

## Garden Expo 2016

### Diseases of Trees and Shrubs

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## Garden Expo 2016 Tar Spot

- **Causes:** *Rhytisma americanum*  
*Rhytisma acerinum*
- **Hosts:** Maples
- **Favorable environment:** Cool, wet weather



## Garden Expo 2016 Tar Spot

- **Control**
  - **DO NOT panic**
  - **Remove and destroy diseased leaves**
    - Burn (where allowed)
    - Deep bury
    - Hot compost
  - **Use fungicides to prevent infections**
    - Copper-containing fungicides
    - Apply at bud break, 1/2 and full leaf expansion

## Garden Expo 2016 Scab (Apple and Pear)

- **Cause:** *Venturia inaequalis* (*V. pirina*)
- **Hosts**
  - Apple
  - Crabapple
  - Pear
  - Mountain ash
- **Favorable environment:** Cool, wet weather



## Garden Expo 2016 Scab (Apple and Pear)

- **Control**
  - Plant resistant varieties
  - Remove and destroy diseased leaves
    - Burn (where allowed)
    - Deep bury
    - Hot compost
  - Thin trees to promote air flow

## Garden Expo 2016 Scab (Apple and Pear)

- **Control**
  - Use fungicides to prevent infections
    - Chlorothalonil, copper, mancozeb, myclobutanil, propiconazole, thiophanate-methyl, sulfur
    - Alternate active ingredients (FRAC codes)
    - From bud break through the end of favorable weather
    - Apply at 7-14 day intervals

## Garden Expo 2016 Powdery Mildews

- **Causes**
  - *Erysiphe* spp.      – *Microsphaera* spp.
  - *Uncinula* spp.    – *Sphaerotheca* spp.
  - *Phyllactinia* spp. – *Podosphaera* spp.
  - *Blumeria* spp.    – *Brasiliomyces* spp.
  - *Oidium* spp.      – *Ovulariopsis* spp.
- **Hosts**
  - Virtually everything
  - Not conifers



## Garden Expo 2016 Powdery Mildews

- **Control**
  - Remove diseased plant material and debris
    - Burn (where allowed)
    - Deep bury
    - Hot compost
  - Reduce humidity
    - Plant less densely
    - Thin existing stands
  - Use resistant cultivars/varieties

## Garden Expo 2016 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 7-14 day intervals

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**Rhizosphaera Needle Cast**

- **Pathogen:** Rhizosphaera kalkhoffii  
(Rhizosphaera sp.)
- **Hosts (major)**
  - Colorado blue spruce
  - Other spruces: Engelmann, black, Serbian, Sitka

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**Rhizosphaera Needle Cast**

- **Hosts (minor)**
  - Pines: Austrian, mugo, eastern white pine
  - Douglas fir
  - Hemlock
  - Balsam fir
- **Favorable environment**
  - Long periods of needle wetness
  - High humidity



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**Rhizosphaera Needle Cast**

- **Control**
  - DO NOT plant Colorado blue spruce
  - DO NOT crowd trees when planting
  - Thin healthy branches to increase airflow
  - Prevent tree stress
  - Prune diseased branches

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**Rhizosphaera Needle Cast**

- **Control**
  - Use fungicides to prevent infections
    - Copper-containing fungicides, chlorothalonil
    - Alternate active ingredients (FRAC codes)
    - Apply starting at bud break and at 3-4 week intervals thereafter under favorable conditions

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**“Cedar-Apple” Rusts**

- **Cause:** Gymnosporangium spp.
- **Hosts**
  - Junipers
  - Woody rosaceous plants  
(apple, crabapple, hawthorn, quince, pear!)
- **Favorable environment:** Wet weather



### Garden Expo 2016 "Cedar-Apple" Rusts

- **Control**
  - Grow only the juniper or rosaceous host
  - Use resistant cultivars/varieties
  - Remove galls

### Garden Expo 2016 "Cedar-Apple" Rusts

- **Control**
  - Use fungicides to prevent infections
    - Ferbam, triadimefon
    - Alternate active ingredients (FRAC codes)
    - Mid May through mid June (rosaceous hosts)
    - Early July through August (juniper hosts)
    - Apply at 7-21 day intervals

### Garden Expo 2016 Black Knot

- **Cause:** Apiosporina morbos
- **Hosts**
  - Prunus species
  - Plums
  - Cherries
- **Favorable environment:** Wet weather



### Garden Expo 2016 Black Knot

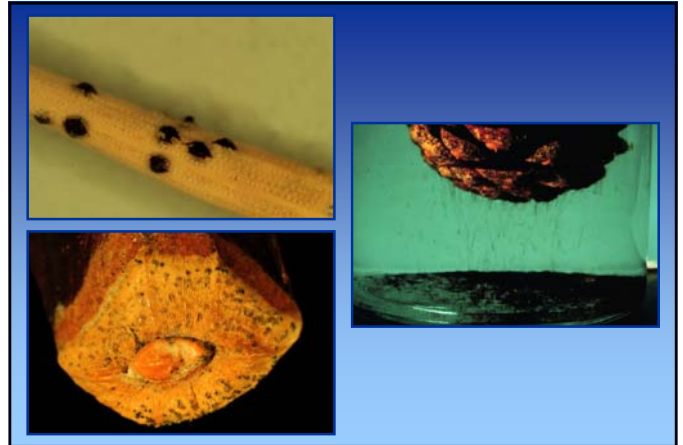
- **Control**
  - DO NOT plant infected Prunus stock
  - Buy black knot-resistant varieties if available (Prunus 'Accolade', Prunus sargentii, Prunus maackii)
  - Remove volunteer plums/cherries
  - Prune diseased branches
  - DO NOT use fungicides

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**Diplodia (Sphaeropsis) Shoot Blight**

- **Pathogen:** *Diplodia pinea*  
*(Sphaeropsis sapinea)*
- **Hosts (major)**
  - Pines: Austrian
  - Other pines: red, jack, Scots, mugo
- **Hosts (minor)**
  - Other conifers: cedars, cypresses, firs, spruces, junipers, yews

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**Diplodia (Sphaeropsis) Shoot Blight**

- **Favorable environment**
  - Long periods of needle wetness
  - Drought



Garden Expo 2016  
**Diplodia (Sphaeropsis) Shoot Blight**

- **Control**
  - DO NOT plant Austrian pines
  - Prevent tree stress, particularly water stress
  - Thin branches to increase airflow
  - Prune diseased branches
  - Remove infected cones

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**Diplodia (Sphaeropsis) Shoot Blight**

- **Control**
  - Use fungicides to prevent infections
    - Thiophanate methyl, chlorothalonil
    - Alternate active ingredients (FRAC codes)
    - Bud break through shoot elongation
    - 14 day application interval

### Garden Expo 2016 Verticillium Wilt

- **Causes:** Verticillium dahliae  
(Other species)
- **Hosts**
  - Many woody ornamentals
    - Common: Maple, ash, redbud, smokebush
    - “New”: Seven son flower, wafer-ash, buttonbush
  - Many herbaceous plants
  - Many vegetables (tomato, potato, eggplant)
- **Favorable environment:** Cool, wet weather



### Garden Expo 2016 Verticillium Wilt

- **Control**
  - Avoid Verticillium-infested areas
  - Pretest soils/mulches/composts for the presence of Verticillium
  - Use “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

### Garden Expo 2016 Verticillium Wilt

- **Control**
  - Keep broad-leaf weeds under control
  - Avoid municipal mulches
  - Prevent plant stress
  - Prune diseased (wilted) areas
  - Decontaminate pruning tools
  - Make infected trees comfortable until they die

### Garden Expo 2016 Verticillium Wilt

- **Control**
  - Remove diseased plants
  - Destroy infected materials
    - Burning (where allowed)
    - Landfilling
    - Hot composting?

### Garden Expo 2016 Chlorosis

- **Cause:** Micronutrient (Fe or Mn) deficiency
- **Problem trees**
  - Oaks (especially pin oak)
  - Red Maples
  - Rhododendrons
  - Other woody and herbaceous plants can be affected



### Garden Expo 2016 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 trees are adequately watered
  - Minimize damage to tree root systems

### Garden Expo 2016 Herbicide Injury

- **Causes**
  - Growth regulator herbicides
    - 2,4-D
    - Dicamba
    - Imprelis!
  - Other classes of herbicides
- **Affected plants: Anything and everything**



### *Garden Expo 2016 Herbicide Injury*

- *Control*
  - *Apply herbicides only when needed*
  - *Follow application directions exactly*
  - *Apply herbicides only when wind speed is low (< 5 mph)*
  - *DO NOT apply herbicides too close to nontarget plants*
  - *Apply herbicides at low pressure*

### *Garden Expo 2016 Herbicide Injury*

- *Control*
  - *Use amine rather than ester forms of herbicides*
  - *Adequately test herbicides prior to registration!*

### *Garden Expo 2016 Where to Go for Help*

*Plant Disease Diagnostics Clinic  
Department of Plant Pathology  
University of Wisconsin-Madison  
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