Evil Twins: Plant Disease Look-Alikes

Oak Wilt

• Cause
  – *Bretziella fagacearum* (formerly *Ceratocystis fagacearum*)
  – Chalara sp.

• Hosts
  – Red oak group: Red, black, pin
  – White oak group: White, bur, swamp white
  – Chinese chestnut

• Favorable environment
  – Cool, wet conditions (for infection)
  – Hot, dry weather (for symptom development)

• Transmission
  – Oak bark beetles
    • *Pseudopiptoophorus ninutissimus*
    • *Pseudopiptoophorus pruinosus*
  – Sap beetles
    • *Carpophilus* spp.
    • *Colopterus* spp.
    • *Cryptarcha* spp.
    • *Epuraea* spp.
    • *Clischochilus* spp.

• Root grafts
  – Major method of movement in clumps of oaks
  – Commonly form between trees in the same group
    • Red oak group: Red, black, pin
    • White oak group: White, bur, swamp white
  – Rarely form between trees in different groups
  – Movement of up to 20-25 ft/year
Control
– DO NOT prune or wound oaks from bud break through 2-3 weeks past full leaf development
– Disrupt root grafts
• “Oak Wilt Management: What are the Options?” (https://learningstore.extension.wisc.edu/)
• Mechanically (vibratory plow or trenching machine)
• Chemically (soil fumigant)
• Physical barriers

Evil Twins: Plant Disease Look-Alikes
Oak Wilt

• Control
– Remove diseased (and healthy) trees
– Decontaminate pruning tools (70% alcohol, disinfectants, 10% bleach)
– Be careful using oak wood
  • Remove bark
  • Cover wood

Evil Twins: Plant Disease Look-Alikes
Armillaria Root Disease

• Pathogens: Armillaria spp.

• Hosts
  – Many trees and shrubs
  – Some herbaceous plants

• Favorable environment
  – Drought stress
  – Defoliation stress
  – Other stresses
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

Evil Twins: Plant Disease Look-Alikes
Armillaria Root Disease

Evil Twins: Plant Disease Look-Alikes
Root/Crown Rots

Pathogens
- *Pythium* spp.
- *Phytophthora* spp.
- *Rhizoctonia solani*
- *Fusarium* spp.
- *Cylindrocarpon* spp.
- *Thielaviopsis* spp.

Hosts: Any plant

Favorable environment: Cool, wet soils

Evil Twins: Plant Disease Look-Alikes
Root/Crown Rots

Control
- Moderate soil moisture
  - Grow plants in well-drained sites
  - Use a potting mix with adequate drainage
  - Improve drainage in poorly drained soils
    - Add organic matter to improve drainage
    - Use raised beds
- DO NOT overwater
- DO NOT overmulch
Evil Twins: Plant Disease Look-Alikes
Root/Crown Rots

• Control
  – Pretest soils/mulches/composts
  – Use a soil-less potting mix or a pasteurized potting mix for containerized plants
  – DO NOT move contaminated soil or plants
  – Disinfest contaminated materials (70% alcohol, disinfectants, 10% bleach)

Evil Twins: Plant Disease Look-Alikes
Root/Crown Rots

• Control
  – Use fungicides to prevent infections
    • Contract with a professional pesticide applicator
    • Etridiazole, metalaxyl, mefenoxam, fosetyl-Al, PCNB, thiophanate-methyl, fludioxonil
    • Alternate active ingredients (FRAC codes)
    • Use granular formulations if possible
    • Use during periods of wet weather

Evil Twins: Plant Disease Look-Alikes
Root/Crown Rots

• Control
  – Use biopesticides to prevent infections
    • Trichoderma, Gliocladium
    • Use for potted plants
    • Exercise caution when combining with chemical fungicides

Evil Twins: Plant Disease Look-Alikes
Southern Blight

• Pathogen: *Sclerotium rolfsii*
• Hosts
  – Any herbaceous plant
  – Some woody plants
• Favorable environment: Warm, wet weather

Evil Twins: Plant Disease Look-Alikes
Southern Blight

• Control
  – DO NOT buy infected.infested plants
  – Avoid cocoa mulch (?)
  – Remove infected plants, mulch, and soil
    • Double bag and landfill
  – Disinfest contaminated materials (70% alcohol, disinfectants, 10% bleach)
Evil Twins: Plant Disease Look-Alikes 
Southern Blight

- **Control**
  - Amend soil with organic matter (?)
  - Allow affected areas to go fallow
  - Use fungicides for control
    - Contract with a professional pesticide applicator
    - Azoxystrobin, flutolanil, flutolanil + thiophanate-methyl, PCNB, tebuconazole, triadimefon
    - Alternate active ingredients (FRAC codes)
    - Apply at 14 – 28 day intervals
    - Pray for a really, really, REALLY cold winter

Evil Twins: Plant Disease Look-Alikes 
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)
- **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

Evil Twins: Plant Disease Look-Alikes 
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

Evil Twins: Plant Disease Look-Alikes 
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
Evil Twins: Plant Disease Look-Alikes
Spruce Needle Drop

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

**Cause:** *Erwinia amylovora*

**Hosts**
- Many woody rosaceous plants
  - Apple, crabapple, pear, mountain ash, cotoneaster
- Favorable environment
  - Wet weather (but not too wet)
  - Hail (or other wounding)
### Evil Twins: Plant Disease Look-Alikes

#### Fire Blight

- **Control**
  - Plant resistant varieties
    - “Home Fruit Cultivars for Northern Wisconsin” ([https://learningstore.uwex.edu/](https://learningstore.uwex.edu/))
    - “Home Fruit Cultivars for Southern Wisconsin” ([https://learningstore.uwex.edu/](https://learningstore.uwex.edu/))
    - “Top Ornamental Crabapples for Wisconsin” ([https://pddc.wisc.edu/fact-sheet-listing-all/](https://pddc.wisc.edu/fact-sheet-listing-all/))
  - Prune diseased branches

- **Control**
  - Decontaminate pruning tools (70% alcohol, disinfectants, 10% bleach)
  - Destroy infected materials
    - Burn (where allowed)
    - Deep bury
  - DO NOT over-fertilize with nitrogen

#### Bacterial Canker

- **Control**
  - Use bactericides to prevent infections (?)
    - Copper, streptomycin
  - Apply
    - Pre-bloom (copper)
    - During flowering (streptomycin)
  - Apply every
    - Two applications at spaced 4 days apart (copper)
    - Multiple applications spaced 3-4 days apart (streptomycin)

- **Causes**
  - *Pseudomonas syringae pv. syringae*
  - *Pseudomonas syringae pv. mors-prunorum*

- **Hosts:** Stone fruits (plum, cherry, peach)

- **Favorable environment**
  - Wet weather
  - Cold temperatures
  - Wounding

- **Control**
  - Minimize wounding
  - Prune diseased branches
  - Decontaminate pruning tools (70% alcohol, disinfectants, 10% bleach)
  - Destroy infected materials
    - Burn (where allowed)
    - Deep bury
  - DO NOT use bactericides
**Evil Twins: Plant Disease Look-Alikes**

**Tobacco Mosaic**

- **Cause:** *Tobacco mosaic virus* (TMV)
- **Hosts**
  - Many herbaceous ornamentals
  - Many vegetables
- **Favorable environment:** None
- **Transmission:** Mechanical
  - Touch
  - Tools

**Evil Twins: Plant Disease Look-Alikes**

**Tobacco Mosaic**

- **Control**
  - Buy plants from a reputable source
  - Inspect plants for symptoms
  - Test plants prior to purchase
  - DO NOT smoke around plants
  - Wash hands routinely with soap and water
  - Keep weeds under control
  - Landfill diseased plants and plant debris

**Evil Twins: Plant Disease Look-Alikes**

**Cucumber Mosaic**

- **Cause:** *Cucumber mosaic virus* (CMV)
- **Hosts**
  - Many herbaceous ornamentals
  - Many vegetables
- **Favorable environment:** None
- **Transmission**
  - Insect (aphids)
  - Mechanical (contaminated tools)

**Evil Twins: Plant Disease Look-Alikes**

**Tobacco Mosaic**

- **Control**
  - Disinfect contaminated materials
    - 1% Sodium dodecyl sulfate (sodium lauryl sulfate) + 1% Alconox® (2½ Tbsp + 2½ Tbsp/gal)
    - Trisodium phosphate (14 dry oz/gal)
    - 20% low fat dry milk (Carnation®) + 0.1% polysorbate 20 (9⅛ cups + ¾ tsp/gal)
  - Alcohol dip followed by flaming
  - DO NOT use chemical controls on plants
Evil Twins: Plant Disease Look-Alikes
Cucumber Mosaic

• Control
  – Buy plants from a reputable source
  • Inspect plants for symptoms
  • Test plants prior to purchase
  – Keep weeds under control
  – Remove diseased plants and plant debris
    • Burn (where allowed)
    • Deep bury
    • Hot compost

• 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
Evil Twins: Plant Disease Look-Alikes
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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