

THE UNIVERSITY OF BRITISH COLUMBIA
The Faculty of Land and Food Systems / Biology Program, Faculty of Science

APBI 426/BIOL 421 Plant Microbe Interactions

Comparative analysis of the genetics, physiology and ecology of key plant-microbe relationships. Impacts of these relationships on society and the ecosystem.
(3 credits)

Meeting times and location: Lecture 11:00 MWF: MacMillan 260
Tutorial W 2:00-4:00: West Mall Swing Space 405

Instructors: Jim Kronstad – Room 313 Michael Smith Bldg – kronstad@interchange.ubc.ca
Xin Li – Room 319 Michael Smith Bldg - xinli@interchange.ubc.ca
D'Ann Rochon – AAFC Summerland Research Station - dann.rochon@agr.gc.ca
Suzanne Simard – Room 360 Forest Sciences Bldg - suzanne.simard@ubc.ca

Course purpose: To allow students to explore the various ways in which microbes interact with plants, and the outcomes of that interplay. The focus is on examination of the physiological, biochemical and genetic basis of these interactions, using comparisons to other prokaryotic and eukaryotic model systems.

Course objectives: At the end of this course students will be able to:

1. distinguish between the different types of plant-microbe interactions
2. explain the physiological and biochemical processes underlying major symbiotic and pathogenic relationships
3. recognize the processes common to all plant-microbe interactions
4. analyze objectively the design and content of current research studies published in this area of study
5. draw connections between the biology of plant-microbe relationships, the impacts of those relationships on human society and the ecosystem, and different approaches to their management

Textbook:

There is no required text for this course but students will be responsible for assigned readings in the original literature, which can be accessed electronically through the UBC Library e-journal system.

Marks Distribution:

Discussions of Research papers	20
Midterm Examination (in tutorial period)	20
Case Presentation	20
Final Examination (in formal exam period)	40

	100

Course Syllabus

Discussion of research papers

At seven points during the term, typically toward the end of a major topic, each member of the class will be provided with a copy of research paper describing a relevant, recently published study. Each student will have the same paper, which will be accompanied by a short series of questions to guide you in effectively reading and analyzing the experimental results and conclusions. You will be expected to draft answers to those questions and to be prepared to present your ideas orally in class when the instructor reviews the paper. Your written answers will also be submitted to the instructor at that time.

The quality of your responses will be considered in the overall course evaluation.

Case Studies

The lectures in *Plant Microbe Interactions* will provide you with an introduction to the biology underlying the widespread symbiotic and pathogenic relationships between plants and microbes. However, there are also important human dimensions to plant-microbe interaction phenomena. To help you explore those dimensions, and put your theoretical knowledge to work in a real-world context, the class will be divided into 2 or 3 person teams at the beginning of the term, and each team will be assigned a specific case study topic for in-depth study, synthesis and presentation to the class (approx. 20 minutes).

Some suggested topics available this term are:

- 1 Coming to a nursery near you – ‘Sudden Oak Death’
- 2 *Fusarium* – biocontrol in the drug wars
- 3 Potato late blight – it’s back, and its not just an Irish problem
- 4 No need to add nitrogen to your peas, beans orsugarcane?
- 5 ‘Black Sigatoka’: Yes, we may have no bananas!
- 6 ‘*Fusarium* head blight’: Plant pathology meets Genomics, and is there a link with ‘Roundup’?
- 7 ‘Chestnut blight’ and hypovirulence: can a virus save a tree?
- 8 BT corn - do we need to choose between butterflies and caterpillars?
- 9 The rice blast fungus *Magnaporthe grisea*: what can we learn from the genome of one of the world’s most successful fungal phytopathogens?
- 10 *Crinipellis perniciosus*: what are we going to do without chocolate?
- 11 *Stachybotrys* and sick building syndrome.
- 12 Lateral gene transfer – is there such a thing as a bacterial species?
- 13 Is bioterrorism a threat to food safety?
- 14 Is Ug99 a time bomb for the world’s wheat crop?
- 15 Golden Rice and the prevention of vitamin deficiencies

Other topics may be acceptable as well, in consultation with the course instructors. Each team will develop a story around their assigned topic, which they will present in class toward the end of term, using Powerpoint files. Evaluation of the oral presentations (20% of final grade) will be based on:

- ❖ quality and appropriateness of the content
- ❖ effectiveness of its organization
- ❖ clarity of oral communication
- ❖ participation and team-work (students will be asked to confidentially evaluate the contribution of each member of their group to the development and presentation of their assigned topic)