

## Advanced Master Gardener Training

### The Science (and Art) of Plant Disease Diagnosis

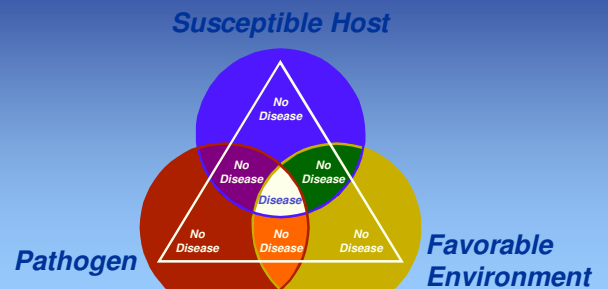
Brian D. Hudelson

Department of Plant Pathology

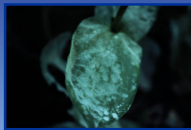
University of Wisconsin-Madison/Extension



## Plant Disease Diagnosis The Disease Triangle



## Plant Disease Diagnosis “Easy Money Diseases”



Powdery Mildew



Golden Canker



Cedar-Apple Rust



Black Knot

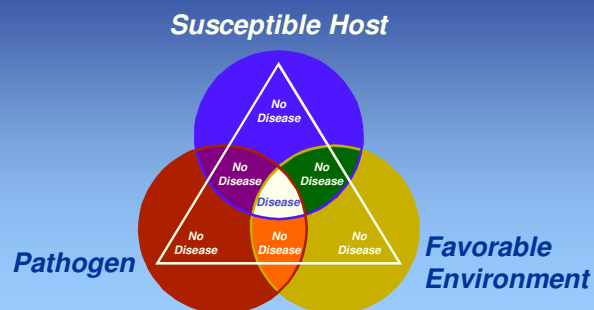
## Plant Disease Diagnosis “The Rest . . .”

Sample



Diagnosis

## Plant Disease Diagnosis The Disease Triangle



## Plant Disease Diagnosis Susceptible Host

Colorado Blue Spruce



Cytospora Canker



Spruce Needle Drop



Rhizosphaera Needle Cast

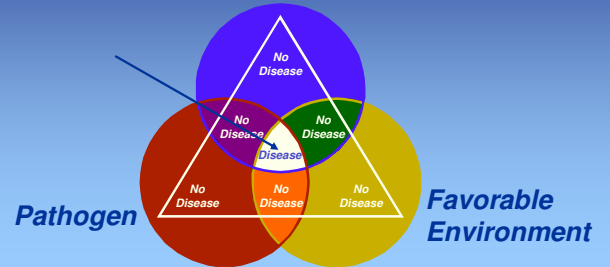
## Plant Disease Diagnosis Susceptible Host

### Varietal Differences



## Plant Disease Diagnosis The Disease Triangle

### Susceptible Host



## Plant Disease Diagnosis Symptoms

### Necrotic Symptoms



## Plant Disease Diagnosis Symptoms

### Necrotic Symptoms



## Plant Disease Diagnosis Symptoms

### Necrotic Symptoms



## Plant Disease Diagnosis Symptoms

### Discolorations



## Plant Disease Diagnosis Symptoms

### Discolorations



## Plant Disease Diagnosis Symptoms

### Discolorations



## Plant Disease Diagnosis Symptoms

### Overgrowth Symptoms



## Plant Disease Diagnosis Symptoms

### Overgrowth Symptoms



## Plant Disease Diagnosis Symptoms

### Undergrowth Symptoms



## Plant Disease Diagnosis Symptoms

### Wilt Symptoms





## Plant Disease Diagnosis Symptoms

### Spatial Patterns



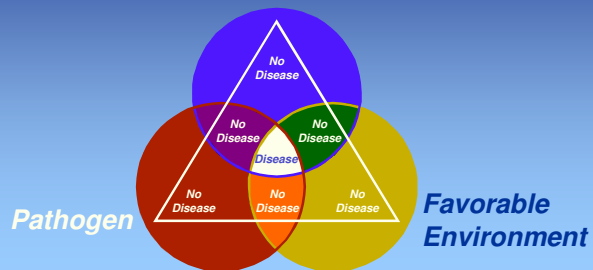
## Plant Disease Diagnosis Symptoms

### Temporal Patterns



## Plant Disease Diagnosis The Disease Triangle

### Susceptible Host



## Plant Disease Diagnosis Pathogens

### Macroscopic Examination



## Plant Disease Diagnosis Pathogens

### Microscopic Examination



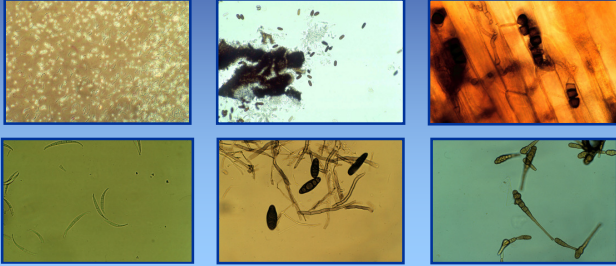
## Plant Disease Diagnosis Pathogens

### Microscopic Examination



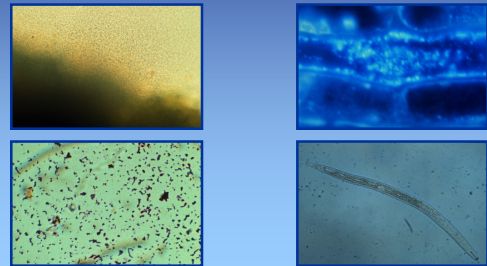
## Plant Disease Diagnosis Pathogens

### Microscopic Examination



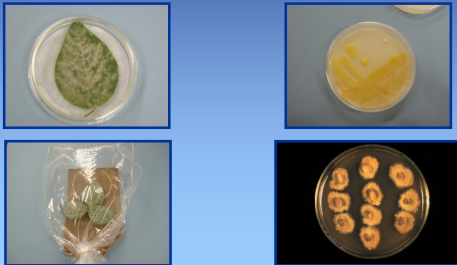
## Plant Disease Diagnosis Pathogens

### Microscopic Examination



## Plant Disease Diagnosis Pathogens

### Incubations and Isolations



## Plant Disease Diagnosis Pathogens

### Bioassays



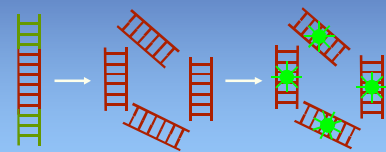
## Plant Disease Diagnosis Pathogens

### Serological Techniques

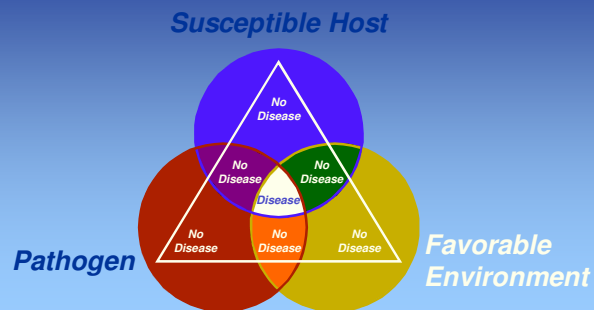


## Plant Disease Diagnosis Pathogens

### DNA-Based Techniques



## Plant Disease Diagnosis The Disease Triangle



## Plant Disease Diagnosis Favorable Environment

- Collect information on weather
  - Rainfall vs. drought
  - Driving vs. gentle rain
  - Humidity
  - Hail
  - High winds
  - Hot vs. cold temperatures

## Plant Disease Diagnosis Favorable Environment

- Collect information on weather
  - Winter conditions
    - Snow cover
    - Ice sheets
    - Freezing and thawing
    - Fall/winter transitions

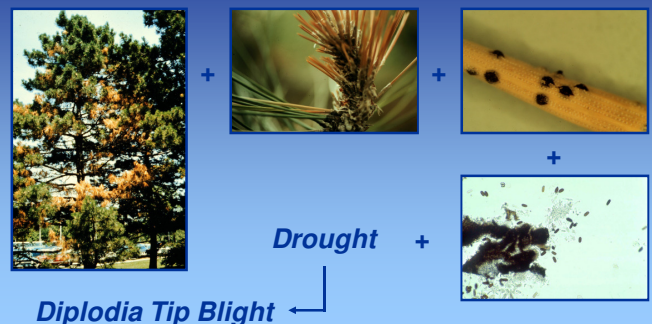
## Plant Disease Diagnosis Favorable Environment

- Collect information on soils
  - Clay vs. sandy
  - Well vs. poorly drained
  - Flat vs. sloped
  - Fertility and pH

## Plant Disease Diagnosis Favorable Environment

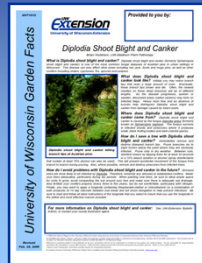
- Collect information on chemical sources
  - Fertilizer applications
  - Pesticide applications
  - Air pollutant point sources
  - Heating systems

## Plant Disease Diagnosis Putting It All Together





## Plant Disease Diagnosis Putting It All Together



## Plant Disease Diagnosis New Diseases



### Koch's Postulates

- Link a pathogen with symptoms on a given host
- Isolate the pathogen in pure culture
- Inoculate plants and reproduce symptoms
- Re-isolate the pathogen from inoculated plants

## Plant Disease Diagnosis Abiotic Disorders



Chlorosis



Imprecisely Defined Injury



Salt Damage



Blossom End Rot



2,4-D Injury



Urine Damage

## Plant Disease Diagnosis Abiotic Disorders



Cold Injury



Drought Stress



Improper Planting



Heat Injury

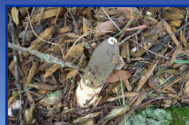


Winter Injury

## Plant Disease Diagnosis Non-Diseases



Maple Eyespot Gall



Stink Horns



Broad Mite Injury



Slime Mold

## Plant Disease Diagnosis Where to Go for Help

Plant Disease Diagnostics Clinic  
Department of Plant Pathology  
University of Wisconsin-Madison  
1630 Linden Drive

Madison, WI 53706-1598

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