Garden and Landscape Expo 2024

Ten Diseases of Native Plants
(and Non-Natives, Too)

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Ten Diseases of Native Plants
Powdery Mildews

- **Pathogens**
  - ***Erysiphe* spp.**
  - ***Uncinula* spp.**
  - ***Phyllactinia* spp.**
  - ***Blumeria* spp.**
  - ***Oidium* spp.**
  - ***Microsphaera* spp.**
  - ***Sphaerotheca* spp.**
  - ***Podosphaera* spp.**
  - ***Brasiliomyces* spp.**
  - ***Ovulariopsis* spp.**

Ten Diseases of Native Plants
Powdery Mildews

- **Hosts**
  - **Virtually everything**
  - **Phlox, bed balm, queen-of-the-prairie, ninebark**
  - **Not conifers**
- **Favorable environment: High humidity**

Ten Diseases of Native Plants
Powdery Mildews

- **Control**
  - **Remove/destroy diseased leaves/plant debris**
    - **Burn (where allowed)**
    - **Deep bury**
    - **Hot compost**
  - **Reduce humidity**
    - **Plant less densely**
    - **Thin canopies**
  - **Use resistant cultivars/varieties**

Ten Diseases of Native Plants
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 to 14-day intervals

Ten Diseases of Native Plants
Septoria Leaf Spot

- Pathogens
  - *Septoria rudbeckiae*
  - *Septoria* spp.
- Hosts
  - Black-eyed Susan
  - Many other herbaceous plants
  - Tomato
  - Many trees and shrubs

Ten Diseases of Native Plants
Septoria Leaf Spot

- Favorable environment
  - Long periods of leaf wetness

Ten Diseases of Native Plants
Septoria Leaf Spot

- Control
  - Remove/destroy diseased leaves
  - Move plants to new location
  - Use non-susceptible varieties/plants
  - Space plants far apart
  - DO NOT overhead water
  - DO NOT overmulch
  - Thin plants as they grow

Ten Diseases of Native Plants
Septoria Leaf Spot

- Control
  - Use fungicides to prevent infections
    - Copper, chlorothalonil
    - Applications every 7-14 days

Ten Diseases of Native Plants
Aster Yellows

- Pathogen: Aster yellows phytoplasma
- Hosts
  - Many plants in the Asteraceae (aster family)
  - Many other plants in many other plant families
- Favorable environment: None
- Vector: Aster leafhopper

Ten Diseases of Native Plants
Aster Yellows

- Control
  - Remove/destroy infected plants
  - Control leafhopper vector (?)

Ten Diseases of Native Plants
Gymnosporangium Rusts

- Pathogens
  - *Gymnosporangium juniperi-virginianae* (Cedar-apple rust)
  - *Gymnosporangium globosum* (Cedar-hawthorn rust)
  - *Gymnosporangium clavipes* (Cedar-quince rust)
  - *Gymnosporangium yamadae* – NEW! (Japanese apple rust)

Ten Diseases of Native Plants
Gymnosporangium Rusts

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





Ten Diseases of Native Plants
Gymnosporangium Rusts

- Control
  - Grow only the juniper or rosaceous host
  - Use resistant cultivars/varieties
    - "Juniper Diseases" (Available on request)
    - "Disease and Insect Resistant Ornamental Plants: Juniperus (Juniperus)" (https://ecommons.cornell.edu/handle/1813/56372.2)

Ten Diseases of Native Plants
Gymnosporangium Rusts

- Control
  - Use resistant cultivars/varieties
    - "Home Fruit Cultivars for Northern Wisconsin" (https://learningstore.extension.wisc.edu/)
    - "Home Fruit Cultivars for Southern Wisconsin" (https://learningstore.extension.wisc.edu/)

Ten Diseases of Native Plants
Gymnosporangium Rusts

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

Ten Diseases of Native Plants
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

Ten Diseases of Native Plants
Black Knot

- Pathogen: *Apiosporina morbosa*
- Hosts
  - *Prunus* species
  - Black cherry!
- Favorable environment
  - Long periods of leaf wetness




Ten Diseases of Native Plants
Black Knot

- Control
  - DO NOT plant infected *Prunus* stock
  - Buy black knot-resistant varieties if available
    - Accolade flowering cherry (*Prunus* 'Accolade')
    - Sargent's cherry (*Prunus sargentii*)
    - Amur chokecherry (*Prunus maackii*)
  - Remove volunteer plums/cherries
  - Prune diseased branches

Ten Diseases of Native Plants
Black Knot

- Control
  - Decontaminate pruning tools (70% alcohol, disinfectants, bleach)
  - Destroy infected materials
    - Burn (where allowed)
    - Deep bury
  - DO NOT use fungicides

Ten Diseases of Native Plants
Verticillium Wilt

- Pathogens
  - *Verticillium dahliae*
  - *Verticillium albo-atrum*
  - Other *Verticillium* spp.
  - New *Verticillium* spp.

Ten Diseases of Native Plants
Verticillium Wilt

- Hosts
  - Many woody ornamentals
    - Common: Maple, ash, redbud, smokebush
    - Newer: Seven son flower, wafer-ash, buttonbush
  - Many vegetables
    - Tomato, potato, pepper, EGGPLANT, cucurbits
  - Many herbaceous plants
    - Common: Purple coneflower, blazing star
    - New: Vervain ('Quartz White')

Ten Diseases of Native Plants
Verticillium Wilt

- Favorable environment
  - Cool, wet weather (for infection)
  - Hot, dry weather (for symptom development)

Ten Diseases of Native Plants
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, serviceberry, sycamore, willow
  - Pretest soils/mulches/composts
  - Control broad-leaf weeds
  - Avoid municipal mulches

Ten Diseases of Native Plants
Verticillium Wilt

- Control
  - Prevent plant stress
  - Prune diseased (wilted) areas
  - Decontaminate pruning tools (70% alcohol, disinfectants, bleach)
  - Practice good general plant maintenance
  - Remove and destroy diseased plants/leaves
    - Burn
    - Hot Compost (?)

Ten Diseases of Native Plants
Verticillium Wilt

- Control
  - Remove and destroy diseased plants/leaves
    - Burn
    - Hot Compost (?)
  - DO NOT use fungicides

Ten Diseases of Native Plants
Oak Wilt

- Pathogen
  - *Bretziella fagacearum* (*Ceratocystis fagacearum*)
  - *Chalara* sp.
- Hosts
  - Red oak group: Red, black, pin
  - White oak group: White, bur, swamp white
  - Chinese chestnut

Ten Diseases of Native Plants
Oak Wilt

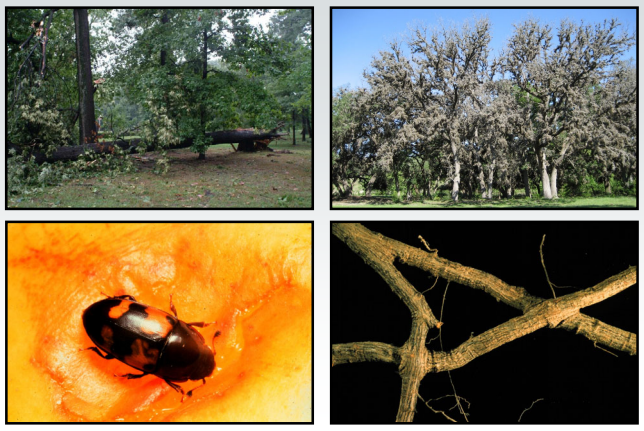
- Favorable environment
  - Cool, wet conditions (for infection)
  - Hot, dry weather (for symptom development)

Ten Diseases of Native Plants
Oak Wilt

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

Ten Diseases of Native Plants
Oak Wilt

- Transmission
  - 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



Ten Diseases of Native Plants
Oak Wilt

- Control
  - DO NOT prune or wound oaks from bud break through 2-3 weeks past full leaf development
  - Disrupt root grafts
    - "Oak Wilt Management" (https://widnr.widen.net/s/nwf2cgskdn/fr-825-oak-wilt-management-fact-sheet)
    - Mechanically (vibratory plow or trenching machine)
    - Chemically (soil fumigant)
    - Physical barriers

Ten Diseases of Native Plants
Oak Wilt

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

Ten Diseases of Native Plants
Oak Wilt

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

Ten Diseases of Native Plants
Armillaria Root Disease

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






Ten Diseases of Native Plants
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
  - DO NOT use fungicides

Ten Diseases of Native Plants
Root/Crown Rots

- Pathogens
  - *Pythium* spp.
  - *Rhizoctonia solani*
  - *Cylindrocarpon* spp.
  - *Phytophthora* spp.
  - *Fusarium* spp.
  - *Thielaviopsis* spp.
- Hosts: Anything and everything
- Favorable environment
  - Cool temperatures
  - Wet weather

Ten Diseases of Native Plants
Root/Crown Rots

- Control
  - Moderate soil moisture
    - Grow plants in the proper site
    - 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

Ten Diseases of Native Plants
Root/Crown Rots

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

Ten Diseases of Native Plants
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

Ten Diseases of Native Plants
Chlorosis

- Cause: Micronutrient (Fe or Mn) deficiency
- Susceptible plants
  - Oaks (especially pin oak)
  - Red Maple
  - Birch
  - Blueberry
  - Rhododendron
  - Other woody and herbaceous plants

Ten Diseases of Native Plants
Chlorosis

- Control
  - Plant the right plant in the right location
  - Monitor soil pH and soil nutrients
  - Decrease pH using sulfur or aluminum sulfate
  - Add chelated Fe and/or Mn as needed
  - Make sure plants are adequately watered
  - Minimize damage to plant root systems

Ten Diseases of Native Plants
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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