

## Garden & Green Living Expo

### 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 (?)

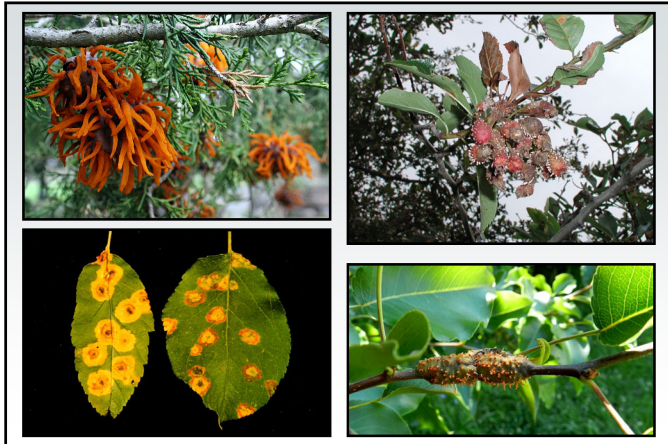
### Ten Diseases of Native Plants Gymnosporangium Rusts

- Pathogens
  - *Gymnosporangium juniperi-virginianae* (Cedar-apple rust)
  - *Gymnosporangium globosum* (Cedar-hawthorn rust)
  - *Gymnosporangium clavipes* (Cedar-quince rust)
  - *Gymnosporangium yamadae* (Red star 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
    - “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
    - New: Red-twigged dogwood
  - Many vegetables
    - Tomato, potato, pepper, EGGPLANT, cucurbits
  - Many herbaceous plants
    - Common: Purple coneflower, blazing star
    - New: Gasplant

## 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
  - Avoid *Verticillium*-infested areas
  - Pretest soils/mulches/composts for the presence of *Verticillium*
  - Fumigate heavily infested soils
  - Keep broad-leaf weeds under control
  - Clean up leaf litter
  - Avoid municipal mulches

### Ten Diseases of Native Plants Verticillium Wilt

- Control
  - Use immune/resistant plants
    - CONIFERS: Pines, spruces, firs, junipers
    - DECIDUOUS TREES/SHRUBS: Beech, birch, ginkgo, hackberry, hawthorn, hickory, honey locust, mountain ash, white oak, bur oak, poplar, serviceberry, sycamore, willow
  - Prevent stress
  - Prune diseased (wilted) areas

### Ten Diseases of Native Plants Verticillium Wilt

- Control
  - Decontaminate pruning tools (70% alcohol, disinfectants, bleach)
  - Make plants comfortable until they die
  - Remove and destroy diseased plants/leaves
    - Burn (where allowed)
    - 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

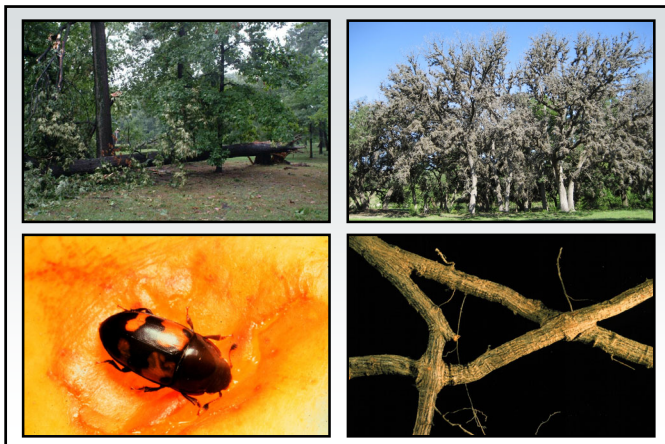
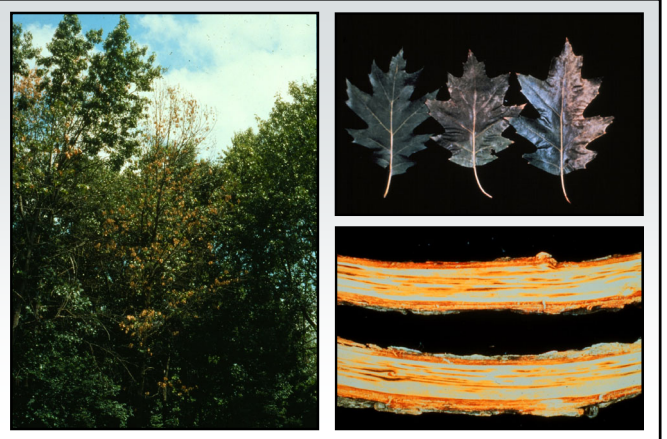
- Favorable environment
  - Cool, wet conditions (for infection)
  - Hot, dry weather (for symptom development)

## Ten Diseases of Native Plants Oak Wilt

- Transmission
  - Oak bark beetles
    - *Pseudopityophthorus minutissimus*
    - *Pseudopityophthorus pruinosis*
  - 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/inwf2cgskdn/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



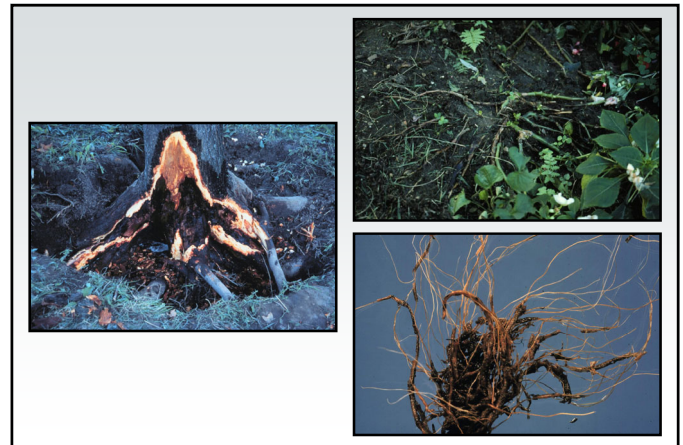
## Ten Diseases of Native Plants Armillaria Root Disease

- 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 well-drained sites
    - Use a soil/potting mix 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 (70% alcohol, disinfectants, bleach)
  - Pretest soils/mulches/composts
  - Use soil-less potting mixes for containerized plants

### Ten Diseases of Native Plants Root/Crown Rots

- **Control**
  - Use fungicides to prevent infections
    - Contract with a professional pesticide applicator
    - PCNB, thiophanate-methyl, fludioxonil, Etridiazole, metalaxyl/mefenoxam, fosetyl-Al
    - Alternate active ingredients
    - Use granular formulations if possible
    - Use during periods of wet weather

### Ten Diseases of Native Plants Root/Crown Rots

- **Control**
  - Use biopesticides to prevent infections
    - *Trichoderma*, *Gliricladium*
    - Use for potted plants

### 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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