Pierce County Seminar 2015

The Science (and Art) of Plant Disease Diagnosis

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Disease Diagnosis
The Disease Triangle

Susceptible Host
Pathogen
Favorable Environment

Disease Diagnosis

“Easy Money Diseases”

Powdery Mildew
Golden Canker
Cedar-Apple Rust
Black Knot

Disease Diagnosis

“The Rest . . .”

Sample
Diagnosis

Disease Diagnosis

The Disease Triangle

Susceptible Host
Pathogen
Favorable Environment

Disease Diagnosis

Susceptible Host

Colorado Blue Spruce

Cytospora Canker
Spruce Needle Drop
Rhizosphaera Needle Cast
Disease Diagnosis
Susceptible Host
Varietal Differences

Disease Diagnosis
The Disease Triangle
Susceptible Host
Pathogen
Favorable Environment

Disease Diagnosis
Symptoms
Necrotic Symptoms

Disease Diagnosis
Symptoms
Necrotic Symptoms

Disease Diagnosis
Symptoms
Necrotic Symptoms

Disease Diagnosis
Symptoms
Discolorations
Disease Diagnosis
Symptoms
Discolorations

Disease Diagnosis
Symptoms
Overgrowth Symptoms

Disease Diagnosis
Symptoms
Undergrowth Symptoms

Disease Diagnosis
Symptoms
Wilt Symptoms
Disease Diagnosis
Symptoms
Spatial Patterns

Disease Diagnosis
Symptoms
Temporal Patterns

Disease Diagnosis
The Disease Triangle
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Disease Diagnosis
Pathogens
Macroscopic Examination

Disease Diagnosis
Pathogens
Microscopic Examination
Disease Diagnosis

The Disease Triangle

Susceptible Host

Pathogen

Favorable Environment

Disease Diagnosis

Favorable Environment

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

Disease Diagnosis

Favorable Environment

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

Disease Diagnosis

Favorable Environment

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

Disease Diagnosis

Favorable Environment

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

Disease Diagnosis

Putting It All Together

Drought

Diplodia Tip Blight
Disease Diagnosis
Putting It All Together

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

Disease Diagnosis
New Diseases

Abiotic Disorders
- Chlorosis
- Imprelis Injury
- Salt Damage
- Blossom End Rot
- 2,4-D Injury
- Urine Damage

Abiotic Disorders
- Cold Injury
- Drought Stress
- Heat Injury
- Winter Injury
- Improper Planting

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

Where to Go for Help
Plant Disease Diagnostics Clinic
Department of Plant Pathology
University of Wisconsin-Madison
1630 Linden Drive
Madison, WI 53706-1598
(608) 262-2863
pddc@plantpath.wisc.edu
http://pddc.wisc.edu
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