

Advanced Master Gardener Training

Diseases of Evergreens

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Diseases of Evergreens Rhizosphaera Needle Cast

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

Diseases of Evergreens 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 Evergreens 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 Evergreens Rhizosphaera Needle Cast

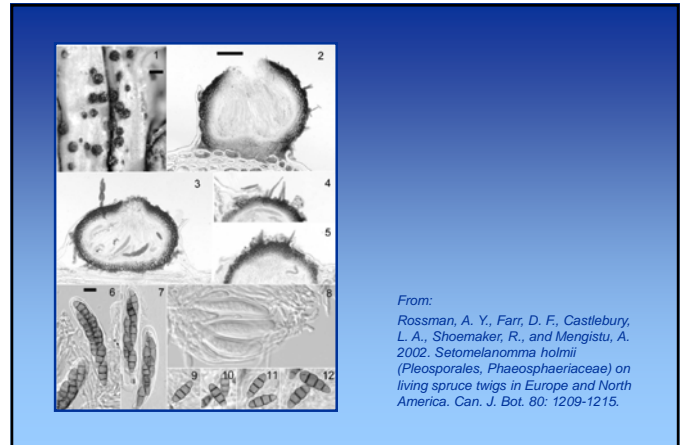
- Control
 - Decontaminate pruning tools
 - 70% alcohol (spray disinfectants)
 - Commercial disinfectants
 - 10% bleach
 - Destroy infected materials
 - Burn (where allowed)
 - Deep bury
 - Hot compost (needles)

Diseases of Evergreens 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 Evergreens Spruce Needle Drop

- **Pathogen:** Setomelanomma holmii (?)
- **Hosts**
 - Colorado blue spruce
 - Other spruces
- **Favorable environment**
 - Wet weather (?)
 - Stress (?)



Diseases of Evergreens Spruce Needle Drop

- **Control**
 - Unclear
 - Prune diseased branches
 - Decontaminate pruning tools
 - 70% alcohol
 - Commercial disinfectants
 - 10% bleach
 - Prevent tree stress
 - DO NOT use fungicides

Diseases of Evergreens Dothistroma Needle Blight

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



Diseases of Evergreens 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 Evergreens 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 Evergreens Boxwood (Box) Blight

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



Diseases of Evergreens Boxwood (Box) Blight

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

Diseases of Evergreens Boxwood (Box) Blight

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

Diseases of Evergreens 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

Diseases of Evergreens Boxwood (Box) Blight

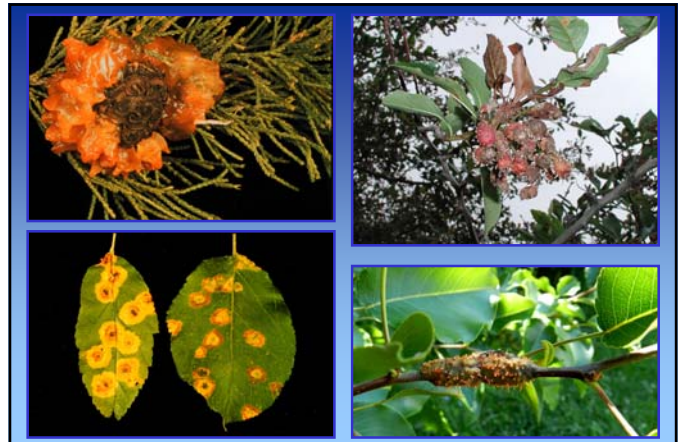
- **Control**
 - Use fungicides to prevent infections
 - Chlorothalonil, fludioxonil, mancozeb, metconazole, propiconazole, tebuconazole, thiophanate-methyl
 - 7 day application intervals
 - Alternate active ingredients (FRAC codes)
 - Contact the PDDC if you believe you have found boxwood (box) blight!

Diseases of Evergreens Gymnosporangium Rusts

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

Diseases of Evergreens Gymnosporangium Rusts

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



Diseases of Evergreens 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 Evergreens Gymnosporangium Rusts

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

Diseases of Evergreens 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 Evergreens White Pine Blister Rust

- **Pathogen:** *Cronartium ribicola*
- **Hosts**
 - White pine
 - Gooseberry/Currants (*Ribes* spp.)
- **Favorable environment:** Wet weather

Diseases of Evergreens White Pine Blister Rust

- **Control**
 - Remove and destroy gooseberries/currants
 - Plant pines other than white pine
 - DO NOT overcrowd white pines
 - Keep weeds under control
 - DO NOT overhead irrigate
 - Scout routinely for disease



Diseases of Evergreens White Pine Blister Rust

- **Control**
 - Prune diseased branches
 - Prune healthy branches from the ground up
 - Disinfect pruning tools
 - 70% alcohol
 - Commercial disinfectants
 - 10% bleach

Diseases of Evergreens Cytospora Canker

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



Diseases of Evergreens 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 Evergreens Cytospora Canker

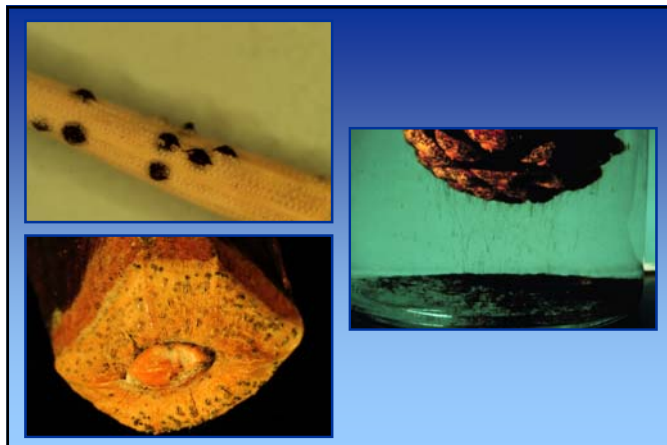
- **Control**
 - Decontaminate pruning tools
 - 70% alcohol (spray disinfectants)
 - Commercial disinfectants
 - 10% bleach
 - Destroy infected materials
 - Burn (where allowed)
 - Deep bury
 - DO NOT use fungicides

Diseases of Evergreens 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 Evergreens
Diplodia (Sphaeropsis) Shoot Blight

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



Diseases of Evergreens
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 Evergreens
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 Evergreens
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 Evergreens Phomopsis Tip Blight

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



Diseases of Evergreens 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 Evergreens 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 Evergreens 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 Evergreens Root/Crown Rots

- **Pathogens**
 - *Pythium* spp.
 - *Phytophthora* spp.
 - *Rhizoctonia solani*
 - *Fusarium* spp.
 - *Cylindrocarpon* spp.
- **Hosts**
 - Any evergreen
 - Yew, fir (especially)
- **Favorable environment: Cool, wet soils**



Diseases of Evergreens Root/Crown Rots

- **Control**
 - Moderate soil moisture
 - Grow trees and shrubs in well-drained sites
 - Use a soil with adequate drainage
 - Improve drainage in poorly drained soils
 - Add organic matter to improve drainage
 - Use raised beds
 - DO NOT overwater
 - DO NOT overmulch

Diseases of Evergreens Root/Crown Rots

- **Control**
 - DO NOT move contaminated soil or plants to non-infested areas
 - Decontaminate infested tools, pots, work areas
 - Pretest soils/mulches/composts for the presence of root rot fungi
 - Use a soil-less potting mix for containerized plants

Diseases of Evergreens Root/Crown Rots

- **Control**
 - Use fungicides to prevent infections
 - Etridiazole, metalaxyl/mefenoxam, fosetyl-AI, PCNB, thiophanate-methyl, fludioxonil
 - Use granular formulations if possible
 - Use during periods of wet weather
 - Use biopesticides to prevent infections
 - Trichoderma, Gliocladium
 - Use for potted plants

Diseases of Evergreens Armillaria Root Disease

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





Diseases of Evergreens 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

Diseases of Evergreens Herbicide Injury

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



Diseases of Evergreens 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 Evergreens Herbicide Injury

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

Diseases of Evergreens Winter Injury/Winter Burn

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

Diseases of Evergreens Winter Injury/Winter Burn

- **Affected plants**
 - Yew
 - Spruce (Alberta)
 - Boxwood
 - Arborvitae



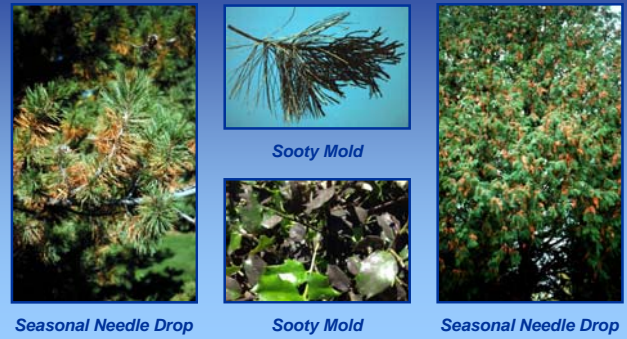
Diseases of Evergreens Winter Injury/Winter Burn

- **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 Evergreens Other Abiotic Disorders



Diseases of Evergreens Non-Diseases



Diseases of Evergreens
Non-Diseases: Fungi/Fungal Allies



Giant Puffballs



Bird's Nest Fungi



Lichens



Stink Horns



Slime Molds

Diseases of Evergreens
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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