Chippewa County Seminar

Tree and Shrub Diseases and Their Management

Brian D. Hudelson
Department of Plant Pathology
University of Wisconsin-Madison/Extension

Tree and Shrub Diseases

Powdery Mildews

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

Tree and Shrub Diseases

Powdery Mildews

• Hosts
  – Virtually everything
  – Not conifers

• Favorable environment: High humidity

Tree and Shrub Diseases

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

Tree and Shrub Diseases

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
Tree and Shrub Diseases

**Anthracnose**

- **Causes**
  - *Gloeosporium* spp.
  - *Discula* spp.
  - *Colletotrichum* spp.
  - Many other fungi

- **Hosts**
  - Any deciduous tree
  - Ash, maple, oak
  - Sycamore

- **Favorable environment:** Cool, wet weather

---

**Tree and Shrub Diseases**

**Scab (Apple and Pear)**

- **Causes**
  - *Venturia inaequalis*
  - *Venturia pirina*

- **Hosts**
  - Apple/crabapple
  - Pear
  - Mountain ash

- **Favorable environment:** Cool, wet weather

---

**Tree and Shrub Diseases**

**Anthracnose**

- **Control**
  - DO NOT panic
  - Remove/destroy diseased leaves and branches
    - Burn (where allowed)
    - Deep bury
    - Hot compost

---

**Tree and Shrub Diseases**

**Anthracnose**

- **Control**
  - Use fungicides to prevent infections
    - Copper-containing fungicides, chlorothalonil, mancozeb, thiophanate methyl
    - Alternate active ingredients (FRAC codes)
  - Apply 3 applications: at bud break, 1/2 expansion of leaves, full leaf expansion
Tree and Shrub Diseases
Scab (Apple and Pear)

- **Control**
  - Plant resistant varieties
    - “Growing Apples (Peas) in Wisconsin”  
      [https://learningstore.uwex.edu](https://learningstore.uwex.edu)
  - Remove/destroy diseased leaves
    - Burn (where allowed)
    - Deep bury
    - Hot compost
  - Thin trees to promote air flow

Tree and Shrub Diseases
Rhizosphaera Needle Cast

- **Pathogen**: *Rhizosphaera kalkhoffii*  
  *Rhizosphaera spp.*

- **Hosts (major)**
  - Colorado blue spruce
  - Other spruces: Engelmann, black, Serbian, Sitka, white (Black Hills)

Tree and Shrub Diseases
Scab (Apple and Pear)

- **Control**
  - Use fungicides to prevent infections
    - Chlorothalonil, copper, mancozeb, myclobutanil, propiconazole, thiophanate-methyl, sulfur
  - Alternate active ingredients (FRAC codes)
  - Apply from bud break through the end of favorable weather
  - Apply at 7-14 day intervals

Tree and Shrub Diseases
Rhizosphaera Needle Cast

- **Hosts (minor)**
  - Pines: Austrian, mugo, eastern white pine
  - Douglas fir
  - Hemlock
  - Balsam fir and other firs

- **Favorable environment**
  - Wet weather
  - High humidity

**Control**
  - DO NOT plant Colorado blue spruce
  - DO NOT crowd trees when planting
  - Thin healthy branches to increase airflow
  - Prevent tree stress
  - Prune diseased branches
Tree and Shrub Diseases

**Rhizosphaera Needle Cast**

- **Control**
  - Decontaminate pruning tools
    - 70% alcohol (spray disinfectants)
    - Commercial disinfectants
    - 10% bleach
  - Destroy infected materials
    - Burn (where allowed)
    - Deep bury
    - Hot compost (needles)

- **Decontaminate pruning tools**
  - 70% alcohol (spray disinfectants)
  - Commercial disinfectants
  - 10% bleach

- **Destroy infected materials**
  - Burn (where allowed)
  - Deep bury
  - Hot compost (needles)

**Tree and Shrub Diseases**

**Gymnosporangium Rusts**

- **Causes**
  - *Gymnosporangium juniperi-virginianae* (Cedar-apple rust)
  - *Gymnosporangium globosum* (Cedar-hawthorn rust)
  - *Gymnosporangium clavipes* (Cedar-quince rust)

- **Hosts**
  - Junipers
  - Woody rosaceous plants (apple, crabapple, hawthorn, quince, pear, serviceberry)

- **Favorable environment**
  - Cool to moderate temperatures
  - Wet weather

- **Control**
  - Grow only the juniper or rosaceous host
  - Use resistant cultivars/varieties
    - “Juniper Diseases” ([https://store.extension.iastate.edu/Product/5247](https://store.extension.iastate.edu/Product/5247))
  - Remove galls
Tree and Shrub Diseases

Gymnosporangium Rusts

• **Control**
  – Decontaminate pruning tools
    • 70% alcohol (spray disinfectants)
    • Commercial disinfectants
    • 10% bleach
  – Destroy infected materials
    • Burn (where allowed)
    • Deep bury

Tree and Shrub Diseases

Gymnosporangium Rusts

• **Control**
  – Use fungicides to prevent infections
    • Ferbam, triadimefon
    • Alternate active ingredients (FRAC codes)
    • Apply at 7-21 day intervals [mid-May through mid-June (rosaceous hosts), early July through August (juniper hosts)]

Tree and Shrub Diseases

**Black Knot**

• **Cause:** *Apiosporina morbosa*

• **Hosts**
  – *Prunus* species
  – Plums
  – Cherries

• **Favorable environment:** Wet weather

Tree and Shrub Diseases

**Black Knot**

• **Control**
  – DO NOT plant infected *Prunus* stock
  – Buy black knot-resistant varieties if available
    • Accolade flowering cherry (*Prunus* ‘Accolade’)
    • Sargent’s cherry (*Prunus* sargentii)
    • Amur chokecherry (*Prunus* maackii)
  – Remove volunteer plums/cherries
  – Prune diseased branches

Tree and Shrub Diseases

**Black Knot**

• **Control**
  – Decontaminate pruning tools
    • 70% alcohol (spray disinfectants)
    • Commercial disinfectants
    • 10% bleach
  – Destroy infected materials
    • Burn (where allowed)
    • Deep bury
  – DO NOT use fungicides
Pathogen: *Diplodia pinea*  
(*Sphaeropsis sapinea*)  
*Diplodia* spp.

Hosts (major):
- Austrian pine
- Other pines: red, jack, Scots, mugo
- Other conifers: cedars, cypresses, firs, spruces, junipers, yews

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

Control:
- DO NOT plant Austrian pines
- Prevent tree stress, particularly water stress
- Thin branches to increase airflow
- Prune diseased branches

Control:
- Decontaminate pruning tools
  - 70% alcohol (spray disinfectants)
  - Commercial disinfectants
  - 10% bleach
- Remove infected cones (?)
- Destroy infected materials
  - Burn (where allowed)
  - Deep bury
**Tree and Shrub Diseases**

**Diplodia (Sphaeropsis) Shoot Blight**

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

**Oak Wilt**

- **Cause**
  - Bretziella fagacearum
    - Ceratocystis fagacearum
  - Chalara sp.
- **Hosts**
  - Red oak group: Red, black, pin
  - White oak group: White, bur, swamp white
  - Chinese chestnut

**Favorable environment**

- Cool, wet conditions (for infection)
- Hot, dry weather (for symptom development)

**Transmission**

- Root grafts
  - Major method of movement in clumps of oaks
- Form between trees in the same group
  - Red oak group: Red, black, pin
  - White oak group: White, bur, swamp white
- Movement of up to 20-25 ft/year

**Transmission**

- Oak bark beetles
  - Pseudopityophthorus ninutissimus
  - Pseudopityophthorus pruininosus
- Sap beetles
  - Carpophilus spp.
  - Colopterus spp.
  - Cryptarcha spp.
  - Epuraea spp.
  - Clischrochilus spp.
**Tree and Shrub Diseases**

**Oak Wilt**

- **Control**
  - **DO NOT** prune or wound oaks from bud break to 2-3 weeks past full leaf development
  - **Disrupt root grafts**
    - Mechanically (vibratory plow or trenching machine)
    - Chemically (soil fumigant)
    - Physical barriers
  - “Oak Wilt Management: What are the Options?”
    ([https://learningstore.uwex.edu/](https://learningstore.uwex.edu))

**Tree and Shrub Diseases**

**Oak Wilt**

- **Control**
  - Remove diseased (and healthy) trees
  - Decontaminate pruning tools
    - 70% alcohol (spray disinfectants)
    - Commercial disinfectants
    - 10% bleach
  - Be careful using oak wood
    - Remove bark
    - Cover wood

**Tree and Shrub Diseases**

**Verticillium Wilt**

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

**Tree and Shrub Diseases**

**Verticillium Wilt**

- **Hosts**
  - Many woody ornamentals
    - Common: Maple, ash, redbud, smokebush
    - “New”: Seven son flower, wafer-ash, buttonbush
  - Many herbaceous plants
  - Many vegetables (tomato, potato, EGGPLANT)
- **Favorable environment**
  - Cool, wet weather (for infection)
  - Hot, dry weather (for symptom development)
**Tree and Shrub Diseases**

**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
  - Avoid municipal mulches

---

**% Recovery of Verticillium from Wood Chips**

- 'Legacy' sugar maple
  - Wood Chips as an Inoculum Source
    - Amur maple: 30.0%/25.0% (Trtd) vs. 0.0%/0.0% (Non-Trtd)
    - Green Ash: 23.7%/10.5% (Trtd) vs. 0.0%/0.0% (Non-Trtd)
    - Redbud: 10.7%/13.3% (Trtd) vs. 0.0%/0.0% (Non-Trtd)

---

**Tree and Shrub Diseases**

**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

---

**Control**

- Decontaminate pruning tools
  - 70% alcohol (spray disinfectants)
  - Commercial disinfectants
  - 10% bleach
- Make plants comfortable until they die
- Remove and destroy diseased plants
  - Burn (where allowed)
- DO NOT use fungicides
**Tree and Shrub Diseases**

**Boxwood (Box) Blight**

- **Cause**
  - *Calonectria pseudonaviculata*
  - *Cylindrocladium pseudonaviculatum*  
  *(Cylindrocladium buxicola)*
- **Hosts**
  - Boxwood
  - Pachysandra
- **Favorable Environment:** Cool, wet weather

---

**Tree and Shrub Diseases**

**Boxwood (Box) Blight**

- **Control**
  - Buy locally produced boxwood
  - Grow resistant varieties
    - ‘Green Mound’
    - ‘Glencoe’ (Chicagoland Green®)
  - Avoid symptomatic plants
  - Keep new plants isolated

---

**Tree and Shrub Diseases**

**Boxwood (Box) Blight**

- **Control**
  - Physically separate boxwood plantings
  - Space plants far apart
  - DO NOT overhead water
  - Prune out diseased branches

---

**Tree and Shrub Diseases**

**Boxwood (Box) Blight**

- **Control**
  - Use fungicides to prevent infections
    - Chlorothalonil, fludioxonil, mancozeb, metconazole, propiconazole, tebuconazole, thiophanate-methyl
    - 7 day application intervals
    - Alternate active ingredients (FRAC codes)
  - Contact the PDDC if you believe you have found boxwood (box) blight!
  - Disinfest pruning tools and other items
    - 70% alcohol
    - Commercial disinfectants
    - 10% bleach
  - Remove and destroy infected plants
    - Burn (where allowed)
    - Deep bury
Tree and Shrub Diseases
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
http://pddc.wisc.edu
Follow on Facebook and Twitter @UWPDDC