

BI502B- Phytobacteriology
Course Syllabus
Fall, 2015
(November 2-December 9; 5 wk course)
Mon/Wed, 2:00-3:15 PM

Instructor and Office Hours:

Dr. Jan Leach; C203B Plant Sciences; phone: 970-491-2924; email: Jan.Leach@colostate.edu
Office hours: arranged (call or email)

Guest Instructors:

Dr. Alejandra Huerta, CSU, C203A Plant Sciences
Dr. Carolee Bull, Penn State University

Course Structure:

Lectures/student project (research concept note) on Mon and Wed (2:00 – 3:15 PM); 1 credit

Required Text:

None. The lectures/discussions will be developed from current literature.

Recommended Informational Materials (if you need background):

Plant Bacteriology. C. I. Kado. 2010. APS Press.

Phytobacteriology: Principles and Practice by J.D. Janse. 2006. Cabi Publishing. (can be downloaded for free; http://ebookey.org/Phytobacteriology-Principles-and-Practice_351790.html)

Plant-Associated Bacteria by S.S. Gnanamanickam. 2007. Springer. Dordrecht.

Bacterial Plant Pathology: Cell and Molecular Aspects by D. Sigeo, 1993. Cambridge University Press, Cambridge.

Fundamentals of Bacterial Plant Pathology by Masao Goto, 1992 (English edition). Academic Press, Inc.

Laboratory Guide for Identification of Plant Pathogenic Bacteria. N. W. Schaad, editor. APS Press, The American Phytopathological Society, St. Paul, Minnesota.

Useful Weblinks:

<http://www.pk.uni-bonn.de/ppigb/bacterio.htm>

<http://www.bacterio.cict.fr/> List of prokaryotic names with published standing

Course Overview:

The course provides an overview of the broad range of interactions of bacteria with plants that lead to disease. Particular emphasis will be on the major groups of plant pathogenic bacteria, the diseases they cause, and how they cause various disease phenotypes. This course builds upon basic concepts provided in an introductory plant pathology course, and assumes a basic knowledge of microbiology.

Learning Outcomes:

1. To enable integration of concepts in microbial taxonomy, ecology, physiology, molecular biology, and genetics within the context of interactions with plants.
2. To be current in information on how bacteria cause disease on plants.
3. To learn how to develop a research concept note (proposal)

Exams:

There will be one exam, a final, that will be comprehensive. It will contain short answer and multiple choice questions.

Class project/Concept note development:

The class will be divided into small groups (2-3 students per group) and a bacterial pathogen/disease will be assigned to each group. The group will research the pathogen, and, as the course progresses, each group will present in class on the questions listed below. The group will also develop a **research concept note** that will request funding to solve a problem or address a research question. The written concept note will be due on the last day of class.

Presentations in class (can be divided among the group) will be brief, **NO MORE THAN 5 min per group per week** (with the exception of the final presentation, which will be **10 min** each).

Week 2:

1. Describe the taxonomy of the bacterial pathogen assigned (relative to other bacteria).
2. What is known about the genome of this pathogen?
3. What are the current practices for diagnosis of the disease and identification of the pathogen?

Week 3:

1. What are the known routes of infection used by the pathogen? Once in the plant, what tissue(s) does it colonize? What are the symptoms of the disease? Are there signs associated with the disease?
2. How does the microbe cause disease? What are virulence effectors and how are they delivered?
3. State the research **question/problem** you will address in your Concept Note.

Week 4:

1. What are consequences of disease?
2. What are recommended control strategies?
3. State the research **objectives/aims** you will address in your Concept Note.

Week 5:

1. Presentations on research concept notes (10 min each)

The culmination of the project will be a 3 page concept note (written as a team), that will address a research project related to the pathogen assigned, and will due on December 3).

Information on how to write concept notes:

<http://www.can-act.net/files/5componentsofaconceptpaper.pdf>

<http://www.sswm.info/content/writing-concept-note>

Grades:

Points will be assigned as follows:

Final Exam: 40 points

Class projects: 60 points Total

Oral class presentations = 10 pts each (30 total)

Final 3 page written concept note = 30 pts

Grades will be based on a percentage of the total points possible. Grades will be assigned according to a grading scale (i.e. 95-100% = A+, 89-94% = A, 83-88 = B+, etc.).

LECTURE TOPICS/SCHEDULE
BSPM 502B - Phytobacteriology
Fall, 2015

Date	Lecture Topic
Nov 2	Introduction: Structure of bacteria; DNA transfer, Genome structure and evolution; Microbial genome analysis
Nov 4	Taxonomy & classification of plant pathogenic bacteria (Dr. Carolee Bull)
Nov 9	The Phytobiome; Plant associations, Pathogenesis (invasion, movement, pathogenicity and virulence factors); Detection and diagnosis of bacterial plant pathogens (Week 2 presentations)
Nov 11	Blight and wilt diseases (Dr. Alejandra Huerta)
Nov 16	Blight and wilt diseases (Dr. Alejandra Huerta)
Nov 18	Soft rot diseases (Week 3 presentations)
Nov 23	Gall (tumor) diseases
Nov 25	(Week 4 presentations)
Nov 30	Necrotic diseases: Scorches & Spots
Dec 1	Yellowing diseases
Dec 3	Summary (Week 5 oral presentation of research project; 3 page Concept note due)
Dec 7	FINAL EXAM