2014 Landscape & Grounds Maintenance Short Course

Deadly Diseases in the Landscape

Brian D. Hudelson
Department of Plant Pathology
University of Wisconsin-Madison/Extension

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

Deadly Diseases in the Landscape
Verticillium Wilt

- 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

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

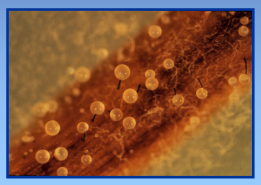
Deadly Diseases in the Landscape
Dutch Elm Disease

- 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

- Control
  - Plant resistant elms
    - Crosses between American and other elms
    - True American elms ('American Liberty', 'Independence', 'Princeton', 'Valley Forge', 'New Harmony')
  - Treatments of dubious use
    - Tracing
    - *Verticillium dahliae*

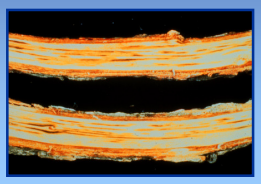
Deadly Diseases in the Landscape
Oak Wilt

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

Deadly Diseases in the Landscape
Oak Wilt

- Transmission
  - Oak bark beetles
    - *Pseudopityophthorus ninutissimus*
    - *Pseudopityophthorus pruinosus*
  - Sap beetles
    - *Carpophilus* spp.
    - *Colopterus* spp.
    - *Cryptarcha* spp.
    - *Epuraea* spp.
    - *Clischrochilus* spp.
  - Root grafts






Deadly Diseases in the Landscape
Oak Wilt

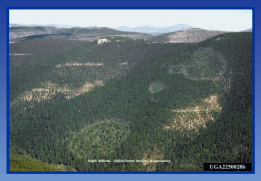
- Control
  - Avoid pruning or wounding oaks when they are physiologically active
  - Paint wounds as needed
  - Remove diseased (and healthy) oaks
  - Disrupt root grafts
  - Use oak wood appropriately

Deadly Diseases in the Landscape
Oak Wilt

- Control
  - Use fungicide injections
    - Propiconazole
    - Prophylactic or therapeutic
    - Every 12-24 months

Deadly Diseases in the Landscape
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

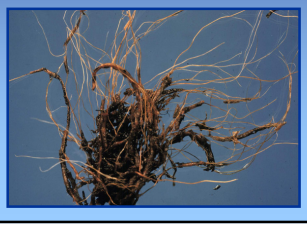
Deadly Diseases in the Landscape
Root/Crown Rots

- Causes
  - Pythium spp.
  - Rhizoctonia solani
  - Cylindrocarpon spp.
  - Phytophthora spp.
  - Fusarium spp.
  - Thielaviopsis 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
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

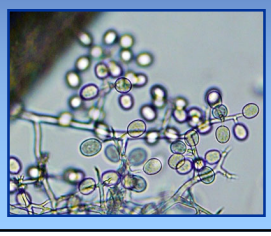
- Pathogen: *Sclerotium rolfsii*
- Hosts
  - Many herbaceous annuals and perennials
    - Hosta
    - Bedding plants
  - Some woody ornamentals
- Environmental trigger: Mild winters


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!

Deadly Diseases in the Landscape
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



Deadly Diseases in the Landscape
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

Deadly Diseases in the Landscape
Impatiens Downy Mildew

- Control
  - Watch for disease on a regular basis
  - Bag and discard affected plants
    - Symptomatic plants
    - Asymptomatic surrounding plants
  - Disinfest contaminated materials
    - 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, fenamidone, azoxystrobin
    - Alternate active ingredients (FRAC codes)
    - Apply at 7 day application intervals

Deadly Diseases in the Landscape
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)

Deadly Diseases in the Landscape
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

Deadly Diseases in the Landscape
Nectria Canker

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

Deadly Diseases in the Landscape
Nectria Canker

- Control
  - Choose well-adapted trees and shrubs
  - Water and fertilize properly
  - Reduce environmental stresses/injuries
  - Prune properly when maintenance pruning
  - Prune diseased branches
  - Disinfest pruning tools
  - DO NOT use fungicides

Deadly Diseases in the Landscape
Thousand Cankers Disease

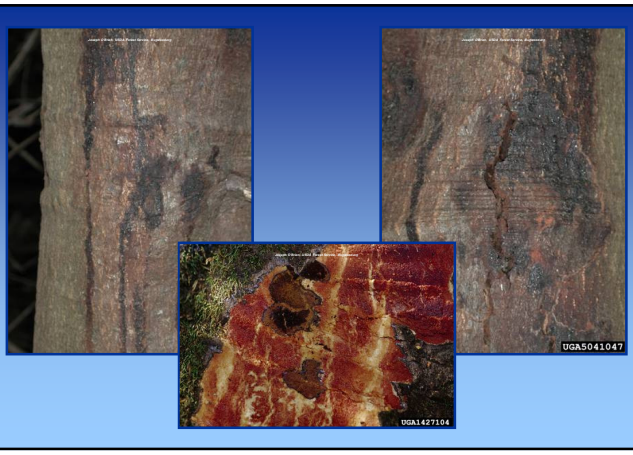
- Cause: Geosmithia morbida
- Hosts
  - Black walnut
  - Other walnuts
- Transmission
  - Walnut twig beetle (Pityophthorous juglandis)

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!*

Deadly Diseases in the Landscape
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)

Deadly Diseases in the Landscape
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