

## 2019 Urban Forestry Workshop

### Ten Plant Disease Lessons (Told by Ten Common Tree Diseases)

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## Not All Plants Like All Soil Types Chlorosis

- Cause: Micronutrient (Fe or Mn) deficiency
- Affected plants
  - Oaks (especially pin oak)
  - Red Maples
  - Rhododendrons
  - Other woody (and herbaceous) plants

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## Not All Plants Like All Soil Types Chlorosis

- Management
  - Plant the right plant in the right location
  - Monitor soil pH and soil nutrients
  - Decrease pH using sulfur or aluminum sulfate
  - Add chelated Fe and/or Mn as needed
  - Make sure trees are adequately watered
  - Minimize damage to tree root systems

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## Not All Plants Like All Environments Golden Canker

- Cause: *Cryptodiaporthe corni*
- Host: Pagoda dogwood
- Favorable environment
  - Water stress
  - Heat stress

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## Not All Plants Like All Environments Golden Canker

- **Control**
  - Reduce plant stress
    - Consider tree placement
    - Water adequately
    - Fertilize appropriately

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## Not All Plants Like All Environments Golden Canker

- **Control**
  - Prune diseased branches
  - Decontaminate pruning tools (70% alcohol, disinfectants, 10% bleach)
  - Destroy infected materials
    - Burn (where allowed)
    - Deep bury
  - DO NOT use fungicides for control

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## Not All Plants Go Together Gymnosporangium Rusts

- **Pathogens: *Gymnosporangium* spp.**
  - *Gymnosporangium juniperi-virginianae* (Cedar-apple rust)
  - *Gymnosporangium globosum* (Cedar-hawthorn rust)
  - *Gymnosporangium clavipes* (Cedar-quince rust)

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## Not All Plants Go Together Gymnosporangium Rusts

- **Hosts**
  - Junipers
  - Rosaceous plants
    - Apple, crabapple
    - Hawthorn
    - Quince
    - Pear
    - Serviceberry
- **Favorable environment: Wet weather**

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## Not All Plants Go Together Gymnosporangium Rusts

- Control
  - Grow only junipers or rosaceous hosts
  - Use resistant cultivars/varieties
    - “Juniper Diseases” (<https://store.extension.iastate.edu/Product/Juniper-Diseases>)
    - “Home Fruit Cultivars for Northern Wisconsin” (<https://learningstore.uwex.edu/>)
    - “Home Fruit Cultivars for Southern Wisconsin” (<https://learningstore.uwex.edu/>)

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## Not All Plants Go Together Gymnosporangium Rusts

- Control
  - Remove galls
  - Decontaminate pruning tools (70% alcohol, disinfectants, 10% bleach)
  - Destroy infected materials
    - Burn (where allowed)
    - Deep bury

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## Not All Plants Go Together Gymnosporangium Rusts

- Control
  - Use fungicides to prevent infections (?)
    - Treat rosaceous hosts
    - Chlorothalonil, copper, ferbam, mancozeb, propiconazole, sulfur, and triadimefon
    - Alternate active ingredients (FRAC Codes)
    - Apply when flowers first show color, when half of flowers open, at petal fall, 7 to 10 days after petal fall, and 10 to 14 days later

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## Good Plants Can Have Bad Problems Diplodia (Sphaeropsis) Tip Blight

- Pathogen: *Diplodia pinea* (*Sphaeropsis sapinea*)
- Hosts (major)
  - Austrian pine
  - Other pines: red, jack, Scots, mugo
- Hosts (minor)
  - Other conifers: cedars, cypresses, firs, spruces, junipers, yews

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## Good Plants Can Have Bad Problems Diplodia (Sphaeropsis) Tip Blight

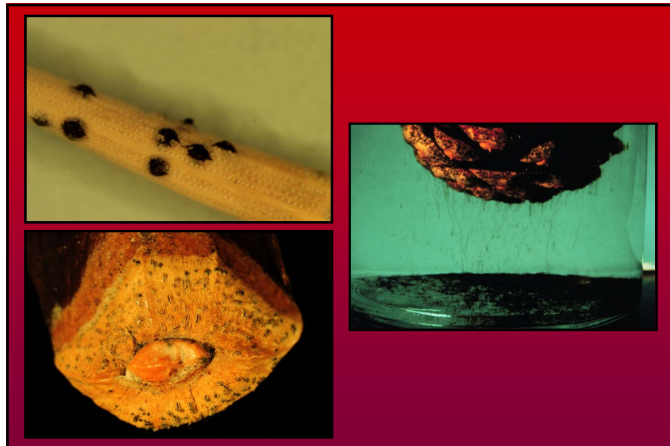
- Favorable environment
  - Wet weather (for infection)
  - Drought (for extensive colonization)

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## Good Plants Can Have Bad Problems Diplodia (Sphaeropsis) Tip Blight

- Control
  - DO NOT plant Austrian pines
  - Prevent tree stress, particularly water stress
  - Thin branches to increase airflow
  - Prune diseased branches
  - Decontaminate pruning tools (70% alcohol, disinfectants, 10% bleach)
  - Remove infected cones (?)

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## Good Plants Can Have Bad Problems Diplodia (Sphaeropsis) Tip Blight

- Control
  - Use fungicides to prevent infections
    - Thiophanate-methyl, chlorothalonil
    - Alternate active ingredients (FRAC Codes)
    - Apply from bud break through shoot elongation
    - Apply at 14 day intervals

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## Plants Can Be Overused Rhizosphaera Needle Cast

- Pathogens: *Rhizosphaera kalkhoffii*  
*Rhizosphaera* spp.
- Look-Alike: Stigmina Needle Cast (*Stigmina* spp.)
- Hosts (major)
  - Colorado blue spruce
  - Other spruces: Black, Engelmann, Serbian, Sitka, white (Black Hills)

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## Plants Can Be Overused Rhizosphaera Needle Cast

- Hosts (minor)
  - Pines: Austrian, mugo, eastern white pine
  - Douglas fir
  - Hemlock
  - Balsam fir and other firs
- Favorable environment
  - Long periods of needle wetness
  - High humidity

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## Plants Can Be Overused Rhizosphaera Needle Cast

- Control
  - DO NOT plant Colorado blue spruce
  - DO NOT crowd trees when planting
  - Plant dwarf spruce varieties
  - Thin healthy branches to increase airflow
  - Prevent tree stress
  - Prune diseased branches

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## Plants Can Be Overused Rhizosphaera Needle Cast

- Control
  - Decontaminate pruning tools (70% alcohol, disinfectants, 10% bleach)
  - Use fungicides to prevent infections
    - Copper, chlorothalonil
    - Alternate active ingredients (FRAC Codes)
    - Start applications at bud break
    - Apply at 3-4 week intervals under favorable conditions

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## Some Plant Diseases are Best Ignored Powdery Mildews

- Causes
 

<ul style="list-style-type: none"> <li>– <i>Erysiphe</i> spp.</li> <li>– <i>Uncinula</i> spp.</li> <li>– <i>Phyllactinia</i> spp.</li> <li>– <i>Blumeria</i> spp.</li> <li>– <i>Oidium</i> spp.</li> </ul>	<ul style="list-style-type: none"> <li>– <i>Microsphaera</i> spp.</li> <li>– <i>Sphaerotheca</i> spp.</li> <li>– <i>Podosphaera</i> spp.</li> <li>– <i>Brasiliomyces</i> spp.</li> <li>– <i>Ovulariopsis</i> spp.</li> </ul>
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## Some Plant Diseases are Best Ignored Powdery Mildews

- Hosts
  - Virtually everything
  - Not conifers
- Favorable environment: High humidity

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## Some Plant Diseases are Best Ignored Powdery Mildews

- Control
  - Remove/destroy diseased leaves
    - Burn (where allowed)
    - Deep bury
    - Hot compost
  - Reduce humidity
    - Plant less densely
    - Thin canopies
  - Use resistant cultivars/varieties

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## Some Plant Diseases are Best Ignored Powdery Mildews

- **Control**
  - Use fungicides to prevent infections
    - Dinocap, dithiocarbamates, myclobutanil, triadimefon, triforine, sulfur or thiophanate-methyl
    - Baking soda (1.5 Tbsp/gal) and light weight horticultural oil (3 Tbsp/gal)
    - Alternate active ingredients (FRAC codes)
    - Apply when humidity >60-70%
    - Apply at 7-14 day intervals

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## Some Plant Diseases are REALLY Serious Verticillium Wilt

- **Causes**
  - *Verticillium dahliae*
  - *Verticillium albo-atrum*
  - Other *Verticillium* spp.
  - New *Verticillium* spp.

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## Some Plant Diseases are REALLY Serious Verticillium Wilt

- **Hosts**
  - Many woody ornamentals
    - Common: Maple, ash, redbud, smokebush
    - Newer: Seven son flower, wafer-ash, buttonbush
  - Many vegetables
    - Tomato, potato, pepper, EGGPLANT, cucurbits
  - Many herbaceous plants
    - Common: Purple coneflower, blazing star
    - New: Vervain ('Quartz White')

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## Some Plant Diseases are REALLY Serious Verticillium Wilt

- **Favorable environment**
  - Cool, wet weather (for infection)
  - Hot, dry weather (for symptom development)

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## Some Plant Diseases are REALLY Serious Verticillium Wilt

- Control
  - Avoid *Verticillium*-infested areas
  - Pretest soils/mulches/composts for the presence of *Verticillium*
  - Fumigate heavily infested soils
  - Keep broad-leaf weeds under control
  - Clean up leaf litter
  - Avoid municipal mulches

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## Some Plant Diseases are REALLY Serious Verticillium Wilt

- Control
  - Use immune/resistant plants
    - CONIFERS: Pines, spruces, firs, junipers
    - DECIDUOUS TREES/SHRUBS: Beech, birch, ginkgo, hackberry, hawthorn, hickory, honey locust, mountain ash, white oak, bur oak, poplar, serviceberry, sycamore, willow
  - Prevent stress
  - Prune diseased (wilted) areas

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## Some Plant Diseases are REALLY Serious Verticillium Wilt

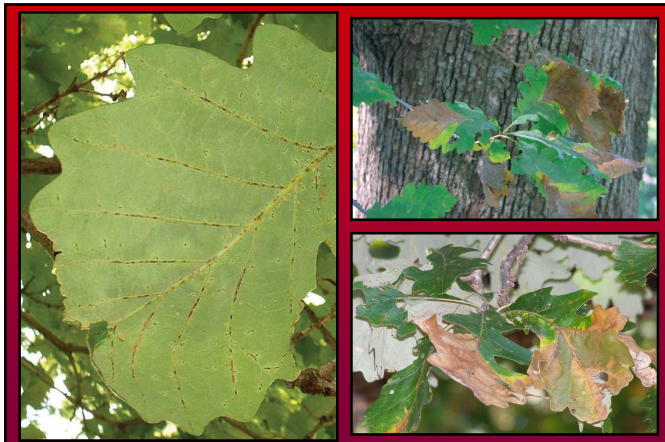
- Control
  - Decontaminate pruning tools (70% alcohol, disinfectants, 10% bleach)
  - Make plants comfortable until they die
  - Remove and destroy diseased plants/leaves
    - Burn (where allowed)
    - Hot compost (?)
  - DO NOT use fungicides

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## Some Plant Diseases are Overhyped Bur Oak Blight

- Cause: *Tubakia iowensis*
- Host: Bur oak
  - *Quercus macrocarpa* var. *oliviformis*
  - *Quercus macrocarpa* var. *macrocarpa*
- Favorable Environment
  - Cool, wet weather
  - Stress?

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## Some Plant Diseases are Overhyped Bur Oak Blight

- **Control**
  - Reduce stress
    - Water stress
    - Nutrient stress (chlorosis)
  - Diseases/insect pests
    - Oak wilt
    - Armillaria root disease
    - Leaf diseases (anthracnose, Tubakia leaf spot, etc.)
    - Two-lined chestnut borer

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## Some Plant Diseases are Overhyped Bur Oak Blight

- **Control**
  - Use fungicide injections
    - Propiconazole
    - Prophylactic or therapeutic
    - Late May or early June
    - Every 12-24 months

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## Plant Disease Diagnosis Isn't Always Easy Fire Blight

- **Cause:** *Erwinia amylovora*
- **Hosts**
  - Many woody rosaceous plants
  - Apple, crabapple, pear, mountain ash, cotoneaster
- **Favorable environment**
  - Wet weather (but not too wet)
  - Hail (or other wounding)

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## Plant Disease Diagnosis Isn't Always Easy Fire Blight

- **Control**
  - Plant resistant varieties
    - “Home Fruit Cultivars for Northern Wisconsin” (<https://learningstore.uwex.edu/>)
    - “Home Fruit Cultivars for Southern Wisconsin” (<https://learningstore.uwex.edu/>)
    - “Top Ornamental Crabapples for Wisconsin” (<https://pddc.wisc.edu/fact-sheet-listing-all/>)

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## Plant Disease Diagnosis Isn't Always Easy Fire Blight

- **Control**
  - Prune diseased branches
  - Decontaminate pruning tools (70% alcohol, disinfectants, 10% bleach)
  - Destroy infected materials
    - Burn (where allowed)
    - Deep bury
  - DO NOT over-fertilize with nitrogen

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## Plant Disease Diagnosis Isn't Always Easy Fire Blight

- **Control**
  - Use bactericides to prevent infections (?)
    - Copper, streptomycin
    - Apply during flowering
    - Apply every 7-14 days (3-4 days)

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## Misdiagnosis has Consequences Armillaria Root Disease

- **Pathogens:** *Armillaria* spp.
- **Hosts**
  - Many deciduous trees and shrubs
  - Many conifers
- **Favorable environment**
  - Drought stress
  - Defoliation stress
  - Other stresses

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## Misdiagnosis has Consequences Armillaria Root Disease

- **Control**
  - Reduce tree/shrub stress where possible
    - Water adequately
    - Fertilize properly
    - Control foliar pathogens
    - Control foliar insect pests
  - DO NOT wound trees
  - Remove *Armillaria*-infested materials
  - DO NOT use fungicides

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## Ten Plant Disease Lessons 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@wisc.edu](mailto:pddc@wisc.edu)  
<https://pddc.wisc.edu>  
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