

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

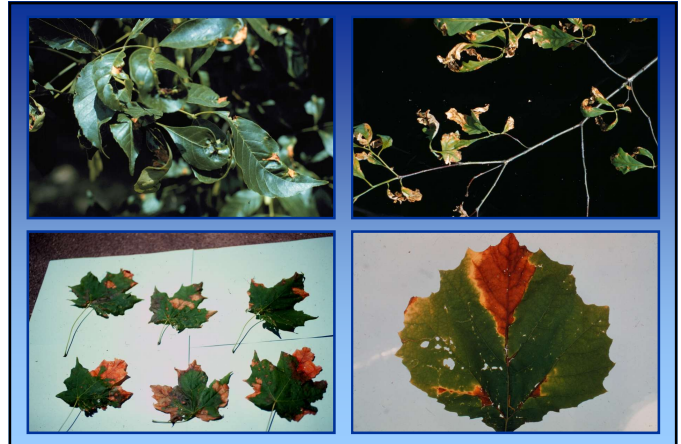
Tree and Shrub Diseases Powdery Mildews

• 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 **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)**

- **Causes**
 - Venturia inaequalis
 - Venturia pirina
- **Hosts**
 - Apple/crabapple
 - Pear
 - Mountain ash
- **Favorable environment:** Cool, wet weather



Tree and Shrub Diseases Scab (Apple and Pear)

- **Control**
 - Plant resistant varieties
 - “Growing Apples (Pears) in Wisconsin” (<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 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

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

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



Tree and Shrub Diseases Rhizosphaera Needle Cast

- **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)

Tree and Shrub Diseases *Rhizosphaera* Needle Cast

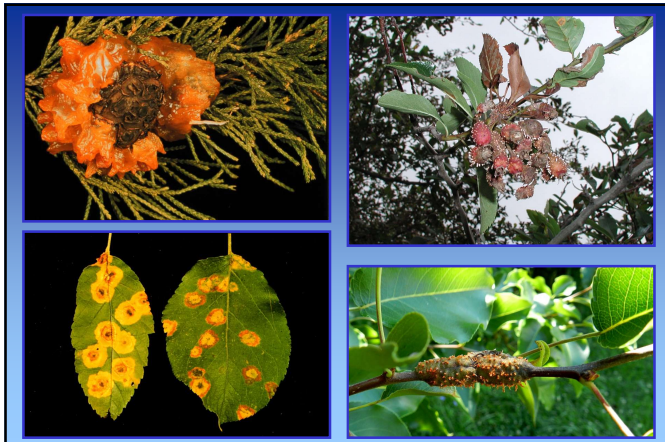
- **Control**
 - Use fungicides to prevent infections
 - Copper-containing fungicides, chlorothalonil
 - Alternate active ingredients (FRAC codes)
 - Apply starting at bud break and at 3-4 week intervals thereafter under favorable conditions

Tree and Shrub Diseases *Gymnosporangium* Rusts

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

Tree and Shrub Diseases *Gymnosporangium* Rusts

- **Hosts**
 - Junipers
 - Woody rosaceous plants
(apple, crabapple, hawthorn, quince, pear, serviceberry)
- **Favorable environment**
 - Cool to moderate temperatures
 - Wet weather



Tree and Shrub Diseases *Gymnosporangium* Rusts

- **Control**
 - Grow only the juniper or rosaceous host
 - Use resistant cultivars/varieties
 - “Juniper Diseases”
(<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

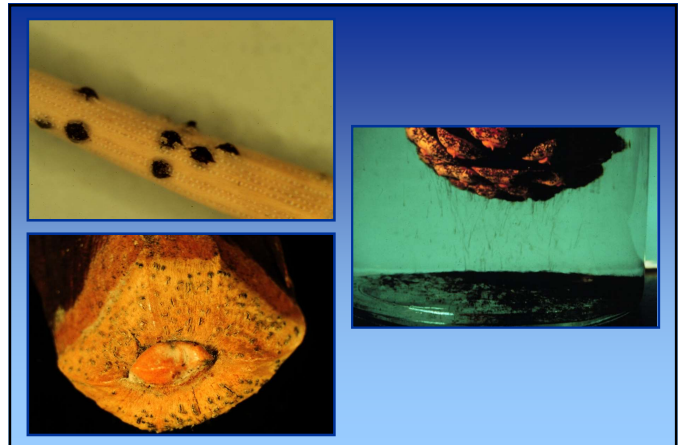
- **Control**
 - Decontaminate pruning tools
 - 70% alcohol (spray disinfectants)
 - Commercial disinfectants
 - 10% bleach
 - Destroy infected materials
 - Burn (where allowed)
 - Deep bury
 - DO NOT use fungicides

Tree and Shrub Diseases *Diplodia (Sphaeropsis) Shoot Blight*

- **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

Tree and Shrub Diseases *Diplodia (Sphaeropsis) Shoot Blight*

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



Tree and Shrub Diseases *Diplodia (Sphaeropsis) Shoot Blight*

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

Tree and Shrub Diseases *Diplodia (Sphaeropsis) Shoot Blight*

- **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*

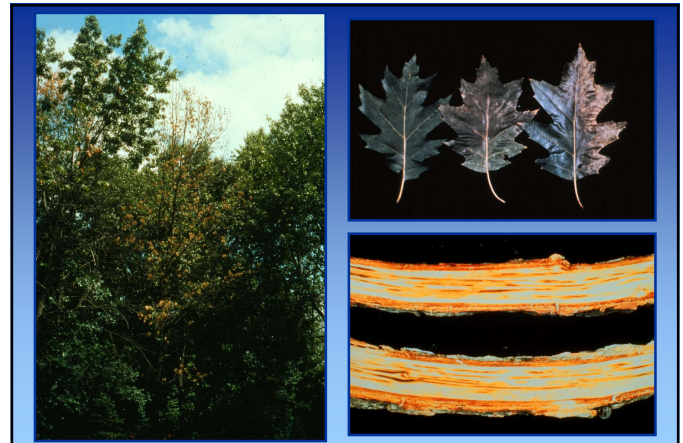
- **Control**
 - Use fungicides to prevent infections
 - Thiophanate-methyl, chlorothalonil
 - Alternate active ingredients (FRAC Codes)
 - Apply from bud break through shoot elongation
 - Apply every 14 days

Tree and Shrub Diseases *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

Tree and Shrub Diseases *Oak Wilt*

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



Tree and Shrub Diseases *Oak Wilt*

- **Transmission**
 - Oak bark beetles
 - *Pseudopityophthorus ninutissimus*
 - *Pseudopityophthorus pruinosis*
 - Sap beetles
 - *Carpophilus* spp.
 - *Epuraea* spp.
 - *Colopterus* spp.
 - *Clischrochilus* spp.
 - *Cryptarcha* spp.

Tree and Shrub Diseases *Oak Wilt*

- **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



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/>)

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 Oak Wilt

- **Control**
 - Use fungicide injections
 - Propiconazole
 - Prophylactic or therapeutic
 - Every 12-24 months

Tree and Shrub Diseases Verticillium Wilt

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

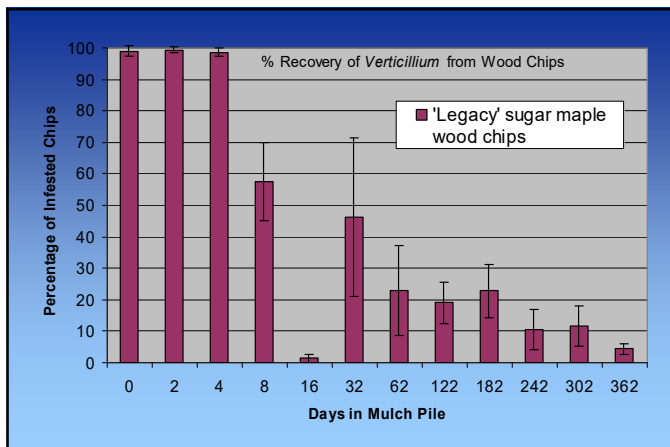
Tree and Shrub Diseases Verticillium Wilt

- **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



- **Wood Chips as an Inoculum Source**
 - **Amur maple**
 - 30.0%/25.0% (Trtd)
 - 0.0%/0.0% (Non-Trtd)
 - **Green Ash**
 - 23.7%/10.5% (Trtd)
 - 0.0%/0.0% (Non-Trtd)
 - **Redbud**
 - 10.7%/13.3% (Trtd)
 - 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

Tree and Shrub Diseases Verticillium Wilt

- **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**
 - Disinfect 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 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!

***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