

Advanced Master Gardener Training

The Science (and Art) of Plant Disease Diagnosis

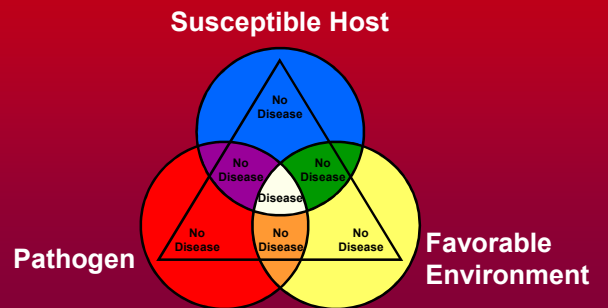
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Department of Plant Pathology

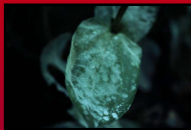
University of Wisconsin-Madison/Extension



Plant Disease Diagnosis The Disease Triangle



Plant Disease Diagnosis “Easy Money Diseases”



Powdery Mildew



Golden Canker



Cedar-Apple Rust

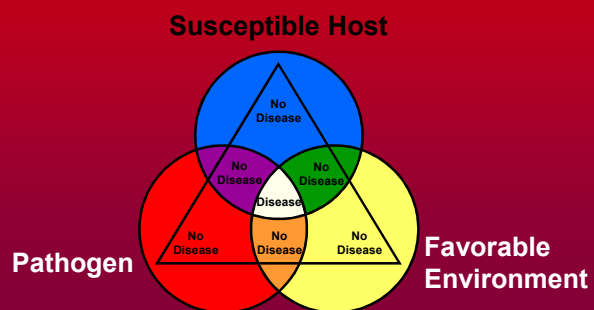


Black Knot

Plant Disease Diagnosis “The Rest . . .”



Plant Disease Diagnosis The Disease Triangle



Plant Disease Diagnosis Susceptible Host

Colorado Blue Spruce



Cytospora Canker



Spruce Needle Drop



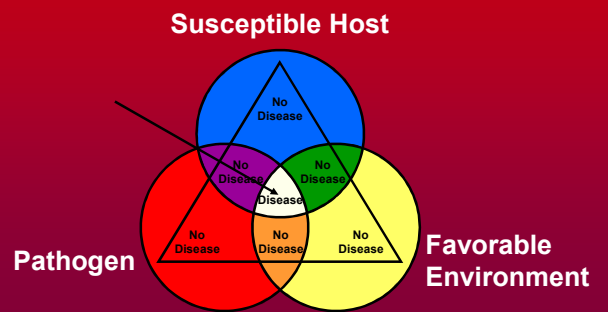
Rhizosphaera Needle Cast

Plant Disease Diagnosis Susceptible Host

Varietal Differences



Plant Disease Diagnosis The Disease Triangle



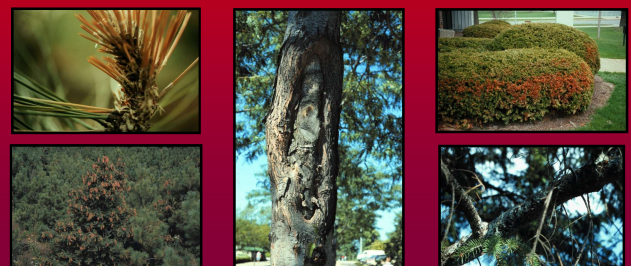
Plant Disease Diagnosis Symptoms

Necrotic Symptoms



Plant Disease Diagnosis Symptoms

Necrotic Symptoms



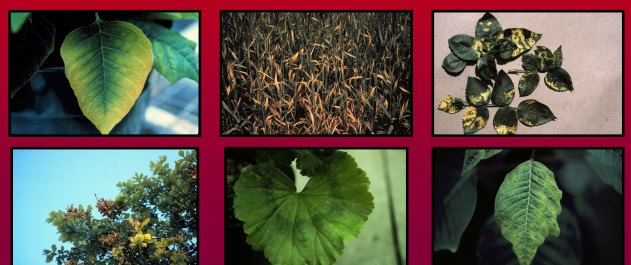
Plant Disease Diagnosis Symptoms

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



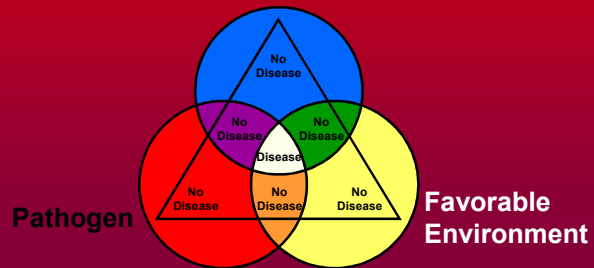
Plant Disease Diagnosis Symptoms

Temporal Patterns



Plant Disease Diagnosis The Disease Triangle

Susceptible Host



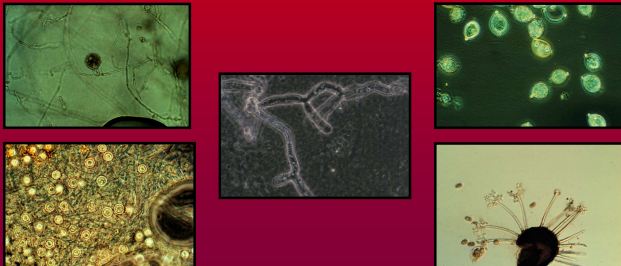
Plant Disease Diagnosis Pathogens

Macroscopic Examination



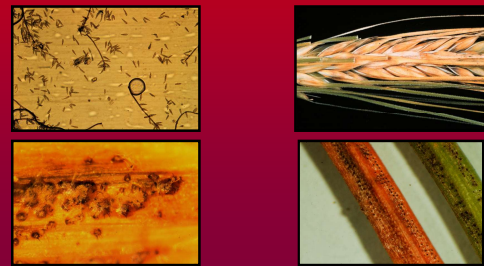
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Microscopic Examination



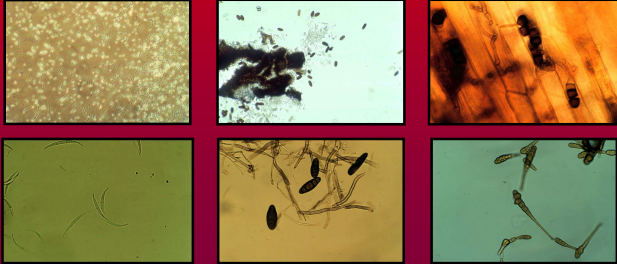
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Microscopic Examination



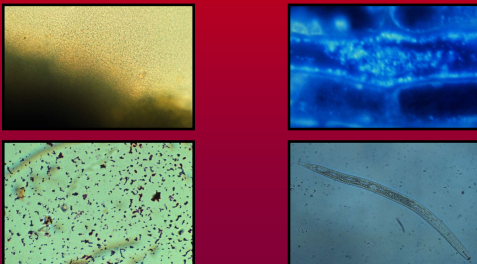
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Microscopic Examination



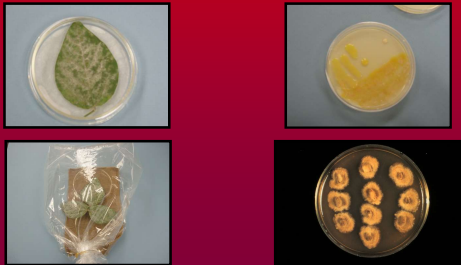
Plant Disease Diagnosis Pathogens

Microscopic Examination



Plant Disease Diagnosis Pathogens

Incubations and Isolations



Plant Disease Diagnosis Pathogens

Bioassays



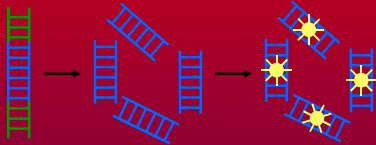
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Serological Techniques



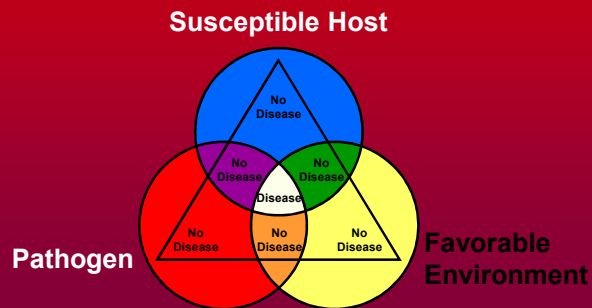
Plant Disease Diagnosis Pathogens

DNA-Based Techniques



CCCTCAAGGCCGACGCTTAGCTCGGCCGCAAGCATACGACTCGGTGCAATGAGCATAGGTTCCAAGCATAGAAGCCCTAGGCG
CAATGTCTGGTGTGATCGTCCGTGGGGGGAGGATAAAATGAGTAACCTGCAGTACTGCAACATTTTCTGTCGGAATCAACACTT
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TTAGCAGCAGTTGAGAGCCGACGCTCATGGAATTTCCAGCCTAGCAAGCATCGGAATTGATGCACGCAATCATGCCGTAAGCTA

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

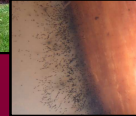
Plant Disease Diagnosis Putting It All Together



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



Imprecis Injury



Salt Damage



Blossom End Rot



2,4-D Injury



Urine Damage

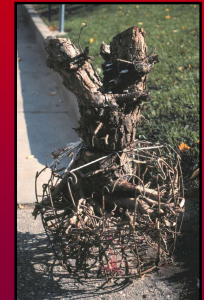
Plant Disease Diagnosis Abiotic Disorders



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
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