

**Department of Plant Pathology  
College of Agricultural Sciences  
The Pennsylvania State University**

**Strategic Plan**

**2009-2013**

**prepared and submitted  
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## **Department of Plant Pathology Strategic Plan – 2009 - 2013**

### **Executive Summary**

The Strategic Plan of the Department of Plant Pathology encompasses the period from 2009 to 2013. The plan sets forth the objectives, targets, strategies, and actions for four major strategic goals. First, the Department will continue to manage and improve a quality graduate program that results in greater student success. Second, the Department will focus its energies on enhanced knowledge discovery and translation in order to benefit its agricultural stakeholders and society at large. Third, the Department recognizes the importance of meaningful communications with our stakeholders. In response, the department will enhance outreach to current stakeholders and endeavor to identify and reach out to newly developing clientele. Fourth, the Department is committed to sustaining a productive academic community by supporting aspirations, rewarding effort, maintaining a safe environment, and promoting inclusiveness. The fourth goal encompasses our efforts to be in congruence with “A Framework to Foster Diversity at Penn State.” To a great extent, these four goals are consonant with College and University goals.

The faculty believes the Department is poised to become one of the best Plant Pathology units in the United States. We are one of 16 stand-alone Departments of Plant Pathology nationwide. Our strength is the balance we currently maintain in our mission-based and discovery-based research programs. This balance does not exist in many of the 16 departments.

The Department recognizes an existing systems approach in many of its mission activities. Successful applications of the Department’s research are vital to food and fiber systems, the ecosystem, and socioeconomic systems that are drivers to the College Plan.

All members of the Department have vetted the Strategic Plan. A number of people contributed to the creative writing process. The faculty at-large held several strategic planning sessions, and graduate students engaged in a strategic planning session. This document outlines the goals, strategies, and action plans developed during these planning sessions. This plan has been approved by the faculty.

## **Strategic Challenges and Strategic Advantages**

### **Stakeholders of Plant Pathology include:**

- Graduate and undergraduate students
- Commodity groups in Pennsylvania (mushrooms, turf, vegetables, potatoes, field crops, grapes, tree fruits, ornamentals/nursery, forestry)
- USDA-ARS, USDA-APHIS, Pennsylvania Department of Agriculture, Pennsylvania Department of Conservation and Natural Resources

### **Strategic Challenges**

- Communicating the relevancy of plant pathology (food quality and safety, environment)
- Incorporating new technologies for maintaining plant health and food safety
- Anticipating emerging issues (biosecurity, food safety, GMOs, bioenergy)
- Aligning with strategic goals of the College of Agricultural Sciences
- The need to participate more in undergraduate education
- Developing programs to address APHIS needs for education of personnel, pathogen identification, and biosecurity
- Loss of faculty to leadership positions
- Maintaining a balance of applied and basic science needs in our graduate curriculum
- Recruiting minority graduate students to enhance diversity
- Utilizing faculty at the Fruit Research and Extension Center in our curriculum

### **Strategic Advantages**

- Strong ties with commodity groups
- Strong links to international agricultural research
- Basic (discovery) –applied research collaborations among faculty
- Long-term collaboration with USDA-ARS and USDA-APHIS
- Success in speciality crop granting
- Nationally recognized disciplinary diversity within the department

## **Mission, Core Values, and Vision**

### **Mission Statement**

The Mission of the Department of Plant Pathology is to engage in quality research, education, cooperative extension, and outreach in phytopathology, mycology, and mushroom science with emphasis on the understanding of relationships among plants, pathogens, and the environment and on the management of plant and mushroom diseases associated with crop production, food safety, and human health.

### **Vision**

The Department of Plant Pathology is dedicated to being an international disciplinary leader in the integration of research, teaching, and extension.

### **Goal**

That the Department of Plant Pathology at The Pennsylvania State University be the preeminent resource in the Northeast on plant health and plant-microbe interactions.

## Core Values

- We maintain the highest standards of integrity, honesty, responsibility, and accountability. In so doing, we subscribe to the Code of Professional Conduct as established by the American Phytopathological Society ([www.apsnet.org/members/gov/conduct.asp](http://www.apsnet.org/members/gov/conduct.asp)).
- We uphold a commitment to the land-grant university concept and our college and its mission
- We actively participate in the planning and implementation of college programs with the involvement, support, and encouragement of our colleagues and the public.
- We are open to change and we are responsive to emerging issues affecting society.
- We cooperate among ourselves and with our colleagues and we use interdisciplinary collaboration and communication to solve complex problems for the common good.
- We provide lifelong learning opportunities and access to information and knowledge for all Pennsylvania residents.
- We support human rights and respect people who are from diverse cultures, who have different ethnic backgrounds, and we support cross-cultural competence.
- We provide an atmosphere of mutual respect that promotes open sharing of ideas and viewpoints and debate of issues and concerns. Moreover, we subscribe to the principles of academic freedom and tenure, as articulated by the American Association of University Professors ([www.aaup.org/Com-a/resources.htm#redbook](http://www.aaup.org/Com-a/resources.htm#redbook)).
- We are committed to the welfare of our co-workers and to an environment that nurtures professional development and personal growth. Further, we expect and stimulate excellence in co-worker performance and pledge to evaluate their work objectively and fairly. The members of the Department of Plant Pathology adhere to employment policies of The Pennsylvania State University, detailed on the web at: [www.ohr.psu.edu/policies.htm](http://www.ohr.psu.edu/policies.htm)
- We value the physical resources of The Pennsylvania State University and the procedures to ensure the physical safety of employees and visitors.

## Strategic Initiatives

- **Pest Prediction and Response**

This is the foundation of our discipline, and our research, resident education, and outreach revolve around this initiative. Several initiatives with national impact (e.g. IPM-PIPE, pathogen databases, biosecurity) have been developed and others are being planned.

- **Food, Diet, and Health**

Department research involving edible commodities contributes to the production of food that is free of biological agents that could be a threat to human health. Research on mycotoxins is directly related to safe food and feed. We feature one upper-level undergraduate course in “mycotoxicology.”

- **Energy**

Because of an open position in Field Crops Pathology, we have reduced capacity in the initiative of “Energy.” We have proposed a position jointly with the Eberly College of Science on researching organisms that break down cellulose related to cellulosic forms of energy. At this time we have no initiatives in the area of energy.

- **Entrepreneurship**

Two initiatives within the department involving mushrooms have resulted or will result in industries creating jobs. Research projects on spent mushroom compost have led to the development of new industries that utilize spent mushroom compost. Another current research project involves utilizing mushrooms as a platform for producing pharmaceuticals.

- **Water Quality and Quantity**

Research and extension activities in this initiative are addressed by a project examining the presence of a serious plant pathogen (*Pythium*) in water. The potential presence of plant pathogens in water is a significant deterrent to the adoption of water recycling practices by growers. Water quality degradation by the presence of plant pathogens indirectly affects the quantity of high quality water available to growers. Also, research in integrated pest management across the commodity groups (turf, field crops, potatoes, vegetables, grapes, tree fruits, mushrooms, and ornamentals) served by our department has led to reduced pesticide applications, resulting in cleaner run-off water. This has been especially important around well-heads and within the Chesapeake Bay drainage area.

## Unit Goals and Strategies

### **Goal A. Enhance Student Success and Increase Enrollment**

#### **Strategic Objectives**

1. Improve graduate education in Plant Pathology to give graduates the knowledge and flexibility to adapt to changing needs during their working career and to be able to make significant contributions to science and society.

#### ***Strategy/Action***

- Enhance the quality of our graduate program through increased professional development opportunities and quality instruction.
  - a. Design and offer a professional development program including professional ethics, cultural awareness, leadership skills, and real-world experiences in outreach and research.
  - b. Clearly define and standardize criteria that can be used for fulfilling the graduate teaching experience required for the Ph.D.
  - c. Encourage and support student travel for collaborations and acquiring new skills and for international learning and work experiences.
- Participate in the Masters of Homeland Security Agricultural Biosecurity Option.
  - a. Develop a web-based course in Plant Biosecurity.
- Realign faculty teaching assignments in response to changing curriculum needs determined by the Graduate Faculty.
  - a. Require an annual review and report by the Instruction & Curriculum Committee on the current status of the Plant Pathology curriculum and recommend modifications in response to changing disciplinary needs over time.
  - b. Strongly consider program curricular deficits when developing job descriptions for new hires to enhance and maintain the core curriculum necessary to support the discipline of plant pathology.
  - c. Enhance capacity to realign existing faculty teaching assignments in response to changing curriculum needs and changing student interests over time.

- Enhance graduate student recruitment activities to increase the number of high quality applicants and to increase the percentage recruitment of accepted applicants.
  - a. Benchmark value of current research assistantships with graduate programs at other similar institutions and enhance value as needed to maintain competitiveness for scholastically superior students.
  - b. Enhance the departmental website for recruitment purposes by increasing interactive presence through departmental blog site, Facebook, and videos advertising research, outreach, and teaching activities by members of the faculty.
  - c. Increase collaboration in recruitment weekend activities for prospective applicants and increase faculty and graduate student involvement.
  - d. Target recruitment of under-represented, ethnically diverse graduate students and enhance support for student retention and success.
- Enhance graduate assistantship funding opportunities
  - a. Encourage increased faculty funding of research assistantships on external grants and submission of training grants.
  - b. Seek and recruit academically superior students competitive for college/university fellowships.
  - c. Maximize utilization of matching funds from the college and graduate school.
- Conduct an annual graduate program evaluation utilizing internal and external stakeholders, and develop a report to the Graduate Faculty for use in realigning the curriculum when appropriate.
  - a. Conduct exit interviews with all graduating M.S. and Ph.D. students following their final thesis defense and prior to their leaving the department.
  - b. Develop a web-based survey/communication platform that will assess learning outcomes and the relevance of their education to career pursuits by graduates. This web-based tool also will allow us to maintain contact with alumni.
  - c. At two and five years post graduation, request feedback on the perceived quality and usefulness of graduate's education in plant pathology.

***Performance Indicators***

- Academic quality of graduate program applicants: Critically evaluate the quality of all applicants prior to acceptance. Maintain high acceptance standards, considering GRE

score, GPA on B.S. degree work, previous professional experiences, and quality of recommendations.

- Graduate Student Achievement: Critically evaluate performance indicators for all graduate students, including GPA, professional awards, publications, professional society participation, professional meeting presentations, significant professional travel experiences, efforts to attract external funding.
  - Number of assistantships from internal and external sources
  - Post-Graduation Student Activities: Evaluate placement of graduate students professionally following graduation. Is post-graduate employment in an area related to the graduate's field of study. Determine the pattern of placement and how that relates to the curriculum.
2. Enhance and strengthen the role of Plant Pathology in undergraduate education and broaden student awareness of the importance of plant health through general education courses.

***Strategy/Action***

- Encourage increased recruitment efforts and continue to support a part-time recruiter for the Agroecology major.
- Increase the number of undergraduate student credit hours generated/year by increasing enrollment limits on general education courses currently taught and by enhancing the number of undergraduates enrolled in supervised independent research (PPATH 296/496).
- Enhance and modify the plant science option of the Agroecology major and evaluate options for development of alternative undergraduate programming in applied microbiology or other identified areas of undergraduate interest.
- Develop an assessment matrix for evaluating the learning outcomes and student performance associated with the Agroecology major and Plant Pathology Minor programs.

***Performance Indicators:***

- Undergraduate enrollment levels: Monitor the number of undergraduates in the Agroecology major, Plant Pathology Minor, and Mushroom Science Minor programs.
- Enrolled undergraduate quality: Enhance recruitment of high quality students, utilizing performance indicators such as high GPA and SAT scores and class rank.
- Post-graduate activities: Track employment satisfaction of graduates utilizing departmental website links.

## **Goal B: Enhance Knowledge Discovery and Translation**

### **Strategic Objectives**

1. Maintain and enhance the quality of research programs while maintaining a balance in project research for both basic discovery and problem solving relevant to our stakeholder groups in the Commonwealth and the nation.

#### ***Strategy/Action***

- Stimulate grant requests by returning overhead to Principal Investigators.
- Continue to develop collaborations with other governmental agencies such as DHS, DEP, EPA, PDA, DCNR, and peer land-grant institutions.
- Encourage the creation of faculty positions that benefit multiple units in the college and also synergistically enhance existing research and education programs.
  - a. Field crops position (75% extension, 25% research) - Pest Prediction initiative
  - b. Invasive species epidemiologist (75% research, 25% teaching) - Pest Prediction initiative)
  - c. Molecular microbial ecologist (75% research, 25% teaching) - Bioenergy initiative
  - d. Molecular Plant Virologist (75% research, 25% teaching) – Pest Prediction initiative
- Encourage increased interdisciplinary research programming and utilize cost-sharing to support relevant faculty positions.
- Increase departmental endowed funding for research programs.
  - a. Work with the College of Agricultural Sciences Development Office
  - b. Campaign by way of the annual Departmental Newsletter

2. Integrate basic and adaptive research in order to increase profitability related to the sustainable production of food, plants, and plant products.

***Strategy/Action***

- Develop plans for development of modern greenhouses and a containment facility for “Plant Sciences”
  - Develop plans for new mushroom facilities
3. Enhance our role in regional/national biosecurity/homeland security issues involving detection, control, containment, and eradication of invasive and exotic plant pathogens and their toxins.

***Strategy/Action***

- Enhance existing linkages with USDA, APHIS, and ARS (i.e. Fort Detrick, Peoria, and Beltsville) to develop innovative research/education initiatives (e.g. those relevant to homeland security and invasive species issues).
4. Enhance the visibility of the department in the scientific community.

***Strategy/Action***

- Encourage faculty and students to attend and present at national and international scientific and technical meetings.
- Increase the number of visitors to the department by encouraging and supporting invitations to visiting scientists, seminar speakers, and faculty sabbaticals.
- Increase participation in the American Phytopathological Society, Mycological Society of America, and other professional society activities, including announcing major activities/developments in the department through their newsletters.
- Increase participation in and contribution to state and federal research funding agencies (e.g. grant review panels, expert panels) as well as trade organizations.

***Performance Indicators***

- Quantity and quality of competitive and extramural grant activity based on grants received expressed as a department rolling average and on source of grants.
- Quality and number of faculty publications based on refereed journals, books and book chapters, trade journals, and clientele-oriented publications, and online articles.

- Number of invited speaking engagements by faculty, staff, and students for symposia, seminars, regional, national, and international meetings.
- Number and value of gifts and research endowments.
- Number of graduate students, postdoctoral associates, visiting and sabbatical scholars in the department.

## **GOAL C: Strengthen Meaningful Communications and Mutual Education with Current and New Stakeholders**

### **Strategic Objectives**

1. Provide expertise and develop relevant education programs on plant health issues.

#### ***Strategy/Action***

- Maintain Plant Disease Clinic staffing to serve stakeholder needs.
  - Enhance the Plant Disease Clinic capabilities to be a first detector of pathogens that pose significant biosecurity threats, and continue to cooperate with other clinics in the region and nation in this effort to protect agricultural production, the ecosystem, and human health.
  - Hire extension faculty in field crops pathology.
  - Offer educational programs to improve stakeholder knowledge about the causes and management of diseases. Into these programs, integrate the concepts of sustainable agricultural systems, entrepreneurship, and the timely and effective use of pesticides.
  - Deliver in-service workshops that provide education in basic plant pathology and disease diagnosis to extension educators. In addition to face-to-face formats, provide opportunities for continued education for extension educators and others by developing modules to be offered via the internet on permanently available and on-demand, self-taught bases, and for use on a scheduled basis for individual instruction.
  - Shift efforts to meet emerging needs as necessary and appropriate (e.g. soybean rust, *Ralstonia*, *Phytophthora ramorum*, plum pox virus, late blight, mushroom green mold, etc.)
2. Promote greater interdisciplinary effort across education, research, extension, and outreach through participation and leadership in the Natural Working Groups (NWGs).

#### ***Strategy/Action***

- Integrate Clinic needs for use of new technologies in diagnosis with the ongoing research work in the department.
- Provide opportunities for extension educators to collaborate in cooperative extension/adaptive research projects.
- Enhance involvement in multi-state cooperative extension programs as appropriate.

3. Improve the Department's communications with the general public and stakeholders.

***Strategy/Action***

- Play a key role in stakeholder education using current and emerging technologies (for example, PA-PIPE).
- Encourage student participation in extension education and outreach.
- Provide extension educational materials and presentations in Spanish, utilizing web-based educational materials and traditional publications (fact sheets).

***Performance Indicators***

- Evaluate stakeholder satisfaction with programs and redirect as needed.
  - a. program evaluation summaries
  - b. number of stakeholders reached
- Document the number of extension educational materials produced by Plant Pathology faculty and track their distribution and use.
  - a. fact sheets and bulletins
  - b. for-sale publications
  - c. newsletters
  - d. web-based information
  - e. PowerPoint presentations
  - f. news releases
  - g. trade journal publications
- Document grant proposal submissions in support of extension education programs.
- Document the number of invitations to participate in extension education and outreach programs in other states.
- Document the Plant Disease Clinic's number of samples completed for stakeholders.
- Document participation in Ag Progress Days and other public venues.

## **Goal D: Sustain and Promote a Productive Workplace Environment**

### **Strategic Objectives**

1. Encourage increased participation in professional development activities for support staff, academic personnel, and students.

#### ***Strategy/Action***

- Advertise, promote and commensurately reward professional development activities.
  - Encourage staff to utilize the staff development fund to further their professional development.
  - Obtain information from Penn State sources and external agencies on developing funding for international program development.
  - Seek to endow a program for extended student and faculty exchanges with other universities and research institutions around the world.
  - Continuously update the department web page to reflect current personnel, programs, and activities.
  - Include graduate students and post-doctoral associates as members of departmental committees.
2. Foster a climate of acceptance and mutual support, and promote positive mental and physical health. (Campus Climate and Intergroup Relations)

#### ***Strategy/Action***

- Maintain an active social committee and increase the sense of community among students, faculty, and staff.
- Integrate more fully postdoctoral researchers in departmental activities.
- Encourage Emeritus faculty involvement in the mission of the department.
- Continue the departmental monthly and annual newsletters and frequently update the department's web page and listserv.
- Maintain awards ceremony including the Outstanding Staff Award and faculty Excellence in Teaching Award.
- Provide updated departmental handbooks to employees, staff, and visiting scientists that clearly outline departmental protocols and expectations.

3. Ensure an inclusive work environment and embrace diversity.

***Strategy/Action***

- Internationalize the graduate curriculum and experience by providing partial funding to graduate students for working abroad for a few weeks or semester (Education and Scholarship).
- Recruit students, staff, and faculty from the underrepresented groups (Representation).
- Discuss diversity issues with incoming students during an annual orientation session.

4. Ensure and maintain a safe physical work environment

***Strategy/Action***

- Hire a Facilities and Safety Coordinator for Buckhout Laboratory
- Promote safety activities and participation in safety workshops and other university-sponsored behavioral programs

5. Reduce the department's environmental footprint.

***Strategy/Action***

- Increase the amount of recycled materials including paper, newspapers, plastic, glass, and metal cans.
- Compost appropriate waste from greenhouse, building, and growth chambers.
- Encourage employees and students to turn off lights and equipment and close fume hoods when not in use to conserve energy wherever possible.

6. Develop cost-savings initiatives within the department.

***Strategy/Action***

- Migration to the College-supported master budget-reporting tool, which builds on IBIS and has increased efficiency of accounting staff.
- Reallocation of graduate assistantship resources, requiring faculty to pay summer wages, thereby enabling the department to increase stipend levels and add four semesters of tuition grant-in-aid to the departmental pool.
- Utilization of the University Copier Management Program to reduce costs of leasing and maintaining departmental copiers.

- Purchase a more energy-efficient soil sterilizer for the greenhouse.
- Renovation of environmentally controlled rooms at the Mushroom Research Center that are more energy efficient.
- Encourage reimbursement for actual out-of-pocket costs rather than per diem for travel.
- Purchase of some high-use products in bulk to get discounts.
- Utilization of videoconference capability to reduce travel costs.
- Use of web-based learning to reduce copying costs and paper.
- Seek seminar speakers who are within driving distance to reduce airfare costs.
- Invite seminar speakers to be guests in our home when appropriate.
- Utilization of in-service opportunities to train the trainer and reduce travel costs.

#### ***Performance Indicators***

- Quantitate percentage of employees participating in professional development activities and the number of activities attended.
- Track international traveling—numbers of employees and trips.
- Pass safety inspections consistently.
- Track international education activities.

## Prioritized List of Programs

### **Prioritized list of programs to be enhanced:**

- Field Crops Pathology (Pest Prediction Initiative)
- Epidemiology (Pest Prediction Initiative)
- Development of an option within the undergraduate Agroecology major that addresses needs of APHIS
- Curriculum on plant biosecurity and other emerging areas as needs arise.
- Continued emphasis on developing departmental leadership from within the faculty.
- The Plant Disease Clinic

### **Prioritized list of programs to be reduced:**

- Evaluate programmatic areas regularly and reallocate FTEs to priority areas as appropriate to address newly emerging extension, research, or teaching needs.

## Appendix I

### Extension Faculty and their Natural Working Groups (NWG)

<b>Faculty</b>	<b>(FTE)</b>	<b>NWG</b>
David Beyer	(.90)	Horticulture- Edible and non-edible
Beth Gugino	(.75)	Horticulture- Edible and non-edible
John Halbrendt	(.20)	Horticulture- Edible and non-edible
Gary Moorman	(.73)	Horticulture- Edible and non-edible
Henry Ngugi	(.25)	Horticulture- Edible and non-edible
Peter Romaine	(.15)	Value Added
Daniel Royse	(.20)	Horticulture- Edible and non-edible
Elwin Stewart	(.30)	Horticulture- Edible and non-edible
James Travis	(.74)	Horticulture- Edible and non-edible

## **Appendix II**

### **Learning Goals and Outcomes for Graduate Students in Plant Pathology**

#### **Goals**

1. Develop high-level writing skills  
(Research proposal, written candidacy examination for Ph.D. students, professional development and ethics course)
2. Develop high-level oral communication skills  
(PPATH 590 - seminar, oral candidacy and comprehensive examinations for Ph.D. students, presentations at regional and national meetings, professional development and ethics course, final examinations/thesis defense)
3. Develop research skills (analyze and interpret data)  
(PPATH 600- research)
4. Develop a high level of technical competency in plant pathology  
(PPATH 405, 505)
5. Develop leadership skills
6. Develop high level of ethical standards  
(professional development and ethics course)
7. Develop an international or global view of plant pathology  
(PPATH 590 – seminar; PPATH 597 - Tropical Plant Pathology)

## APPENDIX III: Plant Pathology Courses and Courses Taught by Plant Pathology Faculty

### PPATH 100-400 LEVEL COURSES

[PPATH 120](#) (GN) **THE FUNGAL JUNGLE: A MYCOLOGICAL SAFARI FROM TRUFFLES TO SLIME MOLDS** (3) Students will learn about the world of fungi and the many ways it impacts their lives. [M. Jimenez Gasco and G. Kuldau]

[PPATH 296](#) **INDEPENDENT STUDIES** ( 1 -18)

[PPATH 297](#) **SPECIAL TOPICS** ( 1 - 9)

[PPATH 300](#) (GN) **HORTICULTURAL CROP DISEASES** (3) Diseases of horticultural crops are examined stressing their cause, diagnosis, control and national and international importance. Prerequisite: 3 credits in a biological science [G.Moorman]

[PPATH 318](#) **DISEASES OF FOREST AND SHADE TREES** ( 2) Introduction to diagnosis and control of forest and shade tree diseases. [D. Davis]

[PPATH 397](#) **SPECIAL TOPICS** ( 1 - 9)

[PPATH 405](#) **MICROBE-PLANT INTERACTIONS: PLANT DISEASE AND BIOLOGICAL CONTROL** ( 3) Survey of microbe-plant interactions causing plant disease, mechanisms of pathogenesis, disease control, and microbial and molecular biological control strategies. Prerequisite: [BIOL 110](#) [F. Gildow]

[PPATH 412](#) **TURFGRASS DISEASE MANAGEMENT** ( 3) Introduction to biology of turfgrass pathogens and management of cool- and warm-season turfgrass disease. Prerequisite: [TURF 230](#), [TURF 235](#), [CHEM 101](#) or [CHEM 110](#), [BIOL 027](#) [W.Uddin]

[PPATH 416](#) **PLANT VIROLOGY: MOLECULES TO POPULATIONS** (3) An exploration of the molecular biology and population dynamics of the virus-plant interaction. Prerequisite: [BIOL 110](#) and [BIOL 120](#) [P. Romaine]

[PPATH 417](#) **PHYTOBACTERIOLOGY** (3) The physical, molecular and genetic mechanisms of bacterial pathogenesis in plants. Prerequisites: [BIOL 110](#), BIOL 222, and any one of the following: BMB 211, MICRB 201 or MICRB/BMB 251. [T. McNellis]

[PPATH 419](#) **PLANT NEMATOLOGY** (2) The biology of plant pathogenic nematodes, the diseases they cause, and their control. Prerequisite: [BIOL 110](#), [BIOL 120](#) [J. Halbrendt]

[PPATH 425](#) (BIOL) **BIOLOGY OF FUNGI** ( 4) A survey of the biological diversity of fungi, stressing evolution, ecology, disease, morphology, life histories, and importance to humans. Prerequisite: fifth-semester or graduate standing in a biological sciences major, with six credits completed in the major [D. Geiser]

[PPATH 427](#) **MYCOTOXINS: EFFECTS OF FUNGAL TOXINS ON HUMAN AND ANIMAL HEALTH** ( 3) Description and history of mycotoxicoses. Mycotoxin formation, occurrence, control, economic and social impacts, and regulatory issues. Prerequisite: [BIOL 110](#) or [BIOL 011](#) and [BIOL 012](#); [CHEM 112](#), [CHEM 113](#); course can also be taken with approval of the instructor [**G. Kuldau**]

[PPATH 430](#) (E R M) **AIR POLLUTION IMPACTS TO TERRESTRIAL ECOSYSTEMS** ( 3) An overview of direct and indirect effects of air pollution on terrestrial plants and ecosystems. [**D.Decoteau**]

[PPATH 457](#) (AGECO / ENT) **PRINCIPLES OF INTEGRATED PEST MANAGEMENT** ( 3) Integrated study of pest complexes and their management, emphasizing ecological principles drawing on examples from a range of agricultural, forestry and urban systems. This course is designed for sixth, seventh, and eighth semester students and graduate students. Prerequisite: Must take two or more of the following: [ENT 313](#) and/or [PPATH 405](#) and/or [PPATH 318](#) and/or [HORT 238](#) or permission of program [**P. Backman**]

[PPATH 496](#) **INDEPENDENT STUDIES** ( 1 -18)

[PPATH 497](#) **SPECIAL TOPICS** ( 1 - 9)

### **PPATH 500-600 LEVEL COURSES**

[PPATH 502](#) **PLANT DISEASE DIAGNOSIS** ( 3) Field and laboratory techniques used in diagnosing plant diseases caused by various types of pathogens with emphasis on fungi. [**D. Davis**]

[PPATH 505](#) **FUNDAMENTALS OF PHYTOPATHOLOGY** ( 3) An in-depth tutorial of the fundamental theories and concepts of plant pathology. Prerequisite: [PPATH 405](#) or equivalent [**M. Jimenez Gasco**]

[PPATH 533](#) **MOLECULAR GENETICS OF PLANT-PATHOGEN INTERACTIONS** ( 3) In depth discussion/review of the primary literature on the mechanisms of plant-pathogen interactions at the molecular and cellular levels. Prerequisite: [PPATH 405](#) or equivalent and [BMB 400](#) or equivalent [**S.Kang**]

[PPATH 540](#) **PLANT DISEASE CONTROL** ( 3) Principles of plant disease control, including theoretical considerations involved in control by chemical and nonchemical means. [**P. Backman**]

[PPATH 542](#) **EPIDEMIOLOGY OF PLANT DISEASES** ( 3) Disease development in populations of plants, with emphasis on the impact of environment and control practices on rate of development. Prerequisite: [PPATH 405](#); [MATH 111](#) or [MATH 141](#) or 3 credits in statistics. [**assigned faculty**]

[PPATH 543](#) **PATHOGEN VARIATION AND HOST RESISTANCE** ( 3) Mechanisms and implications of genetic variation in plant pathogens related to breeding for disease resistance in plants by genetic means. Prerequisite: [PPATH 405](#) and [HORT 407](#) [**B. Christ**]

[PPATH 544](#) **FUNGAL GENETICS** ( 4) Fungal breeding systems, mating types, asexual restrictions and recombination, tetrad analysis, gene conversion and extra genetic elements. Prerequisite: 3 credits of mycology and introductory genetics [**G.Kuldau**]

[PPATH 590](#) **COLLOQUIUM** (1) Continuing seminars which consist of a series of individual lectures by faculty, students, or outside speakers.

[PPATH 596](#) **INDIVIDUAL STUDIES** ( 1 - 9) Creative projects, including non- thesis research, which are supervised on an individual basis and which fall outside the scope of formal courses.

[PPATH 597](#) **SPECIAL TOPICS** ( 1 - 9)

[PPATH 600](#) **THESIS RESEARCH** (1-15)

[PPATH 601](#) **PhD DISSERTATION FULL-TIME**.(0)

[PPATH 602](#) **SUPERVISED EXPERIENCE AND COLLEGE TEACHING**.(1-3)

[PPATH 611](#) **PhD DISSERTATION PART-TIME**.(0)

#### **OTHER COURSES TAUGHT BY PLANT PATHOLOGY FACULTY**

[AG 150S](#) **BE A MASTER STUDENT!** (2) Students explore agricultural issues and research methodologies through literature review, library searches, field studies, and critical thinking. [**D. Decoteau**]

[AG 160](#) (GH) **INTRODUCTION INTO ETHICS AND ISSUES IN AGRICULTURE** (3) The course explores ethical theories, concepts of critical thinking, and major ethical issues related to American agriculture. [**F. Lukezic**]

[AGECO 121](#) (PPATH) (GN) **PLANT STRESS: IT'S NOT EASY BEING GREEN** (3) The many hazards faced by plants and the dynamic ways that plants respond to these problems are examined. [**T. McNellis**]

[AGECO 122](#) (PPATH)(GN) **ATMOSPHERIC ENVIRONMENT: GROWING IN THE WIND** (3) Dynamic effects of weather on ecosystems and habitation of Earth. [**S. Isard**]

[AGECO 457](#) (AGECO / PPATH) **PRINCIPLES OF INTEGRATED PEST MANAGEMENT** ( 3) Integrated study of pest complexes and their management, emphasizing ecological principles drawing on examples from a range of agricultural, forestry and urban systems. This course is designed for sixth, seventh, and eighth semester students and graduate students. Prerequisite: Must take two or more of the following: [ENT 313](#) and/or [PPATH 405](#) and/or [PPATH 318](#) and/or [HORT 238](#) or permission of program. [**P. Backman**]

[AGECO 490](#) **AGROECOLOGY COLLOQUIUM** (3) Students will be discussing topics related to the major and develop presentations in consultation with the course instructor. [**P. Backman**]

**AGRO 518 RESPONSES OF CROP PLANTS TO ENVIRONMENTAL STRESS (3)**

Physiological and ecological aspects of the response of crop plants to environmental stresses in establishment, persistence, and reproduction. [Y. Yang, team taught]

**BMMB 598C MICROBIAL BIOLOGY I (4)** Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or term. [G. Kuldau, team taught]

**ENT 539 CHEMICAL ECOLOGY OF INSECTS (3)** Interactions of insects with environmental chemicals, including natural and synthetic compounds; host finding and other behavior modifying cues. [G. Kuldau, team taught]

**E R M 430 (PPATH 430) AIR POLLUTION IMPACTS TO TERRESTRIAL ECOSYSTEMS (3)** Overview of the direct and indirect effects of air pollutants on terrestrial plants and ecosystems. [D. Decoteau]

**HLS 520 AGRICULTURAL BIOSECURITY: PROTECTING A KEY INFRASTRUCTURE (3)** Course will explore intentional and unintentional threats to the agriculture- food system, history and current approaches for safeguarding this key infrastructure. [G. Kuldau]

**HORT 297A ORNAMENTAL AND TURF PEST MANAGEMENT AND PESTICIDE HANDLING (2)** Principles and practices for Pennsylvania certification in handling, storage, and application of pesticides in management of turf and ornamental pests. [G. Moorman, team taught]

**HORT 315 ENVIRONMENTAL EFFECTS ON HORTICULTURAL CROPS (3)** Horticultural plants respond to the environmental factors of light, temperature, water, and fertilizer both in controlled and field environments. [D. Decoteau]

**HORT 490 SENIOR SEMINAR (1)** Exploration of the interrelationships of horticulture, science, and society; evaluation of attributes and abilities related to various career opportunities. [D. Decoteau]

**IBIOS 571 CURRENT ISSUES IN BIOTECHNOLOGY (2)** Lecture-discussion series by academic and industry experts on the cutting-edge of science, business, intellectual property, legal, social, and ethical issues in biotechnology. The course also requires a group project, involving case studies or market research on various areas of biotechnology. [S. Kang, guest lecture]

**IBIOS 592 CURRENT RESEARCH SEMINAR (2)** This course uses a weekly biological seminar as a springboard for discussion of a research topic of high current interest. [Y. Yang, team taught]

[IBIOS 597G](#) **PLANT GENOMICS** (3) Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or semester. [**S. Kang, Y. Yang, team taught**]

[IBIOS 600](#) **THESIS RESEARCH** (1-15) [**Y. Yang**]

[PLBIO 513](#) **INTEGRATIVE PLANT COMMUNICATION AND GROWTH** (4) Advanced study of plant communication, growth, and development considering molecular, physiological, and whole plant perspectives through lectures and problem solving. [**S. Isard, S. Kang, T. McNellis, Y. Yang team taught**]

[PPATH 902A](#) **CERTIFICATE PROGRAM WITHIN CROP & SOILS.** [**W. Uddin**]

**Appendix IV** Faculty in Plant Pathology

<i>Name</i>	<i>Rank</i>	<i>Alma Mater</i>	<i>Expertise</i>	<i>FTE Teaching</i>	<i>FTE Research</i>	<i>FTE Extension</i>
<b><i>Tenure Track Faculty</i></b>						
Backman, Paul B.	Professor	University of California, Davis	Epidemiology, biocontrol	.40	.60	
Beyer, David M.	Professor	Penn State	Mushroom science and technology		.10	.90
Davis, Donald D.	Professor	Penn State	Mycology, forest pathology	.30	.70	
Decoteau, Dennis D.	Professor	University of Massachusetts	Plant ecosystem health and air quality; courtesy appointment with Department of Horticulture			
Geiser, David M.	Associate Professor	University of Georgia	Mycology, Fusarium systematics	.25	.75	
Gugino, Beth K.	Assisnant Professor	Penn State	Diseases of vegetables; development of integrated vegetable crop management educational programming		.25	.75
Halbrendt, John M.	Associate Professor	University of Missouri	Nematology, fruit pathology		.80	.20
Isard, Scott	Professor	Indiana University	Aerobiology	.25	.75	
Jimenez Gasco, Maria del mar	Assistant Professor	University of Cordoba	Fungal population biology	.25	.75	
Kang, Seogchan	Associate Professor	University of Wisconsin	Host-parasite interactions	.22	.78	
Kuldau, Gretchen A.	Associate Professor	University of California, Berkeley	Mycotoxicology	.30	.70	
McNellis, Timothy W.	Associate Professor	Yale University	Host-parasite interactions, bacteriology	.26	.74	
Moorman, Gary W.	Professor	North Carolina State University	Mycology, diseases of horticultural crops	.12	.15	.73
Ngugi, Henry	Assistant Professor	University of Reading	Biology and management of bacterial and fungal diseases of tree fruits		.75	.25
Romaine, C. Peter	Professor	Cornell University	Mushroom science, virology	.20	.65	.15

Royse, Daniel J.	Professor	University of Illinois	Mushroom science		.80	.20
Stewart, Elwin L.	Professor	Oregon State University	Mycology, systematics		.70	.30
Travis, James W.	Professor	North Carolina State University	Mycology, fruit pathology Scientist-in-Charge, Fruit Research & Extension Center, Biglerville, PA		.26	.74
Uddin, Wakar	Associate Professor	University of Georgia	Epidemiology, turfgrass pathology		.25	.75
Yang, Yinong	Associate Professor				.25	.75
<b>Total Tenure-Track FTEs:</b>				<b>19.00</b>	<b>3.05</b>	<b>11.73</b>
<b>4.22</b>						
<b><i>Non Tenure Track Faculty</i></b>						
Sinn, Judith P.	Sr. Research Assistant	Penn State	<i>(T. McNellis program)</i>		100.00	
Wenner, Nancy G.	Sr. Research Assistant	Penn State	<i>(G. Kuldau program)</i>		100.00	
<b>Total Non-Tenure-Track FTEs:</b>				<b>2.00</b>	<b>2.00</b>	
<b><i>Administrative</i></b>						
Ayers, John E.	Professor	Penn State	Director, Pesticide Education Program		*	
Christ, Barbara J.	Professor	University of British Columbia	Sr. Associate Dean, College of Agricultural Sciences		*	
Gildow, Frederick E.	Professor	Cornell University	Host-parasite genetics, potato pathology Virology Head, Department of Plant Pathology		.34	.33
Pell, Eva J.	Professor	Rutgers University	Sr. Vice President for Research and Dean of the Graduate School		*	
<i>*FTEs assigned to other units</i>						

*Adjunct Faculty and Emeriti*

<i>Name</i>	<i>Penn State Title</i>	<i>Alma Mater</i>	<i>Area of Expertise/Employer</i>
Bailey, Bryan A.	Adjunct Professor	Texas A & M University	Research Plant Pathologist, Alternate Crops and Systems, USDA-ARS, Beltsville, MD
Berner, Dana	Adjunct Professor	Louisiana State University	Research Plant Pathologist, USDA-ARS Foreign Disease Weed Research Lab, Beltsville, MD
Frederick, Reid D.	Adjunct Associate Professor	University of California	Research Molecular Biology, USDA-ARS Foreign Disease Weed Research Lab, Beltsville, MD
Gray, Stewart	Adjunct Professor	North Carolina State University	Virologist, USDA-ARS, Cornell University
Haynes, Kathleen G.	Adjunct Professor	North Carolina State University	Potato Geneticist, USDA-ARS Vegetable Lab, Beltsville, MD
Kim, Seong-Hwan	Adjunct Professor	University of Maryland	Plant Disease Diagnostic Laboratory, Pennsylvania Department of Agriculture, Harrisburg, PA
Bloom, James R.	Professor Emeritus	University of Wisconsin	Nematology
Boyle, John S.	Professor Emeritus	University of Wisconsin	Bacteriology
Cole, Herbert Jr.	Professor Emeritus	Penn State	Plant Disease Management Systems
Hickey, Kenneth D.	Professor Emeritus	Penn State	Fruit Pathology
Hock, Winand K.	Professor Emeritus	University of Maryland	Pesticide Education
Kneebone, Leon R.	Professor Emeritus	Penn State	Mushroom Science
Lukezic, Felix L.	Professor Emeritus	University of California	Bacteriology
Pennypacker, Stanley P.	Professor Emeritus	Penn State	Epidemiology
Schisler, Lee C.	Professor Emeritus	Penn State	Mushroom Science
Skelly, John M.	Professor Emeritus	Penn State	Air Pollution Effects on Forest Trees
Tammen, James	Professor Emeritus	University of California	Floricultural Crop Diseases
Toussoun, T.A.	Professor Emeritus	University of California	Fusarium Taxonomy

