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.

- **Hosts**
  - Virtually everything
  - Phlox, bed balm, queen-of-the-prairie, ninebark
  - Not conifers

- **Favorable environment:** High humidity

- **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 (Junipers)” (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

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)

- **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

- **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 (?)

- **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 ninutissimus
    • Pseudopityophthorus pruinosus
  – Sap beetles
    • Carphophilus spp.
    • Colopterus spp.
    • Cryptarcha spp.
    • Epuraea spp.
    • Cliicrochilus 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
    - Mechanically (vibratory plow or trenching machine)
    - Chemically (soil fumigant)
    - Physical barriers

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

**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

A. 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

B. Root/Crown Rots

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

- **Hosts:** Anything and everything

- **Favorable environment**
  - Cool temperatures
  - Wet weather

C. 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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