Deadly Diseases in the Landscape

Verticillium Wilt

- **Causes:** Verticillium dahliae, Verticillium albo-atrum
- **Hosts**
  - Many woody ornamentals (maple, ash, redbud, smoke bush)
  - Many herbaceous plants
  - Many vegetables (tomato, potato, eggplant)
- **Environmental trigger:** Cool, wet weather

**Control**
- Use appropriate plants in suspect areas
  - Pine, juniper, fir, spruce
  - Beech, birch, ginkgo, hackberry, hawthorn, hickory, honey locust, mountain ash, white oak, bur oak, poplar, serviceberry, sycamore, willow
- Pretest soils/mulches/composts
- Control broad-leaf weeds
- Avoid municipal mulches

Deadly Diseases in the Landscape

Verticillium Wilt

- **Causes**
  - Ophiostoma ulmi (Ceratocystis ulmi)
  - Ophiostoma novo-ulmi
  - Pesotum ulmi (Graphium ulmi)
- **Hosts**
  - American, Belgian, English, red, rock, September, European white, winged
  - Cedar, smooth-leaf, Scots

**Control**
- Prevent plant stress
- Prune diseased (wilted) areas
- Practice good general plant maintenance
- Remove diseased plants
- Destroy infected materials
  - Burn
  - Composting (?)

Deadly Diseases in the Landscape

Dutch Elm Disease

- **Causes**
  - Ophiostoma ulmi (Ceratocystis ulmi)
  - Ophiostoma novo-ulmi
  - Pesotum ulmi (Graphium ulmi)
- **Hosts**
  - American, Belgian, English, red, rock, September, European white, winged
  - Cedar, smooth-leaf, Scots
Deadly Diseases in the Landscape
Dutch Elm Disease

• Transmission
  – Elm bark beetles
    • Scolytus multistriatus (European)
    • Hylurgopinus rufipes (Native)
  – Root grafts
• Environmental trigger: Cool, wet weather

Deadly Diseases in the Landscape
Dutch Elm Disease

• Control
  – Remove diseased (and healthy) elms
  – Disrupt root grafts
  – Use elm wood appropriately
  – Prune diseased branches
  – Use fungicides injections
    • Propiconazole, thiabendazole
    • Prophylactic or therapeutic
    • Every 12-24 months

Deadly Diseases in the Landscape
Dutch Elm Disease

• Cause
  – Ceratocystis fagacearum
  – Chalara sp.
• Hosts
  – Oaks
  – Chinese chestnut
• Environmental trigger: Cool, wet weather

Deadly Diseases in the Landscape
Oak Wilt

• Control
  – Plant resistant elms
    • Crosses between American and other elms
  – Treatments of dubious use
    • Tracing
    • Verticillium dahliae
Deadly Diseases in the Landscape

**Oak Wilt**

- **Transmission**
  - Oak bark beetles
    - *Pseudopityophthorus ninutissimus*
    - *Pseudopityophthorus pruinuos*
  - Sap beetles
    - *Carpophilus spp.*
    - *Euparea spp.*
    - *Colopterus spp.*
    - *Clischrochilus spp.*
    - *Cryptarca spp.*
  - Root grafts

- **Control**
  - Avoid pruning or wounding oaks when they are physiologically active
  - Paint wounds as needed
  - Remove diseased (and healthy) oaks
  - Disrupt root grafts
  - Use oak wood appropriately

**Armillaria Root Disease**

- **Pathogen**: *Armillaria spp.*
- **Hosts**
  - Many deciduous trees and shrubs
  - Many conifers/evergreens
- **Environmental trigger**: Stress
Deadly Diseases in the Landscape

**Armillaria Root Disease**

- **Control**
  - Reduce stress where possible
  - Water adequately
  - Fertilize properly
  - Control foliar pathogens
  - Control foliar insect pests
  - DO NOT wound trees
  - Remove *Armillaria*-infested materials

**Deadly Diseases in the Landscape**

**Root/Crown Rots**

- **Causes**
  - *Pythium* spp.
  - *Rhizoctonia solani*
  - *Cylindrocarpon* spp.
  - *Thielaviopsis* spp.
  - *Phytophthora* spp.
  - *Fusarium* spp.
- **Hosts**: Anything and everything
- **Environmental trigger**: Cool, wet weather
Deadly Diseases in the Landscape
Root/Crown Rots

- **Control**
  - Moderate soil moisture
    - Grow ornamentals 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

Deadly Diseases in the Landscape
Root/Crown Rots

- **Control**
  - DO NOT move contaminated soil or plants
  - 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

Deadly Diseases in the Landscape
Southern Blight

- **Pathogen:** *Sclerotium rolfsii*
- **Hosts**
  - Many herbaceous annuals and perennials
    - Hosta
    - Bedding plants
  - Some woody ornamentals
- **Environmental trigger:** Mild winters

Deadly Diseases in the Landscape
Root/Crown Rots

- **Control**
  - Use fungicides to prevent infections
    - Etridiazole, metalaxyl, mefenoxam, fosetyl-Al, PCNB, thiophanate-methyl, fludioxonil
  - Use granular formulations if possible
  - Use during periods of wet weather
  - Use biopesticides to prevent infections
    - *Trichoderma, Gliocladium*
    - Use in pot production
**Deadly Diseases in the Landscape**

**Southern Blight**

- **Control**
  - Avoid purchasing infected plants
  - Avoid cocoa mulch (?)
  - Remove infected (and healthy) plants
  - Use fungicides for control
    - Triadimefon
    - 14 – 28 day intervals
  - Pray for a cold winter!

**Impatiens Downy Mildew**

- **Cause:** *Plasmopara obducens*
- **Hosts**
  - Standard garden impatiens (*I. walleriana*)
  - Balsam impatiens (*I. balsamina*)
  - Jewelweed (*I. pallida, I. capensis*)
  - New Guinea impatiens (*I. hawkeri*)
    (resistant/tolerant)
- **Environmental trigger:** Cool, wet weather

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**Impatiens Downy Mildew**

- **Control**
  - Grow tolerant/resistant/immune plants
  - DO NOT grow impatiens in the same bed every year
  - Start with clean transplants and seed
  - Keep materials from different sources physically separated
  - DO NOT overcrowd plants
  - DO NOT overhead water

- **Watch for disease on a regular basis**
- **Bag and discard affected plants**
- **Disinfect contaminated materials**
  - Symptomatic plants
  - Asymptomatic surrounding plants
  - **Commercial disinfectants**
    - 10% bleach
    - 70% alcohol
**Deadly Diseases in the Landscape**

**Impatiens Downy Mildew**

- **Control**
  - Use fungicides to prevent infections
  - Mefenoxam, fluopicolide, potassium phosphite, mancozeb, pyraclostrobin + boscalid, fluoxastobin, cyazofamid, dimethomorph, fenamidine, azoxystrobin
  - Alternate active ingredients (FRAC codes)
  - Apply at 7 day application intervals

**Fire Blight**

- **Cause:** *Erwinia amylovora*
- **Hosts**
  - Many rosaceous plants
  - Apple, crabapple, pear, mountain ash, cotoneaster
- **Environmental trigger**
  - Weather-related injuries/wounds
  - Cool, wet weather

**Deadly Diseases in the Landscape**

**Fire Blight**

- **Control**
  - Plant resistant varieties where available
  - Prune diseased branches
  - Disinfest pruning tools
  - DO NOT over-fertilize with nitrogen
  - Use bactericides to prevent infections (?)
    - Copper-containing fungicides, antibiotics
    - During flowering
    - Applications every 7-14 days (3-4 days)

**Bacterial Canker**

- **Causes**
  - *Pseudomonas syringae pv. syringae*
  - *Pseudomonas syringae pv. mors-prunorum*
- **Hosts:** Plum, cherry, peach, apricot
- **Environmental trigger**
  - Weather-related injuries/wounds
  - Cool, wet weather
**Deadly Diseases in the Landscape**

**Bacterial Canker**

- **Control**
  - DO NOT maintenance prune during cool, wet weather
  - Water and fertilize properly
  - Reduce environmental stresses/injuries
  - Control weeds
  - Prune diseased branches
  - DO NOT use bactericides

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**Nectria Canker**

- **Pathogen:** *Nectria* spp.
- **Hosts**
  - Many woody ornamentals
  - Honey locust
  - Maple
- **Environmental trigger**
  - Weather-related injuries/wounds
  - Wet weather conditions

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**Nectria Canker**

- **Cause:** *Geosmithia morbida*
- **Hosts**
  - Black walnut
  - Other walnuts
- **Transmission**
  - Walnut twig beetle
    
  *Pityophthorous juglandis*
**Deadly Diseases in the Landscape**

**Thousand Cankers Disease**

- **Control**
  - DO NOT transport walnut wood/products from areas known to have the disease
  - Remove and destroy affected trees
  - No effective fungicide strategies known
  - No effective insecticide strategies known
  - Contact the PDDC if you believe you have found this disease!

**Ramorum Blight (Sudden Oak Death)**

- **Cause:** *Phytophthora ramorum*
- **Hosts**
  - Coast live oak, California black oak, Shreve oak, tanoak, big leaf maple, rhododendron, huckleberry, California bay laurel, madrone, manzanita, huckleberry, California honeysuckle, toyon, California buckeye, California coffeeberry, arrow wood, *Viburnum* spp., and many others
  - Northern red oak, northern pin oak (by inoculation)
  - Host list continues to expand
Deadly Diseases in the Landscape
Ramorum Blight (Sudden Oak Death)

• Control
  – Buy plants from a reputable sources
  – Carefully inspect plants prior to purchase
  – Keep new plants isolated
  – Contact the PDDC if you believe you have found this disease!
  – Remove and destroy infected plants
    (with assistance from WI DATCP and USDA APHIS)

Deadly Diseases in the Landscape
Ralstonia Wilt

• Cause: Ralstonia solanacearum
  – races
  – biovars
• Hosts
  – Geranium
  – Many other herbaceous plants
  – Potato

Deadly Diseases in the Landscape
Ralstonia Wilt

• Control
  – Start with clean propagation materials
  – Keep plants separated
  – Disinfect pruning tools and hands
  – Contact the PDDC if you believe you have found this disease!
  – Remove and destroy infected plants
    (with assistance from WI DATCP and USDA APHIS)

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@plantpath.wisc.edu
http://pddc.wisc.edu
Follow the clinic on Twitter @UWPDDC