

Wachtel Tree Science

Diseases of Trees and Shrubs

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Diseases of Trees and Shrubs Powdery Mildews

• Causes

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

Diseases of Trees and Shrubs Powdery Mildews

• Hosts

- Virtually everything
- Not conifers

• Favorable environment: High humidity



Diseases of Trees and Shrubs 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

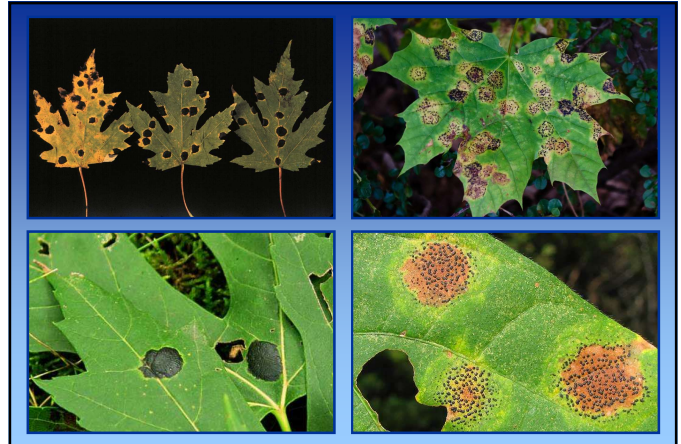
Diseases of Trees and Shrubs Powdery Mildews

• 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

Diseases of Trees and Shrubs Tar Spot

- **Causes:** Rhytisma americanum
Rhytisma acerinum
- **Hosts:** Maples
- **Favorable environment:** Cool, wet weather

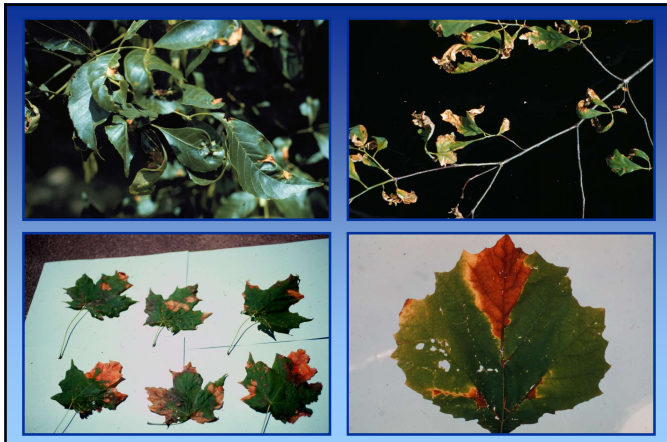


Diseases of Trees and Shrubs Tar Spot

- **Control**
 - DO NOT panic
 - Remove/destroy diseased leaves
 - Burn (where allowed)
 - Deep bury
 - Hot compost
 - Use fungicides to prevent infections
 - Copper-containing fungicides
 - Apply 3 applications: at bud break, 1/2 expansion of leaves, full leaf expansion

Diseases of Trees and Shrubs Anthracnose

- **Causes**
 - Gloeosporium spp.
 - Colletotrichum spp.
 - Discula spp.
 - Many other fungi
- **Hosts**
 - Any deciduous tree
 - Ash, maple, oak
 - Sycamore
- **Favorable environment:** Cool, wet weather



Diseases of Trees and Shrubs Anthracnose

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

Diseases of Trees and Shrubs **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

Diseases of Trees and Shrubs **Black Spot**

- Cause: Marssonina rosae
- Host: Rose
- Favorable environment: Cool, wet weather



Diseases of Trees and Shrubs **Black Spot**

- **Control**
 - Plant resistant rose varieties
 - Promote rapid drying of leaves and canes
 - DO NOT overcrowd plants
 - Prune to thin established plants
 - DO NOT overhead water
 - DO NOT overwater

Diseases of Trees and Shrubs **Black Spot**

- **Control**
 - Remove/destroy diseased leaves and canes
 - Burn (where allowed)
 - Deep bury
 - Hot compost
 - Decontaminate pruning tools
 - 70% alcohol (spray disinfectants)
 - Commercial disinfectants
 - 10% bleach

Diseases of Trees and Shrubs **Black Spot**

- **Control**
 - Use fungicides to prevent infections
 - Chlorothalonil, copper-containing fungicides, mancozeb, maneb, myclobutanil, propiconazole, thiophanate-methyl
 - Neem oil
 - Baking soda (1.5 Tbsp/gal) and light weight horticultural oil (3 Tbsp/gal)
 - Alternate active ingredients (FRAC Codes)
 - Apply at 7-14 day intervals

Diseases of Trees and Shrubs Scab (Apple and Pear)

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



Diseases of Trees and Shrubs 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

Diseases of Trees and Shrubs 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

Diseases of Trees and Shrubs Rhizosphaera Needle Cast

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

Diseases of Trees and Shrubs 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



Diseases of Trees and Shrubs *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

Diseases of Trees and Shrubs *Rhizosphaera* Needle Cast

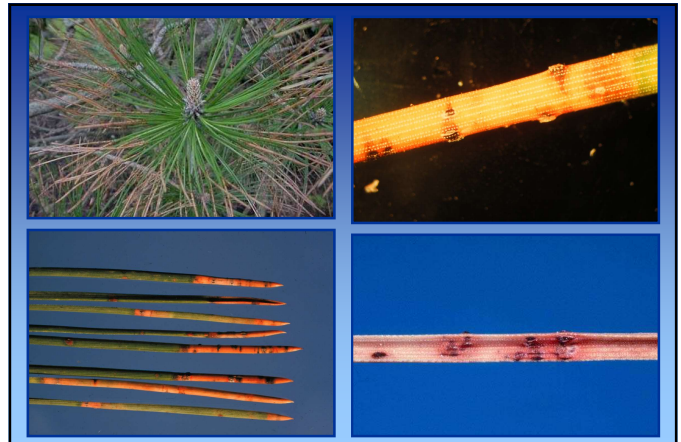
- **Control**
 - Decontaminate pruning tools
 - 70% alcohol (spray disinfectants)
 - Commercial disinfectants
 - 10% bleach
 - Destroy infected materials
 - Burn (where allowed)
 - Deep bury
 - Hot compost (needles)

Diseases of Trees and Shrubs *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

Diseases of Trees and Shrubs *Dothistroma* Needle Blight

- **Pathogen:** *Dothistroma pini*
- **Hosts**
 - Austrian pine
 - Mugo pine
 - Ponderosa pine
- **Favorable environment:** Wet weather



Diseases of Trees and Shrubs *Dothistroma Needle Blight*

- **Control**
 - Plant disease-free trees
 - Plant resistant/immune tree species
 - Destroy infected materials
 - Burn (where allowed)
 - Deep bury
 - Hot compost

Diseases of Trees and Shrubs *Dothistroma Needle Blight*

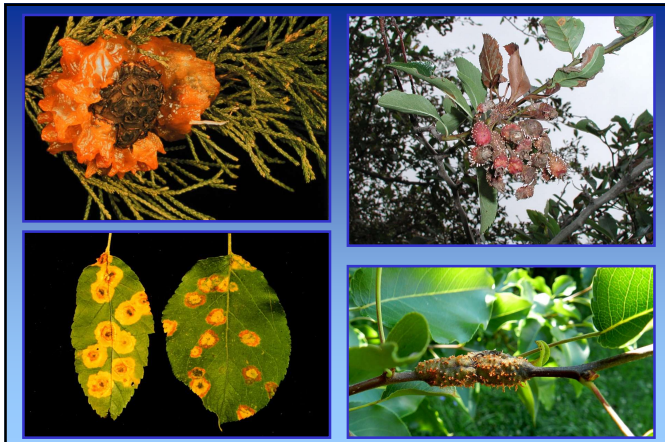
- **Control**
 - Use fungicides to prevent infections
 - Copper
 - Early June
 - Apply 1 treatment, or 2 treatments spaced 3-4 weeks apart

Diseases of Trees and Shrubs *Gymnosporangium Rusts*

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

Diseases of Trees and Shrubs *Gymnosporangium Rusts*

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



Diseases of Trees and Shrubs *Gymnosporangium Rusts*

- **Control**
 - Grow only the juniper or rosaceous host
 - Use resistant cultivars/varieties
 - “Juniper Diseases”
(<https://store.extension.iastate.edu/Product/Juniper-Diseases>)
 - Remove galls

Diseases of Trees and Shrubs Gymnosporangium Rusts

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

Diseases of Trees and Shrubs 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)]

Diseases of Trees and Shrubs Black Knot

- **Cause:** Apiosporina morbosa
- **Hosts**
 - Prunus species
 - Plums
 - Cherries
- **Favorable environment:** Wet weather



Diseases of Trees and Shrubs 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

Diseases of Trees and Shrubs 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

Diseases of Trees and Shrubs Crown Gall

- **Cause**
 - Agrobacterium tumefaciens
 - Agrobacterium vitis
- **Hosts**
 - Plants in 93 plant families
 - Trees and shrubs (deciduous and coniferous)
 - Herbaceous plants
- **Favorable environment: None**



Diseases of Trees and Shrubs Crown Gall

- **Control**
 - DO NOT buy infected plant
 - Buy well-adapted, winter-hardy plants
 - Avoid wounding plants during transplant
 - Consider root dips of A. radiobacter
 - Prune out galls

Diseases of Trees and Shrubs Crown Gall

- **Control**
 - Decontaminate pruning tools
 - 70% alcohol (spray disinfectants)
 - Commercial disinfectants
 - 10% bleach
 - Remove plants (including roots) and soil
 - Destroy infected materials
 - Burn (where allowed)
 - Landfill

Diseases of Trees and Shrubs Crown Gall

- **Control**
 - Plant nonsusceptible plants
 - DO NOT use bactericides

Diseases of Trees and Shrubs Dutch Elm Disease

- **Causes**
 - Ophiostoma ulmi (Ceratocystis ulmi)
 - Ophiostoma novo-ulmi
 - Pesotum ulmi (Graphium ulmi)
- **Hosts**
 - High susceptibility
 - American, Belgian, English, red, rock, September, European white, winged

Diseases of Trees and Shrubs Dutch Elm Disease

- **Hosts**
 - Intermediate susceptibility
 - Cedar, European field (smooth-leaf), wych (Scots)
 - Low susceptibility
 - Siberian, Chinese
- **Favorable environment**
 - Cool, wet conditions (for infection)
 - Hot, dry weather (for symptom development)



Diseases of Trees and Shrubs Dutch Elm Disease

- **Transmission**
 - Elm bark beetles
 - *Scolytus multistriatus* (European)
 - *Hylurgopinus rufipes* (Native)
 - Root grafts
 - Major method of movement in clumps of elms
 - *Ophiostoma* spp. can reach the roots during the first season of infection



Diseases of Trees and Shrubs Dutch Elm Disease

- **Control**
 - Remove diseased elms
 - Disrupt root grafts
 - Mechanically (vibratory plow or trenching machine)
 - Chemically (soil fumigant)
 - Physical barriers
 - Be careful using elm wood
 - Remove bark
 - Cover wood

Diseases of Trees and Shrubs Dutch Elm Disease

- **Control**
 - Prune diseased branches
 - Decontaminate pruning tools
 - 70% alcohol (spray disinfectants)
 - Commercial disinfectants
 - 10% bleach

Diseases of Trees and Shrubs Dutch Elm Disease

- **Control**
 - Use fungicides injections
 - Propiconazole, thiabendazole
 - Prophylactic or therapeutic
 - Every 12-24 months

Diseases of Trees and Shrubs Dutch Elm Disease

- **Control**
 - Plant resistant elms
 - Crosses between American and other elms
 - True American elms
 - American Liberty
 - Independence
 - Princeton
 - New Harmony
 - Valley Forge
 - Others

Diseases of Trees and Shrubs Dutch Elm Disease

- **Control**
 - Treatments of dubious use
 - Tracing
 - Verticillium dahliae

Diseases of Trees and Shrubs 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

Diseases of Trees and Shrubs Oak Wilt

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



Diseases of Trees and Shrubs Oak Wilt

• Transmission

– Oak bark beetles

- Pseudopityophthorus minutissimus
- Pseudopityophthorus pruinosis

– Sap beetles

- Carpophilus spp.
- Epuraea spp.
- Colopterus spp.
- Clischrochilus spp.
- Cryptarcha spp.

Diseases of Trees and Shrubs 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



Diseases of Trees and Shrubs 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/>)

Diseases of Trees and Shrubs 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

Diseases of Trees and Shrubs Oak Wilt

• Control

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

Diseases of Trees and Shrubs Verticillium Wilt

• Causes

- Verticillium dahlia
- Verticillium albo-atrum
- Other Verticillium spp.
- New Verticillium spp.

Diseases of Trees and Shrubs Verticillium Wilt

• Hosts

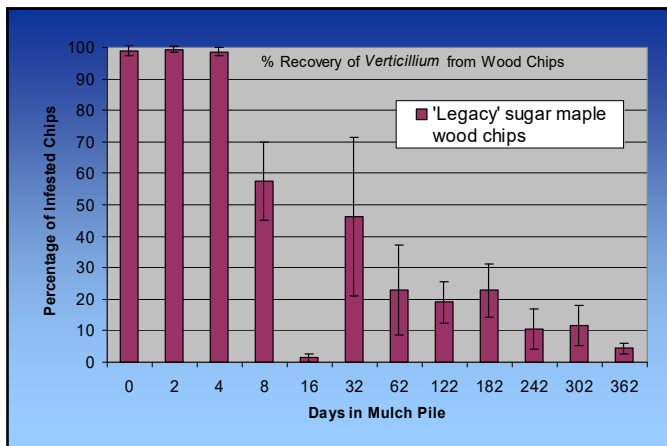
- Many woody ornamentals
 - Common: Maple, ash, redbud, smokebush
 - “New”: Seven son flower, wafer-ash, buttonbush
 - Many herbaceous plants
 - Many vegetables (tomato, potato, EGGPLANT)
- ### • Favorable environment
- Cool, wet weather (for infection)
 - Hot, dry weather (for symptom development)



Diseases of Trees and Shrubs 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% (Trted)
 - 0.0%/0.0% (Non-Trted)
- **Green Ash**
 - 23.7%/10.5% (Trted)
 - 0.0%/0.0% (Non-Trted)
- **Redbud**
 - 10.7%/13.3% (Trted)
 - 0.0%/0.0% (Non-Trted)

Diseases of Trees and Shrubs **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

Diseases of Trees and Shrubs **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

Trees and Shrubs Diseases **Nectria Canker**

- **Pathogen:** Nectria spp.
- **Hosts**
 - Many woody ornamentals
 - Honey locust
- **Favorable environment**
 - Injuries/wounds
 - Wet weather



Diseases of Trees and Shrubs **Nectria Canker**

- **Control**
 - Choose well-adapted trees and shrubs
 - Reduce environmental stresses/injuries
 - Water and fertilize properly
 - Prune properly when maintenance pruning
 - Prune diseased branches

Diseases of Trees and Shrubs **Nectria Canker**

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

Diseases of Trees and Shrubs **Golden Canker**

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



Diseases of Trees and Shrubs **Golden Canker**

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

Diseases of Trees and Shrubs **Golden Canker**

- **Control**
 - Reduce plant stress
 - Consider tree placement
 - Water adequately
 - Fertilize appropriately
 - **DO NOT** use fungicides for control

Diseases of Trees and Shrubs **Fire Blight**

- **Cause:** *Erwinia amylovora*
- **Hosts**
 - Many woody rosaceous plants
 - Apple, crabapple, pear, mountain ash, cotoneaster
- **Favorable environment**
 - Wet weather
 - Hail (or other wounding)



Diseases of Trees and Shrubs **Fire Blight**

- **Control**
 - Plant resistant varieties where available
 - “Top Ornamental Crabapples for Wisconsin” (<https://pddc.wisc.edu/fact-sheet-listing-all/>)
 - Prune diseased branches
 - Decontaminate pruning tools
 - 70% alcohol (spray disinfectants)
 - Commercial disinfectants
 - 10% bleach

Diseases of Trees and Shrubs **Fire Blight**

- **Control**
 - Destroy infected materials
 - Burn (where allowed)
 - Deep bury
 - DO NOT over-fertilize with nitrogen
 - Use bactericides to prevent infections (?)
 - Copper-containing fungicides, streptomycin
 - Apply during flowering
 - Apply every 7-14 days (3-4 days)

Diseases of Trees and Shrubs **Bacterial Canker**

- **Causes**
 - *Pseudomonas syringae* pv. *syringae*
 - *Pseudomonas syringae* pv. *mors-prunorum*
- **Hosts:** Stone fruits (plum, cherry, peach)
- **Favorable environment**
 - Wet weather
 - Wounding



Diseases of Trees and Shrubs **Bacterial Canker**

- **Control**
 - Minimize wounding
 - Prune diseased branches
 - Decontaminate pruning tools
 - 70% alcohol (spray disinfectants)
 - Commercial disinfectants
 - 10% bleach

Diseases of Trees and Shrubs **Bacterial Canker**

- **Control**
 - Destroy infected materials
 - Burn (where allowed)
 - Deep bury
 - **DO NOT** use bactericides

Diseases of Trees and Shrubs **Bacterial Blight**

- **Cause:** *Pseudomonas syringae* pv. *syringae*
- **Host**
 - Lilac
 - Other trees and shrubs
- **Favorable environment**
 - Wet weather
 - Cold temperatures



Diseases of Trees and Shrubs **Bacterial Blight**

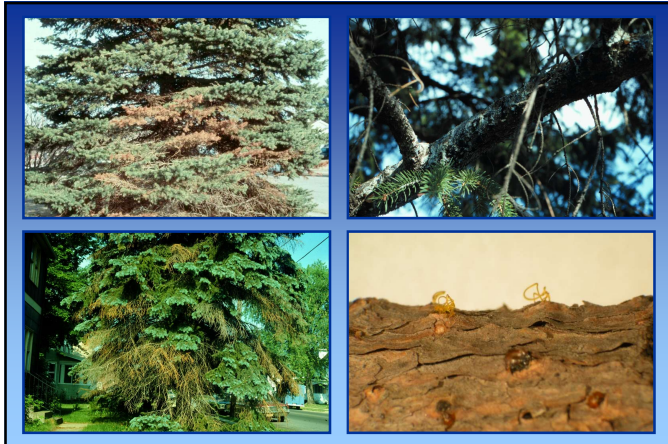
- **Control**
 - Space lilacs to promote good air flow
 - Reduce any stresses
 - Avoid overhead watering
 - Prune diseased branches
 - Decontaminate pruning tools
 - 70% alcohol (spray disinfectants)
 - Commercial disinfectants
 - 10% bleach

Diseases of Trees and Shrubs **Bacterial Blight**

- **Control**
 - Destroy infected materials
 - Burn (where allowed)
 - Deep bury
 - Use bactericides to prevent infections
 - Copper + mancozeb
 - Apply starting at bud break, 2-3 times at 7-10 day intervals

Diseases of Trees and Shrubs **Cytospora Canker**

- **Pathogen:** *Leucocytospora kunzei*
- **Hosts**
 - Spruces (particularly Colorado blue spruce)
 - Douglas fir
 - Many other conifers
- **Favorable environment:** Wet weather



Diseases of Trees and Shrubs Cytospora Canker

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

Diseases of Trees and Shrubs Cytospora Canker

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

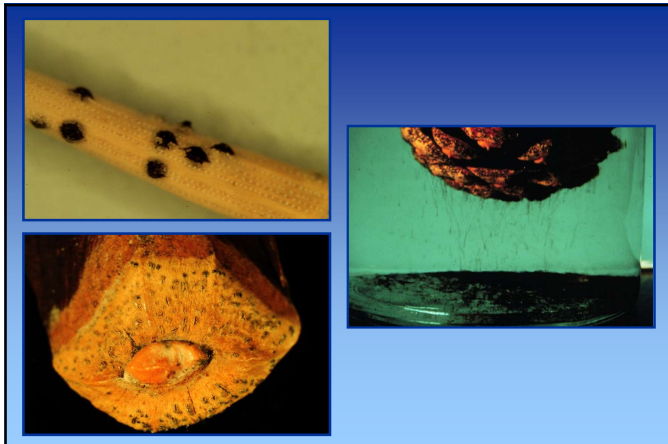
Diseases of Trees and Shrubs Diplodia (Sphaeropsis) Shoot Blight

- **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

Diseases of Trees and Shrubs Diplodia (Sphaeropsis) Shoot Blight

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





Diseases of Trees and Shrubs *Diplodia (Sphaeropsis) Shoot Blight*

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

Diseases of Trees and Shrubs *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

Diseases of Trees and Shrubs *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

Diseases of Trees and Shrubs *Phomopsis Tip Blight*

- **Pathogen**
 - *Phomopsis juniperovora*
 - *Phomopsis* spp.
- **Host: Junipers**
- **Favorable environment**
 - Cool temperatures
 - Wet weather
 - Factors stimulating excessive host growth



Diseases of Trees and Shrubs *Phomopsis Tip Blight*

- **Control**
 - Use resistant varieties
(<https://store.extension.iastate.edu/Product/Juniper-Diseases>)
 - DO NOT crowd trees/shrubs when planting
 - Prevent tree/shrub stress
 - Avoid over-fertilization with nitrogen
 - Prune diseased branches
 - Avoid excessive pruning

Diseases of Trees and Shrubs *Phomopsis Tip Blight*

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

Diseases of Trees and Shrubs *Phomopsis Tip Blight*

- **Control**
 - Use fungicides to prevent infections
 - Mancozeb, copper, thiophanate-methyl
 - Alternate active ingredients (FRAC Codes)
 - Bud break through period of rapid growth
 - 7-21 day application interval

Diseases of Trees and Shrubs *Ash Yellows*

- **Cause**
 - *Candidatus Phytoplasma fraxini*
(Ash yellows phytoplasma)
- **Hosts**
 - White ash
 - Green ash
 - Other ash
 - Lilac

Diseases of Trees and Shrubs *Ash Yellows*

- **Favorable environment**
 - High leafhopper populations (*Scaphoideus*)



Diseases of Trees and Shrubs Ash Yellows

- **Control**
 - Make infected trees comfortable until they die
 - Remove infected trees
 - Destroy infected materials
 - Burn (where allowed)
 - Deep bury
 - Avoid growing susceptible trees and shrubs

Diseases of Trees and Shrubs Chlorosis

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



Diseases of Trees and Shrubs 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

Diseases of Trees and Shrubs Herbicide Injury

- **Causes**
 - Growth regulator herbicides
 - 2,4-D
 - Dicamba
 - Imprelis!
 - Other herbicides
- **Affected plants:** Anything and everything



Diseases of Trees and Shrubs *Herbicide Injury*

- **Management**

- Apply herbicides only when needed
- Follow application directions exactly
- Apply herbicides only when wind speed is low (< 5 mph)
- DO NOT apply herbicides too close to nontarget plants
- Apply herbicides at low pressure

Diseases of Trees and Shrubs *Herbicide Injury*

- **Management**

- Use amine rather than ester forms of herbicides
- Adequately test herbicides prior to registration!

Diseases of Trees and Shrubs *Winter Injury/Winter Burn*

- **Causes**

- Water stress
- Extreme winter temperatures
- Cycling winter temperatures
- Insufficient snow cover
- Excessive snow

Diseases of Trees and Shrubs *Winter Injury/Winter Burn*

- **Affected plants**

- Evergreens
 - Yew, Alberta spruce, boxwood, arborvitae
- Deciduous woody ornamentals
 - Redbud, Japanese maple, Korean maple
- Fruit trees
 - Pome fruits (apple, pear)
 - Stone fruits (cherry, plum, peach, apricot)





Diseases of Trees and Shrubs Winter Injury/Winter Burn

- **Management**
 - Water trees and shrubs adequately
 - Plant trees and shrubs
 - Properly
 - In protected locations (sensitive plants)
 - Insulate sensitive plants where possible
 - Pray for
 - Lots of snow
 - A slow, gradual spring warm up

Diseases of Trees and Shrubs Other Abiotic Disorders



Salt Injury



Tatters



Construction Injury



Water Stress



Girdling Root



Lawn Mower Injury

Diseases of Trees and Shrubs Non-Diseases



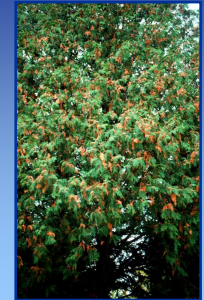
Seasonal Needle Drop



Sooty Mold



Sooty Mold



Seasonal Needle Drop

Diseases of Trees and Shrubs Non-Diseases: Fungi/Fungal Allies



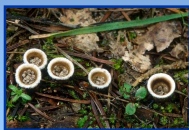
Giant Puffballs



Lichens



Stink Horns



Bird's Nest Fungi



Slime Molds

Diseases of Trees and Shrubs 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>
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