2019 Urban Forestry Workshop

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

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

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

Not All Plants Like All Environments
 Golden Canker

• Cause: Cryptodiaporthe corni
• Host: Pagoda dogwood
• Favorable environment
  – Water stress
  – Heat stress
Not All Plants Like All Environments
Golden Canker

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

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

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)

Not All Plants Go Together
Gymnosporangium Rusts

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

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

• Favorable environment
  – Wet weather (for infection)
  – Drought (for extensive colonization)
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 (?)

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

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)

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
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

Some Plant Diseases are Best Ignored
Powdery Mildews

- Causes
  - Erysiphe spp.
  - Uncinula spp.
  - Phyllactinia spp.
  - Blumeria spp.
  - Oidium spp.
  - Microsphaera spp.
  - Sphaerotheca spp.
  - Podosphaera spp.
  - Brasiliomyces spp.
  - Ovulariopsis spp.

Some Plant Diseases are Best Ignored
Powdery Mildews

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

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
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

Some Plant Diseases are REALLY Serious

Verticillium Wilt

• Causes
  – Verticillium dahliae
  – Verticillium albo-atrum
  – Other Verticillium spp.
  – New Verticillium spp.

• 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’)

• Favorable environment
  – Cool, wet weather (for infection)
  – Hot, dry weather (for symptom development)
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

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

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

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?

Some Plant Diseases are Overhyped Bur Oak Blight

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  – Cool, wet weather
  – Stress?
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

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

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)

- 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)

Misdiagnosis has Consequences
Armilaria Root Disease

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

Misdiagnosis has Consequences
Armilaria 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

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
https://pddc.wisc.edu
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