

## 2014 Garden Expo

### Diseases of Annuals and Perennials

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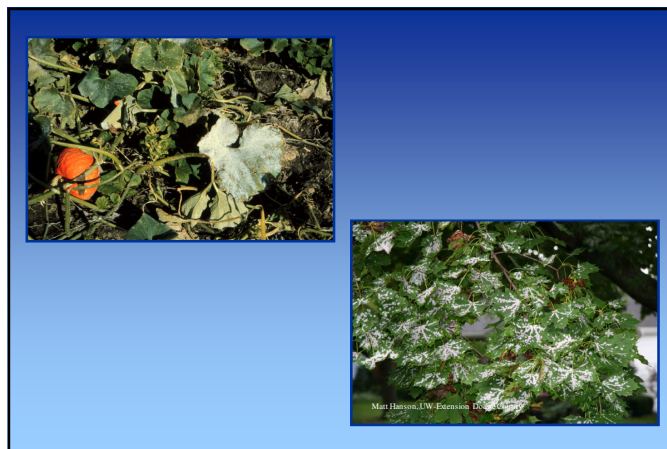
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### Diseases of Annuals and Perennials Powdery Mildews

- **Cause**
  - *Erysiphe* spp.
  - *Uncinula* spp.
  - *Phyllactinia* spp.
  - *Blumeria* spp.
  - *Oidium* spp.
  - *Microsphaera* spp.
  - *Sphaerotheca* spp.
  - *Podosphaera* spp.
  - *Brasiliomyces* spp.
  - *Ovulariopsis* spp.
- **Hosts:** Virtually everything



### Diseases of Annuals and Perennials 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

### Diseases of Annuals and Perennials Powdery Mildews

- **Control**
  - Use fungicides to prevent infections
    - Dinocap, dithiocarbamates, myclobutanil, triadimefon, triforine, thiophanate-methyl, or sulfur
    - Baking soda (1.5 Tbsp/gal) and light weight horticultural oil (3 Tbsp/gal)
    - Alternate active ingredients (FRAC Codes)
    - Apply when humidity >60-70%
    - 7-14 day application interval

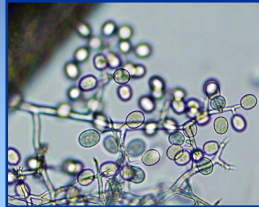
## Diseases of Annuals and Perennials *Impatiens Downy Mildew*

- **Cause:** *Plasmopara obducens*
- **Hosts**
  - Standard garden impatiens (*I. walleriana*)
  - Balsam impatiens (*I. balsamina*)
  - Jewelweed (*I. pallida*, *I. capensis*)
  - New Guinea impatiens (*I. hawkeri*) (resistant/tolerant)



## Diseases of Annuals and Perennials *Impatiens Downy Mildew*

- **Control**
  - Grow tolerant/resistant/immune plants
  - DO NOT grow impatiens in the same location every year
  - Start with clean transplants and seed
  - Keep materials from different sources physically separated
  - DO NOT overcrowd plants
  - DO NOT overhead water



## Diseases of Annuals and Perennials *Impatiens Downy Mildew*

- **Control**
  - Watch carefully for the disease
  - Bag and discard affected plants
    - Symptomatic plants
    - Asymptomatic surrounding plants
  - Disinfect contaminated materials
    - 10% bleach
    - 70% alcohol
    - Commercial disinfectants

## Diseases of Annuals and Perennials *Impatiens Downy Mildew*

- **Control**
  - Use fungicides to prevent infections
    - Mancozeb
    - Apply at 7 day application intervals

## Diseases of Annuals and Perennials Aster Yellows

- **Pathogen:** *Aster yellows phytoplasma*
- **Hosts**
  - Many plants in the *Asteraceae* (aster family)
  - Many other plants in many other plant families
- **Vector:** *Aster leafhopper*

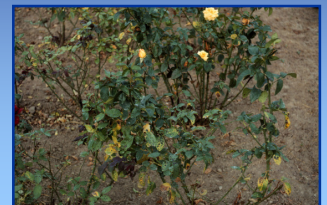


## Diseases of Annuals and Perennials Aster Yellows

- **Control**
  - Remove infected plants
  - Control leafhopper vector (?)

## Diseases of Annuals and Perennials Black Spot

- **Cause:** *Marssonina rosae*
- **Host:** Rose



## Diseases of Annuals and Perennials **Black Spot**

- **Control**
  - Plant resistant rose varieties
  - Promote rapid drying of leaves and canes
    - DO NOT overcrowd plants
    - Prune to thin established plants
  - DO NOT overhead water
  - DO NOT overwater

## Diseases of Annuals and Perennials **Black Spot**

- **Control**
  - Remove and destroy infested leaf debris and infected canes
    - Burn (where allowed)
    - Deep bury
    - Hot compost

## Diseases of Annuals and Perennials **Black Spot**

- **Control**
  - Use fungicides to prevent infections
    - Chlorothalonil, copper-containing fungicides, mancozeb, maneb, myclobutanil, propiconazole, thiophanate-methyl
    - Baking soda (1.5 Tbsp/gal) and light weight horticultural oil (3 Tbsp/gal)
    - Neem oil
    - Alternate active ingredients (FRAC Codes)
    - 7-14 day application interval

## Diseases of Annuals and Perennials **Leaf Streak**

- **Cause:** Aureobasidium microstictum
- **Host:** Daylily



## Diseases of Annuals and Perennials **Leaf Streak**

- **Control**
  - Remove diseased leaves and plant debris
    - Burn (where allowed)
    - Deep bury
    - Hot compost
  - Promote rapid drying of leaves
    - Divide large clumps
    - Plant less densely
  - DO NOT overhead water



## Diseases of Annuals and Perennials Leaf Streak

- **Control**
  - Use varieties that are less susceptible
    - 'Betty Bennet', 'Edna Spalding', 'Ella Pettigrew', 'Globe Trotter', 'Nancy Hicks', 'Pink Superior', 'Ron Rousseau', 'Sudie', 'Tropical Tones', 'Upper Room', 'Winsome Lady'
  - Use fungicides to prevent infections
    - Chlorothalonil, mancozeb, thiophanate-methyl
    - Alternate active ingredients (FRAC Codes)
    - 7-14 day application interval

## Diseases of Annuals and Perennials Hosta Virus X

- **Cause:** Hosta virus X virus (HVX)
- **Host:** Hosta
  - 'Gold Edger', 'Gold Standard', 'Golden Tiara', 'Striptease', 'Sum and Substance'
- **Transmission:** Mechanical
  - Tools
    - Shovels
    - String edgers
  - Touch



[hostalibrary.org/firstlook/HVX.htm](http://hostalibrary.org/firstlook/HVX.htm)

## Diseases of Annuals and Perennials Hosta Virus X

- **Control**
  - Buy hostas from reputable sources
  - Inspect hostas prior to purchase for symptoms of HVX
  - Request that hostas be tested for HVX prior to purchase
  - Keep new hostas isolated from established hostas

## Diseases of Annuals and Perennials Hosta Virus X

- **Control**
  - Remove and destroy infected plants and infested plant debris
  - Disinfest contaminated materials
    - Sodium dodecyl sulfate (sodium lauryl sulfate) + Alconox® (1% + 1%)
    - Trisodium phosphate
    - Alcohol dip followed by flaming

## Diseases of Annuals and Perennials Tobacco Rattle

- **Cause:** Tobacco Rattle Virus
- **Hosts**
  - Ornamentals
    - Astilbe, bleeding heart, columbine, coral bells, daffodils, epimedium, gladiolus, hyacinth, marigold, peony, tulip, vinca
  - Vegetables
    - Beans, beet, pepper, potato, spinach

## Diseases of Annuals and Perennials Tobacco Rattle

- **Transmission**
  - Stubby-root nematodes
    - Trichodorus spp.
    - Paratrichodorus spp.
  - Mechanical inoculation
  - Grafting
  - Seed



Anette Phibbs, WI DATCP

## Diseases of Annuals and Perennials Tobacco Rattle

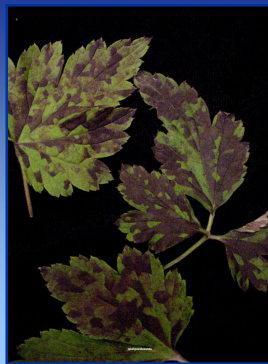
- **Control**
  - DO NOT buy symptomatic plants
  - Grow non-susceptible plants
    - Annual phlox, carnation, devil's trumpet (downy thorn-apple), sweet William, zinnia, zombie cucumber
  - Remove and destroy infected plants

## Diseases of Annuals and Perennials Tobacco Rattle

- **Control**
  - Disinfest contaminated materials
    - Sodium dodecyl sulfate (sodium lauryl sulfate) + Alconox® (1% + 1%)
    - Trisodium phosphate
    - Alcohol dip followed by flaming
  - DO NOT attempt to control stubby-root nematodes

## Diseases of Annuals and Perennials Foliar Nematode

- **Cause:** Aphelenchoides spp.
- **Hosts**
  - Many types of herbaceous plants
  - Houseplants
    - African violets, ferns, chrysanthemum
  - Landscape plants
    - Hosta, begonia, coral bells, miterwort



### Diseases of Annuals and Perennials *Foliar Nematode*

- **Control**
  - Inspect plants prior to purchase for symptoms
  - Avoid overhead irrigation
  - Remove symptomatic plants and infested plant debris
    - Burn (where allowed)
    - Deep bury (landfill)
    - Hot compost

### Diseases of Annuals and Perennials *Foliar Nematode*

- **Control**
  - Disinfest contaminated materials
    - 10% bleach
    - 70% alcohol
    - Commercial disinfectants
  - Hot water treatments (10 minutes at 125°F)

### Diseases of Annuals and Perennials *Southern Blight*

- **Pathogen:** *Sclerotium rolfsii*
- **Hosts**
  - Many other herbaceous annuals and perennials
  - Some woody ornamentals
  - *Hosta*
  - Bedding plants



### Diseases of Annuals and Perennials *Southern Blight*

- **Control**
  - DO NOT buy infected/infested plants
  - Avoid cocoa mulch (????)
  - Remove infected plants, mulch and soil
    - Double bag
    - Landfill
  - Disinfest contaminated materials
    - 10% bleach
    - 70% alcohol
    - Commercial disinfectants

### Diseases of Annuals and Perennials *Southern Blight*

- **Control**
  - Use fungicides for control
    - Triadimefon
    - 14 – 28 day intervals
  - Pray for a cold winter

## Diseases of Annuals and Perennials Root/Crown Rots

- **Pathogens**
  - Pythium spp.
  - Phytophthora spp.
  - Rhizoctonia solani
  - Fusarium spp.
  - Cylindrocarpon spp.
  - Thielaviopsis spp.
- **Hosts:** Anything and everything



## Diseases of Annuals and Perennials Root/Crown Rots

- **Control**
  - Moderate soil moisture
    - Grow ornamentals in well-drained sites
    - Use a potting soil with adequate drainage
    - Improve drainage in poorly drained yard soils
      - Add organic matter to improve drainage
      - Use raised beds
  - DO NOT overwater
  - DO NOT overmulch

## Diseases of Annuals and Perennials Root/Crown Rots

- **Control:**
  - Pretest soils/mulches/composts for the presence of root rot fungi
  - Use a soil-less potting mix or pasteurized potting mixes for containerized plants

## Diseases of Annuals and Perennials Root/Crown Rots

- **Control**
  - DO NOT move contaminated soil or plants to non-infested areas
  - Disinfect contaminated materials
    - 10% bleach
    - 70% alcohol
    - Commercial disinfectants

## Diseases of Annuals and Perennials Root/Crown Rots

- **Control:**
  - Use fungicides to prevent infections
    - Etridiazole, metalaxyl, mefenoxam, fosetyl-AI, PCNB, thiophanate-methyl, fludioxonil
    - Alternate active ingredients (FRAC codes)
    - Use granular formulations if possible
    - Use during periods of wet weather
  - Use biopesticides to prevent infections
    - Trichoderma, Gliocladium
    - Use in pot production



***Diseases of Annuals and Perennials  
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@plantpath.wisc.edu  
<http://pddc.wisc.edu>***

***Follow the clinic on Twitter @UWPDDC***