

McKay Nursery Seminar

Diseases in the Nursery

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Diseases in the Nursery Boxwood Blight

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



Diseases in the Nursery Boxwood Blight

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

Diseases in the Nursery 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'

Diseases in the Nursery Boxwood Blight

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

Diseases in the Nursery Boxwood Blight

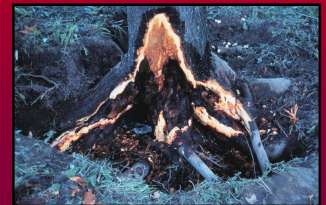
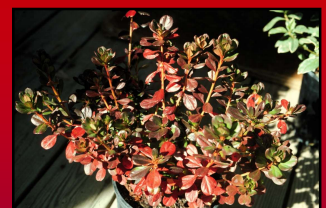
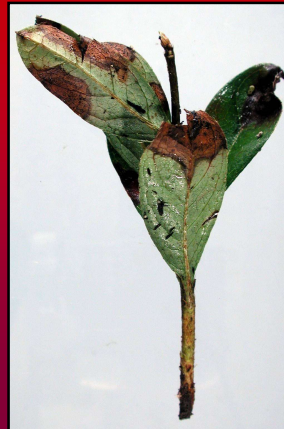
- **Control**
 - Prune out diseased branches
 - Decontaminate pruning tools (70% alcohol, 10% bleach, disinfectants)
 - Remove and destroy infected plants
 - Burn (where allowed)
 - Deep bury (two feet)/Double bag and landfill
 - DO NOT compost

Diseases in the Nursery 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

Diseases in the Nursery Root/Crown Rots

- **Pathogens**
 - *Rhizoctonia solani*
 - *Fusarium* spp.
 - *Cylindrocarpon* spp.
 - *Cylindrocladium* spp.
 - *Pythium* spp.
 - *Phytophthora* spp.
- **Hosts:** Any plant
- **Favorable environment:** Cool, wet soils



Diseases in the Nursery Root/Crown Rots

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

Diseases in the Nursery Root/Crown Rots

- **Control**
 - DO NOT move contaminated soil or plants
 - Decontaminate infested tools, pots, work area (70% alcohol, disinfectants, 10% bleach)
 - Pretest soils/mulches/composts
 - Use soil-less potting mixes for containerized plants
 - Fumigate propagation beds

Diseases in the Nursery Root/Crown Rots

- **Control**
 - Use fungicides to prevent infections
 - Captan, chlorothalonil, fludioxonil, PCNB, propiconazole, thiophanate-methyl, triflumizole
 - Etridiazole, metalaxyl/mefenoxam, fosetyl-Al
 - Formulation/timings will depend on setting
 - Use biopesticides to prevent infections
 - *Trichoderma*, *Gliricladium*
 - Use for potted plants

Diseases in the Nursery Botrytis Blight/Gray Mold

- **Pathogen:** *Botrytis cinerea*
- **Hosts**
 - Virtually any herbaceous plant
 - Flowering plants
 - Rose
 - Peony
 - Dahlia
- **Favorable environment:** Wet weather



Diseases in the Nursery Botrytis Blight/Gray Mold

- **Control**
 - Remove infested plant debris/infect plant parts
 - Burn (where allowed)
 - Deep bury
 - Hot compost
 - Remove aging plant parts
 - Promote rapid drying
 - Plant less densely
 - Thin existing plant stands

Diseases in the Nursery Botrytis Blight/Gray Mold

- **Control**
 - DO NOT overhead water
 - DO NOT overwater
 - Use fungicides to prevent infections
 - Chlorothalonil, copper, fludioxonil, mancozeb, thiophanate-methyl
 - Alternate active ingredients (FRAC Codes)
 - Apply during periods of high moisture
 - Apply at 7-14 day intervals

Diseases in the Nursery Gymnosporangium Rusts

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

Diseases in the Nursery Gymnosporangium Rusts

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



Diseases in the Nursery Gymnosporangium Rusts

- Control
 - Separate juniper and rosaceous hosts
 - Remove volunteer junipers/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/>)

Diseases in the Nursery Gymnosporangium Rusts

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

Diseases in the Nursery 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

Diseases in the Nursery White Pine Blister Rust

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



Diseases in the Nursery White Pine Blister Rust

- **Control**
 - Remove and destroy *Ribes* spp.
 - Physically separate white pine and *Ribes* spp.
 - Grow pines other than white pine
 - DO NOT overcrowd white pines
 - Keep weeds under control
 - DO NOT overhead irrigate
 - Scout routinely for disease

Diseases in the Nursery White Pine Blister Rust

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

Diseases in the Nursery Crown Rust

- **Pathogen:** *Puccinia coronata*
- **Hosts**
 - Buckthorn
 - Grasses
 - Ornamental grasses (turf, reed grass)
 - Grain grasses (oats, barley)
 - Weed grasses (brome grass, canary grass)
- **Favorable environment:** Wet weather



Diseases in the Nursery Crown Rust

- **Control**
 - DO NOT grow buckthorn
 - Separate buckthorn and grass hosts
 - Physically separate buckthorn and ornamental grasses
 - Grow buckthorn as far from grain fields as possible
 - Remove and destroy weed grasses

Diseases in the Nursery Crown Rust

- Control
 - DO NOT overcrowd buckthorn plants
 - Keep weeds under control
 - DO NOT overhead irrigate
 - Fertilize (N) turf properly
 - Mow turf regularly
 - DO NOT use fungicides

Diseases in the Nursery Cytospora Canker

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



Diseases in the Nursery Cytospora Canker

- Control
 - DO NOT grow 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)

Diseases in the Nursery Cytospora Canker

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

Diseases in the Nursery Rhizosphaera Needle Cast

- Pathogens: *Rhizosphaera kalkhoffii*
Rhizosphaera spp.
- Look-Alike: Stigma Needle Cast (*Stigma* spp.)
- Hosts (major)
 - Colorado blue spruce
 - Other spruces: Black, Engelmann, Serbian, Sitka, white (Black Hills)

Diseases in the Nursery 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 in the Nursery Rhizosphaera Needle Cast

- **Control**
 - DO NOT grow Colorado blue spruce
 - Grow dwarf spruce varieties
 - DO NOT crowd trees when planting
 - Thin healthy branches to increase airflow
 - Prevent tree stress
 - Prune diseased branches

Diseases in the Nursery 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

Diseases in the Nursery Powdery Mildews

- **Causes**

<ul style="list-style-type: none"> – <i>Erysiphe</i> spp. – <i>Uncinula</i> spp. – <i>Phyllactinia</i> spp. – <i>Blumeria</i> spp. – <i>Oidium</i> spp. 	<ul style="list-style-type: none"> – <i>Microsphaera</i> spp. – <i>Sphaerotheca</i> spp. – <i>Podosphaera</i> spp. – <i>Brasiliomyces</i> spp. – <i>Ovulariopsis</i> spp.
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Diseases in the Nursery Powdery Mildews

- **Hosts**
 - Virtually everything
 - Not conifers
- **Favorable environment: High humidity**



Diseases in the Nursery Powdery Mildews

- **Control**
 - Avoid growing susceptible varieties
 - Phlox
 - Bee balm
 - Ninebark (red-foliaged)
 - Remove/destroy diseased leaves/branches
 - Burn (where allowed)
 - Deep bury
 - Hot compost

Diseases in the Nursery Powdery Mildews

- **Control**
 - Reduce humidity
 - Plant less densely
 - Thin plant canopies

Diseases in the Nursery 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 in the Nursery Black Spot

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



Diseases in the Nursery Black Spot

- **Control**
 - Grow 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 in the Nursery Black Spot

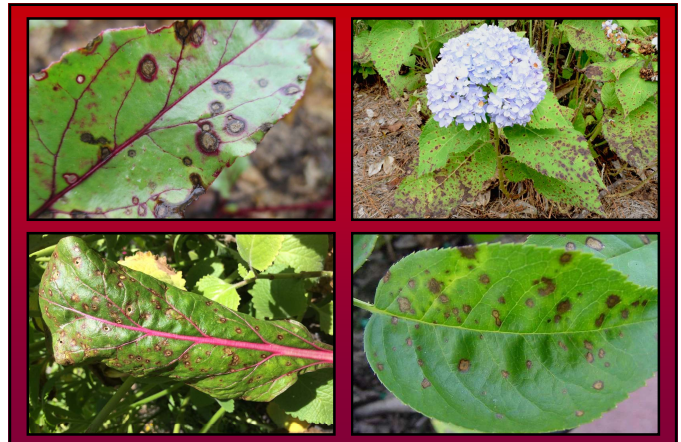
- **Control**
 - Remove/destroy diseased leaves and canes
 - Burn (where allowed)
 - Deep bury
 - Hot compost
 - Decontaminate pruning tools
(70% alcohol, disinfectants, 10% bleach)

Diseases in the Nursery Black Spot

- **Control**
 - Use fungicides to prevent infections
 - Chlorothalonil, copper, 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 in the Nursery Cercospora Leaf Spot

- **Cause:** *Cercospora* spp.
- **Hosts:**
 - Many herbaceous ornamentals
 - Many woody ornamentals
 - Hydrangea
 - Rose
- **Favorable environment:** Cool, wet weather



Diseases in the Nursery Cercospora Leaf Spot

- **Control**
 - Grow resistant plant 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 in the Nursery Cercospora Leaf Spot

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

Diseases in the Nursery Cercospora Leaf Spot

- **Control**
 - Use fungicides to prevent infections
 - Chlorothalonil, copper, fludioxonil, mancozeb, propiconazole (and other azoles)
 - *Bacillus subtilis*, neem oil
 - Alternate active ingredients (FRAC Codes)
 - Apply at 7-14 day intervals

Diseases in the Nursery 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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