Advanced Master Gardener Training
The Science (and Art) of Plant Disease Diagnosis

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Plant Disease Diagnosis
The Disease Triangle

Susceptible Host

Pathogen

Favorable Environment

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
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Plant Disease Diagnosis
Susceptible Host

Colorado Blue Spruce

Cytospora Canker

Spruce Needle Drop

Rhizosphaera Needle Cast
Plant Disease Diagnosis

Susceptible Host

Variatel Differences

Plant Disease Diagnosis

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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
Overgrowth Symptoms

Plant Disease Diagnosis
Symptoms
Undergrowth Symptoms

Plant Disease Diagnosis
Symptoms
Wilt Symptoms
Plant Disease Diagnosis

Symptoms

Spatial Patterns

Spatial Patterns

Temporal Patterns

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Plant Disease Diagnosis

Pathogens

Macroscopic Examination

Microscopic Examination

Plant Disease Diagnosis

Pathogens

Microscopic Examination

Microscopic Examination
Plant Disease Diagnosis
Pathogens

Microscopic Examination

Incubations and Isolations

Bioassays

Serological Techniques

DNA-Based Techniques
Plant Disease Diagnosis
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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

Drought + Late Blight =

31 32 33 34 35 36
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

Abiotic Disorders
Chlorosis
Impelis Injury
Salt Damage
Blossom End Rot
2,4-D Injury
Urine Damage
Cold Injury
Drought Stress
Heat Injury
Winter Injury
Improper Planting

Non-Diseases
Maple Eyespot Gall
Broad Mite Injury
Stink Horns
Slime Mold

Where to Go for Help
Plant Disease Diagnostics Clinic
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University of Wisconsin-Madison
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