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

Septoria Leaf Spot

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

- **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

- **Favorable environment**
  - Long periods of leaf wetness
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
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
Aster Yellows

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

Ten Diseases of Native Plants
Gymnosporangium Rusts

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

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/)

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

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

- 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

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

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


**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" ([link](https://widnr.widen.net/s/nwf2cgskdnr/fr-825-oak-wilt-management-fact-sheet))
    - Mechanically (vibratory plow or trenching machine)
    - Chemically (soil fumigant)
    - Physical barriers

**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

**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

**Ammillaria Root Disease**

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

**Root/Crown Rots**

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

- Hosts: Anything and everything

- Favorable environment
  - Cool temperatures
  - Wet weather

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**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

- 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

- 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