16. Kachroo, A., Srivathsa C. V., Lapchyk, L., Falcone, D., Hildebrand, D., **Kachroo, P*.** (2004) Oleic acid levels regulated by glycerolipid metabolism modulate defense gene expression in Arabidopsis. **Proceedings of the National Academy of Sciences USA,** 101: 5152-5157.

17. Kachroo, A., Lapchyk, L., Fukushigae, H., Hildebrand, D., Klessig, D., **Kachroo P*.** (2003) Plastidal fatty acid signaling modulates SA- and JA-mediated signaling in the Arabidopsis *ssi2* mutant. **Plant Cell,** 15: 2952-2965.

18. Navarre, D.A., Brown, C., Thomas, P., **Kachroo P**. **(**2003) Systemic Acquired Resistance in Potato. **Acta Horticulturae,** 619: 177-181.

19. **Kachroo, P*.**, Kachroo, A., Lapchyk, L., Hildebrand, D., Klessig, D. (2003) Restoration of defective cross talk in *ssi2* mutant: Role of salicylic acid, jasmonic acid, and fatty acids in *SSI2*-mediated signaling. **Molecular Plant-Microbe Interactions,** 11: 1022-1029.

20. Nandi, A., **Kachroo, P.**, Fukushige, H., Hildebrand, D.F., Klessig, D.F., Shah J. (2003) Ethylene and jasmonic acid signaling affect the *NPR1*-independent expression of defense genes without impacting resistance to *Pseudomonas syringae* and *Peronospora parasitica* in the Arabidopsis *ssi1* mutant. **Molecular Plant Microbe Interactions,** 16: 588-599.

21. Shirano, Y., **Kachroo, P.**, Shah, J., Klessig, D. (2002) A gain-of-function mutation in an Arabidopsis Toll Interleukin1 receptor-nucleotide binding site-leucine-rich repeat type *R* gene triggers defense responses and results in enhanced disease resistance. **The Plant Cell,** 14: 3149-3162.

22. **Kachroo, P.**, Shanklin, J., Shah, J., Whittle, E., Klessig, D. (2001) A fatty acid desaturase modulates the activation of defense signaling pathways in plants. **Proceedings of the National Academy of Sciences USA,** 98: 9448-9453.

23. Yoshioka, K., **Kachroo, P.**, Tsui, F., Sharma, S., Klessig, D. (2001) Environmentally-sensitive, SA-dependent defense responses in the *cpr22* mutant of Arabidopsis. **Plant Journal,** 26: 447-459.

24. Shah, J., **Kachroo, P**, Nandi, A., Klessig, D. (2001) A recessive mutation in the Arabidopsis *ssi2* gene confers SA- and *NPR1*-independent expression of *PR* genes and resistance against bacterial and oomycete pathogens. **Plant Journal,** 25: 563-574.

25. Klessig, D., Durner, J., Noad, R., Navarre, D., Wendehenne, D., Kumar, D., Zhou, J., Shah, J., Zhang, S., **Kachroo, P.,** Trifa, Y., Pontier, D., Lam, E., Silva, H. (2000) Nitric oxide and salicylic acid signaling in plant defense. **Proceedings of the National Academy of Sciences USA,** 97: 8849-8855.

26. **Kachroo, P.**, Yoshioka, K., Shah, J., Klessig, D. (2000) Resistance to turnip crinkle virus in Arabidopsis is regulated by two host genes, is salicylic acid-dependent but *NPR1*-, ethylene- and jasmonate-independent. **Plant Cell,** 12: 677-690.

27. Cooley, M., Pathirana, S., Wu, H., **Kachroo, P.,** Klessig, D. (2000) Members of the Arabidopsis *HRT*/*RPP8* family of resistance genes confer resistance to both viral and oomycete pathogens. **Plant Cell,** 12: 663-676.

28. Shah, J., **Kachroo, P.**, Klessig, D. (1999) The Arabidopsis *ssi1* mutation restores *PR* gene expression in SA-Insenstive (*npr1*) plants and renders *PDF1.2* (Defensin) gene expression SA dependent. **Plant Cell,** 11: 191-206.

29. Hamsa, P., **Kachroo, P.**, Chattoo, B. (1998) Production and secretion of biologically active human epidermal growth factor in *Yarrowia lipolytica*. **Current Genetics,** 33: 231-237.

30. **Kachroo, P.**, Leong, S., Chattoo, B. (1997) A rapid method for extracting DNA from filamentous fungi. **International Rice Research Notes,** 22: 47-48.

31. **Kachroo, P.**, Potnis, A., Chattoo, B. (1997) Transformation of the rice blast fungus to benomyl resistance. **World Journal of Microbiology and Biotechnology,** 13: 185-187.

32. **Kachroo, P.**, Lee, K., Schwerdel, C., Bailey, J., Chattoo, B. (1997) Analysis of host-induced response in the rice blast fungus *Magnaporthe grisea* using two dimensional gel electrophoresis. **Electrophoresis,** 18: 163-169.

33. **Kachroo, P.**, Leong, S., Chattoo, B. (1997) Organisation and molecular analysis of repeated DNA sequences in the rice blast fungus *Magnaporthe grisea*. **Current Genetics,** 31: 361-369.

34. **Kachroo, P.**, Leong, S., Chattoo, B. (1995) Mg-SINE: A short interspersed nuclear element from the rice blast fungus *Magnaporthe grisea*. **Proceedings of the National Academy of Sciences USA,** 92: 11125-11129.

35. **Kachroo, P.**, Leong, S., Chattoo, B. (1994) Pot2, an inverted repeat transposon from the rice blast fungus *Magnaporthe grisea*. **Molecular General Genetics,** 245: 339-348.

Book Chapters/ Reviews

1. Kachroo, A., **Kachroo P.** (2009) Fatty acid derived signals in plant defense. **Annual Review of Phytopathology**, 47:153-176.

2. D. Navarre, **Kachroo, P.** (2007) Potato inducible defenses and disease resistance. In: **Current concepts in potato disease management**, In press

3. Kachroo A., **Kachroo P***. (2007) Salicylic acid-, jasmonic acid- and ethylene-mediated regulation of plant defense signaling. In: **Genetic Engineering, Principles and Methods**, Ed. J. Setlow. 28: 55-83.

4. Kachroo, A., Venugopal, S.C., Navarre, D.A., Lapchyk, L., **Kachroo, P*.** (2006) Metabolite signaling; role of fatty acids in plant defense. In: **Biology of Molecular Plant-Microbe Interactions**, Eds., F. Sanchez, C. Quinto, I. M. Lopez-Lara, O. Geiger. 5: 195-201.

5. **Kachroo, P***., Chandra-Shekara, A.C., Klessig, D. (2006) Plant signal transduction and defense against viral pathogens. In: **Advances in Viral Research,** Eds., K. Maramososch and A. J. Shatkin, 66: 161-191.

6. **Kachroo, P*.** (2006) Host gene-mediated virus resistance mechanisms and signaling in Arabidopsis. In: **Natural Resistance Mechanisms of Plants to Viruses**. Eds., G. Loebenstein and J. P. Carr. Kluwer Academic Publishers, The Netherlands, pp. 147-164.

7. Klessig, D.F., **Kachroo, P**., Slaymaker, D., Yoshioka, K., Navarre, D.A., Clark, D., Kumar, D., Shah, J. (2001) SA- and NO-mediated signaling in plant disease resistance. In: **Biology of Plant-Microbe Interactions**. Eds., S.A. Long, C. Allen and W.W. Triplett. International Society of Molecular Plant-Microbe Interactions., St. Paul, MN, pp. 78-82.

8. Klessig, D., Kumar, D., Navarre, R., Zhou, J., Shah, J., Zhang, S., Wendehenne, D., **Kachroo, P**., Trifa, Y., Silva, H., Pontier, D., Lam, E., Noad, R. (2000) Salicylic acid- and nitric oxide-mediated signal transduction in plant disease resistance. In: **Biology of**

Plant-Microbe Interactions, Eds., P. de Wit, T. Bisseling and W. Stiekema. Kluwer Academic Publishers, The Netherlands, 2: 13-18.

9. Klessig, D., Navarre, D., Kumar, D., Zhou, J., Shah, J., Durner, J., Zhang, S., Wendehenne, D., **Kachroo, P**., Trifa, Y., Silva, H., Pontier, D., Lam, E., Noad, R. (2000) Salicylic acid- and nitric oxide-mediated signaling in plant-microorganism interactions. In: **2000 Years of Natural Products Research; Past, Present and Future**, Ed., TJC Luijendijk, Photoconsult, Leiden, The Netherlands, pp. 105-118

10. Klessig, D., Durner, J., Navarre, D., Kumar, D., Shah, J., Zhou, J., Zhang, S., Wendehenne, D., **Kachroo, P**., Silva, H., Yoshioka, K., Trifa, Y., Pontier, D., Lam, E., Chen, X., Anderson, M., Du, H. (2000) Salicylic acid- and nitric oxide-mediated signal transduction in disease resistance. In: **Signal Transduction in Plants: Current Advances**. Eds., S. K. Sopory., R. Oelmüller and S. C. Maheshwari. Kluwer Academic Plenum Publishers, The Netherlands, pp. 201-207.

11. **Kachroo, P.**, Leong, S., Chattoo, B. (1996) Molecular analysis of repeated DNA sequences from the rice blast fungus *Magnaporthe grisea.* In: **Rice Genetics** III, Published by International Rice Research Institute, pp. 279-291.

Presentations

Total number of seminar abstracts – 68

Invited Seminars (2004-2009)

1. American Phytopathological Society Annual Meeting, Portland, USA, July 2009. Oleate-regulated signaling in plants.
2. American Phytopathological Society Annual Meeting, Portland, USA, July 2009. Glycerol-3-phosphated-mediated plant defense against necrotrophic pathogens.
3. International Center for Genetic Engineering and Biotechnology, Delhi, India, February 2009. Oleic acid regulated signaling and plant defense.
4. M. S. University, Baroda, India, February 2009. Oleic acid regulated signaling and plant defense.
5. International Group of Legume and Vegetable Viruses, Lubljana, Slovenia, August 2008. Oleic acid signaling and plant defense.
6. Department of Biology, University of Kentucky, April 2008. Fatty acid signaling and plant defense.
7. American Phytopathological Society Annual Meeting, San Diego, USA, July 2007. Oleate-regulated signaling in plants.
8. International Conference on Arabidopsis Research, Beijing, China, June 2007. Plastidial oleate levels regulate expression of resistance genes.
9. Department of Plant Pathology, UK, March 2007. Plant defense signaling: Old players, new roles!
10. M. S. University, Baroda, India, November 2006. Fatty acid signaling and its role in plant defense.
11. American Phytopathological Society, Quebec, Canada, August 2006. Light dependent host defense signaling against Turnip Crinkle Virus in Arabidopsis.

12. International Society of Molecular Plant-Microbe Interactions, Cancun, Mexico, December 2005. Fatty acid signaling and its role in plant defense.
13. Purdue University, October 2005. Fatty acid and R gene-mediated signaling and its role in plant defense.
14. Department of Plant Pathology, UK, September 2004. Plant defense signaling in Arabidopsis.
15. American Society of Plant Biologists, Orlando, Florida, July 2004. FA signaling pathway and its role in plant defense.

Other presentations from the Lab (2004-2009)

1. American Phytopathological Society, 2009- Invited speaker- Qing-Ming Gao
2. American Society of Plant Biologists, 2009- Poster presentation by Qing-Ming Gao
3. American Society of Plant Biologists, 2009- Poster presentation by Mihir Mandal
4. American Phytopathological Society, 2009- Poster presentation by Qing-Ming Gao
5. American Phytopathological Society, 2009- Poster presentation by Mihir Mandal
6. International Society of Molecular Plant-Microbe Interactions, 2009- Poster presentation by Lisa Vaillancourt
7. International Conference on Arabidopsis Research, 2007- Poster presentation by Xia Ye
8. Annual Kentucky EPSCOR conference, 2006- Poster presentation by A. C. Chandra-Shekara
9. Plant Lipid Signaling meeting, 2005- Poster presentation by Srivathsa Venugopal and A. C. Chandra-Shekara
10. American Phytopathological Society, 2005- Invited speaker- A. C. Chandra-Shekara
11. American Society of Plant Biologists, 2005- Poster presentation by Srivathsa Venugopal
12. American Society of Plant Biologists, 2004- Poster presentation by Srivathsa Venugopal

OTHER DOCUMENTED ACCOMPLISHMENTS

Patents

1. Overexpression of a dehydrogenase confers enhanced resistance to *Colletotrichum*- Kachroo, A., **Kachroo, P.** – Filed (US Patent No. 11/458,344)
2. Plastidial fatty acid levels regulate expression of resistance gene and confer enhanced disease resistance. **Kachroo, P.**, Kachroo, A., Chandra-Shekara, A.C. – Filed.

SERVICE AND RECOGNITION

Editorships

- Member Editorial Board- Plant Signaling and Behavior- 2005 to present
- Associate Editor- BMC Plant Biology
- Associate Editor- Molecular Plant-Microbe Interactions

Review panels, reviewer service

Peer-reviewed journals

- The Plant Cell
- Plant Molecular Biology
- Proceedings of the National Academy of Sciences USA
- Plant Disease
- The Plant Journal
- Phytochemistry
- Plant Physiology
- Journal of Phytopathology
- Molecular Plant-Microbe Interactions
- Tree Physiology

- Plant Growth Regulators
- Journal of Plant Physiology
- Journal of Chromatographic Science
- Journal of General Virology
- Molecular and Cell Biology of Lipids
- EMBO J.
- Journal of Biomedicine and Biotechnology

Funding agencies

- USDA-NRI grant proposals
- NSF grant proposals
- Canada-Israel (BARD)
- BBSRC (United Kingdom)
- Netherlands Organization for Scientific Research (Council for Earth and Life Sciences)
- Research proposals, Mississippi State University
- Research proposals, Auburn University
- Research proposals, Kentucky Tobacco Research and Development Center, University of Kentucky
- Research proposals, Ohio State University
- Research proposals, University of California, Davis

Committees, elected positions, offices held

- Member, departmental Safety Committee
- Member, departmental Faculty Merit Evaluation Committee
- Chair, departmental Ad hoc Curriculum Committee

Memberships

- American Society of Plant Biology
- American Phytopathological Society
- International Society of Molecular Plant-Microbe Interactions

Awards/ Recognition

- Prestigious paper award - 2007
- Faculty Futures Award - 2004
- Certificate of appreciation awarded by the University of Kentucky, Environmental Health and Safety Program - 2004
- Featured in the online summer issue of Odyssey- 2004
- http://www.rgs.uky.edu/ca/odyssey/exclusive/summer04/kachroo.html

Background

Plant diseases have a devastating impact on agricultural production every year and annual worldwide crop losses due to disease are estimated in excess of $100 billion. Presently, control of diseases relies primarily on the cultivation of resistant varieties, cultural practices (for example, planting density, spacing among plants) and pesticide applications. In the long run, the last strategy is unlikely to be sustainable, because of loss-of-effectiveness of chemicals due to selection for resistant microorganisms and or societal/environmental pressures. Host resistance, ideally, provides the grower an efficient method to combat plant disease with minimal additional inputs. By elucidating the mechanism(s) through which plants perceive and resist infection, successful strategies for engineering and/or manipulating disease resistance may be developed, so that it is more effective and/or longer-lasting.

Pathogen perception by the plant results in a variety of signaling events. Although various signaling pathways have been examined in a variety of plants, the mechanisms and molecular components are best understood in the "model" plant *Arabidopsis*, a member of the cruciferous family. Recently, fatty acid (FA) and lipid-derived signals have also been implicated in defense signaling and have gained increasing importance in modulating host defense.

Shortly before I initiated my program at the University of Kentucky (UK), the only implicated function for FAs in defense was via a role in jasmonic acid (JA) biosynthesis. An *Arabidopsis* mutant defective in the biosynthesis of linolenic acid was known to be defective in JA biosynthesis (since linolenic acid is a precursor for JA biosynthesis) and, thereby, defective in JA-mediated defenses. During my postdoctoral tenure, I had identified a second FA-related mutation, which altered normal defense signaling in the plant. A mutation in the chloroplastic stearoyl-acyl carrier protein-desaturase (SACPD) resulted in the constitutive up-regulation of the salicylic acid (SA) pathway and enhanced resistance to pathogens requiring live host cells to sustain themselves. Interestingly, this mutant (*ssi2*) was one of only two mutants affected in both the SA- and JA-mediated pathways. Thus, the *ssi2* mutant promised to help elucidate a role for FAs, as well as the interaction between SA and JA signaling, during plant defense. I have continued this line of work as an Associate Professor here at UK.

Major initiatives at UK

Since my appointment at UK, my group, which presently comprises four graduate students, three postdoctoral scholars, two undergraduate, a research specialist and a full-time technician, has, for the first time, identified a role for glycerol, glycerol-3-phosphate (G3P) and oleic acid in plant defense signaling. In addition, we for the first time have shown a specific role for blue-light photoreceptors in R-protein-mediated resistance.

We have thus far:

1. Identified a novel FA-mediated defense-signaling pathway in *Arabidopsis thaliana*: **MPMI 2003; Plant Cell 2003; PNAS 2004; Plant Physiology 2005**.
2. Implicated a role for oleic acid (or its derivative) in modulating resistance by regulating resistance (*R*) gene expression: **PNAS 2007; MPMI 2008; Cell Host & Microbe 2009, PLOS Genetics 2009.**
3. Characterized the SACPD family in *Arabidopsis* and established that SSI2 is the major isoform contributing to oleic acid levels in the plant: **Plant Molecular Biology 2007**.
4. Identified host-signaling components in the *Arabidopsis*-Turnip Crinkle Virus (TCV) pathosystem. Our very recent work shows a role for blue-light photoreceptors in R-protein

mediated resistance to TCV: **The Plant Journal 2004 and 2006; Cell Host & Microbe 2008; MPMI 2008**.

5. Shown that glycerolipid metabolism affects defense signaling by modulating the levels of FAs in the plant: **PNAS 2004**.
6. Established a novel role for glycerol metabolism in modulating the *Arabidopsis* resistance response to *Colletotrichum higginsianum* (a close relative of a major corn pathogen): **Plant Physiology 2008; Plant Signaling and Behavior, 2009.**

These projects were supported by major grants from the National Science Foundation (3), the United States Department of Agriculture (2), and the Kentucky Science and Engineering Foundation (5).

A novel FA-modulated defense pathway

In a recent and further exciting breakthrough, we have discovered that 18:1 levels regulate host defense by modulating resistance (*R*) gene expression, and that this *R* gene-regulated pathway can confer both specific as well as broad-spectrum disease resistance. Activation of the pathway can also confer resistance in plants that are normally susceptible. This pathway is independent of the SA-mediated pathway and is more robust in conferring resistance. This work has appeared in several high profile journals. A patent application, related to the development of strategies for engineering broad-spectrum resistance in plants, has also been filed by the University.

***Arabidopsis*-Turnip Crinkle Virus (TCV) Interaction**

In addition to studying FA-mediated signaling, my group also studies the *Arabidopsis*-TCV pathosystem to dissect the defense signaling pathway(s) against viral pathogens. We have established that *HRT*-mediated signaling is unique, and recruits downstream molecular components not normally utilized by other structurally-similar R proteins. We also showed that SA levels feedback-regulate *HRT* transcription, and the up-regulation of *HRT* by increasing SA can bypass a requirement for the *rrt* locus. Our work has also established a role for light signaling in resistance to TCV and more recently we showed that blue-light photoreceptors are required for stability of R-proteins.

***Arabidopsis-Colletotrichum* Interaction**

We have recently begun to examine the newly described interaction between *Arabidopsis* and the pathogen *Colletotrichum higginsianum*. We have identified several plant mutants with increased or reduced resistance to *C. higginsianum*. We have established a role for glycerol-3-phosphate in basal and *R* gene-mediated resistance to hemibiotrophic and necrotrophic pathogens. In collaboration with Dr. Aardra Kachroo and Dr. Vaillancourt's groups, we have also isolated fungal mutants with reduced virulence on the host. A patent describing some of these results has also been filed.

Future scope

The research is at a very exciting stage. We have identified defense-related components that are downstream of the FA signal and are required for low 18:1-mediated induction of *R* gene expression. We have also uncovered several component required for Arabidopsis-TCV and Arabidopsis- *C. higginsianum* interactions. Clearly, much has been learned of defense-related signaling, yet prospects of exciting new research continue to grow and intrigue us.

TEACHING

My teaching philosophy is largely influenced by my own experiences as a student. The most stimulating classes were the ones where I was made to think and participate actively, and so I endeavor to do the same for my students. I try to gear my classroom as well as laboratory instruction towards raising questions in the students' minds, rather than just providing answers. As much as basic knowledge of a subject is important for a graduate student, he/she also needs to be able to problem-solve and design experiments. Consequently, I often ask my students (classroom and graduate advisees) to critically evaluate experimental design and comment on the strategy.

It is my aim to mentor students so that they graduate as competent, independent researchers who can be relied upon to shoulder the future of science. In addition to one-on-one meetings, we schedule weekly lab meetings where one graduate student and postdoctoral scholar (per week) is expected to formally present their research. The presentation is then critically reviewed for its conceptual and technical merits by everyone present. This exercise provides training in critical assessment of scientific research, develops presentation skills and ultimately prepares the individuals for dissertation/manuscript writing. I am currently mentoring four graduate students and three postdoctoral researchers as well as two undergraduate students. I have also mentored eight undergraduate students, two of whom joined my laboratory as high school seniors, and continued to work with me as UK freshmen. Several of them are considering a future in biological research as a result of their stay in the laboratory.

I have come to realize that teaching/mentoring itself is a learning process and am happy to say that it has been an enriching one in the past four years. I can only hope that my students share these sentiments.

Peter D. Nagy

CURRICULUM VITAE

Professor, Department of Plant Pathology, University of Kentucky
Original Date Appointed: 01/19/99.

EDUCATION

University of Massachusetts, Department of Biochemistry and Molecular Biology, Amherst, MA, 1996-1998, Research Associate.

Northern Illinois University, Department of Biological Sciences, DeKalb, 1990-1995, Research Associate.

University of Bari, Italy, 1990, Postdoctoral Fellow.

Hungarian Academy of Sciences, Institute for Plant Protection (IPP), Budapest, Hungary, 1985-1990. Ph. D. Student.

Agricultural University of Keszthely, Hungary, B.Sc. and M. S. in plant protection, 1980-1985.

PROFESSIONAL EXPERIENCE

Assistant Professor, January 1999-2003: Department of Plant Pathology,
University of Kentucky, Lexington, KY 40546.

Full member of the Graduate Faculty of the University of Kentucky. 2001-present

Research Associate, 1996-1999**:** Department of Biochemistry and Molecular Biology, University of Massachusetts, Amherst, MA 01003.
Research project: Mechanism of RNA recombination, repair and replication in carmoviruses

Research Associate, 1990 -1995**:** Plant Molecular Biology Center and Department of Biological Sciences, Northern Illinois University, DeKalb.
Research project: Mechanism of RNA recombination in bromoviruses.

Postdoctoral Fellow,1990**.** Dipartimento di Patologia Vegetale, Universita degli Studi and Centro di Studio del CNR sui Virus e le Virosi delle Colture Mediterranee, University of Bari, Italy;
United Nations (UNIDO) postdoctoral fellowship (internationally competitive).
Research project: Synthesis of full-length cDNA of cymbidium ringspot tombusvirus and characterization of defective interfering RNAs.

Graduate Research Assistant, 1985-1989. Department of Plant Pathophysiology, Institute for Plant Protection, Hungarian Academy of Sciences, Budapest, Hungary; nationally competitive Ph. D. fellowship from the Hungarian Academy of Sciences
Research projects: Molecular characterization of hordeiviruses and crossprotection between hordeiviruses.

EXTRAMURAL FUNDING

A. Grants:

Current:

1. **National Science Foundation (NSF)**. Title: The role of a host ion pump in viral RNA recombination. 08/01/08-07/31/12. Role: PI. $ 600,000.

2. National Institute of Health (NIH/NIAID-R21). Title: Functional role of a host metabolic enzyme in viral replication. Role: PI. $374,000. Staring date: 02/13/09-01/31/11

3. **National Science Foundation (NSF)**. Title: Suppression of viral RNA recombination by host genes. 08/01/05-07/31/10. Role: PI. $ 424,277.

4. National Institute of Health (NIH/NIAID-R21). Title:Roles of host RNA-binding proteins in virus replication. Role: PI. $374,000. Staring date: 02/01/07-01/31/10

5. **Kentucky Science and Technology Center (KSTC).** Identification of Anti-Prion drugs active against plant viruses. 07/01/08-06/3/10. P. Nagy (PI). **$98,010** (regionally competitive).

Previous:

5. NSF-DBI (instrumentation grant): Title: Acquisition of a Laser Scanning Confocal Microscope for Plant Science Research. $ 307,616. Starting date: 05/01/05. Role: PI
(nationally competitive grant).

6. NIH/NIAID-R03. Title: Role of an essential RNA chaperone in virus replication. Role: PI. $136,000. Staring date: 05/15/05-04/30/08

7. NIH/NIAID-R03. Title: Host factors involved in viral RNA recombination. Role: PI
$136,000. Staring date: 05/01/05-04/30/08

8. National Institute of Health (NIH). Dissecting the mechanism of viral RNA recombination.
P. Nagy, principal Investigator. 08/01/2003-07/31/2006. $136,000.

9. USDA-NRI. Characterization of host factors involved in plant virus replication.
P. Nagy, principal Investigator. 08/01/2003-07/31/2005. $75,000.

10. NSF, Molecular and Cellular Biology (MCB). Mechanism of defective interfering RNA replication and interference with helper infections. P. Nagy, Principal Investigator (PI). 09/01/00-10/31/04. **$ 307,980** (nationally competitive grant). I was also awarded a **United States Department of Agriculture (USDA) National Research Initiative (NRI)** grant ($196,000 for three years) for a closely related project, but I declined this grant due to the extensive overlap of goals and objectives with the NSF grant.

11. **Kentucky Science and Technology Center (KSTC).** Development of a novel biotechnology tool based on RNA recombination. 04/01/02-03/31/04. P. Nagy (PI). **$44,130** (regionally competitive).

12. **USDA-NRI**. Efficient leaf aldehyde production. D. Hildebrand (PI) and P. Nagy (Co-PI). 10/01/02-09/30/04. **$162,521** (nationally competitive).

13. **KSTC**. Efficient leaf aldehyde production. D. Hildebrand (PI) and P. Nagy (Co-PI). 07/01/02-06/30/04. **$72,758** (regionally competitive).

14. **USDA-Special Research Grant Program.** Advanced Genetic Technologies. C. Schardl (PI), L. Vaillancourt, D. Hildebrand, P. Nagy, S. Perry (Co-PI). 07/01/02-06/30/04. Total: **$561,217** (non-competitive).

15. **USDA Hatch program**. Role of promoter and enhancer elements in the replication of defective interfering tombusvirus RNA. P. Nagy (PI). 10/1/00-9/30/05 (non-competitive).

INTERNATIONAL RESEARCH COLLABORATORS:

Dr. Andrew White, York University, Toronto, Canada. Replication of tombusviruses.

Dr. Matteo Negroni, Pasteur Institute, Paris, France. Mechanism of RNA recombination.

Dr. Gabi Krczal, Centrum Grune Gentechnik, Neustadt, Germany. Virus resistance.

INSTRUCTION

Faculty Affiliation: Plant Pathology

Percent effort devoted to teaching has ranged from 5 to 15% over the period of my tenure track.

Guest lecturer, PPA784-002 Special Problems Plant Pathology. I lectured on Scientific Writing: Conventions and Ethics (one lecture in Fall, 2007 and 2008).

Principal Instructor, PPA 671. Advanced Plant Virology. Together with M. Goodin, I started a new 1-credit class. Spring 2006. My scores were 3.8 for value of course and also 3.8 for quality of teaching against college averages of 3.3 and 3.4, respectively.

Principal Instructor, PPA 656. Plant Virology (Fall, 2000, Fall, 2002, Spring 2005). Three credit lecture course focusing on biochemistry, molecular and traditional biology of plant viruses. Co-instructor: Dr. Pirone (2000) and Dr. Ghabrial (2002, 2005), M. Goodin (2005).

Coordinator, PPA 770. Plant Pathology seminar (Fall, 2001; Spring, 2002; Fall, 2002). One credit course. The coordinator is responsible for scheduling the seminar for graduate students and grading their presentations.

Guest lecturer, PPA 660. Plant-Microbe Interactions I. I lectured on plant virus-host interactions (four lectures in Fall, 1999 and four lectures in Fall, 2001). I graded the exam questions concerning plant virus-host interactions.

Guest lecturer, PPA 661. Plant-Microbe Interactions II. I lectured on plant virus-host interactions (one lecture in Spring, 2002).

Guest lecturer, UK, Department of Biology. General Virology. I lectured on replication of tombusviruses and carmoviruses (one lecture in Spring, 2000).

A. Undergraduate Students Mentored:

Jeremy Brasher, UK, 2002-2003
Imogen Herrick, UK-2003-2004

Cecily M. Hawkins, UK-2003-2005
Christin Herbst, UK- 2004-present
Alan Herbst, UK-2006-2007
Kanueng Noppornpitak, Thailand, 2005
B. Phuangrat, Kasetsart University, Thailand, 2004
P. Dimarsky, Dijon, France, 2007
High school students:
Michelle W. Wang (Dunbar High School, Lexington), 2002-03
Verena Ochanine (Dunbar High School, Lexington), 2004-2006
Lei Lei (Dunbar High School, Lexington), 2007

B. Undergraduate Student Advising:
Kelly Kutzlo, UK Agricultural Biotechnology student, Fall, 2001-present
Jeremy Brasher, UK Agricultural Biotechnology student, Fall, 2000-2003

C. Postgraduate Student Advising:
Major professor for:
Kottampatty Rajendran, Ph. D. student, Plant Pathology, 1999-2004
Current Address: Dana Faber Institute, Harvard University
Natalia Shapka, Ph. D. student, Plant Pathology, 1999-2006
Chi-Ping Cheng, Ph. D. student, Plant Pathology, 2000-2005
Currently an assistant professor U. Taichung, Taiwan
Zivile Panaviene, Ph. D. student, Plant Pathology, 2001-2004
Current address: University of Kentucky
Jozsef Stork, Ph. D. student, Plant Pathology, 2002-2009
Current address: University of Kentucky
Yi Jiang, Ph. D. student, Plant Pathology, 2004-2009
Kunj Pathak, Ph. D. student, Plant Pathology, 2004-present
Monika Sharma, Ph. D. student, Plant Pathology, 2006-
Kai Xu, Ph. D. student, Plant Pathology, 2007-
Jiang, Zuodong, Ph. D. student, Plant Pathology, 2009-
Mr. Rajendran and Ms. Panaviene got the distinguished Visiting Faculty Awards from the UK Graduate School in 2004.

Member of Advisory Committee:
Jimmy Blankenship, Ph. D. Plant Pathology, 2000-present
Honcang Gu, Ph. D. Plant Pathology, 2000-present
Wipawan Siangdung, Ph.D. Plant Physiology/Agronomy, 2001-present
Meizhu Du, M. S. Plant Pathology, completed in 2002
Zhang, Ph. D. Plant Pathology, 2001-present
Stephanie Mathews, M.S., Plant Pathology, 2001-present
Simona Florea, Ph. D., Plant Pathology, 2003-present
Sharon M. Yelton, Ph. D.,Plant Pathology, 2003-present

Outside Examiner:
Nazira El Hage, Ph. D. student, Dept. Microbiol. & Immunol., Medical Center, UK. 2002
Jeremy Kroemer, Ph. D. student, Dept. Entomology, UK, 2005

D. Major Advisor for Postdoctoral Researchers:
Dr. Tadas Panavas, Ph. D. University of Massachusetts, 2000-2005
Currently a group leader in Life Sensors Inc.
Dr. Gabriela Dujovny Ph. D. University of Cordoba, Argentina, 2002-2003
Dr. Judit Pogany, Ph. D. Northern Illinois University, 1999-present

Dr. Zoltan Cseh, Ph. D. Eotvos University, Budapest, Hungary, 2002-2003
Dr. Saulius Serva, Ph. D. Vilnius University, Vilnius, Lithuania, 2003-2005
Currently a group leader in Fermentos, Lithuania
Dr. Elena Serviene, Ph. D. Vilnius University, Vilnius, Lithuania, 2003-2005
Dr. Jozsef Gal, Ph. D. University of Szeged, Hungary, 2003-2004
Dr. Kottampatty Rajendran, Ph. D. University of Kentucky, 2004
Dr. Zivile Panaviene, Ph. D. University of Kentucky, 2004
Dr. X. Luo, Ph. D. Chinese Center for Disease Control and Prevention, Beijing, China, 2004.
Dr. Magda Jonczyk, Ph. D. Myskiewitz U. Poznan, Poland, 2005-2006
Dr. Natalia Martinez, Ph. D., 2005-2007
Dr. Robert Wang, Ph. D. Taiwan U., Taipei, Taiwan. 2005-2009
Dr. Hannah Jaag, Ph. D. Max Planck Institute, Cologne, Germany, 2005-present
Dr. Zhenghe Li, Ph. D., 2005-present
Dr. Daniel Barajas, Ph. D., 2006- present
Dr. Zsuzsanna Sasvari, Ph. D., St. Stephan U., Godollo, Hungary. 2007-present
Dr. Mendu Venugopal, Ph. D. U. Kentucky, 2008-present
Dr. Suzanna Martin, Ph. D., 2009-present
Dr. Nikolay Kovalev, Ph. D. 2009-present
Dr. Khan, Muhammad Shah Nawaz, Ph. D. 2009-present

E. Visiting Scientists:

Dr. Gabriela Dujovny, (2000-2002), from Argentina, who had her own support for two years from CONICET and chose to work in my lab.
Mr. Kajonh Boonrod, from Germany, 2001.
Ms. Patricia Rico from Valencia, Spain, 2003.
Dr. Daniel Barajas, Ph. D., 2007- 2008
Meng Hsuen Chiu, National Chung Hsing UNIV, Taichung Taiwan-2008-present

F. Activities Outside the Classroom:

I launched a continuing university-wide *Molecular Virology Club* in the fall of 1999. The goal of this interdepartmental scientific club is to bring graduate students, postdocs, visiting scientists and faculty members working on molecular aspects of viruses together to discuss scientific results and models and disseminate ideas. We meet regularly once a month. Programs from Plant Pathology (three labs), Agronomy, Entomology, Animal Sciences, Biological Sciences and the Medical School (four labs) are represented.

PUBLICATIONS:

REFEREED JOURNAL ARTICLES:

1. Wang RY, Stork J, **Nagy PD** (2009) A key role for heat shock protein 70 in the localization and insertion of tombusvirus replication proteins to intracellular membranes. ***J Virol*** 83: 3276-3287.
2. Wu B, Pogany J, Na H, Nicholson BL, **Nagy PD**, et al. (2009) A Discontinuous RNA Platform Mediates RNA Virus Replication: Building an Integrated Model for RNA-based Regulation of Viral Processes. ***PLoS Pathog*** 5: e1000323.
3. Li Z, Pogany J, Panavas T, Xu K, Esposito AM, et al. (2009) Translation elongation factor 1A is a component of the tombusvirus replicase complex and affects the stability of the p33 replication co-factor. ***Virology*** 385: 245-260.
4. Jaag HM, ***Nagy PD*** (2009) Silencing of Nicotiana benthamiana Xrn4p exoribonuclease promotes tombusvirus RNA accumulation and recombination. ***Virology*** 386: 344-352.

5. Pogany, J., Stork, J., Li, Z., and ***Nagy, P. D***. 2008. In vitro assembly of the Tomato bushy stunt virus replicase requires the host Heat shock protein 70. ***Proc Natl Acad Sci U S A***, 105: 19956-61.
6. Wang, R. Y., and ***Nagy, P. D.*** 2008. Tomato bushy stunt virus Co-Opts the RNA-Binding Function of a Host Metabolic Enzyme for Viral Genomic RNA Synthesis. ***Cell Host Microbe*** 3:178-87.
7. Li, Z., D. Barajas, T. Panavas, D. A. Herbst, and **P. D. Nagy.** 2008. Cdc34p ubiquitin-conjugating enzyme is a component of the tombusvirus replicase complex and ubiquitinates p33 replication protein. ***J Virol.*** 82: 6911-6926.
8. Pogany, J., and **Nagy, P. D.** 2008. Authentic replication and recombination of Tomato bushy stunt virus RNA in a cell-free extract from yeast. ***J Virol*** **82:**5967-80.
9. **Nagy, P. D.** 2008. Yeast as a Model Host to Explore Plant Virus-Host Interactions. ***Annu Rev Phytopathol***. 46:217-42.
10. Rajendran, K. S., and ***Nagy, P. D.*** 2008. Surface plasmon resonance analysis of interactions between replicase proteins of tomato bushy stunt virus. ***Methods Mol Biol*** 451**:**267-77.
11. Panavas, T., E. Serviene, J. Pogany, and ***Nagy, P. D.*** 2008. Genome-wide screens for identification of host factors in viral replication. ***Methods Mol Biol*** 451**:**615-24.
12. ***Nagy, P. D.,*** and J. Pogany. 2008. Multiple roles of viral replication proteins in plant RNA virus replication. ***Methods Mol Biol*** 451**:**55-68.
13. Pathak, K. B., Sasvari, Z., and ***Nagy, P. D.*** (2008). The host Pex19p plays a role in peroxisomal localization of tombusvirus replication proteins. ***Virology*** 379: 294-305.
14. Jonczyk, M., Pathak, K. B., Sharma, M., and ***Nagy, P. D***. 2007. Exploiting alternative subcellular location for replication: Tombusvirus replication switches to the endoplasmic reticulum in the absence of peroxisomes. ***Virology*** 362(2), 320-30.
15. Jaag, H. M., Stork, J., and ***Nagy, P. D***. 2007. Host transcription factor Rpb11p affects tombusvirus replication and recombination via regulating the accumulation of viral replication proteins. ***Virology*** 368, 388-404.
16. Cheng, C. P., Jaag, H. M., Jonczyk, M., Serviene, E., and ***Nagy, P. D***. 2007. Expression of the Arabidopsis Xrn4p 5'-3' exoribonuclease facilitates degradation of tombusvirus RNA and promotes rapid emergence of viral variants in plants. ***Virology*** 368, 338-248.
17. Serva, S. and **Nagy, P. D.** 2006. Proteomics analysis of the Tombusvirus replicase: Hsp70 molecular chaperone is associated with the replicase and enhances viral RNA replication ***Journal of Virology*** 80: 2162-2169.
18. Jiang, Y. Elena Serviene, Jozsef Gal, Tadas Panavas and **Nagy, P. D**. 2006. Identification of essential host factors affecting tombusvirus RNA replication based on the yeast yTHC collection. ***Journal of Virology*** 80(15), 7394-7404.
19. Cheng, C-P., Elena Serviene, and **Nagy, P. D**. 2006. Suppression of viral RNA recombination by a host exoribonuclease. ***Journal of Virology*** 80: 2631-2640.
20. Serviene, E., Jiang, Y., Cheng, C. P., Baker, J., and **Nagy, P. D**. 2006. Screening of the Yeast yTHC Collection Identifies Essential Host Factors Affecting Tombusvirus RNA Recombination. ***Journal of Virology*** **80**(3)**,** 1231-41.
21. Rajendran, K. S., and **Nagy, P. D**. 2006. Kinetics and functional studies on interaction between the replicase proteins of Tomato Bushy Stunt Virus: Requirement of p33:p92 interaction for replicase assembly. ***Virology*** **345**(1)**,** 270-9.
22. Panavas, T., Stork, J., Nagy, P. D. 2006. Use of double-stranded RNA templates by the tombusvirus replicase in vitro: Implications for the mechanism of plus-strand initiation. ***Virology*** **352**(1)**,** 110-20.
23. **Nagy, P. D**., and Pogany, J. 2006. Yeast as a model host to dissect functions of viral and host factors in tombusvirus replication. ***Virology*** **344**(1)**,** 211-20.

24. Panavas, P. Elena Serviene, Jeremy Brasher, and **P. D Nagy**. 2005. Yeast genome-wide screen reveals dissimilar set of host genes affecting replication of RNA viruses. ***Proc Natl Acad Sci U S A. (PNAS)*** 102:7326-31***.***
25. Stork, J., Z. Panaviene, and **P. D. Nagy.** 2005. Inhibition of in vitro RNA binding and replicase activity by phosphorylation of the p33 replication protein of Cucumber necrosis tombusvirus. ***Virology*** **343:**79-92.
26. Serviene, E., N. Shapka, C. P. Cheng, T. Panavas, B. Phuangrat, J. Baker, and ***Nagy, P.D***. 2005. Genome-wide screen identifies host genes affecting viral RNA recombination. ***Proc Natl Acad Sci U S A. (PNAS)*** 102:10545-10550.
27. Shapka, N., J. Stork, and **P. D. Nagy.** 2005. Phosphorylation of the p33 replication protein of Cucumber necrosis tombusvirus adjacent to the RNA binding site affects viral RNA replication. ***Virology*** **343:**65-78.
28. Cheng, C. P., T. Panavas, G. Luo, and **P. D. Nagy.** 2005. Heterologous RNA replication enhancer stimulates in vitro RNA synthesis and template-switching by the carmovirus, but not by the tombusvirus, RNA-dependent RNA polymerase: Implication for modular evolution of RNA viruses. ***Virology*** **341:**107-21.
29. Panaviene, Z., Panavas, T., and **P. D Nagy**. 2005. Role of an internal and two 3'-terminal RNA elements in assembly of tombusvirus replicase. **Journal of *Virology* 79:** 10608-18.
30. Panavas, T., C. M. Hawkins, Z. Panaviene, and P. D. Nagy. 2005. The role of the p33:p33/p92 interaction domain in RNA replication and intracellular localization of p33 and p92 proteins of Cucumber necrosis tombusvirus. ***Virology***. 338: 81-95.
31. Tadas Panavas and **Peter D. Nagy**. 2005. Mechanism of stimulation of plus-strand synthesis by an RNA replication enhancer in a tombusvirus" ***Journal of Virology*** 79:9777-85.
32. Pogany, J., White, K.A., and **Nagy, P.D**. 2005. Specific Binding of the Tombusvirus Replication Protein p33 to an Internal Replication Element in the Viral RNA is Essential for Replication. **Journal of Virology 79:**4859-69.
33. Monkewich, S., Lin, H-X, Fabian, M.R., Xu, W., Na, H., Ray, D., Chernysheva, O.A., **Nagy, P.D**., and White, K.A. 2005. p92 Polymerase Coding Region Contains an Internal RNA Element Required at an Early Step in Tombusvirus Genome Replication. **Journal of Virology**, **79:**4848-58.
34. Panaviene, Z. Panavas, T., Serva, S. and Nagy, P.D. 2004. Purification of the Cucumber necrosis virus replicase from yeast: The role of co-expressed viral RNA in stimulation of replicase activity. ***Journal of Virology*** 78, 8254-8263.
35. Rajendran, K. S. and **Nagy, P.D.** 2004. Interaction between the replicase proteins of Tomato Bushy Stunt Virus in vitro and in vivo. **Virology**, 326: 250-261.
36. Boonrod, K., Galetzka, D., Nagy, P.D., Conrad, U. and Krczal, G. 2004. Single-chain antibodies against a plant viral RNA-dependent RNA polymerase confer virus resistance. **Nature Biotechnolology**, 22, 856-862.
37. Panavas, T., and **Nagy, P. D**. 2003. Yeast as a model host to study replication and recombination of defective interfering RNA of Tomato bushy stunt virus. **Virology** 314: 315-325.
38. Pogany, J., Fabian, M., White, K.A., and **Nagy, P. D.** 2003. A replication silencer element in an RNA virus. ***EMBO Journal*** 22: 5602-5611.
39. Cheng, C.-P. and **Nagy, P. D**. 2003. Mechanism of RNA recombination in Carmo- and Tombusviruses: Evidence for Template Switching by the RNA-dependent RNA polymerase in vitro. **Journal of Virology** 77: 12033-12047.
40. Panaviene, Z. and **Nagy, P. D**. 2003. Mutations in the RNA-binding domains of tombusvirus replicase proteins affect RNA recombination in vivo. **Virology** 317, 359-372.

41. Shapka, N. and Nagy, P.D. 2004. The AU-rich RNA recombination hot spot sequence of Brome mosaic virus is functional in tombusviruses: Implications for the mechanism of RNA recombination. ***Journal of Virology*** 78, 2288-2300.
42. White, K.A., and **Nagy, P.D**. 2004. Advances in the Molecular Biology of Tombusviruses: Gene Expression, Genome Replication and Recombination. **Progress in nucleic acid research and molecular biology** 78, 187-226.
43. Rajendran, K.S. and **Nagy, P.D**. 2003. Characterization of the RNA-binding domains in the replicase proteins of tomato bushy stunt virus. **Journal of Virology** 77, 9244-9258.
44. Panavas, T., and **Nagy, P. D.** 2003. The RNA replication enhancer element of tombusviruses contains two interchangeable hairpins that are functional during plus-strand synthesis. ***Journal of Virology***, 77, 258-269.
45. Panaviene, Z., Baker, J. M., and **Nagy, P. D.** 2003. The overlapping RNA-binding domains of p33 and p92 replicase proteins are essential for tombusvirus replication. ***Virology***, 308, 191-205.
46. Panavas, T., Panaviene, Z., Pogany J., and **Nagy, P. D.** 2003. Generation of a novel cis-acting replication element by promoter duplication in tombusviruses. ***Virology***, 310, 118-129.
47. Cheng, C.-P., Pogany, J., and **Nagy, P. D.** 2002. Mechanism of DI RNA formation in Tombusviruses: Dissecting the requirement for primer extension by the Tombusvirus RNA-dependent RNA polymerase *in vitro.* ***Virology***, 304, 460-473.
48. Panavas, T., Pogany, J., and **Nagy, P. D.** 2002. Analysis of minimal promoter sequences for plus-strand synthesis by the *Cucumber necrosis virus* RNA-dependent RNA polymerase. ***Virology***, 296, 263-274.
49. Panavas, T., Pogany, J., and **Nagy, P. D.** 2002. Internal initiation by the *Cucumber necrosis virus* RNA-dependent RNA polymerase is facilitated by promoter-like sequences. ***Virology***, 296, 275-287.
50. Rajendran, K. S., Pogany, J., and **Nagy, P. D.** 2002. Comparison of *Turnip crinkle virus* RNA-dependent RNA polymerase preparations expressed in *E. coli* or derived from infected plants. ***Journal of Virology***, 76, 1707-1717.
51. Nagy, P. D., Pogany, J., and Simon, A. E. 2001. *In vivo* and *in vitro* characterization of an RNA replication enhancer in a satellite RNA associated with *Turnip crinkle virus.* ***Virology***, 288, 315-324.
52. **Nagy, P. D.** and Pogany, J. 2000. Partial purification and characterization of *Cucumber necrosis virus* and *Tomato bushy stunt virus* RNA-dependent RNA polymerases: Similarities and differences in template usage between tombusvirus and carmovirus RNA-dependent RNA polymerases. ***Virology***, 276: 279-288.
53. Yoshinari, S., **Nagy, P.D**., Simon, A.E., and T.W. Dreher (2000). CCA initiation boxes without unique promoter elements support in vitro transcription by three viral RNA-dependent RNA polymerases. ***RNA***: 6, 698-707.
54. **Nagy, P. D**., Pogany, J., and Simon, A. E. (1999). RNA elements required for RNA recombination function as replication enhancers *in vitro* and *in vivo* in a plus-strand RNA virus. ***EMBO Journal*** 18**:** 5653-5665.
55. **Nagy, P. D.**, Ogiela, C., and Bujarski, J.J. (1999). Mapping sequences active in homologous recombination in brome mosaic virus: Prediction of recombination hot spots. ***Virology*****,** 254: 92-104**.**
56. **Nagy, P. D.**, Zhang, C. and Simon, A.E. (1998). Dissecting RNA recombination *in vitro*: role of RNA sequences and the viral replicase. ***EMBO J****ournal,* 17: 2392-2403.
57. **Nagy, P. D.**, and Simon, A. E. (1998a). *In vitro* characterization of late steps of RNA recombination in turnip crinkle virus I. Role of the motif1-hairpin structure. ***Virology,*** 249: 379-392.
58. **Nagy, P. D.**, and Simon, A. E. (1998b). *In vitro* characterization of late steps of RNA recombination in turnip crinkle virus II. The role of the priming stem and flanking sequences. ***Virology,*** 249: 393-405.

59. Figlerowicz, M., **Nagy, P. D.**, Tang, N., Kao, C.C., and Bujarski, J.J. (1998). Mutations in the N terminus of the brome mosaic virus polymerase affect genetic RNA-RNA recombination. ***Journal of Virology***, 72: 9192-9200**.**
60. **Nagy, P. D.**, and Bujarski, J.J. (1998). Silencing homologous recombination hotspots with GC-rich sequences in brome mosaic virus. ***Journal of Virology***, 72: 1122-1130.
61. **Nagy, P. D.**, and Simon, A.E. (1997). New insights into the mechanisms of RNA recombination. ***Virology*****,** 235: 1-9.
62. **Nagy, P. D.**, Carpenter, C.D. and Simon, A.E. (1997). A novel 3'-end repair mechanism in an RNA virus. ***Proceedings of the National Academy of Sciences USA (PNAS)*****,** 94: 1113-1118.
63. Figlerowicz, M., **Nagy, P. D.**, and Bujarski, J.J. (1997). A mutation in the putative RNA polymerase gene inhibits nonhomologous, but not homologous, genetic recombination in an RNA virus. ***Proceedings of the National Academy of Sciences USA (PNAS)*** 94:2073-2078.
64. **Nagy, P. D.**, and Bujarski, J.J. (1997). Engineering of homologous recombination hotspots with AU-sequences in brome mosaic virus. ***Journal of Virology***, 71: 3799-3810.
65. **Nagy, P. D.**, and Bujarski, J.J. (1996). Homologous recombination in brome mosaic virus: AU-sequences decrease the precision of crossovers. ***Journal of Virology***, 70:415-426.
66. Simon, A.E., and **Nagy, P. D.** (1996). RNA recombination in turnip crinkle virus: its role in formation of chimeric RNAs, multimers, and in 3'-end repair. ***Seminars in Virology*** 7: 373-379.
67. Bujarski, J.J. and **Nagy, P. D.** (1996). Different mechanisms of homologous and nonhomologous recombination in brome mosaic virus: role of RNA sequences and replicase proteins. ***Seminars in Virology*** 7:363-372.
68. **Nagy, P. D.**, Dzianott, A., Ahlquist, P. and Bujarski, J.J. (1995). Mutations in the helicase-like domain of protein 1a alter the sites of RNA-RNA recombination in brome mosaic virus. ***Journal of Virology***, 69: 2547-2556
69. **Nagy, P. D.**, and Bujarski, J.J. (1995). Efficient system of homologous RNA recombination in brome mosaic virus: sequence and structure requirements and accuracy of crossovers. ***Journal of Virology***, 69: 131-140.
70. Bujarski, J.J, **Nagy, P. D.,** and Flasinski, S. (1994). Molecular studies of genetic RNA-RNA recombination in brome mosaic virus. **Advances in Virus Research**, Vol 43 (eds. Maramorosch, K., Murphy, F. and Shatkin, A). pp. 275-302.
71. Pogany, J., Huang, Q., Romero, J., **Nagy, P. D.**, Bujarski, J. J. 1994. Infectious transcripts from PCR-amplified broad bean mottle bromovirus cDNA clones and variable nature of leader regions in RNA. **J Gen Virol.** 75; 693-697.
72. Bujarski, J.J, and **Nagy, P. D.** (1994). Targeting of the site of nonhomologous recombination in brome mosaic virus. **Archives in Virolology** 9: 231-238.
73. **Nagy, P. D.**, and Bujarski, J.J. (1993). Targeting the site of RNA-RNA recombination in brome mosaic virus with antisense sequences**.** ***Proceedings of the National Academy of Sciences USA (PNAS)*** 90: 6390-6394.
74. **Nagy, P. D.**, and Bujarski, J.J. (1992). Genetic recombination in brome mosaic virus: Effect of sequence and replication of RNA on accumulation of recombinants. ***Journal of Virology***, 66: 6824-6828.
75. Burgyan, J., **Nagy, P. D**., and Russo, M. (1990). Synthesis of infectious RNA from full-length cloned cDNA to RNA of cymbidium ringspot tombusvirus. **Journal of General Virology**, 71: 1857-1860.
76. A. Ádám and **Nagy P. D**. (1989). Variations in membrane polar lipids of barley leaves infected with three strains of barley stripe mosaic virus and with poa semilatent virus. **Plant Science**, 61: 53-59.
77. **Nagy, P. D**., Gaborjanyi, R., Kovacs, L., Farkas, I. 1989. Antiviral activity of tiazofurine against barley stripe mosaic virus. **Antiviral Res.** 11: 41-45.

INVITED REVIEWS IN SCIENTIFIC JOURNALS:

1. **Nagy, P. D**., and Pogany, J. 2006. Yeast as a model host to dissect functions of viral and host factors in tombusvirus replication. ***Virology*** **344**(1)**,** 211-20.
2. **Nagy, P. D.**, and Simon, A.E. (1997). New insights into the mechanisms of RNA recombination. ***Virology*****,** 235: 1-9.
3. Simon, A.E. and **Nagy, P. D.** (1996). RNA recombination in turnip crinkle virus: its role in formation of chimeric RNAs, multimers, and in 3'-end repair. ***Seminars in Virology*** 7: 373-379.
4. Bujarski, J.J. and **Nagy, P. D.** (1996). Different mechanisms of homologous and nonhomologous recombination in brome mosaic virus: role of RNA sequences and replicase proteins. ***Seminars in Virology*** 7:363-372.

BOOKS AND CHAPTERS:

I am currently serving as a Co-EDITOR on Plant Virology Protocols, Vol. 2. Humana Press.

1. **Nagy, P.D**., Tadas Panavas, Elena Serviene and Judit Pogany (2008) A high-throughput approach for studying tombusvirus replication in yeast. **Current Protocols in Microbiology**. Willey and Sons (in press).

2. **Nagy, P. D.** , and Pogany J. 2003. Role of enhancer and silencer elements in replication of defective interfering RNAs and satellite RNAs associated with tombusvirus and carmovirus infections. In: **Mechanisms of Replication and Transcription of RNA Viruses** (ed. X. Zhang). Publisher: Research Signpost
3. Bujarski, J.J, and **Nagy, P. D.** (1994). Genetic RNA-RNA recombination in positive-stranded RNA viruses of plants. In**: Homologous Recombination in Plants** (ed. J. Paszkowski). Kluwer Acad. Pub. pp.1-24.

Presentations on scientific meetings (1999-2009): 58 from the Nagy lab

Plenary/invited presentations:

International Congress of Virology (Workshop, invited), Paris, 2002
EMBO workshop on Genomics approaches in Plant Virology (Plenary), 2003
State-of-the-Art presentation: American Society for Virology (invited), 2005.
International Congress of Virology (Workshop, invited), San Francisco, 2005
Plant-Microbe interactions (Plenary), Budapest, Hungary, 2006
Plant regulatory RNAs (Plenary), Taipei, Taiwan, 2007
Annual meeting of the Spanish Virology Society (Plenary), Zaragoza, Spain, 2007
EMBO workshop on RNA viruses (Plenary), Vienna, Austria, 2007
Annual meeting of the Mexican Virology Society (Plenary), Mexico City, Mexico, 2007
Samuel Noble lecturer (plenary presentation): American Society for Virology, 2008
State-of-the-Art presentation: International Congress of Virology (Turkey), 2008
Plenary Speaker, Gordon research Conference (Italy), 2009
Symposium speaker, Annual meeting of APS; 2009

SERVICE AND RECOGNITION:

Editorship:

Associate Member (Editorial Board) of VIROLOGY. 2000-present.
Associate Member (Editorial Board) of JOURNAL OF VIROLOGY. 2008-present.

Ad Hoc Reviewer:

Reviewed more hundred articles for journals, such as Science, Proceedings of the National Academy of Sciences USA, the EMBO Journal, Nature Biotechnology, Nature Reviews in Microbiology, Cell Host and Microbes; PLOS Pathogens, Virology, Journal of Virology, RNA, Virus Genes, Virus Research, Molecular Plant Pathology, Nucleic Acid Research, Vaccine, Plant Physiology, Phytopathology, BMC Biology, BMC genetics, and Plant Disease.

Reviewed grant proposals for NSF, USDA-NRI, and served as an internal reviewer for several Tobacco Health and Research Institute grant and five USDA Hatch proposals.

Grant Panelist:
USDA-NRI, Plant-Microbe associations, 2004
NIH-NIAID, Innovative Virology, March, 2005.
NIH-NIAID, Innovative Virology, June, 2005.
NIH-NIAID, Innovative Virology, October 2005.
NIH-NIAID, Virology, October, 2005.
National Scientific Foundation (NSF), Plant Biotic Interactions, October 2005
NIH-BARDA study section, October 2008
NSF-Integrated organismal systems, October 2008
NIH-NIAID, Special emphasis panel; July, 2009

National Scientific Advisory Board member:
Environmental Protection Agency (EPA): on **"**Issues Associated with Deployment of a Type of Plant-Incorporated Protectant (PIP), Specifically Those Based on Plant Viral Coat Proteins (PVCP-PIPs)" 2004.

Committee Services:
National level:
Program planning committee of the American Society for Virology. 2002-2005
This is a highly prestigious committee. I represent the following areas: replication /recombination/protein-nucleic acid interaction and plant viruses.
Membership Committee of the American Society for Virology. 2000-2003
University level:
Institutional Biosafety Committee, 2002-2004
UK equipment grant Ad Hoc Committee, 2007
UK research professorship committee, 2009
College level:
Transgenic plants, 2003-present
T.P Cooper Award Ad Hoc Committee, 2008-9
Department level:
Resource Committee. 2000-2003
Academic Program Committee, 2000-2003, 2005-present
Faculty merit evaluation Committee, 2003-2004
Department of Plant Pathology Faculty Search Committee, 2001
Symposium organized:
Satellite symposium on "Mechanism of viral RNA replication and transcription"; *Organizers: C.C. Kao and P. D. Nagy,* July, 1999. University of Massachusetts.

AWARDS

2002 Science and Engineering Award from the Governor of Kentucky.
2004 Faculty Futures Award, University of Kentucky
2005 *One of Nagy's publications (Nagy and Simon, 1997) is among the top 100 research papers published in the 50 year history of VIROLOGY, an international leading journal of general virology.*
2005 *A groundbreaking paper from Nagy lab (Serviene et al., 2005, PNAS) was chosen by the FACULTY of 1000.*
2006 A breakthrough paper on virus evolution (Cheng, C-P., Elena Serviene, and Nagy, P. D.) was selected in the "SPOTLIGHT" by Journal of Virology, the leading journal in the field of virology.

2006 Bobby Pass Excellence in Grantsmanship Award
2006 *FACULTY of 1000 selection of a paper from the Nagy lab (Jiang et al, JVI, 2006).*
2007 Thomas P. Cooper Research Award
2007 University Research Professor Award
2008 Ruth Allen Award from The American Phytopathological Society
2009 A breakthrough paper on virus replication (Wang, and Nagy, P. D.) was selected in the "SPOTLIGHT" by Journal of Virology, the leading journal in the field of virology.

MEMBERSHIP IN SCIENTIFIC SOCIETIES

American Society for Microbiology
American Society for Virology
RNA Society
American Phytopathology Society

RESEARCH NARRATIVE

My research program is devoted to further our understanding of plant RNA virus replication, viral recombination/evolution and virus – host interaction. Building on the strong progress my laboratory made between 1999-2006, leading to the development of in vitro replication and recombination assays for tombusviruses and yeast as a model host, we took advantage of numerous opportunities:

One of the major frontiers in virus research is the identification of the roles of host factors. We were successful in developing yeast, a model host, by introducing plasmids expressing tombusvirus replication proteins and a viral RNA template (termed replicon). The replicon was able to replicate in yeast as efficiently as in plant cells (Panavas and Nagy, 2003), allowing us to utilize the awesome power of yeast genetics. We were among the first to start systems biology approaches to identify host factors affecting virus replication as well as virus evolution. The systems biology approach generates large data sets, which are currently in preparation for publications. These data sets will be one of the largest for viruses and are expected to change dramatically our understanding of virus - host interactions.

We also undertook a proteomics approach, analyzing the viral and host proteins present in the purified tombusvirus replicase complex (Li, 2008). Also, using protein arrays containing 4,100 purified yeast proteins, we identified more than 60 host proteins interacting with the viral replication proteins (2008). Altogether, tombusviruses became the premier systems to study host protein - viral protein interactions. This research will promote further intensive research into dissecting the roles of the identified host genes/proteins in tombusvirus replication.

Recently, my laboratory expanded our research scope to cell biology with the goal of identifying subcellular sites of tombusvirus replication and the roles of host proteins in assembly of the viral replicase complex. We obtained a confocal microscope that facilitates studies on peroxisome biogenesis (Jonczyk et al., 2007) and additional cellular processes in tombusvirus replication. We have identified a host transport protein termed Pex19p as a factor involved in targeting the viral proteins to the site of replication (Pathak, 2008).

In addition to studying the replication process of tombusviruses, I have a continuing interest in RNA recombination, a major avenue for virus evolution. One of the reasons that RNA viruses are successful pathogens is that they change their genomes frequently to avoid host resistance. This rapid evolution of viruses is due to high frequency mutations and RNA recombination. The significant role of RNA recombination in the emergence of new viruses is well documented for numerous plant, animal, bacterial, fungal and human viruses. In spite of its significance in virus evolution, our understanding of the mechanism of RNA recombination is incomplete. To study this mechanism in Tombusviruses, we have developed both *in vitro* and *in vivo* systems. More progress in my laboratory was achieved through the development of a yeast host for viral RNA recombination (Panavas and Nagy, 2003). This work has led to the first dissection of a host protein, termed Xrn1p 5'-to-3' exoribonuclease, in an RNA virus evolution (Cheng et al., 2007). Currently, we have achieved 95% coverage of the yeast genes, which will promote further intensive research into dissecting the roles of the identified host genes/proteins in tombusvirus recombination.

Viruses cause major losses for agriculture and represent significant risks to crop, livestock and human health. Therefore, I would like to use the information obtained through the above basic scientific experiments to fight against viruses and to prevent viral diseases. To do so, we have demonstrated that one of the identified host protein, termed GAPDH, can cause resistance against tombusviruses in tobacco plants when down-regulated (Wang and Nagy, 2008). Future experiments will seek to test antiviral and other methodologies to reduce the adverse effect of viruses and to exploit the benefits of their “molecular wizardry”.

Christopher Lewis Schardl

VITAE

ADDRESS

Department of Plant Pathology
201F Plant Science Building
1405 Veterans Drive
University of Kentucky
Lexington, KY 40546-0312
Tel: 859 257 7445 x80730; Fax: 859 323 1961
e-Mail: SCHARDL@UKY.EDU
http://www.ca.uky.edu/agcollege/plantpathology/schardl/schardl.htm

ACADEMIC BACKGROUND AND TRAINING

Doctor of Philosophy, Biochemistry (1983) Thesis: "The Nopaline Catabolic Pathway in *Agrobacterium tumefaciens* C58." University of California, Davis
Bachelor of Science with Distinction, Biochemistry (1978) Cornell University, Ithaca, New York
Postdoctoral Fellow, Plant Breeding Institute, Cambridge, England 1983-1985

PROFESSIONAL APPOINTMENTS

H. E. Wheeler Chair in Plant Mycology, University of Kentucky, appt. 11 Dec., 2001
Professor of Plant Pathology, University of Kentucky, appt. 1 July, 1997
Associate Professor of Plant Pathology, University of Kentucky, 1991-1997
Member of the Faculty of Plant Physiology, Biochemistry and Molecular Biology, University of Kentucky, 1987-present
Assistant Professor of Plant Pathology, University of Kentucky, 1985-1991

SERVICE AND RECOGNITION:

Administrative assignments:

Director, University of Kentucky Advanced Genetic Technologies Center, 2000-present
Director of Graduate Studies, Department of Plant Pathology, 1995-2003

Awards and honors:

University of Kentucky President's Award for Diversity, 17 April 2008
Fellow of the Mycological Society of America, 20 July 2004
Honorable Order of Kentucky Colonels, Inducted, 5 Nov. 2003
Fellow of the American Phytopathological Society, 10 Aug. 2003
Gastdozent (Visiting Professor), Swiss Federal Institute of Technology (ETH), Zürich, Switzerland, 1 April-30 September 2003.
Harry E. Wheeler Chair in Plant Mycology, appt. 11 Dec. 2001
University Research Professorship, University of Kentucky, 2000-2001

Gamma Sigma Delta George Mitchell, Jr. Award for Outstanding Service to Graduate Students, University of Kentucky, 2000
Thomas Poe Cooper Award for Research in Agriculture, University of Kentucky, 1999
Elected Councilor for Molecular Biology, Mycological Society of America (1998-2000)
Gamma Sigma Delta (inducted 1997)
Sigma Xi (inducted 1994)
McKnight Foundation Individual Award for Research in Plant Biology, 1989-92.
University of Kentucky Special Faculty Grants, 1988-91.
DeKalb-Pfizer Genetics Postdoctoral Fellowship, 1982-85.
Jastro-Shields Research Scholarship, University of California, Davis, 1979.
Cornell University Scholarships, 1975-6, 1977-8.
New York State Regents Scholarship 1974-1978.
Thorwelle Foundation Scholarship, administered by the United National Bank, Callicoon, New York, 1974-1978.

Editorial:

Senior Editor, Molecular Plant-Microbe Interactions, 01/2007-present
Associate Editor & Editorial Board Member, Fungal Genetics & Biology, 2002-present
Associate Editor & Editorial Board Member, Mycologia, 1997-2000, 2000-2003 (handled 16 manuscripts/yr)
Associate Editor, Phytopathology, 2000-2002 (reviewed 6 manuscripts /yr)

Study Panels/ Grant Review Panels:

National Science Foundation, Plant Fungal and Microbial Developmental Mechanisms, 2008.
National Science Foundation/ U.S. Department of Agriculture National Research Initiative, Microbial Genome Sequencing Program, 2007.
U.S. Department of Agriculture Small Business Innovation Research, 2001.
U.S. Department of Agriculture Initiative for Future Agriculture and Food Systems (IFAFS) 2000.
National Science Foundation Major Research Instrumentation, 1999.
U.S. Department of Agriculture National Research Initiative, 1999.
U.S. Department of Agriculture National Research Initiative, 1995.

Professional Societies:

American Phytopathological Society (Fellow)
American Society of Plant Biologists
Botanical Society of America
Gamma Sigma Delta
Genetics Society of America
International Society for Molecular Plant-Microbe Interactions
International Symbiosis Society
Mycological Society of America (Fellow)
Sigma Xi

Society for Molecular Biology and Evolution

National and International Activities (Other):

Co-organizer (with L.J. Vaillancourt), joint meeting of the Mycological Society of America and the International Symposium on Fungal Endophytes of Grasses, to be held 26 June – 1 July 2009.

Member, APS Awards and Honors Committee, 2006-2010, Vice-Chair 2007-2008, Chair 2008-2009

Member, Editorial Advisory Committee, Mycologia, 2004-2009

Session organizer and moderator, Fungus-Host Interactions, 22nd Fungal Genetics Conference, Pacific Grove, California, 18-23 March 2003.

Participant in Deep Hypha conference (NSF sponsored), and Chair of the "Molecular data sets" session, Baton Rouge, Louisiana, 8-10 February 2002.

Session moderator, Genetics & Molecular Biology, Cell Biology & Development. Mycological Society of America, San Diego, CA, 1995

Discussion leader, Mitochondria: function, plasmids and introns. 5th International Mycological Congress, Vancouver, British Columbia, Canada, 1994

Outside participant and reviewer for NSF Research Experiences for Undergraduates Program at Northeast Missouri State Univ., June 1993

Member, American Phytopathological Society Subject Matter Committee, Phyllosphere Microbiology, 1992-1995

Member, American Phytopathological Society Committee, Biochemistry, Physiology & Molecular Biology, 1991-1994

Member, American Phytopathological Society Committee, Biotechnology Regulation Impact Assessment, 1991-1994

Ad hoc reviewer for 8 National Science Foundation panels, 10 U.S. Department of Agriculture panels, U.S. Department of Energy Program in Energy Biosciences, Noble Foundation, Swiss National Science Foundation, British National Environmental Research Council, the Kentucky, Maryland and New Jersey Agricultural Experiment Stations, and the University of Kentucky THRI.

Member, Mycological Society of America Long-term Planning Committee, 1999-2000

Councilor, Molecular Biology, Mycological Society of America, term: 1998-2001.

External examiner for:

- Ganley, Austen Rawlinson, PhD candidate, Massey University, Palmerston North, New Zealand (1999)
- Xu, Xiuqin PhD candidate, National University of Singapore (2001)

Reviewer for the following books:

- *A Short Guide to Writing about Biology, 3rd edition,* by Jan A. Pechenik. Addison Wesley-Longman (review acknowledged in 4th ed. preface). 1998.
- *Molecular Systematics, 2nd edition,* Hillis DM, Moritz C, Mable BK (eds.) Sinauer Associates, Inc. Publishers, Sunderland, Massachusetts. 1996

Manuscript reviewer for:

- 32 scientific journals
- Chapman and Hall
- US Department of Agriculture/ARS

University and College Activities:

Informatics Certificate, Biology Coordinator, 9/2009-present.
Faculty Advisor, University of Kentucky Wildwater Cats Student Organization, 2005-present.
Member, Graduate Council, University of Kentucky, 8/2006-7/2009.
Member, Search Committee for the Chair of the Department of Biology, 2006-2007.
Chair, Biological Sciences Area Committee. University of Kentucky, 2005-2006.
Member, Biological Sciences Area Committee. University of Kentucky, 2004-2006.
Member, Graduate Council Committee on Fellowships and Traineeships. University of Kentucky, 2004-2007.
Multiyear Fellowships, 2005
Women in Under-Represented Areas, 2006
Member, Faculty Search Committee (Forage Position), Plant and Soil Science Dept., 2005.
Member, College of Agriculture Advisory Committee on Appointment, Promotion and Tenure 2001-2003.
Member, evaluation committee for the Thomas Poe Cooper Research Award, College of Agriculture, March 2002.
Director, Advanced Genetic Technologies Center, University of Kentucky, 2000-present.
Faculty Representative, College of Agriculture Marketing Committee, 2002.
Member, Vice President's Task Force on Biocomputing, 2001.
Faculty Co-reviewer, PLS 609, Plant Biochemistry, 2001.
Evaluator, College of Agriculture Upperclass Scholarships, 1998.
Member, Gamma Sigma Delta Graduate Student Awards Committee, 1998.
Member, Dean's Plant Sciences Ad Hoc Committee, College of Agriculture, 1997-98.
Member, Kirwin Award Committee, University of Kentucky, 1997.
Member, Faculty Search Committee (2 Positions), Agronomy, 1996.
Member, Technical Advisory Committee, Tobacco and Health Research Institute 1996-1997.
Member, Undergraduate Curriculum Committee, College of Agriculture 1994-1996.
Member, Coordinating Committee, Individualized Program in Agricultural Biotechnology, College of Agriculture, 1988-1990 & 1993-1996.
Member, Research Committee, University of Kentucky, 1993.
Member, Macromolecular Structure Analysis Facility Committee, University of Kentucky 1991-1996.
Moderator, Session on "The Impact of Biotechnology." Agriculture in 2001 Symposium, University of Kentucky, 6-8 May 1991.
Chair, Multidisciplinary Feasibility Assessment Program: Plant Gene Transfer Center Seminar Series, College of Agriculture, 1989-1990.
Member, Development Committee for Individualized Program in Agricultural Biotechnology, College of Agriculture, 1988.
Co-chair, Genetics Curriculum Development Committee, College of Agriculture, 1987.

Department Activities:

Member, Faculty Evaluation Committee, Department of Plant Pathology, 2006-2007.

Member, Safety Committee, Department of Plant Pathology, 2004-2006.
Member, Ad-hoc Curriculum Committee, Department of Plant Pathology, 2005.
Member, Faculty Evaluation Committee, Department of Plant Pathology, 2002-2003.
Director of Graduate Studies, Department of Plant Pathology, 1995-2003.
Webmaster, Department of Plant Pathology, 1997-2000.
Member, Faculty Evaluation Committee, Department of Plant Pathology, 1998-1999.
Member, Faculty Search Committee, Department of Plant Pathology, 1995-1996.
Member, Academic Program Committee 1993-1995.
Member, Safety Committee 1994-1996.
Member, Ad-hoc Committee on Rules and Procedures 1994.

Community Activities:

Secretary, Bluegrass Wildwater Association, Lexington, KY, June 2007-2009.
Member at Large, Bluegrass Wildwater Association, Lexington, KY, June 2006-2007.
Member of the Board of Directors and Hospitality Officer, Lexington Talent Education Association (an organization for Suzuki method music instruction) (1994-1996).
Science Fair Judge, Meadowthorpe Elementary School, Lexington, KY (16 Feb. 1995).

TEACHING

Term	Course	Credits	Enrollment
Spring 1986	AGR/BCH/BIO/MI/PPA 601*	1	25
Spring 1987	AGR/BCH/BIO/MI/PPA 601	1	25
Fall 1987	PPA 660†	3	10
Spring 1988	PPA 770	1	5
Spring 1988	MI 615†	3	20
Fall 1988	PPA 770	1	5
Spring 1989	PPA 661	3	11
Spring 1989	PPA 770	1	4
Spring 1989	MI 615†	3	20
Spring 1991	PPA 661	3	9
Fall 1993	PPA 661	3	10
Fall 1994	AGR 773*	1	3
Spring 1995	AGR 773*	1	6
Spring 1995	PPA 660	4	4
Fall 1995	ABT 401*	2	16
Spring 1996	PPA 661	3	4
Fall 1996	ABT 401*	2	20
Spring 1997	ASC 395	2	2
Fall 1997	PPA 660	4	5
Spring 1998	ABT 401	2	17
Fall 1998	ABT 401	2	11
Spring 1999	ABT 401	2	10
Fall 1999	PPA 660	4	5
Fall 1999	ABT 401	2	12
Spring 2000	ABT 401	2	10
Fall 2001	PPA 660	3	8
Fall 2001	ABT 401	2	18
Spring 2002	ENT 695†	3	5
Fall 2002	ABT 401	2	27
Fall 2003	PPA 660*	3	4
Spring 2004	ABT 460	3	30 (+2 I)
Spring 2005	ABT 460	3	40
Fall 2005	PPA 784 002	2	12
Spring 2006	ABT 460	3	31
Fall 2006	PPA 500	2	7
Fall 2007	PPA 500	2	8
Fall 2007	PPA 784 002	1	7
Spring 2008	ABT 460	3	25
Spring 2008	PPA 670	1	5
Fall 2008	PPA 500* (10 Lectures)	2	3
Fall 2008	PPA 784 002	1	3
Spring 2009	PPA 670	1	3

*Co-instructor

†Guest lectures

Courses Organized:

ABT 301 Writing and Presentations in the Life Sciences (2 semester hours; formerly ABT 401 Technical Writing and Presentations in Biotechnology). This course focuses on effective communication of ideas and research in biotechnology. We concentrate on written communication and oral communication, including the preparation of visual aids. Student participation and interaction is strongly emphasized by class discussions and peer evaluations of oral and written presentations. Each student writes a project proposal, presents the proposal orally, and evaluates the oral and written proposals of other students.

ABT 460 Introduction to Molecular genetics (3 semester hours). Molecular genetics is the study of the biochemical basis of heredity and focuses on the structure and expression of DNA at the molecular and cellular level. The course provides a detailed understanding of the biochemical events involved in genome replication, prokaryotic and eukaryotic transcription, and translation of DNA, as well as RNA processing, recombination and the theoretical underpinnings of genetic engineering.

PPA 660 Molecular and Physiological Dynamics of Plant-microbe Interactions (4 semester hours), organized and taught by C.L. Schardl. The course is intended to introduce the advanced student to the dynamic nature of plant-microbe interactions through diverse considerations of biochemical, cytological, physiological and molecular genetic aspects of plant diseases and symbiosis.

PPA 661, Genetics of Plant-microbe Interactions (3 semester hours), organized and taught by C.L. Schardl. Genetics and molecular genetics of plant interactions with fungi and bacteria. Areas of study are: principles of interorganismal genetics and the gene-for-gene model; race-cultivar interactions; genetic determinants of disease in pathogenic relationships, and symbiosis in mutualistic relationships; oligogenic, polygenic and cytoplasmic genes of host and pathogen; interactions of genes, genomes and the environment; strategies to identify genes and elucidate mechanisms for host resistance to disease, and virulence of pathogens. Examples include Flor's flax/flax rust system, plant transformation by Agrobacterium, mutualistic symbiosis and nitrogen fixation by Rhizobium, and others.

PPA 500 (first taught as PPA 784 002), Physiology of Plant Health and Disease (2 semester hours), organized by C.L. Schardl, and team-taught. Major teaching objectives: To provide first-semester graduate students and upperclass undergraduates with a sophisticated appreciation of the interactions of plants with microbes, viruses and the environment. The course focuses on physiological, biochemical and genetic aspects of these interactions, and explores how microbes may promote or degrade plant health; how plant viruses transmit, replicate and cause disease; how plants respond to biotic and abiotic stresses; how plants defend against pathogens; and modern approaches to disease management and risk assessment.

PPA 670 Plant Bacteriology (1 semester hour), organizer and sole instructor.

PPA 784-003 (co-organizer; joint with STA 685 and CS 695) Phylogenetic Analysis and Molecular Evolution. Methods underlying molecular phylogeny studies of protein and nucleic acid sequences to elucidate evolutionary histories and relationships of genes and organisms, as summarized in phylogenetic trees. Students learn theory of molecular sequence evolution, methods of data acquisition, utilization of sequence databases, methods of phylogenetic analysis, and the interpretation and evaluation of phylogenetic trees.

Other Courses Organized:

PPA 784 002 'Discussions in Plant Pathology' (1 credit hour, Organized each Fall Semester since 2006).
PPA 770 'Plant Pathology Seminar' (1 credit hour, Organized for four semesters in 1988-1989).
AGR/BCH/BIO/MI/PPA 601 'Special Topics in Cellular and Molecular Genetics' (1 credit hour, Co-organized Spring 1986, Chaired Spring 1987).
AGR/ASC 361 'Genetics Laboratory' (1 credit hour, Co-organized Fall 1987).
AGR 773 Seminar in Plant Physiology (1 credit hour, Co-organized Fall 1994).
ABT 460 Introduction to Molecular Genetics (3 credit hour, Spring 2004, 2005, 2006)

Other Teaching:

PPA 660 'Dynamics of Plant-Pathogen Interactions' (3 cr, Guest lecture 1987).
AGR/ASC 361 'Genetics Laboratory' (1 cr), Guest instructor Fall 1987.
MI 615 'Molecular Biology' (3 cr), Guest lectures each in 1988 and 1989.
PPA 400G 'Principles of Plant Pathology' (4 cr), Guest lecture 1991.
ABT 101 (2 cr), Guest lecture 2001.
ENT 695 (3 cr): Five 75-min lectures on molecular phylogenetics, Spring 2003.

MENTORING[1]

Distinct from formal classroom instruction and undergraduate advising, I have supervised 16 PhD students (12 completed, 5 in progress), 6 MS students (5 completed, 1 in progress), and 22 postdoctoral scholars, participated in another 64 graduate student guidance and examination committees, provided funding for 5 additional graduate student research assistants, advised 29 undergraduate students, and provided research experiences to 66 others including visiting scholars (12), graduate students (6 lab rotations), undergraduate students/ post-baccalaureates (40), high school teachers (3), and high school students (5).

Undergraduate Advisees:

Fielden, Micah *, Class of 2012
Cox, Corey Peyton*, Class of 2011
Lay, Thanh Andrea*, Class of 2011

[1] Asterisks (*) indicate current mentorees.

McCord, Lauren Ashley*, Class of 2011
Murry, TeNisha Cherelle*, Class of 2011
Mann, Lesley Jaye*, Class of 2010
Ragland, Jessica Elaine, Class of 2009
Prewitt, Adam R., Class of 2009
Richards, Jena Lennea, Class of 2008
Small, Sarah Ross, Class of 2008
Craft, Patrick Alexander, Class of 2007
Fischer, Ryan Gile, Class of 2007
Gue, Racine Shmay, Class of 2007
Schweri, Kathryn Keller, Class of 2007
Williams, LaTasha Sheree, Class of 2007
Fisher, Brent, Class of 2004
Jones, Jessica Lynn, Class of 2003
Takach, Johanna Elise, Class of 2002
Wiseman, Jennifer Lynn, Class of 2002
Binion, Jessica Beth, Class of 2001
Dassel, Mark Wesley, Class of 2001
Spillman, Anita Joe, Class of 2001
Rahn, Kristin Noel, Class of 2000
McGreevy, Alison Michelle, Class of 2000, transferred to Biol. Sci.
Strunk, Sarah Elizabeth, Class of 2000
Mallory, Allison Clare, Class of 1998
McReynolds, Mary Helen, Class of 1998
Hopkins, Jill Sharon, Class of 1997
Lynch, John William, III, Class of 1996
Songlin, Peeranan Jeap, Class of 1990

Graduate Student Advisees:

Arnaudova, Elisaveta*, PhD Student in Computer Sciences (co-major advisor with J.W. Jaromczyk).
Faulkner, Jerome,* PhD candidate in Plant Pathology, University of Kentucky.
Florea, Simona,* PhD candidate in Plant Pathology, University of Kentucky.
Gill, Love,* MS student in Plant Pathology, University of Kentucky.
Lee, Eunjung,* PhD student in Plant Pathology, University of Kentucky.
Pan, Juan,* PhD student in Plant Pathology, University of Kentucky.
Zhang, Dong-Xiu, PhD 2008, University of Kentucky. Dissertation: Loline alkaloid biosynthesis gene expression in epichloë endophytes of grasses <http://archive.uky.edu/handle/10225/785>.
Mundell, Jaclyn Nicole Inman, MS 2005 in Plant Pathology. Thesis: Phylogenetic analysis of Kentucky strains of *Xylella fastidiosa* <http://archive.uky.edu/handle/10225/510>.
Present position: Research Analyst, University of Kentucky.

Blankenship, Jimmy Douglas, PhD 2004, University of Kentucky. Dissertation: Loline alkaloid biosynthesis in *Neotyphodium uncinatum*, a fungal endophyte of *Lolium pratense* <http://archive.uky.edu/handle/10225/506>.
Present position, PharmD student, College of Pharmacy, University of Kentucky.

Machado, Caroline, PhD 2004, University of Kentucky. Dissertation: Studies of ergot alkaloid biosynthesis genes in Clavicipitaceous fungi <http://archive.uky.edu/handle/10225/505>.

Craven, Kelly D., PhD 2003, University of Kentucky. Dissertation: Coevolution and genetic diversity in grass-endophyte symbioses <http://archive.uky.edu/handle/10225/503>.
Present position, Staff Scientist, Samuel R. Noble Foundation, Ardmore, Oklahoma.

Heist, Elmer Patrick, PhD, 2003. University of Kentucky. Dissertation: Interactions of the tobacco blue mold pathogen, *Peronospora tabacina,* with wild and commercial *Nicotiana* species.
Present position, Assistant Professor of Microbiology at the Pikeville College School of Osteopathic Medicine.

Craven, Kelly Dale, MS 2000. University of Kentucky. Thesis: Evolution of *Epichloë* and *Neotyphodium* endophytes, fungal symbionts of grasses.
Present position: see above.

Heist, Elmer Patrick, MS 2000. University of Kentucky. Thesis: Development of tissue culture systems with *Peronospora tabacina* and various *Nicotiana* species to study growth of pathogen in callus and to examine interactions with host roots. Present position: see above.

Wang, Jinghong, PhD 2000. University of Kentucky. Dissertation: *dmaW* Encoding tryptophan dimethylallyltransferase in ergot alkaloid biosynthesis from clavicipitaceous fungi. Present position, Research Scientist, Amgen San Francisco.

Chung, Kuang-Ren, PhD 1996. University of Kentucky. Dissertation: Genetics of the grass symbiont, *Epichloë typhina* (Pers.:Fr.) Tul. Present position: Assistant Professor, Department of Plant Pathology University of Florida.

Smigell, Christopher G., MS 1996. University of Kentucky. Thesis: Development of a polymerase chain reaction-based assay for the detection of *Peronospora tabacina* in tobacco. Present position: Agricultural Extension Specialist Associate, Department of Horticulture, University of Kentucky.

Tsai, Huei-Fung, PhD 1993. University of Kentucky. Dissertation: Molecular genetics of *Epichloë* mycosymbionts of tall fescue (*Festuca arundinacea*). Present position, Staff Scientist, National Institute of Allergy and Infectious Diseases, National Institutes of Health, Bethesda, MD.

Liu, Jih-Shiou, PhD 1993, University of Kentucky. Dissertation: Evolution of the fungal tribe Balansieae (Clavicipitaceae) and related endophytes of grasses. Present position, Institute of Botany, Academica Sinica, Taipei, Taiwan.

Li, Daoxin, PhD 1992, University of Kentucky. Dissertation: The *khs* gene encoding kievitone hydratase, a phytoalexin detoxification enzyme of *Fusarium solani* f. sp. *phaseoli*. Microbiology Lab Director, EMSL Analytical, Inc., Indianapolis, IN

Chang, Shinyu, MS 1990. University of Kentucky. Thesis: The *sti35* gene of *Fusarium solani.*

Richey, Margaret Gallagher, PhD 1989. University of Kentucky (co-advisor w/ D. A. Smith). Dissertation: Development of techniques for the molecular analysis of *Fusarium solani* f. sp. *phaseoli*. Present position: Professor of Biology & Biochemistry, Centre College, Danville, Kentucky.

Choi, Gil Ho, PhD 1989. University of Kentucky (co-advisor w/ D.A. Smith). Dissertation: Biochemical and molecular responses of *Fusarium solani* f. sp. *phaseoli* and *Fusarium oxysporum* f. sp. *cucumerinum* to isoflavonoids, including bean phytoalexins. Present position: Staff Scientist, Human Genome Sciences, Inc., Rockville, Maryland.

Competitive Student Awards:

Mann, Lesley J. (ABT program Undergraduate): Beckman Scholar, 2008-2009.
Schweri, Kathryn K. (ABT program Undergraduate): Beckman Scholar, 2006-2007.
Machado, C (PhD candidate): Melhus Symposium at the 2003 Annual Meeting of the American Phytopathological Society (competitive).

Graduate Student Committees (other):

Bec, Sladana* (PhD Candidate in Plant Pathology).
Feliciano-Rivera, Merari* (PhD Student in Plant Pathology).
Hilstrom, Carl* (PhD Candidate in Plant & Soil Science).
Martin, Katherine Bateman* (PhD Candidate in Plant Pathology).
Nybo, Stephen Eric* (PhD Candidate in Pharmacy).
Starnes John Howard* (PhD Candidate in Plant Pathology).
Torres-Quintero, Maria Fernanda* (MS Student in Plant Pathology).
Xia, Ye (PhD in Plant Pathology, 2009).
Gao, Qing-ming (PhD Student in Plant Pathology).
Jiang, Yi (PhD Candidate in Plant Pathology).
Sharanowski, Barbara J (PhD Candidate in Entomology) (outside examiner 2009).
Yelton, Sharon (PhD Candidate in Plant Pathology, left program in 2007).
Speakman, Skyler (MS in Statistics, 2008)
Lu, Ronghua (PhD Student in Chemistry, switched to MS program in 2007).
Sarmiento, Carlos (PhD in Entomology, 2007).
Flowers, Jennifer L. (PhD in Plant Pathology, 2006).
Gopal-Puram, Venu (MS in Biology, 2006).
Peyyala, Rebecca (PhD in Plant & Soil Sciences, 2006).
Pitz, Kevin M. (PhD in Entomology, 2006).
Rehmeyer, Cathryn J. (PhD in Plant Pathology, 2006).
Shapka, Natalia A. (PhD in Plant Pathology, 2006).
Venard, Claire (PhD in Plant Pathology, 2006).
Mathews, Stephanie Anne (MS Student in Plant Pathology, withdrew, 2005).
Myung, Kyung PhD 2005, Plant Physiology: Outside Examiner.
Badgett, Thomas (PhD University of Kentucky, Biological Sciences, 2004).
Gu, Hongcang (PhD University of Kentucky, Plant Pathology, 2004).

Rajendran, K.S. (PhD University of Kentucky, Plant Pathology, 2004).
Sukrong, Suchada (PhD University of Kentucky, Plant Physiology, 2004).
Wu, Pingsheng (PhD in Crop Science, 2004).
Johnson, Linda (PhD West Virginia University, 2003)
Flowers, Jennifer L. (MS in Plant Pathology, 2002).
Du, Meizhu (MS in Plant Pathology, 2002).
Xu, Xiuqin PhD 2001, National University of Singapore: Outside Examiner
Chaky, Jennifer Arndt (MS in Plant Pathology, 2000).
Ganley, Austen Rawlinson (PhD, 2000, Massey University, Palmerston North, New Zealand): Outside Examiner
Koning, Gwen (Ph.D, 1999 in Crop Science).
Hong, Yiling (PhD, 1997 in Plant Physiology, Genetics and Molecular Biology).
Murrell, Courtney (MS, 1997 in Agricultural Economics)
Philley, Melissa (PhD, 1997 in Biological Sciences): Outside Examiner
Wang, Rui (PhD, 1997 in Plant Physiology, Genetics and Molecular Biology).
Zheng, Qi (PhD, 1997 in Plant Physiology, Genetics and Molecular Biology).
Williams, Jennifer Marin (PhD, 1997 in Biological Sciences): Outside Examiner
Chen, Hsien-Jung (PhD, 1996 in Plant Pathology).
Huang, Shaohua (PhD, 1996 in Plant Pathology).
Yan, Xianghe (PhD, 1996 in Plant Physiology, Genetics and Molecular Biology).
Chu, Mei Hua (PhD, 1995 in Plant Pathology).
Huang, Yan (MS, 1995 in Plant Physiology, Genetics and Molecular Biology).
Lusso, Marcos Fernando (PhD, 1995 in Plant Pathology).
Yuan, Jing (MS student in Plant Pathology 1993-1995).
Wei, Wensheng (MS student in Plant Pathology 1993-1995).
Chang, Shinyu (PhD, 1994 in Biological Sciences): Outside Examiner.
Muccharommah (PhD, 1994 in Plant Pathology).
Choi, Il-Ryong (PhD, 1993 in Plant Pathology).
Wiglesworth, Martin Dale (PhD, 1993 in Plant Pathology).
Richins, Richard Dean (PhD, 1993 in Plant Pathology).
Haddix, Pryce Lee (PhD, 1992 in Microbiology and Immunology): Outside Examiner.
McCracken, Daniel Vernon (PhD, 1991 in Soil Science): Outside Examiner.
Franklin, Kathleen Marie (PhD, 1989 in Plant Pathology).
Li, Daoxin (MS, 1988 in Plant Pathology).
Hellmann, Gary (PhD, 1988 in Plant Pathology).
Ray, Phillip Dale (PhD candidate in Plant Physiology).
Franks, Deborah (former PhD candidate in Plant Physiology).
Rambo, Katherine Clevenger (former PhD candidate in Biological Sciences).
Nalim, F. Ameena (former PhD student in Plant Pathology).

Graduate Student Rotations:

Singleton, Rebecca Rae (Fall 2001) MS student in Plant Pathology
Sukrong, Suchada (Fall 1998) PhD student in Plant Physiology.
Ferhataglu, Yürdagül Gündgör (Fall, 1994) PhD student in Plant Physiology.
Wei, Wensheng (Fall, 1993) MS student in Plant Pathology.

Vögeli-Lange, Regina (Fall 1987) PhD Student in Plant Physiology, Genetics and Molecular Biology.
Holthaus, Stephen (Summer 1997), M.Ed. Student, University of Kentucky.

Research Assistants (Others):

Lengacher, Casey (PhD Student in Computer Sciences, 2007-2008).
Alluri, Salini (MS Student in Computer Sciences, 2006-2007).
Tata, Swati (MS Computer Sciences, 2006).
Lindstrom, Adam, (MS Statistics, 2006).

Postdoctoral Scholars and Assistant Research Professors:

Liu, Jinge,* Postdoctoral Scholar, 2007-present
Nagabhyru, Padmaja,* Postdoctoral Scholar, 2006-present
Andreeva, Kalina, Postdoctoral Scholar, 2005-2009
Hesse, Uljana, Postdoctoral Scholar, 2002-2008
Wilson, Ella, Postdoctoral Scholar, 2006-2008
Zhang, Dong-Xiu, Postdoctoral Scholar, 2008
Blankenship, Jimmy Douglas, Postdoctoral Scholar, 2004-2006
Liu, Miao, Postdoctoral Scholar, 2005-2006
Machado, Caroline, Postdoctoral Scholar, 2004-2005
Spiering, Martin Jürgen, Postdoctoral Scholar, 1999-2005
Moon, Christina Diane, Postdoctoral Scholar, 1999-2002
Wang, Jinghong, Postdoctoral Scholar, 2000-2001
Funnell, Deanna L., Postdoctoral Scholar, 1998-2000
Wilkinson, Heather Hope, Postdoctoral Scholar, 1995-1996, Assistant Research Professor, 1996-1999
Hsiau, Portia Tang-Wung, Postdoctoral Scholar, 1996-1997
Kuldau, Gretchen Anne, Postdoctoral Scholar, 1995-1996
Chung, Kuang-Ren, Postdoctoral Scholar, 1996
Tsai, Huei-Fung, Postdoctoral Scholar, 1993-1995
An, Zhiqiang, Postdoctoral Scholar, 1991-1992
Mogen, Kim Leigh, Postdoctoral Scholar, 1988-1991
Tuzun, Sadik, Postdoctoral Scholar, 1988-1990 (cosponsored with Joseph Kuc')
Marek, Elzbieta Tarantowicz, Postdoctoral Scholar, 1987-1989 (cosponsored with David Smith)

Visiting Scholars:

Panyakard, Kamolporn, MS Student, Maejo University, Chiang Mai, Thailand, April-August 2009.
Sriwati, Rina, Lecturer, Syiah Kuala University, Banda Aceh, Indonesia. May-June 2009.
Sugawara, Koya: Researcher, Plant Pathology Laboratory, National Institute of Livestock and Grassland Science, Researcher, Plant Pathology Laboratory, National Institute of Livestock and Grassland Science. September 2007-October 2008.
Kaser, Joseph Matthew: PhD Student, Oregon State University. July 2008.

Iannone, Leopoldo: PhD Student, Buenos Aires University, Argentina. February-July 2007.

Khan, Anar K.: Bioinformatician, AgResearch Ltd., Dunedin, New Zealand, August-September 2007; June 2008.

Li, Chunjie: Associate Professor, Lanzhou University, Lanzhou China, February 2006-February 2007 (officially designated Postdoctoral Scholar).

Schmid, Jan: Senior Lecturer in Microbiology, Massey University, Palmerston North, New Zealand/ Aotearoa, April-October, 2004.

Gentile, Agustina; Research Assistant, PhD Student, Buenos Aires University, Argentina. Visited May-August 2002.

Leuchtmann, Adrian; Research Scientist, Geobotanisches Institut, ETH Zürich, Switzerland. Visited September-November 1995, July 1996, July 1998.

Moon, Christina; Research Assistant, Massey University, Palmerston North, New Zealand. Visited 8 May-7 August 1998

Rollinger, Jeanette: Assistant Professor, Hazard Community College, Hazard, Kentucky, Summer 1998.

Richey, Margaret G.: Associate Professor, Centre College, Danville, Kentucky. Visited June-August 1990, January-May 1997.

Christensen, Michael J.: Research Scientist, AgResearch Grasslands Crown Research Institute, Palmerston North, New Zealand. Visited May 6-27, 1997

Undergraduate and Postbaccalaureate Interns:

Meyer, Naomi L.* (Summer-Fall 2009) Eastern Kentucky University, Forensic Science, Class of 2009.

Bullock, Charles Thomas* (Spring 2008-present) University of Kentucky

Calder, James Otto* (Spring 2007-present) University of Kentucky

Guinaudeau, Julien (Summer 2009), M.S. Student, Dijon University, Dijon France.

Heffington, Lindsey N. (Summer 2009) University of Kentucky, Class of 2009.

Mann, Lesley Jaye (Summer 2007-Summer 2009) University of Kentucky, ABT, Class of 2010, **2008 Beckman Scholarship Recipient**.

Worm, James T (Spring 2009) BIO 395, University of Kentucky.

Carmichael, Emily (Summer 2008) Eastern Kentucky University, Forensic Science, Class of 2008.

Johnson, Erin (Summer 2007) Rose-Hulman Institute of Technology.

Adams, Kandi (Summer 2006) Eastern Kentucky University, Forensic Science, Class of 2006

Bonilla, Tracy (Summer and Fall 2006) University of Kentucky, ABT, Class of 2007

Porter, Joseph Christopher (Summer 2006) Eastern Kentucky University, Forensic Science, Class of 2007

Wagner, Dianna R. (Summer 2006) Eastern Kentucky University, Forensic Science, Class of 2006

Arnold, William Caswell (Spring and Fall 2006, Fall 2008) University of Kentucky, BIO

Holcomb, Nathaniel (Fall, 2005; Spring 2006) University of Kentucky, BIO, Class of 2007

Milby, Lindsey Brook (Fall, 2005) University of Kentucky, BIO, Class of 2007

Moyers, John (Summer-Fall 2005), Postbaccalaureate, University of Kentucky
Gay, Emily (Summer 2005, Summer 2006) Sewanee the University of the South, Sewanee Tennessee, Class of 2007
Gayheart, Dustin Todd (Summer 2005, Fall 2005; Spring 2006, Summer 2006), University of Kentucky, ABT, Class of 2006
Birkenhauer, Thomas James (Fall 2004; Spring-Fall 2005; Spring 2006), University of Kentucky, ABT, Class of 2006
Gue, Racine Shmay (Summer 2004), University of Kentucky, ABT, Class of 2007
Schweri, Kathryn Keller (Summer 2004-Spring 2005, Fall 2005-Summer 2007) University of Kentucky, ABT, Class of 2007, **2006 Beckman Scholarship Recipient**
Williams, Latasha Sheree, (Fall 2003-Summer 2006; Spring 2006; Bucks-for-Brains Scholarships Summer 2004, Summer 2005, Summer 2006), University of Kentucky, Class of 2007
Njoku, Oriaku Akuma-Kalu (Summer 2003), University of Kentucky, ABT, Class of 2006
Goins, Amy Gail (Summer-Fall 2002), University of Kentucky, ABT, Class of 2004
Inman, Jaclyn Nicole (Spring 2002), University of Kentucky, PLS, Class of 2002
Wiseman, Jessica Lynn (Fall 2000-Summer 2001), University of Kentucky, ABT, Class of 2002
Binion, Jessica Beth (Fall 1999-Spring 2001), University of Kentucky, ABT, Class of 2001
Mathews, Stephanie Anne (NSF Research Experiences for Undergraduates Summer 1999-Fall 1999, Kentucky Youth Summer Scholarship Summer 2000; Fall 2000-Spring 2001) University of Kentucky, ABT, Class of 2001
Yeargan, Bret (Summer 1999; Summer 2000), Duke University, Class of 2002
Steele, Ron (Summer 1998), Alcorn State University, Natchez Mississippi, Class of 1999.
Lee, Ellen Christy (Summer 1999), University of Kentucky, BIO, Class of 2000
Hampton, John David (Summer 1998), University of Kentucky, ABT, Class of 1998
Dueñas, Jasmine L. (1997-98), University of Kentucky, Class of 1999
Blankenship, Jimmy Douglas (1997-98), University of Kentucky, BIO, Class of 1998
Mallory, Allison Clare (Spring 1997-Spring 1998), University of Kentucky, ABT, Class of 1998
Go, Melalani (Spring 1996), University of Kentucky, ABT, Class of 1996.
Crider, Misty (Winter 1996), Centre College, Danville, Kentucky, Class of 1996.
Lynch, John William, III (Spring 1996), University of Kentucky, ABT, Class of 1996.
Dame, Christi (Summer 1994), University Program for Women and Minorities.
Garrett, Kris (Summer 1994), University Program for Women and Minorities.
Moeller, Stephanie (Summer 1993), NSF Program for Women and Minorities.
Songlin, Peeranan Jeap (Summer & Fall 1989), University of Kentucky, ABT.
Ghabrial, Amin Said (Summer 1987; Summer 1988; Summer 1989), Washington University, St. Louis, MO.

Other Mentorships:

Timmons, Sarah (Fall 2005), Student, Tates Creek High School, Lexington, Kentucky
Sleighman, Megan (Spring 2005), Student, Tates Creek High School, Lexington, Kentucky
Plymale, Christopher W. (Summers 2004, 2005), Student, Lafayette High School, Lexington, Kentucky
Potter, Benjamin (Summer 2000), High School Student, Lexington, Kentucky.
Townsend, Cathy Richardson (Summer 1997), Biology Teacher, Powell County High School, Stanton, Kentucky.
Rodriguez, Grace ("Tara") (Summer 1996), Chemistry Teacher, Western Hills High School, Frankfort, Kentucky.
Holthaus, Stephen (Summer 1995; Summer 1997), Biology Teacher, Jessamine County High School, Nicholasville, Kentucky.
Jayasekera, Rasika (1994-1995), Student, Dunbar High School, Lexington, Kentucky.

GRANT SUPPORT

Current Grant Support:

USDA-CSREES Special Grant 2009-34457-20125
PIs: C. L. Schardl (@1.2 c. mo.)
Title: "Advanced genetic technologies, KY."
Duration: 9/2009-8/2012.
Total award: $ 421,394.

NSF-EPSCOR, Ecological Genomics Initiative,
PIs: C.L. Schardl (@ 0.5 c. mo.), J.W. Jaromczyk, S.R. Voss, A.J. Stromberg, B.A. Webb, P. Calie, H. Barton.
Duration: 01 July 2008-31 Aug. 2013
Award: $2,310,132 (one of 5 initiatives of the Kentucky EPSCOR grant)

USDA-NRI 2008-35318-04549
PIs: D.G. Panaccione, C.L. Schardl (@ 0.5 c. mo.)
Title: "Biochemical and Genetic Basis for Ergot Alkaloid Diversification."
Duration: 9/2008-8/2011.
Total award: $394,989 ($132,000 to University of Kentucky).

USDA-CSREES Special Grant 2008-34457-19176
PIs: C. L. Schardl (@1.2 c. mo.), D. K. Howe.
Title: "Advanced genetic technologies, KY."
Duration: 9/2008-8/2011.
Total award: $448,178.

NIH-NIGMS 1R01GM086888-01
PIs: R. Yoshida, C.L. Schardl (@1 c. mo.), J.Wl. Jaromczyk
Title: Geometry of gene cophylogenies as relates to genome evolution and speciation.
Duration: 01 July 2008 – 30 June 2013
Total award: $ 1,400,000

USDA-ARS Specific Cooperative Agreement 200710021743
PIs: C.L. Schardl (@1 c. mo.), R. Dinkins
Title: "Plant and Endophyte Gene Expression and Metabolism in Response to Stress and Parasitism."
Duration: 07-01/2007-12-31/2008.
Total award: $ 117,662.

USDA-NRI 2005-35318-16184
PIs: D.G. Panaccione, C.L. Schardl (@0.5 c. mo.),
Title: "Toxin biosynthesis genes in ergot alkaloid-producing fungi."
Duration: 9/2005-8/2009.
Total award: $358,000.

Prior Grant Support-Extramural:

NSF EF-0523661
PIs: C.L. Schardl (@1.0 c. mo.), B.A. Roe, M.L. Farman.
Title: "Genome of *Epichloë festucae*, a model endophyte of grasses."
Duration: 9/2005-8/2008.
Total award: $771,075.

USDA-NRI 2005-35319-16141
PI: C.L. Schardl (@1.0 c. mo.),
Title: "Gene expression profiles in a grass-endophyte symbiosis."
9/2005-8/2008,
Total award: $390,000.

USDA-CSREES Special Grant 2006-34457-17180
PIs: C. L. Schardl (@1.2 c. mo.).
Title: "Advanced genetic technologies, KY."
Duration: 7/2006-6/2008.
Total award: $596,122.

USDA-CSREES Special Grant 2004-34457-14496
PIs: C. L. Schardl (@1.2 c. mo.), E.M. D'Angelo, J.F. Timoney, S.C. Artiushin, A.B. Downie.
Title: "Advanced genetic technologies, KY."
Duration: 7/2005-6/2007.
Total award: $601,893.

USDA-ARS Specific Cooperative Agreement 200506271031
PIs: C.L. Schardl (@0.5 c. mo.), J.D. Blankenship, L.P. Bush, P. Kachroo, R. Dinkins, I. Kagan
Title: "Tall fescue endophyte effects on environmental stress tolerances."
Duration: 4/2005-2/2006.
Total award: $118,627.

Hope College (Holland Michigan) Subcontract for NSF DBI-0330840 (T.L. Bultman et al. Hope College, Holland, MI.).
PI: C.L. Schardl (@0.25 c. mo.).
Title: "CRUI: A multidisciplinary test of mutualistic benefits fungal endophytes provide their host plants."
Duration: 9/2004-8/2007.
Total award: $69,000.

USDA-ARS Specific Cooperative Agreement 200403171013
PIs: C.L. Schardl (@0.5 c. mo.), T.D. Phillips.
Title: "Deletion of ergot alkaloid production genes in a tall fescue endophyte."
Duration: 3/2004-2/2007.
Total award: $214,014.

USDA-CSREES Special Grant 2004-34457-14496
C. L. Schardl (@1.2 c. mo.), M.J. Sharkey, A.G. Hunt, J.R. Hartman. "Advanced genetic technologies, KY." 7/2004-6/2006. Total award: $560,895.

NSF MCB-0213217
C.L. Schardl (@3 c. mo.), R.B. Grossman, L.P. Bush. "Molecular biology and biosynthesis of lolines by grass endophytes." 9/2002-8/2006. Total award: $411,143.

United States Department of Agriculture Special Grant 2003-34457-13114
C.L. Schardl (@1 c. mo.), J.F. Timoney, A.B. Downie, D.K. Howe, J. Matthews, K.R. McLeod, S. Ghabrial. "Advanced genetic technologies." 1 July 2003-30 June 2005, $626,887. Noncompetitive.

Centro Internacional de Agricultura Tropical, Colombia 200308081413
C.L. Schardl (@2% DOE). "Extraction and identification of antimycotic compounds from Acremonium implicatum infected Brachiaria grasses." 1 Aug. 2003-31 Dec. 2004, $20,000. Noncompetitive.

Cornell University 42405-6995 (Subcontract for USDA-CSREES Eastern Grape Consortium)
J.R. Hartman, C.L. Schardl (@5% DOE), J. Beale, R.T. Bessin, J.G. Strang. "Pierce's disease of grapes caused by *Xylella fastidiosa*: a survey for the pathogen, identification of reservoir hosts, and identification of insect vectors in Kentucky vineyards." $10,000. 2003-2004. Regionally competitive.

United States Dept. Agriculture National Research Initiative 2001-35319-10930
D.G. Panaccione, C.L. Schardl (@10% DOE). "Toxin biosynthesis genes in ergopeptine-producing fungi." 1 Sep. 2001-31 Aug. 2004 (3 yr), $300,000 ($118,518 to Univ. Kentucky on West Virginia University subcontract 50012039). Nationally competitive.

United States Department of Agriculture Special Grant 2002-34457-11844.
C. L. Schardl (@5% DOE), L.J. Vaillancourt, P.D. Nagy, S.E. Perry, S.L. Dobson, D.F. Hildebrand. "Advanced genetic technologies." 7/2002-6/2004, $561,217. Noncompetitive.

National Science Foundation MCB-2001-04670

M.L. Farman, C.L. Schardl (@1% DOE), C. Staben, R.A. Dean, M. Sachs, , " Comparative genomics of telomeres in pathogenic and saprophytic fungi" 01 Oct. 2001-30 Sep. 2003, $793,000 ($523,784 to University of Kentucky). Nationally competitive.

Eastern Grape Consortium

J. R. Hartman, C. L. Schardl (@5% DOE), J. Beale, R. T. Bessin, J. G. Strang. "Pierce's disease of grapes caused by *Xylella fastidiosa*: a survey for the pathogen, identification of reservoir hosts, and identification of insect vectors in Kentucky vineyards." $15,000. 2002-2003. Regionally competitive.

United States Department of Agriculture Special Grant 2001-34457-10343.

C. L. Schardl (@5% DOE), B.A. Webb, E. Bailey, J. Chappell, S. Gan, M. L. Farman. "Advanced genetic technologies." 2001-2003, $443,343. Noncompetitive.

United States Department of Agriculture Special Grant 00-34431-8975.

T. D. Phillips, C. L. Schardl (@1% DOE). "Forage for advancing livestock production." 2000-2003, $198,764. Noncompetitive.

United States Department of Agriculture Cooperative State Research Education & Extension 2001-34103-10532.

C. Dougherty, C. L. Schardl & al. (10 co-PIs)"IPM of weeds, clover and endophyte in tall fescue grassland." 1 June 2001-31 May 2003, $54,675. Nationally competitive.

United States Department of Agriculture Enhancement Program 2002-35311-11716.

C. L. Schardl (@0.1% DOE), B. A. Webb, S. E. Perry, S. Gan, D. K. Howe, P. D. Nagy. "Enhancing genetic analysis and sequencing facility." 01-January 2002-31 December 2002, $32,500. Regionally competitive (USDA-EPSCoR)

University of Arkansas (subcontract).

C.L. Schardl (@0.5% DOE). "Genotyping endophytes of grass species in *Festuca* subgenus *Schedonorus.*" 01 April 2001 - 31 March 2002, $13,113. Noncompetitive

National Science Foundation Integrative Plant Biology Program IOB-9808554

C. L. Schardl (@25% DOE), L. P. Bush. "Molecular genetics and biosynthesis of loline alkaloids by mutualistic endophytes." 1 July 1998-31 Aug. 2002, $225,000. Nationally competitive.

Research Experiences for Undergraduates, supplement for NSF IBN-9808554

C. L. Schardl. 1999, $5,500.

United States Dept. Agriculture National Research Initiative 98-35303-6663

D.G. Panaccione, C.L. Schardl. "Toxin biosynthesis genes in ergopeptine-producing fungi." 15 Nov. 1998-30 Nov. 2001 (3 yr), $170,000 ($61,613 to Univ. Kentucky). Nationally competitive.

National Science Foundation Systematic Biology Program DEB-9707427

C. L. Schardl. Molecular systematics of grass symbionts of the fungal family Clavicipitaceae (Hypocreales). 1997-2000 (3 yr), $125,000. Nationally competitive.

Research Experiences for Undergraduates, supplements for NSF DEB-9707427

C.L. Schardl. 1998 & 1999, $10,800.

Advanta Seeds Pacific. C.L. Schardl. Biodiversity of grass endophytes. 1999. $5,000.

University of Kentucky THRI, C.L. Schardl, Control of acidic beta-1,3-glucanase gene expression in induced systemic resistance of tobacco to blue mold. 1998-2000 (2 yr), $110,000. Regionally competitive.

R.J. Reynolds. C.L. Schardl. Optimizing and testing the utility of a PCR technique to detect the tobacco blue mold pathogen. 1997-1998 (1 yr) $15,000. Noncompetitive

National Science Foundation Systematic Biology Program DEB-9408018
C. L. Schardl, M. R. Siegel. Phylogenetics of *Epichloe* species and related grass mycosymbionts. 1994-97 (3 yr), $185,000. Nationally competitive.

United States Dept. Agriculture National Research Initiative 95-37303-1678
C. L. Schardl, M. R. Siegel, L. P. Bush. Altering ergot alkaloid biosynthesis by the *Acremonium* endophyte of tall fescue. 1995-98 (3 yr), $125,000. Nationally competitive.

Tobacco and Health Research Institute, Lexington, Kentucky
C. L. Schardl, L. J. Vaillancourt, W. C. Nesmith. Interactions of tobacco with the biotrophic fungus *Peronospora tabacina*: Potential for novel metabolism and enhanced disease resistance. 1996-97 (1 yr), $15,000. Regionally competitive.

United States Dept. Agriculture National Research Initiative 92-37303-7612
C. L. Schardl, M. R. Siegel, L. P. Bush. Natural and modified grass endophytes as agents for biological protection. 1992-95 (3 yr), $178,000. Nationally competitive.

Avanta Seeds West, Inc.
M.R. Siegel, C.L. Schardl. Introduction of *Acremonium* endophytes into grasses for crop improvement. 1993-95 (1.5 yr), $4,000. Noncompetitive

National Science Foundation International Program INT-912083
U.S.-New Zealand Cooperative Research: Diversity and evolution of grass mycosymbionts. 5/1992-10/1993 (1.5 yr), $21,000. Nationally competitive.

R. J. Reynolds Tobacco Co.
M. R. Siegel, W. C. Nesmith, C. L. Schardl. Race differentiation and population dynamics in *Peronospora tabacina*. 1992-93 (1 yr), $13,500. Noncompetitive

International Seeds
M.R. Siegel, C.L. Schardl. Introduction of *Acremonium* endophytes into grasses for crop improvement. 1992 (1 yr) $6,000. Noncompetitive

USDA Competitive Research Grants 90-37262-5447
C. L. Schardl, D. A. Smith, M. G. Richey. Molecular genetics of phytoalexin detoxification by *Fusarium solani phaseoli*. 1990-93 (3 yr), $90,000. Nationally competitive.

McKnight Foundation Individual Awards for Research in Plant Biology
C. L. Schardl. Mitochondrial plasmids and host compatibility in the grass endophyte, *Epichloë typhina*. 1989-1992 (3 yr), $105,000. Nationally competitive.

R. J. Reynolds Tobacco Co.
M. R. Siegel, W. C. Nesmith, C. L. Schardl. Race differentiation and population dynamics in *Peronospora tabacina*. 1991-92 (1 yr), $10,000. Noncompetitive

USDA Competitive Research Grant, 88-37151-3860
M. R. Siegel, C. L. Schardl, L. P. Bush, P. M. Zavos, D. L. Dahlman, C. W. Bacon. Manipulation of the fungal endophyte *Acremonium coenophialum* for use in control of pests of tall fescue. 1988-1991 (3 yr), $150,000. Nationally competitive.

R. J. Reynolds Tobacco Co.
L. P. Bush, C. L. Schardl. Nicotine demethylation of tobacco. 1990-91 (1 yr), $35,000. Noncompetitive

R. J. Reynolds Tobacco Co.
M. R. Siegel, C. L. Schardl, W. C. Nesmith. Differentiation among populations of *Peronospora tabacina* by host range and nuclear genomic analysis. 1990-91 (1 yr), $12,000. Noncompetitive

USDA-KAES Cooperative Agreement 58-43YK-9-0024
J. Kuc´, C. L. Schardl, S. Tüzün, H. W. Spurr. Regulation of gene expression during the immunization of tobacco against blue mold. 1989-1991 (2 yr), $67,500. Regionally competitive.

R. J. Reynolds Tobacco Co.
M. R. Siegel, C. L. Schardl, W. C. Nesmith. Differentiation among populations of *Peronospora tabacina* by host range and nuclear genomic analysis. 1989-1990 (1 yr), $18,000. Noncompetitive

USDA Competitive Research Grant 87-CRCR-1-2391
C. L. Schardl, D. A. Smith. Molecular studies of phytoalexin detoxification and virulence in *Fusarium*. 1987-1989 (2 yr), $100,000. Nationally competitive.

USDA-KAES Cooperative Agreement 58-43YK-7-0030
J. Kuc´, C. L. Schardl, H. W. Spurr. Regulation of gene expression, identification of gene products and application of immunization technology for the control of blue mold in tobacco. 1987-1989 (2 yr), $75,000. Regionally competitive.

Kentucky Soybean Promotion Board
S.A. Ghabrial, D.E. Hershman, D.A. Johnson, K.V. Yeargan, C.L. Schardl. Epidemiology and control of bean pod mottle virus in soybean. 1987-88 (1 yr), $8,000. Regionally competitive.

Support for Associated Postdoctoral Scholars:

United States Dept. Agriculture National Research Initiative-Postdoctoral Research 96-35303-3578. Heather H. Wilkinson. Genes of grass endophytes determining expression of protective alkaloids. 1996-98 (2 yr), $82,000

PUBLICATIONS & PATENTS[2]

Refereed Research Papers

Bryant MK, Schardl CL, Hesse U, Scott B* (2009) Evolution of a subtilisin-like protease gene family in the grass endophytic fungus *Epichloe festucae*. BMC Evolutionary Biology **9:** 168 (13 pp.) (supported by NSF grant EF-0523661).

Florea S, Andreeva K, Machado C, Mirabito PM, Schardl CL* (2009) Elimination of marker genes from transformed filamentous fungi by unselected transient transfection with a Cre-expressing plasmid. Fungal Genetics and Biology 46: 721-730 (funded by USDA-CSREES grants 2005-35319-16141, 2007-10021743, and 2008-35318-04549).

[2] Asterisk (*) indicates corresponding author.

Iannone LJ, Cabral D, Schardl CL, Rossi MS* (2009) Phylogenetic divergence, morphological and physiological differences distinguish a new *Neotyphodium* endophyte species in the grass *Bromus auleticus* from South America. Mycologia 101: 340-351.

Liu M*, Panaccione DG, Schardl CL (2009) Phylogenetic analyses reveal monophyletic origin of the ergot alkaloid gene *dmaW* in fungi. Evolutionary Bioinformatics 5: 15-30 (Supported by USDA-NRI 2008-35318-04549).

Young CA*, Tapper BA, May K, Moon CD, Schardl CL, Scott B (2009) Indole-diterpene biosynthetic capability of epichloë endophytes as predicted by *ltm* gene analysis. Applied and Environmental Microbiology 75: 2200-2211 (Supported by USDA-NRI 2005-35319-16141).

Zhang D-X, Nagabhyru P, Schardl CL* (2009) Regulation of a chemical defense against herbivory produced by symbiotic fungi in grass plants. Plant Physiology 150: 1072-1082 (funded by USDA-CSREES grants 200506271031 and 200710021743, NSF grant EF-0523661 and USDA-NRI grant 20053531916141).

Zhang D-X, Stromberg AJ, Spiering MJ, Schardl CL* (2009) Coregulated expression of loline alkaloid-biosynthesis genes in *Neotyphodium uncinatum* cultures. Fungal Genetics and Biology 46: 517-530 (funded by USDA-CSREES grants 200506271031 and 200710021743, NSF grant EF-0523661 and USDA-NRI grant 20053531916141).

Spiering MJ, Faulkner JR, Machado C, Zhang D-X, Grossman RB, Schardl CL* (2008) Role of the LolP cytochrome P450 in biosynthesis of *N*-formylloline. Fungal Genetics and Biology 45: 1307-1314 (funded by NSF IOB/MCB-0213217).

Schardl CL, Craven KD, Speakman S, Stromberg A, Lindstrom A, Yoshida R* (2008) A novel test for host-symbiont codivergence indicates ancient origin of fungal endophytes in grasses. Systematic Biology 57: 483-498 (funded by NSF DEB–9707427, USDA CSREES 2005-34457-15712).

Potter DA*, Stokes JT, Redmond CT, Schardl CL, and Panaccione DG (2008) Contribution of ergot alkaloids to suppression of a grass-feeding caterpillar assessed with gene-knockout endophytes in perennial ryegrass. *Entomologia Experimentalis et Applicata* 126:138-147. (Supported by USDA-NRI 2005-35318-16184)

Moon CD, Guillaumin J-J, Ravel C, Li C, Craven KD, Schardl CL* (2007) New *Neotyphodium* endophyte species from the grass tribes Stipeae and Meliceae. Mycologia 99: 895-905.

Lorenz N, Wilson EV, Machado C, Schardl CL, and Tudzynski P* (2007) Comparison of ergot alkaloid biosynthesis gene clusters in *Claviceps* species indicates loss of late pathway steps in evolution of *C. fusiformis*. *Appl Environ Microbiol* 73: 7185-7191. (Supported by USDA-NRI 2005-35318-16184).

Sullivan TJ, Rodstrom J, Vandop J, Librizzi J, Graham C, Schardl CL, and Bultman TL* (2007) Symbiont-mediated changes in *Lolium arundinaceum* inducible defenses: evidence from changes in gene expression and leaf composition. *New Phytologist* 176: 673-679 (funded by NSF DBI-0330840).

Kutil BL, Greenwald C, Liu G, Spiering MJ, Schardl CL, Wilkinson HH* (2007) Comparison of loline alkaloid gene clusters across fungal endophytes: predicting the co-regulatory sequence motifs and the evolutionary history. *Fungal Genetics and Biology* 44: 1002-1010 (funded by NSF IBN/MCB-0213217)

Faulkner JR, Hussaini SR, Blankenship JD, Pal S, Brannan BM, Grossman RB, Schardl CL* (2006) On the sequence of bond formation in loline alkaloid biosynthesis. *Chembiochem* 7: 1078-1088 (funded by NSF IBN/MCB-0213217).

Panaccione DG*, Cipoletti JR, Sedlock AB, Blemings KP, Schardl CL, Machado C, Seidel GE (2006) Effects of ergot alkaloids on food preference and satiety in rabbits, as assessed with gene-knockout endophytes in perennial ryegrass (*Lolium perenne). J Agric Food Chem*: 54: 4582-4587 (funded by USDA NRI 2001-35319-10930 and 2005-35318-16184).

Panaccione DG*, Kotcon JB, Schardl CL, Johnson RD, Morton JB (2006) Ergot alkaloids are not essential for endophytic fungus-associated population suppression of the lesion nematode, *Pratylenchus scribneri*, on perennial ryegrass. *Nematology*: 8: 583-590 (funded by USDA NRI 2001-35319-10930 and 2005-35318-16184).

Blankenship JD, Houseknecht JB, Pal S, Bush LP, Grossman RB, Schardl CL* (2005) Biosynthetic precursors of fungal pyrrolizidines, the loline alkaloids. *Chembiochem* 6: 1016-1022 (funded by NSF IBN/MCB-0213217).

Du M., Schardl CL, Nuckles EM, Vaillancourt LJ* (2005) Using mating-type gene sequences for improved phylogenetic resolution of *Collectotrichum* species complexes. *Mycologia* 97: 641-658.

Funnell DL*, Lawrence CB, Pedersen JF, Schardl CL (2005) Expression of the tobacco β-1,3-glucanase gene PR-2d, following induction of SAR with *Peronospora tabacina*. *Physiological and Molecular Plant Pathology*: 65: 285-296 (funded by THRI, Ms. No. PMPP04-73R1).

Gentile A, Rossi MS, Cabral D, Craven KD, Schardl CL* (2005) Origin, divergence, and phylogeny of epichloë endophytes of native Argentine grasses. *Molecular Phylogenetics and Evolution* 35: 196-208.

Haarmann T, Machado C, Lübbe Y, Correia T, Schardl CL, Panaccione DG, Tudzynski P* (2005) The ergot alkaloid gene cluster in *Claviceps purpurea*: extension of the cluster sequence and intra species evolution. *Phytochemistry* 66: 1312-1320 (funded by USDA NRI 2001-35319-10930).

Damrongkool P, Sedlock AB, Young CA, Johnson RD, Goetz KE, Scott B, Schardl CL, Panaccione DG* (2005). Structural analysis of a peptide synthetase gene required for ergopeptine production in the endophytic fungus *Neotyphodium lolii*. *DNA Sequence* 16: 379-385 (funded by USDA NRI 2001-35319-10930).

Spiering MJ, Moon CD, Wilkinson HH, Schardl CL* (2005) Gene clusters for insecticidal loline alkaloids in the grass-endophytic fungus *Neotyphodium uncinatum*. *Genetics* 169: 1403-1414 (funded by NSF IBN/MCB-0213217).

Zhuang J*, Marchant MA, Schardl CL, Butler CM (2005) Economic analysis of replacing endophyte-infected with endophyte-free tall fescue pastures. *Agronomy J* 97: 711-716.

Heist EP, Zaitlin D, Funnell DL, Nesmith WC, Schardl CL* (2004) Necrotic-lesion resistance induced by *Peronospora tabacina* on leaves of *Nicotiana obtusifolia*. *Phytopathology* 94: 1178-1188

Moon CD, Craven KD, Leuchtmann A, Clement SL, Schardl CL* (2004). Prevalence of interspecific hybrids amongst asexual fungal endophytes of grasses. *Molecular Ecology* 13: 1455-1467 (funded by NSF DEB-9707427)

Wang J, Machado C, Panaccione DG, Tsai H-F, Schardl CL* (2004) The determinant step in ergot alkaloid biosynthesis by an endophyte of perennial ryegrass. *Fungal Genetics and Biology* 41: 189-198 (funded by USDA NRI 2001-35319-10930)

Johnson LJ, Johnson RD, Schardl CL, Panaccione DG* (2003) Identification of differentially expressed genes in the mutualistic association of tall fescue with *Neotyphodium coenophialum*. *Physiological and Molecular Plant Pathology* 63: 305-317 (funded by USDA NRI 2001-35319-10930)

Heist EP*, Nesmith WC, Schardl CL (2002) Interactions of *Peronospora tabacina* with roots of *Nicotiana* species in gnotobiotic associations. *Phytopathology* 92: 400-405 (chosen as the cover article for the issue)

Moon CD, Miles CO, Jarlfors U, Schardl CL* (2002) The evolutionary origins of three new *Neotyphodium* endophyte species from grasses indigenous to the Southern Hemisphere. *Mycologia* 94: 694-711 (funded by NSF DEB-9707427)

Spiering MJ, Wilkinson HH, Blankenship JD, Schardl CL* (2002) Expressed sequence tags and genes associated with loline alkaloid expression by the fungal endophyte *Neotyphodium uncinatum*. *Fungal Genetics and Biology* 36: 242–254 (funded by NSF IBN-9808554)

Blankenship JD, Spiering MJ, Wilkinson HH, Fannin FF, Bush LP, Schardl CL* (2001) Production of loline alkaloids by the grass endophyte, *Neotyphodium uncinatum,* in defined media. *Phytochemistry* 58: 395–401 (funded by NSF IBN-9808554)

Craven KD, Blankenship JD, Leuchtmann A, Hignight K, Schardl CL* (2001) Hybrid fungal endophytes symbiotic with the grass *Lolium pratense*. *Sydowia* 53: 44-73 (funded by NSF DEB-9707427)

Craven KD, Hsiau PTW, Leuchtmann A, Hollin W, Schardl CL* (2001) Multigene phylogeny of *Epichloë* species, fungal symbionts of grasses. *Annals of the Missouri Botanical Garden* 88: 14-34 (funded by NSF DEB-9707427)

Heist EP*, Nesmith WC, Schardl CL (2001) Cocultures of *Peronospora tabacina* and *Nicotiana* species to study host-pathogen interactions. *Phytopathology* 91: 1224-1230

Panaccione DG*, Johnson RD, Wang JH, Young CA, Damrongkool P, Scott B, Schardl CL (2001) Elimination of ergovaline from a grass-Neotyphodium endophyte symbiosis by genetic modification of the endophyte. *Proceedings of the National Academy of Sciences of the United States of America* 98: 12820-12825. http://www.pnas.org/cgi/content/full/98/22/12820 (funded by USDA NRI 2001-35319-10930)

Moon CD, Scott B*, Schardl CL, Christensen MJ (2000) Evolutionary origins of Epichloë endophytes from annual ryegrasses. *Mycologia* 92:1103-1118. (funded by NSF DEB-9707427)

Wilkinson HH, Siegel MR, Blankenship JD, Mallory AC, Bush LP, Schardl CL* (2000): Contribution of fungal loline alkaloids to protection from aphids in a grass-endophyte mutualism. *Molecular Plant-Microbe Interactions* 13: 1027-1033. http://www.apsnet.org/mpmi/pdfs/2000/0803-01R.pdf. (funded by NSF IBN-9808554)

Kuldau GA, Tsai H-F, Schardl CL* (1999) Genome sizes of *Epichloë* species and anamorphic hybrids. *Mycologia* 91: 776-782 (funded by NSF DEB-9707427)

Schardl CL*, Leuchtmann A (1999) Three new species of *Epichloë* symbiotic with North American grasses. *Mycologia* 91: 95-107 (funded by NSF DEB-9707427)

Eizenga GC*, Schardl CL, Phillips TD, Sleper DA (1998) Differentiation of tall fescue monosomic lines using RFLP markers and double monosomic analysis. *Crop Science* 38: 221-225 (funded by USDA NRI 95-37303-1678)

Leuchtmann A*, Schardl CL (1998) Mating compatibility and phylogenetic relationships among two new species of *Epichloë* and other congeneric European species. *Mycological Research* 102: 1169-1182 (funded by NSF DEB-9707427)

Miles CO*, de Menna ME, Jacobs SWL, Garthwaite I, Lane GA, Prestidge RA, Marshall SL, Wilkinson HH, Schardl CL, Ball OJ-P, Latch GCM (1998) Endophytic fungi in indigenous Australasian grasses associated with toxicity to livestock. *Applied & Environmental Microbiology* 64: 601-606. http://aem.asm.org/cgi/reprint/64/2/601. (DEB-9707427 to CLS, USDA NRI 96-35303-3578 to HHW)

Christensen MJ*, Ball OJ-P, Bennett R, Schardl CL (1997) Fungal and host genotype effects on compatibility and vascular colonisation by Epichloë festucae. Mycological Research 101: 493-501 (funded by NSF DEB-9408018).

Chung K-R, Hollin W, Siegel MR, Schardl CL* (1997) Genetics of host specificity in *Epichloë typhina. Phytopathology* 87: 599-605 (funded by USDA NRI 95-37303-1678)

Chung K-R, Schardl CL* (1997) Sexual cycle and horizontal transmission of the grass symbiont, *Epichloë typhina*. *Mycological Research* 101: 295-301 (funded by NSF DEB-9408018)

Chung K-R, Schardl CL* (1997) Vegetative compatibility between and within *Epichloë* species. *Mycologia* 89: 558-565 (funded by NSF DEB-9408018)

Kuldau, GA, Liu J-S, White JF, Siegel MR, Schardl CL* (1997) Molecular systematics of Clavicipitaceae supporting monophyly of genus *Epichloë* and form genus *Ephelis*. *Mycologia* 89:431-441 (funded by NSF DEB-9408018).

Schardl CL*, Leuchtmann A, Chung K-R, Penny D, Siegel MR (1997) Coevolution by common descent of fungal symbionts (*Epichloë* spp.) and grass hosts. *Molecular Biology and Evolution* 14: 133-143 (funded by NSF DEB-9408018)

Chung K-R, Leuchtmann A, Schardl CL* (1996) Inheritance of mitochondrial DNA and plasmids in the ascomycetous fungus, *Epichloë typhina. Genetics* 142: 259-265 (funded by NSF DEB-9408018)

Tsai H-F, Wang H, Gebler JC, Poulter CD, Schardl CL* (1995) The *Claviceps purpurea* gene encoding dimethylallyltryptophan synthase, the committed step for ergot alkaloid biosynthesis. *Biochemical and Biophysical Research Communications* 216: 119-125. http://www.genome.ad.jp/dbget-bin/www_bget?ec:2.5.1.34. (funded by USDA NRI 95-37303-1678)

Li D, Chung K-R, Smith DA, Schardl CL* (1995) The *Fusarium solani* gene encoding kievitone hydratase, a secreted enzyme that catalyzes detoxification of a bean phytoalexin. *Molecular Plant-Microbe Interactions* 8: 388-397

Siegel MR, Schardl CL*, Phillips TD (1995) Incidence and compatibility of non-clavicipitaceous fungal endophytes in *Festuca* and *Lolium* grass species. *Mycologia* 87: 196-202

Finkel RA, Bent S, Schardl CL* (1994) Determining the probability of obtaining a desired clone in an amplified or shuttle library. *Biotechniques* 16: 580-583

Leuchtmann A*, Schardl CL, Siegel MR (1994) Sexual compatibility and taxonomy of a new species of *Epichloë* symbiotic with fine fescue grasses. *Mycologia* 86: 802-812

Liu J-S, Schardl CL* (1994) A conserved sequence in internal transcribed spacer 1 of plant nuclear rRNA genes. *Plant Molecular Biology* 26: 775-778

Schardl CL*, Leuchtmann A, Tsai H-F, Collett M, Watt DM, Scott DB (1994) Origin of a fungal symbiont of perennial ryegrass by interspecific hybridization of a mutualist with the ryegrass choke pathogen, *Epichloë typhina*. *Genetics* 136: 1307-1317 (funded by NSF INT-912083)

Tsai H-F, Liu J-S, Staben C, Christensen MJ, Latch GCM, Siegel MR, Schardl CL* (1994) Evolutionary diversification of fungal endophytes of tall fescue grass by hybridization with *Epichloë* species. *Proceedings of the National Academy of Sciences of the United States of America* 91: 2542-2546 (funded by NSF INT-912083)

Wiglesworth MD*, Nesmith WC, Schardl CL, Li D, Siegel MR (1994) Use of specific repetitive sequences in *Peronospora tabacina* Adam for the early detection of the tobacco blue mold pathogen. *Phytopathology* 84: 425-430

An Z-q, Siegel MR, Hollin W, Tsai H-F, Schmidt D, Schardl CL* (1993) Relationships among non-*Acremonium* sp. fungal endophytes in five grass species. *Applied and Environmental Microbiology* 59: 1540-1548

Tsai H-F, Siegel MR, Schardl CL* (1992) Transformation of *Acremonium coenophialum*, a protective mycosymbiont of the grass *Festuca arundinacea*. *Current Genetics* 22: 399-406

Schardl CL*, Tsai H-F (1992) Molecular biology and evolution of the grass endophytes. *Natural Toxins* 1: 171-184

Turbek CS, Smith DA, Schardl CL* (1992) An extracellular enzyme from *Fusarium solani* f. sp. *phaseoli* which catalyzes hydration of the isoflavonoid phytoalexin, phaseollidin. *FEMS Microbiology Letters* 94: 187-190

An Z-q, Liu J-S, Siegel MR, Bunge G, Schardl CL* (1992) Diversity and origins of endophytic fungal symbionts of the North American grass *Festuca arizonica*. *Theoretical and Applied Genetics* 85: 366-371

Schardl CL*, Liu J-S, White JF, Finkel RA, An Z, Siegel MR (1991) Molecular phylogenetic relationships of nonpathogenic grass mycosymbionts and clavicipitaceous plant pathogens. *Plant Systematics and Evolution* 178: 27-41

Mogen KL, Siegel MR, Schardl CL* (1991) Linear DNA plasmids of the perennial ryegrass choke pathogen, *Epichloë typhina* (Clavicipitaceae). *Current Genetics* 20: 519-526

Byrd AD, Schardl CL*, Songlin PJ, Mogen KL, Siegel MR (1990) The β-tubulin gene of *Epichloë typhina* from perennial ryegrass. *Current Genetics* 18: 347-354

Choi GH, Marek EM, Richey MG, Chang S, Schardl CL*, Smith DA (1990) *sti35,* A stress responsive gene in *Fusarium*. *Journal of Bacteriology* 172: 4522-4528

Turbek CS, Li D, Choi GH, Schardl CL*, Smith DA (1990) Induction and purification of kievitone hydratase from *Fusarium solani* f. sp. *phaseoli*. *Phytochemistry* 29: 2841-2846

Marek ET, Schardl CL*, Smith DA (1989) Transformation of *Fusarium solani* with an antibiotic resistance marker with no fungal DNA homology. *Current Genetics* 15: 421-428

Richey MG, Marek ET, Schardl CL*, Smith DA (1989) Transformation of filamentous fungi with plasmid DNA by electroporation. *Phytopathology* 79: 844-847

Tuzun S, Rao N, Vogeli U, Schardl CL, Kuc´ J* (1989) Induced systemic resistance to blue mold: Early induction and accumulation of β-1,3-glucanases, chitinases and other pathogenesis related (b-)proteins in immunized tobacco. *Phytopathology* 79: 979-983

Schardl CL, Byrd AD, Benzion G, Altschuler MA, Hildebrand DA, Hunt AG* (1987) Design and construction of a versatile system for the expression of foreign genes in plants. *Gene* 61: 1-11

Brears T, Schardl CL, Lonsdale DM* (1986) Chloroplast genome organization in sugar beet and maize. *Plant Molecular Biology* 6: 171-176

Houchins JP*, Ginsburg H, Rohrbaugh M, Dale RMK, Schardl CL, Hodge TP, Lonsdale DM (1986) DNA Sequence analysis of a 5.27-kb direct repeat occurring adjacent to the regions of S-episome homology in maize mitochondria. *European Molecular Biology Organization Journal* 5: 2781-2788

Schardl CL, Pring DR, Lonsdale DM* (1985) Mitochondrial DNA rearrangements in fertile revertants of S-type male-sterile maize. *Cell* 43: 361-368

Schardl CL, Lonsdale DM*, Pring DR, Rose KR (1984) Linearization of maize mitochondrial chromosomes by recombination with linear episomes. *Nature* 310: 292-296

Schardl CL, Kado CI* (1983) A functional map of the nopaline catabolism genes on the Ti plasmid of *Agrobacterium tumefaciens* C58. *Molecular and General Genetics* 191: 10-16

Schardl CL, Kado CI* (1983) Ti plasmid and chromosomal ornithine catabolism genes of *Agrobacterium tumefaciens* C58. *Journal of Bacteriology* 155: 196-202

Liu S-T, Perry KL, Schardl CL, Kado CI* (1982) *Agrobacterium tumefaciens* Ti plasmid indoleacetic acid gene is required for crown gall oncogenesis. *Proceedings of the National Academy of Sciences of the United States of America* 79: 2812-2816

Patents <http://www.uspto.gov/patft/index.html>:

Schardl CL, Wilkinson HH, Spiering MJ. US Patent Number 7,183,098. Loline alkaloid gene clusters of the fungal endophyte *Neotyphodium uncinatum*. Issue Date: 27 February 2007.

Schardl CL, Wang J. US Patent Number 6,335,188. Endophyte ergot alkaloid synthetic compounds, compounds which encode therefor and related methods. Issue Date: 1 January 2002.

Peer-Reviewed Reviews and Book Chapters:

Schardl CL*, Grossman RB, Nagabhyru P, Faulkner JR, Mallik UP (2007) Loline alkaloids: currencies of mutualism. Phytochemistry 68: 980-996 (funded by NSF IBN-9808554, NSF MCB-0213217, and USDA CSREES 200506271031).

Selosse M-A*, Schardl CL (2007) Fungal endophytes in grasses: hybrids rescued by vertical transmission? An evolutionary perspective. New Phytologist 173: 452–458.

Panaccione DG*, Schardl CL, Coyle CM (2006) Pathways to diverse ergot alkaloid profiles in fungi. pp 23-52 in: Romeo JT (ed) Recent Advances in Phytochemistry, vol 40, Elsevier, Amsterdam (funded by USDA NRI 2001-35319-10930 & 2005-35318-16184).

Schardl CL*, Leuchtmann A, Spiering MJ (2004) Symbioses of grasses with seedborne fungal endophytes. Annual Review of Plant Biology 55: 315-340 (funded by NSF DEB-9707427, NSF MCB-0213217, USDA NRI 2001-35319-10930)

Craven KD, Schardl CL*, Clay K (2003). Tall fescue - systematics and morphology. in: Fribourg HA (ed) Tall fescue information system: Tall Fescue Book On-Line. Oregon State University, Corvallis, Oregon. http://forages.oregonstate.edu/is/tfis/enmain.cfm?PageID=339.

Schardl CL*, and Craven KD. 2003. Interspecific hybridization in plant-associated fungi and oomycetes: a review. Molecular Ecology 12: 2861–2873.

Clay K*, Schardl CL (2002) Evolutionary origins and ecological consequences of endophyte symbiosis with grasses. American Naturalist 160: S99-S127

Schardl CL* (2001) *Epichloë festucae* and related mutualistic symbionts of grasses. Fungal Genetics & Biology 33: 69-82

Funnell DL, Schardl CL* (2000) Biochemistry of plant defences against fungal attack. In: Encyclopedia of Life Sciences. London: Macmillan Reference Ltd. Stockton Press.

Funnell DL, Schardl CL* (2000) Plant defences against fungal attack: recognition and signal transduction. In: Encyclopedia of Life Sciences. London: Macmillan Reference Ltd. Stockton Press.

Schardl CL* (1999) Plant defences against herbivore and insect attack. Encyclopedia of Life Sciences. London: Macmillan Reference Ltd. Stockton Press.

Bush LP, Wilkinson HH, Schardl CL* (1997) Bioprotective alkaloids of grass-fungal endophyte symbioses. Plant Physiology 114: 1-7 (funded by USDA NRI 95-37303-1678)

Schardl CL*, Phillips TD (1997) Protective grass endophytes: Where are they from and where are they going? Plant Disease 81: 430-438 (funded by USDA NRI 95-37303-1678; NSF DEB-9408018)

Schardl CL* (1996) *Epichloë* species: fungal symbionts of grasses. Annual Review of Phytopathology 34: 109-130

Schardl CL* (1996) Interactions of grasses with endophytic *Epichloë* species and hybrids. pp 107-140 *in:* Stacey G, Keen N (eds) Plant-Microbe Interactions. Chapman & Hall, Publishers, New York, N.Y., 316 pp

Scott B*, Schardl C (1993) Fungal symbionts of grasses: evolutionary insights and agricultural potential. Trends in Microbiology 1: 196-200

Schardl CL*, Siegel MR (1993) Molecular genetics of *Acremonium coenophialum* and *Epichloë typhina*. Agriculture, Ecosystems and Environment 44: 169-185 [from symposium in New Orleans, Louisiana, November 1990, reprinted as Joost R, Quisenberry S (eds) *Acremonium*/Grass Interactions. Elsevier, Amsterdam, 324 pp]

Invited Publications:

Schardl CL* (2009) Fungal endophytes in *Lolium* and *Festuca* species. pp 285-298 in Yamada T, Spangenberg G, eds. Molecular breeding of forage and turf: The proceedings of the 5th international symposium on the molecular breeding of forage and turf. New York: Springer.

Schardl CL*, Scott B, Florea S, Zhang D (2009) Epichloë endophytes: clavicipitaceous symbionts of grasses. pp 275-306 *in* Deising H, ed, The Mycota V Plant Relationships, 2nd ed., Berlin Heidelberg: Springer-Verlag.

Hesse U, Maynard P, Macmil S, Wiley G, Andreeva K, Beech WE, Arnaoudova E, Willey BT, Puram V-G, Wiseman J, Webb J, Gill L, Farman ML, Jaromczyk JW, Roe BA, and Schardl CL* (2007) The genome and the genes of *Epichloë festucae*. In *New Zealand Grassland Association: Endophyte Symposium*. Popay A, Thom ER (eds.) Christchurch, New Zealand: New Zealand Grassland Association, pp. 461-465.

Florea S, Machado C, Zhang D, Panaccione DG, and Schardl CL* (2007) Towards the elimination of ergot alkaloid biosynthesis genes in *Neotyphodium coenophialum*. In *New Zealand Grassland Association: Endophyte Symposium*. Popay A, Thom ER (eds.) Christchurch, New Zealand: New Zealand Grassland Association, pp. 477-479.

Schardl CL*, Grossman RB, Blankenship JD, Spiering MJ, and Faulkner JR (2007) Biosynthesis of loline alkaloids by epichloë endophytes of grasses. In *New Zealand Grassland Association: Endophyte Symposium*. Popay A, Thom ER (eds.) Christchurch, New Zealand: New Zealand Grassland Association, pp. 482.

Schardl CL*, Panaccione DG, Potter DA, Florea S, Hesse U, Konnova E, Liu M, Machado C, and Stokes JT (2007) Genetic tests of ecological roles of ergot alkaloids produced by an epichloë endophyte of ryegrass. In *New Zealand Grassland Association: Endophyte Symposium*. Popay A, Thom ER (eds.) Christchurch, New Zealand: New Zealand Grassland Association, pp. 172.

Schardl CL*, Leuchtmann A, and McDonald BA (2007) Relationships of *Epichloë typhina* isolates from different host grasses. In *New Zealand Grassland Association: Endophyte Symposium*. Popay A, Thom ER (eds.) Christchurch, New Zealand: New Zealand Grassland Association, pp. 451-455.

Schardl CL*, Craven KD, Schweri KK, Hollin W, Clement SL, Schmid J, West CP, and Phillips TD (2007) Endophytes of the tall fescue ploidy series in Europe, North Africa and the Mediterranean. In *New Zealand Grassland Association: Endophyte Symposium*. Popay A, Thom ER (eds.) Christchurch, New Zealand: New Zealand Grassland Association, pp. 456.

Schardl CL* (2006) Commentary: A global view of metabolites. Chemistry & Biology 13: 5-6

Schardl CL*, Panaccione DG, Tudzynski P. (2006) Ergot alkaloids – biology and molecular biology. pp 45-86 (Chapter 2) *in* Cordell GA (ed) The Alkaloids: Chemistry & Biology, Volume 63 (funded by USDA NRI 2001-35319-10930 & 2005-35318-16184, & USDA-CSREES 200403171013).

Schardl CL*, Leuchtmann A (2005) The epichloë endophytes of grasses and the symbiotic continuum. pp. 475-503 *In* Dighton J, White JF, Oudemans P (eds.), The Fungal Community: Its Organization and Role in the Ecosystem, Boca Raton, Florida: CRC Press

Schardl CL*, Panaccione DG (2005). Biosynthesis of ergot and loline alkaloids. pp 75-92 *in* Roberts CA, West CP, Spiers DE (eds.), *Neotyphodium* in Cool-season Grasses, Ames, Iowa: Blackwell

Hesse U, Christensen MJ, Schardl CL* (2004) Tissue specificity of endophyte development in *Epichloë/Neotyphodium* symbioses with grasses. Proceedings of the XI Molecular Plant-Microbe Interactions Congress, St. Petersburg, Russia 448-452

Schardl CL*, Blankenship JD, Spiering MJ, Machado C (2004) Chapter 15: Loline and ergot alkaloids in grass endophytes. *In* Handbook of Industrial Mycology, ed. Z An, pp. 427-448. New York & Basel: Marcel Dekker, Inc.

Panaccione DG*, Schardl CL (2003) Chapter 13: Molecular genetics of ergot alkaloid biosynthesis. In Clavicipitalean Fungi: Evolutionary Biology, Chemistry, Biocontrol and Cultural Impacts, ed. JF White, Jr., CW Bacon, NL Hywel-Jones, JW Spatafora, pp. 399-424. New York and Basel: Marcel-Dekker, Inc.

Schardl C* (2003) Ergot and endophytic fungal infection and mycotoxin development. In: Mycotoxins: Risks in Plant, Animal, and Human Systems (eds. Richard JL, Payne GA, Desjardins AE, et al.), pp. 29-31. Council for Agricultural Science and Technology, Ames, Iowa.

Schardl CL*, Moon CD (2003) Chapter 9: Processes of species evolution in *Epichloë/ Neotyphodium* endophytes of grasses. In Clavicipitalean Fungi: Evolutionary Biology, Chemistry, Biocontrol and Cultural Impacts, ed. JF White, Jr., CW Bacon, NL Hywel-Jones, JW Spatafora, pp. 273-310. New York and Basel: Marcel-Dekker, Inc.

Schardl CL*, Blankenship JD, Machado C, and Spiering MJ (2002) Web essay 13.2: alkaloid-making fungal symbionts. In: Taiz L and Zeiger E, eds. Plant Physiology. 3rd ed. Sunderland, Massachusetts: Sinauer Associates. <http://www.plantphys.net/article.php?ch=e&id=37&PHPSESSID=06ff6a5f6fadc3330dc6113f4fc6f761>

Moon CD*, Miles CO, Schardl CL (2001) The evolutionary origins of Neotyphodium endophytes from grasses indigenous to the Southern Hemisphere. Pp 289-293 in: Paul VH, Dapprich PD, Krohn K (eds) Grassland Conference 2000: 4th International Neotyphodium/grass Interactions Symposium Proceedings. Universität-GH Paderborn, Soest, Germany.

Spiering MJ*, Blankenship JD, Wilkinson HH, Bush LP, Fannin FF, Schardl CL (2001) Loline biosynthesis in Neotyphodium uncinatum: identifying biosynthetic genes with the use of subtractive hybridization. Pp 295-300 in: Paul VH, Dapprich PD, Krohn K (eds) Grassland Conference 2000: 4th International Neotyphodium/grass Interactions Symposium Proceedings. Universität-GH Paderborn, Soest, Germany.

Wang J*, Schardl CL (2001) Association of Neotyphodium coenophialum dimethylallyltryptophan synthase gene with ergot alkaloid biosynthesis. pp 301-305 in: Paul VH, Dapprich PD, Krohn K (eds) Grassland Conference 2000: 4th International Neotyphodium/grass Interactions Symposium Proceedings. Universität-GH Paderborn, Soest, Germany.

Schardl CL* (2000) Symbiotic Parasites and Mutualistic Pathogens: Clavicipitaceous Symbionts of Grasses. Chapter 11 pp 307-345 In: Kronstad JW (ed) Fungal Pathogens. Dordrecht, The Netherlands: Kluwer Academic Publishers 404 pp

Schardl CL*, Wilkinson HH (2000) Hybridization and cospeciation hypotheses for the evolution of grass endophytes. p 63-83 In: Bacon CW, White JF, Jr. eds. Microbial Endophytes. New York & Basel: Marcel Dekker, Inc. 487 pp

Schardl CL*, Wang J, Wilkinson HH, Chung K-R (1999) Genetic analysis of biosynthesis and roles of anti-herbivore alkaloids produced by grass endophytes. p 118-125 in: Kumagai S, et al eds. Mycotoxin Contamination: Health Risk and Prevention Project. Chiba, Japan: Japanese Association of Mycotoxicology. 278 pp

CAB International (1998) *Neotyphodium coenophialum* [original text by CL Schardl]. In: Database of Seedborne Diseases, Crop Protection Compendium. Module 1: Update. Wallingford, UK: CAB International.

Wilkinson HH, Schardl CL* (1997) The evolution of mutualism in grass-endophyte associations. In: Bacon CW, Hill N (eds) *Neotyphodium*/Grass Interactions. Plenum Press, New York, pp 13-25

Schardl CL*, Clay K (1997) Evolution of mutualistic endophytes from plant pathogens. pp 221-238 *in:* Carroll GC, Tudzynski P (eds) The Mycota V: Plant Relationships, Part B. Springer-Verlag, Berlin, 288 pp

Schardl CL*, Tsai H-F, Chung K-R, Leuchtmann A, Siegel MR (1996) Evolution of *Epichloë* species symbioses with grasses. pp 541-546 *in:* Stacey G, Mullin B, Gresshoff PM (eds) Biology of Plant-Microbe Interactions: Proceedings of the 8th International Symposium on Molecular Plant-Microbe Interactions, St. Paul, Minnesota, U.S.A., 588 pp.

Schardl CL* (1996) Book review: Molecular systematics, second edition, ed. by David M. Hillis, Craig Moritz and Barbara K. Mable. Mycotaxon 61: 499-500

Schardl CL* (1994) Molecular and genetic methodologies and transformation of grass endophytes. pp 151-166 *in:* Bacon CW, White JF Jr. (eds) Biotechnology of Endophytic Fungi of Grasses. CRC Press, Boca Raton, Florida, 214 pp

Schardl CL*, An Z (1993) Molecular biology and genetics of protective fungal endophytes of grasses. In: Setlow JK (eds) Genetic Engineering, Principles and Methods. Plenum Press, New York, pp 191-212

Siegel MR*, Schardl CL (1991) Fungal endophytes of grasses: Detrimental and beneficial associations. pp 198-221 *in:* Andrew JH, Hirano SS (eds) Microbial Ecology of Leaves. Springer-Verlag, Berlin

Schardl CL, Lonsdale DM*, Pring DR (1985) Mitochondrial genome structures in male sterile and fertile maize. pp 575-583 *in:* Freeling M (ed) Plant Genetics. UCLA Symposia on Molecular and Cellular Biology, New Series. Vol. 35. Alan R. Liss, Inc, New York.

Lonsdale DM*, Schardl CL, Pring DR (1984) The mitochondrial genome of the S-male sterile cytoplasm of maize: organization and rearrangements associated with fertility reversion. *in* Current Topics in Plant Biochemistry and Physiology 3. University of Missouri, Columbia. pp 133-140

Technical Publications:

Mundell, N, Schardl C, Hartman J (2005) Phylogenetic analysis of Kentucky strains of *Xylella fastidiosa*. p 27 *In*: Nursery and Landscape Program: 2005 Research Report (PR-520, University of Kentucky College of Agriculture, Agricultural Experiment Station.

Henning JC, Lacefield GC, Vincelli P, Schardl CL, Bush LB, Moon CD (2001) New recommendations for perennial ryegrass seedings for Kentucky horse farms. Kentucky Pest News no. 934, October 15, 2001. http://www.uky.edu/Agriculture/kpn/kpn_01/pn011015.htm

Fribourg HA*, Gwinn KD, Schardl CL (1991) Tall fescue toxicosis glossary. Tennessee Farm & Home Science 160: 82-83.

PRESENTATIONS & ABSTRACTS

Invited Presentations:

"A little help from our friends: symbiont metabolites." Plant Metabolic Engineering Symposium, 9th International Plant Molecular Biology Congress, St. Louis, Missouri, 25-30 October, 2009.

"How and why do plant mutualists evolve? The grass endophyte story." Systematics Symposium: Angiosperm phylogeny: not just trees, but insects, fungi, and much more. Missouri Botanical Garden, St. Louis, Missouri, 10-11 October, 2009.

"Super organisms and super genomes: metabolic genetics and diversity of bioprotective endophytes in grasses." Department of Biochemistry and Molecular and Cellular Biology, University of Tennessee, 9 September 2009.

"Genomic analysis of secondary metabolism genes in the grass endophyte *Epichloë festucae*." American Chemical Society Annual Meeting, Washington, DC, 16-20 August 2009.

"Symbionts with super genomes: metabolic diversity of grass endophytes." Sixth International Symbiosis Society Congress, Madison, Wisconsin, 9-15 August 2009.

"Endophyte alkaloids: protecting the home turf." Southern Pasture & Forage Crop Improvement Conference (SPFCIC), Lexington, Kentucky, 10-12 May 2009.

"Is the genomic evolution of grass endophytes all about hybridization?" Department of Ecology and Evolutionary Biology, Rice University, Houston, Texas, 16 February 2009.

"Lessons from the genome of the *Festuca/Lolium* endophyte, *Epichloë festucae*." Noble Foundation Plant Biology Division 20th Anniversary Symposium, Noble Foundation, Ardmore, Oklahoma, 30 October 2008.

"Symbiogenesis and defensive mutualism: The remarkable grass-epichloe system." Department of Biological Sciences, Eastern Kentucky University, Richmond, Kentucky, 3 October 2008.

"Species and genomes: lessons from my favorite symbionts, questions from my inscape." Opening Workshop - Algebraic Methods in Systems Biology and Statistics, Research Triangle Park, North Carolina, 14-17 September 2008.

"Plant-microbe interactions above ground." Plant-microbe Interactions, Krakow, Poland, 2–6 July 2008.

"Evolution, biology and genomics of endophytic fungi." University of Melbourne, Melbourne, Victoria, Australia, 19 May 2008.

"Genome sequence analysis of *Epichloë festucae*." Systems Biology Workshop, Victorian AgriBiosciences Centre, La Trobe University, Melbourne, Victoria 3083, Australia, 19–30 May 2008.

"Evolution of lolines, a chemical defense conferred by a symbiotic fungus on its plant host." SPP 1152 Evolution of metabolic diversity 7th Colloquium, Halle, Germany, 3–4 April 2008.

"Fungal endophytes: Biochemistry and genomics of protective and heritable symbiosis." University of California, Davis, California, 22 October 2007.

"Fungal endophytes: Biochemistry and genomics of protective and heritable symbiosis." University of Louisville, Louisville, Kentucky, 7 September 2007.

"Evolution and host relationships of seedborne fungal endophytes of grasses." Lanzhou University 兰州大学草地农业科技学院, Lanzhou, China, 18 July 2007.

"Endophyte alkaloids: Significance, biosynthesis and genetics." Lanzhou University 兰州大学草地农业科技学院, Lanzhou, China, 15 July 2007.

"A life of symbiosis: Genetic and genomic studies of protective mutualism in common pasture grasses." Lanzhou University 兰州大学草地农业科技学院, Lanzhou, China, 13 July 2007.

"Evolution of seedborne fungal endophytes and their biochemical contributions to mutualistic symbiosis." Lanzhou University 兰州大学草地农业科技学院, Lanzhou, China, 12 July 2007.

"Ergot alkaloids: history and current situation." Zhejiang University of Science and Technology 浙江工业大学 Hangzhou, China, 10 July 2007.

"Evolution of seedborne fungal endophytes and their biochemical contributions to mutualistic symbiosis." Institute of Plant Physiology and Ecology, Chinese Academy of Sciences 中国科学院上海分院, Shanghai, China, 9 July 2007.

"Evolution and host relationships of seedborne fungal endophytes of grasses." The 5th International Symposium on the Molecular Breeding of Forage and Turf (MBFT 2007) Sapporo, Japan, 1-6 July 2007.

"Interaction & Gene Expression in Plant-microbe Symbiosis." Shanghai University 上海大学, Shanghai, China, 27 June 2007.

"Endophyte alkaloids with emphasis on biosynthesis and genetics of the pharmaceutically important ergot alkaloids." Shanghai Academy of Agricultural Sciences 上海市农科院, Shanghai, China, 26 June 2007.

"Interaction and gene expression in plant-microbe symbiosis." Nanjing Agricultural University 南京农业大学, Nanjing, China 24 June 2007.

"Diversity, origin, evolution and genome sequence of Grass Endophytic-fungi." Nanjing Agricultural University 南京农业大学, Nanjing, China, 24 June 2007

"Host-specific populations of *Epichloë typhina*, and a test of the phylogenetic species recognition method." International Meeting on Population and Evolutionary Biology of Fungal Symbionts, Ascona, Switzerland, 29 April–4 May 2007.

"Evolution and speciation of seed transmissible fungal symbionts of grasses." Alan Wilson Center, Massey University, Palmerston Nth, New Zealand, 4 April 2007.

"Relationships of *Epichloë typhina* isolates from different host grasses." 6th International Symposium on Fungal Endophytes of Grasses, Christchurch, New Zealand, 25–28 March 2007.

"A life of symbiosis: Genetic and genomic studies of protective mutualism in common pasture grasses." Centre College, Danville, Kentucky, 20 October 2006.

"En route to symbiosis. Symposium held on the occasion of retirement of Professor Clarence I. Kado, University of California, Davis, 22 July 2006.

"Bioprotective alkaloids produced by fungal symbionts of grasses." Center for Evolution Ecology and Behavior Symposium, University of Kentucky, 11 May 2006.

"General aspects of grass endophytes: A baseline for comparing endophytes of woody plants." Symposium on Fungal endophytes: Diversity and function in forest ecosystems, Joint meeting of the American Phytopathological Society, Canadian Phytopathological Society, and Mycological Society of America, Québec, QC, Canada, 29 July–2 August 2006.

"Loline alkaloid biosynthesis in grass endophytes." AgResearch Grasslands, Palmerston North, New Zealand/Aotearoa, 15 Nov. 2005.

"Mutualistic pathogens: epichloë endophytes of grasses." Joint meeting of New Zealand Microbiological Society and the New Zealand Society for Biochemistry and Molecular Biology, University of Otago, Dunedin, New Zealand/Aotearoa, 22-25 Nov. 2005.

"Bioprotective alkaloids produced by epichloë endophytes of grasses." Frontiers In Bioorganic And Natural Products Chemistry, The 46th Annual Meeting of the American Society of Pharmacognosy Oregon State University, Corvallis, Oregon, 23-27 July 2005.

"Sexual and parasexual gene flow in endophytes of grasses." XI International Congress of Mycology (Co-convener), San Francisco, California, 24-28 July 2005.

"Evolution of fungal endophytes of grasses, and the role of host specialization." XVII International Botanical Congress, Vienna, Austria, 18 -23 July 2005.

"Phylogenetic and population genetic structure as related to pathogenesis and mutualism in grass endophytes." Nusbaum symposium, North Carolina State University, Raleigh, NC, 27 February–2 March 2005.

"Loline and ergot alkaloid synthesis genes in grass endophytes." Plant and Animal Genome XIII. San Diego, California, 16-19 January 2005.

"Host specialization of endophytes and coevolution." Symposium on coevolution of fungi and plants. Annual meeting of the American Phytopathological Society, Anaheim, California 31 July – 4 August, 2004.

"Synthesis of Ergot and Loline Alkaloids." 5th International Symposium on *Neotyphodium*/Grass Interactions, Fayetteville, Arkansas, 24 May 2004.

"Making a life of symbiosis." Biology Department, Georgetown College, Georgetown, Kentucky, 25 February 2004.

"What Is Really Growing in Your Grass?" Distinguished Scholar Lecture Series, University of Kentucky, Lexington, KY, 27 January 2004.

"Evolutionary and genetic basis of metabolic diversity among grass myco-endophytes." Michigan State University, East Lansing, MI, 1 December 2003.

"The fungal genome part of the grass-endophyte symbiotum: roles and evolution." Endophyte Workshop, Noble Foundation, Ardmore, Oklahoma, 19–21 October 2003.

"Phylogenetic questions." Symposium on systematics and phylogeography of plants and associated microbes. ETH Zürich, Switzerland 24 September 2003.

"Endophytes of grasses and the symbiotic continuum." 4th International Symbiosis Society Congress, Halifax, NS, Canada, 17–23 August 2003.

"Distinct evolutionary processes in fungal endophytes with different life cycles." Schardl CL. Symposium on mechanisms of fungal speciation, Annual meeting of the American Phytopathological Society, Charlotte, NC, 9–13 August, 2003.

"Tissue specificity of endophyte development in *Epichloë/ Neotyphodium* symbioses with grasses." Symposium on: Specificity of plant-associated microflora (roots, leaves, stem), XI International Society for Plant-Microbe Interactions, St. Petersburg, Russia, 19–27 July, 2003.

"Evolutionary genetics of bioprotective alkaloids in grass endophytes." Allgemeines Kolloquium, Pharmazeutischen Kolloquium SS 2003, Institut für Pharmazeutische Biologie, Universität Bonn, Bonn, Germany, 23 June 2003

"Bioprotective alkaloids of grass endophytes: biosynthetic pathways and genetics." Federal Institute of Technology (ETH) Zürich, Switzerland, 29 April 2003.

"Distinct endophyte genome evolution associated with differing degrees of antagonism or mutualism." Session on Fungus-Host Interactions, 22nd Fungal Genetics Conference, Pacific Grove, California, 18–23 March 2003.

"In with the good and out with the bad: genetic analysis and manipulations of loline and ergot alkaloids in endophytes." 8th International Congress of Plant Pathology, Christchurch, New Zealand/Aotearoa, 2–7 February 2003.

"Loline alkaloid and ergot alkaloid biosynthesis genes in grass endophytes." AgResearch Grasslands, Palmerston North, New Zealand/Aotearoa, 24 January 2003.

"Grass endophyte host specificity and evolutionary implications." Symposium: Comparative biology of lichens and plant endophytes, 7th International Mycological Congress, Oslo, Norway, 11–17 August 2002.

"Role of reticulation events in the co-evolution of Epichloë grass endophytes" Symposium: Hybridisation as a force in fungal evolution, 7th International Mycological Congress, Oslo, Norway, 11–17 August 2002.

"Diversification of protective alkaloid profiles as relates to evolutionary processes in fungal endophytes of grasses." Symposium on Chemical Ecology in Symbiosis, 19th Annual International Society for Chemical Ecology (ISCE) Meeting, Hamburg, Germany, 3–8 August 2002.

"The grass endophyte gene for the first step in ergot alkaloid biosynthesis." CL Schardl, J Wang, C Machado, DG Panaccione, 19th Annual International Society for Chemical Ecology (ISCE) Meeting, Hamburg, Germany, 3–8 August 2002.

"Making a life of symbiosis." Biology Department, Hope College, Holland, Michigan, 10 July 2002.

"The biology and systematics of *Neotyphodium* endophytes." American Society of Agronomy/ Soil Science Society of America/ Crop Science Society of America (ASA-CSSA-SSSA) Annual Meeting, Charlotte, N.C. 21-25 Oct, 2001.

"Evolution of fitness enhancing traits in grass endophytes." University of Kentucky Plant Physiology Program, Lexington, KY, 1 November 2001.

"Anti-herbivore alkaloids produced by mutualistic endophytes of grasses." University of Kentucky Department of Chemistry, Lexington, KY, 19 October 2001.

"Protective alkaloids in mutualistic endophytes of grasses: biosynthesis pathways, genes and evolution" Federal Institute of Technology (ETH) Zürich, Switzerland, 15 October 2001.

"Genetics and evolution of anti-herbivore alkaloids produced by mutualistic endophytes of grasses." SFB 369 Symposium: Secondary Metabolites: Biochemistry, Biology, Functional Genomics, Munich, Germany, 10–12 October 2001.

"Biochemistry and evolution of anti-herbivore alkaloids produced by mutualistic endophytes of grasses." Program for the Biology of Filamentous Fungi (PboFF) Symposium, Texas A&M University, College Station, TX, 18–20 April 2001.

"Origins and roles of alkaloid biosynthesis genes in mutualistic fungal endophytes." Plant Pathology Dept., University of Missouri, Columbia, 18 October 2000.

"Alkaloid roles and genes governing their expression in mutualistic symbionts of grasses." CL Schardl, HH Wilkinson, MR Siegel, JD Blankenship, MJ Spiering. 5th European Conference on Fungal Genetics, Arcachon, France, 25–29 March 2000.

"Clavicipitaceous endophytes of grasses." Microbiology 2000/Vereinigung für Allgemeine und Angewandte Mikrobiologie (VAAM), Munich, Germany, 12–16 March 2000.

"Roles and genes for biosynthesis of protective alkaloids produced by fungal symbionts of grasses." Merck Natural Products Drug Discovery 1999/2000 Seminar Series, Merck Research Labs, Rahway, New Jersey, 8 March 2000.

"Coevolution of fungal symbionts and their plant hosts." 46th Annual Systematics Symposium, Missouri Botanical Garden, St. Louis, Missouri, 8–9 October 1999.

"Genetic analysis of biosynthesis and roles of anti-herbivore alkaloids produced by grass endophytes." International Symposium of Mycotoxicology 1999, Chiba University, Chiba, Japan, 9–10 September 1999.

"Fungal hybridizations and host hybridizations in evolution of grass-endophyte symbioses." International Botanical Congress, St. Louis, Missouri, June 1999.

"Genetic analysis and roles of alkaloids produced by mutualistic fungal endophytes of grasses." Dept. Botany and Plant Pathology Purdue University, West Lafayette, Indiana, 21 April 1999.

"Secondary metabolism in endophytic fungi." 20th Fungal Genetics Conference, Asilomar, Pacific Grove, California, 26 March 1999.

"Evolution of mutualism and antagonism in fungal endophytes of grasses." Evolution of Biodiversity Symposium, International Institute of Advanced Studies, Kansai Science Area, Nara, Japan, 3–4 Dec 1998.

"Mutualism, life histories and evolutionary histories of fungal endophytes of grasses." Per Brinck Ecology Lecture, Lund University, Lund, Sweden, 19 Nov 1998.

"Relationships and discrepancies between genetic and phylogenetic species in a genus of endophytic fungi." Molecular Phylogeny in Fungal Ecology and Evolution (workshop). Lund, Sweden, 16–17 Nov 1998.

"Transmission strategies for grass-endophyte symbiota predict coevolutionary phylogenies." 6th International Mycological Congress. Jerusalem, Israel, 23–28 Aug 1998.

"Genetic analysis and modification of bioprotective alkaloid profiles of grass endophytes." Chemical Ecology in the Molecular Era, Max-Planck-Institut für Chemische Ökologie, Jena, Germany, 5–7 April 1998.

"Natural and human-induced evolution of bioprotective endophytes of grasses." Division of Plant & Soil Sciences, West Virginia University, Morgantown WV, 17 March 1998.

"Hybridization and cospeciation hypotheses for the evolution of grass endophytes." CL Schardl, HH Wilkinson, MR Siegel. 2nd International Congress on Symbiosis, Woods Hole, Massachusetts, 13–18 April 1997.

"Evolution of mutualistic symbionts of grasses." Department of Environmental Sciences, University of California, Berkeley. 18 March 1997.

"Ergot alkaloid biosynthesis in *Claviceps purpurea* and the related grass mutualist, *Neotyphodium coenophialum*." CL Schardl, J Wang, MR Siegel. 19th Fungal Genetics Conference, Asilomar, California, 19 March 1997.

"The evolution of mutualism in grass-endophyte associations." CL Schardl, HH Wilkinson. 3rd International Symposium on *Acremonium*/grass Interactions. Athens, Georgia, May 1997.

"Re-engineering endophytes for better grasses and healthier livestock." P Scharko, C Schardl. Voice over by M Eclov. University of Kentucky Cooperative Extension Service Radio-TV Service, Sept 23–27, 1996.

"Assessment of PCR diagnosis for *Peronospora tabacina* and implications for the tobacco transplant industry." American Phytopathological Society/Mycological Society of America, Indianapolis, Indiana, July 1996.

"Evolution of mutualism and antagonism in *Epichloë* species symbioses with grasses." 8th International Congress: Molecular Plant-Microbe Interactions, Knoxville, Tennessee, July 1996.

"Genetics of the grass-symbiotic fungi, *Epichloe* species, and their interspecific hybrids." John C. Walker Lecture, Department of Plant Pathology, University of Wisconsin, Madison, October 1995.

"Research highlight: Fescue endophyte." Overview of Programs in Plant Science Departments for Agricultural and Horticultural Agents, University of Kentucky, Lexington, KY, April 1995.

"Evolution of Clavicipitaceae and related asexual endophytes of grasses" Botany Department, Duke University, Raleigh, North Carolina, September, 1994.

"Evolution of Clavicipitaceae and related asexual endophytes of grasses" Department of Biology, Indiana University, Bloomington, 16 September 1994.

"Role of interspecific hybridization in biochemical diversity of *Epichloë*-type endophytes of grasses." USDA-ARS, Peoria, Illinois, May 1994.

"Genetics and evolution of *Epichloë*-type mycosymbionts of grasses." Department of Botany and Plant Pathology, Oregon State University, Corvallis, 14 April 1994.

"Interspecific hybridization in the evolution of *Epichloë* endophytes of grasses." Biology Department, University of Oregon, Eugene, 15 April 1994.

"Evolution of fungal symbionts of grasses: role of interspecific hybridization." Department of Biology, University of Louisville, 4 April 1994.

"Phylogenetic analysis of fungal endophytes of grasses." NSF Research Experiences for Undergraduates Program at Northeast Missouri State University, June 1993.

Workshop on Plant-Microbe Co-Evolution, Molecular Genetics of Plant-Microbe Interactions, Symposium, Rutgers University, New Brunswick, New Jersey, April 1993.

"Evolution of endophytes of tall fescue and perennial ryegrass." 2nd International Symposium on *Acremonium*/Grass Interactions. Palmerston North, New Zealand, February 1993.

PCR Workshop (organized by Norman Schaad). Joint Meeting of the Mycological Society of America and the American Phytopathological Society. Portland, Oregon, August 1992.

"Natural biological protection of grasses by symbiotic fungi." National Science Foundation Plant Science Workshop. Tuskegee University, Tuskegee, Alabama, September 1991.

"Mutualistic pathogens: Molecular evolution of the grass mycosymbiont *Epichloë typhina.*" Gordon Conference on Applied and Environmental Microbiology, Colby-Sawyer College, New London, New Hampshire, July 1991.

"Mutualistic pathogens: Molecular evolution of the grass mycosymbiont *Epichloë typhina.*" Rutgers University, May 1991.

"Fungal endophytes of grasses: host-fungus interaction in *Acremonium*-infected grasses." 4th International Mycological Congress, Regensburg, Germany, September 1990.

"Transformation of fungi." Annual Meeting of the American Phytopathological Society, Grand Rapids, Michigan, August 1990.

"Opportunities for use of endophytic microorganisms." Annual Meeting of the American Phytopathological Society, Grand Rapids, Michigan, August 1990.

"Mitochondrial plasmids and host compatibility in the grass endophyte, *Epichloë typhina*." McKnight Foundation Conference. Plant Biology. Minneapolis, Minnesota, May 1990.

"The cmsS mitochondrial genome of maize." EMBO Workshop: Plant Mitochondrial DNA. Melrose, Scotland, April 1984.

"Rearrangements in fertile revertants of cmsS maize." Colloque CNRS-INRA. Biologie Moleculaire Vegetale. Universite Paris XI-Centre d'Orsay, France, July 1984.

Teaching Narrative

I have been responsible for organizing and teaching ABT 460 in Spring 2008, and PPA 670 in the 2008 and 2009 Spring terms. I also organized and taught part of PPA 500 in Fall 2007, and PPA 784-002 in Fall terms of 2007, Fall 2008 and 2009. I continued to be responsible for 10-11 lectures in PPA 500 in each of the 2008 and 2009 Fall terms, but no longer organize that course. I am a co-instructor (but not the main organizer) of a new experimental course STA 685 / CS 695 / PPA 784-003, Phylogenetic Analysis and Molecular Evolution, which is being taught in the Fall 2009 term and planned for every alternate Fall term thereafter.

ABT 460, Introduction to Molecular Genetics, is a senior-level course required in the ABT program, and familiarizes students with principles of genomics and molecular biology. PPA 500, required for first year PPA graduate students, is meant to establish a basic knowledge required for further coursework and research that the students in the program will undertake. Areas covered are molecular biology, biochemistry, genetics, and cell biology, as well as plant anatomy, development, physiology, plant-microbe symbiosis and plant disease resistance. I also initiated the orientation course, PPA 784-002, for incoming graduate students, to provide basic information for success in the PPA graduate programs, and provided lectures on informational resources, software tools (Endnote, Microsoft Office), and reading literature., PPA 670, Plant Bacteriology, is an inquiry-based course for advanced Plant Pathology graduate students. The experimental course, STA 685 / CS 695 / PPA 784-003, Phylogenetic Analysis and Molecular Evolution, is meant to provide cross-disciplinary education and promote collaboration between graduate students in disciplines relevant to phylogenetics and phylogenomics.

The main challenge in each of my courses is to help students achieve a sufficient knowledge base in a very rapidly expanding discipline. One can readily observe this phenomenon by the increased volume of textbooks and their online supplementary materials. Asking students to read and assimilate more information is impractical and, I think, an abrogation of the instructor's responsibility. Instead, one should strive to build an understanding of the basic principles that such information, both old and new, can illustrate. I believe that the student learning process must consist of developing a mental framework on which to hang such information, and to be able to deconstruct and reconstruct that framework in new ways as necessitated by new knowledge. Also, the textbook information must not be considered fossilized knowledge, but instead should be the subject of critical scientific inquiry.

Though students in my courses are expected to remember a fair amount of information, I explicitly outline in my lectures the type of information they should remember, and to help them build an underlying conceptual framework. I try to draw analogies in common everyday experiences wherever possible. For example, multimeric transcription factors binding multiple sites of DNA employ the same principle as cellulose — chains of glucose — forming the tough structure of wood, and can be related to the function of Velcro. For graduate students, I also encourage them to think about their common lab experiences. For example, how is it that CO_2, at a mere 0.25% of the atmosphere, can be incorporated into plants at the rather astonishing rate we observe in our yards and gardens? The answer can be found by measuring the pH of highly purified water over time as it is exposed to the air. The pH drops because of the high solubility of CO_2 in water, and this phenomenon among others allows photosynthesis to proceed efficiently and rapidly. I use in-class discussions to draw from the broad range of the student's existing knowledge and experience, in order to enhance their capabilities to build their own conceptual frameworks.

It is important to me to be learning new concepts while preparing my courses. This helps me maintain empathy with the students, and keeps me in tune with the actual learning process. As I try to assimilate and comprehend the material, I reflect upon the mental process that I use to do so. I do not expect all students to build the same conceptual framework, but I hope to encourage them to keep the learning process both fresh and creative.

Curriculum Vitae

Kenneth W. Seebold, Jr.

University of Kentucky
Department of Plant Pathology
205 Plant Science Building
1405 Veterans Drive
Lexington, KY 40546
(859) 257-7445 [voice]
(859) 323-1961 [fax]
kwseebold@uky.edu

Date of Birth: 11/06/64
Place: Louisville, KY

EDUCATION

Ph.D., Plant Pathology – August, 1998
University of Florida; Gainesville, FL
Major Professors: Dr. L.E. Datnoff
Dr. T.A. Kucharek

Dissertation Title: The Influence of Silicon Fertilization on the Development and Control of Blast, caused by *Magnaporthe grisea* (Hebert) Barr, in Upland Rice.

M.S., Plant Pathology – June, 1994
Auburn University; Auburn, AL
Major Professor: Dr. P.A. Backman

Thesis Title: Studies on the Control of Soilborne Peanut Diseases and Impact on Biological Control Agents Using Improved Fungicide Applications.

B.S., Integrated Pest Management – June, 1990
Auburn University; Auburn, AL

PROFESSIONAL EXPERIENCE

Assistant Extension Professor 3/21/2005 to present
University of Kentucky, Dept. of Plant Pathology
DOE: 90% Extension, 10% Instruction (approximate 4-year average)

Assistant Professor 12/2000 to 3/2005
University of Georgia, Dept. of Plant Pathology

Developed research program on the ecology, epidemiology, and control of soilborne and foliar fungal diseases of cotton and vegetables. Emphasis was placed on soilborne diseases of cotton (cultural, chemical, and biological control) and diseases of cucurbits and onion (biological, cultural, and chemical control; epidemiology). Pathogens of interest included *Phoma terrestris*, *Didymella bryoniae*, and *Phytophthora capsici*.

Fungicide Project Leader 5/1998 to 12/2000
Uniroyal Chemical Co., Inc.; Bethany, CT 06524
Supervisor: Dr. Allyn R. Bell

Responsible for the design and implementation of procedures necessary for the screening of chemical compounds for activity against plant-pathogenic fungi, and for the characterization of the biological activity of these compounds. Managed programs for the testing of potential chemical and biological fungicides in the field, maintain a diverse collection of plant-

pathogenic fungi for use in the fungicide screening program, and oversaw the activities of three junior-level biologists. Duties also included database management, writing of patents, and presentation of research findings at company-based and national meetings.

Graduate Research Assistant
University of Florida 6/1994 to 5/1998

Designed, executed, and analyzed experiments to study the effects of silicon on the epidemiology and control of rice blast (*M. grisea*) and leaf scald (*Monographella albescens*) in conjunction with the International Center for Tropical Agriculture (CIAT) in Villavicencio, Colombia. Designed greenhouse experiments to determine the effects of silicon on the components of resistance to rice blast. Refined methodologies for the use of digital imaging to assess disease severity in rice.

Graduate Research Assistant 9/1991 to 6/1994
Auburn University

Planned, executed, and analyzed experiments to determine the effects of application methods and adjuvant combinations on the performance of two fungicides against southern stem rot (*Sclerotium rolfsii*) and limb rot (*Rhizoctonia solani*).

Information Management Intern 6/1990 to 9/1991
Rhone-Poulenc AG; Research Triangle Park, NC

Tabulated, summarized, and entered into database all cooperator data from contract research trials. Also tracked the progress of individual cooperator trials. Installed software, hardware and trained field personnel in the use of data entry software. Maintained REACH agricultural chemical database.

TEACHING EXPERIENCE

Co-Instructor: Diagnosis and Management of Plant Diseases 2006-present
University of Kentucky

Course (PPA/PLS 640) focuses on recognition and identification of plant diseases and their cause and development. The course is designed to give students practical experience in dealing with a wide array of plant diseases, symptom expressions, causal agents, and interactions with environmental factors encountered in the difficult task of identifying plant diseases (from the UK Bulletin, 2007-2008).

Co-Instructor: Pesticide Management and Utilization Spring 2004
University of Georgia, Tifton Campus

Course (ENTO/CRSS 4250/6250) dealt with practical management and utilization of pesticides in urban and agricultural environments. Enrollment - 6

Teaching Assistant - Plant Disease Epidemiology Spring 1997
University of Florida

Co-assisted with laboratory preparation. Prepared and delivered introductory lectures for each lab session. Assisted students in exercises on basic principles of plant disease epidemiology. Prepared and delivered two lectures during the classroom portion of the course.

Guest Lectures

Fruit and Vegetable Production, PLS 520. One guest lecture. Spring 2006-2009.
Certified Crop Advisor Program, PLS 490. Two guest lectures. Spring 2006, 2008.
Tobacco Production, PLS 408. Four guest lectures. Fall 2006, 2008.
Plant Diseases Caused by Oomycetes – PATH 3530 (General Plant Path.); Fall 2003, Spring 2004.
lecture + lab exercise.

Graduate Study at an International Research Center – PATH 8160; Fall 2003, Spring 2004.
Plant-Pathogenic Species of *Phoma* – PATH 8160 (Spec. Problems in Plant Path); Spring 2004.
Management and Diagnosis of Diseases Caused by Soilborne Fungi – PATH 6280 (Diagnosis and Management of Plant Diseases); Fall 2004 (lecture + lab).

GRADUATE AND UNDERGRADUATE ADVISING

Advisor, Maria Holdcroft, Ph.D. candidtate, 2007-present.
Member, advisory committee for Merari Feliciano and Bidisha Chanda, Ph.D. candidates, 2007-present.
Advisor, Nakisha Harris, M.S. candidate. 2004-2005.
Member, advisory committee for Sara Gremillion, Ph.D. candidate. 2003-2005.
Advisor, Cheryl Murray, TiftArea Academy instructor and participant of GA GIFT program. 2003, 2004.
Advisor, Mary Crumley, Tift Co. High School student and participant of UGA College of Ag. and Environmental Sciences Student Mentoring Program. Fall 2003.

AWARDS & HONORS

James E. Payne Memorial Scholarship. 1988-1990.
Research Assistantship, Auburn University. 1991-1994.
Graduate Research Assistantship, University of Florida. 1994 - 1998.
Second Place. Graduate Paper Contest. Biennial Meeting of the Florida Phytopathological Society. 1997. Title: Effects of Silicon and Edifenfos on Leaf Blast of Upland Rice in Eastern Colombia.
First Place. Graduate Student Paper Competition. Soil and Crop Science Society of Florida.1997. Title: The Use of Silicon and Fungicides for the Management of Leaf and Neck Blast (*Magnaporthe grisea*) in Upland Rice.
Second Place. Graduate Student Paper Competition. Southern Division of the American Phytopathological Society. 1998. Title: Effects of silicon and edifenfos on epidemics of leaf and neck blast in upland rice in eastern Colombia.
Co-recipient. Interdisciplinary Research Team Award. University of Florida. 1999.
Award of Excellence for Teaching, University of Georgia, Tifton Campus (ENTO/CRSS 4250/6250). 2005.

PROFESSIONAL MEMBERSHIPS

American Phytopathological Society. 1998 – present.
Southern Division of the American Phytopathological Society. 1998 – present.
Georgia Association of Plant Pathologists. 2001 – 2005.
Watermelon Research and Development Working Group. 2002 – present.
Kentucky Association of State Extension Professionals. 2005 - present.

SERVICE

Chair, Extension Committee of the American Phytopathological Society, 2009.
President, Southern Division of the American Phytopathological Society, 2008-2009.
Member, Search Committee for Extension Plant Pathologist, 2008.
Member, Agricultural Faculty Council, 2007-2009.
Member, Dept. of Plant Pathology Resource Committee, 2007-present.
Member, College of Agriculture Search Committee for Director of Ag. and Natural Resources, 2007.
Member, College of Agriculture County Review Team, 2007.
President Elect, Southern Division of the American Phytopathological Society, 2007-2008.
Vice-President, Southern Division of the American Phytopathological Society, 2006-2007.
Chair, Multistate Project S-1028, 2006.
Associate Member, University of Kentucky Graduate faculty, 2005-present.
President, Tifton Area Optimist Club. 2003-2004.
Member, Tifton Area Optimist Club. 2000-2005.
Member, University of Georgia Faculty Council. 2002-2005.
Secretary, UGA College of Agricultural and Environmental Sciences Faculty Council. 2003-present.
Member, UGA College of Agricultural and Environmental Sciences Faculty Council. 2002-2005.
Chair, Chemical Control Committee of the American Phytopathological Society. 2003-2004.

Vice-Chair, Chemical Control Committee of the American Phytopathological Society. 2002-2003.
Chair, Industry Committee of the American Phytopathological Society. 2001-2002.
Vice-Chair, Industry Committee of the American Phytopathological Society. 2000-2001.
Vice President, Plant Pathology Graduate Student Group, University of Florida. Fall 1995-Fall 1996.
President, Plant Pathology Graduate Student Association, Auburn University. 1994.
Vice President, Plant Pathology Graduate Student Association, Auburn University. 1993.

EDITORSHIPS, REVIEW PANELS, AND REVIEWER SERVICE

Review panel for Northeastern IPM Competitive Grants Program, 2/2007.
Review panel for Northeastern IPM Competitive Grants Program, 2/02-2/03/06.
Served on technical review panel for USDA-CSREES PMAP, 4/17-4/19/06.
Editorial Advisory Board, Crop Protection. 2004-present.
Associate Editor, Plant Disease. 2004-2006.
Section Editor, Plant Disease Management Reports (formerly Fungicide and Nematicide Tests). 2003-present.

PUBLICATIONS (REFEREED)

Seebold, K.W., Datnoff, L.E., Correa-Victoria, F.J., Kucharek, T.A., and Snyder, G.H. 2000. Effect of silicon rate and host resistance on blast, scald, and yield of upland rice. Plant Disease 84:871-876.

Seebold, K.W., Kucharek, T.A., Datnoff, L.E., Correa Victoria, F.J., and Marchetti, M.A. 2001. The influence of silicon on components of resistance to blast in susceptible, partially resistant, and resistant cultivars of rice. Phytopathology 91:63-69.

Rodrigues, F.A., Datnoff, L.E., Korndorfer, G.H., Seebold, K.W., and Rush, M.C. 2001. Effect of silicon and host resistance on sheath blight development in rice. Plant Disease 85:827-832.

Csinos, A.S., Webster, T.M, Sumner, D.R., Johnson, A.W., Dowler, C.C., and Seebold, K.W. 2002. Application and crop safety parameters for soil fumigants. Crop Protection 21(10):973-982.

Desaeger, J., Csinos, A., Timper, P., Hammes, G, and Seebold, K. 2004. Soil fumigation and oxamyl drip applications for nematode and insect control in vegetable plasticulture. Ann. App. Biol 145:59-70.

Maw, B.W., Butts, C.L., Purvis, A.C., Seebold, K.W., and Mullinix, B.G. 2004. High temperature continuous flow curing of sweet onions. Applied Engineering in Agriculture.. 20(5):657-663.

Seebold, K.W., Datnoff, L.E., Correa-Victoria, F.J., Kucharek, T.A., and Snyder, G.H. 2004. Effects of silicon and fungicides on the control of leaf and neck blast in upland rice. Plant Disease 88:253-258.

Stevenson, K. L., Langston, D. B., Jr., and Seebold, K. W. 2004. Resistance to azoxystrobin in the gummy stem blight pathogen documented in Georgia. Online. Plant Health Progress doi:10.1094/PHP-2004-1207-01-RS.

Maw, B.W., Seebold, K.W., Purvis, A.C., and Paulk, J.T. 2005. Low-humidity, warm-air storage of sweet onions. Applied Engineering in Agriculture. 21(2):259-264.

Seebold, K.W., Langston, D.B., Kemerait, R.C., and Hudgins, J.E. 2005. First report of a leaf spot and stem canker caused by *Myrothecium roridum* on watermelon in the United States. Plant Dis. 89:342.

Tollner, E.W., Gitaitis, R.D., Seebold, K.W., and Maw, B.W. 2005. Experiences with a food product X-ray inspection system for classifying onions. Applied Engineering in Agriculture 21(5):907-912.

Montfort, W.S., Csinos, A.S., Desaeger, J., Seebold, K.W., and Diaz-Perez, J.C. 2007. Evaluating Brassica species as an alternative control measure for root-knot nematode (*M. incognita*) in Georgia vegetable plasticulture. Crop Protection 26:1359-1368.

Desaeger, J.A., Seebold, K.W., and Csinos, A.S. 2008. Effect of application timing and method on efficacy and

phytotoxicity of 1,3-D, chloropicrin and metam sodium combinations in squash plasticulture. Pest Management Science 64: 230-238.

DeSa, P.B., Seebold, K.W., and Vincelli, P.A. 2008. First report of Tomato Yellow Leaf Curl Virus in Greenhouse Tomatoes in Kentucky and Csinos. Plant Health Progress doi:10.1094/PHP-2008-0819-01-RS.

Vincelli, P.A. and Seebold, K.W. 2009. Report of a watermelon mosaic potyvirus strain in Kentucky undetected by ELISA. Plant Health Progress doi:10.1094/PHP-2009-0313-01-BR.

In Preparation

Seebold, K.W. and Johnson, C.S. 2009. Effect of application timing on the efficacy of azoxystrobin against target spot of burley tobacco. To be submitted to Plant Disease.

Seebold, K.W., Vincelli, P.A., Dixon, E., Beale, J., Bachi, P., and Ivors, K. 2009. Root rot of cabbage caused by *Phytophthora drechsleri* – a new disease in the United States. To be submitted to Plant Disease.

BOOK CHAPTERS

Datnoff, L.E. Correa-Victoria, F.J., Seebold, K.W., and Snyder, G.H. 2000. Silicon management of blast in upland and irrigated rice ecosystems. Pp. 180-187 IN: Advances in Rice Blast Research. D. Tharreau, M.H. Lebrun, N.J. Talbot, and J.L. Notteghem, eds. Kluwer Academic Press. Dordrecht, The Netherlands.

Datnoff, L.E., Seebold, K.W., and Correa-Victoria, F.J. 2001. Effects of silicon fertilization on disease development and yields of rice in Colombia. Pp. 171-184 IN: Silicon in Agriculture. Datnoff, L.E., Snyder, G.H., and Korndorfer, G.H., eds. Elsevier Science.

Datnoff, L.E., Rodrigues, F.A., and Seebold, K.W. 2007. Silicon and Plant Disease. Pp 233-246 in: Mineral Nutrition and Plant Disease. L. Datnoff et al. eds., APS Press, St. Paul MN, 279 pp.

Langston, D. and Seebold, K. 2008. Sections on onion diseases (revisions from previous publication). Pp. 10, 11-12, 18-22, 50-51, and 53-54 in: Compendium of Onion Diseases. H.F. Schwartz and S.K. Mohan, eds. APS Press, St. Paul MN. 127 pp.

PUBLICATIONS (PEER-REVIEWED, NON-REFEREED)

Seebold, K.W., J.C. Jacobi, and P.A. Backman. 1993. Evaluation of fungicides for control of soilborne diseases of peanut, 1992. Fungicide and Nematicide Tests 48:267.

Seebold, K.W. and P.A. Backman. 1994. Effects of adjuvants and application methods on fungicide performance in peanut, 1993. Fungicide and Nematicide Tests 49:248.

Langston, D.B. and Seebold, K.W. 2002. Evaluation of fungicides and spray programs for control of gummy stem blight of watermelon, 2001. Fungicide and Nematicide Tests 57:V134.

Langston, D.B. and Seebold, K.W. 2002. Evaluation of fungicides and biological materials for control of downy mildew and Microdochium blight of pumpkin, 2001. Fungicide and Nematicide Tests 57:V083.

Seebold, K.W. and Kemerait, R.C. 2002. Evaluation of azoxystrobin and Maxim combinations for the control of seedling diseases of cotton, 2001. Fungicide and Nematicide Tests 57:ST09.

Seebold, K.W. and Kemerait, R.C. 2002. Evaluation of selected seed treatments for the control of seedling diseases of cotton, 2001. Fungicide and Nematicide Tests 57:ST10.

Seebold, K.W. 2002. Evaluation of experimental fungicides for the control of Phytophthora crown rot of summer squash, 2001. Fungicide and Nematicide Tests 57:V096.

Seebold, K.W. 2002. Screening fungicides for the efficacy against *Phytophthora capsici* in summer squash, 2001. Fungicide and Nematicide Tests 57:V097.

Kemerait, R.C., Seebold, K.W., and McDaniel, R.G. 2003. Effects of tillage, seeding rates, and at plant fungicides on seedling disease in cotton, 2002. Fungicide and Nematicide Tests 58:FC056.

Kemerait, R.C., Seebold, K.W., and Mills, W.A. 2003. Evaluation of seeding rates and at plant fungicides to manage seedling diseases in cotton, 2002. Fungicide and Nematicide Tests 58:FC057.

Langston, D.B., Seebold, K.W., Lewis, K.L., and Jennings, W.T. 2003. Evaluation of fungicide programs for control of powdery mildew of watermelon, 2002. Fungicide and Nematicide Tests 58:V088.

Seebold, K.W. and Horten, T.B. 2003. Evaluation of in-furrow fungicides for the control of seedling diseases of cotton, 2002. Fungicide and Nematicide Tests 58:FC024.

Seebold, K.W. and Horten, T.B. 2003. Evaluation of azoxystrobin formulations for the control of seedling diseases of cotton, 2002. Fungicide and Nematicide Tests 58:ST029.

Seebold, K.W. and Langston, D.B. 2003. Evaluation of fungicides for control of downy mildew and gummy stem blight on watermelon, 2002. Fungicide and Nematicide Tests 58:V038.

Seebold, K.W. and Horten, T.B. 2003. Evaluation of fungicides for control of gummy stem blight on watermelon, 2002. Fungicide and Nematicide Tests 58:V039.

Seebold, K.W. and Horten, T.B. 2003. Evaluation of fungicides and timings for control of southern blight of carrot, 2002. Fungicide and Nematicide Tests 58:V096.

Seebold, K.W. and Langston, D.B. 2003. Evaluation of Ranman 400SC for control of downy mildew on pumpkin, 2002. Fungicide and Nematicide Tests 58:V097.

Seebold, K.W. and Horten, T.B. 2003. Evaluation of fungicides for control of Phytophthora crown and fruit rot of summer squash, 2002. Fungicide and Nematicide Tests 58:V098.

Seebold, K.W., Boyhan, G.E., Torrance, R.L., and Cook, M.J. 2003. Screening cultivars of sweet onion for susceptibility to pink root, 2002. Biological and Cultural Tests 18:V024.

Seebold, K.W. and Langston, D.B. 2004. Evaluation of fungicide programs for the control of gummy stem blight in watermelon, 2003. Fungicide and Nematicide Tests 59:V152.

Seebold, K.W. and Langston, D.B. 2004. Evaluation of boscalid for control of gummy stem blight on watermelon, 2003. Fungicide and Nematicide Tests 59:V051.

Seebold, K.W. and Langston, D.B. 2004. Evaluation of fungicides for control of gummy stem blight of watermelon, 2003. Fungicide and Nematicide Tests 59:V140.

Seebold, K.W. and Langston, D.B. 2004. Evaluation of fungicide programs for control of gummy stem blight of watermelon, 2003. Fungicide and Nematicide Tests 59:V139.

Seebold, KW. 2005. Evaluation of Pristine, Switch, and Vanguard for control of gummy stem blight in watermelon, 2004. Fungicide and Nematicide Tests 60:V127.

Seebold, K.W. and Langston, D.B. 2005. Evaluation of fungicide programs for control of gummy stem blight in watermelon, 2004. Fungicide and Nematicide Tests 60:V128.

Seebold, K.W. and Langston, D.B. 2005. Evaluation of fungicide programs for control of anthracnose of watermelon, 2004.

Fungicide and Nematicide Tests 60:V129.

Seebold, K.W. and Langston, D.B. 2005. Evaluation of Quadris programs for control of gummy stem blight in watermelon, 2004. Fungicide and Nematicide Tests 60:V130.

Seebold, K.W. and Dixon, E. 2006. Use of host resistance and fungicides to manage of downy and powdery mildew of summer squash, 2005. Biological and Cultural Tests 21:V023.

Seebold, K.W. and Dixon, E. 2006. Evaluation of fungicides for control of blue mold, target spot, and frogeye on burley tobacco, 2005. Fungicide and Nematicide Tests 61:FC052.

Seebold, K.W. and Palmer, G.K. 2006. Evaluation of Quadris for control of target spot on burley tobacco, 2005. Fungicide and Nematicide Tests 61:FC053.

Seebold, K.W. and Dixon, E. 2006. Use of Previcur Flex to control Pythium root rot on tobacco seedlings in a float-bed system, 2005. Fungicide and Nematicide Tests 61:FC054.

Seebold, K.W. and Dixon, E. 2007. Evaluation of experimental fungicides for control of Phytophthora crown rot of bell pepper, 2006. Plant Disease Management Reports (formerly Fungicide & Nematicide / Biological and Cultural Tests) 1:V100.

Seebold, K.W. and Dixon, E. 2007. Evaluation of experimental fungicides and strobilurins for control of downy and powdery mildew on winter squash, 2006. Plant Disease Management Reports 1:V101.

Seebold, K.W. and Dixon, E. 2007. Evaluation of fungicides for management of downy and powdery mildew on winter squash (IR-4 performance trial), 2006. Plant Disease Management Reports 1:V102.

Seebold, K.W. and Dixon, E. 2007. Effect of potassium phosphite and fungicides on Phytophthora crown and fruit rot of summer squash, 2006. Plant Disease Management Reports 1:V103.

Seebold, K.W. and Palmer, G.K. 2007. Evaluation of Quadris and V-10161 for control of blue mold on burley tobacco, 2006. Plant Disease Management Reports 1:FC121.

Seebold, K.W. and Palmer, G.K. 2007. Evaluation of V-10161, Ridomil Gold, and Quadris for control of black shank on burley tobacco, 2006. Plant Disease Management Reports 1:FC119.

Seebold, K.W. and Palmer, G.K. 2007. Evaluation of Quadris for control of target spot on burley tobacco, 2006. Plant Disease Management Reports 1:FC117.

Seebold, K.W. and Sizemore, P. 2007. Effect of application timing on the efficacy of Quadris against target spot on burley tobacco, 2006. Plant Disease Management Reports 1:FC118.

Canaday, C., Ownley, B., Gwinn, K., Rothrock, C., Keinath, A., and Seebold, K.W. 2008. Effects of biocontrol agents versus a fungicide on growth, yield, and diseases of broccoli in Tennessee, 2007-2008. Plant Disease Management Reports (PDMR) 2:V145.

Ownley, B., Gwinn, K., Dee, M., Canaday, C., Keinath, A., Rothrock, C., and Seebold, K.W. 2008. Effects of biocontrol agents on growth, yield, and root disease of broccoli in East Tennessee, 2007-08. PDMR 2:V155.

Seebold, K.W. 2008. Evaluation of Ridomil Gold applied at different timings for management of black shank, 2007. PDMR 2:FC103.

Seebold, K.W. 2008. Evaluation of Ridomil Gold, Quadris, and Revus for management of black shank, 2007. PDMR 2:FC102.

Seebold, K.W. and Henderson, J. 2008. Evaluation of Quadris applied at different timings for control of target spot on

burley tobacco, 2007. PDMR 2:FC098.

Seebold, K.W., Palmer, G.K., and Smith, S.P. 2008. Evaluation of burley cultivars for resistance to black shank, 2007. PDMR 2:FC101.

Seebold, K.W. 2008. Evaluation of fungicides for management of target spot on burley tobacco, 2007. PDMR 2:FC099.

Seebold, K.W. 2008. Evaluation of fungicides for management of foliar diseases on burley tobacco, 2007. PDMR 2:FC100.

Seebold, K.W. and Dixon, E. 2008. Evaluation of kiralaxyl (IR 6141) on Phytophthora crown and fruit rot of summer squash, 2007. PDMR 2:V004.

Seebold, K.W., Holdcroft, A., and Dixon, E. 2008. Effect of potassium phosphite and fungicides on Phytophthora crown and fruit rot of summer squash, 2007. PDMR 2:V005.

PATENTS

Dekeyser, M.A., Seebold, K.W., and Chee, G.L. 2001. Method for Controlling Fungi Using Phenylhydrazine Derivatives. U.S. Patent 6,297,275. 7 pp.

ABSTRACTS OF PRESENTED PAPERS

Seebold, K.W. and P.A. Backman. 1993. Development of bioassays to evaluate fungicide distribution, tenacity, and longevity on peanut plants and soil. Proc. Am. Peanut Res. and Ed. Society 25:24.

Seebold, K.W. and P.A. Backman. 1993. Formulation effects on iprodione performance in peanut: impact on disease control. Phytopathology 83:1371A.

Seebold, K.W. and P.A. Backman. 1994. Effects of adjuvant and application method on flutolanil performance against soilborne diseases of peanut. APS Southern Division Meeting.

Seebold, K.W., L. Datnoff, F. Correa-Victoria, and G. Snyder. 1995. Effects of silicon and fungicides on leaf and neck blast development in rice. Phytopathology 85:1168.

Seebold, K.W., L. Datnoff, F. Correa-Victoria, and T. Kucharek. 1997. Effects of silicon and fungicide timing on foliar disease control and yield in upland rice. Phytopathology 87:S87.

Seebold, K.W., L. Datnoff, F. Correa-Victoria, T. Kucharek, and G. Snyder. 1998. Effects of silicon and edifenfos on epidemics of leaf and neck blast in upland rice in eastern Colombia. Phytopathology 88:S126.

Seebold, K.W. Datnoff, L.E., Correa-Victoria, F.J., Kucharek, T.A., Snyder, G.H., and Tulande, E. 1998. Effects of calcium silicate plus fungicides at reduced rates on the control of leaf and neck blast in upland rice. Proceedings of the 27th Rice Technical Working Group Meeting.

Rodrigues, F.A., Datnoff, L.E., Korndorfer, G.H., Rush, M.C., Seebold, K.W., and Linscombe, S.E. 1998. Effects of calcium silicate and resistance on the development of sheath blight in rice. Proceedings of the 27th Rice Technical Working Group Meeting.

Seebold, K.W., Datnoff, L.E., Correa-Victoria, F.J., Kucharek, T.A., and Snyder, G.H. 1998. Effects of silicon and host resistance on leaf and neck blast in upland rice. Phytopathology 88:S80.

Seebold, K.W and Csinos, A.S. 2001. Comparison of Application Timing on the Efficacy of Metam Sodium and Chloropicrin Against Soilborne Fungi and Yellow Nutsedge. Proceedings of the 2001 Annual International Research Conference on Methyl Bromide Alternatives and Emissions Reductions. Pp. 101.1 - 101.4.

Csinos, A., Laska, J.E., Seebold, K., and Eger, J. 2001. Evaluation of Microirrigation Wetting Patterns in Polyethylene Film

Mulch Beds. Proceedings of the 2001 Annual International Research Conference on Methyl Bromide Alternatives and Emissions Reductions. Pp. 47.1 - 47.

Langston, D.B, Stevenson, K., and Seebold, K. 2001. Insensitivity of the Gummy Stem Blight Fungus (*Didymella bryoniae*) to Azoxystrobin in Georgia. Proceedings of the Southeastern Fruit and Vegetable Exposition, Greensboro NC, Dec. 2001.

Csinos, A.S., Laska, J.E., and Seebold, K.W. 2002. Evaluation of Micro Irrigation Wetting Patterns in Polyethylene Film Mulch Beds. Pp. 55-56 in: Proceedings of the 2002 Georgia Vegetable Conference. University of Georgia Cooperative Extension Service. 99 pp.

Seebold, K.W. and Csinos, A.S. 2002. Effect of Selected Fumigants on Soilborne Fungi. Pp. 59-60 in: Proceedings of the 2002 Georgia Vegetable Conference. University of Georgia Cooperative Extension Service. 99 pp.

Seebold, K.W., Desaeger, J., and Csinos, A.S. 2002. Effect of Application Timing on the Efficacy of Drip-Applied Soil Fumigants. Pp. 84.1-84.5 in: Proceedings of the 2002 Annual International Research Conference on Methyl Bromide Alternatives and Emissions Reductions. MBAO.

Stevenson, K.L., Langston, D.B., and Seebold, K.W. 2002. Resistance to Azoxystrobin (Quadris) in the Gummy Stem Blight Pathogen in Georgia. Pp. 75-75 in: Proceedings of the 2002 Georgia Vegetable Conference. University of Georgia Cooperative Extension Service. 99 pp.

Csinos, A.S., Seebold, K.W., and Davis, R.F. 2002. 1,3-D and oxamyl for nematode management in cucumbers. Phytopathology 92:S17.

Kemerait, R.C., Seebold, K.W., McDaniel, R.G., Spaid, D.G., and Parks, W.J. 2002. Assessment of fungicides to reduce seedling disease of cotton in Georgia. Phytopathology 92:S150.

Seebold, K.W., Csinos, A.S., and Davis, R.F. 2002. Evaluation of in-line injected materials as alternatives to fumigation with methyl bromide. Phytopathology 92:S152.

Seebold, K.W., Csinos, A.S., and Horten, T.B. 2002. Management of Phytophthora crown rot of yellow squash with foliar applied fungicides. Phytopathology 92:S74.

Stevenson, K.L., Langston, D.B., and Seebold, K.W. 2002. Resistance to azoxystrobin in the gummy stem blight pathogen in Georgia. Phytopathology 92:S79.

Kemerait, R.C., Seebold, K.W., McDaniel, R.G., and Spaid, D.G. 2003. Management of Rhizoctonia Seedling Blight with Fungicides and Variable Plant Populations. Pp. 230-233 in: Proceedings of the 2003 Beltwide Cotton Conferences. 2588 pp.

Seebold, K.W., Kemerait, R.C., and May, O.L. 2003. Indexing Modern Cotton Cultivars for Resistance to Fusarium Wilt' Page 269 in: Proceedings of the 2003 Beltwide Cotton Conferences. 2588 pp.

Seebold, K.W. 2003. Fungicide Performance Against Phytophthora Crown and Fruit Rot of Yellow Squash - 2001/2002. Pp. 58-61 in: Proceedings of the 2003 Georgia Vegetable Conference. University of Georgia Cooperative Extension Service. 108 pp.

Seebold, K.W. 2003. Control of *Phytophthora capsici* on Yellow Squash with Organic Amendments and Biological Agents. Page 69 in: Proceedings of the 2003 Georgia Vegetable Conference. University of Georgia Cooperative Extension Service. 108 pp.

Stevenson, K.L., Langston, D.B., and Seebold, K.W. 2003. Resistance to Azoxystrobin (Quadris) in the Gummy Stem Blight Pathogen in Georgia. Proceedings of the 2003 Georgia Vegetable Conference. University of Georgia Cooperative Extension Service. 108 pp.

Desaeger, J., Csinos, A., Timper, P., Hammes, G., and Seebold, K.W. 2003. Soil fumigation and oxamyl drip applications for nematode and insect control in vegetable plasticulture. Phytopathology 93:S20.

Seebold, K.W., Langston, D.B., Boyhan, G.E., Torrance, R.L., and Cook, M.J. 2003. Differential susceptibility in cultivars of sweet onion to pink root. Phytopathology 93:S77.

Seebold, K.W., Desaeger, J., and Csinos, A.S. 2003. Effects of Mulch Type on the Efficacy of Drip-Applied Soil Fumigants. Pp. 124.1-124.4 in: Proceedings of the 2003 Annual International Research Conference on Methyl Bromide Alternatives and Emissions Reductions. MBAO.

Seebold, K.W. 2004. Suppression of gummy stem blight on watermelon and cantaloupe transplants with seed-applied fungicides. Phytopathology 94:S94.

Seebold, K.W., Gitaitis, R.D., and Sanders, F.H. 2004. Biological control of gummy stem blight on watermelon and Phytophthora crown rot on summer squash with bacteria. Phytopathology 94:S94.

Seebold, K.W. 2004. From basic research in a chemical company to being a professor. Phytopathology 94:S141.

Seebold, K.W. 2004. Fungicide performance against strobilurin-resistant populations of *Didymella bryoniae* on watermelon. Phytopathology 94:S147.

Seebold, K.W., Kemerait, R.C., Marois, J.J., Wright, D., Padgett, B., Mueller, J., McLean, K., and Estes, A. 2004. Results from the 2003 Regional Hardlock Project. Pp. 337-340 in: Proceedings of the 2004 Beltwide Cotton Conferences.

Seebold, K.W. and Kemerait, R.C. 2004. Effects of Plant Population and Fungicide Treatment on Seedling Disease of Cotton. Pp. 429-431 in: Proceedings of the 2004 Beltwide Cotton Conferences.

Desaeger, J., Csinos, A., and Seebold, K. 2004. Soil Amendments and Soilborne Pest Control in Plasticulture. Pp. 92-96 in: Proceedings of the 2004 Southeast Regional Vegetable Conference. University of Georgia Cooperative Extension Service. 124 pp.

Gitaitis, R.D., Sanders, F.H., and Seebold, K.W. 2004. Development of a Screening Procedure to Identify Bacteria with Biocontrol Activity. Pp. 80-81 in: Proceedings of the 2004 Southeast Regional Vegetable Conference. University of Georgia Cooperative Extension Service. 124 pp.

Kemerait, R.C., Seebold, K.W., Marois, J.J., Wright, D., Padgett, B., Mueller, J., McLean, K., and Estes, A. 2004. Projected Recommendations for Use of Topsin M for Hardlock Control. Pp. 341-342 in: Proceedings of the 2004 Beltwide Cotton Conferences.

Langston, D.B. and Seebold, K.W. 2004. New Gummy Stem Blight Fungicide Options. Page 23 in: Proceedings of the 2004 Southeast Regional Vegetable Conference. University of Georgia Cooperative Extension Service. 124 pp.

Seebold, K.W. 2004. Management of *Phytophthora capsici* in Squash with Fungicides and Cultural Practices. Pp. 77-78 in: Proceedings of the 2004 Southeast Regional Vegetable Conference. University of Georgia Cooperative Extension Service. 124 pp.

Seebold, K.W. 2004. Soilborne Diseases of Onion in Georgia and Their Management. Pp. 103-106 in: Proceedings of the 2004 Southeast Regional Vegetable Conference. University of Georgia Cooperative Extension Service. 124 pp.

Seebold, K.W., Kemerait, R.C., Marois, J.J., Wright, D., Padgett, B., Mueller, J., McLean, K., and Estes, A. 2005. Results from the 2004 Regional Hardlock Project. In: Proceedings of the 2005 Beltwide Cotton Conferences.

Langston, D.B. and Seebold, K.W. 2005. Watermelon Fungicide Programs. Page 83 in: Proceedings of the 2005 Southeast Regional Vegetable Conference. University of Georgia Cooperative Extension Service. 108 pp.

Seebold, K.W. 2005. Control of Storage Rots of Onion with Fungicides. Pp. 23-26 in: Proceedings of the 2005 Southeast

Regional Vegetable Conference. University of Georgia Cooperative Extension Service. 108 pp.

Seebold, K.W. and Langston, D.B. 2005. Controlling Gummy Stem Blight with Seed Treatments. Page 82 in: Proceedings of the 2005 Southeast Regional Vegetable Conference. University of Georgia Cooperative Extension Service. 108 pp.

Gitaitis, R.D., Martinez, N., Seebold, K.W., Stevenson, K.L., Sanders, F.H., and Mullis, S.M. 2005. PCR amplification of nucleic acids of bacteria, fungi and viruses recovered and stored on FTA cards. Phytopathology 95:S35.

Seebold, K.W. and Langston, D.B. 2005. Suppression of pink root and Botrytis neck rot of onion with fungicides. Online Abstracts of the Southern Division APS Meeting. Publication no. P-2005-0015-SOA.

Seebold, K.W. 2006. Occurrence and Management of Diseases of Tobacco Transplants. In: Proceedings of the 27th Annual Meeting of the Colombian Phytopathological Society (ASCOLFI).

Seebold, K.W. 2006. Prospects and Progress in the Management of Black Shank in Burley Tobacco. In: Proceedings of the 27th Annual Meeting of the Colombian Phytopathological Society (ASCOLFI).

Seebold, K.W. and Palmer, G.K. 2007. Management of target spot on burley tobacco with azoxystrobin. Phytopathology 97:S183.

Seebold, K.W. and Palmer, G.K. 2008. Effect of application timing on the performance of azoxystrobin against target spot on burley tobacco. Proceedings of the 43rd Tobacco Worker's Conference, Savannah GA.

Seebold, K.W. and Dixon, E. 2008. Control of Pythium root rot in a tobacco float system with surfactants. Phytopathology 98:S143.

Seebold, K.W., Dixon, E., and Vincelli, P. 2008. Phytophthora root rot – a new disease of cabbage in Kentucky. Phytopathology 98:S212.

Seebold, K.W., de Sa, P.B., and Vincelli, P.V. 2009. First report of tomato yellow leaf curl virus in Kentucky. Phytopathology 99:S200.

Johnson, C.S. and Seebold, K.W. 2009. Alternative methods to control *Pythium* in tobacco transplant production in 2008-09. Phytopathology 99:S59.

Seebold, K.W., Johnson, C.S., and Dixon, E. 2009. Management of Pythium root rot on tobacco seedling with a non-ionic surfactant. Phytopathology 99:S116.

EXTENSION PUBLICATIONS (NUMBERED SERIES)

Research Reports

Kemerait, R.C. and Seebold, K.W. 2001. Cotton Disease and Nematode Management. Pp. 23-30 in: 2002 Georgia Cotton Production Guide. S.M. Brown, Ed.

Kemerait, R.C. and Seebold, K.W. 2002. Cotton Disease and Nematode Management. Pp. 25-29 in: 2003 Georgia Cotton Production Guide. S.M. Brown, Ed.

Kemerait, R.C. and Seebold, K.W. 2003. Cotton Disease and Nematode Management. Pp. 25-29 in: 2003 Georgia Cotton Production Guide. S.M. Brown, Ed.

Kemerait, R.C., Seebold, K.W., McDaniel, R.G., Spaid, D.G., and Parks, W.J. 2002. Evaluation of At-Plant Fungicides to Reduce Seedling Diseases of Cotton in Georgia. Pp. 288-296 in: Cotton Research-Extension Report 2001. University of GA-CPES Research-Extension Publication No. 4.

Maw, B., Purvis, A., Seebold, K.W., and Paulk, T. 2002. Warm-Air-Low-Humidity Storage of Sweet Onions. Pp. 26-32 in:

Georgia Onion 2001 Research-Extension Report. University of Georgia Cooperative Research-Extension Publication No. 3-2002.

Maw, B., Butts, C., Purvis, A., Seebold, K.W., and Mullinix, B.G. 2002. High Temperature Continuous Flow Curing of Sweet Onions. Pp. 50-60 in: Georgia Onion 2002 Research-Extension Report. University of Georgia Cooperative Research-Extension Publication No. 3-2002.

Seebold, K. and Horten, B. 2002. Experimental Fungicides for the Control of Foliar Diseases of Onion and Botrytis Neck Rot on Sweet Onion. Pp. 74-76 in: Georgia Onion 2002 Research-Extension Report. University of Georgia Cooperative Research-Extension Publication No. 3-2002.

Seebold, K.W., Kemerait, R.C., and Bednarz, C.W. 2002. Effect of Planting Date and Seed Treatment on Seedling Emergence and Yield of Cotton. Pp. 300-302 in: Cotton Research-Extension Report 2001. University of Georgia-CPES Research-Extension Publication No. 4.

Csinos, A.S., Seebold, K.W., Timper, P., Davis, R.F, and Laska, J.E. 2002. Application Methods of Soil Chemical Treatments on Nematodes, Disease, and Yield of Cucumber. Pp. 71-81 in: Georgia Vegetable Extension-Research Report 2001. University of Georgia - CPES Research-Extension Publication No. 5-2001.

Csinos, A.S., Seebold, K.W., Timper, P., Davis, R.F, and Laska, J.E. 2002. Soil Chemical Treatment Alternatives to Methyl Bromide in Cucumber. Pp. 82-92 in: Georgia Vegetable Extension-Research Report 2001. University of Georgia - CPES Research-Extension Publication No. 5-2001.

Csinos, A.S., Seebold, K.W., Timper, P., Davis, R.F, and Laska, J.E. 2002. Effects of Vydate and Telone Treatments for Management of Nematodes, Diseases, and Yield of Cucumber. Pp. 93-102 in: Georgia Vegetable Extension-Research Report 2001. University of Georgia - CPES Research-Extension Publication No. 5-2001.

Csinos, A.S., Seebold, K.W., Timper, P., and Laska, J.E. 2002. Evaluation of Chisel Placement of Telone Products and Drip Injection for Efficacy and Yield in Bell Pepper. Pp. 103-113 in: Georgia Vegetable Extension-Research Report 2001. University of Georgia - CPES Research-Extension Publication No. 5-2001.

Csinos, A.S., Seebold, K.W., Timper, P., and Laska, J.E. 2002. Telone C-17, Metam Sodium Combinations for Efficacy and Evaluation of Phytotoxicity in Squash. Pp. 114-124 in: Georgia Vegetable Extension-Research Report 2001. University of Georgia - CPES Research-Extension Publication No. 5-2001.

Langston, D.B. and Seebold, K.W. 2002. Evaluation of Fungicides and Spray Programs for Control of Gummy Stem Blight of Watermelon. Pp. 132-135 in: Georgia Vegetable Extension-Research Report 2001. University of Georgia - CPES Research-Extension Publication No. 5-2001.

Langston, D.B. and Seebold, K.W. 2002. Evaluation of Fungicides and Biological Materials for Control of Downy Mildew and Plectosporium Blight of Pumpkin. Pp. 141-143 in: Georgia Vegetable Extension-Research Report 2001. University of Georgia - CPES Research-Extension Publication No. 5-2001.

Seebold, K.W., Langston, D.B., and Horten, T.B. 2002. Screening Fungicides for Control of Phytophthora capsici in Summer Squash. Pp. 146-147 in: Georgia Vegetable Extension-Research Report 2001. University of Georgia - CPES Research-Extension Publication No. 5-2001.

Seebold, K.W., Langston, D.B., and Horten, T.B. 2002. Evaluation of Experimental Fungicides for the Control of Phytophthora Crown Rot of Summer Squash. Pp. 148-149 in: Georgia Vegetable Extension-Research Report 2001. University of Georgia - CPES Research-Extension Publication No. 5-2001.

Kemerait, R.C., Seebold, K.W., McDaniel, R.G., and Spaid, D.G. 2003. Management of Rhizoctonia Seedling Blight in Georgia with Fungicides and Variable Plant Populations. Pp. 293-299 in: Cotton Research-Extension Report 2002. UGA-CPES Research-Extension Publication No. 5. 324 pp.

Seebold, K.W., Kemerait, R.C. 2003. Comparison of Seed-Applied Azoxystrobin Formulations and Experimental

Fungicides for Control of Seedling Diseases of Cotton. Pp. 303-305 in: Cotton Research-Extension Report 2002. UGA-CPES Research-Extension Publication No. 5. 324 pp.

Seebold, K.W., Kemerait, R.C., and May, O.L. 2003. Indexing Modern Cotton Cultivars for Resistance to Fusarium Wilt. Pp. 306-308 in: Cotton Research-Extension Report 2002. UGA-CPES Research-Extension Publication No. 5. 324 pp.

Seebold, K.W., Langston, D.B., Boyhan, G., Torrance, R., and Cook, M.J. 2003. Evaluation of Onion Cultivars for Resistance to Pink Root During Seasons 2001-2002 and 2002-2003. Pp. 46-49 in: Georgia Onion 2003 Research-Extension Report. Cooperative Research-Extension Publication No. 3-2003.

Seebold, K.W. and Horten, T.B. 2003. Testing Experimental Fungicides for the Control of Foliar Diseases and Botrytis Neck Rot on Sweet Onions. Pp. 50-53 in: Georgia Onion 2003 Research-Extension Report. Cooperative Research-Extension Publication No. 3-2003.

Seebold, K.W., Gitaitis, R.D., Sanders, F.H., and Horten, T.B. 2003. Effects of Soil Solarization and Turnip Residue on Soil Fungi, Bacteria, and Yield of Sweet Onions in Georgia. Pp. 54-57 in: Georgia Onion 2003 Research-Extension Report. Cooperative Research-Extension Publication No. 3-2003.

Seebold, K.W. and Horten, T.B. 2003. Evaluation of Fungicides for Control of Phytophthora Crown and Fruit Rot of Summer Squash. Pp. 244-246 in: Georgia Vegetable Extension-Research Report 2002. Cooperative Research-Extension Publication No. 5-2003.

Seebold, K.W., Desaeger, J.A.J., and Csinos, A.S. 2003. Effect of Application Timing on the Efficacy of Drip-Applied Soil Fumigants. Pp. 247-250 in: Georgia Vegetable Extension-Research Report 2002. Cooperative Research-Extension Publication No. 5-2003.

Seebold, K.W. and Langston, D.B. 2003. Evaluation of Fungicides for Control of Downy Mildew and Gummy Stem Blight on Watermelon. Pp. 251-253 in: Georgia Vegetable Extension-Research Report 2002. Cooperative Research-Extension Publication No. 5-2003.

Seebold, K.W., Langston, D.B., and Horten, T.B. 2003. Evaluation of Fungicides for Control of Gummy Stem Blight on Watermelon. Pp. 254-256 in: Georgia Vegetable Extension-Research Report 2002. Cooperative Research-Extension Publication No. 5-2003.

Seebold, K.W. and Horten, T.B. 2003. Evaluation of Fungicides and Timings for Control of Southern Blight of Carrot. Pp. 257-259 in: Georgia Vegetable Extension-Research Report 2002. Cooperative Research-Extension Publication No. 5-2003.

Seebold, K.W. and Horten, T.B. 2003. Evaluation of Fungicides for Control of Phytophthora Crown and Fruit Rot of Summer Squash. Pp. 260-262 in: Georgia Vegetable Extension-Research Report 2002. Cooperative Research-Extension Publication No. 5-2003.

Maw, B., Seebold, K., Purvis, A., and Paulk, T. 2004. Warm Air, Low Humidity Storage of Sweet Onions. Pp. 42-50 in: Georgia 2004 Research-Extension Report. . Cooperative Research-Extension Publication No. 3-2004.

Seebold, K.W. and Kemerait, R.C. 2004. Effects of Plant Population and Fungicide Treatment on Seedling Diseases of Cotton. Pp. 237-241 in: Cotton Research-Extension Report 2003. UGA-CPES Research-Extension Publication No. 6. 257 pp.

Seebold, K., Langston, D., and Horten, B. 2004. Evaluation of Pristine for the Control of Pink Root and Botrytis Neck Rot on Sweet Onion. Pp. 57-59 in: Georgia Onion Research-Extension Report. . Cooperative Research-Extension Publication No. 3-2004.

R. C. Kemerait, R.C., Roberts, P.M., Seebold, K.W., Jost, P.H., Brown, S.M., Brown, S.N., Connelly, F.J., and Jacobs, J.L. 2005. Evaluation of Dicrotophos and Thiophanate Methyl for Management of Hardlock of Cotton in Georgia. Pp. 198-201 in: Cotton Research-Extension Report 2003. UGA-CPES Research-Extension Publication No. 7. 215 pp.

Seebold, K.W. and Dixon, E. 2006. Evaluation of Fungicides and Cultivars for Management of Powdery Mildew on Yellow Squash. Pp. 60-62 in: 2005 Fruit and Vegetable Crops Research Report (PR-521). UK Cooperative Extension Service, College of Agriculture, 94 pp.

Beale, J., Bachi, P., Seebold, K., and Hartman, J. 2006. Fruit and Vegetable Disease Observations from the Plant Disease Diagnostic Library. Pp. 90-92 in: 2005 Fruit and Vegetable Crops Research Report (PR-521). UK Cooperative Extension Service, College of Agriculture, 94 pp.

Seebold, K.W., Palmer, G.K., Pearce, R., Bailey, A., Green, J., Schwab, G., Townsend, L., Snell, W., Halich, G., Duncan, G., and Wells, L. 2007. Kentucky Tobacco Production Guide (ID-160). K. Seebold & G. Palmer, eds. UK Cooperative Extension Service, College of Agriculture, 58 pp.

Seebold, K.W., Dixon, E., Jones, T., and Sears, A. 2007. Evaluation of Fungicide Programs for Management of Gummy Stem Blight of Watermelon. Pp. 55-56 in: 2006 Fruit and Vegetable Crops Research Report (PR-538). J. Snyder & C. Smigell, eds. UK Cooperative Extension Service, College of Agriculture, 82 pp.

Seebold, K.W. and Dixon, E. 2007. Evaluation of Fungicide Programs for Management of Downy Mildew of Winter Squash. Pp. 64-65 in: 2006 Fruit and Vegetable Crops Research Report (PR-538). J. Snyder & C. Smigell, eds. UK Cooperative Extension Service, College of Agriculture, 82 pp.

Beale, J., Bachi, P., Long, S., Seebold, K., and Hartman, J. 2007. Fruit and Vegetable Disease Observations from the Plant Disease Diagnostic Library. Pp. 79-80 in: 2006 Fruit and Vegetable Crops Research Report (PR-538). J. Snyder & C. Smigell, eds. UK Cooperative Extension Service, College of Agriculture, 94 pp.

Seebold, K.W., Howard, N., Jackson, K., and Eli, H. 2008. Evaluation of Fungicide Programs for Management of Diseases of Staked Tomato. Pp. 74-75 in: 2007 Fruit and Vegetable Crops Research Report (PR-555). T. Coolong, ed. UK Cooperative Extension Service, College of Agriculture, 92 pp.

Beale, J., Bachi, P., Long, S., Seebold, K., and Hartman, J. 2008. Fruit and Vegetable Disease Observations from the Plant Disease Diagnostic Library. Pp. 89-90 in: 2007 Fruit and Vegetable Crops Research Report (PR-555). T. Coolong, ed. UK Cooperative Extension Service, College of Agriculture, 92 pp.

Coolong, T. and Seebold, K.W. 2009. Evaluation of Powdery Mildew Tolerance in Pumpkin in Central Kentucky Pp. 47-50 in: 2008 Fruit and Vegetable Crops Research Report (PR-572). T. Coolong, J. Snyder, and C. Smigell, eds. UK Cooperative Extension Service, College of Agriculture, 73 pp.

Numbered Bulletins

Rowell, B., Bessin, R., Masabni, J., Strang, J., Jones, T., and Seebold, K. 2006. 2006-2007 Vegetable Production Guide (ID-36), UK Cooperative Extension Service, College of Agriculture, 140 pp.

Sears, A., Masabni, J., Seebold, K., Bessin, R., Woods, T., and Jones, R.T. 2007. Ornamental Gourd Production in Kentucky (ID-119), UK Cooperative Extension Service, College of Agriculture, 12 pp.

Seebold, K.W. and Louwes, F.J. 2007. Relative Effectiveness of Alternative Management for disease control in pepper. Page 192 in: 2007 Vegetable Crop Handbook for the SE U.S. North Carolina Vegetable Growers Assoc., G. Holmes and J. Kemble, eds. 268 pp.

Bessin, R., Coolong, T., Jones, R., Masabni, J., Strang, J., and Seebold, K. 2008. 2008-2009 Vegetable Production Guide for Commercial Growers (ID-36). R. Bessin, Ed. UK Cooperative Extension Service, College of Agriculture, 135 pp.

Coolong, T., Masabni, J., Bessin, R., Seebold, K., Woods, T., and Jones, R. 2008. Ornamental Corn Production in Kentucky (HO-81). UK Cooperative Extension Service, College of Agriculture, 12 pp.

Coolong, T., Bessin, R., and Seebold, K. 2008. An IPM Scouting Guide for Common Pests of Solanaceous Crops in Kentucky (ID-172). T. Coolong, ed. UK Cooperative Extension Service, College of Agriculture, 28 pp.

Durham, R., Coolong, T., Jones, R., Law, D., Masabni, J., Strang, J., Williams, M., Bessin, R., Hartman, J., and Seebold, K. 2008. Home Vegetable Gardening in Kentucky (ID-128). R. Durham, ed. UK Cooperative Extension Service, College of Agriculture, 49 pp.

Seebold, K.W., Palmer, G.K., Pearce, R., Bailey, A., Green, J., Schwab, G., Townsend, L., Snell, W., Halich, G., Powers, L., Duncan, G., and Wells, L. 2008. Kentucky Tobacco Production Guide (ID-160). K. Seebold & R. Pearce, eds. UK Cooperative Extension Service, College of Agriculture, 56 pp.

Seebold, K.W., Palmer, G., Townsend, L., and Long, J. 2008. A Production Calendar for Burley Tobacco in Kentucky (ID-169). UK Cooperative Extension Service, College of Agriculture, 4 pp.

Seebold, K.W., Palmer, G.K., Pearce, R., Bailey, A., Green, J., Schwab, G., Townsend, L., Snell, W., Halich, G., Powers, L., Duncan, G., Wells, L., Wilhoit, J., Velandia, M., Witcher, V., Bost, S.C., Burgess, E., Hale, F., Hensley, D., Rhodes, N., and Denton, H.P. 2009. 2009-2010 Kentucky-Tennessee Tobacco Production Guide (ID-160). K. Seebold & R. Pearce, eds. UK Cooperative Extension Service, College of Agriculture, 56 pp.

Durham R., Coolong, T., Strang, J.G., Jones, R.T., and Seebold, K.W. 2009. Vegetable Cultivars for Kentucky Gardens – 2009 (ID-133). UK Cooperative Extension Service, College of Agriculture, 8 pp.

Seebold, K.W. Coolong, T., Bessin, R., Strang, J., and Jones, R.T. 2009. An IPM Scouting Guide for Common Pests of Cucurbits in Kentucky (ID-91). C. Kaiser, ed. UK Cooperative Extension Service, College of Agriculture, 32 pp.

In preparation

Seebold, K.W., Pearce, R., Bailey, A.W., Townsend, L., and Palmer, G.K. 2009. Field Guide for Identification of Common Pests and Disorders of Burley and Dark Tobacco. K.W. Seebold and G.K. Palmer, eds. UK Cooperative Extension Service, College of Agriculture.

EXTENSION PUBLICATIONS (FACT SHEETS)

Seebold, K. 2006-2009. Fungicide Guide for Burley and Dark Tobacco (PPFS-AGT8)., 8 pp.

Bachi, P., and Seebold, K. Southern Blight (PPFS-VG03), 2 pp.

Seebold, K., Bachi, P., and Beale, J. 2008. Black Rot of Crucifers (PPFS-VG01), 3 pp.

Seebold, K., Hartman, J., Bachi, P., and Beale, J. 2008. Blossom End Rot (PPFS-VG02), 2 pp.

Seebold, K. 2008. Bacterial Canker of Tomato (PPFS-VG06), 3 pp.

NEWSPAPER / TRADE JOURNAL ARTICLES

Seebold, K.W. 2006. Avoid an Epidemic. Pp. 4-6 in: Burley and Dark Tobacco Production Guide 2006. W. Harr, ed. Farm Progress, Carol Stream IL. 22 pp.

Seebold, K.W. 2007. Effectively Manage Target Spot. Pp. 10-12 in: Tobacco Trends. W. Harr & P. Golden, eds. Farm Progress, Carol Stream IL. 22 pp.

Seebold, K.W. 2007 (April). Tips for Successful Management of Diseases in the Home Vegetable Garden, in: Anderson News Annual Home & Garden Guide, B. Carlson, ed.

Seebold, K.W. 2008. Keep Black Shank in Check. Pp. 12-14 in: Tobacco Trends. W. Harr & P. Golden, eds. Farm Progress, Carol Stream IL. 18 pp.

NEWSLETTER ARTICLES

Stevenson, K.L., Langston, D.B., and Seebold, K.W. 2002. Resistance to azoxystrobin in the gummy stem blight pathogen in Georgia. Resistant Pest Management Newsletter 12:35-37.

2005: 42 articles submitted to Kentucky Pest News.
2006: 36 articles submitted to Kentucky Pest News.
2007: 33 articles submitted to Kentucky Pest News.
2008: 40 articles submitted to Kentucky Pest News.
2009: 8 articles submitted to Kentcuky Pest News (as of 4/14/09).

RADIO / TV TAPES & INTERVIEWS, NEWSPAPER INTERVIEWS

2005. 8 radio tapes released through UK Agricultural Communications. 1 radio interview with WEKU (blue mold). 3 interviews with the Courier-Journal (Louisville) regarding blue mold. 1 press release from the College of Agriculture. 1 press release from the KY Dept. of Agriculture.

2006. 12 radio tapes released through UK Agricultural Communications. 1 radio interview with Jack Crowner Farm Report (blue mold). 4 TV segments taped at WBKO (Bowling Green). 5 interviews with the Courier-Journal (Louisville) regarding blue mold. 2 press release from the College of Agriculture. 1 press release from the KY Dept. of Agriculture.

2007. 15 radio tapes released through UK Agricultural Communications. 3 TV segments taped at WBKO (Bowling Green). 1 interviews with the Courier-Journal (Louisville) regarding blue mold. 1 press release from the College of Agriculture.

2008. 33 radio tapes released through UK Agricultural Communications. 5 TV segments taped at WBKO (Bowling Green). 1 press release from the College of Agriculture.

2009. 18 radio tapes release through UK Agricultural Communications and 1 press release from the College of Agriculture as of September 11, 2009. 5 TV segments taped at WBKO (Bowling Green). 4 press releases from the College of Agriculture. Five radio and television interviews with media on blue mold (tobacco) and late blight (tomato).

WEB-BASED COMMUNICATIONS

The KY Tobacco Disease Information Page (formerly the KY Blue Mold Warning System). 10,950 hits were logged between 2005 and September 11, 2009. Web address for page: http://www.uky.edu/Agriculture/kpn/kyblue/kyblue.htm.

INVITED PRESENTATIONS & SEMINARS

"Phytophthora Blight of Peppers and Cucurbits – an Emerging Threat to Vegetable Production in Kentucky", 11/16/2005, UK Dept. of Horticulture, Lexington.

"Vegetable Disease Management Update" and "Recognizing Diseases that Carry Over in Seed", KY Fruit and Vegetable Conference, Lexington KY, 1/10-1/11/2006.

"Phytophthora Blight of Cucumbers and Peppers", Ontario Processing Vegetable Industry Conference, London, Ontario, 1/24-1/25/2006.

"Occurrence and Management of Diseases of Tobacco Transplants" and "Prospects and Progress in the Management of Black Shank in Burley Tobacco", APS-Caribbean Division / ASCOLFI Joint Meeting, Cartagena, Colombia, 9/11-9/15/2006.

"The 2006 Epidemic of Blue Mold", KY Farm Bureau Annual Meeting, Louisville, KY, 11/30/2006.

"Field Diseases of Burley Tobacco in Kentucky", NC State University Tobacco Day, Raleigh NC, 12/07/2006.

"Management of Diseases on Pumpkin, Squash, and Watermelon", KY Fruit and Vegetable Conference, Lexington KY, 1/09/07.

"Disease Management in Burley –A Key to Success in a Changing Industry", Bright Belt Warehouse Association, Myrtle Beach SC, 6/28/07.

"Outlook for Management of Phytophthora Blight of Cucurbits", IR-4 Regional Workshop, Nashville TN, 10/18/07.

"Fungicide Programs for Tomatoes and Cucurbits", KY Fruit and Vegetable Conference, Lexington KY, 1/07/08.

"Managing Phytophthora Blight of Cucurbits with Biopesticides", IR-4 Southern Region Meeting, Richmond, VA, 8/26/08.

"Diseases of Sweet Corn in Kentucky", KY Fruit and Vegetable Conference, Lexington KY, 1/05/09.

"Identification and Management of Cucurbit Diseases", KY Fruit and Vegetable Conference, Lexington KY, 1/05/09.

"Identification Foliar Diseases of Tobacco", NC State Tobacco Disease Workshop, Raleigh NC, 7/23/09.

EXTENSION AND OUTREACH ACTIVITIES

In-Service Training conducted for agents or other professionals.

YEAR	TRAININGS GIVEN
2002	3
2003	1
2004	2
2005	8
2006	6
2007	7
2008	3
2009	3 (as of 9/11/2009)

Statewide Educational Meetings Conducted - Workshops, shortcourse, etc.

DATE	MEETINGS & WORKSHOPS
2001	2
2002	4
2003	6
2004	3
2005	5
2006	6
2007	8
2008	8
2009	3 (as of 9/11/09)

Local or County Educational Meetings Conducted - Workshops, shortcourses, & field days.

DATE	MEETINGS GIVEN
2002	1
2003	2
2005	6
2006	40

2007 42
2008 41
2009 48 (as of 9/11/09)

MISCELLANEOUS

2005. Consulted with USDA Office of Pest Management Policy on re-registration of ferbam on tobacco and copper fungicides for use on vegetable crops.
2006. Invited by Americas Harvest to evaluate severity of Phytophthora blight, caused by *P. capsici*, at several pepper farms in Guadalajara, Mexico (11/17-11/20).
2006. Served as a consultant to ASP Enterprises from 12/08-12/11. Visited several fields of wrapper (cigar) tobacco to assess an outbreak of disease caused by an unknown Potyvirus.
2007. Served as consultant (e-mail & telephone) to Americas Harvest in Guadalajara, Mexico regarding management of diseases of pepper and tomatillo.
2008. Served as consultant (e-mail & telephone) to Americas Harvest in Guadalajara, Mexico regarding management of diseases of pepper and tomatillo. Advised plaintiff & defendant in lawsuit regarding black shank of tobacco (Owen Co.).

EXTRAMURAL FUNDING

DATE	PROPOSAL TITLE	AGENCY	AMOUNT	ROLE
2001	Chemical Industry Grant	Various chemical companies	$54,100	PI
2001	Screening Modern Cotton Cultivars for Resistance to Fusarium wilt	GA Cotton Commission	$6,000	PI
2001	Vidalia Onion Improvement	USDA-CSREES	$12,000	Coop.
2001	The Role of Soilborne Inoculum in the Epidemiology of Botrytis Neck Rot of Sweet Onion	UGARF	$5,000	PI
2001	Control of *Phytophthora capsici* on Yellow Squash with Organic Amendments and Biological Agents	GA Fruit and Vegetable Foundation	$2,500	PI
2001	Seedling Management in a Canola-Cotton Double Crop System.	Southern Regional Canola Research Program	$13,500	Co-PI
2002	Chemical Industry Grant	Various chemical cos.	$59,250	PI
2002	Control of *Phytophthora capsici* on Yellow Squash with Organic Amendments and Biological Agents	GA Fruit and Veg. Foundation	$3,500	PI
2002	Screening of Experiment-al Fungicides for the Control of *Pythium* in	IR-4 Project	$3,500	PI

	Carrot in GA			
2002	Screening of Experimental Fungicides for the Control of Phytophthora Root and Crown Rot of Squash in GA	IR-4 Project	$6,000	PI
2002	Screening of Biopesticides and Conventional Fungicides for the Control of Phytophthora Root and Crown Rot of Squash in GA	IR-4 Project	$8,000	PI
2003	Chemical Industry Grants	Various companies	$40,000	PI
2003	Utilization of Soil Amendments and Brassica Winter Crops for Management of Soilborne Pests and Diseases in Vegetable Plasticulture	USDA-CSREES	$422,000	PI
2003	IR-4 Minor Use Efficacy Trial Program	USDA-IR4	$9,500	PI
2003	Management of *P. capsici* on yellow squash with biopesticides	USDA-IR-4	$8,000	PI
2003	Seedling Management in a Canola-Cotton Double Crop System.	Southern Regional Canola Research Program	$13,500	Co-PI
2004	Chemical Industry Grants	Various companies	$40,000	PI
2004	IR-4 Minor Use Efficacy Trial Program	USDA-IR4	$6,000	PI
2004	Management of *P. capsici* on yellow squash with biopesticides	USDA-IR4	$10,000	PI
2004	Seedling Management in a Canola-Cotton Double Crop System	Southern Regional Canola Research Program	$13,500	Co-PI
2005	Management of *P. capsici* in Summer Squash with a Mycofumigant and Biopesticides	USDA-IR4	$5,000	PI
2005	Management of Diseases of Burley Tobacco	Council for Burley Tobacco	$8,350	PI
2005	Chemical Industry Grants	Various Cos.	$5,500	PI

2006	Biofumigation for Soil Health in Organic High Tunnel and Conventional Field Vegetable Production Systems (CY 2006-08)	USDA-SARE	$174,850	Co-PI
2006	Management of Diseases of Burley Tobacco	Council for Burley Tobacco	$6,850	PI
2006	Control of Phytophthora blight and Downy Mildew with Potassium Phosphite and Conventional Fungicides	USDA-IR4	$10,000	PI
2006	Integrated Management of Burley Tobacco Diseases	Burley Co-Op	$47,000	PI
2006	Management of Burley Tobacco Diseases	Philip Morris	$20,000	PI
2006	Chemical Industry Grants	Various Cos.	$22,500	PI
2007	Control of Phytophthora Blight and Downy Mildew with Potassium Phosphite and Conventional Fungicides	USDA-IR4	$5,000	PI
2007	Predicting and Managing Tomato Spotted Wilt Virus in Tobacco (CY 2007-08)	Tobacco Education and Research Council	$680,718 ($19,475 to Seebold)	Coll.
2007	Investigating the Race Structure and Pop. Biology of the Tobacco Black Shank Pathogen (CY 2007-08)	Tobacco Education and Research Council	$160,122 ($3,700 to Seebold)	Coll.
2007	Management of Diseases of Burley Tobacco	Council for Burley Tobacco	$8,000	PI
2007	Management of Burley Tobacco Diseases	Philip Morris	$20,000	PI
2007	Chemical Industry Grants	Various Cos.	$9,500	PI
2008	Expanding ipmPIPE for Forecasting Downy Mildew of Cucurbits (CY 2008-09)	USDA-CSREES (ipmPIPE program)	$900,000 ($16,000 to Seebold)	Coll.
2008	Management of Diseases of Burley Tobacco	Council for Burley Tobacco	$13,000	PI
2008	Management of Burley Tobacco Diseases	Philip Morris	$20,000	PI

2008	Chemical Industry Grants	Various Cos.	$16,000	PI
2009	Managing *Phytophthora capsici* on Pepper and Summer Squash with Combinations of Bioten and Conventional Fungicides	USDA-IR4	$20,000 ($10,000 to Seebold)	Co-PI
2009	Management of Diseases of Burley Tobacco	Council for Burley Tobacco	$7,500	Co-PI
2009	Management of Burley Tobacco Diseases	Philip Morris USA (Altria)	$8,000	PI
2009	Investigating the Role of the Cuticle in Resistance to Foliar Plant Pathogens	KY Science and Engineering Foundation	$80,000	Co-PI

Narrative

I joined the Department of Plant Pathology in March, 2005 as an Extension Specialist responsible for tobacco and commercial vegetables. Profitable production of tobacco and vegetables hinges on good management practices, and my Extension programs have focused on timely management of disease and prudent use of management tools such as fungicides and resistant varieties. Along with Extension responsibilities, I have developed an active program of applied research that forms the basis for recommendations on management of diseases on the crops for which I am responsible, and have had a significant involvement in the department's teaching program.
The following narrative describes key aspects of my program since my appointment in 2005.

EXTENSION ACTIVITIES

Meetings, training sessions, and other outreach. A major focus of my program is providing educational programs and support for county agents and farmers across the state. Since 2005, invited presentations have been given to 154 grower meetings at field days in Kentucky, Indiana, and Ohio. I have provided support to the UK Master Gardner program, and have taught general principles of plant pathology to 16 groups. I have also worked closely with Dr. Pearce (Plant and Soil Sciences Department) in the development of the UK Innovative Tobacco Growers' Program, which provides producers in Kentucky and Ohio with in-depth information in all aspects of production. Our goal has been to deliver to our tobacco farmers the information they need to remain competitive in the global marketplace.

Agent training and education have been a high priority in my program. I have participated in 24 in-service trainings for county agents (and was organizer of two such events, one on soilborne plant pathogens and the other on the use of digital imaging and microscopy). It is critical to provide high-quality educational programs and timely service to county agents. Accessibility to agents is a key element in supporting their programs; the value of my efforts has been recognized by the agents. In a recent (2008) survey of county agents, scores of 2.94, 2.98, and 2.9 (out of 3.0) were awarded to me on responsiveness, quality of support, and value to local programming efforts.

Involvement in meetings and travel around the state has allowed me to identify important outreach and research demands in my areas of responsibility, and to address the needs of my clientele. Since 2005, I have made 176 field visits to assist county agents in Kentucky, Indiana, and Ohio in troubleshooting disease issues in tobacco and vegetables. Providing growers with the necessary fungicide tools is a priority. To that end, I have been successful in securing emergency labels for Quadris on tobacco, and special local needs (24c) labels for mancozeb on tobacco and etridiazole on greenhouse tomatoes.

Extension publications. Revised editions of ID-36 (Vegetable Production Guide for Commercial Growers) were published in 2006 and 2008 as joint efforts with colleagues from Horticulture and Entomology. Major changes from previous editions included the addition of fungicide tables for each crop, and the merger of sections dealing with cucurbits into a single chapter. ID-36 is valued by our producers and agents, and has a strong reputation with colleagues in

surrounding states. Other vegetable-related publications of note are ID-91 and ID-172, IPM (Integrated Pest Management) guides for pest problems of cucurbits and solanaceous vegetables, respectively that were released recently. These publications stemmed from my idea to provide disease identification tools for agents and producers. Collaboration with Drs. Coolong (Horticulture) and Bessin (Entomology) expanded the scope of these publications to include common abiotic disorders, chemical injuries, nutrient deficiencies, weeds, and insects. These pictorial guide has received positive reviews from our clientele and provides them with an easy-to-use tool to troubleshoot problems in solanaceous vegetables.

In 2005, I saw a need for a comprehensive tobacco production guide in Kentucky. Such a resource had not been published for over 10 years, so I worked closely with colleagues in Biosystems and Agricultural Engineering, Agricultural Economics, Entomology, and Plant and Soil Sciences to design and write a modern guide, which was released in 2006 and has been updated each year since. Growers, agents, and industry professionals have all praised the guide since its debut. In 2008, the UK team enlisted the aid of counterparts in Tennessee, and this publication is now a joint effort between the Extension tobacco teams at both UK and the University of Tennessee.

I have also been invited to make revisions (disease management) to several existing publications, including ID-128 (Home Vegetable Gardening in Kentucky) and HO-81 (Ornamental Corn Production in Kentucky). In the case of fact sheets, revisions were made to those dealing with vegetables, and new sheets on bacterial canker of tomato and fungicides for burley and dark tobacco were released. Future plans include new fact sheets for black shank, blue mold, target spot, and seedling diseases of tobacco, and also the most common diseases of Kentucky's main vegetable crops A field manual for disease and disorders of tobacco should be released in June, 2009.

At the national level, I was invited in 2005 to participate in a revision of the Compendium of Onion Diseases, published by the American Phytopathological Society in 2008.

Kentucky Blue Mold Warning System. Improvements to the Kentucky Blue Mold Warning System web page (established by Dr. Nesmith), have been made yearly since 2005. The site is now called the "Kentucky Tobacco Disease Information Page", and I have added image galleries for diseases, along with links to important tobacco-related publications. I continue to provide up-to-date information on the status of blue mold (and other important diseases) in Kentucky during the growing season. Over 10,500 visitors have been logged on the site since 2005.

Other activities. Numerous media routes, apart from those already mentioned, have been used to convey information. I have published over 150 articles in Kentucky Pest News since 2005. Several articles for Tobacco Trends, a publication read widely by tobacco producers, have been published, and TV, radio, and television interviews have been conducted each year to deliver timely updates on disease-related topics. Along with these, I have made 43 radio tapes dealing with disease management issues in tobacco and vegetables through Agricultural Communications, and these have been broadcast by many local radio stations. I have used mailing lists to broadcast disease alerts to county agents that deal with tobacco and vegetables. I also serve as an "expert" for eXtension, fielding questions dealing with diseases of vegetables submitted online by producers in Kentucky and surrounding states.

APPLIED RESEARCH

Since 2005, I have conducted 85 trials (on-farm or research station) to address disease problems faced by producers of tobacco and vegetables in Kentucky. Research on tobacco has emphasized integrated management of black shank with host resistance and fungicides, screening of fungicides for efficacy against black shank and blue mold, and management of target spot with fungicides. Several projects were collaborations with Drs. Palmer and Pearce (both, Plant and Soil Sciences). Significant effort was devoted to determining the optimal application timing for azoxystrobin (Quadris) to achieve effective control of target spot, through which it was learned that best control of disease was achieved by one-to-two applications made at early or mid-season. Research on black shank of tobacco demonstrated that early-season applications of Ridomil Gold had more impact on control of black shank than those made at layby, and that one or two early applications were as effective as two applications. Research also has shown that surfactants can be used to manage Pythium root rot on tobacco transplants, and have the potential to provide producers with an economical, environmentally friendly alternative to currently registered fungicides.

Maria Holdcroft joined my program in 2007 and is working on a doctoral-level project concerning the effects of biofumigation with brassica cover crops on black shank in burley tobacco, primarily. Results on the ability of Indian mustard to suppress levels of Phytophthora nicotianae in soil following its incorporation have been encouraging.

In the area of vegetables, tests have been carried out to evaluate new and existing fungicides for management of diseases on tomatoes and cucurbits. This research has demonstrated the potential for control of Phytophthora blight of yellow squash with biofungicides. Work on management of powdery mildew of yellow squash demonstrated the utility of host resistance in reducing applications of fungicide and allowing the use of inexpensive materials to manage this disease. I am also a participant in a multi-state project that addresses management of soilborne diseases with biological agents.

Emerging diseases have been addressed effectively. I worked with colleagues, Julie Beale and Paul Bachi, the department's diagnosticians, as well as Drs. Vincelli and DeSa to identify the causal agents of "new" diseases on greenhouse tomato and cabbage. On tomato, this team identified the first reported case of tomato yellow leaf curl, caused by a begomovirus, in Kentucky. In Fall, 2007, the team described the first case of Phytophthora root rot of cabbage in Kentucky (and the United States). Dr. Vincelli and I determined, in 2008, that a strain of watermelon mosaic potyvirus was present in Kentucky that could not be detected with current commercial ELISA tests. Symptomatic pumpkin and squash samples sent to AgDia (commercial testing service) in 2007 and 2008 returned positive results for the general potyvirus group but were negative for known potyviruses, including watermelon mosaic virus. Through sequencing of viral RNA isolated from tissue containing the unknown potyvirus, Dr. Vincelli successfully identified the pathogen as watermelon mosaic virus. Our results allayed concerns that a new potyvirus was present in the state. In each of the cases where an emerging problem appeared, collaboration with colleagues resulted in quick identification of causal agents, allowing me to make the appropriate management recommendations.

Research findings have been published in appropriate outlets. Two manuscripts were published in Plant Health Progress, a refereed online journal, as well as 22 research briefs in Plant Disease Management Reports (a nationally recognized resource). Additionally, I have authored or co-authored five articles published in Extension research reports. Two publications, one dealing with target spot of tobacco, and one Phytophthora root rot of cabbage, should be completed and submitted by fall of 2009.

I have been successful in generating funds to support applied research efforts, having been awarded nearly $200,000 from competitive programs and private industry.

INSTRUCTION AND ADVISING

Since 2006, I have been involved as a co-instructor for PPA 640, Identification of Plant Diseases. Students are given practical training in the diagnosis of plant diseases, as well as opportunities to see various examples of Kentucky's agricultural diversity through field trips. In June of 2008, following the retirement of Dr. Hartman I took over major responsibility for PPA 640 with the excellent assistance of Julie Beale. The effort required to maintain the high standards of my predecessors was considerable, and I continue to refine my approach. Thus far, teaching scores from students have been favorable (2006: 4.0, 2007: 3.8, 2008: 4.0) and encouraging; however, I do not intend to rest in trying to grow and improve as an instructor.

I also supports colleagues' teaching programs through guest lectures on disease-related topics.
I serves as major advisor to a doctoral student, Maria Holdcroft and on the committees of two other graduate students (Merari Feliciano and Bidisha Chanda) in the department.

SERVICE AND RECOGNITION

I serve or have served on two standing committees in the Department, and on a search committee for an Extension plant pathologist. At the College level, I am a member of the Agriculture Faculty Council and have served on a search committee for the Assistant Director of Agriculture and Natural Resources.
Nationally, I am a member of the Southeast Vegetable Workers, and am currently a section editor of Fungicide and Nematicide Tests (now Plant Disease Management Reports) and was an associate editor of the journal Plant Disease (2004-2006). I have been member of the editorial advisory board of Crop Protection since 2006. I have participated in three review panels for competitive grant programs, and have served as an invited reviewer of numerous manuscripts for journals such as Plant Disease, Phytopathology, Crop Protection, and the Journal of Phytopathology. I am an active member of the American Phytopathological Society (APS) and the Southern Division of the APS, as well as the Kentucky Association of Extension Professionals. I currently serve on the APS Extension Committee.
I was honored by my peers in the Southern Division of the APS in 2006, when I was elected vice-president. I later served as president-elect in 2007 and president of this group in 2008.

My expertise in tobacco and vegetable pathology has resulted in invitations to speak at three out-of-state meetings and two international meetings (The Ontario Processing Vegetable Industry Conference and the Caribbean Division of the APS in Colombia). I have served as a consultant to commercial tobacco and vegetable producers in Ecuador and Mexico also.

Curriculum Vitae

Kenneth W. Seebold, Jr.

University of Kentucky
Department of Plant Pathology
205 Plant Science Building
1405 Veterans Drive
Lexington, KY 40546
(859) 257-7445 [voice]
(859) 323-1961 [fax]
kwseebold@uky.edu

Date of Birth: 11/06/64
Place: Louisville, KY

EDUCATION

Ph.D., Plant Pathology – August, 1998
University of Florida; Gainesville, FL
Major Professors: Dr. L.E. Datnoff
Dr. T.A. Kucharek

Dissertation Title: The Influence of Silicon Fertilization on the Development and Control of Blast, caused by *Magnaporthe grisea* (Hebert) Barr, in Upland Rice.

M.S., Plant Pathology – June, 1994
Auburn University; Auburn, AL
Major Professor: Dr. P.A. Backman

Thesis Title: Studies on the Control of Soilborne Peanut Diseases and Impact on Biological Control Agents Using Improved Fungicide Applications.

B.S., Integrated Pest Management – June, 1990
Auburn University; Auburn, AL

PROFESSIONAL EXPERIENCE

Assistant Extension Professor 3/21/2005 to present
University of Kentucky, Dept. of Plant Pathology
DOE: 90% Extension, 10% Instruction (approximate 4-year average)

Assistant Professor 12/2000 to 3/2005
University of Georgia, Dept. of Plant Pathology

Developed research program on the ecology, epidemiology, and control of soilborne and foliar fungal diseases of cotton and vegetables. Emphasis was placed on soilborne diseases of cotton (cultural, chemical, and biological control) and diseases of cucurbits and onion (biological, cultural, and chemical control; epidemiology). Pathogens of interest included *Phoma terrestris*, *Didymella bryoniae*, and *Phytophthora capsici*.

Fungicide Project Leader 5/1998 to 12/2000
Uniroyal Chemical Co., Inc.; Bethany, CT 06524
Supervisor: Dr. Allyn R. Bell

Responsible for the design and implementation of procedures necessary for the screening of chemical compounds for activity against plant-pathogenic fungi, and for the characterization of the biological activity of these compounds. Managed programs for the testing of potential chemical and biological fungicides in the field, maintain a diverse collection of plant-

pathogenic fungi for use in the fungicide screening program, and oversaw the activities of three junior-level biologists. Duties also included database management, writing of patents, and presentation of research findings at company-based and national meetings.

Graduate Research Assistant
University of Florida 6/1994 to 5/1998

Designed, executed, and analyzed experiments to study the effects of silicon on the epidemiology and control of rice blast (*M. grisea*) and leaf scald (*Monographella albescens*) in conjunction with the International Center for Tropical Agriculture (CIAT) in Villavicencio, Colombia. Designed greenhouse experiments to determine the effects of silicon on the components of resistance to rice blast. Refined methodologies for the use of digital imaging to assess disease severity in rice.

Graduate Research Assistant 9/1991 to 6/1994
Auburn University

Planned, executed, and analyzed experiments to determine the effects of application methods and adjuvant combinations on the performance of two fungicides against southern stem rot (*Sclerotium rolfsii*) and limb rot (*Rhizoctonia solani*).

Information Management Intern 6/1990 to 9/1991
Rhone-Poulenc AG; Research Triangle Park, NC

Tabulated, summarized, and entered into database all cooperator data from contract research trials. Also tracked the progress of individual cooperator trials. Installed software, hardware and trained field personnel in the use of data entry software. Maintained REACH agricultural chemical database.

TEACHING EXPERIENCE

Co-Instructor: Diagnosis and Management of Plant Diseases 2006-present
University of Kentucky

Course (PPA/PLS 640) focuses on recognition and identification of plant diseases and their cause and development. The course is designed to give students practical experience in dealing with a wide array of plant diseases, symptom expressions, causal agents, and interactions with environmental factors encountered in the difficult task of identifying plant diseases (from the UK Bulletin, 2007-2008).

Co-Instructor: Pesticide Management and Utilization Spring 2004
University of Georgia, Tifton Campus

Course (ENTO/CRSS 4250/6250) dealt with practical management and utilization of pesticides in urban and agricultural environments. Enrollment - 6

Teaching Assistant - Plant Disease Epidemiology Spring 1997
University of Florida

Co-assisted with laboratory preparation. Prepared and delivered introductory lectures for each lab session. Assisted students in exercises on basic principles of plant disease epidemiology. Prepared and delivered two lectures during the classroom portion of the course.

Guest Lectures

Fruit and Vegetable Production, PLS 520. One guest lecture. Spring 2006-2009.
Certified Crop Advisor Program, PLS 490. Two guest lectures. Spring 2006, 2008.
Tobacco Production, PLS 408. Four guest lectures. Fall 2006, 2008.
Plant Diseases Caused by Oomycetes – PATH 3530 (General Plant Path.); Fall 2003, Spring 2004.
lecture + lab exercise.

Graduate Study at an International Research Center – PATH 8160; Fall 2003, Spring 2004.
Plant-Pathogenic Species of *Phoma* – PATH 8160 (Spec. Problems in Plant Path); Spring 2004.
Management and Diagnosis of Diseases Caused by Soilborne Fungi – PATH 6280 (Diagnosis and Management of Plant Diseases); Fall 2004 (lecture + lab).

GRADUATE AND UNDERGRADUATE ADVISING

Advisor, Maria Holdcroft, Ph.D. candidtate, 2007-present.
Member, advisory committee for Merari Feliciano and Bidisha Chanda, Ph.D. candidates, 2007-present.
Advisor, Nakisha Harris, M.S. candidate. 2004-2005.
Member, advisory committee for Sara Gremillion, Ph.D. candidate. 2003-2005.
Advisor, Cheryl Murray, TiftArea Academy instructor and participant of GA GIFT program. 2003, 2004.
Advisor, Mary Crumley, Tift Co. High School student and participant of UGA College of Ag. and Environmental Sciences Student Mentoring Program. Fall 2003.

AWARDS & HONORS

James E. Payne Memorial Scholarship. 1988-1990.
Research Assistantship, Auburn University. 1991-1994.
Graduate Research Assistantship, University of Florida. 1994 - 1998.
Second Place. Graduate Paper Contest. Biennial Meeting of the Florida Phytopathological Society. 1997. Title: Effects of Silicon and Edifenfos on Leaf Blast of Upland Rice in Eastern Colombia.
First Place. Graduate Student Paper Competition. Soil and Crop Science Society of Florida.1997. Title: The Use of Silicon and Fungicides for the Management of Leaf and Neck Blast (*Magnaporthe grisea*) in Upland Rice.
Second Place. Graduate Student Paper Competition. Southern Division of the American Phytopathological Society. 1998. Title: Effects of silicon and edifenfos on epidemics of leaf and neck blast in upland rice in eastern Colombia.
Co-recipient. Interdisciplinary Research Team Award. University of Florida. 1999.
Award of Excellence for Teaching, University of Georgia, Tifton Campus (ENTO/CRSS 4250/6250). 2005.

PROFESSIONAL MEMBERSHIPS

American Phytopathological Society. 1998 – present.
Southern Division of the American Phytopathological Society. 1998 – present.
Georgia Association of Plant Pathologists. 2001 – 2005.
Watermelon Research and Development Working Group. 2002 – present.
Kentucky Association of State Extension Professionals. 2005 - present.

SERVICE

Chair, Extension Committee of the American Phytopathological Society, 2009.
President, Southern Division of the American Phytopathological Society, 2008-2009.
Member, Search Committee for Extension Plant Pathologist, 2008.
Member, Agricultural Faculty Council, 2007-2009.
Member, Dept. of Plant Pathology Resource Committee, 2007-present.
Member, College of Agriculture Search Committee for Director of Ag. and Natural Resources, 2007.
Member, College of Agriculture County Review Team, 2007.
President Elect, Southern Division of the American Phytopathological Society, 2007-2008.
Vice-President, Southern Division of the American Phytopathological Society, 2006-2007.
Chair, Multistate Project S-1028, 2006.
Associate Member, University of Kentucky Graduate faculty, 2005-present.
President, Tifton Area Optimist Club. 2003-2004.
Member, Tifton Area Optimist Club. 2000-2005.
Member, University of Georgia Faculty Council. 2002-2005.
Secretary, UGA College of Agricultural and Environmental Sciences Faculty Council. 2003-present.
Member, UGA College of Agricultural and Environmental Sciences Faculty Council. 2002-2005.
Chair, Chemical Control Committee of the American Phytopathological Society. 2003-2004.

Vice-Chair, Chemical Control Committee of the American Phytopathological Society. 2002-2003.
Chair, Industry Committee of the American Phytopathological Society. 2001-2002.
Vice-Chair, Industry Committee of the American Phytopathological Society. 2000-2001.
Vice President, Plant Pathology Graduate Student Group, University of Florida. Fall 1995-Fall 1996.
President, Plant Pathology Graduate Student Association, Auburn University. 1994.
Vice President, Plant Pathology Graduate Student Association, Auburn University. 1993.

EDITORSHIPS, REVIEW PANELS, AND REVIEWER SERVICE

Review panel for Northeastern IPM Competitive Grants Program, 2/2007.
Review panel for Northeastern IPM Competitive Grants Program, 2/02-2/03/06.
Served on technical review panel for USDA-CSREES PMAP, 4/17-4/19/06.
Editorial Advisory Board, Crop Protection. 2004-present.
Associate Editor, Plant Disease. 2004-2006.
Section Editor, Plant Disease Management Reports (formerly Fungicide and Nematicide Tests). 2003-present.

PUBLICATIONS (REFEREED)

Seebold, K.W., Datnoff, L.E., Correa-Victoria, F.J., Kucharek, T.A., and Snyder, G.H. 2000. Effect of silicon rate and host resistance on blast, scald, and yield of upland rice. Plant Disease 84:871-876.

Seebold, K.W., Kucharek, T.A., Datnoff, L.E., Correa Victoria, F.J., and Marchetti, M.A. 2001. The influence of silicon on components of resistance to blast in susceptible, partially resistant, and resistant cultivars of rice. Phytopathology 91:63-69.

Rodrigues, F.A., Datnoff, L.E., Korndorfer, G.H., Seebold, K.W., and Rush, M.C. 2001. Effect of silicon and host resistance on sheath blight development in rice. Plant Disease 85:827-832.

Csinos, A.S., Webster, T.M, Sumner, D.R., Johnson, A.W., Dowler, C.C., and Seebold, K.W. 2002. Application and crop safety parameters for soil fumigants. Crop Protection 21(10):973-982.

Desaeger, J., Csinos, A., Timper, P., Hammes, G, and Seebold, K. 2004. Soil fumigation and oxamyl drip applications for nematode and insect control in vegetable plasticulture. Ann. App. Biol 145:59-70.

Maw, B.W., Butts, C.L., Purvis, A.C., Seebold, K.W., and Mullinix, B.G. 2004. High temperature continuous flow curing of sweet onions. Applied Engineering in Agriculture.. 20(5):657-663.

Seebold, K.W., Datnoff, L.E., Correa-Victoria, F.J., Kucharek, T.A., and Snyder, G.H. 2004. Effects of silicon and fungicides on the control of leaf and neck blast in upland rice. Plant Disease 88:253-258.

Stevenson, K. L., Langston, D. B., Jr., and Seebold, K. W. 2004. Resistance to azoxystrobin in the gummy stem blight pathogen documented in Georgia. Online. Plant Health Progress doi:10.1094/PHP-2004-1207-01-RS.

Maw, B.W., Seebold, K.W., Purvis, A.C., and Paulk, J.T. 2005. Low-humidity, warm-air storage of sweet onions. Applied Engineering in Agriculture. 21(2):259-264.

Seebold, K.W., Langston, D.B., Kemerait, R.C., and Hudgins, J.E. 2005. First report of a leaf spot and stem canker caused by *Myrothecium roridum* on watermelon in the United States. Plant Dis. 89:342.

Tollner, E.W., Gitaitis, R.D., Seebold, K.W., and Maw, B.W. 2005. Experiences with a food product X-ray inspection system for classifying onions. Applied Engineering in Agriculture 21(5):907-912.

Montfort, W.S., Csinos, A.S., Desaeger, J., Seebold, K.W., and Diaz-Perez, J.C. 2007. Evaluating Brassica species as an alternative control measure for root-knot nematode (*M. incognita*) in Georgia vegetable plasticulture. Crop Protection 26:1359-1368.

Desaeger, J.A., Seebold, K.W., and Csinos, A.S. 2008. Effect of application timing and method on efficacy and

phytotoxicity of 1,3-D, chloropicrin and metam sodium combinations in squash plasticulture. Pest Management Science 64: 230-238.

DeSa, P.B., Seebold, K.W., and Vincelli, P.A. 2008. First report of Tomato Yellow Leaf Curl Virus in Greenhouse Tomatoes in Kentucky and Csinos. Plant Health Progress doi:10.1094/PHP-2008-0819-01-RS.

Vincelli, P.A. and Seebold, K.W. 2009. Report of a watermelon mosaic potyvirus strain in Kentucky undetected by ELISA. Plant Health Progress doi:10.1094/PHP-2009-0313-01-BR.

In Preparation

Seebold, K.W. and Johnson, C.S. 2009. Effect of application timing on the efficacy of azoxystrobin against target spot of burley tobacco. To be submitted to Plant Disease.

Seebold, K.W., Vincelli, P.A., Dixon, E., Beale, J., Bachi, P., and Ivors, K. 2009. Root rot of cabbage caused by *Phytophthora drechsleri* – a new disease in the United States. To be submitted to Plant Disease.

BOOK CHAPTERS

Datnoff, L.E. Correa-Victoria, F.J., Seebold, K.W., and Snyder, G.H. 2000. Silicon management of blast in upland and irrigated rice ecosystems. Pp. 180-187 IN: Advances in Rice Blast Research. D. Tharreau, M.H. Lebrun, N.J. Talbot, and J.L. Notteghem, eds. Kluwer Academic Press. Dordrecht, The Netherlands.

Datnoff, L.E., Seebold, K.W., and Correa-Victoria, F.J. 2001. Effects of silicon fertilization on disease development and yields of rice in Colombia. Pp. 171-184 IN: Silicon in Agriculture. Datnoff, L.E., Snyder, G.H., and Korndorfer, G.H., eds. Elsevier Science.

Datnoff, L.E., Rodrigues, F.A., and Seebold, K.W. 2007. Silicon and Plant Disease. Pp 233-246 in: Mineral Nutrition and Plant Disease. L. Datnoff et al. eds., APS Press, St. Paul MN, 279 pp.

Langston, D. and Seebold, K. 2008. Sections on onion diseases (revisions from previous publication). Pp. 10, 11-12, 18-22, 50-51, and 53-54 in: Compendium of Onion Diseases. H.F. Schwartz and S.K. Mohan, eds. APS Press, St. Paul MN. 127 pp.

PUBLICATIONS (PEER-REVIEWED, NON-REFEREED)

Seebold, K.W., J.C. Jacobi, and P.A. Backman. 1993. Evaluation of fungicides for control of soilborne diseases of peanut, 1992. Fungicide and Nematicide Tests 48:267.

Seebold, K.W. and P.A. Backman. 1994. Effects of adjuvants and application methods on fungicide performance in peanut, 1993. Fungicide and Nematicide Tests 49:248.

Langston, D.B. and Seebold, K.W. 2002. Evaluation of fungicides and spray programs for control of gummy stem blight of watermelon, 2001. Fungicide and Nematicide Tests 57:V134.

Langston, D.B. and Seebold, K.W. 2002. Evaluation of fungicides and biological materials for control of downy mildew and Microdochium blight of pumpkin, 2001. Fungicide and Nematicide Tests 57:V083.

Seebold, K.W. and Kemerait, R.C. 2002. Evaluation of azoxystrobin and Maxim combinations for the control of seedling diseases of cotton, 2001. Fungicide and Nematicide Tests 57:ST09.

Seebold, K.W. and Kemerait, R.C. 2002. Evaluation of selected seed treatments for the control of seedling diseases of cotton, 2001. Fungicide and Nematicide Tests 57:ST10.

Seebold, K.W. 2002. Evaluation of experimental fungicides for the control of Phytophthora crown rot of summer squash, 2001. Fungicide and Nematicide Tests 57:V096.

Seebold, K.W. 2002. Screening fungicides for the efficacy against *Phytophthora capsici* in summer squash, 2001. Fungicide and Nematicide Tests 57:V097.

Kemerait, R.C., Seebold, K.W., and McDaniel, R.G. 2003. Effects of tillage, seeding rates, and at plant fungicides on seedling disease in cotton, 2002. Fungicide and Nematicide Tests 58:FC056.

Kemerait, R.C., Seebold, K.W., and Mills, W.A. 2003. Evaluation of seeding rates and at plant fungicides to manage seedling diseases in cotton, 2002. Fungicide and Nematicide Tests 58:FC057.

Langston, D.B., Seebold, K.W., Lewis, K.L., and Jennings, W.T. 2003. Evaluation of fungicide programs for control of powdery mildew of watermelon, 2002. Fungicide and Nematicide Tests 58:V088.

Seebold, K.W. and Horten, T.B. 2003. Evaluation of in-furrow fungicides for the control of seedling diseases of cotton, 2002. Fungicide and Nematicide Tests 58:FC024.

Seebold, K.W. and Horten, T.B. 2003. Evaluation of azoxystrobin formulations for the control of seedling diseases of cotton, 2002. Fungicide and Nematicide Tests 58:ST029.

Seebold, K.W. and Langston, D.B. 2003. Evaluation of fungicides for control of downy mildew and gummy stem blight on watermelon, 2002. Fungicide and Nematicide Tests 58:V038.

Seebold, K.W. and Horten, T.B. 2003. Evaluation of fungicides for control of gummy stem blight on watermelon, 2002. Fungicide and Nematicide Tests 58:V039.

Seebold, K.W. and Horten, T.B. 2003. Evaluation of fungicides and timings for control of southern blight of carrot, 2002. Fungicide and Nematicide Tests 58:V096.

Seebold, K.W. and Langston, D.B. 2003. Evaluation of Ranman 400SC for control of downy mildew on pumpkin, 2002. Fungicide and Nematicide Tests 58:V097.

Seebold, K.W. and Horten, T.B. 2003. Evaluation of fungicides for control of Phytophthora crown and fruit rot of summer squash, 2002. Fungicide and Nematicide Tests 58:V098.

Seebold, K.W., Boyhan, G.E., Torrance, R.L., and Cook, M.J. 2003. Screening cultivars of sweet onion for susceptibility to pink root, 2002. Biological and Cultural Tests 18:V024.

Seebold, K.W. and Langston, D.B. 2004. Evaluation of fungicide programs for the control of gummy stem blight in watermelon, 2003. Fungicide and Nematicide Tests 59:V152.

Seebold, K.W. and Langston, D.B. 2004. Evaluation of boscalid for control of gummy stem blight on watermelon, 2003. Fungicide and Nematicide Tests 59:V051.

Seebold, K.W. and Langston, D.B. 2004. Evaluation of fungicides for control of gummy stem blight of watermelon, 2003. Fungicide and Nematicide Tests 59:V140.

Seebold, K.W. and Langston, D.B. 2004. Evaluation of fungicide programs for control of gummy stem blight of watermelon, 2003. Fungicide and Nematicide Tests 59:V139.

Seebold, KW. 2005. Evaluation of Pristine, Switch, and Vanguard for control of gummy stem blight in watermelon, 2004. Fungicide and Nematicide Tests 60:V127.

Seebold, K.W. and Langston, D.B. 2005. Evaluation of fungicide programs for control of gummy stem blight in watermelon, 2004. Fungicide and Nematicide Tests 60:V128.

Seebold, K.W. and Langston, D.B. 2005. Evaluation of fungicide programs for control of anthracnose of watermelon, 2004.

Fungicide and Nematicide Tests 60:V129.

Seebold, K.W. and Langston, D.B. 2005. Evaluation of Quadris programs for control of gummy stem blight in watermelon, 2004. Fungicide and Nematicide Tests 60:V130.

Seebold, K.W. and Dixon, E. 2006. Use of host resistance and fungicides to manage of downy and powdery mildew of summer squash, 2005. Biological and Cultural Tests 21:V023.

Seebold, K.W. and Dixon, E. 2006. Evaluation of fungicides for control of blue mold, target spot, and frogeye on burley tobacco, 2005. Fungicide and Nematicide Tests 61:FC052.

Seebold, K.W. and Palmer, G.K. 2006. Evaluation of Quadris for control of target spot on burley tobacco, 2005. Fungicide and Nematicide Tests 61:FC053.

Seebold, K.W. and Dixon, E. 2006. Use of Previcur Flex to control Pythium root rot on tobacco seedlings in a float-bed system, 2005. Fungicide and Nematicide Tests 61:FC054.

Seebold, K.W. and Dixon, E. 2007. Evaluation of experimental fungicides for control of Phytophthora crown rot of bell pepper, 2006. Plant Disease Management Reports (formerly Fungicide & Nematicide / Biological and Cultural Tests) 1:V100.

Seebold, K.W. and Dixon, E. 2007. Evaluation of experimental fungicides and strobilurins for control of downy and powdery mildew on winter squash, 2006. Plant Disease Management Reports 1:V101.

Seebold, K.W. and Dixon, E. 2007. Evaluation of fungicides for management of downy and powdery mildew on winter squash (IR-4 performance trial), 2006. Plant Disease Management Reports 1:V102.

Seebold, K.W. and Dixon, E. 2007. Effect of potassium phosphite and fungicides on Phytophthora crown and fruit rot of summer squash, 2006. Plant Disease Management Reports 1:V103.

Seebold, K.W. and Palmer, G.K. 2007. Evaluation of Quadris and V-10161 for control of blue mold on burley tobacco, 2006. Plant Disease Management Reports 1:FC121.

Seebold, K.W. and Palmer, G.K. 2007. Evaluation of V-10161, Ridomil Gold, and Quadris for control of black shank on burley tobacco, 2006. Plant Disease Management Reports 1:FC119.

Seebold, K.W. and Palmer, G.K. 2007. Evaluation of Quadris for control of target spot on burley tobacco, 2006. Plant Disease Management Reports 1:FC117.

Seebold, K.W. and Sizemore, P. 2007. Effect of application timing on the efficacy of Quadris against target spot on burley tobacco, 2006. Plant Disease Management Reports 1:FC118.

Canaday, C., Ownley, B., Gwinn, K., Rothrock, C., Keinath, A., and Seebold, K.W. 2008. Effects of biocontrol agents versus a fungicide on growth, yield, and diseases of broccoli in Tennessee, 2007-2008. Plant Disease Management Reports (PDMR) 2:V145.

Ownley, B., Gwinn, K., Dee, M., Canaday, C., Keinath, A., Rothrock, C., and Seebold, K.W. 2008. Effects of biocontrol agents on growth, yield, and root disease of broccoli in East Tennessee, 2007-08. PDMR 2:V155.

Seebold, K.W. 2008. Evaluation of Ridomil Gold applied at different timings for management of black shank, 2007. PDMR 2:FC103.

Seebold, K.W. 2008. Evaluation of Ridomil Gold, Quadris, and Revus for management of black shank, 2007. PDMR 2:FC102.

Seebold, K.W. and Henderson, J. 2008. Evaluation of Quadris applied at different timings for control of target spot on

burley tobacco, 2007. PDMR 2:FC098.

Seebold, K.W., Palmer, G.K., and Smith, S.P. 2008. Evaluation of burley cultivars for resistance to black shank, 2007. PDMR 2:FC101.

Seebold, K.W. 2008. Evaluation of fungicides for management of target spot on burley tobacco, 2007. PDMR 2:FC099.

Seebold, K.W. 2008. Evaluation of fungicides for management of foliar diseases on burley tobacco, 2007. PDMR 2:FC100.

Seebold, K.W. and Dixon, E. 2008. Evaluation of kiralaxyl (IR 6141) on Phytophthora crown and fruit rot of summer squash, 2007. PDMR 2:V004.

Seebold, K.W., Holdcroft, A., and Dixon, E. 2008. Effect of potassium phosphite and fungicides on Phytophthora crown and fruit rot of summer squash, 2007. PDMR 2:V005.

PATENTS

Dekeyser, M.A., Seebold, K.W., and Chee, G.L. 2001. Method for Controlling Fungi Using Phenylhydrazine Derivatives. U.S. Patent 6,297,275. 7 pp.

ABSTRACTS OF PRESENTED PAPERS

Seebold, K.W. and P.A. Backman. 1993. Development of bioassays to evaluate fungicide distribution, tenacity, and longevity on peanut plants and soil. Proc. Am. Peanut Res. and Ed. Society 25:24.

Seebold, K.W. and P.A. Backman. 1993. Formulation effects on iprodione performance in peanut: impact on disease control. Phytopathology 83:1371A.

Seebold, K.W. and P.A. Backman. 1994. Effects of adjuvant and application method on flutolanil performance against soilborne diseases of peanut. APS Southern Division Meeting.

Seebold, K.W., L. Datnoff, F. Correa-Victoria, and G. Snyder. 1995. Effects of silicon and fungicides on leaf and neck blast development in rice. Phytopathology 85:1168.

Seebold, K.W., L. Datnoff, F. Correa-Victoria, and T. Kucharek. 1997. Effects of silicon and fungicide timing on foliar disease control and yield in upland rice. Phytopathology 87:S87.

Seebold, K.W., L. Datnoff, F. Correa-Victoria, T. Kucharek, and G. Snyder. 1998. Effects of silicon and edifenfos on epidemics of leaf and neck blast in upland rice in eastern Colombia. Phytopathology 88:S126.

Seebold, K.W. Datnoff, L.E., Correa-Victoria, F.J., Kucharek, T.A., Snyder, G.H., and Tulande, E. 1998. Effects of calcium silicate plus fungicides at reduced rates on the control of leaf and neck blast in upland rice. Proceedings of the 27th Rice Technical Working Group Meeting.

Rodrigues, F.A., Datnoff, L.E., Korndorfer, G.H., Rush, M.C., Seebold, K.W., and Linscombe, S.E. 1998. Effects of calcium silicate and resistance on the development of sheath blight in rice. Proceedings of the 27th Rice Technical Working Group Meeting.

Seebold, K.W., Datnoff, L.E., Correa-Victoria, F.J., Kucharek, T.A., and Snyder, G.H. 1998. Effects of silicon and host resistance on leaf and neck blast in upland rice. Phytopathology 88:S80.

Seebold, K.W and Csinos, A.S. 2001. Comparison of Application Timing on the Efficacy of Metam Sodium and Chloropicrin Against Soilborne Fungi and Yellow Nutsedge. Proceedings of the 2001 Annual International Research Conference on Methyl Bromide Alternatives and Emissions Reductions. Pp. 101.1 - 101.4.

Csinos, A., Laska, J.E., Seebold, K., and Eger, J. 2001. Evaluation of Microirrigation Wetting Patterns in Polyethylene Film

Mulch Beds. Proceedings of the 2001 Annual International Research Conference on Methyl Bromide Alternatives and Emissions Reductions. Pp. 47.1 - 47.

Langston, D.B, Stevenson, K., and Seebold, K. 2001. Insensitivity of the Gummy Stem Blight Fungus (*Didymella bryoniae*) to Azoxystrobin in Georgia. Proceedings of the Southeastern Fruit and Vegetable Exposition, Greensboro NC, Dec. 2001.

Csinos, A.S., Laska, J.E., and Seebold, K.W. 2002. Evaluation of Micro Irrigation Wetting Patterns in Polyethylene Film Mulch Beds. Pp. 55-56 in: Proceedings of the 2002 Georgia Vegetable Conference. University of Georgia Cooperative Extension Service. 99 pp.

Seebold, K.W. and Csinos, A.S. 2002. Effect of Selected Fumigants on Soilborne Fungi. Pp. 59-60 in: Proceedings of the 2002 Georgia Vegetable Conference. University of Georgia Cooperative Extension Service. 99 pp.

Seebold, K.W., Desaeger, J., and Csinos, A.S. 2002. Effect of Application Timing on the Efficacy of Drip-Applied Soil Fumigants. Pp. 84.1-84.5 in: Proceedings of the 2002 Annual International Research Conference on Methyl Bromide Alternatives and Emissions Reductions. MBAO.

Stevenson, K.L., Langston, D.B., and Seebold, K.W. 2002. Resistance to Azoxystrobin (Quadris) in the Gummy Stem Blight Pathogen in Georgia. Pp. 75-75 in: Proceedings of the 2002 Georgia Vegetable Conference. University of Georgia Cooperative Extension Service. 99 pp.

Csinos, A.S., Seebold, K.W., and Davis, R.F. 2002. 1,3-D and oxamyl for nematode management in cucumbers. Phytopathology 92:S17.

Kemerait, R.C., Seebold, K.W., McDaniel, R.G., Spaid, D.G., and Parks, W.J. 2002. Assessment of fungicides to reduce seedling disease of cotton in Georgia. Phytopathology 92:S150.

Seebold, K.W., Csinos, A.S., and Davis, R.F. 2002. Evaluation of in-line injected materials as alternatives to fumigation with methyl bromide. Phytopathology 92:S152.

Seebold, K.W., Csinos, A.S., and Horten, T.B. 2002. Management of Phytophthora crown rot of yellow squash with foliar applied fungicides. Phytopathology 92:S74.

Stevenson, K.L., Langston, D.B., and Seebold, K.W. 2002. Resistance to azoxystrobin in the gummy stem blight pathogen in Georgia. Phytopathology 92:S79.

Kemerait, R.C., Seebold, K.W., McDaniel, R.G., and Spaid, D.G. 2003. Management of Rhizoctonia Seedling Blight with Fungicides and Variable Plant Populations. Pp. 230-233 in: Proceedings of the 2003 Beltwide Cotton Conferences. 2588 pp.

Seebold, K.W., Kemerait, R.C., and May, O.L. 2003. Indexing Modern Cotton Cultivars for Resistance to Fusarium Wilt' Page 269 in: Proceedings of the 2003 Beltwide Cotton Conferences. 2588 pp.

Seebold, K.W. 2003. Fungicide Performance Against Phytophthora Crown and Fruit Rot of Yellow Squash - 2001/2002. Pp. 58-61 in: Proceedings of the 2003 Georgia Vegetable Conference. University of Georgia Cooperative Extension Service. 108 pp.

Seebold, K.W. 2003. Control of *Phytophthora capsici* on Yellow Squash with Organic Amendments and Biological Agents. Page 69 in: Proceedings of the 2003 Georgia Vegetable Conference. University of Georgia Cooperative Extension Service. 108 pp.

Stevenson, K.L., Langston, D.B., and Seebold, K.W. 2003. Resistance to Azoxystrobin (Quadris) in the Gummy Stem Blight Pathogen in Georgia. Proceedings of the 2003 Georgia Vegetable Conference. University of Georgia Cooperative Extension Service. 108 pp.

Desaeger, J., Csinos, A., Timper, P., Hammes, G., and Seebold, K.W. 2003. Soil fumigation and oxamyl drip applications for nematode and insect control in vegetable plasticulture. Phytopathology 93:S20.

Seebold, K.W., Langston, D.B., Boyhan, G.E., Torrance, R.L., and Cook, M.J. 2003. Differential susceptibility in cultivars of sweet onion to pink root. Phytopathology 93:S77.

Seebold, K.W., Desaeger, J., and Csinos, A.S. 2003. Effects of Mulch Type on the Efficacy of Drip-Applied Soil Fumigants. Pp. 124.1-124.4 in: Proceedings of the 2003 Annual International Research Conference on Methyl Bromide Alternatives and Emissions Reductions. MBAO.

Seebold, K.W. 2004. Suppression of gummy stem blight on watermelon and cantaloupe transplants with seed-applied fungicides. Phytopathology 94:S94.

Seebold, K.W., Gitaitis, R.D., and Sanders, F.H. 2004. Biological control of gummy stem blight on watermelon and Phytophthora crown rot on summer squash with bacteria. Phytopathology 94:S94.

Seebold, K.W. 2004. From basic research in a chemical company to being a professor. Phytopathology 94:S141.

Seebold, K.W. 2004. Fungicide performance against strobilurin-resistant populations of *Didymella bryoniae* on watermelon. Phytopathology 94:S147.

Seebold, K.W., Kemerait, R.C., Marois, J.J., Wright, D., Padgett, B., Mueller, J., McLean, K., and Estes, A. 2004. Results from the 2003 Regional Hardlock Project. Pp. 337-340 in: Proceedings of the 2004 Beltwide Cotton Conferences.

Seebold, K.W. and Kemerait, R.C. 2004. Effects of Plant Population and Fungicide Treatment on Seedling Disease of Cotton. Pp. 429-431 in: Proceedings of the 2004 Beltwide Cotton Conferences.

Desaeger, J., Csinos, A., and Seebold, K. 2004. Soil Amendments and Soilborne Pest Control in Plasticulture. Pp. 92-96 in: Proceedings of the 2004 Southeast Regional Vegetable Conference. University of Georgia Cooperative Extension Service. 124 pp.

Gitaitis, R.D., Sanders, F.H., and Seebold, K.W. 2004. Development of a Screening Procedure to Identify Bacteria with Biocontrol Activity. Pp. 80-81 in: Proceedings of the 2004 Southeast Regional Vegetable Conference. University of Georgia Cooperative Extension Service. 124 pp.

Kemerait, R.C., Seebold, K.W., Marois, J.J., Wright, D., Padgett, B., Mueller, J., McLean, K., and Estes, A. 2004. Projected Recommendations for Use of Topsin M for Hardlock Control. Pp. 341-342 in: Proceedings of the 2004 Beltwide Cotton Conferences.

Langston, D.B. and Seebold, K.W. 2004. New Gummy Stem Blight Fungicide Options. Page 23 in: Proceedings of the 2004 Southeast Regional Vegetable Conference. University of Georgia Cooperative Extension Service. 124 pp.

Seebold, K.W. 2004. Management of *Phytophthora capsici* in Squash with Fungicides and Cultural Practices. Pp. 77-78 in: Proceedings of the 2004 Southeast Regional Vegetable Conference. University of Georgia Cooperative Extension Service. 124 pp.

Seebold, K.W. 2004. Soilborne Diseases of Onion in Georgia and Their Management. Pp. 103-106 in: Proceedings of the 2004 Southeast Regional Vegetable Conference. University of Georgia Cooperative Extension Service. 124 pp.

Seebold, K.W., Kemerait, R.C., Marois, J.J., Wright, D., Padgett, B., Mueller, J., McLean, K., and Estes, A. 2005. Results from the 2004 Regional Hardlock Project. In: Proceedings of the 2005 Beltwide Cotton Conferences.

Langston, D.B. and Seebold, K.W. 2005. Watermelon Fungicide Programs. Page 83 in: Proceedings of the 2005 Southeast Regional Vegetable Conference. University of Georgia Cooperative Extension Service. 108 pp.

Seebold, K.W. 2005. Control of Storage Rots of Onion with Fungicides. Pp. 23-26 in: Proceedings of the 2005 Southeast

Regional Vegetable Conference. University of Georgia Cooperative Extension Service. 108 pp.

Seebold, K.W. and Langston, D.B. 2005. Controlling Gummy Stem Blight with Seed Treatments. Page 82 in: Proceedings of the 2005 Southeast Regional Vegetable Conference. University of Georgia Cooperative Extension Service. 108 pp.

Gitaitis, R.D., Martinez, N., Seebold, K.W., Stevenson, K.L., Sanders, F.H., and Mullis, S.M. 2005. PCR amplification of nucleic acids of bacteria, fungi and viruses recovered and stored on FTA cards. Phytopathology 95:S35.

Seebold, K.W. and Langston, D.B. 2005. Suppression of pink root and Botrytis neck rot of onion with fungicides. Online Abstracts of the Southern Division APS Meeting. Publication no. P-2005-0015-SOA.

Seebold, K.W. 2006. Occurrence and Management of Diseases of Tobacco Transplants. In: Proceedings of the 27th Annual Meeting of the Colombian Phytopathological Society (ASCOLFI).

Seebold, K.W. 2006. Prospects and Progress in the Management of Black Shank in Burley Tobacco. In: Proceedings of the 27th Annual Meeting of the Colombian Phytopathological Society (ASCOLFI).

Seebold, K.W. and Palmer, G.K. 2007. Management of target spot on burley tobacco with azoxystrobin. Phytopathology 97:S183.

Seebold, K.W. and Palmer, G.K. 2008. Effect of application timing on the performance of azoxystrobin against target spot on burley tobacco. Proceedings of the 43rd Tobacco Worker's Conference, Savannah GA.

Seebold, K.W. and Dixon, E. 2008. Control of Pythium root rot in a tobacco float system with surfactants. Phytopathology 98:S143.

Seebold, K.W., Dixon, E., and Vincelli, P. 2008. Phytophthora root rot – a new disease of cabbage in Kentucky. Phytopathology 98:S212.

Seebold, K.W., de Sa, P.B., and Vincelli, P.V. 2009. First report of tomato yellow leaf curl virus in Kentucky. Phytopathology 99:S200.

Johnson, C.S. and Seebold, K.W. 2009. Alternative methods to control *Pythium* in tobacco transplant production in 2008-09. Phytopathology 99:S59.

Seebold, K.W., Johnson, C.S., and Dixon, E. 2009. Management of Pythium root rot on tobacco seedling with a non-ionic surfactant. Phytopathology 99:S116.

EXTENSION PUBLICATIONS (NUMBERED SERIES)

Research Reports

Kemerait, R.C. and Seebold, K.W. 2001. Cotton Disease and Nematode Management. Pp. 23-30 in: 2002 Georgia Cotton Production Guide. S.M. Brown, Ed.

Kemerait, R.C. and Seebold, K.W. 2002. Cotton Disease and Nematode Management. Pp. 25-29 in: 2003 Georgia Cotton Production Guide. S.M. Brown, Ed.

Kemerait, R.C. and Seebold, K.W. 2003. Cotton Disease and Nematode Management. Pp. 25-29 in: 2003 Georgia Cotton Production Guide. S.M. Brown, Ed.

Kemerait, R.C., Seebold, K.W., McDaniel, R.G., Spaid, D.G., and Parks, W.J. 2002. Evaluation of At-Plant Fungicides to Reduce Seedling Diseases of Cotton in Georgia. Pp. 288-296 in: Cotton Research-Extension Report 2001. University of GA-CPES Research-Extension Publication No. 4.

Maw, B., Purvis, A., Seebold, K.W., and Paulk, T. 2002. Warm-Air-Low-Humidity Storage of Sweet Onions. Pp. 26-32 in:

Georgia Onion 2001 Research-Extension Report. University of Georgia Cooperative Research-Extension Publication No. 3-2002.

Maw, B., Butts, C., Purvis, A., Seebold, K.W., and Mullinix, B.G. 2002. High Temperature Continuous Flow Curing of Sweet Onions. Pp. 50-60 in: Georgia Onion 2002 Research-Extension Report. University of Georgia Cooperative Research-Extension Publication No. 3-2002.

Seebold, K. and Horten, B. 2002. Experimental Fungicides for the Control of Foliar Diseases of Onion and Botrytis Neck Rot on Sweet Onion. Pp. 74-76 in: Georgia Onion 2002 Research-Extension Report. University of Georgia Cooperative Research-Extension Publication No. 3-2002.

Seebold, K.W., Kemerait, R.C., and Bednarz, C.W. 2002. Effect of Planting Date and Seed Treatment on Seedling Emergence and Yield of Cotton. Pp. 300-302 in: Cotton Research-Extension Report 2001. University of Georgia-CPES Research-Extension Publication No. 4.

Csinos, A.S., Seebold, K.W., Timper, P., Davis, R.F, and Laska, J.E. 2002. Application Methods of Soil Chemical Treatments on Nematodes, Disease, and Yield of Cucumber. Pp. 71-81 in: Georgia Vegetable Extension-Research Report 2001. University of Georgia - CPES Research-Extension Publication No. 5-2001.

Csinos, A.S., Seebold, K.W., Timper, P., Davis, R.F, and Laska, J.E. 2002. Soil Chemical Treatment Alternatives to Methyl Bromide in Cucumber. Pp. 82-92 in: Georgia Vegetable Extension-Research Report 2001. University of Georgia - CPES Research-Extension Publication No. 5-2001.

Csinos, A.S., Seebold, K.W., Timper, P., Davis, R.F, and Laska, J.E. 2002. Effects of Vydate and Telone Treatments for Management of Nematodes, Diseases, and Yield of Cucumber. Pp. 93-102 in: Georgia Vegetable Extension-Research Report 2001. University of Georgia - CPES Research-Extension Publication No. 5-2001.

Csinos, A.S., Seebold, K.W., Timper, P., and Laska, J.E. 2002. Evaluation of Chisel Placement of Telone Products and Drip Injection for Efficacy and Yield in Bell Pepper. Pp. 103-113 in: Georgia Vegetable Extension-Research Report 2001. University of Georgia - CPES Research-Extension Publication No. 5-2001.

Csinos, A.S., Seebold, K.W., Timper, P., and Laska, J.E. 2002. Telone C-17, Metam Sodium Combinations for Efficacy and Evaluation of Phytotoxicity in Squash. Pp. 114-124 in: Georgia Vegetable Extension-Research Report 2001. University of Georgia - CPES Research-Extension Publication No. 5-2001.

Langston, D.B. and Seebold, K.W. 2002. Evaluation of Fungicides and Spray Programs for Control of Gummy Stem Blight of Watermelon. Pp. 132-135 in: Georgia Vegetable Extension-Research Report 2001. University of Georgia - CPES Research-Extension Publication No. 5-2001.

Langston, D.B. and Seebold, K.W. 2002. Evaluation of Fungicides and Biological Materials for Control of Downy Mildew and Plectosporium Blight of Pumpkin. Pp. 141-143 in: Georgia Vegetable Extension-Research Report 2001. University of Georgia - CPES Research-Extension Publication No. 5-2001.

Seebold, K.W., Langston, D.B., and Horten, T.B. 2002. Screening Fungicides for Control of Phytophthora capsici in Summer Squash. Pp. 146-147 in: Georgia Vegetable Extension-Research Report 2001. University of Georgia - CPES Research-Extension Publication No. 5-2001.

Seebold, K.W., Langston, D.B., and Horten, T.B. 2002. Evaluation of Experimental Fungicides for the Control of Phytophthora Crown Rot of Summer Squash. Pp. 148-149 in: Georgia Vegetable Extension-Research Report 2001. University of Georgia - CPES Research-Extension Publication No. 5-2001.

Kemerait, R.C., Seebold, K.W., McDaniel, R.G., and Spaid, D.G. 2003. Management of Rhizoctonia Seedling Blight in Georgia with Fungicides and Variable Plant Populations. Pp. 293-299 in: Cotton Research-Extension Report 2002. UGA-CPES Research-Extension Publication No. 5. 324 pp.

Seebold, K.W., Kemerait, R.C. 2003. Comparison of Seed-Applied Azoxystrobin Formulations and Experimental

Fungicides for Control of Seedling Diseases of Cotton. Pp. 303-305 in: Cotton Research-Extension Report 2002. UGA-CPES Research-Extension Publication No. 5. 324 pp.

Seebold, K.W., Kemerait, R.C., and May, O.L. 2003. Indexing Modern Cotton Cultivars for Resistance to Fusarium Wilt. Pp. 306-308 in: Cotton Research-Extension Report 2002. UGA-CPES Research-Extension Publication No. 5. 324 pp.

Seebold, K.W., Langston, D.B., Boyhan, G., Torrance, R., and Cook, M.J. 2003. Evaluation of Onion Cultivars for Resistance to Pink Root During Seasons 2001-2002 and 2002-2003. Pp. 46-49 in: Georgia Onion 2003 Research-Extension Report. Cooperative Research-Extension Publication No. 3-2003.

Seebold, K.W. and Horten, T.B. 2003. Testing Experimental Fungicides for the Control of Foliar Diseases and Botrytis Neck Rot on Sweet Onions. Pp. 50-53 in: Georgia Onion 2003 Research-Extension Report. Cooperative Research-Extension Publication No. 3-2003.

Seebold, K.W., Gitaitis, R.D., Sanders, F.H., and Horten, T.B. 2003. Effects of Soil Solarization and Turnip Residue on Soil Fungi, Bacteria, and Yield of Sweet Onions in Georgia. Pp. 54-57 in: Georgia Onion 2003 Research-Extension Report. Cooperative Research-Extension Publication No. 3-2003.

Seebold, K.W. and Horten, T.B. 2003. Evaluation of Fungicides for Control of Phytophthora Crown and Fruit Rot of Summer Squash. Pp. 244-246 in: Georgia Vegetable Extension-Research Report 2002. Cooperative Research-Extension Publication No. 5-2003.

Seebold, K.W., Desaeger, J.A.J., and Csinos, A.S. 2003. Effect of Application Timing on the Efficacy of Drip-Applied Soil Fumigants. Pp. 247-250 in: Georgia Vegetable Extension-Research Report 2002. Cooperative Research-Extension Publication No. 5-2003.

Seebold, K.W. and Langston, D.B. 2003. Evaluation of Fungicides for Control of Downy Mildew and Gummy Stem Blight on Watermelon. Pp. 251-253 in: Georgia Vegetable Extension-Research Report 2002. Cooperative Research-Extension Publication No. 5-2003.

Seebold, K.W., Langston, D.B., and Horten, T.B. 2003. Evaluation of Fungicides for Control of Gummy Stem Blight on Watermelon. Pp. 254-256 in: Georgia Vegetable Extension-Research Report 2002. Cooperative Research-Extension Publication No. 5-2003.

Seebold, K.W. and Horten, T.B. 2003. Evaluation of Fungicides and Timings for Control of Southern Blight of Carrot. Pp. 257-259 in: Georgia Vegetable Extension-Research Report 2002. Cooperative Research-Extension Publication No. 5-2003.

Seebold, K.W. and Horten, T.B. 2003. Evaluation of Fungicides for Control of Phytophthora Crown and Fruit Rot of Summer Squash. Pp. 260-262 in: Georgia Vegetable Extension-Research Report 2002. Cooperative Research-Extension Publication No. 5-2003.

Maw, B., Seebold, K., Purvis, A., and Paulk, T. 2004. Warm Air, Low Humidity Storage of Sweet Onions. Pp. 42-50 in: Georgia 2004 Research-Extension Report. . Cooperative Research-Extension Publication No. 3-2004.

Seebold, K.W. and Kemerait, R.C. 2004. Effects of Plant Population and Fungicide Treatment on Seedling Diseases of Cotton. Pp. 237-241 in: Cotton Research-Extension Report 2003. UGA-CPES Research-Extension Publication No. 6. 257 pp.

Seebold, K., Langston, D., and Horten, B. 2004. Evaluation of Pristine for the Control of Pink Root and Botrytis Neck Rot on Sweet Onion. Pp. 57-59 in: Georgia Onion Research-Extension Report. . Cooperative Research-Extension Publication No. 3-2004.

R. C. Kemerait, R.C., Roberts, P.M., Seebold, K.W., Jost, P.H., Brown, S.M., Brown, S.N., Connelly, F.J., and Jacobs, J.L. 2005. Evaluation of Dicrotophos and Thiophanate Methyl for Management of Hardlock of Cotton in Georgia. Pp. 198-201 in: Cotton Research-Extension Report 2003. UGA-CPES Research-Extension Publication No. 7. 215 pp.

Seebold, K.W. and Dixon, E. 2006. Evaluation of Fungicides and Cultivars for Management of Powdery Mildew on Yellow Squash. Pp. 60-62 in: 2005 Fruit and Vegetable Crops Research Report (PR-521). UK Cooperative Extension Service, College of Agriculture, 94 pp.

Beale, J., Bachi, P., Seebold, K., and Hartman, J. 2006. Fruit and Vegetable Disease Observations from the Plant Disease Diagnostic Library. Pp. 90-92 in: 2005 Fruit and Vegetable Crops Research Report (PR-521). UK Cooperative Extension Service, College of Agriculture, 94 pp.

Seebold, K.W., Palmer, G.K., Pearce, R., Bailey, A., Green, J., Schwab, G., Townsend, L., Snell, W., Halich, G., Duncan, G., and Wells, L. 2007. Kentucky Tobacco Production Guide (ID-160). K. Seebold & G. Palmer, eds. UK Cooperative Extension Service, College of Agriculture, 58 pp.

Seebold, K.W., Dixon, E., Jones, T., and Sears, A. 2007. Evaluation of Fungicide Programs for Management of Gummy Stem Blight of Watermelon. Pp. 55-56 in: 2006 Fruit and Vegetable Crops Research Report (PR-538). J. Snyder & C. Smigell, eds. UK Cooperative Extension Service, College of Agriculture, 82 pp.

Seebold, K.W. and Dixon, E. 2007. Evaluation of Fungicide Programs for Management of Downy Mildew of Winter Squash. Pp. 64-65 in: 2006 Fruit and Vegetable Crops Research Report (PR-538). J. Snyder & C. Smigell, eds. UK Cooperative Extension Service, College of Agriculture, 82 pp.

Beale, J., Bachi, P., Long, S., Seebold, K., and Hartman, J. 2007. Fruit and Vegetable Disease Observations from the Plant Disease Diagnostic Library. Pp. 79-80 in: 2006 Fruit and Vegetable Crops Research Report (PR-538). J. Snyder & C. Smigell, eds. UK Cooperative Extension Service, College of Agriculture, 94 pp.

Seebold, K.W., Howard, N., Jackson, K., and Eli, H. 2008. Evaluation of Fungicide Programs for Management of Diseases of Staked Tomato. Pp. 74-75 in: 2007 Fruit and Vegetable Crops Research Report (PR-555). T. Coolong, ed. UK Cooperative Extension Service, College of Agriculture, 92 pp.

Beale, J., Bachi, P., Long, S., Seebold, K., and Hartman, J. 2008. Fruit and Vegetable Disease Observations from the Plant Disease Diagnostic Library. Pp. 89-90 in: 2007 Fruit and Vegetable Crops Research Report (PR-555). T. Coolong, ed. UK Cooperative Extension Service, College of Agriculture, 92 pp.

Coolong, T. and Seebold, K.W. 2009. Evaluation of Powdery Mildew Tolerance in Pumpkin in Central Kentucky Pp. 47-50 in: 2008 Fruit and Vegetable Crops Research Report (PR-572). T. Coolong, J. Snyder, and C. Smigell, eds. UK Cooperative Extension Service, College of Agriculture, 73 pp.

Numbered Bulletins

Rowell, B., Bessin, R., Masabni, J., Strang, J., Jones, T., and Seebold, K. 2006. 2006-2007 Vegetable Production Guide (ID-36), UK Cooperative Extension Service, College of Agriculture, 140 pp.

Sears, A., Masabni, J., Seebold, K., Bessin, R., Woods, T., and Jones, R.T. 2007. Ornamental Gourd Production in Kentucky (ID-119), UK Cooperative Extension Service, College of Agriculture, 12 pp.

Seebold, K.W. and Louwes, F.J. 2007. Relative Effectiveness of Alternative Management for disease control in pepper. Page 192 in: 2007 Vegetable Crop Handbook for the SE U.S. North Carolina Vegetable Growers Assoc., G. Holmes and J. Kemble, eds. 268 pp.

Bessin, R., Coolong, T., Jones, R., Masabni, J., Strang, J., and Seebold, K. 2008. 2008-2009 Vegetable Production Guide for Commercial Growers (ID-36). R. Bessin, Ed. UK Cooperative Extension Service, College of Agriculture, 135 pp.

Coolong, T., Masabni, J., Bessin, R., Seebold, K., Woods, T., and Jones, R. 2008. Ornamental Corn Production in Kentucky (HO-81). UK Cooperative Extension Service, College of Agriculture, 12 pp.

Coolong, T., Bessin, R., and Seebold, K. 2008. An IPM Scouting Guide for Common Pests of Solanaceous Crops in Kentucky (ID-172). T. Coolong, ed. UK Cooperative Extension Service, College of Agriculture, 28 pp.

Durham, R., Coolong, T., Jones, R., Law, D., Masabni, J., Strang, J., Williams, M., Bessin, R., Hartman, J., and Seebold, K. 2008. Home Vegetable Gardening in Kentucky (ID-128). R. Durham, ed. UK Cooperative Extension Service, College of Agriculture, 49 pp.

Seebold, K.W., Palmer, G.K., Pearce, R., Bailey, A., Green, J., Schwab, G., Townsend, L., Snell, W., Halich, G., Powers, L., Duncan, G., and Wells, L. 2008. Kentucky Tobacco Production Guide (ID-160). K. Seebold & R. Pearce, eds. UK Cooperative Extension Service, College of Agriculture, 56 pp.

Seebold, K.W., Palmer, G., Townsend, L., and Long, J. 2008. A Production Calendar for Burley Tobacco in Kentucky (ID-169). UK Cooperative Extension Service, College of Agriculture, 4 pp.

Seebold, K.W., Palmer, G.K., Pearce, R., Bailey, A., Green, J., Schwab, G., Townsend, L., Snell, W., Halich, G., Powers, L., Duncan, G., Wells, L., Wilhoit, J., Velandia, M., Witcher, V., Bost, S.C., Burgess, E., Hale, F., Hensley, D., Rhodes, N., and Denton, H.P. 2009. 2009-2010 Kentucky-Tennessee Tobacco Production Guide (ID-160). K. Seebold & R. Pearce, eds. UK Cooperative Extension Service, College of Agriculture, 56 pp.

Durham R., Coolong, T., Strang, J.G., Jones, R.T., and Seebold, K.W. 2009. Vegetable Cultivars for Kentucky Gardens – 2009 (ID-133). UK Cooperative Extension Service, College of Agriculture, 8 pp.

Seebold, K.W. Coolong, T., Bessin, R., Strang, J., and Jones, R.T. 2009. An IPM Scouting Guide for Common Pests of Cucurbits in Kentucky (ID-91). C. Kaiser, ed. UK Cooperative Extension Service, College of Agriculture, 32 pp.

In preparation

Seebold, K.W., Pearce, R., Bailey, A.W., Townsend, L., and Palmer, G.K. 2009. Field Guide for Identification of Common Pests and Disorders of Burley and Dark Tobacco. K.W. Seebold and G.K. Palmer, eds. UK Cooperative Extension Service, College of Agriculture.

EXTENSION PUBLICATIONS (FACT SHEETS)

Seebold, K. 2006-2009. Fungicide Guide for Burley and Dark Tobacco (PPFS-AGT8)., 8 pp.

Bachi, P., and Seebold, K. Southern Blight (PPFS-VG03), 2 pp.

Seebold, K., Bachi, P., and Beale, J. 2008. Black Rot of Crucifers (PPFS-VG01), 3 pp.

Seebold, K., Hartman, J., Bachi, P., and Beale, J. 2008. Blossom End Rot (PPFS-VG02), 2 pp.

Seebold, K. 2008. Bacterial Canker of Tomato (PPFS-VG06), 3 pp.

NEWSPAPER / TRADE JOURNAL ARTICLES

Seebold, K.W. 2006. Avoid an Epidemic. Pp. 4-6 in: Burley and Dark Tobacco Production Guide 2006. W. Harr, ed. Farm Progress, Carol Stream IL. 22 pp.

Seebold, K.W. 2007. Effectively Manage Target Spot. Pp. 10-12 in: Tobacco Trends. W. Harr & P. Golden, eds. Farm Progress, Carol Stream IL. 22 pp.

Seebold, K.W. 2007 (April). Tips for Successful Management of Diseases in the Home Vegetable Garden, in: Anderson News Annual Home & Garden Guide, B. Carlson, ed.

Seebold, K.W. 2008. Keep Black Shank in Check. Pp. 12-14 in: Tobacco Trends. W. Harr & P. Golden, eds. Farm Progress, Carol Stream IL. 18 pp.

NEWSLETTER ARTICLES

Stevenson, K.L., Langston, D.B., and Seebold, K.W. 2002. Resistance to azoxystrobin in the gummy stem blight pathogen in Georgia. Resistant Pest Management Newsletter 12:35-37.

2005: 42 articles submitted to Kentucky Pest News.
2006: 36 articles submitted to Kentucky Pest News.
2007: 33 articles submitted to Kentucky Pest News.
2008: 40 articles submitted to Kentucky Pest News.
2009: 8 articles submitted to Kentcuky Pest News (as of 4/14/09).

RADIO / TV TAPES & INTERVIEWS, NEWSPAPER INTERVIEWS

2005. 8 radio tapes released through UK Agricultural Communications. 1 radio interview with WEKU (blue mold). 3 interviews with the Courier-Journal (Louisville) regarding blue mold. 1 press release from the College of Agriculture. 1 press release from the KY Dept. of Agriculture.

2006. 12 radio tapes released through UK Agricultural Communications. 1 radio interview with Jack Crowner Farm Report (blue mold). 4 TV segments taped at WBKO (Bowling Green). 5 interviews with the Courier-Journal (Louisville) regarding blue mold. 2 press release from the College of Agriculture. 1 press release from the KY Dept. of Agriculture.

2007. 15 radio tapes released through UK Agricultural Communications. 3 TV segments taped at WBKO (Bowling Green). 1 interviews with the Courier-Journal (Louisville) regarding blue mold. 1 press release from the College of Agriculture.

2008. 33 radio tapes released through UK Agricultural Communications. 5 TV segments taped at WBKO (Bowling Green). 1 press release from the College of Agriculture.

2009. 18 radio tapes release through UK Agricultural Communications and 1 press release from the College of Agriculture as of September 11, 2009. 5 TV segments taped at WBKO (Bowling Green). 4 press releases from the College of Agriculture. Five radio and television interviews with media on blue mold (tobacco) and late blight (tomato).

WEB-BASED COMMUNICATIONS

The KY Tobacco Disease Information Page (formerly the KY Blue Mold Warning System). 10,950 hits were logged between 2005 and September 11, 2009. Web address for page: http://www.uky.edu/Agriculture/kpn/kyblue/kyblue.htm.

INVITED PRESENTATIONS & SEMINARS

"Phytophthora Blight of Peppers and Cucurbits – an Emerging Threat to Vegetable Production in Kentucky", 11/16/2005, UK Dept. of Horticulture, Lexington.

"Vegetable Disease Management Update" and "Recognizing Diseases that Carry Over in Seed", KY Fruit and Vegetable Conference, Lexington KY, 1/10-1/11/2006.

"Phytophthora Blight of Cucumbers and Peppers", Ontario Processing Vegetable Industry Conference, London, Ontario, 1/24-1/25/2006.

"Occurrence and Management of Diseases of Tobacco Transplants" and "Prospects and Progress in the Management of Black Shank in Burley Tobacco", APS-Caribbean Division / ASCOLFI Joint Meeting, Cartagena, Colombia, 9/11-9/15/2006.

"The 2006 Epidemic of Blue Mold", KY Farm Bureau Annual Meeting, Louisville, KY, 11/30/2006.

"Field Diseases of Burley Tobacco in Kentucky", NC State University Tobacco Day, Raleigh NC, 12/07/2006.

"Management of Diseases on Pumpkin, Squash, and Watermelon", KY Fruit and Vegetable Conference, Lexington KY, 1/09/07.

"Disease Management in Burley –A Key to Success in a Changing Industry", Bright Belt Warehouse Association, Myrtle Beach SC, 6/28/07.

"Outlook for Management of Phytophthora Blight of Cucurbits", IR-4 Regional Workshop, Nashville TN, 10/18/07.

"Fungicide Programs for Tomatoes and Cucurbits", KY Fruit and Vegetable Conference, Lexington KY, 1/07/08.

"Managing Phytophthora Blight of Cucurbits with Biopesticides", IR-4 Southern Region Meeting, Richmond, VA, 8/26/08.

"Diseases of Sweet Corn in Kentucky", KY Fruit and Vegetable Conference, Lexington KY, 1/05/09.

"Identification and Management of Cucurbit Diseases", KY Fruit and Vegetable Conference, Lexington KY, 1/05/09.

"Identification Foliar Diseases of Tobacco", NC State Tobacco Disease Workshop, Raleigh NC, 7/23/09.

EXTENSION AND OUTREACH ACTIVITIES

In-Service Training conducted for agents or other professionals.

YEAR	TRAININGS GIVEN
2002	3
2003	1
2004	2
2005	8
2006	6
2007	7
2008	3
2009	3 (as of 9/11/2009)

Statewide Educational Meetings Conducted - Workshops, shortcourse, etc.

DATE	MEETINGS & WORKSHOPS
2001	2
2002	4
2003	6
2004	3
2005	5
2006	6
2007	8
2008	8
2009	3 (as of 9/11/09)

Local or County Educational Meetings Conducted - Workshops, shortcourses, & field days.

DATE	MEETINGS GIVEN
2002	1
2003	2
2005	6
2006	40

2007 42
2008 41
2009 48 (as of 9/11/09)

MISCELLANEOUS

2005. Consulted with USDA Office of Pest Management Policy on re-registration of ferbam on tobacco and copper fungicides for use on vegetable crops.
2006. Invited by Americas Harvest to evaluate severity of Phytophthora blight, caused by *P. capsici*, at several pepper farms in Guadalajara, Mexico (11/17-11/20).
2006. Served as a consultant to ASP Enterprises from 12/08-12/11. Visited several fields of wrapper (cigar) tobacco to assess an outbreak of disease caused by an unknown Potyvirus.
2007. Served as consultant (e-mail & telephone) to Americas Harvest in Guadalajara, Mexico regarding management of diseases of pepper and tomatillo.
2008. Served as consultant (e-mail & telephone) to Americas Harvest in Guadalajara, Mexico regarding management of diseases of pepper and tomatillo. Advised plaintiff & defendant in lawsuit regarding black shank of tobacco (Owen Co.).

EXTRAMURAL FUNDING

DATE	PROPOSAL TITLE	AGENCY	AMOUNT	ROLE
2001	Chemical Industry Grant	Various chemical companies	$54,100	PI
2001	Screening Modern Cotton Cultivars for Resistance to Fusarium wilt	GA Cotton Commission	$6,000	PI
2001	Vidalia Onion Improvement	USDA-CSREES	$12,000	Coop.
2001	The Role of Soilborne Inoculum in the Epidemiology of Botrytis Neck Rot of Sweet Onion	UGARF	$5,000	PI
2001	Control of *Phytophthora capsici* on Yellow Squash with Organic Amendments and Biological Agents	GA Fruit and Vegetable Foundation	$2,500	PI
2001	Seedling Management in a Canola-Cotton Double Crop System.	Southern Regional Canola Research Program	$13,500	Co-PI
2002	Chemical Industry Grant	Various chemical cos.	$59,250	PI
2002	Control of *Phytophthora capsici* on Yellow Squash with Organic Amendments and Biological Agents	GA Fruit and Veg. Foundation	$3,500	PI
2002	Screening of Experiment-al Fungicides for the Control of *Pythium* in	IR-4 Project	$3,500	PI

	Carrot in GA			
2002	Screening of Experimental Fungicides for the Control of Phytophthora Root and Crown Rot of Squash in GA	IR-4 Project	$6,000	PI
2002	Screening of Biopesticides and Conventional Fungicides for the Control of Phytophthora Root and Crown Rot of Squash in GA	IR-4 Project	$8,000	PI
2003	Chemical Industry Grants	Various companies	$40,000	PI
2003	Utilization of Soil Amendments and Brassica Winter Crops for Management of Soilborne Pests and Diseases in Vegetable Plasticulture	USDA-CSREES	$422,000	PI
2003	IR-4 Minor Use Efficacy Trial Program	USDA-IR4	$9,500	PI
2003	Management of *P. capsici* on yellow squash with biopesticides	USDA-IR-4	$8,000	PI
2003	Seedling Management in a Canola-Cotton Double Crop System.	Southern Regional Canola Research Program	$13,500	Co-PI
2004	Chemical Industry Grants	Various companies	$40,000	PI
2004	IR-4 Minor Use Efficacy Trial Program	USDA-IR4	$6,000	PI
2004	Management of *P. capsici* on yellow squash with biopesticides	USDA-IR4	$10,000	PI
2004	Seedling Management in a Canola-Cotton Double Crop System	Southern Regional Canola Research Program	$13,500	Co-PI
2005	Management of *P. capsici* in Summer Squash with a Mycofumigant and Biopesticides	USDA-IR4	$5,000	PI
2005	Management of Diseases of Burley Tobacco	Council for Burley Tobacco	$8,350	PI
2005	Chemical Industry Grants	Various Cos.	$5,500	PI

2006	Biofumigation for Soil Health in Organic High Tunnel and Conventional Field Vegetable Production Systems (CY 2006-08)	USDA-SARE	$174,850	Co-PI
2006	Management of Diseases of Burley Tobacco	Council for Burley Tobacco	$6,850	PI
2006	Control of Phytophthora blight and Downy Mildew with Potassium Phosphite and Conventional Fungicides	USDA-IR4	$10,000	PI
2006	Integrated Management of Burley Tobacco Diseases	Burley Co-Op	$47,000	PI
2006	Management of Burley Tobacco Diseases	Philip Morris	$20,000	PI
2006	Chemical Industry Grants	Various Cos.	$22,500	PI
2007	Control of Phytophthora Blight and Downy Mildew with Potassium Phosphite and Conventional Fungicides	USDA-IR4	$5,000	PI
2007	Predicting and Managing Tomato Spotted Wilt Virus in Tobacco (CY 2007-08)	Tobacco Education and Research Council	$680,718 ($19,475 to Seebold)	Coll.
2007	Investigating the Race Structure and Pop. Biology of the Tobacco Black Shank Pathogen (CY 2007-08)	Tobacco Education and Research Council	$160,122 ($3,700 to Seebold)	Coll.
2007	Management of Diseases of Burley Tobacco	Council for Burley Tobacco	$8,000	PI
2007	Management of Burley Tobacco Diseases	Philip Morris	$20,000	PI
2007	Chemical Industry Grants	Various Cos.	$9,500	PI
2008	Expanding ipmPIPE for Forecasting Downy Mildew of Cucurbits (CY 2008-09)	USDA-CSREES (ipmPIPE program)	$900,000 ($16,000 to Seebold)	Coll.
2008	Management of Diseases of Burley Tobacco	Council for Burley Tobacco	$13,000	PI
2008	Management of Burley Tobacco Diseases	Philip Morris	$20,000	PI

2008	Chemical Industry Grants	Various Cos.	$16,000	PI
2009	Managing *Phytophthora capsici* on Pepper and Summer Squash with Combinations of Bioten and Conventional Fungicides	USDA-IR4	$20,000 ($10,000 to Seebold)	Co-PI
2009	Management of Diseases of Burley Tobacco	Council for Burley Tobacco	$7,500	Co-PI
2009	Management of Burley Tobacco Diseases	Philip Morris USA (Altria)	$8,000	PI
2009	Investigating the Role of the Cuticle in Resistance to Foliar Plant Pathogens	KY Science and Engineering Foundation	$80,000	Co-PI

Narrative

I joined the Department of Plant Pathology in March, 2005 as an Extension Specialist responsible for tobacco and commercial vegetables. Profitable production of tobacco and vegetables hinges on good management practices, and my Extension programs have focused on timely management of disease and prudent use of management tools such as fungicides and resistant varieties. Along with Extension responsibilities, I have developed an active program of applied research that forms the basis for recommendations on management of diseases on the crops for which I am responsible, and have had a significant involvement in the department's teaching program.
The following narrative describes key aspects of my program since my appointment in 2005.

EXTENSION ACTIVITIES

Meetings, training sessions, and other outreach. A major focus of my program is providing educational programs and support for county agents and farmers across the state. Since 2005, invited presentations have been given to 154 grower meetings at field days in Kentucky, Indiana, and Ohio. I have provided support to the UK Master Gardner program, and have taught general principles of plant pathology to 16 groups. I have also worked closely with Dr. Pearce (Plant and Soil Sciences Department) in the development of the UK Innovative Tobacco Growers' Program, which provides producers in Kentucky and Ohio with in-depth information in all aspects of production. Our goal has been to deliver to our tobacco farmers the information they need to remain competitive in the global marketplace.

Agent training and education have been a high priority in my program. I have participated in 24 in-service trainings for county agents (and was organizer of two such events, one on soilborne plant pathogens and the other on the use of digital imaging and microscopy). It is critical to provide high-quality educational programs and timely service to county agents. Accessibility to agents is a key element in supporting their programs; the value of my efforts has been recognized by the agents. In a recent (2008) survey of county agents, scores of 2.94, 2.98, and 2.9 (out of 3.0) were awarded to me on responsiveness, quality of support, and value to local programming efforts.

Involvement in meetings and travel around the state has allowed me to identify important outreach and research demands in my areas of responsibility, and to address the needs of my clientele. Since 2005, I have made 176 field visits to assist county agents in Kentucky, Indiana, and Ohio in troubleshooting disease issues in tobacco and vegetables. Providing growers with the necessary fungicide tools is a priority. To that end, I have been successful in securing emergency labels for Quadris on tobacco, and special local needs (24c) labels for mancozeb on tobacco and etridiazole on greenhouse tomatoes.

Extension publications. Revised editions of ID-36 (Vegetable Production Guide for Commercial Growers) were published in 2006 and 2008 as joint efforts with colleagues from Horticulture and Entomology. Major changes from previous editions included the addition of fungicide tables for each crop, and the merger of sections dealing with cucurbits into a single chapter. ID-36 is valued by our producers and agents, and has a strong reputation with colleagues in

surrounding states. Other vegetable-related publications of note are ID-91 and ID-172, IPM (Integrated Pest Management) guides for pest problems of cucurbits and solanaceous vegetables, respectively that were released recently. These publications stemmed from my idea to provide disease identification tools for agents and producers. Collaboration with Drs. Coolong (Horticulture) and Bessin (Entomology) expanded the scope of these publications to include common abiotic disorders, chemical injuries, nutrient deficiencies, weeds, and insects. These pictorial guide has received positive reviews from our clientele and provides them with an easy-to-use tool to troubleshoot problems in solanaceous vegetables.

In 2005, I saw a need for a comprehensive tobacco production guide in Kentucky. Such a resource had not been published for over 10 years, so I worked closely with colleagues in Biosystems and Agricultural Engineering, Agricultural Economics, Entomology, and Plant and Soil Sciences to design and write a modern guide, which was released in 2006 and has been updated each year since. Growers, agents, and industry professionals have all praised the guide since its debut. In 2008, the UK team enlisted the aid of counterparts in Tennessee, and this publication is now a joint effort between the Extension tobacco teams at both UK and the University of Tennessee.

I have also been invited to make revisions (disease management) to several existing publications, including ID-128 (Home Vegetable Gardening in Kentucky) and HO-81 (Ornamental Corn Production in Kentucky). In the case of fact sheets, revisions were made to those dealing with vegetables, and new sheets on bacterial canker of tomato and fungicides for burley and dark tobacco were released. Future plans include new fact sheets for black shank, blue mold, target spot, and seedling diseases of tobacco, and also the most common diseases of Kentucky's main vegetable crops A field manual for disease and disorders of tobacco should be released in June, 2009.

At the national level, I was invited in 2005 to participate in a revision of the Compendium of Onion Diseases, published by the American Phytopathological Society in 2008.

Kentucky Blue Mold Warning System. Improvements to the Kentucky Blue Mold Warning System web page (established by Dr. Nesmith), have been made yearly since 2005. The site is now called the "Kentucky Tobacco Disease Information Page", and I have added image galleries for diseases, along with links to important tobacco-related publications. I continue to provide up-to-date information on the status of blue mold (and other important diseases) in Kentucky during the growing season. Over 10,500 visitors have been logged on the site since 2005.

Other activities. Numerous media routes, apart from those already mentioned, have been used to convey information. I have published over 150 articles in Kentucky Pest News since 2005. Several articles for Tobacco Trends, a publication read widely by tobacco producers, have been published, and TV, radio, and television interviews have been conducted each year to deliver timely updates on disease-related topics. Along with these, I have made 43 radio tapes dealing with disease management issues in tobacco and vegetables through Agricultural Communications, and these have been broadcast by many local radio stations. I have used mailing lists to broadcast disease alerts to county agents that deal with tobacco and vegetables. I also serve as an "expert" for eXtension, fielding questions dealing with diseases of vegetables submitted online by producers in Kentucky and surrounding states.

APPLIED RESEARCH

Since 2005, I have conducted 85 trials (on-farm or research station) to address disease problems faced by producers of tobacco and vegetables in Kentucky. Research on tobacco has emphasized integrated management of black shank with host resistance and fungicides, screening of fungicides for efficacy against black shank and blue mold, and management of target spot with fungicides. Several projects were collaborations with Drs. Palmer and Pearce (both, Plant and Soil Sciences). Significant effort was devoted to determining the optimal application timing for azoxystrobin (Quadris) to achieve effective control of target spot, through which it was learned that best control of disease was achieved by one-to-two applications made at early or mid-season. Research on black shank of tobacco demonstrated that early-season applications of Ridomil Gold had more impact on control of black shank than those made at layby, and that one or two early applications were as effective as two applications. Research also has shown that surfactants can be used to manage Pythium root rot on tobacco transplants, and have the potential to provide producers with an economical, environmentally friendly alternative to currently registered fungicides.

Maria Holdcroft joined my program in 2007 and is working on a doctoral-level project concerning the effects of biofumigation with brassica cover crops on black shank in burley tobacco, primarily. Results on the ability of Indian mustard to suppress levels of Phytophthora nicotianae in soil following its incorporation have been encouraging.

In the area of vegetables, tests have been carried out to evaluate new and existing fungicides for management of diseases on tomatoes and cucurbits. This research has demonstrated the potential for control of Phytophthora blight of yellow squash with biofungicides. Work on management of powdery mildew of yellow squash demonstrated the utility of host resistance in reducing applications of fungicide and allowing the use of inexpensive materials to manage this disease. I am also a participant in a multi-state project that addresses management of soilborne diseases with biological agents.

Emerging diseases have been addressed effectively. I worked with colleagues, Julie Beale and Paul Bachi, the department's diagnosticians, as well as Drs. Vincelli and DeSa to identify the causal agents of "new" diseases on greenhouse tomato and cabbage. On tomato, this team identified the first reported case of tomato yellow leaf curl, caused by a begomovirus, in Kentucky. In Fall, 2007, the team described the first case of Phytophthora root rot of cabbage in Kentucky (and the United States). Dr. Vincelli and I determined, in 2008, that a strain of watermelon mosaic potyvirus was present in Kentucky that could not be detected with current commercial ELISA tests. Symptomatic pumpkin and squash samples sent to AgDia (commercial testing service) in 2007 and 2008 returned positive results for the general potyvirus group but were negative for known potyviruses, including watermelon mosaic virus. Through sequencing of viral RNA isolated from tissue containing the unknown potyvirus, Dr. Vincelli successfully identified the pathogen as watermelon mosaic virus. Our results allayed concerns that a new potyvirus was present in the state. In each of the cases where an emerging problem appeared, collaboration with colleagues resulted in quick identification of causal agents, allowing me to make the appropriate management recommendations.

Research findings have been published in appropriate outlets. Two manuscripts were published in Plant Health Progress, a refereed online journal, as well as 22 research briefs in Plant Disease Management Reports (a nationally recognized resource). Additionally, I have authored or co-authored five articles published in Extension research reports. Two publications, one dealing with target spot of tobacco, and one Phytophthora root rot of cabbage, should be completed and submitted by fall of 2009.

I have been successful in generating funds to support applied research efforts, having been awarded nearly $200,000 from competitive programs and private industry.

INSTRUCTION AND ADVISING

Since 2006, I have been involved as a co-instructor for PPA 640, Identification of Plant Diseases. Students are given practical training in the diagnosis of plant diseases, as well as opportunities to see various examples of Kentucky's agricultural diversity through field trips. In June of 2008, following the retirement of Dr. Hartman I took over major responsibility for PPA 640 with the excellent assistance of Julie Beale. The effort required to maintain the high standards of my predecessors was considerable, and I continue to refine my approach. Thus far, teaching scores from students have been favorable (2006: 4.0, 2007: 3.8, 2008: 4.0) and encouraging; however, I do not intend to rest in trying to grow and improve as an instructor.

I also supports colleagues' teaching programs through guest lectures on disease-related topics.
I serves as major advisor to a doctoral student, Maria Holdcroft and on the committees of two other graduate students (Merari Feliciano and Bidisha Chanda) in the department.

SERVICE AND RECOGNITION

I serve or have served on two standing committees in the Department, and on a search committee for an Extension plant pathologist. At the College level, I am a member of the Agriculture Faculty Council and have served on a search committee for the Assistant Director of Agriculture and Natural Resources.
Nationally, I am a member of the Southeast Vegetable Workers, and am currently a section editor of Fungicide and Nematicide Tests (now Plant Disease Management Reports) and was an associate editor of the journal Plant Disease (2004-2006). I have been member of the editorial advisory board of Crop Protection since 2006. I have participated in three review panels for competitive grant programs, and have served as an invited reviewer of numerous manuscripts for journals such as Plant Disease, Phytopathology, Crop Protection, and the Journal of Phytopathology. I am an active member of the American Phytopathological Society (APS) and the Southern Division of the APS, as well as the Kentucky Association of Extension Professionals. I currently serve on the APS Extension Committee.
I was honored by my peers in the Southern Division of the APS in 2006, when I was elected vice-president. I later served as president-elect in 2007 and president of this group in 2008.

My expertise in tobacco and vegetable pathology has resulted in invitations to speak at three out-of-state meetings and two international meetings (The Ontario Processing Vegetable Industry Conference and the Caribbean Division of the APS in Colombia). I have served as a consultant to commercial tobacco and vegetable producers in Ecuador and Mexico also.

CURRICULUM VITAE/NARRATIVE

NAME: David A. Smith

EDUCATION: B.Sc., First Class Honours, Biology, University of Strathclyde, Scotland, 1969
M.S., Plant Pathology, Cornell University, 1971
Ph.D., Plant Pathology, Cornell University, 1974

PROFESSIONAL EMPLOYMENT RECORD:

Professor and Chair of Plant Pathology, University of Kentucky. 1986 to present.
Associate Professor of Plant Pathology, University of Kentucky. 1979-1986.
Lecturer, Department of Plant Biology, The University, Hull, England. 1974-1979.

PROFESSIONAL MEMBERSHIP:

American Phytopathological Society (APS)
American Association for the Advancement of Science

ACTIVITIES:

My experiences as chair have produced a "jack of all trades, and master of none". I have had the privilege of serving as Plant Pathology department chair since October 1986, following selection by my faculty colleagues and approval by then Dean Charles Barnhart. For some five years or so, I maintained an active research program, though collaborations with Christopher Schardl were key to the program's viability. The "Affairs of State" ultimately overwhelmed my capacity to be meaningfully engaged in day-to-day research. My last Ph.D. student, co-advised by Dr. Schardl, graduated in 1992. Coauthorship of a final research article came in 1995. My role as a formal instructor withered somewhat parallel to my research decline. I last taught a specialty graduate course (PPA 660: Dynamics of Plant-Pathogen Interactions) in the spring semester, 1993. I continued having a major role in the instruction of PPA 400G (Principles of Plant Pathology) until the fall semester, 1995. In 2001, I contributed to the team-taught FOR/PPA 410 (Forest Pathology) course. This was necessitated as an interim effort following the retirement of Professor Louis Shain. For the past three fall semesters, I have presented a lecture on the history and mission of the department to incoming graduate students.

My tenure as chair has seen a dramatic change in the departmental faculty. Of the faculty members on board in 1986, *all* have either resigned, retired or hold phased- or post-retirement appointments. My greatest challenge, beyond doubt, was to attempt to recruit new faculty of the caliber necessary to maintain a tradition of superior academic quality, as well as wide recognition for the department in the discipline. In this day and age, faculty recruitment is a demanding, even sometimes exhausting, process. There is a need to advertize widely and demonstrate that Affirmative Action requirements have been met. Competition between institutions is keen for the most promising candidates. Many recruits have professional partners whose personal ambitions must be met, if not on campus, then in the community at large (the department is familiar with the loss of both a junior faculty member and high-profile recruit for whom this factor was a major player). All in all, the cohort recruited has proved more than adequate to the job, maintaining the department in high standing within the University, and nationally. My "instructional" duties over the past dozen-or-so years have principally involved mentoring new faculty hires. I have attempted to ensure that their initiation into the department

proved as smooth as possible by providing, hopefully, appropriate counsel on matters such as establishing sound working relationships with technical support staff, advising graduate students, preparing grant proposals, ensuring timely publication and stressing the importance of personnel recruitment. A related role has been to serve as counselor for any member of the department seeking my professional advice. I believe in a literal "open door" policy.

A second dominant activity through much of this decade was orchestrating the relocation and settling-in of most departmental programs from the Agricultural Science Building-North to the Plant Science Building. Of course, many players -both within and outside the department- helped accomplish these goals, but I believe my support and encouragement, as well as attempts to resolve crises as they arose helped smooth the process.

A never-ending role I see for the chair is to help advance the faculty, whether from the counsel of accumulated experience, through editing key manuscripts and grant proposals or promoting their recognition. While I would claim no credit for their formal accomplishments, I do believe my attention to detail in technical editing as well as in preparing promotion and nomination packages has been instrumental in a number of positive outcomes. There was a BASF advertisement of some years ago to the effect that BASF did not make many of the products we use, but made many of the products we use better… an adage I see pertinent to my role as chair.

Below are a number of bulleted items, both routine activities and notable departmental events, which reflect my involvement to a greater or lesser extent over the last few years:

- Liaison for Plant Science Building (PSB) infrastructure issues affecting the department.
- Orchestrate alumnae/i social at APS Annual Meeting. Irrespective of whether social is held or not, write annual state-of-the-department letter to alums, emeritus faculty and friends of the department.
- Represent department at various University and College of Agriculture-related events e.g. Kentucky Ag Advisory Council.
- Manage departmental budget.
- Lead annual and biennial performance review evaluations for faculty and staff.
- Engage closely in the preparation of all promotion dossiers, and many nomination packages.
- Service on four graduate student Academic Advisory Committees.
- Hiring of three (of the five) administrative staff in the department; a fourth switched positions upon the phased retirement of the primary long-serving Business Officer. The past six years, then, have seen a total turnover in new personnel, or new responsibilities, for *all* of the clerical staff.
- Reclassification of key greenhouse technical support personnel.
- Reassignment of Homeland Security-related Diagnostic Aide to "hard" money.
- Department has never been outside the top four in the three, national, faculty scholarly productivity rankings of doctoral programs prepared by Academic Analytics.
- Stephanie Mathews, first female African American graduate student in Plant Pathology, 2002.
- Peter Nagy promoted early to Associate Professor, with tenure, 2003.
- Christopher Schardl elected a Fellow of APS, 2003.
- Jerome Faulkner, first male African American graduate student in Plant Pathology, 2003.
- Investigated the functioning/effectiveness of the campus Advanced Genetics Technologies Center (AGTC) at the dean's request, ~2003. The AGTC is located in the PSB.

- Hiring of Kenneth Seebold as Assistant Extension Professor, March 2005.
- Department ranked #1 in the College of Agriculture for $ per research FTE in fiscal years 2005 and 2007.
- Departmental Retreat, 2006; career counseling by successful alums.
- Hiring of Aardra Kachroo as Assistant Professor, July 2006.
- John Hartman elected a Fellow of APS, August 2006.
- Donald Hershman; Research/Extension Impact Award, College of Agriculture, 2006.
- Peter Nagy; Bobby Pass Excellence in Grantsmanship Award, College of Agriculture, 2006.
- Donald Hershman; APS Excellence in Extension Award, 2007.
- Paul Vincelli; APS Excellence in Teaching Award, 2007.
- Pradeep Kachroo; Prestigious Research Paper Award, College of Agriculture, 2007.
- Peter Nagy; Thomas Poe Cooper Award for Research, College of Agriculture, 2007.
- Lisa Vaillancourt; George E. Mitchell, Jr. Faculty Award for Outstanding Service to Graduate Students, Gamma Sigma Delta/College of Agriculture, 2007.
- Peter Nagy; University Research Professor, 2007.
- Paul Vincelli; University Provost's Distinguished Service Professor Award, 2007.
- Peter Nagy promoted early to Professor, 2007.
- Pradeep Kachroo promoted early to Associate Professor, with tenure, 2007.
- Search to fill John Hartman's position, 2007/2008/2009; situation in limbo because of budgetary crisis.
- Michael Goodin promoted to Associate Professor, with tenure, 2008.
- Retention of Peter Nagy, 2008/2009; a six-month "adventure".

LISA JAYNE VAILLANCOURT
CURRICULUM VITAE

EDUCATION

Purdue University, West Lafayette, IN
Ph.D. in Plant Pathology, 1991
Dissertation Title Genetic Manipulations of *Glomerella graminicola* (Anamorph *Colletotrichum graminicola*).

University of Illinois, Urbana-Champaign, IL
M.S. in Plant Pathology, 1987
Thesis Title A New Biological Assay for the Elicitation of Glyceollin in Soybeans.

University of Connecticut, Storrs, CT
B.S. in Biology, *cum laude*, 1984
Honors Thesis Title The Isolation and Partial Identification of Some Phenolic Compounds from the Leaves of *Comptonia peregrina* (L.) Coult.

RESEARCH POSITIONS

Full Professor, University of Kentucky, Department of Plant Pathology (July 2009-Present). Molecular biology of fungal stalk-rot diseases of corn; molecular genetics of plant-fungal interactions and of development in fungi; signal transduction and developmental responses to environmental signals in fungi.

Associate Professor, University of Kentucky, Department of Plant Pathology (2002-2009). Research areas: see above.

Assistant Professor, University of Kentucky, Department of Plant Pathology (1996-2002). Research areas: see above.

Postdoctoral Research Fellow, University of Vermont, Microbiology and Molecular Genetics (1991-1996). Molecular regulation of sexual development in the model Basidiomycete *Schizophyllum commune***.**

Graduate Research Assistant, Purdue University, Department of Botany and Plant Pathology (1988-1991). Genetic and molecular analysis of the corn anthracnose fungus *Glomerella graminicola* (*Colletotrichum graminicola*).

Graduate Research Assistant, University of Illinois, Department of Plant Pathology (1987-1988). Nematode diseases of corn and soybeans; biochemistry and physiology of resistance of corn to nematodes.

Diagnostician, University of Illinois Plant Disease Clinic (1987). Diagnosis of nematode diseases of turf and field crops.

Graduate Research Assistant, University of Illinois, Department of Plant Pathology (1984-1987). Physiology and biochemistry of resistance of soybean to *Phytophthora* root rot disease.

Summer Research Fellow, New York Botanical Garden (1983). Biochemical resistance of *Comptonia peregrina* to insect feeding.

RESEARCH

EXTRAMURAL COMPETITIVE SUPPORT

Nationally Competitive: as Principal Investigator (PI)

USDA (United States Department of Agriculture) NRI (National Research Initiative), Microbial Associations with Plants. 2008-2010**.** L. Vaillancourt. "The Role of Signal Peptidase in the Pathogenic Association of the Anthracnose Stalk Rot Fungus *Colletotrichum graminicola* with Maize". $140,010.

USDA Microbial Genome Sequencing Program. 2006-2009. L. Vaillancourt. Co-PIs M. Thon, M. Dickman, L. Ma, J. Osborn. "A Genome Sequence for the Model Hemibiotroph *Colletotrichum graminicola*". $951,260.

USWBSI (U.S. Wheat and Barley Scab Initiative). 2006. L. Vaillancourt. Co-PIs D. Van Sanford, D. Hershman. "The Relationship between Fungal Biomass and DON Contamination in Wheat Seeds". $9,801.

USDA NRI, Microbial Associations with Plants. 2002-2005. L. Vaillancourt. "Mechanisms of the Transition Between Biotrophy and Necrotrophy in a Hemibiotroph". $195,000.

USWBSI. 2002. L. Vaillancourt. Co-PIs D. Van Sanford, D. Hershman. "Role of a *Colletotrichum graminicola* Pathogenicity Gene Homologue in *F. graminearum*". $6,413.

USDA NRI, Microbial Associations with Plants. 1997-2000. L. Vaillancourt. "Aggressiveness and Pathogenicity Determinants in Anthracnose Stalk Rot of Corn". $100,000.

Nationally Competitive: as Co-PI

NSF (National Science Foundation). 2008-2012. PI P. Kachroo. Co-PIs L. Vaillancourt, A. Kachroo. "Molecular and Biochemical Analysis of a Hemibiotrophic Interaction". $510,000

USDA/ BARD (Binational Agricultural Research and Development). 2006-2010. PI D. Prusky. Co-PIs L. Vaillancourt, R. Fluehr. **"**Mechanism of Suppression of Resistance of Fruits to Postharvest Pathogens Following Environmental pH Changes". $330,000.

Industry Funding

DuPont Company Grant. 2002-2006. L. Vaillancourt**. "**Development of Bioassays for Vascular Infection of Maize by *Colletotrichum graminicola*". $90,000.

J.J. Mauget Company Grant. 1999-2002. PI J. Hartman. Co-PI L. Vaillancourt. "Efficacy of Injected Fungicides on Prevention of Austrian Pine Tip Blight Disease Caused by the Fungus *Sphaeropsis sapinea* and Eradication of the Causal Fungus from Symptomless Pine Tissues". $8,000.

Regionally Competitive, as PI

KTRDC (Kentucky Tobacco Research and Development Center). 2007-2009. L. Vaillancourt. Co-PI S. Nokes. "The Potential Use of Engineered Corn Stalk Rot Fungi for Saccharification of Plant Cellulose in Solid Substrate Cultivation Systems". $73,988.

KSEF (Kentucky Science and Engineering Foundation). 2005-2007. L. Vaillancourt. Co-PI P. Kachroo. "Understanding the Molecular Mechanisms Underlying Interactions of Plants with Hemibiotrophic Pathogens". $101,634.

Kentucky Corn Growers Association Research Award. 1997. L. Vaillancourt. "The Potential for Vaccination of Corn Against Stalk Rot Diseases". $5,700.

Regionally Competitive, as Co-PI

KSEF. 2007. PI W. Lushia. Co-PIs L. Vaillancourt, P. Heist. "The Potential of Corn Stalk Rot Fungi for Cellulosic Bioconversion in Fuel Ethanol Production". $30,000.

Participation in Special Grants (non-competitive)

USDA Special Grant. 2002-2004. Advanced Genetics Technologies. PI C. Schardl. Co PIs L. Vaillancourt, D. Hildebrand, P. Nagy, S. Perry. $561,217

Post-doctoral and Student Support: Nationally competitive

Postdoctoral Award to Vaillancourt

NIH (National Institutes of Health) Individual National Research Service Award (NRSA) Postdoctoral Fellowship. 1992-1995. Awarded to L. Vaillancourt. "Regulation of Fruiting Body Development in the Mushroom *Schizophyllum commune*". $72,200

National Awards to Students and Postdoctoral Personnel Directed by Vaillancourt

USDA AREA (Agricultural Research Enhancement Award) Postdoctoral Grant. 1999-2001. Awarded to M. Thon to support his work in my laboratory. "Identification of Pathogenicity Mutants of *Colletotrichum graminicola*". $90,000

International Society of Arboriculture (ISA) Student Travel Award to Jennifer Flowers to travel to the ISA meeting, Nashville, TN, 2005 (one of only five graduate students invited to speak at the meeting).

American Phytopathological Society (APS) Travel Award (Zahir Eyal and APS Council Award) to Claire Venard, for travel to the APS Annual Meeting, Austin, TX, 2005.

APS Travel Award (Wheeler Award) to Jennifer Flowers, for travel to the APS Annual Meeting, New Orleans, LA, 2000.

APS Travel Award (Mathre Award) to Jennifer Chaky, to support her travel to the APS Annual Meeting, Montreal, Canada, 1999.

INTERNAL SUPPORT

Office of the Vice President for Research

Research Equipment Grant. 2001. To purchase digital camera and computer software and hardware for digital microscopy and image analysis. $17,000.

Minigrant. 2001. For page charges related to the publication of a manuscript. $2,000.

Research Committee Grant. 1999-2001. To support work on genetic factors relating to latent infections of pines by the tip blight fungus *Sphaeropsis sapinea*. $4,550.

Minigrant. 2001. To support a pilot research project to investigate mechanisms of spore germination in *Colletotrichum graminicola*. $1,000.

Minigrant. 1998. To travel to the Gordon Conference on Cellular and Molecular Mycology. $892.

University Teaching and Learning Center

Instructional Enhancement Grant. 2001. To aid in developing electronic media for PPA 410, Forest Pathology. $960.

College of Agriculture

Instructional Enhancement Award. 1999. To aid in modernizing PPA 652, Plant Pathogenic Fungi. $3,500.

UK Graduate School

Dissertation Year Awards to Claire Venard, 2005, and Jennifer Flowers, 2004, both Ph.D. students in my laboratory.

Travel Support to Graduate Students in the Vaillancourt Lab:

- Sladana Bec, for travel to the APS Centennial Meeting, Minneapolis, MN, 2008.
- Sladana Bec, for travel to a Fusarium workshop, Manhattan, KS, 2007.
- Sladana Bec, for travel to the U.S. Wheat and Barley Scab meeting, Milwaukee, WI, 2006.
- Amy Bateman, for travel to the APS Annual Meeting, Quebec City, Canada, 2006.
- Claire Venard, for travel to the APS Annual Meeting, Austin, TX, 2005.
- Claire Venard and Jennifer Flowers, for travel to the Fungal Genetics meeting, Pacific Grove, CA, 2005.
- Claire Venard and Jennifer Flowers, for travel to the APS Annual Meeting, Charlotte, NC, 2003.
- Jennifer Flowers, for travel to the APS Annual Meeting, Salt Lake City, UT, 2000.
- Meizhu Du, for travel to the MSA (Mycological Society of America) Annual Meeting, Burlington, VT, 2000.
- Jennifer Chaky, for travel to the APS Annual Meeting, Montreal, Canada, 1999.

Thesis Research Support Grant to Jennifer Chaky, for travel to visit the laboratory of Dr. N. Money at Miami University of Ohio, 1998.

UK Nursery/Landscape Fund

Minigrant. 2005-2006**.** PI J. Hartman. Co-PIs L. Vaillancourt, J. Flowers, A. Bateman, J. Hart. "Effect of Cambistat Treatments of Austrian Pine on Tip Blight Disease Caused by *Diplodia pinea* and on Detection of the Pathogen in Symptomless Shoots". $10,000.

Minigrant. 2004. PI J. Hartman. Co-PIs L. Vaillancourt, J. Flowers. **"**Effect of Cambistat Treatments of Austrian Pine on Tip Blight Disease Caused by *Sphaeropsis sapinea*, and on Detection of the Pathogen in Symptomless Shoots". $2,500.

Minigrant. 2003. PI J. Hartman. Co-PIs L. Vaillancourt, J. Flowers. "Effect of Cambistat Treatments of Austrian Pine on Tip Blight Disease Caused by *Sphaeropsis sapinea*, and on Detection of the Pathogen in Symptomless Shoots". $1,500.

Minigrant. 2001. PI J. Hartman. Co-PIs L. Vaillancourt, J. Flowers. **"**Validating a PCR-based Molecular Method for Detecting *Sphaeropsis sapinea* in Symptomless Pine Tissues". $1,500.

Minigrant. 1999. PI J. Hartman. Co-PI L. Vaillancourt. "Efficacy of Injected Fungicides on Prevention of Austrian Pine Tip Blight Disease Caused by the Fungus *Sphaeropsis sapinea* and Eradication of the Causal Fungus from Symptomless Pine Tissues". $1,500.

Office of the Dean of Undergraduates

Travel Funds to Lisa Vaillancourt, to support travel to the APS Annual Meeting in Salt Lake City, UT, in 2001, as an invited participant in a roundtable discussion entitled "Strategies for Teaching Mycology in the Plant Pathology Curriculum". $600.

Undergraduate Research Award to Johanna Takach, to support her research in my laboratory, Fall 2000, $500.

Undergraduate Research Award to Michael McCollum, to support his research in my laboratory, Fall 1999, $500.

University Fellowship Support

Kentucky Opportunity Fellowship Grant to Meizhu Du, to support her travel to the MSA Annual Meeting in Burlington, VT, 2000, $500.

Kentucky Young Scientists Summer fellowship to Johanna Takach, to support her research in my laboratory, Summer 2000, $2,000.

Howard Hughes Medical Institute Undergraduate Research Award to Michael McCollum, to support his research in my laboratory, Summer 1999, $3,000.

Other Research Projects

Multistate Project NCCC-173 "Biochemistry and Genetics of Plant-Fungal Interactions"

Multistate Project NC 1025 "Mycotoxins: Biosecurity and Food Safety"

Hatch Project "Molecular Genetics of the Interaction Between Corn and Corn Stalk Rot Fungi (*Colletotrichum graminicola* and *Gibberella zeae*)"

PUBLICATIONS

Molecular Plant-Microbe Interactions, Phytopathology, and Plant Disease are ranked first, second, and fourth, respectively, among the top refereed international Plant Pathology research journals (total of 9). Fungal Genetics and Biology and Mycologia are ranked third and fourth, respectively, among refereed international Mycology research journals (total of 18: note that the top two are specialty journals focused on yeast genetics and systematics, and thus are not suitable venues for my research). Source of all ranking information, www.journal-ranking.com, unless otherwise specified.

The first author on a manuscript is typically the junior author, i.e. the student or postdoctoral researcher who designed, carried out, and interpreted the experiments. The corresponding author is usually the senior author, i.e. the laboratory principle investigator (PI), responsible for developing and funding the project, and an equal partner with the student or postdoctoral researcher in designing the experiments, interpreting the results, and writing the manuscript. When two or more laboratories have collaborated on a project, other senior authors are typically listed either directly before or after the corresponding author.

Refereed journal articles (Students, postdoctoral researchers, and technicians from my laboratory are underlined: an asterisk indicates corresponding authorship).

1. Venugopal, S.C., Chanda, B., **Vaillancourt, L.**, Kachroo, A., and Kachroo, P*. 2009. The common metabolite glycerol-3-phosphate is a novel regulator of plant defense signaling. Plant Signaling and Behavior 4:8, 746-749

2. Hartman J.R.*, **Vaillancourt, L.J.,** Flowers, J.L., and Bateman, A.M. 2009. Managing Diplodia tip blight of landscape Austrian pines. Arboriculture and Urban Forestry 35(1): 27-32

3. Chanda, B., Venugopal, S., Kulshrestha, S., Navarre, D., Downie, B., **Vaillancourt, L.,** Kachroo, A., and Kachroo P.* 2008. Glycerol-3-phosphate levels are associated with basal resistance to the hemibiotrophic fungus *Colletotrichum higginsianum* in Arabidopsis. Plant Physiology. 147: 2017-2029 (Plant Physiology is ranked 4 out of 139 among refereed Plant Science research journals).

4. Venard, C., Kulshrestha, S., Sweigard, J., Nuckles, E., and **Vaillancourt, L.*** 2008. The role of a FadA orthologue in the growth and development of *Colletotrichum graminicola in vitro* and *in planta*. Fungal Genetics and Biology 45: 973-983

5. Venard, C., and **Vaillancourt, L.*.** 2007a. Penetration and colonization of unwounded maize tissue by the maize anthracnose pathogen *Colletotrichum graminicola* and the related nonpathogen *C. sublineolum*. Mycologia 99: 368-377. ARTICLE FEATURED ON COVER OF ISSUE.

6. Venard, C., and **Vaillancourt, L.***. 2007b. Colonization of fiber cells by *Colletotrichum graminicola* in wounded maize stalks. Phytopathology 97: 438-447

7. Flowers, J.L., Hartman, J.R., and **Vaillancourt, L.J.*** 2006. Histology of *Diplodia pinea* in diseased and latently infected *Pinus nigra* shoots. Forest Pathology 36: 447-459 (Forest Pathology is ranked 11 out of 39 among all refereed Forestry journals, but it is the top one that deals specifically with forest health issues). Journal Citation Index, Web of Science, 2007)

8. Flowers, J.L., and **Vaillancourt, L.J.*** 2005. Parameters affecting the efficiency of *Agrobacterium tumefaciens*-mediated transformation of *Colletotrichum graminicola*. Current Genetics 48: 380-388 (Current Genetics is ranked 28 out of 121 among international refereed research journals in Genetics and Heredity).

9. Du, M., Schardl, C.L., Nuckles, E.M., and **Vaillancourt L.J.*** 2005. Using mating-type gene sequences for improved phylogenetic resolution of *Colletotrichum* species complexes. Mycologia 97: 641-658

10. Flowers, J., Hartman, J., and **Vaillancourt, L.*** 2003. Detection of latent *Sphaeropsis sapinea* infections in Austrian pine tissues using nested-polymerase chain reaction. Phytopathology 93:1471-1477

11. Mims, C.W., and **Vaillancourt, L.J.*** 2002. Ultrastructural characterization of infection and colonization of maize leaves by *Colletotrichum graminicola*, and by a *C. graminicola* pathogenicity mutant. Phytopathology 92: 803-812. ARTICLE FEATURED ON COVER OF ISSUE.

12. Fang, G.-C., Hanau, R.M., and **Vaillancourt, L.J.*** 2002. The *SOD2* gene, encoding a manganese-type superoxide dismutase, is up-regulated during conidiogenesis in the plant-pathogenic fungus *Colletotrichum graminicola*. Fungal Genetics and Biology 36:155-165

13. Thon, M.R., Nuckles, E.M., Takach, J.E., and **Vaillancourt, L.J.*** 2002. *CPR1*: A gene encoding a putative signal peptidase that functions in pathogenicity of *Colletotrichum graminicola* to maize. Molecular Plant-Microbe Interactions 15: 120-128

14. Flowers, J., Nuckles, E., Hartman, J., and **Vaillancourt, L**.* 2001. Latent infection of Austrian and Scots pines tissues by *Sphaeropsis sapinea*. Plant Disease 85: 1107-1112

15. Fowler, T.*, Mitton, M., **Vaillancourt, L.,** and Raper, C.A. 2001. Changes in mate recognition through alterations of pheromones and receptors in the multisexual mushroom fungus *Schizophyllum commune*. Genetics 158: 1491-1503 (Genetics is ranked 4 out of 121 among international refereed research journals in Genetics and Heredity).

16. Chaky, J., Anderson, L., Moss, M., and **Vaillancourt, L**.* 2001. Surface hydrophobicity and surface rigidity are inducing signals for spore germination in *Colletotrichum graminicola*. Phytopathology 91: 558-564

17. Thon, M., Nuckles, E., and **Vaillancourt, L**.* 2000. Restriction enzyme mediated integration (REMI) used to create pathogenicity mutants of *Colletotrichum graminicola* Molecular Plant-Microbe Interactions 13: 1356-1365

18. **Vaillancourt, L.J.,*** Du, M., Wang, J., Rollins, J., and Hanau, R. 2000. Genetic analysis of cross fertility between two self-sterile strains of *Glomerella graminicola*. Mycologia 92: 430-435

19. **Vaillancourt, L.J.,*** and Hanau, R. 1999. Sexuality of self-sterile strains of *Glomerella graminicola.* Mycologia 91: 593-596

20. **Vaillancourt, L.J.,** Raudaskoski, M., Specht, C.A., and Raper, C.A.* 1997. Multiple genes encoding pheromones and a pheromone receptor define the Bβ1 mating-type specificity in *Schizophyllum commune.* Genetics 146: 541-551

21. Wendland, J., **Vaillancourt, L.J.,** Hegner, J., Lengeler, K.B., Laddison, K.J., Specht, C.A., Raper, C.A., and Kothe E.* 1995. The mating-type locus Bα1 of *Schizophyllum commune* contains a pheromone receptor gene and putative pheromone genes. EMBO Journal 14: 5271-5278 (EMBO Journal is ranked 4 out of 159 among international refereed research journals in Cell Biology).

22. **Vaillancourt,** L.J., and Hanau, R.M.* 1994. Nitrate-nonutilizing mutants used to study heterokaryosis and vegetative compatibility in *Glomerella graminicola* (*Colletotrichum graminicola*). Experimental Mycology (now Fungal Genetics and Biology) 18: 311-319

23. **Vaillancourt,** L.J., and Hanau, R.M.* 1994. Cotransformation and targeted gene inactivation in the maize anthracnose fungus *Glomerella graminicola*. Applied and Environmental Microbiology 60: 3890-3893 (Applied and Environmental Microbiology is ranked 18 out of 94 among journals in Biotechnology and Microbiology. Journal Citation Index, Web of Science, 2007)

24. **Vaillancourt,** L.J., and Hanau, R.M.* 1992. Genetic and morphological comparisons of *Glomerella* (*Colletotrichum*) isolates from maize and from sorghum. Experimental Mycology 16: 219-229

25. **Vaillancourt,** L.J., and Hanau, R.M.* 1991. A method for genetic analysis of *Glomerella graminicola (Colletotrichum graminicola*) from maize. Phytopathology 81: 530-534

26. Panaccione, D.G., **Vaillancourt, L.J.**, and Hanau, R.M**.*** 1989. Conidial dimorphism in *Colletotrichum graminicola*. Mycologia 81: 876-883

Book chapters (refereed)

1. Fowler, T.J. and **Vaillancourt, L.J.** 2007. "Pheromones and Pheromone Receptors in *Schizophyllum commune* Mate Recognition: a Retrospective of a Half-Century of Progress, and a Look Ahead". In. *Sex in Fungi: Molecular Determination and Evolutionary Implications*, edited by J. Heitman, J. Kronstad, J. Taylor, and L. Casselton. American Society of Microbiology (ASM) Press. Washington D.C. pp. 301-315

2. **Vaillancourt, L.J.,** Wang, J., and Hanau, R.M. 2000. "Genetic Regulation of Sexual Compatibility in *Glomerella graminicola*". In *Colletotrichum: Host Specificity, Pathology, and Host Pathogen Interaction*, edited by D. Prusky, S. Freeman, and M. Dickman. American Phytopathological Society (APS) Press. St. Paul. MN. pp. 29-44

3. **Vaillancourt, L.J.**, and Raper, C.A. 1996. "Pheromones and Pheromone Receptors as Determinants of Mating Type in Basidiomycetes". In *Genetic Engineering, Principles and Methods*, Vol 18., edited by J. Setlow. Plenum Press, New York. pp. 219-247

Other refereed publications

1. **Vaillancourt, L.J.**, and Woloshuk, C.P.* 2001. Robert M. Hanau, 1947-2000. Phytopathology 91: 616

2. **Vaillancourt, L.J.*,** and Hartman, J.R. 2000. Apple scab. The Plant Health Instructor. DOI:10.1094/PHI-I-2000-1005-01 (A copy of this article can be found in my teaching portfolio).

3. Pirone, T.P.*, **Vaillancourt, L.J.**, and Luke, H.H. 1999. Harry Ernest Wheeler, 1919-1999. Phytopathology 89: 1125

Non-refereed Publications

1. Bateman, A., Hartman, J., and **Vaillancourt, L**. 2009. The role of shearing in the management of Diplodia tip blight. American Christmas Tree Journal 53 (4) 20-24.

2. Bateman, A., Hartman, J., **Vaillancourt**, L., Godbert, N., Moser, C., and Chopy, H. 2006. Evaluation of the transmissibility of *Diplodia pinea* during the shearing of Scots pine Christmas trees-2006. Nursery and Landscape Program Research Report, University of Kentucky Agricultural Experiment Station. PR-537: 26-28.

3. Bateman, A., Hartman, J., **Vaillancourt**, L., Godbert, N., and Moser, C. 2005. Preliminary evaluation of the transmissibility of *Diplodia pinea* during the shearing of

Scots pine Christmas trees. Nursery and Landscape Program Research Report, University of Kentucky Agricultural Experiment Station PR-520: 29-30.

4. Flowers, J., **Vaillancourt**, L., and Hartman, J. 2005. Cytology of *Diplodia pinea* in diseased and latently infected *Pinus nigra* shoots. Nursery and Landscape Program Research Report, University of Kentucky Agricultural Experiment Station. PR-520: 28-29.

5. Flowers, J.L., Hartman, J.R., and **Vaillancourt, L.J**. 2003. *Agrobacterium*-mediated transformation of *Sphaeropsis sapinea*, the causal agent of pine tip blight. Nursery and Landscape Program Research Report, University of Kentucky Agricultural Experiment Station. PR-486: 18

6. Hartman, J.R., Flowers, J.L., **Vaillancourt, L.J**., Schira, M., Hart J., and Hanks, L. 2002. Injections with fungicides for management of pine tip blight: a four year study. Nursery and Landscape Program Research Report, University of Kentucky Agricultural Experiment Station. PR-468: 24-25

7. Flowers, J.L., Hartman, J.R., and **Vaillancourt, L.J.** 2002. A nested PCR protocol to determine if *Sphaeropsis sapinea* is present in asymptomatic *Pinus nigra* tissue. Nursery and Landscape Program Research Report, University of Kentucky Agricultural Experiment Station. PR-468: 23-24

8. Hartman, J.R., Flowers, J.L., **Vaillancourt, L.J.,** Magnin, J.B., Hart, J., and Hanks, L. 2001. Injections with fungicides for management of pine tip blight: a continuing study. Nursery and Landscape Program Research Report, University of Kentucky Agricultural Experiment Station. PR-450: 22-23

9. Flowers, J.L., Pauly, S., Hartman, J.R., and **Vaillancourt, L.J**. 2001. A PCR-Based protocol to determine if *Sphaeropsis sapinea* is present in asymptomatic tissues of Austrian pine. Nursery and Landscape Program Research Report, University of Kentucky Agricultural Experiment Station. PR-450: 21

10. Flowers, J.L., Nuckles, E., Hartman, J.R., and **Vaillancourt, L.J.** 2001. Latent infections of Austrian and Scots pine tissues by *Sphaeropsis sapinea*. Nursery and Landscape Program Research Report, University of Kentucky Agricultural Experiment Station. PR-450: 20

11. Flowers, J.L., **Vaillancourt, L.J.,** Nuckles, E., and Hartman, J.R. 2000. Latent infections of Austrian and Scots Pines by *Sphaeropsis sapinea*. Nursery and Landscape Program Research Report, University of Kentucky Agricultural Experiment Station. PR-437: 15-16

Abstracts (Titles only since 2002: 15 abstracts published prior to 2002).

1. Chanda, B., Venugopal, S., Kulshrestha, S., Gao, Q., Navarre, D., Downie, B., Kachroo, A., Vaillancourt, L., and Kachroo, P. 2008. Role of glycerol metabolism in the Arabidopsis-*Colletotrichum higginsianum* interaction. Phytopathology 98:S33
2. Bec, S., **Vaillancourt, L.J.**, and Van Sanford, D. 2008. How different are the two model *Fusarium graminearum* strains PH-1 and Gz3639 from one another? Phytopathology 98:S20

3. Crouch, J., Thon, M.R., Clarke, B.B., **Vaillancourt, L.J.**, and Hillman, B.I. 2007. Genomic architecture of the mating-type gene cluster in graminicolous species of the genus *Colletotrichum* and across the Ascomycota. Phytopathology 97:S25
4. Bec, S., Van Sanford, D., and **Vaillancourt, L.J.** 2007. Comparisons of the morphology and pathogenicity of *Fusarium graminearum* strains PH1 and Gz3639. Fungal Genetics Newsletter 54:#484
5. Bateman, A.M., Hartman, J.R., and **Vaillancourt, L.J.** 2006. The effect of shearing on the transmission of *Diplodia pinea* within Scots pine Christmas tree farms. Phytopathology 96:S10
6. Venard, C., and **Vaillancourt, L.** 2005. Growth and colonization by *Colletotrichum graminicola* inside corn tissues. Phytopathology 95:S107
7. Park, E., and **Vaillancourt, L.** 2005. Further characterization of a *Colletotrichum graminicola* mutant that is unable to shift from biotrophy to necrotrophy. Phytopathology 95:S80
8. Flowers, J.L., Hartman, J.R., and **Vaillancourt, L.J.** 2005. The location of *Sphaeropsis sapinea*, the causal agent of pine tip blight, in latently infected versus symptomatic Austrian pine shoots. Fungal Genetics Newsletter 52: supplement. p. 117
9. Venard, C., and **Vaillancourt, L.** 2005. Growth and colonization of *Colletotrichum graminicola* inside corn tissues. Fungal Genetics Newsletter 52: supplement. p. 145
10. Flowers, J.L., Hartman, J.R., and **Vaillancourt, L.J.** 2005. The location of *Sphaeropsis sapinea*, the causal agent of pine tip blight, in latently infected versus symptomatic Austrian pine shoots. Phytopathology 95:S30
11. Park, E., and **Vaillancourt, L.** 2005. The signal peptidase of *Colletotrichum graminicola* and its role in pathogenicity to maize stalks and leaves. Fungal Genetics Newsletter 52: supplement. p. 133
12. Flowers, J.L., Hartman, J.R., and **Vaillancourt, L.J.** 2003. Agrobacterium-mediated transformation of *Sphaeropsis sapinea*, the causal agent of pine tip blight. Phytopathology 93:S26
13. Venard, C., and **Vaillancourt, L.** 2003. Developmental biology of spore dimorphism in *Colletotrichum graminicola*. Phytopathology 93:S87

PATENT

#US 6,601,488 B1; August 5, 2003. On the "Microscore" spore cutter device. Co-inventors are Richard Muse and William Young, Center for Robotics, and Lisa Vaillancourt, Department of Plant Pathology, University of Kentucky.

INSTRUCTION (minimum yearly effort has been 0%, maximum yearly effort has been 30%). This list includes only courses for which I have had significant responsibility: I have also participated as a guest lecturer in various departmental and college courses over the years.

University of Kentucky, Department of Plant Pathology
(Spring 2008, Spring 2009). PPA 784-003/PPA 650 Fungal Biology. An introduction to fungal genetics and biology and to fungal research and biotechnology.

University of Kentucky, Department of Plant Pathology
(Spring 2006, Spring 2007, Spring 2009). PPA 672 Advanced Plant Mycology. One-credit lecture and discussion course designed to introduce graduate students to advanced topics in modern molecular mycology, particularly as related to plant-fungal interactions.

University of Kentucky, Department of Plant Pathology

(Spring 2002, Spring 2003, Spring 2004). PPA 410 Forest Pathology. Three-credit lecture and laboratory undergraduate course, previously required for a major in Forestry.

University of Kentucky, Department of Plant Pathology
(Spring 1999, Fall 2003). PPA 652 Plant Pathogenic Fungi. Four-credit lecture and laboratory graduate course in plant pathogenic fungi and molecular mycology.

University of Kentucky, Department of Plant Pathology
(Spring 1997, Fall 1997, Spring 1998, Fall 1998, Spring 1999). PPA 770 Plant Pathology Department Seminar. Served as the coordinator for the weekly departmental seminar. Responsibilities inlcuded arranging the speaker schedule, inviting and hosting guest speakers, and scheduling and evaluating required seminars presented by the graduate students.

University of Vermont, Department Plant and Soil Science
(Spring, 1996). Biological Control: Science and Technology. Three-credit undergraduate course, team-taught with another instructor. Principles and history of biological control of plant pathogens, weeds, and insect pests. The role of biotechnology in biological control, including use of transgenic plants and manipulation of insect and plant disease pathogens.

University of Illinois, Department of Plant Pathology
(Spring, 1987). PPA 402 Phytobacteriology. Served as the graduate teaching assistant for this course.

ACADEMIC ADVISING

Undergraduate advising
I have had between 4 and 10 undergraduate advisees per semester in Agricultural Biotechnology (ABT) since 2000.

Undergraduate researchers mentored in the laboratory:

1. **Daniel Birkenhauer**, B.S. ABT, University of Kentucky
2. **Ester Buiate**, B.S. Agriculture, Universidade Federal (UF) de Uberlândia, Brazil
3. **Hugues Chopy**, B.S. Biology, Établissement National d'Enseignement Supérieur Agronomique de Dijon (ENESAD), France
4. **Nathalie Godbert**, B.S. Biology, ENESAD, France
5. **Celine Moser**, M.S. Agronomy, Ecole Nationale Supérieur d'Agronomie et des Industries Alimentaires (ENSAIA), France
6. **Justin Camp**, B.S. Biology, University of Kentucky Undergraduate Research Program (UK-URP)*
7. **Hope Johnson**, B.S. Biology, UK-URP
8. **Stephanie Jeandot**, B.S. Biology, ENESAD, France
9. **Latasha Williams**, B.S. ABT, UK-URP
10. **Nicolas Portas**, B.S. Biology, ENESAD, France
11. **Gilles Vache**, B.S. Biology, ENESAD, France
12. **Sabine Pauly**, B.S. Biology, ENESAD, France
13. **Tiana Brawly**, B.S. Biology, UK-URP
14. **Dominique Saffray**, B.S. Biology, ENESAD, France
15. **Jean-Bernard Magnin**, B.S. Biology, ENESAD, France
16. **Fannie Moines**, B.S. Biology, ENESAD, France
17. **Johanna Takach**, B.S. ABT, University of Kentucky
18. **Michael McCollum**, B.S. ABT, University of Kentucky

19. **Stephen Kihl**, B.S. Biology, ENESAD, France
20. **Bruno Poupard**, B.S. Biology, ENESAD, France
21. **Lakmini de Silva**, B.S. Biology, University of Kentucky
22. **Leila Ghabrial**, B.S. Biology, Vanderbilt University
23. **Heidi Griffith**, B.S. Pre-med, Howard University
24. **Monika Martick**, B.S. Biology, University of Vermont
25. **Michael Mitton**, B.S. Biology, University of Vermont
26. **Jamie Weinstock**, B.S. Biology, University of Vermont

*URP = Undergraduate Summer Research Program for Incoming Minority Freshmen at the University of Kentucky (UK).

Postgraduate advising

Acting as Major Advisor or Co-Advisor (asterisk) (all UK Plant Pathology Students)

Ester Buiate	Ph.D.	Current
Maria Fernanda Torres	Ph.D.	Current
Sladana Bec	Ph.D.	Current
Amy Bateman*	M.S.	M.S. in 2007
Jennifer Flowers*	M.S./Ph.D.	M.S. in 2002, Ph.D. in 2005
Claire Venard	Ph.D.	Ph.D. in 2006
Meizhu Du*	M.S.	M.S. in 2002
Jennifer Chaky*	M.S.	M.S. in 2000

* Chaky and Du were co-advised by Dr. C. Schardl (Director of Graduate Studies at the time) until I became a full member of the Graduate Faculty. Flowers and Bateman were co-advised by Extension Professor Dr. J. Hartman, and their thesis and dissertation research was related to a project that we collaborated on.

Member of Advisory Committee (Current in bold)

Maria Holdcroft	**M.S. Student, Plant Pathology**
Love Gill	**M.S. Student, Plant Pathology**
Melanie Heist	**Ph.D. Student, Plant Pathology**
Mohamed El-Habbak	**Ph.D. Student, Plant Pathology**
Bidisha Chanda	**Ph.D. Student, Plant Pathology**
Simona Florea	**Ph.D. Student, Plant Pathology**
Jerome Faulkner	**Ph.D. Student, Plant Pathology**
Ranjana Ranjana	Ph.D. Student, Plant and Soil Science
Srivathsa Venugopal	Ph.D. Student, Plant Pathology
Shengming Yang	Ph.D. Student, Plant and Soil Science
Nicole Mundell	M.S. Student, Plant Pathology
Cathryn Rehmeyer	Ph.D. Student, Plant Pathology
Patrick Heist	Ph.D. Student, Plant Pathology
Kelly Craven	Ph.D. Student, Plant Pathology
Caroline Machado	Ph.D. Student, Plant Pathology
Jimmy Blankenship	Ph.D. Student, Plant Pathology
Ameena Nalim	Ph.D. Student, Plant Pathology
Jinghong Wang	Ph.D. Student, Plant Pathology

Served as Outside Examiner for two Ph.D. students, one in Biology (2004) and one in Plant and Soil Science (2005). Served as a replacement committee member for the final examining committee of Warren Lushia, Plant Pathology Ph.D. student.

Postdoctoral Scholars

2008-present	Dr. Patrick Dotson	Ph.D. from the University of Kentucky
2007-present	Dr. Bandana Sharma	Ph.D. from Institute of Himalayan Bioresource Technology, India
2005-2007	Dr. Saurabh Kulshrethsa	Ph.D. from Jamia Millia Islamia University, India
2002-2005	Dr. Eunyoung Park	Ph.D. from University of Maryland
1998-2001	Dr. Michael Thon	Ph.D. from The Pennsylvania State University

Visiting Scholar

2009-present	Quélen de Lima Barcelos	Ph.D. Student at Universidade Federal de Lavras – MG, Brazil, CAPES Brazilian Govt. scholarship for one-year "sandwich" internship

SERVICE AND RECOGNITION

Honors and awards

- Gamma Sigma Delta, Kentucky Chapter, George E. Mitchell, Jr. Faculty Award for Outstanding Service to Graduate Students, 2007.
- One of two nominees from the University of Kentucky for the R. Powe Junior Faculty Enhancement Award, 1998.
- One of two nominees from the University of Kentucky for the Searle Research Award, 1997.
- NIH National Research Service Award 1992-1995.
- Inducted into Sigma Xi, 1992.
- Lucille Markey Postdoctoral Fellowship, 1991-1992.
- DuPont Graduate Student Award, 1991.
- Inducted into Gamma Sigma Delta, 1990.
- University of Connecticut Honors Scholar, 1984.
- Summer Research Fellowship, New York Botanical Garden, 1983.

Editorships, review panels, reviewer service: National and International

- NSF Grant Review Panel Member, Symbiosis, Defense, and Self-recognition; 2009
- NSF Grant Review Panel Member, Microbial Genomics, 2008.
- Senior Editor, *Journal of Basic Microbiology*, 2006-present.
- Associate Editor and member of the Editorial Board of *Mycologia*. 2005-present.
- Senior Editor, *Plant Health Instructor*, an on-line journal published on the APSnet Educational site by the American Phytopathological Society (APS), featured in *Science* in the September 19, 2003 issue. 2003-2005.
- USDA Grant Review Panel Member, Functional Genomics, 2005.
- Reviewed tenure and promotion packets from Texas A&M University, Vanderbilt University, and the University of Florida.
- Outside Examiner for Ph.D. Dissertations from the University of British Columbia, 2006, and from the University of Melbourne, 2009.
- Reviewed grant proposals for the USDA, the NSF, and the BARD research grant program.
- Reviewed manuscripts for Proceedings of the National Academy of Science U.S.A.; Plant Cell; Fungal Genetics and Biology; Genetics; Phytopathology; Mycologia; Physiological and

Molecular Plant Pathology; Molecular Plant Pathology; Applied and Environmental Microbiology; Molecular Plant-Microbe Interactions; Canadian Journal of Microbiology; New Phytologist; Forest Pathology; Trends in Microbiology; and the Canadian Journal of Plant Pathology.

Committees, organizations, elected or voluntary positions, offices held: National

- Site Coordinator and Co-organizer, with Dr. C. Schardl, of the Mycological Society of America (MSA) Annual Meeting to be held in Lexington, Kentucky in 2010.
- MSA Membership Committee, 2007-present.
- Organizer, Symposium on *Colletotrichum* at the 23rd Fungal Genetics Conference at Asilomar, Pacific Grove, CA, 2006.
- MSA Councilor for Molecular Genetics, selected by national election for a two year term, 2004-2006
- APS Biochemistry, Physiology, and Molecular Biology Committee (2002-present: vice-chair in 2004, chair in 2005)
- Co-organizer of the APS symposium "The Secret Life of Rots: The Surprising Complexity of Necrotrophic Fungal-Plant Interactions" in Austin, TX, 2005. Sponsored by the Biochemistry, Physiology, and Molecular Biology Committee.
- APS Mycology Committee (1998-2001).
- Organizer of the annual meeting of the NCR-173 research group in 1999 at Mammoth Cave National Park.
- MSA, member
- APS, member

Committees, organizations, positions, offices held: University, College, Department

- University of Kentucky Institutional Biosafety Committee (IBC), 2007-present.
- College of Agriculture Tenure and Promotion Review Committee, 2007-2009.
- College of Agriculture Graduate Curriculum Committee, 2007-present.
- Department of Plant Pathology Director of Graduate Studies (DGS), 2003-present.
  DGS responsibilities include recruitment of new students, oversight of current students to ensure timely progression through their programs, advocating for students, and obtaining and overseeing funding for student support.
- Chair of the department's Academic Program Committee, 2003-present.
- Department of Plant Pathology Faculty Screening Committee for Extension pathologist position, Spring and Summer 2008.
- Department of Plant Pathology Faculty Merit Evaluation Committee, 2003-2005.
- College of Agriculture Faculty Appeals Committee, 2003-2004.
- College of Agriculture Review Committee for Barnhardt Award Proposals, 2002-2003.
- College of Agriculture Kentucky Agricultural Experiment Station Project Review Committee, 2000-2004.
- Department of Plant Pathology Resource Committee, 1999-2002.
- Faculty greenhouse liason: direct supervision of Mr. J.D. Brown, greenhouse technician for four research groups in the Department of Plant Pathology, 2000-present.
- Department of Plant Pathology Faculty Screening Committee for two Research faculty positions in the area of Molecular Plant-Microbe Interactions, Fall 2001.
- Department of Plant Pathology Academic Program Committee, 1997-1999.
- Department of Plant Pathology Faculty Screening Committee, Tree Pathology Research faculty position, Spring 2000.

- Agricultural Biotechnology (ABT) Coordination and Curriculum Committee, 1999-2002.
- Technical Advisory Committee of the Tobacco and Health Research Institute, 1999-2001.
- College of Agriculture Plant Science Option Committee, 1999.

INVITED LECTURES (National and International) This list includes only invited presentations, and does not list presentations made during regular participation at annual meetings and symposia**.** It also does not include several invited presentations made to other units at the University of Kentucky.

National:

Purdue University, West Lafayette IN. 2009. "The Sophisticated Rot".

Samuel Roberts Noble Foundation. Ardmore, OK. 2008. "A Potential Role of Secretory Regulation in Pathogenicity of the Hemibiotroph *C. graminicola* to Maize".

Fifteenth Annual Rutgers Turfgrass Symposium. Rutgers University, New Brunswick, NJ. 2006. **KEYNOTE**: "Anthracnose Diseases of Grasses: Lessons to be Learned from the Maize System".

BARD Workshop on Fungal Modulated Host Environment and Pathogenicity. San Francisco, CA. 2005. "The Transition from Biotrophy to Necrotrophy in *Colletotrichum graminicola*: Feeling for the Switch in the Dark".

Annual Program for the Biology of Filamentous Fungi (PBoFF) Symposium, Texas A&M University, College Station, TX. 2005. One of four invited **KEYNOTE** speakers: "Wolves in Sheep's Clothing: Two Tales of Fungal Ambush".

APS Annual Meeting, Symposium entitled The Secret Life of Rots: The Surprising Complexity of Necrotrophic Fungal-Plant Interactions. Austin, TX. 2005. "What can Hemibiotrophs Teach Us About Necrotrophy?".

DuPont-Nemours Co. Wilmington, DE. 2004. "Understanding the Anthracnose Stalk Rot Disease Cycle".

APS Annual Meeting, Symposium entitled Biology and Management of Turfgrass Anthracnose. Charlotte, NC. 2003. "Biology and Genetics of *Colletotrichum graminicola*".

DuPont-Nemours Co. Wilmington, DE. 2002. "Molecular Analysis of the Interaction Between Corn and *C. graminicola*, cause of Anthracnose Stalk Rot and Leaf Blight".

Otterbein College Biology Department. Westerville, OH. 2001. "Use of a Forward Genetic Strategy to Dissect Virulence Mechanisms in Plant-pathogenic Fungi".

APS Annual Meeting Roundtable on Strategies for Teaching Mycology in the Plant Pathology Curriculum. Salt Lake City, UT. 2001. "How to Incorporate Molecular Biology into a Traditional Mycology Curriculum".

DuPont-Nemours Co. Wilmington, DE. 2001. "Does *Colletotrichum graminicola* have a Specialized Secretory Pathway Dedicated to Pathogenicity Factors?".

Pioneer Hi-bred Intl. Johnston, IA. 2001. "Evidence that *Colletotrichum graminicola* has a Specialized Secretory Pathway Dedicated to Pathogenicity Factors".

Twenty-first Fungal Genetics Conference. Pacific Grove, CA. 2001. "*Colletotrichum graminicola* Pathogenicity Mutants Identified using REMI".

University of Georgia Department of Plant Pathology. Athens, GA. 2000. "Using REMI Mutagenesis to Identify Genes Essential for Pathogenicity of *Colletotrichum graminicola* to Corn Stalks and Leaves". Invited by the graduate students.

MSA Annual Meeting Symposium entitled Sexual Mechanisms in Fungi, in memory of Dr. John Raper of Harvard University. Burlington, VT. 2000. "*Glomerella*: A Sexually Ambiguous Genus Without Peer".

Miami University Botany Department. Oxford, OH. 1998. "Sexual Reproduction in *Glomerella*".

Eighteenth Fungal Genetics Conference. Pacific Grove, CA. 1995. **PLENARY:** "The Multispecific B Mating-type Genes of *Schizophyllum commune* Encode Complexes of Putative Pheromones and Pheromone Receptors".

International:

Four talks during a visit to Brazil in August 2008:

- Universidade Federal de Lavras (UFLA) Biology Department. Lavras. "The Sophisticated Rot".
- Empresa Brasileira de Pesquisa Agropecuária (EMBRAPA) Milho e Sorgo. Sete Lagoas. "The Future of Anthracnose Management on Maize and Sorghum".
- XLI Brazilian Congress of Plant Pathology. Belo Horizonte City. **PLENARY**: "Genetic Regulation of Fungus-Plant Incompatiblity".
- XLI Brazilian Congress of Plant Pathology Roundtable discussion, Genetics and Epidemiology of *Colletotrichum*. Belo Horizonte City. "*Colletotrichum* genomics".

9th European Conference on Fungal Genetics, Satellite meeting on *Colletotrichum.* Edinburgh, Scotland. 2008. "A Genome Sequence for the Model Hemibiotroph *Colletotrichum graminicola*".

Two talks during a visit to Brazil in August 2006:

- XXVI Congresso Nacional de Milho e Sorgo, First Brazilian Symposium on Sorghum and Maize Anthacnose. Belo Horizonte City. "Taxonomic and Pathogenic Relationships Between *Colletotrichum graminicola* and *Colletotrichum sublineolum*".

- Universidade Federal de Minas Gerais, (UFMG) Genetics Department. Belo Horizonte City. "Taxonomic and Pathogenic Relationships Between *Colletotrichum graminicola* and *Colletotrichum sublineolum*" (a modified version of the talk above).

Community outreach activities

Plant Pathology Exhibit at the Kentucky State Fair, 2009

Mycology and Plant Pathology Exhibit at ColorFest, Bernheim Forest, 2008.

"Fun with Fungi" exhibit at the UK Arboretum "Trees, Trails, and Creatures" event. 2001, 2002.

Participated in the "Science Station X" exhibit at the Lexington Children's Museum on choosing careers in science. 1998.

Developed a laboratory exercise for a class of fifth-graders, "Glow-in-the-dark Halloween Spider Fungus". 1998.

Served at the College of Agriculture Ag Roundup in 1997 and 1998.

Judge representing UK and APS at the International Science and Engineering Fair, Louisville, KY. 1997.

NARRATIVE STATEMENT

RESEARCH: My research centers on my interest in how filamentous fungi have adapted conserved developmental, signaling, and primary metabolic pathways to support a plant-pathogenic lifestyle. In particular, I am studying the developmental transitions that occur in some plant-pathogenic fungi, in which they shift from latent, biotrophic, or endophytic growth *in planta* to more damaging necrotrophic or rotting modes. The hemibiotrophic fungal genus *Colletotrichum* is the main focus in my laboratory. I am known as a leader in the *Colletotrichum* research community, and most recently I have directed the effort to sequence the first genome of a representative of this genus. I have also organized an international *Colletotrichum* research meeting at the Asilomar Fungal Genetics conference in 2006, and have spoken numerous times nationally and internationally on my work.

I initially chose to work on the anthracnose stalk rot disease of corn caused by *Colletotrichum graminicola* because it is economically very important, and because no one else was studying the molecular biology of corn stalk rots at that time. Fungal stalk rot is one of DuPont/Pioneer Hi-bred's top three disease concerns on corn, and they have estimated that it causes an astonishing 6% loss each year in the U.S., mostly due to reduced kernel weights. *C. graminicola* also causes a leaf blight disease that is becoming increasingly important in the tropics. When I began my work, it was believed that the leaf blight was not a very good model for the stalk rot, so we developed new methods to work with the stalk rot phase of the disease in mature corn stalks in the greenhouse. Several other researchers are now using our plant growth and inoculation protocols to study anthracnose and other stalk rot diseases. My research on corn anthracnose has also become a model for closely related *Colletotrichum* diseases of turfgrasses and sorghum: thus I was invited to give two talks to the turf anthracnose community, one a keynote address at the Rutgers Turfgrass Symposium, and I was also invited twice to speak to the Brazilian sorghum anthracnose research community. My work on the anthracnose stalk rot disease of corn was recognized by DuPont/Pioneer Hi-bred when they invited me to collaborate

with them, and provided financial support to my laboratory, as they began to develop their own research program on this disease several years ago.

We conducted a thorough cytological analysis of the development of the fungus in corn stalks. It had been suggested that the organism grew as a vascular wilt, but we did not find evidence for this. We learned that the anthracnose stalk rot disease is more like the leaf blight than originally thought, and that *C. graminicola* can invade stalk epidermal cells directly and grows hemibiotrophically through the pith cells, not necrotrophically as previously suggested. We discovered that growth of the fungus through the mostly non-living rind and bundle fibers is an important pathogenicity factor, and that rotting does not occur in all tissues or at all times during colonization. We also found that non-rotting biotrophic hyphae were mostly binucleate whereas thinner, rotting necrotrophic hyphae were uninucleate. This observation has led to a new project to investigate the possibility that mating-type genes may regulate the developmental transition from biotrophy to necrotrophy. Another very interesting discovery was that non-host resistance to the related species *C. sublineolum* is not expressed in corn stalk epidermal cells, which has led to a new focus on understanding the mechanism of non-host resistance of corn to *C. sublineolum*.

In addition to the cytological analysis, we performed a successful random insertional mutagenesis study and isolated several very interesting non-pathogenic strains. One of these strains has a mutation in the gene encoding the non-catalytic subunit of the signal peptidase enzyme, an essential housekeeping protein. My most recent work suggests the novel possibility that this subunit of the peptidase plays an important and previously unsuspected role in regulation of the protein transport system, and is essential specifically for establishment of the biotrophic infection and production of cell wall degrading enzymes during necrotrophic development. My most recently funded grant proposal is focused on testing the hypothesis that endoplasmic-reticulum (ER) stress and the unfolded protein response (UPR) are involved in the function of this protein in pathogenicity.

I have recently started working with *C. higginsianum* as a pathogen of Arabidopsis with my colleague Dr. P. Kachroo. Our collaboration has been successful, with two papers published in a high impact journal, two others in preparation, one regional grant and a NSF grant for more than $500,000. Our focus is on understanding the roles of glycerol metabolism in the host-pathogen interaction, including basic questions regarding the importance of oxidative and osmotic stress response and polyol accumulation for pathogenic growth. In the future these studies will be expanded from this model system to the economically important corn-*C. graminicola* pathosystem.

I worked with Dr. J. Hartman on tip blight of landscape and Christmas trees caused by *Diplodia pinea*. This enjoyable and productive ten-year collaboration resulted in four refereed journal articles plus one in preparation, 11 extension and industry publications, and the training of two outstanding graduate students who certainly would not have come to U.K. without the chance to work on tree pathogens. The experience was also useful background for my teaching of the Forest Pathology class. Results of this project, now complete, led to recommendation of new management tools for landscapers and Christmas tree growers.

TEACHING: I have developed and taught four different courses at U.K. In each case I tried to develop unique courses that specifically serve my students' interests and goals, rather than utilizing existing course syllabi. I have been primarily responsible

for teaching plant pathogenic fungi to the graduate students in our department. I have been considered innovative in my approach to teaching mycology, as an invitation to speak at an American Phytopathological Society (APS) roundtable discussion, and to serve as a senior editor for the APS education journal Plant Health Instructor, have demonstrated. I have given my teaching materials to several colleagues who are now using many of the labs I developed. I volunteered to teach Forest Pathology (PPA 410) upon the retirement of my colleague Dr. L. Shain. I focused on applied pathology and the role of pathology in forest management, and used innovative lab and field exercises, including a display of student disease collections at the U.K. Arboretum, and a service-learning project. I applied for and received two awards, one from the college and one from the university, to develop teaching materials, including course CDs, for my Mycology and Forest Pathology courses.

I have trained eight graduate students at U.K. (three masters, four Ph.D., and one that did both degrees with me). Three Ph.D. students are currently in the lab, and the other five have all left for other employment after successfully defending their theses or dissertations. Ms. Bateman is currently a research associate with the USDA in Idaho; Dr. Flowers is employed in a tenure-track position in the Biology department at Spaulding University; Dr. Venard is currently doing a postdoctoral fellowship in the Entomology Department at U.K. (in a related area focused on host-pathogen interactions in insects); Ms. Du decided to follow her heart and was awarded a Teaching Assistantship to do a Ph.D. in religious studies at the University of Georgia, and Ms. Chaky first got a job as a diagnostician and extension educator at the University of Nebraska, and was just recently hired by Pioneer Hi-bred International. I'm very proud that my students have all published their thesis or dissertation work.

I have had five postdoctoral associates at UK, one currently, and four that completed three-to-four years in the lab here. I have also hosted many excellent undergraduates over the years in the lab, including four African American students and one first-generation college student from Kentucky who went on to graduate school in plant pathology in Georgia.

SERVICE: I have been active in serving my department, college, university, and scientific community. As one of relatively few female faculty, I am frequently in demand for service activities, and I consider it important to be visible as an example to younger women (more than half of the students and postdocs in our department are female). As Director of Graduate Studies for my department since 2003, I have been trying to improve accountability of our students, and of advisors to students, and to improve our ability to recruit and retain excellent students. I have been involved in obtaining support funding for students and encouraging their efforts to obtain support on their own. I received the Gamma Sigma Delta George E. Mitchell Jr. Faculty Award for Outstanding Service to Graduate Students in 2007 in recognition of my efforts. I feel a strong sense of responsibility to all of our students, and I am committed to achieving excellence in our graduate program. In addition to these activities, I am also active in my professional societies, have served on numerous college committees and on the campus Institutional Biosafety Committee, and I review for many journals as well as serving as an editor for two. I have also reviewed many grant proposals as well as served on three grant panels.

PAUL VINCELLI

Department of Plant Pathology
University of Kentucky
207 Plant Science Building
Lexington, KY 40546-0312
(859) 257-7445 ext 80722
pvincell@uky.edu

EDUCATION

Ph.D. Plant Pathology, Cornell University, 1988
Thesis: Optimizing Timing of Fungicide Applications for Control of Botrytis Leaf Blight of Onion

M.S. Plant Pathology, Rutgers University, 1983
Thesis: Relationship of Erwinias and Pseudomonads to Bacterial Soft Rot of Bell Peppers

B.A. Botany, Rutgers University, 1981

PROFESSIONAL EXPERIENCE

Extension Professor (since 200) and Provost's Distinguished Service Professor (since 2007), University of Kentucky, Lexington, KY.
U.S. Scholar to Uruguay, Fulbright Program, May-Aug 2005.
Visiting Associate Professor, University of Wisconsin, May-Oct 1998.
Associate Extension Professor, University of Kentucky, Lexington, KY. 1995-2001.
Assistant Extension Professor, University of Kentucky, Lexington, KY. 1990-1995.
Extension Plant Pathologist and Assistant Professor, University of Wyoming, Laramie, WY. 1988-1990
Instructor, Cornell University, Ithaca, NY. 1988
Graduate Assistant, Cornell University, Ithaca, NY. 1983-1987
Graduate Assistant, Rutgers University, New Brunswick, NJ. 1981-1983
Botanist, U.S. Peace Corps, Colombia and Nicaragua. 1977-1980

TEACHING

Courses With Principal Instruction Responsibilities

Principles of Plant Pathology, PPA400G, University of Kentucky, 1996-97, 1999-present.
Special Problems in Plant Pathology: Epidemiology, PPA 784-004, 2009.
Essentials of Plant Disease Epidemiology, PPA641, University of Kentucky, 2005-2006, co-taught with Michael Goodin.
Epidemiology and Management of Plant Disease, PPA695 (formerly PPA595), University of Kentucky, 1994, 1997, 1999, 2001, & 2003.

Epidemiology and Control of Plant Disease, PPA595, University of Kentucky, 1992.
Clinical Plant Pathology, University of Wyoming. 1988-89.
Plant Disease Control, Cornell University. 1988.

Service as Major Professor

Merari Feliciano-Rivera, Ph.D. student, UK Department of Plant Pathology.

Membership on Other Graduate Committees

Brian King, Ph.D. student, UK Department of Plant and Soil Science
Maria Holdcroft, M.S. student, UK Department of Plant Pathology.
John Starnes, Ph.D. student, UK Department of Plant Pathology.
Sharon Yelton, Ph.D. student, UK Department of Plant Pathology.
Carrie Knott, Ph.D., Dept. of Agronomy, degree awarded 2007.
Mike Harrell, Ph.D. Student, Dept. of Agronomy, awarded 2005.
Virginia Verges, M.S. student, UK Department of Agronomy., awarded 2004.
Sunshine Brosi, M.S., Dept. of Forestry, degree awarded 2001.
David W. Williams, Ph.D., UK Dept. of Agronomy, awarded 1996.
James Woltz, M.S., UK Dept. of Agronomy, awarded 1997.
David W. Williams, M.S., UK Dept. of Agronomy, awarded 1993.
Baozhu Guo, M.S., UK Dept. of Plant Pathology, awarded 1992.
Mohamed Sheik, M.S., UW Dept. of Plant, Soil & Insect Sciences, awarded 1990.
Margaret Stacy Page, M.S., UW Dept. Plant, Soil & Insect Sciences, of awarded 1988.

RESEARCH PUBLICATIONS

In addition to the following refereed research papers and notes, I have published 132 research reports in the peer-reviewed research journals Biological and Cultural Tests for Control of Plant Diseases *and* Fungicide and Nematicide Tests, two periodicals which were combined into Plant Disease Management Reports in 2006.

Antonius, G. F., Bomford, M., and **Vincelli, P**. 2009. Screening *Brassica* species for glucosinolate content. Journal of Environmental Science and Health 44:311-316.

Vincelli, P., and Seebold, K. 2009. Report of a *Watermelon mosaic potyvirus* strain in Kentucky undetected by ELISA. Online. Plant Health Progress doi:10.1094/PHP-2009-0313-01-BR.

de Sá, P. B., Seebold, K. W., and **Vincelli, P.** 2008. First report of tomato yellow leaf curl virus in greenhouse tomatoes in Kentucky. Online. Plant Health Progress doi:10.1094/PHP-2008-0819-01-RS.

Vincelli, P., Dixon, E., and Farman, M. 2008. Susceptibility of selected cultivars of forage grasses to *Magnaporthe oryzae* isolates from annual ryegrass and relatedness of the pathogen to strains from other grasses. Online. Forage and Grazinglands doi:10.1094/FG-2008-0226-01-RS.

Vincelli, P., and Dixon, E. 2007. Does spray coverage influence fungicide efficacy against dollar spot? Online. Applied Turfgrass Science doi:10.1094/ATS-2007-1218-01-RS.

Iriarte, F.B., H.C. Wetzel III, J.D. Fry, D.L. Martin, **P. Vincelli**, E.W., Dixon, and N.A. Tisserat. 2005. Aggressiveness of spring dead spot pathogens to bermudagrass. *Intl. Turfgrass Research Soc*. J. 10:258-264.

Vincelli, P. 2004. Simulations of fungicide runoff following applications for turfgrass disease control. Plant Dis. 88:391-396.

Rhoades, C.C., Brosi, S.L., Dattilo, A.J., **Vincelli P.** 2003. Effect of soil compaction and moisture on incidence of Phytophthora root rot on American chestnut (*Castanea dentata*) seedlings. Forest Ecology And Management 184: 47-54.

Kim, Y. S., Dixon, E. W. , **Vincelli, P.**, and Farman, M. L., 2003. Field resistance to strobilurin (Q_oI) fungicides in *Pyricularia grisea* caused by mutations in the mitochondrial cytochrome b gene. Phytopathology 93:891-900.

Vincelli, P., and Dixon, E. 2002. Resistance to Q_o I (strobilurin-like) fungicides in isolates of *Pyricularia grisea* from perennial ryegrass. *Plant Disease* 85:235-240.

Williams, D. W., Burrus, P. B., and **Vincelli, P.** 2001. Severity of gray leaf spot in perennial ryegrass as influenced by mowing height and nitrogen level. Crop Sci. 41:1207-1211.

Vincelli, P., Henning, J., Hendrick, T., Brown, J., Osborne, L. J., Prewitt, B., Shields, V., Sorrell, D., Strohmeier, K. D., Tackett, R., and Wyles, J. W. 2000. Improved seedling health, yield, and stand persistence with Aphanomyces root rot-resistant alfalfa following natural epidemics. Agron. J. 92:1071-1076.

Williams, D.W., Powell Jr., A.J., and **Vincelli, P.** 1998. Separation and quantitation of the sources of dew on creeping bentgrass. Crop Science 38:1613-1617.

Woltz, J., TeKrony, D., Egli, D., and **Vincelli, P.** 1998. Corn cold test germination as influenced by soil moisture, temperature, and pathogens. Seed Technology 20:56-71.

Vincelli, P., Doney, J. C., Jr., and Powell, A. J. 1997. Variation among creeping bentgrass cultivars in recovery from epidemics of dollar spot. Plant Dis. 81:99-102.

Wang, L. and **Vincelli, P.** 1997. *Coniothyrium minitans* on apothecia of *Sclerotinia trifoliorum.* Plant Disease 81:695.

Williams, D. W., Powell, A. J., **Vincelli, P.**, and Dougherty, C. T. 1996. Dollar spot on bentgrass influenced by displacement of leaf surface moisture, nitrogen, and clipping removal. Crop Sci. 36:1304-1309.

Vincelli, P., Lauriault, L. M., and Henning, J. C. 1995. Yields of alfalfa varieties selected for *Aphanomyces* resistance in Kentucky. Agron. J. 87:748-752.

Vincelli, P., Nesmith, W. C., and Eshenaur, B. C. 1994. Incidence of *Aphanomyces euteiches* and *Phytophthora medicaginis* in Kentucky alfalfa fields. Plant Disease 78:645-647.

Vincelli, P. C. 1992. Potential for seedling disease of alfalfa caused by *Aphanomyces euteiches* in a Kentucky soil. Plant Disease 76:622-626.

Vincelli, P. C., and Herr, L. J. 1992. Two diseases of alfalfa caused by *Rhizoctonia solani* AG-1 and AG-4. Plant Disease 76:1283.

Vincelli, P. C., and Lorbeer, J. W. 1990. *Pythium irregulare* and *P. coloratum* causing root rot of onion. Mycopathologia 111:67-72.

Vincelli, P. C., Wilcox, W. F., and Beauprė, C. M-S. 1990. First report of *Phytophthora cryptogea* causing root rot of sugar beet in Wyoming. Plant Disease 74:614.

Lorbeer, J. W., and **Vincelli, P. C.** 1990. Efficacy of dicarboximide fungicides and fungicide

combinations for control of Botrytis leaf blight of onion in New York. Plant Disease 74:235-237.

Vincelli, P. C., and Beauprė, C. 1989. Comparison of media for isolating *Rhizoctonia solani* from soil. Plant Disease 73:1014-1017.

Legg, D. E., and **Vincelli, P. C.** 1989. Sugar beet production and pest management practices in the Big Horn Basin of Wyoming. Journal of Sugar Beet Research 26:17-32.

Vincelli, P. C., and Burne, J. C. 1989. Root rot of sugar beet in Wyoming caused by *Rhizopus arrhizus.* Plant Disease 73:518.

Vincelli, P. C., and Lorbeer, J. W. 1989. BLIGHT-ALERT: a weather-based predictive system for timing fungicide applications on onion before infection periods of *Botrytis squamosa*. Phytopathology 79:493-498.

Vincelli, P. C., and Lorbeer, J. W. 1988. Relationship of precipitation probability to infection potential of *Botrytis squamosa* on onion. Phytopathology 78:1078-1082.

Vincelli, P. C., and Lorbeer, J. W. 1988. Comparison of predictive systems for timing the initial fungicide application to control Botrytis leaf blight of onion. Plant Disease 72:632-635.

Vincelli, P. C., and Lorbeer, J. W. 1987. Sequential sampling plan for timing initial fungicide application to control Botrytis leaf blight of onion. Phytopathology 77:1301-1303.

Vincelli, P. C., and Cappellini, R. A. 1984. *Erwinia carotovora* subsp. *atroseptica* and *Pseudomonas marginalis* in soft-rotted bell peppers. Plant Disease 68:167.

Vincelli, P. C. 1981. Study of the vegetation of El Tuparro Wildlife Reserve. (In Spanish). Cespedesia 10:7-54.

REVIEW ARTICLES

Vincelli, P. and Tisserat, N. 2008. Nucleic acid-based pathogen detection in applied plant pathology. Plant Dis. 92:660-669. *(Reported by APS as the most accessed article in this journal in 2008.)*

Uddin, W., Viji, G., and **Vincelli, P.** 2003. Gray leaf spot (blast) of perennial ryegrass: An emerging problem for the turfgrass industry. Plant Dis. 87:880-889.

EXTENSION PUBLICATIONS AND MATERIALS

Thirty-six publications through UK Agricultural Communications
Twenty-six peer-reviewed Departmental Fact Sheets
Twenty one proceedings of meetings
Nineteen videotapes and DVD's.

ARTICLES IN NATIONAL PERIODICALS (past five years; 23 published pre-2004)

Vincelli, P., and Ed Dixon. 2008. Improving spray coverage improves dollar spot control. *Golf Course Management* 76(2):114-116.

Vincelli, P., and Farman, M. 2007. Update on fungicide resistance in gray leaf spot. Golf Course Management 75:124-127.

Vincelli, P., and Dixon, E. 2005. Performance of Selected Phosphite Fungicides on Putting

Green Turf. Golf Course Management July, 2005, pp. 77-81.

Vincelli, P. and Dixon, E. Getting the most out of the newest strobilurin fungicide. Turfgrass Trends pp. 60-62, June 2004

Vincelli, P. 2004. Computer simulations of fungicide runoff from fairways. Golf Course Management, July 2004, pp. 85-88.

Vincelli, P. 2004. Dealing with dreaded dollar spot. Golfdom, April 2004, pp. 70-73.

INVITED BOOK CHAPTER

Vincelli, P. 2002. Field Crop Pest Management (Plant Pathogens). Pages 270-273 in: The Encyclopedia of Pest Management, Marcel Dekker, Inc.

REEREED TEACHING PUBLICATIONS

Vincelli, P. 2005. An Inquiry-Based Approach to Teaching Disease Cycles. *The Plant Health Instructor.* DOI:10.1094/PHI-T-2005-0222-01 (published online on APS*net*).

Vincelli, P. 2002**.** QoI (Strobilurin) Fungicides: Benefits and Risks. *The Plant Health Instructor*. DOI: 10.1094/PHI-I-2002-0809-02.

Vincelli, P., and Heist, P. 2002. Student Reaction to Review Sessions Modeled After the DeBary Bowl. *The Plant Health Instructor*. DOI: 10.1094/PHI-T-2002-0303-01.

Vincelli, P. 2001. Cytology of fungal infection. *Plant Health Instructor*. DOI: 10.1094/PHI-I-2001-0618-01 (published online on APS*Net*).

VOLUNTEERED SYMPOSIUM CONTRIBUTION

Yelton, S., and **Vincelli, P.** 2006. Development of Cognitive Skills Using an Inquiry-Based Approach to Teaching Disease Cycles. International Society for Plant Pathology Teaching Symposium, 5/15/06-6/4/06. http://www.ispp-teaching-symposium.org/

WORKSHOPS ORGANIZED (past five years; five presented pre-2004)

"Real-time PCR for Applied Plant Pathologists", presented a total of eight times thus far since Jan 2005. This is the only hands-on workshop in the U.S.; attended by scientists from throughout the country. There has been a rolling waiting list since the first workshop was offered.

"Turf Fungicides", Pesticide Applicator Training, Owensboro, KY, 7 Mar 2008.

"Turf Fungicides", Pesticide Applicator Training, Bowling Green, KY, 1 Feb 2008.

"Real-time PCR for Applied Plant Pathologists", attendees from throughout the U.S. and from three other countries Twice in 2007 and twice again in 2008

"Identification and Management of Turfgrass Diseases", Kentucky Turfgrass Conference, Bowling Green, Oct 2007.

"Identification and Management of Turfgrass Diseases", for turf industry representatives. Presented in Catlettsburg, 23 Jan 2006 and in Bowling Green, Feb 2005.

"Training Master Gardeners in Plant Pathology", In-Service Training for Extension Agents,

Elizabethtown, 23 March 2005.

Identification and Management of Turfgrass Diseases, Kentucky Turfgrass Conference, Conducted periodically since 1993, 4 hr, attendance ranges from 30-75. Approved for CEU credits by the Golf Course Superintendents Association of America and the Kentucky Division of Pesticides.

OTHER EXTENSION ACTIVITIES

In-State Extension Presentations: Approximately 340 in Kentucky, including 33 for agent training, since 1990; over 95% of these have been regional or statewide meetings. 51 in Wyoming, New York, and New Jersey, 1982-1990.

Newsletter articles: Approx. 835 in *Kentucky Pest News*, since 1990. 25 in other in-state Kentucky newsletters. 9 in Wyoming and New York, 1987-1990.

News Releases: Over 118 in Kentucky, since 1990. 4 in Wyoming, 1988-90.

Extension Service TV and Radio Tapes: Approx. 245 in Kentucky, 1990-present. 4 in Wyoming, 1988-1990.

National, Regional, and Local Media Interviews: Over 44 since 1990.

Diagnostic Work: Diagnosed or consulted on over 2100 plant samples in Kentucky, 1990-present. Special emphasis was placed on diagnosis during sabbatical leaves. Approx. 750 in Wyoming, 1988-1990; approx. 50 in New York, 1983-1988.

EXTERNAL FUNDING

Gifts & Contracts

Approximately $250,000 since 1990, mostly as unrestricted gifts in support of research in turfgrass pathology, from a variety of pesticide manufacturers and seed companies, but occasionally from other sources such as from the Kentucky Integrated Pest Management Program, publishers (for the use of photos), farm supply organizations, et cetera.

Direct Award

Project Director, Southern Pest Diagnostic Network, Regional Plant Diagnostic Center Laboratory, USDA CSREES Homeland Security Grant, 2004-2009. $36-39,000 awarded annually, plus $35,000 and $14,000 awarded in supplemental funds in 2006 and 2007, respectively.

Competitive Grants

Extension/Outreach Grants

Project Director, Evaluation of Natural Sprays for Control of Economically Important Foliar and Fruit Diseases of Tomato and Cucurbits, New Crop Opportunities Program, $22,500, 2009-2011.

Project Investigator, "Biofumigation for Soil Health in Organic High Tunnel and Conventional Field Vegetable Production Systems", Southern SARE Research Project, $173,550, 2006-08. Principal Investigator is M. Bomford, Kentucky State University.

Co-PI, "Developing an Optimized Organic Production System to Control Cucumber Beetles in

Cucurbits", KY New Crop Opportunities Program, $64,000, 2008-2010. PI=Mark Williams.

Co-PI, "Addressing the Needs of the Kentucky IPM Program Through the Activities of the Plant Disease Diagnostic and Soybean Cyst Nematode Lab", $10,000, FY2005, Principal Investigator= D. Hershman. Funded by the Kentucky IPM Program.

Collaborator, AIPM For Public Landscapes@, Monte Johnson, Project Director, $8000 awarded for 1996-97, funded by UK Integrated Pest Management Program.

Member, Project Management Team, AKentucky Leadership for Agriculture and Environmental Sustainability@, Hal Hamilton and Curtis Absher, Co-Project Directors. $957,000 for 1994-1997, funded by W. K. Kellogg Foundation.

Collaborator, AGreen River Food Corn Total Quality Management Program@, Greg Henson and Mike Smith, Co-Project Directors. $15,300 for 1994-1997, funded by Kentucky Corn Fund Utilization Committee.

Research and Teaching Grants

Project Investigator**,** "Development and Implementation of Real-time PCR for Pathogens of Turfgrass, Ornamentals, and Vegetables", $6000/yr for two years, Kentucky Integrated Pest Management Program., awarded 2002

Collaborator, "Real Time PCR Equipment for Disease Detection and Diagnosis", $24,000, UK Major Equipment Research Fund, awarded 2002.

Collaborator, AWheat Head Scab Survey@, C. Bowley and P. Needham, Project Directors, Kentucky Small Grain Growers Association, $4000 awarded for 1997-98.

ATeaching Plant Pathology Using Videodisc Technology@, Instructional Enhancement Grant, UK College of Agriculture, $1472 awarded 1996.

$575, UK Research Committee Minigrant, Biocontrol Products for Turf Diseases, 1992.

$7200, Western Sugar Joint Research Committee, Control of Rhizoctonia Root Rot of Sugar Beet, 1989.

$9900, New York Competitive IPM Grants Program, Predictive Systems for Botrytis Leaf Blight Control in Onion, 1986.

PROFESSIONAL PRESENTATIONS

Invited Presentations (past five years; 66 presentations made pre-2004) *(*=delivered in Spanish)*

"Results from University Trials, With an Emphasis on Corn", Hot-Topic Symposium on Physiological Benefits of Fungicides, APS Annual Meeting, 5 Aug 2009.

"Utility of *Essential Plant Pathology* in a Laboratory-Based Introductory Course", Teaching Workshop, APS Annual Meeting, Portland, 3 Aug 2009.

"Fungicide Use on Kentucky Corn and Soybean: A New (And Questionable) Practice", Agriculture Canada Eastern Cereal and Oilseed Research Centre, Ottawa, Canada, 29 May 2009.

"Inquiry as a Means of Engaging Students and Teacher: An Example from Plant Pathology", ADVANCE Distinguished Lecture Series, Kansas State University, 8 April 2009.

"Nucleic-Acid Based Pathogen Detection in Applied Plant Pathology: Some Applications and

Considerations", Dept. of Plant Pathology, Kansas State University, 9 April 2009.

*"Disease Forecasting and Fungicide Resistance", 18 March 2009, University of Puerto Rico, Mayaguez.

**"DNA-Based Diagnostics: Principles, Applications, Strengths and Limitations, 16 March 2009, University of Puerto Rico, Mayaguez.

"Nontarget and unexpected effects of turfgrass fungicides", Webinar hosted by TurfNet online 12 February 2009 (68 participants)

"Fungicide Use on Kentucky Corn and Other Field Crops: A New (And Questionable) Practice", Crop Science Seminar Series, 6 Feb, 2009

"Progressive Disease Management: Fungicide Runoff, Resistance and Alternatives", Empire State Green Industry Show, Rochester, 7-8 Jan 2009.

"Diagnostics Basics", Empire State Green Industry Show, Rochester, 7-8 Jan 2009.

"Corn fungicides", Mid-Atlantic Crop Management School, Ocean City, MD, 9 Nov 2008.

Technology Transfer in Extension: Experience in the United States of America, International Congress of Plant Pathology, Turin, Italy, Aug 24-28, 2008.

Runoff of Fungicides, Atlantic Golf Course Superintendents Association Annual Meeting, Halifax, 19 Mar 2008.

Turf Fungicides. Seven-hour workshop presented to the Atlantic Golf Course Superintendents Association Annual Meeting, Halifax, 18 Mar 2008.

Turf Fungicides. Eight-hour workshop presented to the Canadian Golf Course Superintendents Association, Calgary, 29 Feb 2008.

Nucleic-Acid Based Pathogen Detection in Applied Plant Pathology: Some Applications and Considerations, Southern Division APS Meeting, Dallas, 3 Feb 2008.

Cultural Practices and Disease Control on Golf Courses, NJ Turfgrass Association Annual Meeting, Atlantic City, 6 Dec 2007.

Cultural Management of Lawn Diseases, NJ Turfgrass Association Annual Meeting, Atlantic City, 6 Dec 2007.

Update on Gray Leaf Spot and New Pathology Issues, Invited Guest, Cornell ShortCUTT Teleconference, 9 Aug 2007, includes participants from several northeastern and mid-Atlantic states.

Resistance to Fungicides: Management Practices for Reducing Risk, New Jersey Golf Course Superintendents Association, Crystal Springs Resort, Hamburg, 8 Nov 2006.

Cultural Practices that Influence Disease Development, Austrian Greenskeepers Assoc., Hohlwegen, 24 Oct 2006.

Getting the Most Out of Turf Disease Control Products, Austrian Greenskeepers Assoc., Hohlwegen, 25 Oct 2006.

Diagnosing and Controlling Turfgrass Diseases, Purdue Professional Landscape School, Evansville, 27 Jan 2006.

Performance of Phosphite (Phosphonate) Fungicides. Golf Course Superintendents Assoc. Amer. 9 Feb 06. (Only 7% of proposed presentations were selected).

Principles Pertinent to Disease Considerations When Planning For the 2005-2006 Season, Meeting for Onion Producers and Advisors, INIA Las Brujas, 11 Aug 2005.

Resistance to Q_oI Fungicides in *Pyricularia oryzae* from Perennial Ryegrass, INIA Las Brujas (26 July 2005, approx. 35 attendees).
Activities in Las Brujas and Opportunities for Scholastic Exchange in Kentucky, INIA Las Brujas (21 July 2005, approx. 30 attendees).
Aspects of Resistance to Strobilurin Fungicides in Pathogens of Grasses*, Uruguay National Institute for Agricultural Research, La Estanzuela Station, 28 Jun 2005.
Resistance to Strobilurin Fungicides*, Uruguay National Institute for Agricultural Research, Salto, Uruguay 21 Jun 2005.
New Developments in Disease Management in Horticultural Crops in the U.S*, Tenth Biennial Uruguayan Horticultural Conference, Montevideo, May 2005.
Fungicide Programs for Transition Zone Greens, Midwest Turf Expo, Indianapolis, 18 Jan 2005.
Comparing Efficacy of Phosphonate Fungicides, Midwest Turf Expo, Indianapolis, 19 Jan 2005.
Do Fungicides Run Off?, Midwest Turf Expo, Indianapolis, 19 Jan 2005.
Simulations of Fungicide Runoff From Turfgrass Swards, Minnesota Green Expo, 7 Jan 2005, Minneapolis, 200 attendees.
Resistance to Fungicides, Minnesota Green Expo, 7 Jan 2005, Minneapolis, 200 attendees.
"Phosphite Fungicides For Turf Disease Control", Middle Tennessee Golf Course Superintendents Association, Goodlettsville, TN, 8 Jun 04.
"Simulations of Fungicide Runoff From Turfgrasses", Bayer Turf Health Seminar, 13 Mar 04, Naples, FL. *Attended by 45 university scientists, USGA agronomists, and industry professionals nationwide.*
"Comparative Performance of Phosphite Fungicides on Creeping Bentgrass", Bayer Turf Health Seminar, 13 Mar 04, Naples, FL.
"Simulations of Fungicide Runoff From Turfgrasses", Ohio Turfgrass Conference, Columbus, 10-11 Dec 03.
"New Developments in Gray Leaf Spot", Ohio Turfgrass Conference, Columbus, 10-11 Dec 03.
"Fungicide Resistance", Ohio Turfgrass Conference, Columbus, 10-11 Dec 03.
"Simulations of Fungicide Runoff From Turfgrasses", West Virginia Turf Conference, Morgantown, WV, 5 Nov 03.
"Pathogen Resistance to Fungicides", West Virginia Turf Conference, Morgantown, 5 Nov 03.
"Phosphites for Turf Disease Control", Invited Guest, Cornell ShortCUTT Teleconference, 21 Aug 03, includes participants from several northeastern and mid-Atlantic states.
"Resistance to Fungicides", Golf Course Super. Assoc. Ann. Meeting, 15 Feb 03, Atlanta.

Volunteered Research Papers

Forty from research at the University of Kentucky, 1990-present.
One from research during sabbatical at the University of Wisconsin, 1998.
Three from research at the University of Wyoming, 1989-90.
Six from research at Cornell University, 1986-88.
Three from research at Rutgers University, 1982-83.

AWARDS

Fellow, Academy of Teaching and Learning, College of Agriculture, University of Kentucky,

appointed 2009.
Provost's Distinguished Service Professorship, awarded 2007.
Excellence in Teaching Award, American Phytopathological Society, 2007.
Shared in the Agronomy Society of America Division A-4 (Extension) Award of Excellence. Corn and Soybean Production Calendar. Chad Lee, James Herbek, Lloyd Murdock, Greg Schwab, J.D. Green, James Martin, Ric Bessin, Doug Johnson, Donald Hershman, **Paul Vincelli**, Tim Stombaugh, and Steven Riggins.
Fulbright Scholar Award to Uruguay, 2005. The J. William Fulbright Foreign Scholarship Board.
Outstanding Project, 2005, Kentucky Association of State Extension Professionals, for In-Depth Plant Disease Workshops. Awarded to the entire Extension Plant Pathology Team.
Master Teacher Award, Gamma Sigma Delta, Kentucky Chapter, 2004.
Kentucky Turfgrass "Man of the Year" for 2002, Kentucky Turfgrass Conference, Nov 02.
Award of Appreciation. Natrona Country Master Gardeners, Casper, WY, February 24, 1990.
Outstanding Student Paper Award. American Phytopathological Society, Northeast Division, 1987.

HIGHLIGHTS OF PROFESSIONAL SERVICE

Departmental

Member of several Departmental Committees at UK, UW, and Cornell.
Faculty Recording Secretary, UK Dept. of Plant Pathology, 1991-1993.
Reviewer, research and Extension manuscripts and newsletter articles, on an ongoing basis.

College/University

Member, Ad Hoc Committee on Teaching Evaluations, College of Agriculture, 2009.
Member, Advisory Board, Center for Excellence in Teaching and Learning, College of Agriculture, 2007-2009.
Member, College of Agriculture Sustainable Agriculture Committee, 2008-present.
President, Gamma Sigma Delta Kentucky Chapter, 2008-2009,
Faculty Advisor, Men Against Violence And Rape @ UK, UK Student Organization, 2006-2008.
Chair, Academic Area Advisory Committee for the Extension Title Series, University of Kentucky, 2008.
Internal Member, College of Agriculture Review Committee, 2007.
Member, College Advisory Committee on Appointment, Promotion, and Tenure, 2006-08.
Member, Sustainable Agriculture Curriculum Committee, College of Agriculture, 2005-06.
Member, Agroterrorism and Disaster Preparedness Committee, College of Agriculture, 2005-06.
Member, Faculty Merit Evaluation Committee, Dept. of Plant Pathology, 2004-05.
Member, Periodic Review Teams, Depts . of Plant Pathology and Agronomy, 2004-2005.
Member, College of Agriculture Strategic Planning Committee, 2003.
Chair, Instructional Professional Development Committee, College of Agriculture, 2002. Member since 1999.
Member, Academic Area Advisory Committee for the Extension Title Series, University of Kentucky, appointed 2002. Chair in 2003-04.

Member, Search Committee, Associate Dean for Research, UK College of Agriculture, 2001.
Chair, Review Committee for GEN100/200, College of Agriculture, 1999.
Member, *Ad Hoc* Committee on Instructional Professional Development, College of Agriculture, 1997
Member, Faculty Merit Evaluation Appeals Committee, College of Agriculture, 1999.
Member, Awards Committee, Association of Kentucky Extension Specialists, 1998.
.Member, *Ad Hoc* Committee on Faculty Performance Review, College of Agriculture, 1997.
Member, Committee on Communicating Extension Impacts, 1997.
Coordinator and Participant, AHow to Develop and Implement Authentic Assessment Techniques@, College of Ag Workshop, 3 Apr 97.
Secretary, Council of Kentucky Extension Agents and Specialists, 1997.
Member, Strategic Goal Team #2: Enhancing Ag Sustainability, UK Cooperative Extension Service, 1996.
Vice President (1994-95) and President (1995-96), Association of Kentucky Extension Specialists, elected 1994.
Member, Planning Committee, 1995 Statewide Extension Conference, 1994.
Member,, Council of Agts and Specialists, 1994-1995.
Member, Electronic Information Delivery Task Force, UK Coop. Ext. Serv., 1991-93.
Member, Certified Crop Advisor Training Committee, 1994.
Chair, Membership Committee, Association of Kentucky Extension Specialists, 1991-1993.
Member, County Extension Program Review Team: Bath, Boone, Fleming, Gallatin, & Mason Counties, 1993.
Chair, Extension Computer Committee, UK Coop. Ext. Serv., 1990-91. Committee member since 1990.
Member, Philip Morris Graduate Fellowship Selection Committee, UK College of Agriculture, 1991.
Chair, Committee on Evaluation of Extension Specialists, Cooperative Extension Service, University of Wyoming. 1989.
Secretary/Treasurer, Resident Extension Association, College of Agriculture, University of Wyoming. Elected Dec 1988, served 1988-1990.

State/Regional

Member, Investigative Committee on Wheat Streak/Barley Yellow Dwarf, Great Plains Agricultural Council. 1988-1989.
Member, Seed Certification Standards Committee, Wyoming Crop Improvement Association. 1989-1990.
Presided over and assisted in Contributed Paper Sessions of the American Phytopathological Society, Northeast Division (1986 &1987) and Southern Division (1992).

National

Co-chair, Program Committee, National Plant Diagnostic Network National Meeting (scheduled for Dec 2009).
Senior Editor, The *APSnet* Education Center and *The Plant Health Instructor*, 2002-2005.

Moderator and Co-Organizer, "Excellence in Teaching Discussion Session, 2003 APS Meeting, Charlotte, NC, Aug 03.

Member, NC-226, ADevelopment of Pest Management Strategies for Forage Alfalfa Persistence@, 1999-present.

Member, Teaching Committee, American Phytopathological Society, 1999-present.

Chair, New Fungicide and Nematicide Data Committee, 1998-1999.

Coordinator, Turf Working Group, American Phytopathological Society, 1996-1998.

Editor, Corn & Sorghum Section, Biol. & Cult. Tests for Control of Plant Dis., APS Press, 1995-97.

Editor, Turf Section, Biol. Cult. Tests for Control of Plant Dis., APS Press, 1994.

Reviewer of electronically submitted note manuscripts, Plant Disease, 1994.

Moderator, Contributed Paper Session, National Extension Technology Conference, Lexington, May 1994.

Chair, Environmental Quality & Plant Health Committee, Amer. Phytopath. Soc., 1992-1993. Committee member 1991-1994.

Editor, Field Crops Section, Biol. Cult. Tests for Control of Plant Dis., APS Press. 1991-1993.

Chair, NCR-138 Alfalfa Diseases Committee, 1991-92. Secretary 1990-91. Committee member 1990-1994.

Moderator, "Fate of Pesticides in the Environment" Discussion Session, American Phytopathological Society National Meeting, 1992.

Member, Chemical Control Committee, Amer. Phytopath. Soc., 1989-1992.

Cooperator, numerous national surveys on pesticide and disease control issues, since 1989.

Invited Ad Hoc Reviewer

Reviewer of 72 manuscripts for *Plant Disease, Phytopathology, Biocontrol, HortScience, Crop Protection , The International Turfgrass Society Research Journal, Canadian Journal of Plant Pathology, Fungal Genetics & Biology, The Plant Health Instructor,* and *Plant Health Progress*. Also reviewer for USDA ARS, *(2 manuscripts)*, USDA NRI *(2 proposals)*, BARD, *(1 proposal*), Marcel Dekker *(1 book chapter)*, Certified Alfalfa Seed Council *(1 manuscript)*.

Member, 1995 Northeast Integrated Pest Management Special Grants Review Panel.

Introduction to Plant Diseases: Identification and Management, Second Edition. Van Nostrand Reinhold, 1992. Review published as the lead media review in Vol. 22 of J. Nat. Resour. Life Sci. Educ. 22:193 (1993).

Colorado Onion Integrated Pest Management Handbook, Bulletin 547A, Colorado State University Cooperative Extension Service. November, 1989.

PROFESSIONAL MEMBERSHIPS

American Phytopathological Society

Gamma Sigma Delta, The Honor Society of Agriculture

Kentucky Association of State Extension Professionals

NARRATIVE

Extension and Applied Research

Corn

One of the most important Extension thrusts in recent years has been addressing the "exploding" increase in the use of fungicides on field corn in Kentucky and in the U.S. in general. Unfortunately, marketing efforts have been based not only on valid claims of disease control but also on questionable claims of improved "growth efficiency" and improve "stress tolerance". Don Hershman and I have been working together on this important Extension program. We are taking a very science-based approach, grounding our recommendations and educational programs in research conducted throughout the U.S., weighting Kentucky data when available. We have used a variety of Extension approaches: agent training, newsletter articles, many talks at county-based, regional, and statewide meetings, field days, radiotapes, TV interviews, etc. We participate actively in the PLANTHEALTH list server (which Don Hershman created in response to the emergence of this issue in corn), a national list-server for communicating about fungicide issues on grain crops. We created a "risk ladder", a widely cited Extension tool which helps growers understand the factors that increase the probability of a positive net return from a fungicide application in corn. I have collaborated with colleagues in the Department of Plant and Soil Science in the design, execution, and publication of field trials testing fungicides in Kentucky. In February, 2009, I co-authored a letter to the U.S. Environmental Protection Agency (signed by over 40 scientists), questioning the issuance of a supplemental label for Headline® fungicide for growth-promoting purposes. Most recently, I have been invited to speak on the issues of fungicides and crop health at a "Hot Topic" Symposium at the 2009 meeting of the American Phytopathological Society, in a teleconference with five scientists and managers at the US-EPA, and at the National IPM Coordinating Meeting in Washington, D.C.

Forage Crops

In this area, the most important project is the ongoing alfalfa/Sclerotinia disease nursery, conducted in collaboration with Dr. Ray Smith in Plant and Soil Science. This disease nursery serves two purposes: (1) it assures that commercial alfalfa breeders are selecting for levels of resistance suitable for Kentucky conditions; and (2) it provides us data on performance under Kentucky conditions of alfalfa varieties marketed as resistant. Sclerotinia crown and stem rot continues to be a major limitation to the use of fall-seeding in alfalfa. My research suggests that disease pressure in Kentucky and Tennessee is higher than the rest of the nation, so the UK program for screening for resistance and evaluating purportedly resistant commercial varieties is a critical vehicle for overcoming this limitation. I also recently completed a project, collaboratively with Dr. Mark Farman, on gray leaf spot and its apparent primary role in limiting the success in the use of annual ryegrass as a forage crop in Kentucky.

Turfgrass Management

During recent years, I demonstrated that spray configurations which provide improved coverage provide improved control of foliar disease. Though a study like this might seem seems intuitively unnecessary, turf managers have often wondered (logically so) whether movement of fungicide via natural redistribution of residues on turf leaf surfaces or via systemic movement

would offset poor coverage. Therefore, this study represents a significant advance in the practical management of golf course turfgrasses, and it has been extended worldwide in the trade journal *Golf Course Management* as well as thorough invited talks in the U.S. and Canada. I conducted computer simulations testing the hypothesis that fungicide spray programs suitable for fairway management in Kentucky would pose risks to quality of surface waters, and I was surprised to learn that there is reason for concern with certain important and commonly recommended fungicides. These results have been extended in *Golf Course Management* as well as in numerous conference presentations in the U.S. and Canada. In addition to a regular product-testing program which provides data useful for developing Extension recommendations, I am conducting a project to evaluate the impact on total seasonal usage of fungicides on fairways turfgrass maintained with various curative spray programs as well as a preventive program.

Nucleic Acid-based Pathogen Detection

My leadership in this area continues to fill a niche for the Extension plant pathology. We have implemented over 20 molecular lab protocols (recent additions include speciation of soybean cyst nematode (for regulatory samples), speciation of *Phytophthora*, whole genome amplification via multiple displacement amplification; and detection via PCR/dot-blot of *Brettanomyces bruxellensis*). Numerous cucurbit crops in Kentucky and throughout the Southeast have experienced virus outbreaks recently that reacted positively to AgDia's potyvirus group test but negatively to tests for all likely virus species that attack cucurbits in the U.S. My RT-PCR/cloning work revealed that these outbreaks were caused by an apparently new strain of watermelon mosaic virus 2, knowledge which helps us immensely in knowing how to deal with these outbreaks. USDA scientists continue to refer plant pathologists to us for cloned DNA of the Asian soybean rust pathogen, for use as a positive control in PCR assays for this pathogen. Our workshop on real-time PCR (offered since 2003) has been immensely popular, pulling in applied plant pathologists from across North America (and always has a waiting list). My feature article on nucleic acid-based pathogen detection in *Plant Disease* has been very well-received by colleagues and was the online paper most accessed in that journal during the month of its publication.

Teaching

My inquiry-based approach to teaching *Principles of Plant Pathology* seems to be very successful; my impression is that most students are motivated to learn the material and even seem to be interested in it. I foresee no significant changes in the teaching approach I am using, although I always try to keep the material "fresh" and therefore interesting to me as well as to students. In fall, 2009, I offered a distance-learning section of this course, principally to provide county Extension agents a chance to take the course. Live lectures were given through Centra software; laboratories were consolidated into five visits to campus with 4-6 hours of lab work. Inquiry seems just as important in the distance-learning environment as in the classroom, in order to keep student focus and attention at high levels. I certainly prefer the live classroom but it is nice to make the subject matter available to those that cannot travel to campus 2-3 times per week. Plus, it is nice to do all I can to reduce global warming.

PLANT PATHOLOGY ALUMNAE/I
(As of June 2009)

Ali, Muhammad
M.S., 1991, Ferriss
Agricultural & Biological Sciences Program
University of Riau
Riau
INDONESIA

An, Zhiqiang
Ph.D., 1991, Hendrix
Natural Products Drug Discovery
Merck Research Laboratories
P.O. Box 2000
RY80Y-225
Rahway, NJ 07065

Anjos, Jose R. N.
Ph.D., 1991, Ghabrial
CPAC/EMBRAPA
Km 18 BR 020, C.P. 70.0023
73.300 - Planaltina - D.F.
BRAZIL

Bateman, Amy M.
M.S., 2007, Vaillancourt/Hartman
Small Grains and Potato Germplasm Research Unit
Aberden, ID 83210
Email: Amy.Bateman@ars.usda.gov

Bell, Andrea
M.S. (Toxicology), Siegel

Bergstrom, Frances H. (née Brach)
M.S., 1981, Shain
113 Birchwood Drive
Ithaca, NY 14850

Bergstrom, Gary C.
Ph.D., 1981, Kuć
Department of Plant Pathology
334 Plant Science Bldg.
Cornell University
Ithaca, NY 14853

Blankenship, Jimmy D
Ph.D, 2004, Schardl
3228 Durango Drive
Lexington, KY 40509

Bloch, Camila
M.S., 1983, Kuć
1549 Sand Castle Road
Sanibel Island, FL 33957

Bostock, Richard M.
Ph.D., 1981, Kuć
Department of Plant Pathology
University of California, Davis
Davis, CA 95616

Broglio, Jr., E. Peter
Ph.D., 1991, Shepherd
Biological Sciences
Crowder College
601 Laclede
Neosho, MO 64850

Brumagen, Jr., David M.
Ph.D., 1965, Chapman/Hampton
Department of Biology
Morehead State University
UPO 702
Morehead, KY 40351

Calvert, Jimmie R.
M.S., 1965, Stokes
Department of Plant and Soil Sciences
309 Plant Science Building
University of Kentucky
Lexington, KY 40546-0312

Calvert, Lee A.
M.S., 1981, Ghabrial
Centro Int'l. De Argic. Tropical
AA No 6713
Cali
COLOMBIA

Caruso, Frank L.
Ph.D., 1978, Kuć
Cranberry Experiment Station
P.O. Box 569
East Wareham, MA 02538

Chaky, Jennifer L.
M.S., 2000, Vaillancourt
Senior Research Associate
Pioneer Hi-Bred Int'l
7301 NW 62nd Ave
PO Box 85
Johnston, IA 50131-0085

Chang, Shinyu (Dr.)
M.S., 1990, Schardl
College of Pharmacy
337 College of Pharmacy Building
University of Kentucky
UNTIL 1998. NO KNOWN CURRENT ADDRESS.

Chen, Hsien-Jung
Ph.D., 1995, Kuć
F 3, No 37, Ln 200
Yungchi Rd.
Taipei, Taiwan
REPUBLIC OF CHINA

Cheng, Chi-Ping
Ph.D., 2005, Nagy
Graduate Institute of Biotechnology
National Chung Hsing University
Taichung, Taiwan
REPUBLIC OF CHINA

Choi, Gil Ho
Ph.D., 1988, Schardl/Smith
11429 Potomac Oaks Dr.
Rockville, MD 20850

Choi, Il-Ryong
Ph.D., 1992, Shepherd
Department of Biological Sciences
Northern Illinois University
Dekalb, IL 60115

Chompoonutprapa, Kasem
M.S., 1972, Hendrix
THAILAND

Chu, Meihua
Ph.D., 1995, Pirone
Cardiovascular Research Institute
University of California, San Francisco
513 Parnassus Ave., Box 1320
San Francisco, CA 94143-1320

Chung, Kuang-Ren
Ph.D., 1996, Schardl
University of Florida
Citrus Research & Education Center
700 Experiment Road
Lake Alfred, FL 33850-2299

Couch, Ronald
Ph.D. (Toxicology), 1975, Siegel

Craven, Kelly D.
M.S., 2000, Schardl
Ph.D., 2003, Schardl
Samuel Roberts Noble Foundation
2510 Sam Noble Pky.
Ardmore, OK 73401

Csinos, Alex S.
Ph.D., 1977, Hendrix
Department of Plant Pathology
P.O. Box 748
University of Georgia
Tifton, GA 31793

Dalisay, Rodelio F.
Ph.D, 1994, Kuć

de Nettancourt, Dreux
M.S., 1959
MOROCCO

Dean, Ralph A.
Ph.D., 1986, Kuć
Fungal Genomics Laboratory
North Carolina State University
Campus Box 7251
Raleigh, NC 27695-7251

Du, Meizhu
M.S., 2002, Vaillancourt

Ducasse, Daniel A.
Ph.D., 1991, Shepherd
University of Catol Cordoba
Fac Fs Agrarias
Obispo Trejo 323
Cordoba, 5000
ARGENTINA

Edskes, Herman
Ph.D., 1994, Shepherd
1806 Yale Place
Rockville, MD 20850

Elliston, John E. (Deceased)
No U.K. degree(s)? Kuc associate.

Fan, Cheng Jin
M.S., 1963
PEOPLE=S REPUBLIC OF CHINA

Faulkner, Jerome
Ph.D., 2009, Schardl
3500 Beaver Place Road #169
Lexington, KY 40503

Ferry, Deborah R. (née Turner)
Ph.D., 1971, Chapman
26192 Hidden Valley Drive
Farmington Hills, MI 48331-4129

Florea, Simona
Ph.D., 2009, Schardl

Flores, Hermogenes
M.S., 1965, Chapman
Ph.D., 1966, Chapman
Valencia
VENEZUELA

Flores, Julia M.
M.S., 1966
Asheboro, NC

Flowers, Jennifer L.
M.S., 2002, Vaillancourt/Hartman
Ph.D., 2006, Vaillancourt/Hartman
3016 Wenworth Avenue
Louisville, KY 40206

Flowers, Randel A.
Ph.D., 1969, Hendrix
Cumberland County, KY

Forrey, Debbie L. (née Nida)
M.S., 1989, Ghabrial
4300 E. Birch Dr.
Newburgh, IN 47630

Fought, Lorianne M. (née Matthews)
M.S., 1987, Kuć
Ph.D., 1992, Kuć
Product Development Manager-Fungicides
Bayer CropScience
P. O. Box 12014
Research Triangle Park, NC 27709

Franklin, Kathleen M.
Ph.D., 1989, Shaw
1609 Elizabeth Street
Lexington, KY 40503

Gao, Shaojian
M.S., 1992, Shain
Ph.D., 1994, Shain
Center for Agricultural Biotechnology-UMBI
2113 Agri./Life Sci. Surge Building
University of Maryland
College Park, MD 20742-3351

Garas, Nabil A. (Deceased)
Ph.D., 1979, Kuć

Gentry, Claude E.
Ph.D., 1968, Chapman
Berea College
Berea, KY 40404

Ghosh, Debashish
Ph.D., 2007, Lesnaw/Goodin
Biology/Plant Pathology
Department of Microbiology and Immunology
MS415 William R. Willard Medical Education Building
University of Kentucky
Lexington, KY 40536-0298
Email: dghos2@uky.edu

Gill, Love
M.S., 2009, Schardl

Gleason, Mark L.
Ph.D., 1985, Ferriss
Department of Plant Pathology
109 Bessey Hall
Iowa State University
Ames, IA 50011

Gould, Ann B.
Ph.D., 1988, Hendrix
Department of Plant Pathology
P.O. Box 231, Martin Hall
Rutgers University
New Brunswick, NJ 08903

Gu, Hongcang
Ph.D., 2004, Ghabrial
5A Charles Park Road
West Roxbury, MA 02132
Email: hgu@broad.mit.edu

Guo, Baozhu
M.S., 1992, Hendrix
U.S.D.A.
Insect Biology and Population Management Research Laboratory
P.O. Box 748
Tifton, GA 31793-0748

Hamelin, Richard C.
Ph.D., 1991, Shain
Forestry Canada
Laurentian Forestry Centre
1055 du P.E.P.S., PO Box 10380
Stn. Sainte-Foy, Quebec
G1V 4C7
CANADA

Hammerschmidt, Raymond
Ph.D., 1980, Kuć
Department of Botany and Plant Pathology
Michigan State University
East Lansing, MI 48824-1312

Hanchey, Penelope J.
Ph.D., 1968, Wheeler
Department of Plant Pathology
Colorado State University
Fort Collins, CO 80523

Hawes, Martha C.
M.S., 1980, Sheen
Ph.D., 1982, Wheeler
Department of Plant Pathology
University of Arizona
Tuczon, AZ 85721

Heist, E. Patrick
M.S., 2000, Schardl/Nesmith
Ph.D., 2003, Schardl/Nesmith
Ferm Solutions, Inc.
PO Box 203
445 Roy Arnold Avenue
Danville, KY 40423
Email: eheist@ferm-solutions.com

Hellmann, Gary M.
Ph.D., 1988, Shaw
Wake Forest University School of Medicine
Physiology & Pharmacology
Medical Center Blvd.
Winston-Salem, NC 27157

Henfling, Jan W.D.M.
Ph.D., 1979, Kuć
Irisstraat 15
1402 EN Bussum
THE NETHERLANDS
Email: jan-willem@henfling.nl

Hopkins, Donald L.
Ph.D., 1968, Hampton
University of Florida
IFAS - 2725 Binion Road
Mid-Florida Research and Education Center
Apopka, FL 32703-8504

Hu, Chung-Chi
Ph.D., 1997, Ghabrial
Agricultural Biotechnology Laboratories
National Chung-Hsing University
Taichung, 402
Taiwan
REPUBLIC OF CHINA

Huang, Qi (Dr.)
M.S., 1992, Kuć
Fruit Laboratory
Plant Sciences Institute
Beltsville Area
Beltsville, MD 20705

Huang, Shaohua
Ph.D., 1996, Ghabrial
University of Pittsburgh
E1240 Biomed. Sci. Tower
Dept. of Molecular Genetics and Biochemistry
Pittsburgh, PA 15261-0001

Jenns, Anne E. (Deceased)
Ph.D., 1979, Kuć

Ji, Cheng
Ph.D., 1995, Kuć

Jiang, Yi
Ph.D., 2009, Nagy

Johnson, Mark C.
Ph.D., 1980, Pirone
Department of Biological Sciences
Georgetown College
Georgetown, KY 40324

Jones, Keith J.
M.S., 1984, Hendrix
Director, Office of Intellectual Property Administration
1615 NE Eastgate Blvd.
Pullman, WA 99164-1802

Kanglong, Samchai
M.S., 1973
Thonburi
THAILAND

Kaosiri,Thawee
Ph.D., 1971
Bangkok
THAILAND

Keokamnerd, Manop
M.S., 1958
Prachuabkirikan
THAILAND

Kiernan, Jennifer B.
M.S., 1983, Hendrix

Li, Daoxin
M.S., 1988, Smith
Ph.D., 1992, Schardl/Smith
Micro Lab Manager
EMSL Analytical, Inc.
2001 E. 52nd St.
Indianapolis, IN 46205
Email: dli@EMSL.com

Lin, Rose M.
M.S., 1970
Taichung
TAIWAN

Liu, Jih-Shiou
Ph.D., 1993, Schardl
Rm. #320
Institute of Botany
Academia Sinica, Nankang
Taipei, Taiwan
REPUBLIC OF CHINA

Lung, Michael C. Y. (Deceased)
Ph.D., 1971, Pirone

Lushia, Warren A.
Ph.D., 2003, Shaw
Pikeville College
School of Osteopathic Medicine
147 Sycamore Street
Pikeville, KY 41501-1194

Lusso, Marcos F. G.
Ph.D., 1995, Kuć
3257 Pebble Lake Drive
Lexington, KY 40502

Machado, Caroline
Ph.D, 2004, Schardl
3114 Periwinkle Way
New Albany, IN 47150
Email: caromach@gmail.com

Matos, Lidy L.
M.S., 1954
Naranjito
PUERTO RICO

Matovu, Sebastian
M.S., 1968
UGANDA

McCammon, Sally L.
Ph.D., 1979, Wheeler
USDA- APHIS- Unit 98
4700 River Road
Riverdale, MD 20737-1237

McGawley, Edward C.
Ph.D., 1976, Chapman
302 Life Science Building
Louisiana State University
Baton Rouge, LA 70803

Modjo, Hakam S. (Deceased)
Ph.D., 1983, Hendrix

Mucharromah, "Ema"
M.S., 1989, Kuć
Ph.D., 1994, Kuć
Department of Plant Protection
Fakultas Pertanian
University of Bengkulu
I1-Raya, Kandangtimun
Bengkulu
INDONESIA

Mundell, J. Nicole
M.S., 2005, Schardl
1503 Thames Drive
Lexington, KY 40517

Norman, William A.
M.S., 1964
Barren County, KY

Nye, III, Thomas Gordon
Ph.D., 1966, Hampton
Weston, WV

Orlandi, Elizabeth A. (née Weitor)
M.S., 1984, Smith
U.S.D.A. Microbiology & Plant Pathology Laboratory
Building 010 HH5
Beltsville, MD 20705-2350

Pan, Shen-Quan
Ph.D., 1991, Kuć
National University of Singapore
School of Biological Sciences
Kent Ridge
Singapore 119 260
SINGAPORE

Panaviene, Zivile S.
Ph.D., 2004, Nagy
Envera
901 W. 11th Avenue, Suite 1
Coatesville, PA 19320

Peyyala, Rebecca
Ph.D. (Crop Science), 2006, Farman/Phillips
Center for Oral Health Research
MN430 William R. Willard Medical Education Building
University of Kentucky
Lexington, KY 40536-0298

Pickard, Clay
M.S., 1978, Ghabrial
Clay Pickard, MD
744 McCallie Avenue
Suite 427
Chattanooga, TN 37403

Politis, Demetrios
Ph.D., 1975, Wheeler
GREECE

Preisig, Carol
Ph.D. (Plant Physiology), 1985, Kuć
Panlabs Incorporated
22011 30th Drive SE
Bothell, WA 98021-4444

Rajendran, Kottampatty S.
Ph.D., 2004, Nagy
Department of Cancer Immunology and AIDS
Dana Farber Cancer Institute (JFB 712)
44, Binney Street
Boston, MA 02115

Rao, Potu N.
Ph.D., 1963
Muppella
INDIA

Rawn, Carroll D.
Ph.D., 1974, Wheeler
Department of Biological Sciences
Seton Hall University
400 South Orange Avenue
South Orange, NJ 07079

Rehmeyer, Cathryn J. R.
Ph.D., 2005, Farman
Pikeville College
School of Osteopathic Medicine
147 Sycamore Street
Pikeville , KY 41501-1194

Richey, Margaret G.
M.S., 1985, Smith
Ph.D., 1989, Schardl/Smith
Department of Biology
Centre College
Danville, KY 40422

Richins, Richard D.
M.S., 1990, Shepherd
Ph.D., 1993, Shepherd
3115 Sundown Road
Las Cruces, NM 88011

Richmond, Susan G.
M.S., 1978, Kuć
P.O. Box 159
Cadwell, GA 31009

Riggs, Rosa K.
Ph.D., 1966, Chapman
M.S., 1962

Rupe, John C.
M.S., 1981, Siegel
Ph.D., 1984, Ferriss
Department of Plant Pathology, PS-217
University of Arkansas
Fayetteville, AR 72701

Russin, John S.
Ph.D., 1983, Shain
Department of Plant and Soil Science
Southern Illinois University
Carbondale, IL 62901-4415

Sanderlin, Randy S.
Ph.D., 1977, Ghabrial
L.S.U. Pecan Research Station
P.O. Box 5519
Shreveport, LA 71135

Sarindu, Nonglak
M.S., 1969
Bangkok
THAILAND

Sastrosoewignjo, Soegiharso
M.S., 1964
Semarang
Central Java
INDONESIA

Schoelz, James E.
Ph.D., 1986, Shepherd
Department of Plant Pathology
108 Waters Hall
University of Missouri
Columbia, MO 65211

Scholthof, Herman
Ph.D., 1990, Shepherd
Department of Plant Pathology and Mircobiology
Texas A&M University
College Station, TX 77843-2132

Scholthof, Karen-Beth (née Goldberg)
Ph.D., 1989, Shepherd
Department of Plant Pathology and Microbiology
Texas A&M University
College Station, TX 77843-2132

Schoulties, Calvin L.
Ph.D., 1971, Yang (?)
Professor of Plant and Microbial Sciences
Department of Entomology, Soils, and Plant Sciences
114 Long Hall
Clemson University
Clemson, SC 29634-0315

Scibilia, Kevin L.
M.S. (Forestry), 1988, Shain
184 Sharon Road
Robinsville, NJ 08691

Shapka, Natalia A. (Deceased)
Ph.D., 2006, Nagy

Smigell, Christopher G.
M.S., 1996, Nesmith/Schardl
Department of Horticulture
N-318 Agricultural Science Building North
University of Kentucky
Lexington, KY 40546-0091

Sowers, Judy H.
M.S., 1966
Irvine, KY

Srisomchai, Tawin
M.S., 1973, Pirone
THAILAND

Stevens, Cathy D.
M.S., 1980, Hendrix

Stork, Jozsef
Ph.D., 2009, Nagy
Department of Horticulture
N-318 Agricultural Science Building North
University of Kentucky
Lexington, KY 40546-0091

Su, Lih-Chyong
M.S., 1980, Sheen
TAIWAN

Suseno, Hari
Ph.D., 1965
Solo
INDONESIA

Suseno, Roesmilah
Ph.D., 1965
Bogor
INDONESIA

Taylor, John M.
M.S., 1962
4 H Laurel Hill Road
Greenbelt, MD 20770

Tsai, Huei-Fung
Ph.D., 1993, Schardl
10 Center Dr.
MSC 1882
Bldg. 10, Room 11C 304
National Institutes of Health
9000 Rockville Pike
Bethesda, MD 20892-1882

Tuzun, Sadik
Ph.D., 1986, Kuć
Department of Entomology and Plant Pathology
139 Funchess Hall
Auburn University
Auburn, AL 36849-5409

Varney, Danny R. (Deceased)
Ph.D., 1969, Hampton

Venard, Claire M.-P.
Ph.D., 2006, Vaillancourt
331 Chestnut Lane
Versailles, KY 40383

Venugopal, Srivathsa C.
Ph.D., 2008, P. Kachroo
Scientist
Metahelix Life Sciences Private Limited
Plot #3, KIADB Phase IV
Bommasandra
Bangalore 560099
INDIA
Email: Srivathsa.venugopal@meta-helix.com

Walker, H. Lynn
Ph.D., 1970, Pirone
Department of Biological Sciences
Louisiana Tech University
P.O. Box 3178
Ruston, LA 71272
Email: lwalk@latech.edu

Wall, Diana H.
Ph.D., 1971, Chapman
Director, School of Global Environmental Sustainability
Colorado State University
NESB B244
Natural Resource Ecology Laboratory
Fort Collins, CO 80523-1499
Email: diana@nrel.colostate.edu

Wang, Jinghong
Ph.D., 2000, Schardl
Amgen San Francisco
1120 Veterans Blvd.
South San Francisco, CA 94080

Wang, Lilian
M.S., 1971, Shaw
Tsing Tao
PEOPLE=S REPUBLIC OF CHINA

Wattimena, Johanna R.
M.S., 1968
Ambon
INDONESIA

Wigelsworth, Martin D.
M.S., 1989, Nesmith/Siegel
Ph.D., 1994, Schardl/Siegel
2025 Cedar View Drive
Greensboro, NC 27455

Wyatt, Sarah E. (Dr.)
M.S., 1991, Kuć
Department of Environmental and Plant Biology
317 Porter Hall
Ohio University
Athens, OH 45701

Wyatt, Stephen D.
Ph.D., 1973, Shaw
Department of Plant Pathology
Johnson Hall
Washington State University
Pullman, WA 99164-6430

Xia, Ye
Ph.D., 2009, P. Kachroo

Xie, Chengsong
M.S., 1992, Kuć
Ph.D., 1996, Kuć
National Institutes of Health
9000 Rockville Pike
Bethesda, Maryland 20892

Xu, Zhengkai
M.S., 1983, Sheen
Ph.D., 1985, Shaw
Shanghai Institute of Plant Pathology
300 Fonglin Road
Shanghai
PEOPLE'S REPUBLIC OF CHINA

Xuei, Xiao-Ling
M.S., 1985, Kuć
Department of Biochemistry and Molecular Biology
Indiana University School of Medicine
Biotechnology Research and Training Center
1345 W. 16th Street, Room 220
Indianapolis, IN 46202-2111
Email: xxuei@iupui.edu

Yager, Richard
Ph.D., 1974, Pirone

Yamsonrat, Suebsak
M.S., 1969
Bangkok
THAILAND

Yu, Leona M.
M.S., 1963
Chinan
PEOPLE'S REPUBLIC OF CHINA

Zhang, Chunquan
Ph.D., 2005, Ghabrial
Department of Plant Pathology
351A Bessey Hall
Iowa State University
Ames, IA 50011-1020
Email: czhan2@iastate.edu

Zhang, Dongxiu
Ph.D., 2008, Schardl
Department of Cellular Biology and Molecular Genetics
1109 Microbiology Building
University of Maryland
College Park, MD 20742

Zook, Michael N. (Deceased)
M.S., 1986, Kuć
Ph.D. (Plant Physiology), 1991, Kuć

COMMENTS ON ALUMNI/AE

The list makes apparent that the department has placed graduates all around the globe, and across the nation. Since the department's inception, almost 150 students have graduated from the program, some taking only the M.S., some the Ph.D., and some, both degrees. The department has averaged about three graduates per year, with a slightly higher degree productivity. In its formative years, the department trained several international students who returned to their native lands and whose present occupations are unknown. From 1980, a period for which records are more accurately documented, and exempting the small number of students who chose to step aside from the professional ladder or are deceased, approximately 90% remain employed in agricultural or biological careers in academia, industry or government. Over that same time period, 31 of the 88 graduates were female. Clearly, women have found -and are finding- professional educational opportunities in the department, and in a sizeable percentage.

Generally speaking, quantitative analyses are probably of relatively limited value for a department such as Plant Pathology, because of the comparatively small numbers involved. Hence, qualitative considerations concerning alumni/ae are a better measure of the department's accomplishments and national standing. The record is noteworthy, as the following examples indicate: Calvin Schoulties (Ph.D., 1971) is a former Dean of the College of Agriculture, Forestry and Life Sciences at Clemson; Diana Wall (Ph.D., 1971) is founding Director of the School of Environmental Sustainability at Colorado State and a former president of the Ecological Society of America; four are or were Department/Unit Heads/Chairs -Richard Bostock (Ph.D., 1981), U.C. Davis, Raymond Hammerschmidt (Ph.D., 1980), Michigan State, John Russin (Ph.D., 1983), Southern Illinois, James Schoelz (Ph.D., 1986), Missouri; Gary Bergstrom (Ph.D., 1981) is a former president of the American Phytopathological Society (APS); Mark Gleason (Ph.D., 1985) received the Excellence in Extension Award from APS in 1997; Herman Scholthof (Ph.D., 1990) received APS's Ruth Allen Award in 2007; Lorianne Fought (Ph.D., 1992) is Product Development Manager-Fungicides at Bayer CropScience; Ralph Dean (Ph.D., 1986) is Director of the Fungal Genomics Laboratory at N.C. State (this laboratory is amongst the leading international centers for fungal genomics research); Sally McCammon (Ph.D., 1979) is a Science Advisor with APHIS (the Animal and Plant Health Inspection Service of the USDA); Martin Wiglesworth (Ph.D., 1994) is in senior management at Arysta Life Science; and E. Patrick Heist (Ph.D., 2003) has established a company (Ferm Solutions, Inc.). Dr.'s Bergstrom, Dean, Hammerschmidt and Scholthof are all Fellows of APS, as is Donald Hopkins (Ph.D., 1968). These examples make clear that, although a small department in comparison to many around the country, its influence is nonetheless considerable at the national level. This is testament to the quality of the graduate body. Pride is also taken in graduates who have chosen to pursue their careers

in primarily undergraduate teaching institutions, as exemplified by: Peter Broglio (Ph.D., 1991), Crowder College; Jennifer Flowers (Ph.D., 2006), Spalding University; Mark Johnson (Ph.D., 1980), Georgetown College; and Margaret Richey (Ph.D., 1989), Centre College. The department recognizes that such individuals have profound effects on young people in helping them set directions for their lives. Warren Lushia (Ph.D., 2003) and Cathryn Rehmeyer (Ph.D., 2005) are at Pikeville College School of Osteopathic Medicine in Eastern Kentucky, where they are faculty in a program dedicated to producing family practitioner doctors for underserved communities. Master graduates, too, have been successful, for the department does not view the M.S. as a compensatory degree for lack of success at the doctoral level. Indeed, some highly qualified students choose to terminate with the M.S., believing it more suited to their personal and professional goals. Jennifer Chaky (M.S., 2000) is a case in point. She is now a Senior Research Associate with Pioneer Hi-Bred International. Debbie Forrey (M.S., 1989), an academically gifted student, chose not to pursue the Ph.D., but went to work for Monsanto Corporation in St. Louis before opting for perhaps life's most important role, motherhood. Lee Calvert (M.S., 1981) is an example of an individual who went on to take the doctoral degree elsewhere; he is now a Principal Scientist and Administrator at the International Center for Tropical Agriculture in Cali, Colombia.

All in all, the department believes it has graduated a body of alumni/ae who are accomplished in many roles and in many countries and who, collectively, bring great credit to the College of Agriculture and the University of Kentucky.

Graduate Student Handbook
Department of Plant Pathology
University of Kentucky

Revised March 2008

Copies of this handbook are available from the Director of Graduate Studies, and available online via links to the Department of Plant Pathology Home Page, located at http://www.ca.uky.edu/agcollege/plantpathology/index.html.

NOTE: Any information provided here can be superseded by the rules of the University of Kentucky Graduate School. Consult the Graduate School Bulletin and other documentation at < http://www.research.uky.edu/gs/>.

Table of Contents

Introduction

This handbook is a guide to the major rules and procedures of the Graduate School and the University of Kentucky (U.K.) Department of Plant Pathology. Its contents reflect the understanding of the Director of Graduate Studies (DGS) and other faculty at the time that the handbook was most recently revised. However, rules can change. **It is the responsibility of each student to be familiar with and follow the rules of the Graduate School and the department.** Graduate School rules and policies are described in more detail in the most recent Graduate School Bulletin, which can be downloaded from: http://www.research.uky.edu/gs/bulletin/bullinfo.shtml. University regulations are contained in the U.K. Administrative Regulations and Governing Regulations. Copies are available through the Graduate School home page at http://www.research.uky.edu/gs/.

Graduate Degree Programs

The Department of Plant Pathology offers graduate work leading to the Master of Science and Doctor of Philosophy degrees. All students must complete a program that involves original research. Plant Pathology does not currently offer a non-thesis option degree (Plan B). A Master's degree should take not less than two, and not more than three years to complete, while a Ph.D. degree generally requires not less than four, and not more than five years to finish. If both the M.S. and Ph.D. are done at U.K., the Ph.D. typically requires two or three years beyond the M.S. to complete.

Organization and Administration

Graduate Faculty

The Graduate Faculty consists of the Dean of the Graduate School and all persons appointed thereto by the President. Full Members of the Graduate Faculty can serve on Masters and Doctoral committees, and direct Masters theses and Doctoral dissertations. Associate Members of the Graduate Faculty can serve on Masters and Doctoral committees, direct Masters theses, and co-chair Doctoral committees with a Full Member. The DGS can petition the Graduate School to have faculty at other universities appointed as Associate Members of the U.K. Graduate Faculty so that they can serve on Advisory Committees.

Dean of the Graduate School

The Dean of the Graduate School is charged with the administration of the policies adopted by the Graduate Faculty and the University Senate relating to graduate studies.

Director of Graduate Studies (DGS)

For each graduate program, the Dean of the Graduate School appoints a DGS. The DGS administers the rules of the Graduate School as they pertain to the graduate program of the department, and serves as a liaison between the Graduate Dean and the faculty and students of the program.

Major Professor and Advisory Committee: M.S.
Each M.S. student's program is guided by a Major Professor (Thesis Director) and an Advisory Committee. The M.S. Advisory Committee consists of the Major Professor as chair, and at least two other members. At least two committee members (including the chair or a co-chair) must be members of the Graduate Faculty, and at least one of these must be a Full member. At least two of the committee members should be from the Department of Plant Pathology. The committee should be chosen and submitted to the DGS for approval before the end of the second semester of the student's tenure for the M.S. degree. The Advisory Committee should meet at least once a year with the student. It is the responsibility of the student to schedule these meetings. A written record of each meeting of the student and their advisory committee, signed by the student and by the Major Professor, must be provided to the DGS by the Major Professor within two weeks after the meeting, and a copy will be placed in the student's file. No less than two weeks prior to the Final Examination, the DGS will recommend to the Dean of the Graduate School the appointment of the Advisory Committee to serve as the Examination Committee.

Major Professor and Advisory Committee: Ph.D.
Each Ph.D. student's program is guided by a Major Professor (Dissertation Director) and an Advisory Committee throughout the student's graduate career. The purpose of the Advisory Committee is to give the student continuity of direction and counsel and provide intellectual stimulation throughout residency to completion of the doctorate.

The DGS, or a designee (usually the Major Professor), serves as advisor to beginning graduate students until the Advisory Committee is appointed. Most students enter the program having already committed to a Major Professor; however there is an option for an incoming Ph.D. student who is supported on departmental assistantship or fellowship money to do two or three short lab rotations before choosing a Major Professor. This option is not available to students who are supported on individual grant funds. The Advisory Committee should be appointed before the end of the student's second semester. It MUST be appointed no less than one year prior to the Qualifying Examination. The Major Professor and Advisory Committee must be recommended to the Graduate School by the DGS. The DGS will approve the committee only if it meets all Graduate School requirements (below), provides a reasonable breadth and balance of expertise in the major and related disciplines, and presents no obvious conflicts of interest. Once the DGS has approved and recommended the committee, it will be officially appointed by the Graduate Dean. The Dissertation Director and the Advisory Committee specifically set requirements (within the rules and regulations of the Plant Pathology program, Graduate School, and University), which the student must meet in pursuit of the doctorate.

The Ph.D. Advisory Committee has a core of four members. This core consists of the Major Professor (Dissertation Director) as chair, two other faculty members from Plant

Pathology, and at least one representative from outside the Plant Pathology Department. At least one representative must be from a minor area(s), different from the student's major research focus. All members of the core must be members of the Graduate Faculty of the University of Kentucky, and at least three (including the chair or a co-chair) must possess Full Graduate Faculty status. Additional faculty members can serve as members of the Advisory Committee. The core of the Advisory Committee must be kept at its full complement throughout the graduate career of the individual student. Thus, in the event of an unforeseen vacancy on the committee, an appropriate replacement must be made prior to any subsequent committee decisions. The DGS must recommend any replacements or changes to an Advisory Committee. All decisions of the Advisory Committee are by majority vote of its Graduate Faculty members. Advisory Committee decisions are reported promptly to the DGS, who then transmits them to the Dean of the Graduate School.

In addition to advising and program planning, the Advisory Committee also administers the Qualifying Examination, supervises the preparation of the dissertation and, along with the Outside Examiner (selected by the Graduate School), administers the Final Examination. Regular committee meetings are essential both before and after the Qualifying Exam. ***Each doctoral student must meet with her or his Advisory Committee at least once a year to present a written and oral progress report.*** At a meeting prior to the submission of the dissertation to the Advisory Committee, agreement should be reached on the extent of additional research to be conducted for the completion of the dissertation. It is the responsibility of the student to schedule all necessary meetings with his or her Advisory Committee. A record of each meeting that includes the written progress report, signed by the student and the Major Professor, will be provided to the DGS by the Major Professor within two weeks of the meeting, and a copy will be placed in the student's file.

Requirements for Degrees

Departmental Requirements

Prerequisite Coursework. All graduate students pursuing an advanced degree in the Plant Pathology program ideally should have, or should obtain, a background in the following areas: mathematics through differential and integral calculus; physics; chemistry, including analytical, organic, and biochemistry; and the equivalent of introductory courses in botany, plant physiology, genetics, molecular biology, statistics and microbiology. The Academic Program Committee will inform the Major Professor and the student, in writing, of any relevant course deficiencies at the time of admission to the program. Deficiencies should be corrected early in the graduate program either by formal coursework or, with the approval of the Advisory Committee, by independent study. In some cases, the Advisory Committee may decide to waive certain of these requirements, depending on the student's background, goals, and interests. Agreements regarding remedial coursework, independent study, or waivers should be recorded in the notes of the meeting in which they were discussed, and included in the student's file.

Basic Course Requirements. All students are strongly encouraged to take PPA 400G (Principles of Plant Pathology), even if they have had a similar course previously. This course provides a common basis for subsequent required courses in the department, and will allow international students to become conversant with domestic terminology and perspective in the discipline. Required courses for both the M.S. and Ph.D. are PPA 500 (Physiology of Plant Health and Disease), PPA 600 (Critical Methods in Plant-Microbe Interactions), PPA 640 (Identification of Plant Diseases), PPA 641 (Plant Disease, Population Biology, and Biotechnology), and PPA 770 (Plant Pathology Seminar). Ph.D. students are required to complete all of the above courses, and also to take at least two of the following courses or course series: PPA 670 (Plant Bacteriology), 671 (Advanced Plant Virology), 650 and 672 (Fungal Biology and Advanced Plant Mycology), and 673 (Advanced Plant Disease Resistance). The Advisory Committee may decide to waive one or more of these course requirements if the student has already taken equivalent coursework at another institution. A record of this decision should be placed in the student's file.

Individual Course Requirements. Elective courses will be determined by the Major Professor and Advisory Committee together with the student, taking into account the student's background, research topic, and area of specialization.

Departmental Seminars. All students must attend all Department of Plant Pathology seminars, and are strongly encouraged to attend seminars given by other departments that relate to their subject matter interests. At the end of each student's tenure, an Exit Seminar should be presented. This seminar, which summarizes the student's thesis/ dissertation research, is presented immediately before the Final Examination. In addition to the Exit Seminar, each M.S. student must present at least one other seminar, and each Ph.D. student must present at least two other seminars. Students should enroll in PPA 770 for at least one of these seminars. Specific seminar policies will be distributed by the Seminar Coordinator at the beginning of each semester.

Foreign Language. The Department of Plant Pathology does not require knowledge of a language other than English for the M.S. or Ph.D. degrees.

Graduate School Requirements - Master of Science
Coursework. For a M.S. degree, the Graduate School has the following minimum course requirements:

1. 24 total semester hours of graduate course work, with a GPA of at least 3.0. Courses that count toward fulfillment of this requirement are those with numbers from 500 to 799, *except* PPA 768, and all 400-level courses with a G suffix that are outside the student's major (thus PPA 400G does not count for this requirement).
2. 16 hours of graduate course work in regular courses. PPA 768, PPA 784 and PPA 794 *do not count* for fulfillment of this requirement

3. 12 hours of graduate course work in the student's major area (PPA).
4. 12 hours in 600 or 700 level courses.

Thesis. A Masters thesis must represent an original scholarly contribution by the student. This should not discourage collaboration by students in larger, multi-authored projects, but collaborative research must be undertaken very carefully to ensure that the student's contribution represents a complete, self-contained piece of work that can easily be considered an independent accomplishment. It is the responsibility of the student, the Major Professor, and the Advisory Committee to ensure that this is the case.

Although it is not a requirement for graduation, it is common for students to include original data that have already been published, or that have been accepted or submitted for publication, in their theses. Any chapters that have already been published, accepted for publication, or submitted for publication must carry the following footnote: *A version of this chapter has been published/accepted for publication/submitted for publication (cite the reference)*. Furthermore, if the student wants to include verbatim text or figures that have already been published or accepted for publication in a journal article or book chapter, he or she must obtain permission from the publisher, and include this permission in the appendices.

If the student wants to include material from published, accepted, or submitted papers or book chapters on which that student was not the first author, the DGS must write a letter to the Graduate School that justifies inclusion of this material in a work that is supposed to be evidence of independent scholarly accomplishment.

Final Examination. Within 30 days of the start of the semester during which the defense will occur (15 days for the start of Summer Session II), the student must submit the *University of Kentucky Graduate School Application for Degree* form to the Graduate School. No less than two weeks before the Final Examination, the Major Professor and the DGS must submit a *Request for Final Masters Degree Examination* and a *Thesis Approval Form* to the Graduate School. All three of these forms can be downloaded from the Graduate School web page at: http://www.research.uky.edu/gs/gsforms.html. The Thesis Approval form indicates that the thesis satisfies all requirements of the Graduate School and is complete in content and format, and that the student is ready for examination. The examination should be given no later than eight days before the end of the semester in which the degree is to be awarded. The examination is given by a committee of at least three members appointed by the Dean of the Graduate School upon recommendation of the DGS. The members of the examining committee are usually those who have served on the Advisory Committee. The committee determines if the thesis is acceptable and administers the examination. This examination covers the thesis and course work. The choice as to whether the examination is to be oral and/or written rests with the examining committee. If a student is applying to work on a Ph.D. after completion of the M.S., the examiners may also provide recommendation of the candidate's qualification for the Ph.D. program.

Graduate School Requirements - Doctor of Philosophy

Coursework. Before taking the Qualifying Examination, a Ph.D. student must register for at least four semesters of full time residence (9 credit hours per semester) at U.K. An M.S. degree can usually be substituted for two of the required prequalifying residency semesters if desired (consult the current Graduate School Bulletin for details of the various models for fulfilling this requirement). After the Qualifying Examination, the student must register for at least two more semesters of residency credit before they can defend the dissertation. If the student registers for two credits of PPA 767, and if the *Recommendation for Qualifying Examination Form* is submitted within six weeks of the beginning of the semester, the semester in which the exam is taken can count as one of the post-qualifying residency semesters. After successfully completing the Qualifying Examination, Ph.D. students can enroll in PPA 767 for two credit hours (this counts as full-time enrollment) for up to ten semesters. If the defense has not occurred within that time, the student may be required to retake his or her Qualifying Examination.

Qualifying Examination. The Ph.D. Qualifying Examination is both written and oral, and is given by the Advisory Committee. The Advisory Committee determines the subject matter of the examination, including the major area of specialization, minor areas if appropriate, and any other areas that the committee feels are pertinent. The examination can only be taken after the pre-qualifying residency requirement has been fulfilled (consult the current Graduate School Bulletin for details). No less than two weeks before the date of the oral examination, a *Recommendation for Qualifying Examination Form* must be submitted to the Graduate School. The written portion of the exam is usually taken two weeks before the scheduled date of the oral exam. Each member of the Advisory Committee submits written questions to the DGS. The DGS administers the written examination to the student, and then returns the answers to the committee members for evaluation. The student should meet with each committee member to discuss the written examination and identify areas that may require attention before the oral examination. Copies of written questions from prior examinations are kept on file and may be obtained from the Department Chair upon request. The written and oral portions of the examination are not assessed separately, only an overall determination of pass or fail is made. The majority opinion of the Advisory Committee determines whether the student passes or fails the examination. If the student fails, the examination may be repeated no sooner than 4 months and no later than 12 months after the first examination. Under no circumstances may a third examination be given.

Dissertation: A Ph.D. Dissertation must represent an original scholarly contribution by the student. This should not discourage collaboration by students in larger, multi-authored projects, but collaborative research must be undertaken very carefully to ensure that the student's contribution represents a complete, self-contained piece of work that can easily be considered an independent accomplishment. It is the responsibility of the student, the Major Professor, and the Advisory Committee to ensure that this is the case.

Although it is not a requirement for graduation, it is common for students to include original data that have already been published, or that have been accepted or submitted for publication, in their dissertation. Any chapters that have been published, accepted for publication, or submitted for publication must carry the following footnote: *A version of this chapter has been published/accepted for publication/submitted for publication (cite the reference)*. Furthermore, if the student wants to include text or figures that have already been published or accepted for publication in a journal article or book chapter, he or she must obtain permission from the publisher, and include this permission in the appendices.

If the student wants to include material from published, accepted, or submitted papers or book chapters on which that student was not the first author, the DGS must write a letter to the Graduate School that justifies inclusion of this material in a work that is supposed to be evidence of independent scholarly accomplishment. In general, it is best to avoid having a substantial part of the student's dissertation published in articles for which the student is not the first author.

Final Examination. The Final Examination for the Ph.D. is given a minimum of two semesters after the Qualifying Examination. This is an oral examination which includes a defense of the dissertation and may include questions from the major and minor areas. The Final Examination for the Ph.D. is a public event open to any interested member of the university community. The examination is given by a committee, appointed by the Dean of the Graduate School, which consists of the DGS (or a designee) as chair, the Advisory Committee, and an Outside Examiner. The majority opinion of the committee determines the outcome of the examination. If the committee is evenly divided, the candidate fails. In the event of a failure, a second but not a third examination may be given. The dissertation in its final form must be received by the Graduate School within 60 days after successfully passing the Final Examination. The candidate might be required to undergo a second examination if this deadline is not met.

Admissions

Application Procedure

Application materials must be submitted to both the U.K. Graduate School and to the department. All forms may be obtained from the Graduate School online, or by writing to the DGS. Appropriate fees, Graduate School application forms, transcripts, test score reports and other documents must be sent to the Graduate School.

Continuing for a Ph.D. after a U.K. Master's Degree

There are some modifications of the application procedure for prospective Ph.D. students who expect to receive a Master's degree from U.K. Although such students are not required to apply to the Graduate School, they must apply for departmental admission in the same manner as students beginning graduate work at U.K. The letters of reference may be written by the members of the student's M.S. Advisory Committee, and should specifically address the student's suitability for continuing graduate work. The

application is usually submitted early in the semester in which the student expects to finish work on the M.S. The final decision on acceptance is made after the student's Exit Seminar and M.S. Final Examination.

Requirements for Admission

The Graduate School's requirements for admission are outlined in the Graduate School Bulletin. They include a baccalaureate degree from an accredited institution, and a minimum grade-point average (GPA) of 2.75 on a 4.0 scale for all undergraduate work, and 3.0 on a 4.0 scale for all graduate work. Graduate Record Exam (GRE) scores for verbal, quantitative, and analytical tests must be submitted. Applicants whose native language is not English must have a minimum score of 550, 213 (computer), or 79 (internet) on the Test of English as a Foreign Language (TOEFL), or an IELTS score of 6.5 or better. These are the *minimum* requirements for acceptance into any graduate program at U.K. Requirements for admission to the graduate program of the Department of Plant Pathology are more rigorous. The department's Academic Program Committee makes recommendations for admission to the Plant Pathology graduate programs. In addition to the materials required by the Graduate School, the department requires each applicant to submit three letters of recommendation, copies of transcripts from all undergraduate and graduate institutions attended, and a written statement (Statement of Purpose) identifying the applicant's reasons for wishing to undertake studies in this department. Applicants should also submit a resume or a *curriculum vitae* and copies of any papers published or in press, or other evidence of scholarly achievement. Application materials for the department must to be sent to:

Director of Graduate Studies
Department of Plant Pathology
201F Plant Science Building
1405 Veterans Drive
University of Kentucky
Lexington KY 40546-0312

Admission to a graduate program in Plant Pathology does not guarantee financial assistance to the student. Applicants who are admitted will also be informed of any financial offer in a contract that they must sign to be admitted to the Graduate School.

Assistantships and Fellowships

Research Assistantships

Research assistantships are awarded by the department on the basis of merit and availability. They may be funded by departmental general funds or by research grants. Research assistantships carry an expected 20 hours minimum per week for research in addition to time spent on course work and thesis/dissertation research (see the section on Duties for more details). Typically, work performed during the 20 hours per week of assistantship service will comprise part of the thesis or dissertation research, but faculty

supervisors may sometimes require additional, unrelated duties if these are relevant to the student's training and education. Tuition and health insurance will be paid for all students receiving assistantships or fellowships.

Fellowships

Most fellowships are awarded through the Graduate School. They are highly competitive, with minimum GPA and GRE score requirements depending on the fellowship. The fellowships available include: Presidential Fellowships, Graduate Student Academic Year Fellowships, Lyman T. Johnson Fellowships, Academic Excellence (In-State Tuition) Fellowships, Otis A. Singletary and W. L. Matthews, Jr. Fellowships, Kentucky Opportunity Fellowships, Dissertation Year Fellowships, and Jeffrey Fellowships. Some fellowships may include additional money to help support the student's research. If a fellowship stipend is less than that of a typical research assistantship in the department, an appropriate supplement will be provided by the department or by the Major Professor's grant funds. Requirements for fellowships vary for eligibility, the nomination and selection process, and date of application. Generally the student is nominated by the DGS with recommendation from the Major Professor.

Application Procedure

Application for an Assistantship or Fellowship must be made at the time of application for admission. Applications from domestic students should be submitted no later than one month before the beginning of the semester the applicant intends to begin graduate work. However, to improve chances for financial support, domestic applicants should submit their materials as early as possible. Applications from international students must be submitted at least six months before they intend to begin graduate work.

Criteria for Assistantship Awards

Assistantships are awarded on the bases of academic record, GRE scores, letters of recommendation and any other available information relevant to evaluating the academic potential of the student. An effort is made to evaluate motivation and commitment in awarding assistantships. Since the number of available assistantships is usually less than the number of qualified applicants, the requirements for assistantships exceed requirements for admission. Students having the best academic record and greatest potential for successfully completing graduate study are given highest priority for assistantship support; however, exceptions can be made when there is a need for additional students in an area of specialization, to maintain student diversity, or when a faculty member has grant funds available to support students in a particular research program. It may improve the chances of obtaining financial support if prospective students specifically research the interests of departmental graduate faculty, and then write directly and personally to those with research programs that are most relevant to their background and future goals. Advocacy of a faculty member interested in mentoring a student can be very helpful to that student's candidacy.

Duties

A research assistantship or fellowship is awarded for financial support while the student is conducting research for a graduate degree. The thesis or dissertation must be the student's own work; however, the research is almost always consistent with the overall objective of the Major Professor's research program. The Major Professor may require the student to assist in non-thesis research or participate in additional activities for the student's educational benefit.

Research assistantships are generally referred to as "half-time assistantships", implying that the recipient must devote at least 20 hours per week to research when classes are in session (fall and spring semesters). Additional research hours are expected in fulfillment of research and special topics courses, as well as to fulfill research requirements for the degree. Between semesters and during the summer, students receiving departmental or fellowship support are expected to consider the fulfillment of requirements for graduate degrees to be a full-time job. The departmental philosophy is that commitment and dedication are essential characteristics of a good graduate student; that assistantships and fellowships should provide students the opportunity to devote their full attention to study and graduate research; and that successful graduate study demands evening and weekend work. With the exception of University-approved holidays, time between semesters and summers *are not considered to be time off* for graduate students. There is no schedule for accumulation of vacation days for graduate students. A reasonable amount of vacation leave time *must be negotiated with and approved by* the Major Professor.

Enrollment Requirements

Each student must have her/his schedule approved and signed by her/his Major Professor or the DGS before registering each semester. It is strongly recommended that students and their Major Professors consult with the DGS regarding scheduling of coursework. Courses to be added or dropped also must be approved by the DGS and/or by the Major Professor. All students receiving fellowships must be enrolled for a minimum of 1 hour of residence or thesis/ dissertation credit each semester. International students are generally required by the U.S. Immigration Service to be enrolled for 9 credit hours in the spring and fall semesters (or 2 credits of PPA 767). Graduate students are not required to enroll for summer courses to maintain full time status, and most students do not enroll for formal coursework in the summer: however, students are still expected to be present during the summer months working on the research requirements for their degrees.

If not taking enough formal courses to meet the minimum course load requirement, M.S. students may register for 1 to 6 hours per semester of PPA 768 (Residence Credit for the Master's Degree), 1 to 3 hours per semester of PPA 784 (Special Problems in Plant Pathology) and/or 1 to 9 hours per semester of PPA 794 (Research in Plant Pathology). No more than a total of 12 hours of these courses may be taken during the M.S. program. Before taking the Qualifying Examination, Ph.D. students may register for up to 3 hours per semester of PPA 784 and/or up to 9 hours per semester of PPA 794. In order to fulfill

the Graduate School's residence requirement, Ph.D. students must register for 2 hours of PPA 767 for at least two semesters after the Qualifying Examination is passed (if the examination request form is filed within six weeks of the beginning of the semester, the semester in which the exam is taken can count as one of these).

Duration
Fellowships are usually awarded for the academic year (July 1-June 30), with the duration being established by the Graduate School. Graduate Research Assistantships are usually awarded on a 12-month basis, subject to renewal providing the student is making satisfactory progress. Students entering in the spring will have their support renewed after six months, providing the student is making satisfactory progress.

The university's Governing Regulations stipulate that Master's degree research assistants shall serve no more than three years without completion of their degree requirements; and research assistants who are doctoral students shall serve no more than four years without successfully completing their Qualifying Examinations. Extension of assistantships beyond the normal termination date can be granted on a semester-by-semester basis if extenuating circumstances occur. The extension must be requested by the student, recommended by the M.S. or the Ph.D. Advisory Committee, and approved by the DGS. The request must be accompanied by a report of progress and justification for extension.

Review of Progress and Termination of Assistantships
It is each student's responsibility to arrange a meeting of his/her Advisory Committee at least once a year to evaluate academic and research progress. This evaluation will be conveyed in writing from the Major Professor to the student, and a copy will be placed in the student's file. A student will be considered to be making good progress if they maintain a GPA of at least 3.0 in all graduate coursework and demonstrate advancement toward completing their thesis or dissertation research, as determined by the Major Professor and the Advisory Committee.

Students who are placed on academic probation because of failure to meet the minimum 3.0 GPA required by the Graduate School will automatically be placed on probation with respect to the assistantship. The assistantship will be terminated if the student is not removed from academic probation after one semester unless extenuating circumstances can be satisfactorily demonstrated.

An assistantship can be terminated prior to completion of degree requirements or prior to the normal termination date if the student fails to conduct himself or herself in a professional and ethical manner (including but not limited to academic misconduct, excessive absenteeism, or harassment of departmental personnel); fails to make satisfactory research progress as determined by the Major Professor and/or the Advisory Committee; fails the Ph.D. Qualifying Examination; or fails the Final Examination for the Master's degree or the Ph.D. degree. Assistantships can also be terminated if funds are no

longer available (hopefully, a very rare circumstance). Normally, termination of an assistantship is recommended by the Major Professor and/or the Advisory Committee (if one has been appointed), reviewed by the DGS and finally acted upon by the chair of the department. Research assistants will be notified by June 30 regarding the renewal of appointments and status of financial support for the coming academic year.

Facilities and Services

Equipment

The Department of Plant Pathology has excellent facilities and equipment for graduate research. This equipment includes some rather sophisticated and very expensive instruments. Most equipment is under the control of individual faculty members, but may be shared with other faculty and students under rules and supervision required by the faculty in charge. No one should use any piece of equipment without 1) authorization from the faculty member in charge of the instrument, and 2) previous prescribed instruction on how to properly operate the instrument. Good manners, neatness, consideration for the time and property of others, and knowledge of operation are essential for fostering cooperative use of facilities and equipment. Use of equipment may be denied to individuals who do not properly care for equipment and space. Only the faculty member in charge can authorize use of equipment to individuals outside the department. If an individual not known to a group is found using a groups' equipment, the faculty member in charge and/or the campus police should be notified immediately.

Supplies

Each laboratory attempts to maintain an adequate stock of supplies needed for its research. Anyone borrowing supplies from another lab must 1) have the permission of the appropriate faculty member or supervisory laboratory technician, and 2) return or reimburse for the item as soon as possible.

Desk space

Each student is provided with a desk in the department.

Keys

Keys to appropriate office and laboratory facilities can be obtained through the department's Office Manager.

Mail

Student mailboxes are provided in room 201F. Most university and departmental communication occurs via e-mail. Each student should obtain and use a uky.edu e-mail account. Yahoo or other similar accounts are not sufficient due to the inability to attach large files. Application forms for uky accounts are available from the Office Manager.

Copying and Faxing

Copying and fax machines are available in room 201F. Students should not undertake

extensive copying or faxing without the permission of their Major Professor. Students should abide by copyright laws regarding extensive photocopying of books and journals.

Professional Societies and Meetings
Students are encouraged to join appropriate scientific and professional societies, and to present their work at meetings. Many societies have reduced membership fees for student members, and some sponsor graduate student paper competitions with cash prizes. Funds are usually available from the Graduate School for partial support of student travel to professional meetings to present research papers or posters, but applications must often be made several months in advance. See the Graduate School online information for deadlines.

Departmental Graduate Student Organization
Students in the Department of Plant Pathology have an opportunity to elect a Graduate Student Representative each year. The representative is responsible for communicating the needs and positions of students to the DGS and department chair. The activities of the Plant Pathology Graduate Student Organization are determined by the students, and can include both social and academic activities. A graduate student representative serves on the department Academic Program Committee, and graduate students also rotate attendance at department faculty meetings.

Libraries
Books and journals of use to plant pathologists are located in a number of U.K. libraries, including the Agricultural Information Center on the ground floor of Ag. Science North, the Medical Center Library, and the W.T. Young main library building. A student ID is required to check out materials. More materials are available via interlibrary loan, which can be accessed online. Past issues of *Phytopathology, Science, Plant Disease, Mycologia,* and the *Journal of Virology* are available in the Plant Pathology conference room (room 266). Books and journals should not be removed from this room except briefly for the purpose of photocopying. Students should become familiar with available journals and with various reference databases and electronic journal access. The librarians are trained and willing to instruct on use of the databases.

Computers
Most laboratories contain computers for student use, subject to approval by the Principal Investigator/ Major Professor. Each graduate student will also have access to a laptop computer for his or her own use. A laptop is given on loan to each student by the department, and is not the personal property of the student. It should not be used routinely by anyone except the student. Students and/or their advisors will be held financially responsible for damage or theft that is the result of carelessness.

Check List for Master's Degree Students

NOTE: The following is subject to change by the Graduate School, so consult the Graduate School Bulletin and other documentation on the Graduate School home page.

- Plan initial coursework. Before the first semester, meet with the DGS and/or the Major Professor, to determine courses to be taken during the first semester.
- Select Advisory Committee. An Advisory Committee should be selected before the end of the second semester.
- Plan program of study. By the end of the second semester, meet with the Advisory Committee to develop an overall course of study, including classes and research. The student should develop a research proposal that includes a literature review and outlines the research to be undertaken. A copy of this should be placed in the student's file.
- Present a seminar. Determine a topic through consultation with the Major Professor and Seminar Coordinator. Schedule the seminar with the Seminar Coordinator near the end of the semester before the one in which the seminar will be given.
- Complete coursework.
    - 24 hours minimum graduate credit (500-799 and 4--G courses not in major).
    - 12 credit hours must be in Plant Pathology (PPA) courses.
    - 12 credit hours must be at 600-700 level.
    - 16 credit hours must be in regular courses.
- Present research and academic reports to a meeting of the Advisory Committee at least once a year.
- Apply for graduation within 30 days after the beginning of the semester of expected graduation (15 days in summer semester). Download the form from the Graduate School website.
- Schedule Exit Seminar. After the Major Professor has certified that research is essentially completed, meet with the Seminar Coordinator to schedule an exit seminar. The exit seminar is to be scheduled for presentation immediately before the Final Examination.
- Apply for Final Examination. At least two weeks before the examination, submit *MS Final Examination Recommendation Form* and *Thesis Approval Sheet* to the Graduate School.

Check List for Doctoral Students

NOTE: The following is subject to change by the Graduate School, so consult the Graduate School Bulletin and other documentation on the Graduate School home page.

- Plan initial coursework. Before the first semester, meet with the DGS, or, if known, the Major Professor, to determine courses to be taken during the first semester.
- Select Advisory Committee in consultation with Major Professor and DGS. By the end of the second semester, submit an *Advisory Committee Request Form* to the Graduate School (via the DGS), and meet with the Advisory Committee to develop an

overall course of study, including coursework and research. The student should present to the Advisory Committee a research proposal that includes a literature review and outlines the research to be undertaken. A copy should be placed in the student's file.

- Complete residency and seminar requirements. Consult regularly with the DGS, Major Professor, and Advisory Committee to determine specific requirements.
- Schedule Qualifying Examination. Arrange a date well in advance with the Major Professor and Advisory Committee. At least two weeks before the date, submit a *Recommendation for Qualifying Examination* form to the Graduate School.
- Residence credit. Following successful completion of the Qualifying Examination, register for at least two consecutive semesters of 2 credits of PPA 767 (Residence Credit); the semester in which the exam is taken may count for one of these if the *Recommendation for Qualifying Examination* form is submitted within the first two weeks of the semester.
- Present research and academic reports to a meeting of the Advisory Committee at least once a year.
- Apply for graduation. Submit an *Application for Degree* form to the Graduate School within 30 days of the beginning of the semester of expected graduation (15 days during summer semester).
- Schedule Exit Seminar. After the Major Professor has certified that research is essentially completed, meet with the Seminar Coordinator to schedule an exit seminar. The exit seminar is to be scheduled for presentation immediately before the Final Examination.
- Notify Graduate School of possible Final Examination. Submit an *Intent to Schedule Final Examination* form at least 8 weeks before the examination is expected to be scheduled (so that an Outside Examiner can be found).
- Schedule Final Examination. At least two weeks before the examination, submit to the Graduate School a *Request for Final Examination* form. These forms should not be submitted until the Major Professor and a majority of the Advisory Committee considers the dissertation to be suitable for distribution.
- Distribute dissertation to Advisory Committee and to the Outside Examiner at least two weeks ahead of the defense.
- Submit completed dissertation and a signed *Dissertation Approval Sheet* not later than 60 days after the defense or by the end of the semester. If the student will make two high quality copies of the dissertation, the department will pay to have both bound, and present one bound copy to the student. The other copy will go into the department's collection in room 266.

UNIVERSITY OF KENTUCKY
College of Agriculture

Plant Diseases in Kentucky

Plant Disease Diagnostic Laboratory Summary

2008

by:
P.R. Bachi
J.W. Beale
J.R. Hartman
D.E. Hershman
S.J. Long
K.W. Seebold
P. Vincelli

UNIVERSITY
OF KENTUCKY
College of Agriculture
Department of Plant Pathology

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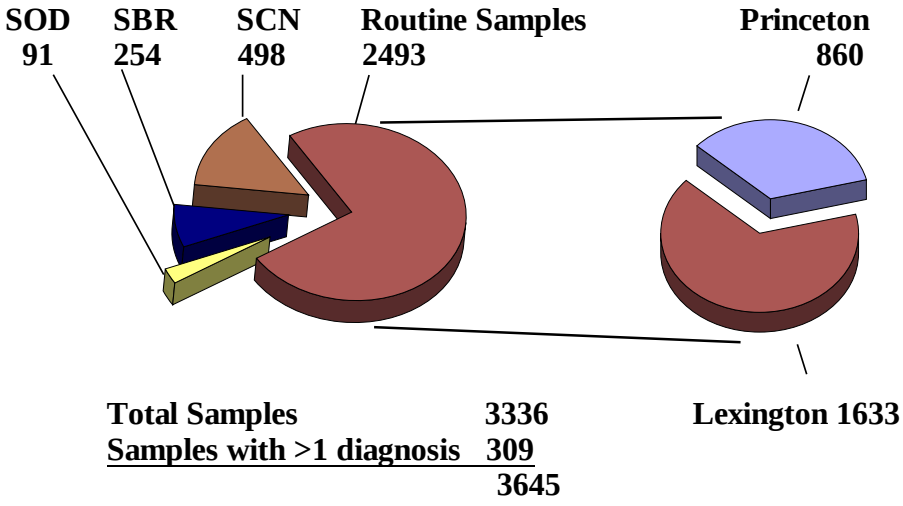
INTRODUCTION

The Plant Disease Diagnostic Laboratory (Lexington and Princeton) handled 2838 plant samples and 498 nematode soil samples during 2008. Plant samples with more than one problem numbered 309 bringing the total number of actual diagnoses to 3645. The Lexington Laboratory diagnosed 1724 specimens. Of that number there were 1633 routine plant samples; and 91 samples from commercial nurseries from the survey work for the occurrence of the Sudden Oak Death (SOD) pathogen. The SOD samples are included in the total number of samples in Figure 1 below, within the totals for rhododendron and viburnum samples, and a summary report on page 24. The Princeton Laboratory's specimens totaled 1612: of that number 860 were plant samples; 254 were Soybean Rust (SBR) sentinel plot samples; and 498 were soil samples submitted exclusively for soybean cyst nematode analysis. The SBR samples are included in the total number of samples in Figure 1 below and in the rest of this summary. In addition to the specimens processed in the laboratory, 173 cases were also submitted in 2008 through the Digital Consulting System for consultation by the Diagnosticians and Extension Specialists (see Table 10, page 22). Plant samples plus SCN samples are summarized in Figure 1 below:

Plant Disease Diagnostic Laboratory - 2008



NATURE OF WORK

Plant disease diagnosis is an ongoing educational and research activity of the U.K. Department of Plant Pathology. We maintain two branches of the Plant Disease Diagnostic Laboratory, one on the U.K. campus in Lexington, and one at the U.K. Research and Education Center in Princeton.

Making a diagnosis involves a great deal of research into the possible causes of the plant problem. Most visual diagnoses involve microscopy to determine what plant parts are affected and to identify the microbe(s) involved. In addition, many specimens require special tests such as moist chamber incubation, culturing, enzyme-linked immunosorbent assay (ELISA), electron microscopy, nematode extraction, or soil pH and soluble salts tests. The laboratory also uses the polymerase-chain-reaction (PCR) technique for identification of certain pathogens. Computer-based laboratory records are maintained to provide information used for conducting plant disease surveys, identifying new disease

outbreaks, and formulating educational programs. In addition, information from the laboratory forms the basis for timely news of plant disease problems through the Kentucky Pest News newsletter, radio and television tapes, and plant health care workshops. Our laboratories currently meet the new homeland security rules that require reporting of all diagnoses of plant diseases to USDA-APHIS on a real-time basis. To assist County Extension Agents and Specialists in dealing with plant disease issues, we also operate a web-based Digital Consulting System utilizing photographic images. The images can be used to help determine how and where best to collect samples for submission to the laboratory, as well as general or specific advice on a wide range of topics.

WEATHER SUMMARY

January: Below normal temperatures and rainfall

Temperatures for the period averaged 32.7 degrees across the state which was 0.4 degrees below normal. High temperatures averaged 42 in the West and 42 in the East. Departure from normal high temperatures ranged from 1 degree below normal in the West to 3 degrees above normal in the East. Low temperatures averaged from 26 degrees in the West to 27 degrees in the East. Departure from normal low temperature ranged from 2 degrees above normal in the West to 4 degrees above normal in the East.

Rainfall for the period totaled 3.12 inches statewide which was 0.60 inches below normal. Rainfall totals by climate division, West 2.74 inches, Central 3.93 inches, Bluegrass 3.19 inches and East 2.79 inches, which was 0.96, 0.09, 0.26 and 0.91 inches respectively below normal, respectively.

February: Normal temperatures and above normal rainfall

Temperatures for the period averaged 37.6 degrees across the state which was 0 degrees from normal and 4.9 degrees higher than the previous month. High temperatures averaged from 46 in the West to 47 in the East. Departure from normal high temperatures ranged from 5 degrees below normal in the West to 2 degrees above normal in the East. Low temperatures averaged from 31 degrees in the West to 32 degrees in the East. Departure from normal low temperature ranged from 4 degrees above normal in the West to 6 degrees above normal in the East.

Rainfall for the period totaled 4.28 inches statewide which was 0.56 inches above normal. Rainfall totals by climate division, West 5.20 inches, Central 4.03 inches, Bluegrass 4.84 inches and East 3.38 inches, which was respectively 1.16 inches above normal, 0.10 inches below normal, 1.40 inches above normal and 0.09 inches below normal, respectively.

March: Above normal rainfall and below normal temperatures

Moderate La Nina conditions left their mark on the Bluegrass State as above normal rainfall was reported for the second month in a row. Several heavy rainfall events created periodic flooding situations across the Commonwealth, especially along the Ohio River.

Temperatures for the period averaged 44.5 degrees across the state which was 2 degrees below normal and 6.9 degrees above the previous month. High temperatures averaged from 56 in the West to 55 in the East. Departure from normal high temperatures ranged from 5 degrees below normal in the West to 1 degree above normal in the East. Low temperatures averaged from 37 degrees in the West to 36 degrees in the East. Departure from normal low temperature ranged from 2 degrees above normal in the West to 2 degrees above normal in the East.

Rainfall for the period totaled 6.81 inches statewide which was 2.14 inches above normal. Rainfall

totals by climate division, West 8.64 inches, Central 7.39 inches, Bluegrass 7.03 inches and East 4.83 inches, which was 3.96, 2.52, 2.68 and 0.43 inches respectively above normal, respectively.

April: Above normal rainfall and normal temperatures

Temperatures for the period averaged 56 degrees across the state which was normal for this month. High temperatures averaged from 67 in the West to 67 in the East. Departure from normal high temperatures ranged from 5 degrees below normal in the West to 1 degree above normal in the East. Low temperatures averaged from 46 degrees in the West to 47 degrees in the East. Departure from normal low temperature ranged from 1 degree below normal in the West to 2 degrees above normal in the East.

Rainfall for the period totaled 5.59 inches statewide which was 1.32 inches above normal. Rainfall totals by climate division, West 7.21 inches, Central 6.15 inches, Bluegrass 5.23 inches and East 4.19 inches, which was 2.68, 1.95, 1.34 and 0.37 inches respectively above normal, respectively.

May: Below Normal Temperatures and Normal Rainfall

After receiving copious amounts of rainfall for 3 straight months, the Commonwealth experienced moderating rainfall with normal rain totals being reported in May. Temperatures continued to be mild in 2008. Above normal temperatures had not been reported for a monthly period yet this year.

Temperatures for the period averaged 62 degrees across the state which was 3 degrees below normal and 6 degrees above the previous month. High temperatures averaged from 75 in the West to 73 in the East. Departure from normal high temperatures ranged from 6 degrees below normal in the West to 3 degrees below normal in the East. Low temperatures averaged from 54 degrees in the West to 52 degrees in the East. Departure from normal low temperature was 3 degrees below normal in the West and 3 degrees below normal in the East.

Rainfall for the period totaled 5.00 inches statewide which was 0 inches from normal. Rainfall totals by climate division, West 6.10 inches, Central 6.05 inches, Bluegrass 4.98 inches and East 3.37 inches, which was respectively 1.12 inches above normal, 0.79 inches above normal, 0.07 inches above normal and 1.48 inches below normal, respectively.

June: Above normal temperatures and below normal rainfall

Temperatures for the period averaged 75 degrees across the state which was 2 degrees above normal and 13 degrees warmer than the previous period. High temperatures averaged from 87 in the West to 85 in the East. Departure from normal high temperatures ranged from 0 degrees from normal in the West to 2 degrees above normal in the East. Low temperatures averaged from 67 degrees in the West to 64 degrees in the East. Departure from normal low temperature ranged from 3 degrees above normal in the West to 2 degrees above normal in the East.

Rainfall for the period totaled 3.59 inches statewide which was 0.66 inches below normal. Rainfall totals by climate division, West 3.00 inches, Central 2.31 inches, Bluegrass 5.05 inches and East 4.00 inches, which was respectively 0.99 inches below normal, 2.05 inches below normal, 0.70 inches above normal and 0.33 inches below normal, respectively.

July: Below normal temperatures and above normal rainfall

Temperatures for the period averaged 75 degrees across the state which was 1 degree below normal. High temperatures averaged from 89 in the West to 86 in the East. Departure from normal high temperatures ranged from 1 degree below normal in the West to 0 degrees from normal in the East. Low temperatures averaged from 67 degrees in the West to 65 degrees in the East. Departure from normal low temperature ranged from 1 degree above normal in the West to 0 degrees from normal in the East.

Rainfall for the period totaled 5.11 inches statewide which was 0.72 inches above normal. Rainfall totals by climate division, West 5.71 inches, Central 5.59 inches, Bluegrass 4.00 inches and East 5.05 inches, which was respectively 1.60 inches above normal, 1.08 inches above normal, 0.52 inches below normal and 0.60 inches above normal, respectively.

August: Below normal temperatures and rainfall

Temperatures for the period averaged 74 degrees across the state which was 1 degree below normal. High temperatures averaged from 87 in the West to 85 in the East. Departure from normal high temperatures ranged from 0 degrees from normal in the West to 2 degrees above normal in the East. Low temperatures averaged from 64 degrees in the West to 63 degrees in the East. Departure from normal low temperature ranged from 0 degrees from normal in the West to 1 degree above normal in the East.

Rainfall for the period totaled 1.61 inches statewide which was 1.99 inches below normal. Rainfall totals by climate division, West 0.86 inches, Central 0.88 inches, Bluegrass 1.62 inches and East 2.72 inches, which was 2.33, 2.64, 2.10 and 1.19 inches respectively below normal, respectively.

September: Below normal rainfall and above normal temperatures

September proved to be an exceptionally dry month which continued a drying trend that had been seen throughout much of the summer. In fact, moderate to severe drought conditions returned to the majority of the Commonwealth during the final week of the period. The period of August 1 to September 30, 2008, was the 2nd driest for that time frame in the past 114 years.

Temperatures for the period averaged 71 degrees across the state which was 3 degrees above normal. High temperatures averaged from 84 in the West to 84 in the East. Departure from normal high temperatures ranged from 3 degrees above normal in the West to 6 degrees above normal in the East. Low temperatures averaged from 60 degrees in the West to 60 degrees in the East. Departure from normal low temperature ranged from 2 degrees above normal in the West to 5 degrees above normal in the East.

Rainfall for the period totaled 1.07 inches statewide which was 2.41 inches below normal. Rainfall totals by climate division, West 1.00 inches, Central 1.33 inches, Bluegrass 0.99 inches and East 0.99 inches, which was 2.37, 2.57, 2.27 and 2.42 inches respectively below normal, respectively.

October: Normal Temperatures and Below Normal Rainfall

The dry weather pattern continued in the Commonwealth during October with below normal rainfall being reported for the 4th time in the past 5 months. Although rainfall amounts were below normal, the Bluegrass State did receive more rain than the previous 2 months as several frontal systems swept through the region.

Temperatures for the period averaged 57 degrees across the state which was 0 degrees from normal. High temperatures averaged from 71 in the West to 69 in the East. Departure from normal high temperatures ranged from 1 degree above normal in the West to 3 degrees above normal in the East. Low temperatures averaged from 46 degrees in the West to 45 degrees in the East. Departure from normal low temperatures ranged from 1 degree below normal in the West to 1 degree below normal in the East.

Rainfall for the period totaled 2.51 inches statewide which was 0.55 inches below normal. Rainfall totals by climate division, West 3.08 inches, Central 3.13 inches, Bluegrass 1.75 inches and East 2.12 inches, which was 0.09, 0.07, 1.18 and 0.81 inches respectively below normal, respectively.

November: Below normal temperatures and rainfall

Temperatures for the period averaged 43 degrees across the state which was 4 degrees below normal. High temperatures averaged from 55 in the West to 53 in the East. Departure from normal high temperatures ranged from 5 degrees below normal in the West to 3 degrees below normal in the East. Low temperatures averaged from 35 degrees in the West to 34 degrees in the East. Departure from normal low temperature ranged from 3 degrees below normal in the West to 0 degrees from normal in the East.

Rainfall for the period totaled 2.67 inches statewide which was 1.37 inches below normal. Rainfall totals by climate division, West 2.57 inches, Central 2.23 inches, Bluegrass 2.59 inches and East 3.11 inches, which was 1.95, 2.07, 1.08 and 0.63 inches respectively below normal, respectively.

December: Near Normal Temperatures and Above Normal Precipitation

Temperatures for the period averaged 37 degrees across the state which was 0 degrees from normal. High temperatures averaged from 45 in the West to 46 in the East. Departure from normal high temperatures ranged from 1 degrees below normal in the West to 2 degrees above normal in the East. Low temperatures averaged from 28 degrees in the West to 29 degrees in the East. Departure from normal low temperature ranged from 1 degree below normal in the West to 6 degrees above normal in the East.

Rainfall for the period totaled 6.41 inches statewide which was 2.13 inches above normal. Rainfall totals by climate division, West 6.74 inches, Central 7.07 inches, Bluegrass 5.58 inches and East 6.24 inches, which was 2.16, 2.25, 1.61 and 2.37 inches respectively above normal, respectively.

CROP SUMMARIES

Tobacco: The number of tobacco samples for 2008 (326) dropped below last year's total (374) which were down significantly from 2006 (536) and 2005 (528) and was the lowest total since accurate records started to be recorded in 1976. After four consecutive years of being first to report Blue Mold (*Peronospora tabacina*) in the U.S., Kentucky relinquished this dubious honor to Florida. Also there were only two blue mold samples confirmed through lab samples. The number of Black Shank (*Phytophthora parasitica* var. *nicotianae*) samples was significantly less than the last two years. The number of cases of Tomato Spotted Wilt virus were down significantly from last year. Target Spot (*Thanatephorus cucumeris*) continued to be a significant problem in the field.

Other agronomic crops:

Corn: A few samples with ear/kernel rot were the only samples with a primary diagnosis caused by a pathogenic organism.

Soybean: Australasian Soybean Rust (SBR; *Phakopsora pachyrhizi*) was detected in Kentucky, October 16, 2008, nearly a month after last year's date, September 20, 2007. The fungus was found on soybean leaves within the sentinel plot located in Ballard Co. In all, SBR was found on 4 samples; all soybeans, none on kudzu.

Small Grains: There were several samples of Wheat Streak Mosaic Virus which had symptoms similar to what are usually seen with Wheat Spindle Streak Mosaic Virus (WSSMV). It is speculated that the abundant volunteer corn crop in the late summer and fall of 2007 was the green bridge needed for the pathogen and vector to survive and move to the wheat crop.

Forages: There were a low level of diseases in the forage crop samples sent to the laboratory. We did find Leaf Rust on two samples of Switchgrass from biomass research plots in the Lexington area.

Fruit and Vegetable Plant Disease Observations:

Diagnosing fruit and vegetable diseases involves a great deal of research into the possible causes of the problems. Most visual diagnoses include microscopy to determine what plant parts are affected and to identify the microbe(s) involved. In addition, many specimens require special tests such as moist chamber incubation, culturing, enzyme-linked immunosorbant assay (ELISA), polymerase chain reaction (PCR) assay, electron microscopy, nematode extraction, or soil pH and soluble salts tests. Diagnoses which require consultation with UK faculty plant pathologists and horticulturists and which need culturing, ELISA, or PCR are common for commercial fruits and vegetables. The Extension plant pathology group has tested protocols in our laboratory for PCR detection of several pathogens of interest to fruit and vegetable growers. These include the difficult-to-diagnose pathogens causing bacterial wilt of cucurbits, bacterial leaf spot of pepper, cucurbit yellow vine decline, and Pierce's disease of grape. The laboratory also has a role in monitoring pathogen resistance to fungicides and bactericides. These exceptional measures are efforts well spent because fruits and vegetables are high-value crops. Computer-based laboratory records are maintained to provide information used for conducting plant disease surveys, identifying new disease outbreaks, and formulating educational programs. New homeland security rules now require reporting of all diagnoses of plant diseases to USDA-APHIS on a real-time basis.

The 2008 growing season was better than the 2007 season. January had lower-than-normal temperatures and precipitation. February began with destructive severe weather that produced one of the highest tornado totals for a single weather event that the Commonwealth has experienced. A couple of winter weather systems that created an icy situation across the state caused significant branch breakage to many trees and larger woody plants. In March, there were several heavy rainfall events which created periodic flooding across the Commonwealth, especially along the Ohio River. The first part of April continued with above-average rainfall (the period from October 1, 2007, through April 19, 2008, was the wettest ever recorded during that time in Louisville with 41.28 inches of rain), but the latter half of the month was relatively dry. Temperatures for April were average. May saw below-normal temperatures and normal rainfall. In June temperatures were above normal and rainfall below normal. There were below-normal temperatures and above-normal rainfall in July, but the end of the month saw the beginning of a significant dry period across the state which continued through October. The period of August 1 to September 30, 2008, was the second driest for that time frame in the past 114 years.

The abundant rainfall at bud break and beyond provided optimum conditions for many diseases such as scab, cedar-apple rust and bitter rot of apple, black rot of grape, anthracnose of strawberry, leaf curl of peach, and plum pockets to be widespread. In vegetable crops, foliar diseases were also quite common early to mid-season but tapered off significantly during the dry weather in mid- to late summer.

New, Emerging, and Problematic Fruit and Vegetable Diseases in Kentucky:

Grape crown gall caused by Agrobacterium vitis continues to affect vineyards, particularly in vines with freeze injury or other wounding.

Plum pockets disease (*Taphrina communis*) was an unusual find. Although the related disease, peach leaf curl, is a common occurrence, plum pockets is seen less often in Kentucky, and leaf/twig infections, as were found this year, are seen even more infrequently. Leaves and developing shoots become thickened, curled, and deformed; infected fruits are much larger than normal and hollow.

Some cucurbit crops, particularly cucumber and summer squash, had poor fruit production and uneven development due to poor pollination. Although certain environmental conditions can adversely

affect pollination, the most likely scenario for many commercial growers and home gardeners this year was inadequate pollinator populations.

Tomato yellow leaf curl virus was diagnosed for only the second time in Kentucky. This virus is vectored by *Bemesia* species of whitefly, and both vector and virus are not known to overwinter in Kentucky. Prompt destruction of infected plants is needed to prevent possible overwintering of this disease in greenhouses.

Tobacco mosaic virus (TMV) is being seen in tomato plantings more frequently due to the rise in popularity of heirloom tomato varieties, most of which have no resistance to TMV. Some commercially grown tomato varieties are also susceptible to TMV. The virus spreads easily via mechanical transmission. At least one commercial producer saw extensive TMV infection throughout a large planting.

Spinach white rust (*Albugo occidentalis*) was diagnosed from a home garden planting. This disease is favored by cool temperatures and high humidity. It is not common in Kentucky.

Sclerotinia fruit rot (*Sclerotinia sclerotiorum*), favored by cool, moist weather, was found in a commercial cucumber planting.

Tree Fruit Diseases:

Pome Fruits: Common foliar diseases of apple were abundant this year, particularly apple scab (*Venturia inaequalis*), cedar-apple rust *(Gymnosporangium juniperi-virginianae*), and frogeye leaf spot (*Botryosphaeria obtusa*). Botryosphaeria branch cankers were also common on apple. Most fire blight (*Erwinia amylovora*) infections of apple and pear occurred on April 9 and 10 with symptoms appearing about one month later. A number of cases of bitter rot (*Glomerella cingulata*) were diagnosed as late-season apple fruit rot symptoms became visible.

Stone Fruits: Scab (*Cladosporium carpophilum*) and brown rot (*Monilinia fructicola*) were diagnosed on apricot and peach, while brown rot was also seen on cherry. Spring rains favored the development of peach leaf curl (*Taphrina deformans*), and the related disease plum pockets (*Taphrina communis*) was also diagnosed (see above).

Small Fruit Diseases:

Grapes: Foliar diseases were common due to wet spring weather and high humidity throughout the season. Black rot (*Guignardia bidwellii*) was quite common; anthracnose (*Elsinoe ampelina*), Phomopsis cane and leaf spot (*Phomopsis viticola*), powdery mildew (*Uncinula necator*), and downy mildew (*Plasmopara viticola*) were diagnosed. Crown gall (*Agrobacterium vitis*) continues to damage certain plantings.

Brambles: Cane blight *(Leptosphaeria coniothyrium*) and spur blight (*Didymella applanata*) were both diagnosed on blackberry canes. Double blossom disease, also known as rosette *(Cercosporella rubi*), was diagnosed in a number of blackberry samples. Enlargement of the sepals and flower buds is a characteristic, early-season symptom of the disease; infected canes fail to fruit and eventually die back.

Blueberries: Root and collar rot caused by *Phytophthora* spp. and twig blight (*Botryosphaeria dothidea*) were diagnosed.

Strawberries: Diseases were common, including leaf spot (*Mycosphaerella fragariae*) as well as a case of black seed disease caused by the same fungus, leaf blight (*Phomopsis obscurans*), anthracnose (*Colletotrichum acutatum*) causing foliar symptoms, crown rot and fruit decay, angular leaf spot *(Xanthomonas fragariae*), black root rot (various fungi), and crown rot (*Phytophthora cactorum*).

Vegetable diseases:

Vegetable transplants: Pythium (*Pythium* sp.) root rot and/ or damping off were seen in vegetable transplants, including cabbage, lettuce, and tomato.

Beans: Foliar diseases including Ascochyta leaf spot (*Phoma exigua*), Cercospora leaf spot (*Cercospora* sp.), and common bacterial blight (*Xanthomonas phaseoli*) and foliar and pod infections of anthracnose (*Glomerella lindemuthianum*) were favored by wet weather early in the growing season and high humidity throughout the summer. Root diseases (*Rhizoctonia* sp., *Fusarium* sp., *Pythium* sp.) and southern blight (*Sclerotium rolfsii*) were also observed on bean.

Cucurbits: Bacterial wilt (*Erwinia tracheiphila*), which is vectored primarily by the striped cucumber beetle (*Acalymma vittatum*), was problematic in cucurbit crops this year, particularly in cucumber and melon fields. Anthracnose *(Colletotrichum orbiculare*), Alternaria leaf blight (*Alternaria cucumerina*), and powdery mildew (*Podosphaera xanthii* and *Erysiphe cichoracearum*) were common foliar diseases in all cucurbit crops. Powdery mildew pressure was extremely high on pumpkin, squash, and even watermelon. Gummy stem blight (*Didymella bryoniae*) was problematic in certain fields, particularly in watermelon and cantaloupe. Aphid-vectored viruses (zucchini yellow mosaic virus and the potyvirus complex) were also diagnosed on cucurbits.

Tomatoes: Diseases of tomato were abundant in 2008. Foliar diseases such as early blight (*Alternaria solani*), Septoria leaf spot (*Septoria lycopersici*), bacterial spot (*Xanthomonas campestris* pv. *vesicatoria*), and bacterial speck (*Pseudomonas syringae* pv. *tomato*) were common this year even though dry conditions starting in midsummer prevented high levels of late-season disease. Timber rot (*Sclerotinia sclerotiorum*) was diagnosed from several locations, as were southern blight *(Sclerotium rolfsii*) and root knot nematode (*Meloidogyne incognita*). Bacterial canker (Clavibacter michiganensis subsp. michiganensis) was found in some commercial plantings. Fusarium wilt (*Fusarium oxysporum* f. sp. *lycopersici*) was diagnosed a number of times, most often in home garden plantings and heirloom or older varieties lacking wilt resistance. Tobacco mosaic virus, tomato spotted wilt virus, and tomato yellow leaf curl virus were diagnosed.

Peppers: Bacterial spot (*Xanthomonas campestris* pv. *vesicatoria*) was the most common disease of pepper this year. Anthracnose *(Colletotrichum gloeosporioides*), southern blight *(Sclerotium rolfsii*), and alfalfa mosaic virus were also seen.

Other vegetables: Drop (*Sclerotinia* sp.) and gray mold (*Botrytis cinerea*) were diagnosed on lettuce in high tunnel production systems. Bacterial soft rot (*Erwinia chrysanthemi* pv. *zeae*) was diagnosed on sweet corn from several home gardens. Common scab (*Streptomyces scabies*) and Verticillium wilt (*Verticillium* sp.) were diagnosed on potato. Spinach white rust (*Albugo occidentalis*) was an unusual find.

Landscape Plant Disease Observations:

Plant diseases play a significant role in production and maintenance of landscape plants in Kentucky. The first step in appropriate pest management in the landscape and nursery is an accurate diagnosis of the problem. The U.K. Plant Disease Diagnostic Laboratory assists the landscape industry of Kentucky in this effort. To serve their clients effectively, landscape industry professionals, such as arborists, nursery operators, and landscape installation and maintenance organizations need to be aware of recent plant disease history and the implications for landscape maintenance. As previously mentioned, making a diagnosis involves a great deal of research into the possible causes of the plant problem, and many types of testing may be necessary. Like fruit and vegetable samples, the variety of ornamental plant samples received makes diagnosis more difficult.

To assist County Extension Agents in dealing with plant disease issues, we also rely on our digital consulting system utilizing photographic images. When the system is used to assist in diagnosis, the images can help us determine where and how agents should collect samples for submission to the laboratory. The digital consulting system is especially useful in providing advice about landscape tree and shrub diseases and disorders because whole plants are difficult to send to the laboratory. Of the 173 cases in 2008, 36% dealt with landscape and nursery plants.

The 2008 growing season was kinder than the 2007 season, but not by a lot. January had slightly lower-than-normal temperatures and precipitation. February began with destructive severe weather that produced one of the highest tornado totals from a single weather event that the Commonwealth has experienced. A couple of winter weather systems that created an icy situation across the state caused significant branch breakage to many trees and large shrubs. In March there were several heavy rainfall events that created periodic flooding across the Commonwealth, especially along the Ohio River. The first part of April continued with above-average rainfall (the period from October 1, 2007, through April 19, 2008, was the wettest ever recorded during that time in Louisville, with 41.28 inches of rain), but the latter half of the month was relatively dry. Temperatures for April were average. May saw below-normal temperatures and normal rainfall. In June temperatures were above normal and rainfall below normal. Temperatures were below normal and rainfall was above normal in July, but the end of the month saw the beginning of a significant dry period across the state, which has continued through October. The period of August 1 to September 30, 2008, was the second driest for that time frame in the past 114 years.

The abundant rainfall at budbreak and beyond provided optimum conditions for many diseases like scab, anthracnose, black spot of rose, cedar/apple and cedar/quince rusts to be widespread. Bark cracking was also noted in some woody trees and shrubs, due to the 2007 spring freeze and summer-long drought.

Landscape plant diseases were common this year and included those favored by wet spring weather (e.g., leaf spot diseases) and those enhanced by drought conditions in 2007 and 2008 (e.g., cankers, wilts). The following important or unusual diseases were observed:

Deciduous trees:

- Ash, buckeye, chestnut, maple oak and sycamore anthracnose (Discula, Glomerella, Kabatiella, Apiognomonia) and dogwood spot anthracnose (Elsinoe).
- Crabapple scab (Venturia)
- Honeylocust and redbud leaf spot (Cercospora); birch leaf spot (Gloeosporium)
- Dogwood, oak, and crapemyrtle powdery mildew (Microsphaera, Phyllactinia)
- Witchhazel leaf blotch(Phyllosticta)
- Serviceberry rust (Gymnosporangium)
- Oak leaf blister (Taphrina) and Actinopelte leaf spot (Tubakia)
- Flowering pear, serviceberry, and flowering crabapple fire blight (Erwinia)
- Birch, elm, maple, oak, redbud and willow cankers (Botryosphaeria, Cytospora, Phompsis)
- Maple and oak bacterial leaf scorch (Xylella)
- Redbud and yellowwood wilt (Verticillium)
- Dutch elm disease (Ophiostoma)
- Dogwood root/crown rot (Phytophthora)
- Serviceberry root rot (Armillaria)

Needle Evergreens:

- Leyland cypress blight (Seridium) and canker (Botryosphaeria)
- Pine tip blight (Diplodia) and needle spot (Mycosphaerella)
- Spruce needle cast/blight (Rhiozsphaeria and Stigmina)
- Taxus root rot (Phytophthora)
- White pine and spruce root and collar rot (Phytophthora)
- White pine and spruce canker (Cytospora)
- White pine decline (physiological)

Shrubs:

- Boxwood canker (Pseudonectria)
- Euonymus powdery mildew (Erysiphe)
- Holly black root rot (Thielaviopsis) and canker (Botryosphaeria)
- Hydrangea bacterial leaf spot (Xanthomonas) and fungal leaf spot (Cercospora)
- Hazelnut [filbert] blight (Anisogramma)
- Cherrylaurel root rot (Phytophthora)
- Tree peony root rot (Armillaria)
- Hibiscus Southern blight (Sclerotium)
- Rose black spot (Diplocarpon), blight (Botrytis), spot anthracnose (Sphaceloma) and rosette (possible virus, leaf curl mite-transmitted)

Herbaceous Annuals and Perennials:

- Hollyhock rust (Puccinia)
- Chrysanthemum, petunia, and snapdragon root rots (Pythium)
- Coreopsis, impatiens, vinca, and petunia root/crown rots (Rhizoctonia)
- Daylily leaf streak (Aureobasidium) and thrips injury
- Petunia black root rot (Thielaviopsis)
- Pachysandra stem canker and blight (Volutella)
- Phlox crown rot (Fusarium)
- Hosta root rot (Phytophthora) and foliar nematodes (Aphelenchoides)
- Osteospermum and zinnia blights (Botrytis)
- Geranium bacterial blight (Xanthomonas)
- Vinca canker (Phoma)
- Portulaca virus symptoms from the papaya mosaic virus
- Peony blight (Phytophthora)

A Shift in Sample Types:

As noted above, the number of tobacco samples for 2008 (326) was the lowest total since accurate records started to be recorded in 1976. Overall tobacco samples have been much lower than historical levels prior to 2000. This drop in the number of tobacco samples has been mostly offset by increases in the number of woody and herbaceous ornamental samples, both commercial and homeowner, as well as commercial vegetable samples. An increasing number of these samples are of plant types which are less common and therefore require more work, testing, and time to provide an accurate diagnosis. Along with the diversification of crops, we are seeing a diversification of diseases.

Disease Monitoring:

In addition to the day-to-day diagnosis of samples, monitoring of several organisms and the diseases they cause is conducted by the diagnostic laboratory during the year.

Pierce's disease of grapes caused by *Xylella fastidiosa*
Grape crown gall caused by *Agrobacterium tumefaciens*
Cucurbit yellow vine disease caused by *Serratia marsescens*
Root, stem and fruit diseases of solanaceous and cucurbit vegetables caused by *Phytophthora* spp.
Bacterial canker of peppers caused by *Clavibacter michiganensis* subsp. *michiganensis*
Copper-resistant bacterial speck of tomatoes caused by *Pseudomonas syringae* pv. *tomato*

In addition to those mentioned above and the work with Asian soybean rust and Sudden oak death, the detection of soybean cyst nematodes in new areas of the state and in soil on commercial ornamental stock for export (e.g., to Canada and California) is also conducted.

Educational Resource:

A major activity of the laboratory is to serve as an educational resource to County Extension Agents and Extension Specialists for assistance in the diagnosis of plant diseases--common, complex, and new.

ACKNOWLEDGMENTS

Sara Long works in the Lexington laboratory as a full-time Diagnostic Assistant. Her main responsibility is to fulfill the laboratory's data transmission requirements for the National Plant Diagnostic Network as part of our duties under the Department of Homeland Security. In addition, Sara provided much-needed assistance to the Lexington laboratory in sample triage, diagnostic and technical support.

Technicians within the department of Plant Pathology continued to make significant contributions. Ed Dixon, research technician in Lexington, worked with specialists in conducting research in turf, ornamentals, corn, tobacco, forages, and fruits as well as with the Soybean rust sentinel plot in Lexington. Bernadette Amsden conducted laboratory research on vegetables, tobacco, and ornamentals, including conducting diagnostic tests (PCR, ELISA, etc.) on many plant samples. Terry Yielding works in Princeton and looked at all the Asian Soybean Rust samples as well as worked with Soybean Cyst Nematode analysis. Mary Rachel Ray provided very capable, part-time assistance in the Princeton Laboratory. Brenda Kennedy, research technician, worked her first full year in Princeton with plot research and overseeing the Soybean Cyst Nematode and Asian Soybean Rust work.

Thanks also go to Mindy Thompson in Lexington and Mary Ann Kelley and Stephanie Farmer in Princeton, for their work in mailing thousands of diagnostic forms and IPM/PDDL Surveys.
Tom Priddy, Biosystems and Ag. Engineering - Meteorology, and his staff provided information for the summary of weather conditions for 2008.

Support from the Kentucky Integrated Pest Management Program for supplemental funding of additional diagnostic testing and part-time laboratory assistance and support from the Pesticide Safety Education Program for reference books is gratefully acknowledged.

We also wish to thank the College of Agriculture's extension specialists and researchers who served as consultants to the diagnostic laboratory in 2008. Their services ranged from making diagnoses to assisting the diagnosticians with plant, insect, weed or pesticide questions. These individuals are too

numerous to mention here (see Table 9) but we are grateful nonetheless to each for their valuable assistance.

EXPLANATORY REMARKS

As you examine the main body of this report, you will notice three columns of numbers following the diagnosis and causal agent sections. The first column indicates the number of primary diagnoses, the second column contains the number of secondary diagnoses and the third column is the total of the previous two. The primary diagnosis is the main, or frequently, the only problem observed on a plant sample. If a second problem of equal or lesser importance was observed, it was entered as the secondary diagnosis. Occasionally, a problem may have only been diagnosed as a secondary problem, and not as a primary problem for this year thus a zero (0) will appear in the primary diagnosis column. Referrals and consultations: Insect problems were generally identified or verified by a specialist in the Entomology Department. Chemical injuries on all commercially grown crops were diagnosed by a weed control specialist or by the crop specialist in the Agronomy or Horticulture Departments. On a number of occasions we also consulted with crop specialists in other departments to diagnose or verify abiotic problems.

Table 1.

SUMMARY OF DIAGNOSES[1] BY CROP CATEGORY AND CAUSAL AGENT TYPE.

Crop Category	Abiotic Problems	Biotic[2] Problems	Chemical Injury	Inadequate Specimen	Insect Injury	Other[3]	Total Diagnoses
Agronomic							
Corn	27	5	7	2	6	6	53
Forages	13	12	0	2	2	5	34
Small grains	10	22	1	0	1	7	41
Soybeans	57	531*	15	2	10	252*	867
Tobacco	119	177	30	4	3	42	375
Fruit							
Small fruit	21	56	4	1	7	30	119
Tree fruit	15	107	5	2	23	12	164
Herbs	6	6	0	1	4	1	18
Identifications	0	46	0	0	0	2	48
Ornamentals							
Herbaceous and Houseplants	47	85	8	2	27	38	207
Turfgrass	16	54	1	4	1	42	118
Woody	261	302**	44	8	170	292**	1077
Vegetables	88	207	43	24	46	78	486
Miscellaneous	5	1	0	0	1	31***	38
Total	685	1611	158	52	301	838	3645

[1] All counts and totals include primary diagnoses plus secondary diagnoses.

[2] Refer to Table 2 for a further breakdown of this category.

[3] "Other" includes the causal agent categories: No disease and Unknown.

* Numbers include 4 soybean samples with and 222 soybean samples without Asian Soybean Rust from the SBR sentinel plot system; and 484 soil samples with and 14 soil samples without Soybean Cyst Nematodes.

**Numbers include 91 SOD samples with 22problems caused by fungi and 69 with no diseases.

***Number includes 28 Kudzu samples without Asian Soybean Rust from the SBR sentinel plot system.

Table 2. SUMMARY OF BIOTIC PROBLEMS[1] BY CROP CATEGORY.

Crop Category	Bacterial	Fungal	Nematode	Virus	Other[2]
Agronomic					
Corn	1	4	0	0	0
Forages	0	12	0	0	0
Small grains	0	10	0	12	0
Soybeans	1	36*	490**	4	0
Tobacco	3	149	2	23	0
Fruit					
Small fruit	4	51	0	1	0
Tree fruit	19	84	0	0	4
Herbs	0	6	0	0	0
Identifications	0	15	0	0	31
Ornamentals					
Herbaceous and Houseplants	7	73	1	4	0
Turfgrass	0	54	0	0	0
Woody	47	243***	0	2	10
Vegetables	59	126	2	19	1
Miscellaneous	0	1	0	0	0
Total	141	864	495	65	46

[1] All counts and totals include primary diagnoses plus secondary diagnoses.

[2] Other includes these categories: Animal (rodent and bird damage), Plant (plant identifications or parasitic plant) and Algae, Lichen and Phytoplasma.

* Number includes 4 soybean samples with Asian Soybean Rust from the SBR sentinel plot system.

**Number includes 484 soil samples with Soybean Cyst Nematodes.

***Number includes 22 SOD samples with problems caused by fungi.

Table 3. NUMBER OF PLANT SAMPLES BY CROP CATEGORY

Crop Category	Number of Plant Specimens	Percentage of Total Plant Specimens
Agronomic (-Tobacco + 226 Soybean SBRs)	446	15.7
Tobacco	326	11.5
Fruit	247	8.7
Herbs	14	0.5
Identifications	48	1.7
Ornamentals (+91 SODs)	1272	44.8
Vegetables	447	15.8
Miscellaneous (includes 28 Kudzu SBRs)	38	1.3
Total Plant Samples (includes SBRs and SODs)	2838	100.0

Table 4.

SUMMARY OF DIAGNOSES BY CROP CATEGORY AND CROP.

Crop Category and Crop	Number of Primary Diagnoses[1]	Number of Secondary Diagnoses[2]	Total Diagnoses[3]
Agronomic			
Corn	44	9	53
Forages	26	8	34
Small grains	35	6	41
Soybeans	839*	28	867
Tobacco	326	49	375
Fruit			
Small fruit	105	14	119
Tree fruit	142	22	164
Herbs	14	4	18
Identifications	48	0	48
Ornamentals			
Herbaceous and Houseplants	179	28	207
Turfgrass	114	4	118
Woody**	979	98	1077
Vegetables	447	39	486
Miscellaneous* **	38	0	38
Total	3336	309	3645

[1] The number of primary diagnoses corresponds to the number of different specimens examined.

[2] If a second problem was evident on the plant specimen it was considered the secondary diagnosis. See "Explanatory Remarks."

[3] Total diagnoses equals the number of primary plus the number of secondary diagnoses.

* Soybean plant samples + 498 SCN soil samples + 226 SBR samples

**Numbers include 91 SOD samples

***Numbers include 28 Kudzu samples from the SBR sentinel plot system.

Table 5.

SUMMARY OF ROUTINE SAMPLES RECEIVED BY GROWER TYPE AND CROP GROUP.

	Grower Type							
	Commercial		Homeowner		Research		Institution	
Crop Group	Ext[1]	Non-Ext[2]	Ext[1]	Non-Ext[2]	Ext[1]	Non-Ext[2]	Ext[1]	Non-Ext[2]
Agronomic								
Corn	42	2	0	0	0	0	0	0
Forages	20	0	0	0	0	6	0	0
Small grains	29	4	0	0	0	2	0	0
Soybeans	101	6	0	0	1	7	0	0
Tobacco	285	24	0	0	0	15	0	2
Fruit								
Small Fruit	47	1	43	5	1	8	0	0
Tree Fruit	13	2	121	4	0	2	0	0
Herbs	8	0	5	0	0	1	0	0
Identifications	2	4	22	2	0	0	2	16
Ornamental								
Herbaceous and Houseplants	78	15	71	10	0	1	3	1
Turfgrass	12	26	43	3	0	0	6	24
Woody	104	81	651	24	0	9	14	5
Vegetable	146	4	268	9	6	12	2	0
Miscellaneous	4	2	3	0	0	1	0	0
Total	891	171	1227	57	8	64	27	48
Total/Grower Type	1062		1284		72		75	

Total number of routine samples received = 2493

[1] Ext = Extension samples submitted via County Extension Agents or Extension Specialists.

[2] Non-Ext = Non-extension samples submitted directly by the grower or other non-extension clients.

Table 6.

NUMBER OF ROUTINE SAMPLES REFERRED TO OTHER DEPARTMENTS, UK LABORATORY FACILITIES OR OUTSIDE AGENCIES FOR DIAGNOSIS.*

Department, Facility or outside agency	Crop Category					
	Agronomic	Fruit	Ornamental	Vegetable	Other	Total
Agdia, Inc.	6	0	0	4	0	10
Entomology Department	1	2	18	5	2	28
Horticulture Department	0	1	5	0	5	11
Plant & Soil Sciences Department	31	0	10	0	5	46
					Total	95
					Total number of routine plant specimens	2493
					Percent of specimens referred outside Diagnostic Lab for diagnosis	3.8

*** Numbers do not reflect the total number of diagnoses and/or consultations conducted by other departments (See Table 9).**

Table 7.

SPECIAL LABORATORY TESTS PERFORMED BY PLANT DISEASE DIAGNOSTIC LABORATORY*.

Test	Number of Tests
Polymerase Chain Reaction (PCR)	13
Culturing	16
Enzyme-linked Immunosorbent Assay (ELISA) (133 routine plant samples +91 SOD)	224
Microscope (902 routine plant samples +254 SBR)	1156
Nematode extraction Soybean cyst nematode (SCN)	498
Soil tests	97
Visual	1324
Total	3336

*** Based on 2493 routine plant samples, 254 SBR, 498 SCN, and 91 SOD samples = 3336.**

Note: Some samples may have required more than one test but only the definitive test was recorded.

Table 8.

NUMBER OF ROUTINE PLANT SAMPLES RECEIVED BY COUNTY AND CROP CATEGORY (KY AND OUT-OF-STATE SOURCES).[1]

COUNTY	Total	Agronomic[2]	Tobacco	Fruit	Ornamental	Vegetable	Other
ADAIR	20	2	9	3	4	2	0
ALLEN	10	1	1	2	0	6	0
ANDERSON	15	3	1	1	8	2	0
BALLARD	12	2	2	2	4	2	0
BARREN	18	5	5	1	6	1	0
BATH	13	5	3	2	2	0	1
BELL	5	0	0	1	0	4	0
BOONE	33	1	1	1	19	9	2
BOURBON	21	7	3	2	8	1	0
BOYD	8	0	0	1	4	3	0
BOYLE	43	1	5	1	30	5	1
BRACKEN	3	1	0	0	2	0	0
BREATHITT	10	0	1	1	1	7	0
BRECKINRIDGE	73	6	37	6	16	8	0
BULLITT	16	0	1	3	11	1	0
BUTLER	7	1	1	0	2	3	0
CALDWELL	47	7	4	9	18	8	1
CALLOWAY	49	3	8	7	21	8	1
CAMPBELL	14	0	0	1	11	2	0
CARLISLE	9	3	0	0	6	0	0
CARROLL	6	0	3	0	3	0	0
CARTER	6	0	1	0	4	1	0
CASEY	26	3	3	3	2	15	0
CHRISTIAN	74	11	13	2	25	22	1
CLARK	17	0	4	3	5	5	0
CLAY	4	0	0	0	4	0	0
CLINTON	2	2	0	0	0	0	0
CRITTENDEN	11	2	0	1	4	4	0
CUMBERLAND	11	0	1	4	5	1	0
DAVIESS	93	14	8	9	50	11	1
EDMONSON	19	1	5	0	3	10	0
ELLIOTT	4	0	0	3	0	1	0
ESTILL	14	2	1	1	5	5	0
FAYETTE	295	13	28	20	180	30	24
FLEMING	28	9	6	4	5	3	1
FLOYD	1	0	0	0	1	0	0
FRANKLIN	70	0	0	5	43	18	4
FULTON	4	3	0	0	1	0	0
GALLATIN	3	0	0	0	1	0	2
GARRARD	9	0	1	0	7	1	0
GRANT	14	2	0	5	2	4	1
GRAVES	23	5	6	1	9	2	0
GRAYSON	31	3	0	1	17	9	0
GREEN	10	0	5	2	3	0	0
GREENUP	12	0	0	1	7	4	0
HANCOCK	5	1	0	1	1	2	0
HARDIN	18	1	0	0	17	0	0
HARLAN	6	0	0	2	3	1	0
HARRISON	15	0	5	0	3	7	0
HART	4	0	2	0	1	1	0
HENDERSON	39	6	7	4	16	6	0
HENRY	18	0	9	4	3	1	1
HICKMAN	13	5	0	2	4	2	0
HOPKINS	7	1	1	0	5	0	0
JACKSON	14	0	1	3	10	0	0
JEFFERSON	34	0	0	0	29	5	0
JESSAMINE	18	1	3	1	13	0	0
JOHNSON	0	0	0	0	0	0	0
KENTON	19	0	1	1	13	3	0
KNOTT	0	0	0	0	0	0	0
KNOX	1	0	0	0	1	0	0

COUNTY	Total	Agronomic[2]	Tobacco	Fruit	Ornamental	Vegetable	Other
LARUE	8	1	4	0	3	0	0
LAUREL	27	1	1	6	17	1	1
LAWRENCE	17	0	0	5	5	7	0
LEE	0	0	0	0	0	0	0
LESLIE	0	0	0	0	0	0	0
LETCHER	5	0	0	3	0	2	0
LEWIS	12	4	2	3	2	1	0
LINCOLN	33	4	4	2	10	13	0
LIVINGSTON	5	0	0	2	3	0	0
LOGAN	59	9	10	7	19	8	1
LYON	22	2	4	1	12	3	0
McCRACKEN	40	6	0	1	16	16	1
McCREARY	0	0	0	0	0	0	0
McLEAN	4	3	1	0	0	0	0
MADISON	35	2	6	2	21	4	0
MAGOFFIN	0	0	0	0	0	0	0
MARION	21	2	10	1	7	1	0
MARSHALL	30	2	0	3	21	4	0
MARTIN	7	0	0	5	2	0	0
MASON	0	0	0	0	0	0	0
MEADE	20	1	4	1	12	2	0
MENIFEE	10	0	0	3	4	3	0
MERCER	41	1	1	6	28	5	0
METCALFE	12	1	1	1	2	7	0
MONROE	11	0	2	2	7	0	0
MONTGOMERY	32	1	6	4	9	12	0
MORGAN	34	0	8	7	3	16	0
MUHLENBERG	13	3	4	1	3	2	0
NELSON	19	0	1	6	8	4	0
NICHOLAS	5	1	2	0	1	1	0
OHIO	0	0	0	0	0	0	0
OLDHAM	32	2	0	0	23	6	1
OWEN	7	3	1	1	1	1	0
OWSLEY	0	0	0	0	0	0	0
PENDELTON	0	0	0	0	0	0	0
PERRY	9	0	0	1	5	3	0
PIKE	1	0	0	0	1	0	0
POWELL	1	0	0	0	0	1	0
PULASKI	37	3	7	2	12	4	9
ROBERTSON	9	0	3	3	2	1	0
ROCKCASTLE	2	0	0	1	1	0	0
ROWAN	5	0	1	0	3	1	0
RUSSELL	11	3	0	1	3	1	3
SCOTT	21	0	0	1	19	0	1
SHELBY	48	3	8	4	31	1	1
SIMPSON	36	7	3	5	12	7	2
SPENCER	15	0	0	0	14	1	0
TAYLOR	12	2	1	0	8	1	0
TODD	39	10	8	4	12	5	0
TRIGG	32	0	3	0	23	3	3
TRIMBLE	10	2	4	1	1	2	0
UNION	8	2	0	2	4	0	0
WARREN	98	0	2	8	60	22	6
WASHINGTON	11	1	5	1	3	1	0
WAYNE	14	1	1	0	2	10	0
WEBSTER	10	2	1	2	1	4	0
WHITLEY	19	2	0	4	9	3	1
WOLFE	10	0	0	1	2	7	0
WOODFORD	41	0	7	4	28	2	0
Out-of-State (none)	14	0	3	2	8	1	0
TOTALS	2493	220	326	247	1181	447	72

[1] Does not include SBR, SCN, or SOD samples

[2] Agronomic crops include corn, soybeans, forages, and small grains but in this particular case, it excludes tobacco.

Table 9.

THE NUMBER OF CASES IN WHICH EXTENSION SPECIALISTS, DIAGNOSTICIANS OR RESEARCHERS WERE INVOLVED IN MAKING A PRIMARY DIAGNOSIS AND THE NUMBER OF CASES IN WHICH THEY SERVED AS CONSULTANTS.

		Number of cases	
Specialists, Researchers, Diagnosticians	**Department**	**Primary Diagnosis[1]**	**Consultations[2]**
LEXINGTON			
Beale, JW (Diagnostician)	Plant Pathology	1214	60
Berberich, SG	Horticulture	0	1
Bessin, RT	Entomology	2	3
Durham, RE	Horticulture	1	0
Dutton, SR	Horticulture	0	1
Fountain, WM	Horticulture	5	1
Fulcher, AF	Horticulture (grad student)	0	3
Geneve, RL	Horticulture	0	1
Green, JD	Plant & Soil Sciences	36	3
Grove, JH	Plant & Soil Sciences	1	1
Hartman, JR	Plant Pathology	0	14
Lee, CD	Plant & Soil Sciences	3	6
Long, SJ	Plant Pathology	406	2
Palmer, GK	Plant & Soil Sciences	2	1
Paratley, RD	Forestry	2	0
Pearce, BC	Plant & Soil Sciences	2	9
Powell, AJ	Plant & Soil Sciences	2	1
Schwab, GJ	Plant & Soil Sciences	1	0
Seebold, KW	Plant Pathology	12	14
Smigell, CG	Horticulture	0	1
Strang, JG	Horticulture	1	2
Townsend, LH	Entomology	25	2
Vincelli, P	Plant Pathology	20	7
Witt, WW	Plant & Soil Sciences	1	0
PRINCETON			
Bachi, PR (Diagnostician)	Plant Pathology	789	31
Bailey, WA	Plant & Soil Sciences	15	11
Dunwell, WC	Horticulture	7	20
Herbek, JH	Plant & Soil Sciences	3	1
Hershman, DE	Plant Pathology	4	3
Johnson, DW	Entomology	5	8
Kennedy, BS	Plant Pathology	1	1
Lacefield, GD	Plant & Soil Sciences	2	1
Masabni, JG	Horticulture	7	6
Martin, JR	Plant & Soil Sciences	9	5
Murdock, LW	Plant & Soil Sciences	8	4
Yielding, TL	Plant Pathology	252	0

[1] The specialist or diagnostician making the primary diagnosis.

[2] In some cases, more than one person was consulted, however, only one name can be entered into the computer database. Therefore, these numbers may indicate fewer consultations than were actually performed.

Table 10.

DIGITAL CONSULTING SYSTEM

To assist County Extension Agents and Specialists in dealing with plant disease, insect, and weed issues, we also operate a web-based Digital Consulting System utilizing photographic images. The images can be used to help determine how and where best to collect samples for submission to the laboratory, as well as general or specific advice on a wide range of topics.

The system is also useful for Homeland Security purposes because the topic possibilities are not limited to plants and because specialists in other states can be brought into the system as a consultant on a case-by-case basis with limited access to only the case in question.

173 cases were submitted in 2008 by a total of 49 submitters.
Cases came from a total of 45 counties.

Plant/Crop	CountOfPlant/Crop
Corn	9
Forage crop	4
Forest tree	3
Herbaceous ornamental	7
Landscape shrub	11
Landscape tree	44
other (Fungal ID)	1
other (Insect ID)	1
other (Plant ID)	2
Small fruit	12
Small grain	5
Soybean	12
Tobacco	12
Tree fruit	15
Turf grass	3
Vegetable	34

National Nursery Survey for *Phytophthora ramorum* in Kentucky, 2008

Julie Beale and Sara Long, Department of Plant Pathology;
Janet Lensing, Katie Kittrell, and John Obrycki, Department of Entomology

Note: A more complete report of this work can be found in the UK Agricultural Experiment Station publication, PR-571, http://www.ca.uky.edu/agc/pubs/pr/pr571/pr571.pdf

Acknowledgments: Thanks to John Obrycki (Dept. of Entomology) for providing funding for part of this work, and to all the nursery owners for their collaboration.

Nature of Work

Phytophthora ramorum, the cause of Ramorum blight and sudden oak death, continues to be a problem on the West Coast in California and Oregon. This disease, first observed in California in the mid 1990s, causes the widespread death of many oak and tanoak species. Other hosts for this pathogen include camellia, rhododendron, viburnum, lilac, and mountain laurel. Regulations and quarantines have been established to limit the spread of this pathogen, but concerns still remain about potential movement in contaminated nursery stock. Methods of long distance spread of the pathogen include moving plants, plant parts, soil, and water. P. ramorum infection and symptom expression takes place when the leaves, shoots, and stems are wet for 12 hours a day for 10 days or more at temperatures between 37-82°F. The Appalachian region is considered to be a high risk area for the establishment of P. ramorum because appropriate weather conditions often occur and because several native plant species in the region are identified as hosts.

The National Nursery Survey for P. ramorum in Kentucky was continued through the 2008 growing season. This survey, a collaborative effort between the Department of Plant Pathology and the Office of the State Entomologist (Department of Entomology) at the University of Kentucky, and the USDAAPHIS, has been ongoing each year since 2004 (1). Procedures for collecting and testing followed protocols established by the USDA-APHIS-PPQ. Twenty nurseries in Central and Western Kentucky were inspected. Ninety-one samples with foliar symptoms suggestive of general Phytophthora infection were collected from 10 counties: Calloway, Daviess, Graves, Hancock, Hardin, Henderson, Hopkins, Jefferson, Oldham, and Union. These samples were double-bagged and sent to the Plant Disease Diagnostic Lab (PDDL) in Lexington for testing. An immunological assay (ELISA) was used to detect the presence of proteins typical of several species of Phytophthora as an initial screen of these samples at the PDDL. DNA was then extracted from samples testing positive for general Phytophthora infection and were sent to USDA-APHIS approved testing laboratories for further identification via polymerase chain reaction (PCR).

Results and Discussion

Of the 91 total samples collected throughout the state, 22 tested positive for infection by Phytophthora species. Extracted DNA from these samples was sent to the USDA-APHIS approved laboratory in Florida or Maryland for further testing via polymerase chain reaction (PCR). The P. ramorum PCR test for each of these samples was negative. Phytophthora ramorum was not found in the state of Kentucky this growing season.

Literature Cited

1 De Sa, P.B., J. Hartman, J. Lensing, J. 1. Collins, C. Harper, J. Obrycki. 2007. National Nursery Survey for Phytophthora ramorum in Kentucky. Research Report of the Nursery and Landscape Program. Agricultural Experiment Station. University of Kentucky. PR-554. P26-27.

CROP	DIAGNOSIS		CAUSAL AGENT		#

AGRONOMIC CROPS

CORN

CORN (Zea) (includes Popcorn)					
Bacterial stalk rot	-	Erwinia	0	1	1
Chemical injury	-	herbicide	4	1	5
	-	unknown	1	0	1
Cultural	-	improper depth	0	1	1
Ear/Kernel rot	-	Fusarium	2	0	2
	-	Stenocarpella	1	0	1
Environmental stresses			5	0	5
Inadequate specimen, no disease			8		8
Insect injury			6	0	6
Nutritional	-	acid soil	1	0	1
	-	general	1	0	1
	-	magnesium deficiency	4	0	4
	-	nitrogen deficiency	2	0	2
	-	phosphorus deficiency	2	0	2
	-	potassium deficiency	2	4	6
	-	zinc deficiency	2	0	2
Pollination problem	-	unknown	0	1	1
Purple leaf sheath	-	complex	1	0	1
Tassel ear	-	genetic	1	0	1

FORAGES

ALFALFA (Medicago)					
Crown rot	-	Rhizoctonia	1	0	1
Crown/Stem rot	-	Sclerotinia	1	0	1
Environmental stresses			2	1	3
Inadequate specimen, no disease			5		5
Insect injury			0	2	2
Leaf spot	-	Stemphylium	0	1	1
Nutritional	-	acid soil	1	0	1
	-	boron deficiency	2	1	3
	-	nitrogen deficiency	1	1	2
	-	potassium deficiency	2	0	2
Powdery mildew	-	oidium	1	0	1
Root/Crown rot	-	Fusarium	0	1	1
	-	Rhizoctonia	1	0	1
Stem canker	-	Rhizoctonia	1	0	1
Summer black stem	-	Cercospora	2	0	2
ORCHARDGRASS (Dactylis)					
Environmental	-	drought	1	0	1
RYE (Secale)					
No disease			1		1

CROP	DIAGNOSIS		CAUSAL AGENT		#
SWITCHGRASS (Panicum)					
Environmental	-	drought	1	0	1
Leaf spot	-	Bipolaris	0	1	1
No disease			1		1
Rust	-	Puccinia	2	0	2

SOYBEAN

SOYBEAN (Glycine)					
Air pollution	-	ozone	1	0	1
Asian soybean rust	-	Phakopsora	4	0	4
Blight	-	Fusarium	1	0	1
Brown spot	-	Septoria	0	2	2
Bud blight	-	Tobacco ringspot virus	1	0	1
Charcoal rot	-	Macrophomina	1	1	2
Chemical injury	-	growth regulator	9	0	9
	-	herbicide	4	0	4
	-	unknown	2	0	2
Damping-off	-	Pythium	1	0	1
Downy mildew	-	Peronospora	2	6	8
Environmental stresses			4	5	9
Frogeye	-	Cercospora	1	0	1
Inadequate specimen, no disease			240		240
Insect injury			4	5	9
Leaf blotch	-	unknown	2	0	2
Nutritional	-	general	2	0	2
	-	manganese deficiency	1	0	1
	-	nitrogen deficiency	2	0	2
	-	potassium deficiency	36	3	39
	-	soluble salts	2	0	2
Powdery mildew	-	oidium	1	0	1
Root knot nematode	-	Meloidogyne	1	0	1
Root rot	-	Pythium	0	1	1
	-	Rhizoctonia	1	1	2
Root/stem rot	-	Phytophthora	3	0	3
	-	Rhizoctonia	1	0	1
Soybean cyst nematode	-	Heterodera			
		on plant samples	0	4	4
	*	in soil samples	484		484
	*	absent in soil samples	14		14
		(*soil submitted to Nematode Analysis Laboratory)			
Stem canker	-	Diaporthe	1	0	1
Stunting	-	unknown	1	0	1
Sudden death	-	Fusarium	8	0	8
Virus	-	Alfalfa mosaic	1	0	1
	-	Bean pod mottle	1	0	1
	-	unknown	1	0	1

CROP	DIAGNOSIS		CAUSAL AGENT		#
			SMALL GRAINS		
MILLET (Panicum)					
Gray leaf spot	-	**Pyricularia**	**1**	**0**	**1**
OAT (Avena)					
Nutritional	-	**nitrogen deficiency**	**1**	**0**	**1**
SORGHUM (Sorghum)					
No disease			**1**		**1**
WHEAT (Triticum)					
Chemical injury	-	**herbicide**	**1**	**0**	**1**
Common bunt	-	**Tilletia**	**1**	**0**	**1**
Environmental stresses			**4**	**0**	**4**
Flecking	-	**physiological**	**1**	**0**	**1**
Head blight	-	**Fusarium**	**1**	**0**	**1**
Insect injury			**0**	**1**	**1**
Leaf spot	-	**Septoria**	**0**	**1**	**1**
No disease			**6**		**6**
Nutritional	-	**nitrogen deficiency**	**3**	**0**	**3**
	-	**phosphorus deficiency**	**1**	**0**	**1**
Sharp eyespot	-	**Rhizoctonia**	**1**	**0**	**1**
Speckled leaf blotch	-	**Septoria**	**0**	**2**	**2**
Take-all	-	**Gaeumannomyces**	**2**	**1**	**3**
Virus	-	**Barley yellow dwarf**	**1**	**1**	**2**
	-	**Soilborne wheat mosaic**	**1**	**0**	**1**
	-	**Wheat streak mosaic**	**6**	**0**	**6**
	-	**Wheat spindle streak mosaic**	**3**	**0**	**3**

CROP	DIAGNOSIS		CAUSAL AGENT			#

TOBACCO

TOBACCO (Nicotiana)					
Bacterial soft rot	-	**Erwinia**	**2**	**0**	**2**
Black root rot	-	**Thielaviopsis**	**1**	**0**	**1**
Black shank	-	**Phytophthora**	**63**	**0**	**63**
Blue mold	-	**Peronospora**	**2**	**0**	**2**
Brown spot	-	**Alternaria**	**2**	**0**	**2**
Chemical injury	-	**burn**	**4**	**0**	**4**
	-	**fungicide**	**2**	**2**	**4**
	-	**growth regulator**	**13**	**0**	**13**
	-	**herbicide**	**4**	**1**	**5**
	-	**unknown**	**4**	**0**	**4**
Collar rot	-	**Sclerotinia**	**4**	**0**	**4**
Cultural	-	**high temperature**	**4**	**0**	**4**
	-	**transplant shock**	**7**	**3**	**10**
Damping-off	-	**Rhizoctonia**	**2**	**3**	**5**
Environmental	-	**weather scald**	**6**	**0**	**6**
	-	**wet feet**	**10**	**2**	**12**
	-	**others**	**9**	**4**	**13**
Frenching	-	**metabolites**	**2**	**0**	**2**
Frogeye	-	**Cercospora**	**3**	**2**	**5**
Hollow stalk	-	**Erwinia**	**1**	**0**	**1**
Improper curing	-	**greening**	**1**	**0**	**1**
	-	**piebald**	**1**	**0**	**1**
Inadequate specimen, no disease			**46**		**46**
Insect injury			**2**	**1**	**3**
Mold	-	**Alternaria**	**0**	**1**	**1**
Nutritional	-	**acid soil**	**18**	**1**	**19**
	-	**fertilizer burn**	**5**	**0**	**5**
	-	**general**	**2**	**2**	**4**
	-	**manganese toxicity**	**14**	**0**	**14**
	-	**nitrogen deficiency**	**3**	**1**	**4**
	-	**potassium deficiency**	**5**	**1**	**6**
	-	**soluble salts**	**4**	**8**	**12**
	-	**temp. phosphorus def.**	**1**	**0**	**1**
Oedema	-	**physiological**	**1**	**0**	**1**
Root knot nematode	-	**Meloidogyne**	**2**	**0**	**2**
Root rot	-	**Pythium**	**25**	**1**	**26**
Root/stem rot	-	**Rhizoctonia**	**0**	**2**	**2**
Sooty mold	-	**species**	**1**	**0**	**1**
Sore shin	-	**Rhizoctonia**	**5**	**7**	**12**
Stem rot	-	**Pythium**	**0**	**1**	**1**
Target spot	-	**Rhizoctonia**	**14**	**6**	**20**
Virus	-	**Alfalfa mosaic**	**2**	**0**	**2**
	-	**Cucumber mosaic**	**2**	**0**	**2**
	-	**Tobacco mosaic**	**2**	**0**	**2**
	-	**Tobacco ringspot**	**1**	**0**	**1**
	-	**Tobacco streak**	**6**	**0**	**6**
	-	**Tomato spotted wilt**	**8**	**0**	**8**
	-	**unknown**	**1**	**1**	**2**
Weather fleck	-	**ozone**	**2**	**0**	**2**
Wilt	-	**Fusarium**	**4**	**0**	**4**

CROP	DIAGNOSIS		CAUSAL AGENT		#

FRUIT CROPS

SMALL FRUITS

BLUEBERRY (Vaccinium)					
Cultural	-	transplant shock	1	0	1
Environmental	-	stress	0	1	1
Flyspeck	-	Schizothyrium	0	1	1
Inadequate specimen, no disease			8		8
Insect injury			1	0	1
Nutritional	-	acid soil	1	1	2
	-	iron deficiency	1	0	1
Root rot	-	Phytophthora	2	0	2
Sooty blotch	-	Gloeodes	1	0	1
Stem blight	-	Botryosphaeria	1	0	1
BRAMBLES - BLACKBERRY, and RASPBERRY (Rubus)					
Cane blight	-	Leptosphaeria	2	0	2
Double blossom	-	Cercosporella	2	0	2
Environmental stresses			4	0	4
Insect injury			4	1	5
No disease			7		7
Spur blight	-	Didymella	0	1	1
Virus	-	unknown	1	0	1
GOJI BERRY (Lycium)					
No disease			1		1
GRAPE (Vitis)					
Anthracnose	-	Elsinoe	5	2	7
Black rot	-	Guignardia	15	0	15
Cane blight/Leaf spot	-	Phomopsis	1	1	2
Chemical injury	-	growth regulator	1	0	1
	-	insecticide	1	0	1
Crown gall	-	Agrobacterium	1	1	2
Downy mildew	-	Plasmopora	1	0	1
Environmental stresses			4	0	4
Insect injury			2	0	2
Leaf scorch	-	unknown	1	0	1
Nutritional	-	general	1	0	1
Powdery mildew	-	Uncinula	1	0	1
Root rot	-	Rhizoctonia	1	0	1
STRAWBERRY (Fragaria)					
Angular leaf spot	-	Xanthomonas	2	0	2
Anthracnose	-	Colletotrichum	3	0	3
Black root	-	complex	1	0	1
Black seed	-	Mycosphaerella	1	0	1
Chemical injury	-	herbicide	1	0	1
Crown rot	-	Phytophthora	2	0	2
Leaf blight	-	Phomopsis	0	2	2
Leaf spot	-	Mycosphaerella	3	1	4
No disease			3		3

CROP	DIAGNOSIS		CAUSAL AGENT			#

TREE FRUITS

APPLE (Malus)					
Bitter rot	-	Glomerella	6	0	6
Blotch	-	Phyllosticta	1	0	1
Canker	-	Botryosphaeria	1	0	1
Cedar apple rust	-	Gymnosporangium	19	2	21
Chemical injury	-	burn	2	0	2
	-	herbicide	1	0	1
Collar rot	-	Phytophthora	1	0	1
Cultural	-	transplant shock	1	0	1
Environmental	-	drought	1	0	1
Fire blight	-	Erwinia	13	2	15
Flyspeck	-	Schizothyrium	0	1	1
Frogeye	-	Botryosphaeria	6	4	10
Inadequate specimen, no disease			5		5
Insect injury			7	3	10
Scab	-	Venturia	4	0	4
Sooty blotch	-	Gloeodes	1	2	3
CHERRY (Prunus)					
Bacterial canker	-	Pseudomonas	1	0	1
Black knot	-	Apiosporina	2	0	2
Brown rot	-	Monilinia	1	0	1
Powdery mildew	-	Podosphaera	1	0	1
Root rot	-	Phytophthora	1	0	1
FIG (Ficus)					
No disease			1		1
PEACH and APRICOT (Prunus)					
Bacterial spot	-	Xanthomonas	1	0	1
Brown rot	-	Monilinia	3	0	3
Canker	-	Cytospora	1	0	1
Inadequate specimen, no disease			6		6
Insect injury			6	3	9
Leaf curl	-	Taphrina	10	1	11
Nutritional	-	nitrogen deficiency	4	0	4
Scab	-	Cladosporium	1	2	3
PEAR (Pyrus)					
Bitter rot	-	Glomerella	1	0	1
Blight	-	Pseudomonas	1	0	1
Fire blight	-	Erwinia	2	0	2
PECAN (Carya)					
Insect injury			1	0	1
No disease			2		2
Scab	-	Cladosporium	2	0	2
PLUM (Prunus)					
Black knot	-	Apiosporina	4	0	4
Plum pockets	-	Taphrina	2	0	2

CROP	DIAGNOSIS		CAUSAL AGENT		#
			HERBS		
BASIL (Ocimum)					
Environmental	-	**sunscald**	**1**	**0**	**1**
Insect injury			**1**	**0**	**1**
Nutritional	-	**fertilizer burn**	**0**	**1**	**1**
Root/Stem rot	-	**Rhizoctonia**	**1**	**0**	**1**
FEVERFEW (Tanacetum)					
Stem rot	-	**Sclerotinia**	**1**	**0**	**1**
GINSENG (Panax)					
Leaf blight	-	**Alternaria**	**1**	**0**	**1**
OREGANO (Origanum)					
Insect injury			**1**	**0**	**1**
Nutritional	-	**fertilizer burn**	**0**	**1**	**1**
Root rot	-	**Pythium**	**1**	**0**	**1**
ROSEMARY (Rosmarinus)					
Inadequate specimen			**1**		**1**
Insect injury			**2**	**0**	**2**
Root rot	-	**Pythium**	**1**	**0**	**1**
SAGE (Salvia)					
Environmental stresses			**1**	**1**	**2**
No disease			**1**		**1**
Root rot	-	**Pythium**	**1**	**0**	**1**
			MISCELLANEOUS		
ARABIDOPSIS (Arabidopsis)					
Nutritional	-	**soluble salts**	**1**	**0**	**1**
KUDZU (Pueraria) (part of survey work for Asian Soybean Rust)					
No disease			**28**		**28**
POTTING MIX					
Fungal			**1**	**0**	**1**
SOIL					
No disease			**2**		**2**
Nutritional	-	**high pH**	**1**	**0**	**1**
	-	**soluble salts**	**2**	**0**	**2**
WATER					
No disease			**1**		**1**
WOOD					
Insect injury			**1**	**0**	**1**

CROP	DIAGNOSIS		CAUSAL AGENT		#

IDENTIFICATIONS

FUNGAL IDENTIFICATIONS

Chlorophyllum	-	molybdites	1	1
Ganoderma	-	species	1	1
Lepiota	-	cepaestipes	1	1
Oxyporus	-	latemarginatus	1	1
Panaeolus	-	foenisecii	1	1
Phaeolus	-	schweinitzii	1	1
Pluerotus	-	species	1	1
Polyporus	-	squamosus	1	1
Scleroderma	-	species	1	1
Slime mold	-	species	1	1
Sphaerobolus	-	species	1	1
Trametes	-	species	1	1
	-	versicolor	1	1
Trichoderma	-	species	1	1

PLANT IDENTIFICATIONS

Acer	-	rubrum	2	2
Carya	-	cordiformis	1	1
Castanea	-	mollissima	1	1
	-	species	1	1
Celtis	-	occidentalis	1	1
Conium	-	maculatum	1	1
Daucus	-	carota	1	1
Dioda	-	virginiana	1	1
Dispyros	-	virginiana	1	1
Inadequate specimen			4	4
Laminacea	-	species	1	1
Liverwort	-	species	3	3
Malus	-	species	1	1
Medicago	-	sativa	1	1
Panicum	-	dichotomoflorum	1	1
Paulownia	-	tomentosa	1	1
Pedilanthus	-	tithymaloides	1	1
Pinus	-	virginiana	1	1
Pseudotsuga	-	menziesii	1	1
Quercus	-	alba	1	1
	-	muehlenbergii	1	1
Ranunculus	-	species	1	1
Rosa	-	multiflora	1	1
Rumex	-	crispus	1	1
Silene	-	latifolia	1	1
Taxus	-	species	1	1
Tibouchina	-	species	1	1
Ulmus	-	species	1	1

CROP	DIAGNOSIS		CAUSAL AGENT		#
			ORNAMENTALS		
			HERBACEOUS ORNAMENTALS and INDOOR PLANTS		
AFRICAN VIOLET (Saintpaulia)					
No disease			**1**		**1**
ALOE (Aloe)					
Cultural	**-**	**overwatering**	**0**	**1**	**1**
Insect injury			**1**	**0**	**1**
ASTILBE (Astilbe)					
Environmental	**-**	**wet feet**	**1**	**0**	**1**
BEGONIA (Begonia)					
No disease			**1**		**1**
BIDENS (Bidens)					
Insect injury			**1**	**0**	**1**
BISHOP'S WEED (Aegopodium)					
No disease			**1**	**0**	**1**
BLEEDING HEART (Dicentra)					
Virus	**-**	**Tobacco rattle**	**1**	**0**	**1**
CACTUS (Cereus)					
Bacterial soft rot	**-**	**Erwinia**	**1**	**0**	**1**
CALIBRACHOA (Calibrachoa)					
Insect injury			**2**	**0**	**2**
No disease			**1**		**1**
Nutritional	**-**	**iron deficiency**	**1**	**0**	**1**
Powdery mildew	**-**	**Oidium**	**1**	**0**	**1**
CANE (Arundinaria)					
Senescence	**-**	**natural**	**1**	**0**	**1**
CHRYSANTHEMUM (Chrysanthemum)					
Insect injury			**1**	**0**	**1**
No disease			**2**		**2**
Nutritional	**-**	**soluble salts**	**3**	**0**	**3**
Root/Stem rot	**-**	**Pythium**	**4**	**1**	**5**
Wilt	**-**	**Fusarium**	**2**	**0**	**2**
COLUMBINE (Aquilegia)					
Environmental	**-**	**cold injury**	**1**	**0**	**1**
CONVOLVULUS (Convolvulus)					
No disease			**1**		**1**
COREOPSIS (Coreopsis)					
Crown rot	**-**	**Rhizoctonia**	**1**	**0**	**1**

CROP	DIAGNOSIS		CAUSAL AGENT		#
CYCLAMEN (Cyclamen)					
	Insect injury		**1**	**0**	**1**
DAFFODIL (Narcissus)					
	Bud blast	**- environmental**	**1**	**0**	**1**
DAHLIA (Dahlia)					
	Insect injury		**2**	**1**	**3**
DAYLILY (Hemerocallis)					
	Air pollution	**- sulfur dioxide**	**1**	**0**	**1**
	Environmental	**- drought**	**1**	**0**	**1**
	Insect injury		**1**	**0**	**1**
	Leaf streak	**- Aureobasidium**	**1**	**1**	**2**
	No disease		**2**		**2**
DRACAENA (Dracaena)					
	Anthracnose	**- Colletotrichum**	**1**	**0**	**1**
	Cultural	**- Oedema**	**1**	**0**	**1**
	Environmental	**- unknown**	**1**	**0**	**1**
	No disease		**1**		**1**
	Nutritional	**- nitrogen deficiency**	**1**	**0**	**1**
ERYNGIUM (Eryngium)					
	Environmental	**- wet feet**	**1**	**0**	**1**
FERN (Nephrolepis)					
	Nutritional	**- soluble salts**	**1**	**0**	**1**
FICUS (Fig)					
	Insect injury		**1**	**0**	**1**
	No disease		**1**		**1**
GARDENIA (Gardenia)					
	No disease		**1**		**1**
	Root rot	**- Pythium**	**1**	**0**	**1**
GAURA (Gaura)					
	No disease		**1**		**1**
GERANIUM (Pelargonium)					
	Cultural	**- oedema**	**1**	**1**	**2**
	Inadequate specimen, no disease		**4**		**4**
	Nutritional	**- iron deficiency**	**1**	**0**	**1**
		- nitrogen deficiency	**1**	**0**	**1**
	Virus	**- unknown**	**1**	**0**	**1**
HOLLYHOCK (Althaea)					
	Chemical injury	**- growth regulator**	**1**	**0**	**1**
	Leaf spot	**- Cercospora**	**1**	**0**	**1**
	Rust	**- Puccinia**	**2**	**0**	**2**

CROP	DIAGNOSIS		CAUSAL AGENT		#
HOSTA (Hosta)					
Environmental	-	sunscald	1	0	1
Foliar nematode	-	Aphelenchoides	1	0	1
No disease			2		2
Root rot	-	Phytophthora	1	0	1
IMPATIENS (Impatiens)					
Insect injury			1	1	2
Root rot	-	Pythium	0	1	1
	-	Rhizoctonia	1	0	1
IRIS (Iris)					
Bacterial soft rot	-	Erwinia	1	0	1
Leaf spot	-	Heterosporium	2	0	2
IVY (Hedera)					
Bacterial spot	-	Xanthomonas	1	0	1
Nutritional	-	pH high	1	0	1
JADE PLANT (Crassula)					
Nutritional	-	soluble salts	1	0	1
LEMON (Citrus)					
Nutritional	-	general	1	0	1
LILY (Lilium)					
No disease			2		2
Root rot	-	Pythium	1	0	1
LIRIOPE (Liriope)					
Anthracnose	-	Colletotrichum	1	0	1
Environmental	-	stress	1	0	1
LISIANTHUS (Eustoma)					
Chemical injury	-	unknown	1	0	1
LOBELIA (Lobelia)					
No disease			1		1
Southern blight	-	Sclerotium	1	0	1
LUPINE (Lupinus)					
Nutritional	-	general	1	0	1
MALLOW (Malva)					
No disease			1		1
MANDEVILLA (Mandevilla)					
Cultural	-	overwatering	0	1	1
Insect injury			1	0	1
MARIGOLD (Tagetes)					
Insect injury			1	0	1

CROP	DIAGNOSIS		CAUSAL AGENT		#
ORCHID (unknown)					
	Root rot	- Pythium	1	0	1
ORNAMENTAL GRASS (Unknown)					
	Root rot	- Rhizoctonia	1	0	1
OSTEOSPERMUM (Osteospermum)					
	Gray mold	- Botrytis	1	0	1
	No disease		1		1
PACHYSANDRA (Pachysandra)					
	Leaf/Stem blight	- Volutella	2	0	2
PALM (Arecaceae)					
	Insect injury		2	0	2
PANSY (Viola)					
	No disease		1		1
PEONY (Paeonia)					
	Blight	- Phytophthora	2	0	2
	Crown rot	- Rhizoctonia	1	0	1
	Environmental stresses		2	0	2
	Leaf blotch	- Cladosporium	1	1	2
	No disease		1		1
	Powdery mildew	- Oidium	0	1	1
	Red spot	- Cladosporium	0	1	1
	Root rot	- Armillaria	1	0	1
PERIWINKLE (Vinca)					
	Canker/Dieback	- Phoma	1	0	1
	Root/Crown rot	- Fusarium	0	1	1
		- Rhizoctonia	1	0	1
PETUNIA (Petunia)					
	Air pollution	- sulfur dioxide	1	0	1
	Black root rot	- Thielaviopsis	1	1	2
	Chemical injury	- unknown	1	0	1
	Crown rot	- Fusarium	1	0	1
		- Rhizoctonia	0	1	1
	Mutation	- genetic	2	0	2
	No disease		2		2
	Nutritional	- fertilizer burn	0	1	1
		- general	2	0	2
		- nitrogen deficiency	2	0	2
		- phosphorus deficiency	0	1	1
		- soluble salts	1	0	1
	Root rot	- Pythium	6	3	9
	Root/Stem rot	- Rhizoctonia	5	0	5
	Web blight	- Rhizoctonia	1	0	1

CROP	DIAGNOSIS		CAUSAL AGENT		#
PHLOX (Phlox)					
	Chemical injury	**- growth regulator**	**0**	**1**	**1**
	Crown rot	**- Fusarium**	**1**	**0**	**1**
	Powdery mildew	**- Erysiphe**	**2**	**0**	**2**
		- Oidium	**1**	**0**	**1**
POINSETTIA (Euphorbia)					
	Chemical injury	**- growth regulator**	**2**	**0**	**2**
	Insect injury		**0**	**1**	**1**
	No disease		**1**		**1**
	Nutritional	**- calcium deficiency**	**0**	**1**	**1**
	Root rot	**- Pythium**	**2**	**0**	**2**
		- Rhizoctonia	**0**	**1**	**1**
PORTULACA (Portulaca)					
	Insect injury		**1**	**1**	**2**
	Virus	**- Papaya mosaic**	**2**	**0**	**2**
PRIMROSE (Oenothera)					
	Insect injury		**1**	**0**	**1**
	No disease		**1**		**1**
RUBBER PLANT (Ficus)					
	Insect injury		**1**	**0**	**1**
	No disease		**1**		**1**
SALVIA (Salvia)					
	Insect injury		**1**	**0**	**1**
	No disease		**1**		**1**
SANSEVIERA (Sanseviera)					
	No disease		**1**		**1**
SCHEFFLERA (Brassaia)					
	Environmental	**- stress**	**0**	**1**	**1**
	Insect injury		**2**	**0**	**2**
	No disease		**1**		**1**
SEDUM (Sedum)					
	No disease		**1**		**1**
SILVER PLUME GRASS (Saccharum)					
	Nutritional	**- nitrogen deficiency**	**1**	**0**	**1**
	Root rot	**- Pythium**	**0**	**1**	**1**
SNAPDRAGON (Antirrhinum)					
	Root rot	**- Pythium**	**1**	**0**	**1**
SPATHIPHYLLUM (Spathiphyllum)					
	Environmental	**- stress**	**1**	**0**	**1**
	No disease		**1**		**1**
TICKSEED (Coreopsis)					
	Environmental	**- stress**	**1**	**0**	**1**

CROP	DIAGNOSIS		CAUSAL AGENT		#
UNKNOWN (Unknown)					
	Insect injury		1	0	1
	No disease		1		1
VERBENA (Verbena)					
	Air pollution	- sulfur dioxide	0	1	1
	Chemical injury	- herbicide	1	0	1
		- insecticide	1	0	1
	Insect injury		0	1	1
	Leaf spot	- Cercospora	1	0	1
	Nutritional	- fertilizer burn	2	0	2
VINCA (Vinca)					
	Black root rot	- Thielaviopsis	1	0	1
	No disease		1		1
	Root/Stem rot	- Rhizoctonia	1	0	1
YELLOW STAR CREEPER (unknown)					
	Inadequate specimen		1		1
ZINNIA (Zinnia)					
	Bacterial spot	- Xanthomonas	1	1	2
	Chemical injury	- growth regulator	1	0	1
	Gray mold	- Botrytis	1	0	1

TURFGRASS

BENTGRASS (Agrostis)					
	Anthracnose	- Colletotrichum	4	0	4
	Brown patch	- Rhizoctonia	2	0	2
	Dollar spot	- Sclerotinia	2	0	2
	Inadequate specimen, no disease		19		19
	Nutritional	- fertilizer burn	1	0	1
	Root disfunction	- Pythium	4	0	4
	Root rot	- Pythium	4	0	4
	Take-all patch	- Gaeumannomyces	3	0	3
BERMUDAGRASS (Cyndon)					
	Inadequate specimen, no disease		3		3
	Insect injury		1	0	1
	Root rot	- Pythium	1	0	1
	Smut	- Ustilago	2	0	2
	Spring dead spot	- Ophiosphaerella	1	0	1
BLUEGRASS (Poa)					
	Brown patch	- Rhizoctonia	0	1	1
	Cultural	- heavy thatch	1	1	2
	Environmental	- compaction	2	0	2
	No disease		1		1
	Root rot	- Pythium	1	0	1
	Rust	- Puccinia	1	0	1
	Summer patch	- Magnaporthe	4	0	4

CROP	DIAGNOSIS		CAUSAL AGENT		#
FESCUE (Festuca)					
	Blight	**-**	**Pythium**	**1**	**0**	**1**
	Brown patch	**-**	**Rhizoctonia**	**4**	**0**	**4**
	Chemical	**-**	**unknown**	**1**	**0**	**1**
	Cultural	**-**	**heavy thatch**	**2**	**0**	**2**
	Dollar spot	**-**	**Sclerotinia**	**1**	**0**	**1**
	Inadequate specimen, no disease			**12**		**12**
	Red thread	**-**	**Laetisaria**	**1**	**0**	**1**
	Root rot	**-**	**Pythium**	**1**	**0**	**1**
	Senescence	**-**	**natural**	**1**	**1**	**2**
	Slime mold	**-**	**species**	**3**	**0**	**3**
	Summer patch	**-**	**Magnaporthe**	**1**	**0**	**1**
	Yellow patch	**-**	**Rhizoctonia**	**1**	**0**	**1**
ORCHARDGRASS (Dactylis)					
	Leaf streak	**-**	**Cercosporidium**	**1**	**0**	**1**
RYEGRASS (Lolium)					
	No disease			**2**		**2**
TURF (unspecified)					
	Brown patch	**-**	**Rhizoctonia**	**1**	**0**	**1**
	Environmental	**-**	**stress**	**1**	**0**	**1**
	No disease			**6**		**6**
	Nutritional	**-**	**nitrogen deficiency**	**1**	**0**	**1**
	Physical injury	**-**	**mowing**	**2**	**0**	**2**
	Powdery mildew	**-**	**Oidium**	**1**	**0**	**1**
	Red thread	**-**	**Laetisaria**	**1**	**0**	**1**
	Root rot	**-**	**Pythium**	**1**	**0**	**1**
	Senescence	**-**	**natural**	**1**	**0**	**1**
	Slime mold	**-**	**species**	**1**	**0**	**1**
ZOYSIA (Zoysia)					
	Brown patch	**-**	**Rhizoctonia**	**1**	**0**	**1**
	Large patch	**-**	**Rhizoctonia**	**1**	**0**	**1**
	No disease			**3**	**0**	**3**
	Root decline	**-**	**Gaeumannomyces**	**2**	**0**	**2**

CROP	DIAGNOSIS		CAUSAL AGENT		#
			WOODY ORNAMENTALS		
ARBORVITAE (Thuja)					
Cultural	**-**	**transplant shock**	**5**	**0**	**5**
Environmental	**-**	**winter drying**	**2**	**0**	**2**
Inadequate specimen, no disease			**9**		**9**
Insect injury			**5**	**0**	**5**
Root rot	**-**	**Phytophthora**	**1**	**0**	**1**
Twig blight	**-**	**Phoma**	**0**	**1**	**1**
ASH (Fraxinus)					
Anthracnose	**-**	**Apiognomonia**	**2**	**0**	**2**
Insect injury			**1**	**1**	**2**
No disease			**2**		**2**
Wood rot	**-**	**Basidiomycete**	**1**	**0**	**1**
AZALEA - See listing under RHODODENDRON					
BALDCYPRESS (Taxodium)					
Environmental	**-**	**drought**	**1**	**0**	**1**
Insect injury			**2**	**0**	**2**
BARBERRY (Berberis)					
Inadequate specimen			**1**		**1**
BEECH (Fagus)					
Insect injury			**2**	**0**	**2**
Leaf spot	**-**	**Gloeosporium**	**1**	**0**	**1**
	-	**Phyllosticta**	**0**	**1**	**1**
No disease			**2**		**2**
BIRCH (Betula)					
Canker	**-**	**Botryosphaeria**	**1**	**0**	**1**
Chemical injury	**-**	**herbicide**	**2**	**0**	**2**
Insect injury			**3**	**1**	**4**
Leaf spot	**-**	**Cryptocline**	**2**	**0**	**2**
	-	**fungal**	**0**	**1**	**1**
	-	**Gloeosporium**	**4**	**0**	**4**
No disease			**1**		**1**
Tatters	**-**	**environmental**	**1**	**0**	**1**
BLACK GUM (Tupelo)					
Environmental	**-**	**sunscald**	**0**	**1**	**1**
Insect injury			**3**	**0**	**3**
BOXELDER (Acer)					
Chemical injury	**-**	**growth regulator**	**1**	**0**	**1**

CROP	DIAGNOSIS		CAUSAL AGENT		#
BOXWOOD (Buxus)					
	Black root rot	**- Thielaviopsis**	**1**	**0**	**1**
	Canker	**- Pseudonectria**	**4**	**0**	**4**
	Cultural	**- transplant shock**	**1**	**0**	**1**
	Environmental stresses		**6**	**2**	**8**
	Insect injury		**6**	**2**	**8**
	No disease		**6**		**6**
	Nutritional	**- acid soil**	**1**	**0**	**1**
		- manganese toxicity	**1**	**0**	**1**
	Root rot	**- Rhizoctonia**	**1**	**0**	**1**
BUCKEYE (Aesculus)					
	Anthracnose	**- Glomerella**	**1**	**0**	**1**
	No disease		**1**		**1**
BUDDLEIA (Buddleia)					
	Insect injury		**2**	**0**	**2**
CHAMAECYPARIS (Chamaecyparis)					
	Cultural	**- transplant shock**	**1**	**0**	**1**
	No disease		**1**		**1**
CHERRY (Prunus)					
	Chemical injury	**- growth regulator**	**1**	**0**	**1**
	Cultural	**- transplant shock**	**2**	**0**	**2**
	Decline	**- unknown**	**3**	**0**	**3**
	Environmental	**- freeze injury**	**2**	**0**	**2**
	Insect injury		**4**	**0**	**4**
	No disease		**8**		**8**
CHERRYLAUREL (Prunus)					
	Cultural	**- oedema**	**1**	**0**	**1**
		- transplant shock	**1**	**0**	**1**
	Insect injury		**1**	**1**	**2**
	No disease		**2**		**2**
	Root rot	**- Phytophthora**	**1**	**0**	**1**
CHESTNUT (Castanea)					
	Anthracnose	**- Glomerella**	**1**	**0**	**1**
	Canker	**- Cryptodiaporthe**	**1**	**0**	**1**
	Root rot	**- Phytophthora**	**2**	**0**	**2**
CLEMATIS (Clematis)					
	No disease		**2**		**2**
COTONEASTER (Cotoneaster)					
	Decline	**- unknown**	**1**	**0**	**1**

CROP	DIAGNOSIS		CAUSAL AGENT		#
CRABAPPLE (Malus)					
Cultural	-	improper depth	0	2	2
Environmental stresses			4	0	4
Fire blight	-	Erwinia	2	0	2
Frogeye	-	Botryosphaeria	1	0	1
Inadequate specimen, no disease			2		2
Root/Collar rot	-	Phytophthora	0	1	1
Scab	-	Venturia	13	0	13
CRAPE MYRTLE (Lagerstroemia)					
No disease			1		1
Powdery mildew	-	Oidium	3	0	3
CYPRESS (Cupressocyparis)					
Insect injury			1	0	1
CRYPTOMERIA (Cryptomeria)					
No disease			2		2
DAWN REDWOOD (Metasequoia)					
Cultural	-	transplant shock	1	0	1
No disease			1		1
DOGWOOD (Cornus)					
Chemical injury	-	growth regulator	3	0	3
	-	herbicide	1	0	1
Cultural	-	transplant shock	5	1	6
Decline	-	unknown	2	0	2
Environmental stresses			4	1	5
Insect injury			2	0	2
Leaf scorch	-	unknown	3	0	3
Leaf spot	-	Septoria	2	0	2
No disease			5		5
Nutritional	-	acid soil	1	0	1
Powdery mildew	-	Microsphaera	2	0	2
Root rot	-	Phytophthora	1	0	1
	-	Pythium	1	0	1
Sooty mold	-	species	0	1	1
Spot anthracnose	-	Elsinoe	2	1	3
ELAEAGNUS (Elaeagnus)					
Insect injury			1	0	1
No disease			1		1
ELM (Ulmus)					
Canker	-	Botryosphaeria	1	0	1
	-	Phomopsis	1	0	1
Decline	-	environmental	1	0	1
Dutch elm disease	-	Ophiostoma	2	0	2
Environmental	-	freeze	1	1	2
Insect injury			1	0	1
No disease			4		4
Physical injury	-	unknown	2	0	2
Sooty mold	-	species	1	0	1

CROP	DIAGNOSIS		CAUSAL AGENT			#
EUONYMUS (Euonymus)						
	Anthracnose	**-**	**Gloeosporium**	**1**	**0**	**1**
	Crown gall	**-**	**Agrobacterium**	**1**	**0**	**1**
	Cultural	**-**	**oedema**	**1**	**0**	**1**
	Inadequate specimen, no disease			**6**		**6**
	Insect injury			**8**	**1**	**9**
	Powdery mildew	**-**	**Microsphaera**	**2**	**3**	**5**
FILBERT (Corylus)						
	Cultural	**-**	**transplant shock**	**1**	**0**	**1**
FIR (Abies)						
	No disease			**1**		**1**
	Root rot	**-**	**Phytophthora**	**1**	**0**	**1**
FORSYTHIA (Forsythia)						
	Cultural	**-**	**transplant shock**	**1**	**0**	**1**
	Environmental	**-**	**freeze**	**1**	**0**	**1**
	Gall	**-**	**Phomopsis**	**2**	**0**	**2**
FRINGETREE (Chionanthus)						
	Chemical injury	**-**	**unknown**	**1**	**0**	**1**
GINKGO (Ginkgo)						
	Cultural	**-**	**transplant shock**	**1**	**0**	**1**
HACKBERRY (Celtis)						
	Insect injury			**1**	**1**	**2**
HAWTHORN (Crataegus)						
	Cedar/Quince rust	**-**	**Gymnosporangium**	**1**	**0**	**1**
	Chemical injury	**-**	**growth regulator**	**1**	**0**	**1**
HAZELNUT (Corylus)						
	Blight	**-**	**Anisogramma**	**1**	**0**	**1**
HEMLOCK (Tsuga)						
	Environmental	**-**	**drought**	**2**	**0**	**2**
	Inadequate specimen, no disease			**7**		**7**
	Insect injury			**1**	**0**	**1**
	Lichen	**-**	**species**	**1**	**0**	**1**
HIBISCUS (Hibiscus)						
	Chemical injury	**-**	**growth regulator**	**1**	**0**	**1**
	Cultural	**-**	**transplant shock**	**1**	**0**	**1**
	No disease			**2**		**2**
	Southern blight	**-**	**Sclerotium**	**1**	**0**	**1**
HICKORY (Carya)						
	Decline	**-**	**unknown**	**1**	**0**	**1**
	Insect injury			**2**	**0**	**2**

CROP	DIAGNOSIS		CAUSAL AGENT		#
HOLLY and INKBERRY (Ilex)					
	Black root rot	- Thielaviopsis	9	0	9
	Cultural	- transplant shock	3	1	4
	Decline	- unknown	5	0	5
	Environmental stresses		8	1	9
	Insect injury		3	3	6
	No disease		19		19
	Nutritional	- general	1	0	1
	Root rot	- Rhizoctonia	2	1	3
	Senescence	- natural	1	0	1
HONEYLOCUST (Gleditsia)					
	Insect injury		1	0	1
	Leaf spot	- Cercospora	0	1	1
	No disease		2		2
HONEYSUCKLE (Lonicera)					
	No disease		1		1
	Sooty mold	- species	1	0	1
HORNBEAM (Ostrya)					
	Environmental	- freeze	1	0	1
	Insect injury		1	0	1
HYDRANGEA (Hydrangea)					
	Bacterial spot	- Xanthomonas	2	0	2
	Chemical injury	- growth regulator	1	0	1
	Environmental stresses		2	1	3
	Leaf spot	- Cercospora	1	0	1
	No disease		3		3
	Root rot	- Pythium	2	0	2
		- Rhizoctonia	0	1	1
JUNIPER and RED CEDAR (Juniperus)					
	Cedar/Quince rust	- Gymnosporangium	1	0	1
	Cultural	- overwatering	1	0	1
		- transplant shock	1	0	1
	Environmental stresses		2	1	3
	Insect injury		1	0	1
	Lichen	- species	0	1	1
	No disease		8		8
	Root rot	- Rhizoctonia	0	1	1
	Twig blight	- Kabatina	1	0	1
		- Phomopsis	1	0	1
KERRIA (Kerria)					
	Leaf/Twig blight	- Blumeriella	1	0	1
KY COFFEETREE (Gymnocladus)					
	No disease		2		2
LEUCOTHOE (Leucothoe)					
	No disease		1		1

CROP	DIAGNOSIS		CAUSAL AGENT		#
LEYLAND CYPRESS (X Cupressocyparis)					
	Canker	**- Botryosphaeria**	**1**	**0**	**1**
		- Seiridium	**1**	**0**	**1**
	Dieback	**- unknown**	**1**	**0**	**1**
	Environmental stresses		**2**	**0**	**3**
	No disease		**1**		**1**
LILAC (Syringa)					
	Cultural	**- transplant shock**	**1**	**0**	**1**
	Insect injury		**1**	**0**	**1**
	Leaf spot	**- Alternaria**	**1**	**0**	**1**
		- Phyllosticta	**0**	**1**	**1**
	No disease		**5**		**5**
	Physical injury	**- unknown**	**1**	**0**	**1**
LOCUST (Robinia)					
	No disease		**1**		**1**
MAGNOLIA (Magnolia)					
	Chemical injury	**- growth regulator**	**2**	**0**	**2**
	Cultural	**- transplant shock**	**1**	**0**	**1**
	Dieback	**- unknown**	**1**	**0**	**1**
	Environmental stresses		**2**	**0**	**2**
	Leaf scorch	**- winter drying**	**6**	**0**	**6**
	No disease		**4**		**4**
MAHONIA (Mahonia)					
	Chemical injury	**- growth regulator**	**1**	**0**	**1**
MAPLE (Acer)					
	Air pollution	**- ozone**	**1**	**0**	**1**
	Anthracnose	**- Aureobasidium**	**1**	**0**	**1**
		- Discula	**8**	**0**	**8**
		- Kabatiella	**3**	**0**	**3**
	Bacterial scorch	**- Xylella**	**2**	**0**	**2**
	Canker	**- Botryosphaeria**	**1**	**1**	**2**
		- Hypoxylon	**1**	**0**	**1**
	Chemical injury	**- growth regulator**	**4**	**0**	**4**
		- herbicide	**1**	**0**	**1**
		- unknown	**1**	**0**	**1**
	Cultural	**- transplant shock**	**3**	**0**	**3**
	Decline	**- unknown**	**1**	**0**	**1**
	Environmental stresses		**7**	**1**	**8**
	Inadequate specimen, no disease		**19**		**19**
	Insect injury		**10**	**3**	**13**
	Leaf scorch	**- unknown**	**3**	**0**	**3**
	Leaf spot	**- Phyllosticta**	**1**	**1**	**2**
	Nutritional	**- iron deficiency**	**1**	**0**	**1**
		- manganese deficiency	**1**	**0**	**1**
	Physical injury	**- rodent**	**3**	**0**	**3**
	Sooty mold	**- species**	**0**	**1**	**1**
	Tar spot	**- Rhytisma**	**1**	**0**	**1**

CROP	DIAGNOSIS		CAUSAL AGENT		#
MIMOSA (Albizzia)					
	Chemical injury	**- growth regulator**	**1**	**0**	**1**
	No disease		**1**		**1**
	Wood decay	**- Basidiomycete**	**1**	**0**	**1**
MOCKORANGE (Philadelphus)					
	Environmental	**- stress**	**1**	**0**	**1**
	Insect injury		**1**		**1**
NANDINA (Nandina)					
	Cultural	**- transplant shock**	**1**	**0**	**1**
	Environmental	**- stress**	**1**	**0**	**1**
	Nutritional	**- acid soil**	**1**	**0**	**1**
NINEBARK (Physocarpus)					
	No disease		**1**		**1**
OAK (Quercus)					
	Anthracnose	**- Apiognomonia**	**4**	**0**	**4**
	Bacterial scorch	**- Xylella**	**24**	**0**	**24**
	Canker	**- Botryosphaeria**	**1**	**0**	**1**
	Chemical injury	**- growth regulator**	**5**	**1**	**6**
	Cultural	**- transplant shock**	**1**	**0**	**1**
	Decline	**- unknown**	**1**	**0**	**1**
	Environmental stresses		**3**	**1**	**4**
	Insect injury		**26**	**6**	**32**
	Leaf blister	**- Taphrina**	**2**	**0**	**2**
	Leaf spot	**- Elsinoe**	**1**	**0**	**1**
		- Marssonina	**0**	**1**	**1**
		- Tubakia	**5**	**7**	**12**
	No disease		**14**		**14**
	Nutritional	**- iron deficiency**	**11**	**0**	**11**
	Physical injury	**- unknown**	**1**	**0**	**1**
	Powdery mildew	**- Oidium**	**1**	**0**	**1**
		- species	**2**	**1**	**3**
	Wood decay	**- Basidiomycete**	**1**	**0**	**1**
PAGODATREE (Sophora)					
	Wood decay	**- Schizophyllum**	**1**	**0**	**1**
PAWPAW (Asimina)					
	Leaf spot	**- fungal**	**1**	**0**	**1**
PEACH (Prunus)					
	No disease		**1**		**1**
	Root/Collar rot	**- Phytophthora**	**1**	**0**	**1**

CROP	DIAGNOSIS		CAUSAL AGENT			#
PEAR (Pyrus)						
	Bacterial spot	**-**	**Pseudomonas**	**1**	**0**	**1**
	Cedar/Quince rust	**-**	**Gymnosporangium**	**0**	**1**	**1**
	Chemical injury	**-**	**growth regulator**	**2**	**0**	**2**
	Cultural	**-**	**transplant shock**	**2**	**0**	**2**
	Decline	**-**	**unknown**	**10**	**0**	**10**
	Environmental stresses			**10**	**0**	**10**
	Fire blight	**-**	**Erwinia**	**13**	**1**	**14**
	Insect injury			**1**	**2**	**3**
	No disease			**2**		**2**
PHOTINIA (Photinia)						
	Decline	**-**	**unknown**	**1**	**0**	**1**
	Leaf spot	**-**	**fungal**	**1**	**0**	**1**
PIERIS (Pieris)						
	No disease			**1**		**1**
PINE (Pinus)						
	Brown spot	**-**	**Mycosphaerella**	**1**	**1**	**2**
	Canker	**-**	**Cytospora**	**2**	**0**	**2**
	Cultural	**-**	**transplant shock**	**5**	**0**	**5**
	Environmental stresses			**2**	**1**	**3**
	Inadequate specimen, no disease			**9**		**9**
	Insect injury			**6**	**2**	**8**
	Needle drop	**-**	**normal**	**1**	**0**	**1**
	Root rot	**-**	**Phytophthora**	**2**	**0**	**2**
	Tip blight	**-**	**Sphaeropsis**	**4**	**0**	**4**
	White pine decline	**-**	**environmental**	**13**	**0**	**13**
PLUM (Prunus)						
	Algae	**-**	**species**	**1**	**0**	**1**
	Black knot	**-**	**Apiosporina**	**7**	**0**	**7**
	Environmental	**-**	**freeze**	**1**	**0**	**1**
	Lichen	**-**	**species**	**0**	**1**	**1**
PRIVET (Ligustrum)						
	Decline	**-**	**unknown**	**1**	**0**	**1**
REDBUD (Cercis)						
	Canker	**-**	**Botryosphaeria**	**1**	**0**	**1**
	Chemical injury	**-**	**growth regulator**	**1**	**0**	**1**
	Cultural	**-**	**transplant shock**	**2**	**0**	**2**
	Decline	**-**	**unknown**	**1**	**0**	**1**
	Environmental	**-**	**cold injury**	**1**	**0**	**1**
	Insect injury			**3**	**0**	**3**
	Leaf blotch	**-**	**Monochaetia**	**0**	**1**	**1**
	Leaf spot	**-**	**Cercospora**	**2**	**0**	**2**
	No disease			**1**		**1**
	Physical injury	**-**	**unknown**	**1**	**0**	**1**
	Wilt	**-**	**Verticillium**	**1**	**0**	**1**

CROP	DIAGNOSIS		CAUSAL AGENT		#
RHODODENDRON and AZALEA (Rhododendron)					
Cultural	-	transplant shock	7	0	7
Decline	-	unknown	1	0	1
Environmental stresses			4	1	5
Inadequate specimen, no disease			27		27
Insect injury			10	2	12
Leaf blight	-	Phytophthora	20	0	20
Leaf scorch	-	winter drying	1	0	1
Nutritional	-	iron deficiency	2	0	2
	-	pH high	0	1	1
	-	soluble salts	1	0	1
ROSE (Rosa)					
Black spot	-	Diplocarpon	7	1	8
Blight	-	Botrytis	1	0	1
Canker	-	Coniothyrium	0	1	1
	-	unknown	1	0	1
Chemical injury	-	growth regulator	2	0	2
	-	herbicide	3	0	3
	-	unknown	2	0	2
Cultural	-	transplant shock	2	0	2
Dieback	-	unknown	2	0	2
Environmental stresses			2	1	3
Insect injury			11	2	13
No disease			5		5
Nutritional	-	acid soil	1	0	1
	-	general	1	1	2
Physical injury	-	deer	1	0	1
Powdery mildew	-	Sphaerotheca	0	1	1
Spot anthracnose	-	Sphaceloma	1	0	1
Virus	-	Rose rosette	2	0	2
SERVICEBERRY (Amelanchier)					
Fire blight	-	Erwinia	1	0	1
Insect injury			1	0	1
No disease			2		2
Root rot	-	Armillaria	1	0	1
Rust	-	Gymnosporangium	1	0	1
SPIREA (Spiraea)					
Chemical injury	-	herbicide	1	0	1
Decline	-	unknown	1	0	1
Environmental	-	stress	1	0	1
Leaf spot	-	Phyllosticta	0	1	1
No disease			1		1

CROP	DIAGNOSIS		CAUSAL AGENT			#
SPRUCE (Picea)						
	Canker	**-**	**Cytospora**	**2**	**0**	**2**
	Chemical injury	**-**	**unknown**	**2**	**0**	**2**
	Cultural	**-**	**transplant shock**	**6**	**1**	**7**
	Decline	**-**	**unknown**	**1**	**0**	**1**
	Environmental stresses			**1**	**2**	**3**
	Insect injury			**14**	**3**	**17**
	Needle blight	**-**	**Stigmina**	**3**	**0**	**3**
	Needle cast	**-**	**Rhizosphaera**	**6**	**0**	**6**
	Root rot	**-**	**Phytophthora**	**1**	**0**	**1**
	Sooty mold	**-**	**species**	**1**	**0**	**1**
SUMAC (Rhus)						
	Leaf blister	**-**	**Taphrina**	**1**	**0**	**1**
SWEETGUM (Liquidambar)						
	Decline	**-**	**environmental**	**1**	**0**	**1**
	No disease			**2**		**2**
SWEETSPIRE (Itea)						
	Cultural	**-**	**transplant shock**	**1**	**0**	**1**
SYCAMORE (Platanus)						
	Anthracnose	**-**	**Apiognomonia**	**2**	**0**	**2**
	Powdery mildew	**-**	**Microsphaera**	**1**	**0**	**1**
TAXUS (Taxus)						
	Chemical injury	**-**	**growth regulator**	**1**	**0**	**1**
	Cultural	**-**	**transplant shock**	**2**	**0**	**2**
	Environmental	**-**	**stress**	**2**	**0**	**2**
	No disease			**12**		**12**
	Root rot	**-**	**Phytophthora**	**3**	**0**	**3**
TULIPTREE (Liriodendron)						
	Cultural	**-**	**transplant shock**	**1**	**0**	**1**
	Insect injury			**2**	**0**	**2**
	No disease			**2**		**2**
UNKNOWN (Unknown)						
	No disease			**2**		**2**
VIBURNUM (Viburnum)						
	Cultural	**-**	**planted too deep**	**0**	**1**	**1**
	Leaf blight	**-**	**Phytophthora**	**2**	**0**	**2**
	No disease			**47**		**47**
	Root rot	**-**	**Phytophthora**	**1**	**0**	**1**
WALNUT (Juglans)						
	Insect injury			**1**	**0**	**1**
WEIGELA (Weigela)						
	Environmental	**-**	**stress**	**1**	**0**	**1**

CROP	DIAGNOSIS		CAUSAL AGENT		#
WILLOW (Salix)					
Canker	-	Cytospora	1	0	1
Leaf spot	-	Cercospora	1	0	1
	-	fungal	1	0	1
No disease			2		2
WITCH HAZEL (Hamamelis)					
Canker	-	unknown	1	0	1
Leaf blotch	-	Phyllosticta	2	0	2
YELLOWWOOD (Cladrastis)					
Leaf spot	-	unknown	0	1	1
Wilt	-	Verticillium	1	0	1

VEGETABLES

ASPARAGUS (Asparagus)					
No disease			2	0	2
BEAN (Phaseolus)					
Air pollution	-	ozone	1	0	1
Anthracnose	-	Colletotrichum	3	0	3
Chemical injury	-	growth regulator	2	0	2
	-	herbicide	2	0	2
	-	unknown	1	0	1
Common blight	-	Xanthomonas	2	0	2
Environmental	-	sunscald	2	0	2
Inadequate specimen, no disease			6		6
Insect injury			6	1	7
Leaf scorch	-	unknown	1	0	1
Leaf spot	-	Ascochyta	1	0	1
	-	Cercospora	0	1	1
	-	Phyllosticta	1	0	1
Nutritional	-	general	1	0	1
	-	soluble salts	1	0	1
Root rot	-	Pythium	1		
Root/stem rot	-	Fusarium	1	0	1
	-	Rhizoctonia	3	1	4
Rust	-	Uromyces	1	0	1
Southern blight	-	Sclerotium	3	0	3
Virus	-	Bean common mosaic	1	0	1
Yeast spot	-	Nematospora	0	1	1

CABBAGE - See listing under CRUCIFERS

CANTALOUPE - See listing under CUCURBITS

CAULIFLOWER - See listing under CRUCIFERS

CROP	DIAGNOSIS		CAUSAL AGENT		#
CORN, SWEET (Zea)					
Bacterial stalk rot	-	Erwinia	3	0	3
Insect injury			2	1	3
No disease			3		3
Nutritional	-	phosphorus deficiency	1	0	1
	-	potassium deficiency	1	1	2
	-	soluble salts	1	0	1
	-	zinc deficiency	1	0	1
CRUCIFERS - CABBAGE, CAULIFLOWER, KALE, and TURNIP (Brassica)					
Bacterial soft rot	-	Erwinia	0	1	1
Chemical injury	-	growth regulator	1	0	1
Environmental	-	hollow stalk	1	0	1
Inadequate specimen, no disease			3		3
Insect injury			2	0	2
Wire stem	-	Rhizoctonia	1	0	1
CUCUMBER - See listing under CUCURBITS					
CUCURBITS - CANTALOUPE, CUCUMBER, MELON (Cucumis), PUMPKIN, SQUASH (Cucurbita) and WATERMELON (Citrulus)					
Air pollution	-	ozone	1	0	1
Anthracnose	-	Colletotrichum	3	0	3
Bacterial wilt	-	Erwinia	15	0	15
Chemical injury	-	growth regulator	1	0	1
	-	herbicide	1	0	1
	-	unknown	2	0	2
Environmental stresses			7	0	7
Fruit decay	-	Fusarium	2	0	1
Fruit rot	-	Sclerotinia	1	0	1
Gummy stem blight	-	Didymella	2	0	2
Inadequate specimen, no disease			32		32
Insect injury			7	0	7
Leaf blight	-	Alternaria	3	1	4
Nutritional	-	fertilizer burn	1	0	1
	-	general	4	0	4
	-	magnesium deficiency	4	0	4
	-	soluble salts	1	0	1
Physical injury	-	plastic	1	0	1
Pollination problem	-	no bees	5	0	5
Powdery mildew	-	Erysiphe	1	0	1
	-	Oidium	2	0	2
	-	Sphaerotheca	2	0	2
Root knot nematode	-	Meloidogyne	1	0	1
Root rot	-	Pythium	1	0	1
Stem rot	-	Erwinia	1	0	1
	-	Pythium	1	0	1
Root/stem rot	-	Rhizoctonia	1	0	1
Virus	-	potyvirus	4	1	5
	-	unknown	1	0	1
	-	Zucchini yellow mosaic	1	0	1
Wet rot	-	Choanephora	1	0	1
Wilt	-	Fusarium	1	0	1

CROP	DIAGNOSIS		CAUSAL AGENT		#
EGGPLANT (Solanum)					
	No disease		1		1
KALE - See listing under CRUCIFERS					
LETTUCE (Lactuca)					
	Damping-off	- Pythium	1	0	1
	Drop	- Sclerotinia	2	0	2
	Gray mold	- Botrytis	1	0	1
ONION (Allium)					
	Gray mold	- Botrytis	0	1	1
	No disease		1		1
	Physical injury	- unknown	1	0	1
PEA (Pisum)					
	Chemical injury	- growth regulator	1	0	1
	No disease		2		2
	Senescence	- natural	1	0	1
PEPPER (Capsicum)					
	Anthracnose	- Colletotrichum	1	0	1
	Bacterial spot	- Xanthomonas	11	0	11
	Blight	- Phytophthora	1	0	1
	Blossom end rot	- calcium deficiency/dry	3	0	3
	Chemical injury	- growth regulator	1	0	1
		- herbicide	1	0	1
	Environmental stresses		1	1	2
	Inadequate specimen, no disease		6		6
	Nutritional	- fertilizer burn	1	0	1
		- soluble salts	3	0	3
	Root rot	- Pythium	5	0	5
	Root/stem rot	- Rhizoctonia	1	0	1
	Southern blight	- Sclerotium	3	1	4
	Stem injury	- wind	1	0	1
	Virus	- Alfalfa mosaic	2	0	2
		- unknown	1	0	1
POTATO (Solanum)					
	Dry rot	- Fusarium	1	1	2
	Inadequate specimen, no disease		7		7
	Insect injury		1	2	3
	Jelly end rot	- physiological	1	1	2
	Root/Stem rot	- Rhizoctonia	2	0	12
	Scab	- Streptomyces	4	0	4
	Wilt	- Verticillium	1	0	1
PUMPKIN - See listing under CUCURBITS					
RHUBARB (Rheum)					
	Bacterial crown rot	- Erwinia	1	0	1
	Root/Crown rot	- Rhizoctonia	1	0	1

CROP	DIAGNOSIS		CAUSAL AGENT		#
SPINACH (Spinacia)					
White rust	-	Albugo	1	0	1
SQUASH - See listing under CUCURBITS					
SWEETPOTATO (Ipomoea)					
Mollusk	-	slug	1	0	1
Scurf	-	Monilochaetes	1	0	1
TOMATO (Lycopersicon)					
Bacterial canker	-	Clavibacter	2	0	2
Bacterial speck	-	Pseudomonas	2	0	2
Bacterial spot	-	Xanthomonas	17	0	17
Blossom drop	-	poor pollination	2	0	2
Blossom end rot	-	calcium deficiency/dry	4	1	5
Catfacing	-	environmental	1	0	1
	-	unknown	1	0	1
Chemical injury	-	burn	0	1	1
	-	growth regulator	17	3	20
	-	herbicide	7	1	8
	-	unknown	1	0	1
Damping-off	-	Pythium	1	1	2
Early blight	-	Alternaria	5	0	5
Environmental stresses			8	1	9
Inadequate specimen, no disease			39		39
Insect injury			16	4	20
Leaf curl	-	unknown	0	1	1
Leaf roll	-	physiological	1	0	1
Leaf scorch	-	unknown	0	1	1
Leaf spot	-	Phoma	0	1	1
	-	Septoria	11	2	13
Nutritional	-	fertilizer burn	1	1	2
	-	general	1	0	1
	-	magnesium deficiency	0	1	1
	-	nitrogen deficiency	2	0	12
	-	phosphorus deficiency	2	0	2
	-	potassium deficiency	1	0	1
	-	soluble salts	7	0	7
Physical injury	-	unknown	1	0	1
Pith necrosis	-	Pseudomonas	1	0	1
Root knot nematode	-	Meloidogyne	1	0	1
Root rot	-	Pythium	9	0	9
Root/stem rot	-	Rhizoctonia	3	0	3
Southern blight	-	Sclerotium	3	0	3
Stem injury	-	unknown	0	1	1
Stem rot	-	Botrytis	1	0	1
	-	Fusarium	1	0	1
	-	Sclerotinia	7	0	7
Virus	-	Tobacco mosaic	4	0	4
	-	Tomato spotted wilt	3	0	3
	-	Tomato yellow leaf curl	1	0	1
Walnut wilt	-	juglone	1	0	1
Wilt	-	Fusarium	10	1	7
Yellow shoulder	-	unknown	1	0	1

CROP	DIAGNOSIS	CAUSAL AGENT		#
TURNIP - See listing under CRUCIFERS				
WATERMELON - See listing under CUCURBITS				
TOTALS		**3336**	**309**	**3645**

AgriLIFE RESEARCH & EXTENSION
Texas A&M System

TEXAS A&M UNIVERSITY

COLLEGE OF AGRICULTURE
AND LIFE SCIENCES

Department of Plant Pathology and Microbiology

April 16, 2010

Dr. M. Scott Smith, Dean
College of Agriculture
S-123 Agricultural Science Bldg.-North
Lexington, KY 40546-0091

Dear Dr. Smith:

Please find enclosed a copy of the final report prepared and approved by all members of the Plant Pathology Program Review Team. The report presents an overall assessment of the statewide plant pathology programs at the University of Kentucky, and includes a series of recommendations that will help guide and strengthen the research, teaching, and extension activities of the Department of Plant Pathology. Members of the Review Team were favorably impressed by the overall plant pathology activities at Kentucky, and you will find that this is documented throughout our report. Review Team members appreciated the opportunity to be given a close-up view of the many fine plant pathology programs affiliated with the University of Kentucky. We also want to thank you and other members of the College of Agriculture for your hospitality throughout the review process in Lexington.

Sincerely,

Dennis C. Gross
Review Team Leader

Xc: Dr. Caitilyn Allen
Dr. Helene R. Dillard
Dr. David W. Horohov
Dr. John G. Strang

2132 TAMU
120 Peterson Bldg.
College Station, TX 77843-2132

Tel. 979-845-7311
Fax.979-845-6483
http://plantpathology.tamu.edu

University of Kentucky
College of Agriculture

Department of Plant Pathology
Comprehensive Departmental Review
March 7-9, 2010

✦ Final Report ✦
April 2010

Review Team

Dennis C. Gross, Professor (Team Leader)
Department of Plant Pathology & Microbiology
Texas A&M University

Caitilyn Allen, Professor
Department of Plant Pathology
University of Wisconsin – Madison

Helene R. Dillard, Professor
Department of Plant Pathology and Plant-Microbe Biology
Director of Cornell Cooperative Extension
Associate Dean, CALS and CHE
Cornell University

David W. Horohov, Professor
Department of Veterinary Science
University of Kentucky

John G. Strang, Professor
Department of Horticulture
University of Kentucky

✦ Introduction ✦

The Review Team was charged by Dean M. Scott Smith of the College of Agriculture with conducting a comprehensive review of research, extension and instructional functions in the Department of Plant Pathology at the University of Kentucky. The goal of the review was to assess the status and future outlook of all departmental programs with the aim of establishing priorities and recommendations that will help strengthen and guide future programmatic development. Members of the team visited with faculty, staff, students, postdocs, and administrators beginning in Lexington on March 7 and concluding on March 9, 2010. Prior to the on-site visit, the review team was provided with an excellent overview document entitled "Review of Educational Units – Self Study Document" that summarized the current status of departmental programs and progress that had been made since the last internal review in 2004. In addition, the Review Team was provided with copies of the departmental strategic plan document for 2009-2014. Overall, members of the Review Team found this review process to be well-organized and smoothly run.

Our report is subdivided into five sections that present an overall assessment of elements critical to promote progress and excellence in Plant Pathology at the University of Kentucky. In addition to evaluations of the research, extension and instructional programs of the department, the report includes an assessment of relationships with administrative leadership, agricultural industries of the state, and departmental personnel.

✦ Overview and Introduction to the Department ✦

The Department of Plant Pathology at the University of Kentucky has a long, proud history of contributions to fundamental plant pathology, especially in the areas of basic fungal biology and virology. The department has emerging strength in plant disease resistance research. The extension programs are recognized as a model for serving the applied plant pathology needs of stakeholder groups while contributing to the teaching and research missions of the department. Its international reputation in research and extension extends back to the department's founding and has been maintained through the years.

Today, younger faculty have replaced their eminent forebears and have established productive programs that continue in this tradition. The current level of faculty and staff research productivity is impressive. The obvious strength of the department lies in its highly visible externally-funded basic biology research programs. An impressive number of graduate students and postdoctoral scientists are affiliated with the department and this reflects the attractiveness of the outstanding research and extension programs available, as well as the quality educational programs offered at the University of Kentucky. The agricultural industries of Kentucky are well served by the plant pathology research and extension programs. The faculty work to mitigate existing and new disease threats to Kentucky crops.

The imminent retirement of the department's long-serving chair, Professor David Smith, creates an opportunity for constructive change. Along with Dr. Smith's departure, the department faces challenging circumstances at both the local and national level. The university's emphasis on student credit teaching hours and the increasing competition for plant science research grants are just two of the significant challenges facing this faculty. Accordingly, the Review Team believes that this department's scholarly identity needs to be thoughtfully explored in the immediate future. The change in department leadership offers an excellent opportunity for

reflection on the department's relationship to the discipline of plant pathology and to the other basic and applied biology departments at the university.

✦ Administrative Leadership ✦

The Plant Pathology Department has benefited greatly from the strong and steady leadership of Dr. David Smith, who has served as chair since 1986. He has been instrumental in facilitating the department's evolution from disease biochemistry and physiology research to contemporary studies of molecular cell biology and genomics. As faculty retired, the department maintained a critical mass by recruiting exceptional research faculty, and this has resulted in the extraordinary growth in numbers of both graduate students and postdoctoral scientists. The department is recognized by the university for its "Programs of Excellence", and the leadership of the College of Agriculture is supportive of maintaining an innovative and vigorous unit.

A. ***Synopsis and Areas of Strength:***

- Dr. Smith has provided great continuity of leadership and, in particular, is recognized for his strong support of faculty and for enabling their success.
- The chair is seen as fair, direct, available, and supportive by all departmental personnel.
- Dr. Smith has created a collegial faculty team who are loyal and appreciative of his efforts.
- A strong, productive working relationship exists between the department and College of Agriculture administration.
- The mentoring of young faculty is outstanding.
- What resources are available to the department are well-managed for the most part.

B. ***Challenges and Areas for Improvement:***

- The current chair has taken on excessive administrative responsibilities. Consequently, the next chair may face unreasonable expectations that cannot be met, especially if the in-coming chair is expected to maintain a productive research and/or extension program.
- The intense effort to facilitate research excellence may have inadvertently resulted in a loss of disciplinary identity, especially for graduate students and postdocs.
- Faculty and staff gender/racial/cultural diversity is not reflective of the population of Kentucky at large.

C. ***Recommendations:***

- The collegial atmosphere of the department is commendable, and the faculty should draw on this base as they move towards a more equitable distribution of administrative responsibilities.
- The faculty are encouraged to hold a retreat to discuss departmental leadership and explicitly outline the duties and responsibilities for an incoming chair with an active scholarly program.
- It will be easier to recruit an excellent chair if the structure of the department's support staff is changed such that the incoming chair is not overly burdened with personnel,

compliance, and budget management. This may entail hiring a department administrator or business manager.

- The College administration is encouraged to consider recruiting external candidates for department chair who would be expected to establish a scholarly program at Kentucky that contributes to the visionary goals of the department.
- The incoming chair is encouraged to engage the faculty in a substantial discussion of the department's long-term goals and disciplinary identity. Discussions should include where resources and priorities are to be allocated for the foreseeable future.
- A more creative approach to management of department resources should be instituted to support travel, seminars, and other forms of professional development for graduate students and postdoctoral scholars.
- Continue efforts as identified in the department's strategic plan to improve gender/racial/cultural diversity within the faculty, staff, and student ranks.

✦ Research Programs ✦

The Department of Plant Pathology has a strong historical commitment to research and values the contributions of both basic and applied researchers. The fundamental research programs are focused on three areas of specialization – virology, mycology and host biology. Faculty members have received substantial local and national recognition for scientific and professional achievements. This programmatic emphasis is viewed by the Review Team as being a successful strategy that fosters collaboration and accomplishment among faculty, and has helped maintain national recognition for research excellence.

A. ***Synopsis and Areas of Strength:***

- All faculty members are engaged in research and strongly support each other's research goals and activities.
- The research faculty members are recognized for outstanding expertise in their respective areas of specialization as evidenced by their attainment of major competitive funding from a variety of sources including federal, state, corporate, and commodity groups.
- Success in the grants arena is reflected in the number of graduate students and postdoctoral fellows being trained in the department.
- The faculty and their trainees publish their research in highly regarded scientific journals and regularly present at national and international meetings and symposia.
- The department provides significant support to fundamental and applied research efforts by funding technical staff and providing access to state-of-the-art equipment and facilities.
- The complementary efforts of faculty in the designated research areas of focus allow for optimal sharing of equipment and space.
- The Advanced Genetic Technologies Center directed by Dr. Schardl provides a unique and valued capability to the research programs of the department, and to the college and university at large.

B. ***Challenges and Areas for Improvement:***

- The department needs to maintain a critical mass of faculty, and at the very least be able to refill faculty vacancies as they occur. Currently, the department has 13 faculty members and two of these hold either partial appointments or are in phased retirement.
- The success of the faculty in building their research programs, and the accompanying recruitment of graduate students and postdoctoral fellows, has outgrown the space available for these efforts. The department currently occupies all available space and has needed to "borrow" laboratory space from another department for its newest faculty member. Limitations in space will reduce the ability of current research programs to grow. This could also adversely affect the department's ability to recruit new faculty, postdoctoral fellows, and students.
- Research space for extension faculty is even more limited. Laboratory space or equivalent capability at the farm is urgently needed to support their productive field research.
- The uncertainty of state funding could reduce the department's ability to provide technical support to each research program. Declining state funds may require greater reliance upon grant monies for those items now covered by the department.
- Long-term support for the sequencing facility is needed in order to maintain the quality of this service for the research programs in the department and across the university. Expansion into a bioinformatics capability will eventually be necessary if this service is to be fully functional.
- While the department's equipment inventory is quite extensive, one may envision a long-term need to enhance and expand these capabilities through the purchase of both small and large equipment. Again, limitations in state funding for this purpose will be a challenge.

C. ***Recommendations:***

- The Review Team strongly endorses the departmental 5-year strategic goal of increasing the faculty numbers from 13 to 15 by the year 2014.
- It is imperative that faculty vacancies be refilled as soon as possible to avoid losing a critical mass of faculty programs that are essential for maintaining national stature in fundamental and applied research.
- Given the current space limitations as existing programs experience phenomenal growth, it may prove difficult to both replace retiring faculty and increase faculty numbers as outlined in the departmental strategic plan. Given that a new building or renovations seem unlikely in the near future, the department needs to develop alternative models for use of space to maximize utility of available space. For example, better utilization of work stations and storage space are needed, especially in regards to older less-used lab equipment.
- Alternative locations may also need to be considered for faculty research programs. For example, one or more researchers might be moved into the Kentucky Tobacco Research and Development Center, if space becomes available.
- Likewise, the proposed ARS building to be constructed adjacent to the Plant Sciences Building could provide additional overflow space.

- The faculty and chair will need to find creative solutions for replacing limited state funding support for technical staff and other services. In particular, recovered indirect costs and salary savings monies may be needed to supplement those monies previously provided by the department to support technical staff, travel and other services.

✦ Extension Programs ✦

The Plant Pathology Department has a very strong and dedicated Extension team whose members are recognized nationally as highly effective and leaders in extension plant pathology. The team meets every week to discuss emerging issues and to discuss priorities and action steps. As a high-functioning team, they have clearly identified their primary audience as the county-based extension agents serving the agricultural industries.

A. ***Synopsis and Areas of Strength:***

- The extension faculty members have developed a cohesive, collegial, and very collaborative team. They work well together, and have even achieved a sufficient level of cross-training that they can fill in for each other when needed.
- The diagnostic labs in Lexington and Princeton are strong and provide a much-needed educational service to commercial stakeholders, homeowners and extension agents throughout the state of Kentucky. The lab receives well over 3,000 samples per year, which provides the extension faculty with an overview of the pest concerns in the state. The lab remarkably remains a free service in Kentucky, which is quite rare. It is considered a very direct interface with the stakeholder groups in the state.
- The research and extension faculty collaborate at several levels and, unlike in some departments, the collaborative efforts are seamless. There is strong mutual respect between the basic research and the applied research and extension conducted in the department. There are no conflicts between the groups, adding to the collegiality within the department.
- In addition to conducting applied research and extension, the extension faculty members also have a substantial and highly significant teaching load. It is very unusual to find such a strong commitment to the teaching mission among extension faculty in other states, and the faculty here should be commended and recognized for their tri-fold efforts in teaching, research and extension. The courses taught by the extension faculty are highly regarded and favored by the students.
- The extension faculty members have strong relationships with stakeholder groups, commodity boards, and extension agents in the counties. They are highly regarded and well respected throughout the state. Although the review team did not meet with stakeholders, the data from previous surveys indicates that stakeholders are satisfied with the extension faculty and the diagnostic laboratories.

B. ***Challenges and Areas for Improvement:***

- Professor John Hartman has officially retired and agreed to return for a short 40 percent assignment. There is an urgent need to fill the Hartman extension faculty line, as the individual in this position provided critical extension pathology expertise in diseases of

nursery, forest, greenhouse and landscape plants; urban horticulture; and fruit crops. At various times in his career, Professor Hartman also worked on diseases of vegetable crops, corn and turf grasses. Currently, no applied research is being conducted in fruit and woody ornamentals. This is generating a knowledge gap that could create significant problems as new diseases continue to emerge in Kentucky.

- The extension faculty in Lexington needs additional research space for three purposes. The space for the diagnostic lab is cramped and inadequate, especially during the busy summer months when over 40 samples per day may be received. It would be advantageous to move the diagnostic lab closer to the Plant Science Building, perhaps into the proposed ARS building. Space is also needed in the small laboratory dedicated to applied research. And finally, "dirty lab" space is urgently needed at the research farm to prepare and process field experiments. This space could be easily resolved by the erection of a small steel building or through the use of a temporary building (i.e., portable building or trailer).

C. ***Recommendations:***

- Refill the extension pathology position vacated by Professor Hartman because this faculty position is of critical importance to the plant and crop health extension effort statewide.
- Develop approaches and plans for adequate space for diagnostic activities and field-oriented research, which are presently housed in cramped and substandard facilities.

✦ Academic Programs ✦

The Department of Plant Pathology offers M.S. and Ph.D. degrees in Plant Pathology and does not offer an undergraduate degree program. A wide range of graduate courses, extending from organismal courses to special topics in molecular and cellular genetics, are taught annually or in alternate years. A "Principles of Plant Pathology" (PPA 400G) is offered as an introductory course for plant science majors and entry-level graduate students. In addition, some Plant Pathology faculty members teach within the undergraduate Agricultural Biotechnology program.

A. ***Synopsis and Areas of Strength:***

- The department currently has around 27 graduate students, an impressive number for a program of its size. Many were attracted by the productivity and high profile of individual faculty research programs. The majority of graduate students are advised by research faculty.
- The department is also training about 22 postdoctoral research associates, and postdocs outnumber graduate students in several research groups. Thus the mentoring of these early-career professionals is a significant responsibility.
- In recent years the department has revised its curriculum to reduce core graduate coursework requirements; the format and content of the resulting courses are still being optimized. The graduate courses taught by extension faculty, such as PP400G (Principles of Plant Pathology) and PP640 (Identification of Plant Diseases), are widely recognized as being valuable and well-taught.

B. ***Challenges and Areas for Improvement:***

- The chair has very ably protected the faculty from standard academic duties like undergraduate and, to some degree, graduate teaching. While this has allowed them to achieve research excellence, as measured by Federal grants and high-impact publications, it may have had the undesirable side-effect of undermining their sense of responsibility to their university's teaching mission. In some ways this department functions like a research institute, and this does not always facilitate optimal mentoring of students and postdocs.
- Specifically, the review committee was concerned that graduate students are not receiving the professional training they need to prepare them for successful careers in academia, industry, or government agencies. Doctoral students are not required to teach. In some cases they get little training from their advisors in writing up their work for publication (some do not write their own "first-authored" research papers), and they have limited opportunities to present research at professional meetings. Many students felt simultaneously overworked at the bench and under mentored.
- In parallel, many faculty are not satisfied with the quality or the work ethic of the department's graduate students and may view them more as inexpensive labor than as future colleagues to be mentored. The committee also had concerns that some of the postdoctoral researchers were not receiving optimal career preparation and guidance.
- This situation may be complicated by the fact that most of the graduate students and all of the postdoctoral associates are non-US citizens. Both groups of trainees included individuals who seemed intimidated by their advisors, and anxious that any complaint might endanger their professional futures. In these cases it seemed unlikely that trainees and faculty enjoyed open intellectual discourse.
- Faculty with concerns about low-quality mentoring of the department's junior scientists may not speak up because of a desire to maintain the department's much-valued collegial atmosphere. However, the faculty and chair have a common responsibility for creating a supportive working environment for the least powerful younger members of the department.
- The department should consider how better to develop and foster a sense of disciplinary identity and scholarly breadth in all aspects of their academic program.
- The new upper-level one-credit courses reportedly require more than a credit's worth of work. In addition to the truth-in-advertising issue, this can cause problems for graduate students who after taking (for example) three substantial courses in mycology have transcripts that document only 3 credits of mycology, which may not meet job position description criteria. Some graduate courses may not contain enough didactic content and rely excessively on student-generated lectures.
- The current qualifying exam process seems to involve excessive time and may represent an effort to compensate for gaps in didactic classroom instruction.
- Faculty, students, and postdocs concur that the department's seminar series needs improvement.

C. *Recommendations:*

- The committee encourages the department to continue its iterative process of modifying and improving its graduate course requirements and offerings. Review of new or revised course syllabi, assignments, and exams by expert teachers can ensure consistent depth and breadth of coverage.
- Classroom teaching effort should be more equitably distributed across the department.
- The department may benefit from increased teaching (for example, in the Ag Biotechnology and Natural Resources Programs) in terms of scholarly breadth and student credit hours.
- A substantial experience in classroom teaching should be a part of doctoral training.
- Consider reforming the PhD qualifying exam to make it a more thoughtful learning and assessment experience.
- Use department resources to bring in several outside speakers each semester to enrich the seminar series, and use peer pressure to increase seminar attendance by all department members.
- The department should consider using undergraduate teaching and independent research projects to recruit more domestic graduate students. Overall, an emphasis on quality over quantity in graduate admissions may improve satisfaction of both faculty and students.
- The incoming chair should be empowered to investigate and take any necessary steps to improve the climate and professional development of graduate students and postdocs.
- Both graduate students and postdoctoral scholars should be given a written "plain-English" explanation of their rights and benefits (such as vacation, sick leave, family leave) when they join the department. This should identify an ombudsperson within the department or college that could help resolve confusion or conflicts associated with these rights.
- The department should consider using common departmental resources to support student attendance to professional meetings.
- The department should create and sustain separate formal organizations for its graduate students and postdocs. The department should make some resources available to these groups for social/professional activities.
- The department should periodically arrange presentations, workshops, or other ways to train their junior scientists in areas such as career opportunities, resume preparation, writing fellowship and grant applications, strategies for job applications and job interviews, development of management and budgeting skills for a faculty position, research ethics, etc.
- Graduate student and postdoc stipends are not competitive with peer institutions and need to be increased accordingly.

✦ Technical and Clerical Staff ✦

The highly skilled professional staff is recognized for making major contributions to the success of the Department of Plant Pathology. The staff exhibits strong loyalty to the departmental programs and mission. Many individual staff members have worked several years within the department and have progressed to new programs and duties over time.

A. ***Synopsis and Areas of Strength:***

- The Plant Pathology technical and clerical staff is very dedicated, capable, and effective in their jobs.
- An excellent working relationship exists among the staff and they readily help each other out as much as possible. Faculty, graduate students and postdoctoral scholars rely on the staff heavily and are very pleased with the quality of the work and expertise that they provide.
- All are pleased with Dr. David Smith's leadership and feel comfortable discussing problems with him and appreciate his willingness to foster change. They are particularly appreciative of Dr. Smith's consideration when faced with extenuating family issues and with his flexibility in addressing difficult working conditions.
- The majority have worked for the department for many years, which provides valuable continuity and experience to the research and extension programs.
- The extension group has displayed commendable planning in training a replacement for the UKREC diagnostician position in an effort to avoid Plant Diagnostic lab down time upon the planned retirement of the current diagnostician.
- Graduate students and postdocs felt that the clerical staff did an outstanding job in helping them settle in and adapt to the department.

B. ***Challenges and Areas for Improvement:***

- The rapid increase in the number of graduate students and postdoctoral scholars in recent years has presented significant challenges for the technical and clerical staff and imposed stress. Several of the lab technical staff felt that it was difficult to focus their efforts because of excessive demands for their attention. The IRIS system and increased accountability have significantly increased the work load.
- Low pay, lack of salary increases for the past four years, and salary caps are a constant source of frustration. If an individual has been in a position for more than 10 years their salary is capped out. There are no rewards for doing an exceptional job. Efforts to increase salaries through the special request process are a rigorous uphill battle and stopped when they reach HR. There was the impression that Human Resources had little understanding of the working environment and constraints in the sciences. Several individuals noted that the best way to obtain a salary increase was to apply for another position, such as in the medical center where the wage scale was higher.

C. ***Recommendations:***

- Salaries are low and stagnant and efforts to reward outstanding staff performance with recognition should be made (e.g., departmental staff awards) regardless of whether salary adjustments are feasible.
- The department chair and faculty should make a concerted effort to reward research and clerical staff for performance and ensure that as duties change and increase with responsibility and training that the job classification reflects these achievements.

- Working space is cramped and future plans should include expanded working space for technical and clerical staff.
- The rotation of a staff representative for attendance at faculty meetings has not worked as well as expected because of a lack of communication between the individual who attended the faculty meeting and other staff. The election of a staff representative for a 1-year term to attend faculty meetings would provide some continuity and provide a recognized informational contact for other staff.

✦ Summary ✦

The Department of Plant Pathology continues to provide excellent leadership in the areas of research and extension. The faculty are highly productive and widely recognized for their efforts in these areas. The department trains substantial numbers of graduate students and postdoctoral fellows, and the current teaching and mentoring practices need some attention. Upcoming changes in leadership and financial challenges, both internal and external, will likely impact this program. Both the faculty and the administration will need to work to maintain and expand the department's research, extension and teaching missions.

UK Program Review Implementation Plan

*This **required** form is described as Appendix A in AR II-I.0.6.*

College/Unit: Agriculture/Plant Pathology **Date:** September 2010

Recommendation/ Suggestion	Source I/E/H*	Accept/ Reject**	Unit Response (resulting goal or objective)	Actions (including needed resources)	Time Line
More equitable distribution of administrative responsibilities	E	R	May be counterproductive to redistribute administrative tasks amongst faculty	None	NA
Hold retreat to discuss departmental leadership	E	R	Retreat, as such, is viewed as unnecessary	Faculty have held extensive discussions concerning departmental leadership	2010
Hire upgraded business officer to help administer department	E	R	Current staffing maintains satisfactory departmental operations	Present budget environment does not permit upgraded hire	NA
External search for department chair replacement	E	A/R	Several faculty would support such a search	Current college budget situation precludes outside search	NA
Incoming chair to engage faculty in strategic discussions	E	A	Such discussions have happened in the past and are expected to continue	Ongoing discussions anticipated	Indefinite
More creative approach to management of departmental resources/professional development	E	A	New chair can consider options	Serious budget constraints may limit possible actions	Indefinite
Continue efforts to improve diversity	E/H	A	Greater gender/racial diversity amongst the faculty and staff would enrich work environment	Diversity to be considered as an important part of hiring/recruitment decisions	Indefinite
Increase faculty number from 13 to 15 by 2014	E/H	A	Would serve to strengthen an already nationally-recognized department	Requires permission to hire, plus resources to do so, both of which appear unlikely at this time	2014?
Refill faculty vacancies as soon as possible	E/H	A	Essential to maintain current standing of the department	Requires permission to hire, plus resources to do so, both of which appear unlikely at this time	Uncertain
Maximize utility of available space	E	A	To help accommodate the several dynamic research programs in the department	The faculty has, and will continue, to try to better utilize work and storage space	Ongoing

Alternative locations for research programs; enhance research space	E/H	A	To foster further development of the already high-profile research programs	Requires reallocation of College of Agriculture-assigned space; new options and/or temporary made permanent	2012?
Creative solutions for replacing limited state funding support	E	A/R	To supplement monies previously available to support technical staff, travel and other services	Indirect costs/salary savings/grants all already helping with funding limitations and it is unclear what more can be done	Indefinite
Refill the Extension faculty position presently occupied by part-time, post-retiree	E	A	To provide critical pathology expertise, statewide	Requires permission to hire, plus resources to do so, both of which appear unlikely at this time	2012?
Enhance diagnostic space	E/H	A	To improve disease diagnostic service, statewide	Requires identification/renovation of appropriate space, if available	Uncertain
Provide Research Farm laboratory space	E	A	To enhance field experimentation	Requires purchase/construction of temporary or permanent building, if funds available	Uncertain
Continue iterative process for modifying and improving graduate course requirements and offerings	E	A	To work towards optimizing a curriculum which balances traditional and contemporary studies of plant pathology	The faculty continue to refine the curriculum content and adjust credits appropriately	Ongoing
Classroom teaching effort should be more equitably distributed	E	R	Teaching is optimally divided amongst faculty members with appropriate expertise	The faculty continue to self-monitor this situation	Ongoing
Increase teaching to bolster scholarly breadth and gain student credit hours	E	A/R	Faculty are free to become more involved in teaching if this is a professional direction desired	A better administrative mechanism is needed to account for student credit hour Ag Biotech (ABT) research involvement by faculty	NA
Substantial experience in classroom teaching should be a part of doctoral training	E	A/R	Depending upon a student's ambitions, a teaching experience may or may not be necessary	PPA 799 (up to four credits) already allows students to gain substantial experience in classroom teaching, if he/she desires	NA
Consider reforming the Ph.D. Qualifying Exam to make it a more effective experience	E	A	To improve the learning and assessment outcomes of Qualifying Exams	Some faculty have initiated practice examinations to better prepare students and improve their Qualifying Exam experiences	Ongoing
Use department resources to bring in outside seminar speakers and exert peer pressure to increase seminar attendance	E	A/R	Until the very recent budget crisis, departmental monies were regularly used to bring in outside speakers	At least one outside speaker will be paid for by the department in Academic Year 2010-2011; seminar attendance and participation is being encouraged	Ongoing
Recruit more domestic graduate students and enhance quality	E	A/R	To broaden the graduate student cohort	Already existing ABT and summer research experiences for undergraduates may allow opportunities to boost domestic graduate student recruitment and,	Ongoing

				perhaps, overall quality	
Improve graduate student and postdoctoral scholar professional development opportunities	E	A	To create a more optimal climate for junior scientist professional development	The newly established Association of Plant Pathology Scholars (APPS) will seek to provide improved professional development opportunities	2010; ongoing
Graduate student and postdoctoral scholar rights and benefits; ombudsperson	E	A/R	Much information is already provided through the department, or is available elsewhere on campus; the Office Manager or Chair will direct any concerned individual(s) to University rules regarding grievance procedures	Where/When appropriate, additional pertinent information will be provided; APPS will serve an advocacy role for graduate students and postdoctoral scholars	Ongoing
Use common departmental resources to support student attendance at professional meetings	E	A/R	To help students participate in relevant professional conferences	Beyond help already provided from individual faculty-controlled resources, it is unclear, in the present budget climate, that more funds could be assigned centrally	Uncertain
Create and sustain formal organization(s) for graduate students and postdoctoral researchers	E	A	To encourage professional development, networking and outreach opportunities	The establishment of APPS, which receives departmental financial support, is a major step forward	2010; ongoing
Training of junior scientists beyond formal classwork and laboratory research	E	A	To train graduate students and postdoctoral scholars in a manner which assures that they will be “well rounded” individuals upon leaving the department	Beyond what is already accomplished in this regard, it is anticipated that APPS’s activities will provide further enriching opportunities	Ongoing
Bolster graduate student and postdoctoral stipends	E/H	A	To achieve nationally competitive remuneration	As a first step, the department increased graduate student stipends by $1,000 in FY 2010-2011; the University has blocked raises for postdoctoral researchers	2010
Recognition for outstanding staff performance	E	A/R	To reward staff in times of stagnant salaries	Consideration could be given to creating departmental staff awards; the College of Agriculture has a prominent Outstanding Staff Awards program which has led to recognition of several departmental staff and to which further nominations will be encouraged	Uncertain
Job classifications should accurately reflect duties and responsibilities	E	A/R	To reward research and clerical staff for job performance	Within the constraints of Human Resources’s grade scales and budget realities, efforts are made to ensure that staff are appropriately classified	Ongoing
Additional working space for technical and clerical staff	E/H	A	To help accommodate the many ongoing departmental activities	Requires reallocation of College of Agriculture-assigned space; new options and/or temporary made permanent	Uncertain

Stabilize staff representation at Faculty Meetings	E	A/R	To accomplish continuity and (a) recognized point-of-contact(s)	Requires election, by staff, of clerical and technical representatives to serve 1-year terms for attending Faculty Meetings, if each group so desires	By 2011

*** 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: David A. Smith **Unit Head Supervisor Signature:** _____ **Date:** _____