

PLP 881 - Spring 2007

Molecular and Biochemical Plant Pathology

Instructors: Brad Day
105 CIPS Bldg
353-7991
bday@msu.edu

Ray Hammerschmidt
107 CIPS Bldg
353-8624
hammersr@anr.msu.edu

Course Structure: The course consists of overview lectures that are designed to assist you in reading the assigned papers from the original literature. Each week, two papers will be assigned. The papers will be discussed during the time that will be arranged during the first week of class. You should come to the discussion session prepared to lead a discussion on each paper. (See Suggestions for Discussion Leaders on the next page).

Evaluation: Two hourly exams (each worth 30%)
Research paper (20%)
Paper presentations, in-class discussion and participation (20%).

Prerequisites for PLP 881:

Knowledge of eukaryotic and prokaryotic cell structure and function, plant pathology, plant physiology, basic concepts and techniques of molecular biology.

Journals that publish papers in molecular, cellular, cytological or biochemical plant pathology

*Applied and Environmental
Microbiology*
Canadian Journal of Botany
Cell
EMBO
European Journal of Plant Pathology
Fungal Genetics and Biology
Genetics
Journal of Bacteriology
Journal of Phytopathology
Journal of General Virology
Molecular Microbiology
Molecular Plant-Microbe Interactions
Molecular Plant Pathology
Mycologia
Mycological Research
Nature
Virology

New Phytologist
*Physiological & Molecular Plant
Pathology*
Phytopathology
Plant and Cell Physiology
Plant Cell
Plant Disease
Plant Journal
Plant Molecular Biology
Plant Pathology
Plant Physiology
Plant Science
Planta
PLOS
PNAS
Science

Suggestions for Discussion Leaders

Each student should carefully read the assigned paper and be prepared to present a **BRIEF** (15-20 minute) summation of the work. This will require some forethought and planning in order to avoid wasting your colleagues' time in class. Discussing the papers with each other prior to class is one means of preparing for the discussion.

As discussion leader, you should try to cut through the author's verbiage and get to the heart of the matter. This is a skill that you should try to develop; it will be useful throughout your career. This will also avoid a tiresome experience for the other members of the class. Remember, you must listen to many such presentations for every one that you present.

As you read each paper ask yourself:

1. What is the author trying to explain?
2. What (if any) hypothesis is involved in the author's explanation?
3. How did the author's go about testing the hypothesis? (i.e., what **general** methods/approaches were used? Leave the more tedious details for the general discussion if this is appropriate and/or necessary).
4. In brief, what are the main findings and conclusions?
5. Are the data convincing? Do they support the author's conclusions? If so, why? If not, why not?
6. What is your general or overall evaluation of the work and its significance?
7. Try to indicate what the next step of the work should be. If needed, suggest new experiments to make the work more conclusive.

Some Useful Terms

Apoplast

Auxin

Avirulence

Basic compatibility

Biotroph

Blight

Callose

Chlorosis

Compatibility

Coronatine

Disease triangle

Disease

Disease Cycle

Effector protein

Endophyte

Ethylene

Epiphyte

Facultative parasite

Facultative saprophyte

Flagellin

Gene-for-gene

GFP

Guard Hypothesis

Hemibiotroph

Herbivore

Hormone (see specific examples)

Hypersensitive response (HR)

Immunity

Incompatibility

Infection

Inoculation

Jasmonic Acid

LRR

MAP Kinase

Microarray

Necrosis

Necrotroph

Nonhost resistance

Obligate parasite

Oxidative burst

PAMP

Parasite

Pathogen

Pathogenesis

Pathogenicity

PCR

Plasma Membrane

Receptor

Resistance

Resistance Protein

SAR

Signs

Speck

Susceptibility

Symbiosis

Symptoms

Tolerance

Virulence

Wilt

26 Cell wall alterations and defense (H)

28 PR and other protein defenses (H)

April 2 Phytoalexins (H)

4 Perception, Receptors and Infection (D)

9 Defense pathways, Signaling (D)

11 Defense pathways, Surveillance and Subterfuge (D)

16 Systemic acquired resistance (H)

18 Induced systemic resistance (H)

23 Experimental Design, Part I (D)

25 Experimental Design, Part II (D)

30 Exam 2