

**General Plant Pathology**

PIP 429/529  
Fall Semester 2008

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**Who's Who?**

Instructors  
Dr. Timothy Murray  
Dr. Hanu Pappu  
Dr. Ekaterini Riga

TAs  
Hongyan Sheng  
Dipak Poudyal Sharma

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**Philosophy**

- Introduction to the science of plant pathology
- Help you learn what questions to ask when dealing with plant health problems and where to get the answers
- Two important elements:
  - Understand plant growth and development
  - Understanding of microbiology

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## Philosophy

- Plant Pathology is multi-disciplinary and you need to have an open mind – not every problem is a “disease”
- The goal of every plant pathologist is to control disease
  - Successful disease control depends on an accurate diagnosis of the problem
  - Understanding of the factors that led to development of the problem

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## Specific Objectives:

1. Develop an understanding of the principles and terminology of PIP
2. Provide an opportunity to observe pathogens and diseases firsthand
3. Introduce you to the literature resources for PIP
4. Raise your awareness of plant diseases around you

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## Course Structure

Lecture: M, W 8-9a    Lab: W 2-5p  
Lecture & lab outlines are provided with exam dates  
Text: PIP 429 - *Essential Plant Pathology*  
      PIP 529 - *Plant Pathology*  
      Lab Syllabus  
Website: <http://classes.plantpath.wsu.edu/plp429/>  
Exams:  
  Lecture - dates are listed on outline  
  Lab – weekly quizzes  
      Spelling counts!

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## Grading

Point totals for PIP 429:

3 Lecture examinations	350 pts
12 Laboratory quizzes	120 pts
1 Laboratory notebook	<u>70 pts</u>
Total	540 pts

Extra Credit!

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## Grading

Point totals for PIP 529:

3 Lecture examinations	350 pts
12 Laboratory quizzes	120 pts
1 Laboratory notebook	70 pts
1 Oral presentation	<u>60 pts</u>
Total	600 pts

Extra Credit!

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## Plant Pathology

**Phytopathology:**

**phyto = plant**

**pathos = suffering or disease**

**logos = the study of**

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**Plant Pathology**

Interdisciplinary science

Botany, Mycology, Bacteriology,  
Virology, Nematology, Entomology,  
Plant Physiology, Biochemistry,  
Molecular biology

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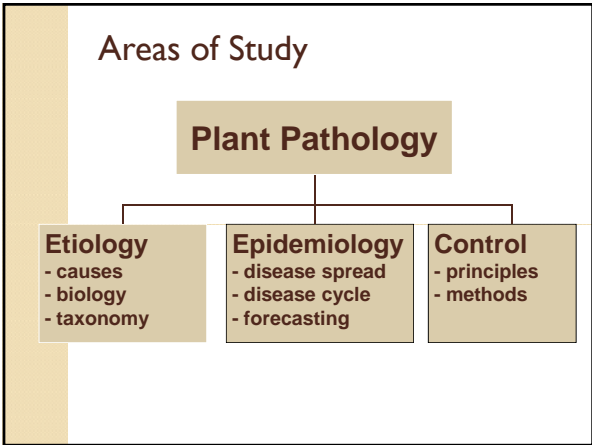
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**Plant Disease vs. Human Disease**

Treatment directed at populations rather than individuals

Prevention rather than cure

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### Why Study Plant Diseases?

- 1. Reduced productivity = \$\$
- 2. Starvation
- 3. Aesthetic reasons

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### Why Study Plant Diseases?

Crop	Value* \$ million	# Diseases	
		U.S.	WA
Apples	1,386.1	193	60
Wheat	625.8	87	39
Potatoes	561.9	145	59
Hops	88.6	20	9
Total	\$2,662.4	445	167
All Crops	\$4,565.5		

\*value in 2006

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### Plant Disease Defined:

A harmful alteration of the normal physiological and biological development of a plant that results in abnormal morphological and physiological changes (symptoms)

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## Disease or Injury ?

a process	an event
develops over time	occurs suddenly*
non random event	random event

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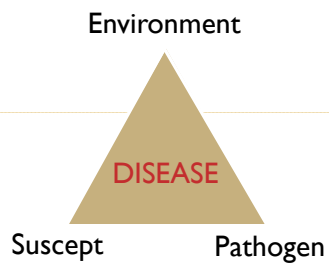
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## Plant Disease Triangle



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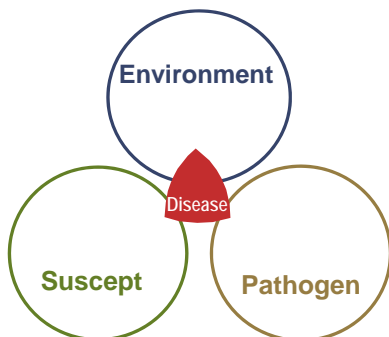
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## 'Disease Triangle'



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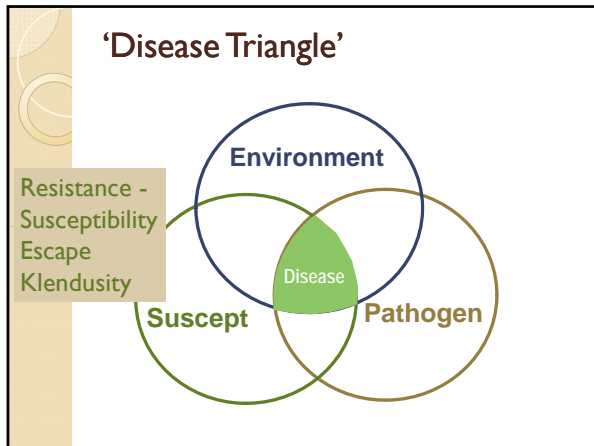
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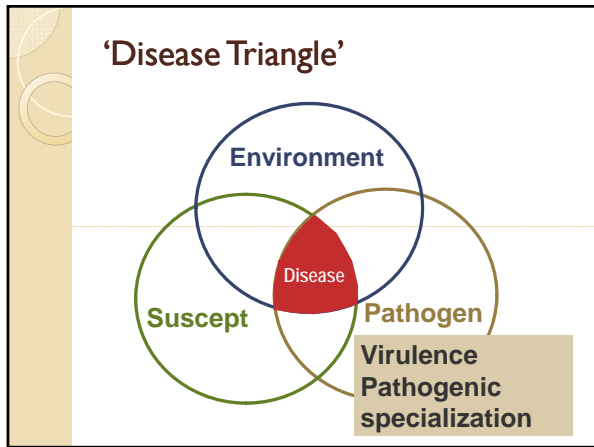
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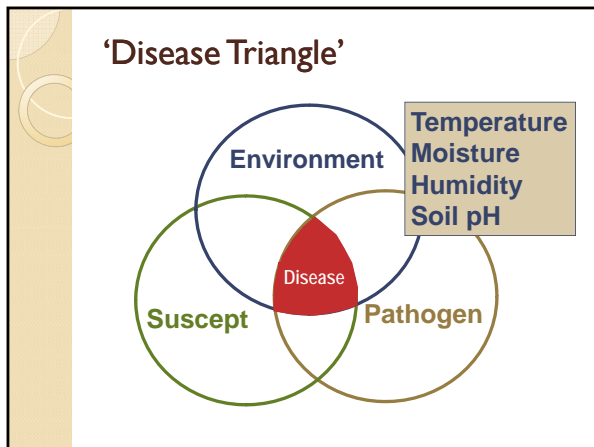
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**Causes of Plant Disease**

Causal agents:

**Biotic**  
Infectious = Transmissible

**Abiotic**  
Noninfectious = Nontransmissible

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**Biotic Causes of Plant Disease**

- Fungi
- Viruses
- Viroids
- Nematodes
- Bacteria
  - *Xylella* (aka rickettsia-like-organisms = rlo)
- Phytoplasmas
  - mycoplasma-like-organisms (aka mlo)
  - *Spiroplasma*
- Protozoa (protocista)
- Parasitic plants

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**Abiotic Causes of Plant Disease**

- Unfavorable temperature
  - heat or cold damage
- Water relations
  - waterlogging or uneven water supply
- Unfavorable soil pH
- Nutrient deficiencies
- Air pollutants
- Herbicides

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**Etiology**  
= causes of plant disease

- Pathogen
- Pathogenicity
- Virulence
- Suscept

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**Nutritional Strategies**

- Parasite:
  - derives nutrition from another living organism (host)
- Saprophyte:
  - derives nutrition from dead organic matter

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**Levels of Parasitism**

Obligate:  
obliged or obligated to be ....

Facultative:  
has the ability to be ....

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### Levels of Parasitism

Mode of Nutrition	Pathogens
Obligate parasite	+
Facultative parasite	+
Facultative saprophyte	+
Obligate saprophyte (perthophyte)	?

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### Pathogens vs. Parasites

Pathogen	
Pathogenicity	Disease Relationship
Virulence	
Suscept	
Parasite	
Host	Nutritional Relationship
Saprophyte	

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