

## Advanced Master Gardener Training

### Diseases of Evergreens

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### Diseases of Evergreens 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)

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### Diseases of Evergreens 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

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### Diseases of Evergreens 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

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### Diseases of Evergreens Rhizosphaera Needle Cast

- Control
  - Decontaminate pruning tools (70% alcohol, disinfectants, 10% bleach)
  - Use fungicides to prevent infections
    - Copper, chlorothalonil
    - Alternate active ingredients (FRAC Codes)
    - Start applications at bud break
    - Apply at 3-4 week intervals under favorable conditions

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## Diseases of Evergreens

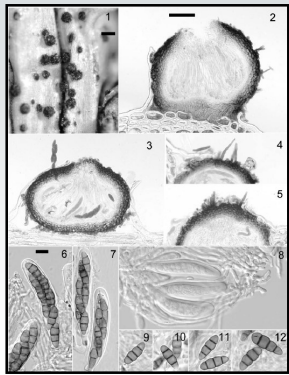
### Spruce Needle Drop

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

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From:  
 Rossman, A. Y., Farr, D. F., Castlebury, L. A., Shoemaker, R., and Mengistu, A. 2002. *Setomelanomma holmii* (Pleiosporales, Phaeosphaeriaceae) on living spruce twigs in Europe and North America. Can. J. Bot. 80: 1209-1215.

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## Diseases of Evergreens

### Spruce Needle Drop

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

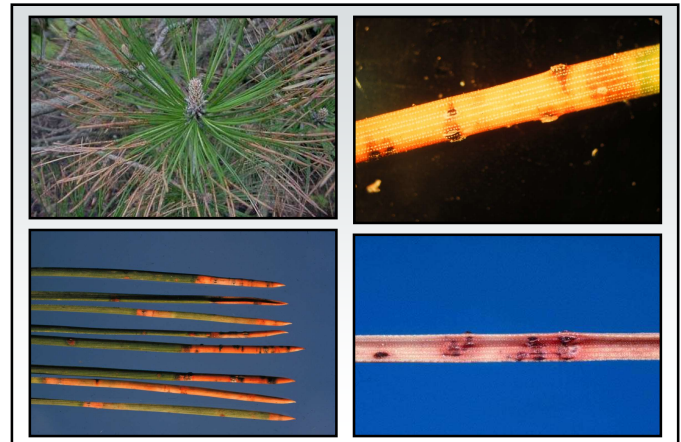
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## Diseases of Evergreens

### Dothistroma Needle Blight

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

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### 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

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### Diseases of Evergreens Dothistroma Needle Blight

- **Control**
  - Use fungicides to prevent infections
    - Copper
    - Start application(s) in early June
    - Apply 1 treatment, or 2 treatments spaced 3-4 weeks apart

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### Diseases of Evergreens Boxwood Blight

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

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### Diseases of Evergreens Boxwood Blight

- **Control**
  - Be cautious about holiday wreaths
  - Use shrubs other than boxwood
  - Buy locally produced boxwood
  - Buy from a reputable supplier

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### Diseases of Evergreens Boxwood Blight

- **Control**
  - Grow resistant varieties
    - Hybrid boxwood 'Green Gem'
    - Common boxwood 'Katerberg' North Star®
    - Korean littleleaf boxwood
      - 'Eseles' Wedding Ring®
      - 'Franklin's Gem'
      - 'Winter Gem'
      - 'Wintergreen'

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### Diseases of Evergreens Boxwood Blight

- **Control**
  - Avoid symptomatic plants
  - DO NOT replant in an area where boxwood blight has been a problem
  - Keep new plants isolated
  - Space plants far apart
  - DO NOT overhead water
  - Prune out diseased branches

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### Diseases of Evergreens Boxwood Blight

- **Control**
  - Decontaminate pruning tools (70% alcohol, commercial disinfectants)
  - Remove and destroy infected plants
    - Burn (where allowed)
    - Deep bury (two feet)/Double bag and landfill
    - DO NOT compost

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### Diseases of Evergreens Boxwood Blight

- **Control**
  - Use fungicides to prevent infections
    - Chlorothalonil (alone or with propiconazole or thiophanate-methyl), fludioxonil, metconazole, tebuconazole
    - Alternate active ingredients (FRAC codes)
    - Apply at 7-day intervals
  - Contact the PDDC if you suspect you have infected boxwoods

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### Diseases of Evergreens Gymnosporangium Rusts

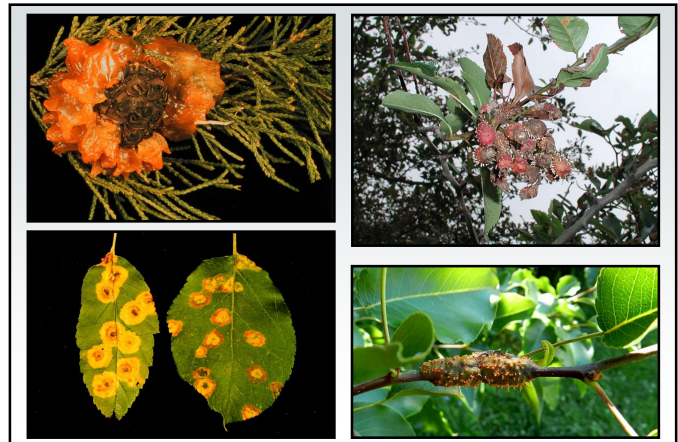
- **Pathogens: *Gymnosporangium* spp.**
  - *Gymnosporangium juniperi-virginianae* (Cedar-apple rust)
  - *Gymnosporangium globosum* (Cedar-hawthorn rust)
  - *Gymnosporangium clavipes* (Cedar-quince rust)

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### Diseases of Evergreens Gymnosporangium Rusts

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

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## Diseases of Evergreens 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/>)

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## Diseases of Evergreens Gymnosporangium Rusts

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

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## Diseases of Evergreens Gymnosporangium Rusts

- **Control**
  - Use fungicides to prevent infections (?)
    - Treat rosaceous hosts
    - Chlorothalonil, copper, ferbam, mancozeb, propiconazole, sulfur, and triadimefon
    - Alternate active ingredients (FRAC Codes)
    - Apply when flowers first show color, when half of flowers open, at petal fall, 7 to 10 days after petal fall, and 10 to 14 days later

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## Diseases of Evergreens White Pine Blister Rust

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

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## 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

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### Diseases of Evergreens White Pine Blister Rust

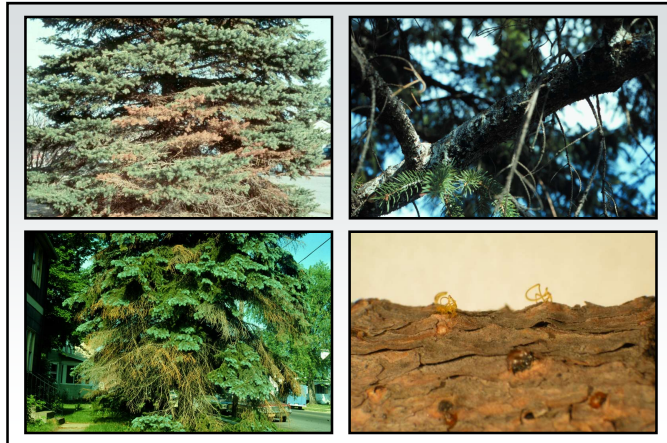
- Control
  - Prune diseased branches
  - Prune healthy branches from the ground up
  - Disinfect pruning tools  
(70% alcohol, disinfectants, 10% bleach)
- DO NOT use fungicides

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### Diseases of Evergreens Cytospora Canker

- Pathogen
  - *Leucostoma (Valsa) kunzei*
  - *Cytospora (Leucocytospora) kunzei*
  - *Cytospora* spp.
- Hosts
  - Spruces (particularly Colorado blue spruce)
  - Many other conifers
- Favorable environment: Wet weather

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### 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
  - Decontaminate pruning tools  
(70% alcohol, disinfectants, 10% bleach)

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### Diseases of Evergreens Cytospora Canker

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

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### Diseases of Evergreens 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

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## Diseases of Evergreens

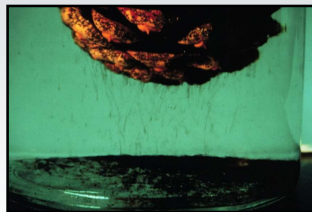
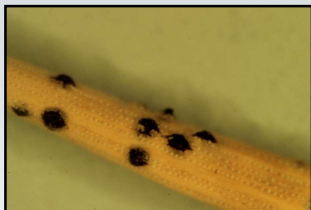
### Diplodia (Sphaeropsis) Tip Blight

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

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## Diseases of Evergreens

### 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 (?)

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## Diseases of Evergreens

### 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

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## Diseases of Evergreens

### Phomopsis Tip Blight

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

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## Diseases of Evergreens

### Phomopsis Tip Blight

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

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## Diseases of Evergreens

### Phomopsis Tip Blight

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

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## Diseases of Evergreens

### Phomopsis Tip Blight

- **Control**
  - Use fungicides to prevent infections
    - Mancozeb, copper, thiophanate-methyl
    - Alternate active ingredients (FRAC Codes)
    - Apply from bud break through period of rapid growth
    - Apply every 7-21 days

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## Diseases of Evergreens

### Root/Crown Rots

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

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## 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

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## Diseases of Evergreens Root/Crown Rots

- **Control**
  - DO NOT move contaminated soil or plants
  - Decontaminate infested tools, pots, work areas
  - Pretest soils/mulches/composts
  - Use soil-less potting mixes for containerized plants

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## Diseases of Evergreens Root/Crown Rots

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

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## Diseases of Evergreens Armillaria Root Disease

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

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## 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

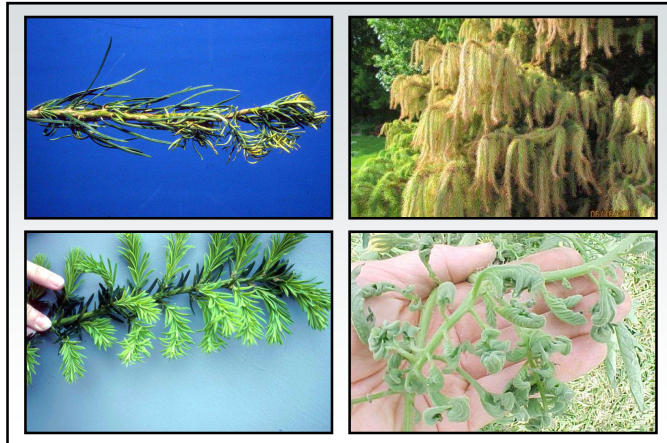
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## Diseases of Evergreens

### Herbicide Injury

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

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## 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

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## Diseases of Evergreens

### Herbicide Injury

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

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## Diseases of Evergreens

### Winter Injury/Winter Burn

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

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## Diseases of Evergreens Winter Injury/Winter Burn

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

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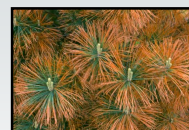
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## Diseases of Evergreens Winter Injury/Winter Burn

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

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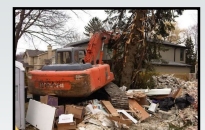
## Diseases of Evergreens Other Abiotic Disorders



Salt Injury



Chlorosis



Construction Injury



Water Stress



Girdling Root



Lawn Mower Injury

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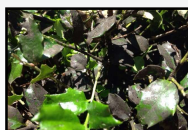
## Diseases of Evergreens Non-Diseases



Seasonal Needle Drop



Sooty Mold



Sooty Mold



Seasonal Needle Drop

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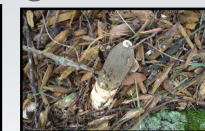
## Diseases of Evergreens Non-Diseases: Fungi/Fungal Allies



Giant Puffballs



Lichens



Stink Horns



Bird's Nest Fungi



Slime Molds

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**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  
<https://pddc.wisc.edu>**

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