

## Horticulture 334

### Diseases of Greenhouse Crops

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### Diseases of Greenhouse Crops Damping-Off/Seedling Blights

- **Pathogens**
  - Pythium spp.
  - Rhizoctonia solani
  - Fusarium spp.
- **Hosts:** Seedlings of virtually anything
- **Favorable environment:** Cool, wet soils



### Diseases of Greenhouse Crops Damping-Off/Seedling Blights

- **Control**
  - Use a pasteurized soil mixture
  - Use decontaminated pots, working surfaces and tools
  - Moderate soil moisture
    - Use a soil with adequate drainage
    - DO NOT overwater

### Diseases of Greenhouse Crops Damping-Off/Seedling Blights

- **Control**
  - Germinate seeds at higher temperatures
  - Use fungicides/biological control products to protect seedlings
    - Etridiazole, metalaxyl/mefenoxam, captan
    - Trichoderma spp., Gliocladium spp., Streptomyces spp., Pseudomonas spp., Bacillus spp.
    - Applied as a seed treatment or soil treatment

### Diseases of Greenhouse Crops Root/Crown Rots

- **Pathogens**
  - Pythium spp.
  - Phytophthora spp.
  - Rhizoctonia solani
  - Fusarium spp.
  - Cylindrocarpon spp.
  - Thielaviopsis spp.
- **Hosts:** Anything and everything
- **Favorable environment:** Cool, wet soils



## Diseases of Greenhouse Crops Root/Crown Rots

- **Control**
  - Use a soil-less potting mix
  - Pretest soils/mulches/composts for the presence of root rot fungi
  - Moderate soil moisture
    - Use a soil/potting mix with adequate drainage
    - Improve drainage in poorly drained soils/potting mixes
    - DO NOT overwater

## Diseases of Greenhouse Crops Root/Crown Rots

- **Control**
  - Decontaminate infested tools, pots, work areas
  - Decontaminate recycled water
    - Filtration
    - Irradiation
    - Chemical treatment

## Diseases of Greenhouse Crops Root/Crown Rots

- **Control**
  - Use fungicides to prevent infections
    - Etridiazole, metalaxyl, mefenoxam, fosetyl-AI
    - PCNB, thiophanate-methyl, fludioxonil
    - Spray applications or soil drenches
    - Alternate active ingredients (FRAC Codes)
  - Use biopesticides to prevent infections
    - *Trichoderma* spp., *Gliocladium* spp.
    - Incorporated into potting mixes

## Diseases of Greenhouse Crops Powdery Mildews

- **Causes**
  - *Erysiphe* spp.
  - *Uncinula* spp.
  - *Phyllactinia* spp.
  - *Blumeria* spp.
  - *Oidium* spp.
  - *Microsphaera* spp.
  - *Sphaerotheca* spp.
  - *Podosphaera* spp.
  - *Brasiliomyces* spp.
  - *Ovulariopsis* spp.
- **Hosts: Virtually everything**
- **Favorable environment: High humidity**





## Diseases of Greenhouse Crops Powdery Mildews

- **Control**
  - Remove diseased plant material and debris
  - Reduce humidity
    - Space plants farther apart
    - Increase air flow
  - Grow resistant cultivars/varieties

## Diseases of Greenhouse Crops 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)
    - Apply when humidity >60-70%
    - Alternate active ingredients (FRAC Codes)
    - 7-14 day application interval

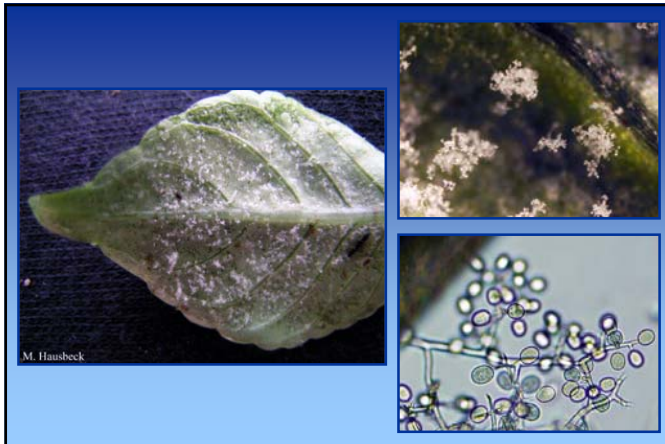
## Diseases of Greenhouse Crops Impatiens Downy Mildew

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

## Diseases of Greenhouse Crops Impatiens Downy Mildew

- **Favorable environment**
  - Cool conditions (59 - 73°F)
  - Long leaf wetness periods (> 6 hrs)
  - High humidity





## Diseases of Greenhouse Crops Impatiens Downy Mildew

- **Control**
  - Grow immune/resistant/tolerant species
  - Start with clean seed and transplants
  - Move (i.e., rotate) impatiens production
  - Keep materials from different sources physically separated
  - DO NOT overcrowd plants
  - DO NOT overhead water

## Diseases of Greenhouse Crops Impatiens Downy Mildew

- **Control**
  - Scout frequently
  - Bag and discard affected plants
    - Symptomatic plants
    - Asymptomatic surrounding plants
  - Disinfect contaminated areas
    - Commercial disinfectants
    - 10% bleach
    - 70% alcohol

## Diseases of Greenhouse Crops Impatiens Downy Mildew

- **Control**
  - Use fungicides to prevent infections
    - Metalaxyl/mefenoxam, fluopicolide, potassium phosphite, mancozeb, pyraclostrobin + boscalid, fluoxastobin, cyazofamid, dimethomorph, fenamidone, azoxystrobin
    - Alternate active ingredients (FRAC Codes)
    - Apply at 7 day application intervals

## Diseases of Greenhouse Crops Viral Diseases

- **Pathogens**
  - Many (with more discovered all the time)
  - Wide host-range
    - Tobacco mosaic virus (TMV)
    - Cucumber mosaic virus (CMV)
    - Impatiens necrotic spot virus (INSV)
    - Tomato spotted wilt virus (TSWV)
    - Tobacco rattle virus (TRV)

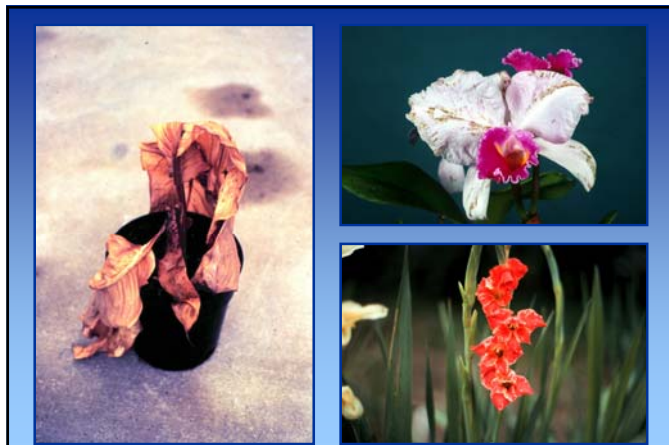
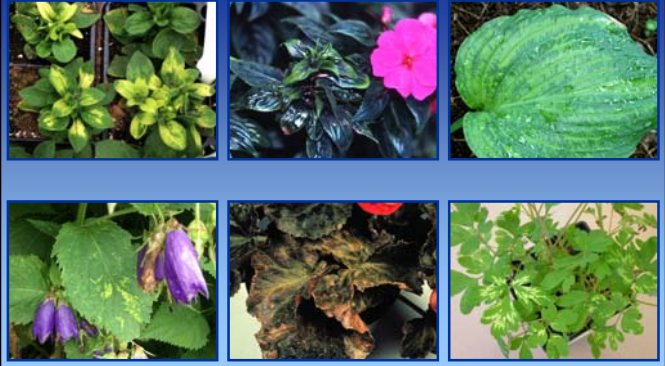
## Diseases of Greenhouse Crops Viral Diseases

- **Pathogens**
  - Narrow host-range
    - Cymbidium mosaic virus (CyMV)
    - Odontoglossum ringspot virus (ORSV)
    - Hosta virus X (HVX)
  - **Favorable environment: None**

## Diseases of Greenhouse Crops Virus Diseases

### • Transmission

- Mechanical
  - Touch (TMV)
  - Tools (TMV, CMV, INSV, TSWV, HVX, TRV, CyMV, ORSV)
- Insects/Nematodes
  - Aphids (CMV)
  - Thrips (INSV, TSWV)
  - Stubby root nematode (TRV)
- Plant parts/seed (TRV)



## Diseases of Greenhouse Crops Viral Diseases

### • Control

- Buy plants from a reputable source
- Inspect plants prior to purchase for disease
- Test plants prior to purchase (Agdia, Inc. – [www.agdia.com](http://www.agdia.com))
- DO NOT smoke around plants
- Control insect vectors
- Isolate infected plants/remove plant debris

## Diseases of Greenhouse Crops Viral Diseases

### • Control

- Remove weed hosts
- Disinfest contaminated materials
  - 1% Sodium dodecyl sulfate (sodium lauryl sulfate) + 1% Alconox® (2½ Tbsp + 2¾ Tbsp/gal)
  - 20% low fat dry milk (Carnation®) + 0.1% polysorbate 20 (9¼ cups + ¼ tsp/gal)
  - Trisodium phosphate (14 dry oz/gal)
  - Alcohol dip followed by flaming

## Diseases of Greenhouse Crops Viral Diseases

### • Control

- Wash hands, particularly if you smoke
- Decontaminate recycled water
- DO NOT use chemical controls

### Diseases of Greenhouse Crops Bacterial Leaf Spots and Blights

- **Cause:** Xanthomonas spp.
- **Hosts:**
  - Poinsettia
  - Begonia
  - Geranium
  - Ivy
  - Dieffenbachia
- **Favorable environment:** High moisture



### Diseases of Greenhouse Crops Bacterial Leaf Spots and Blights

- **Control**
  - Start with clean propagation materials
  - Follow strict sanitation procedures when working with plant materials
  - Remove symptomatic plants
  - Remove contaminated plant debris
  - Disinfest greenhouses after production

### Diseases of Greenhouse Crops Ralstonia Wilt

- **Cause:** Ralstonia solanacearum
  - races
  - biovars
- **Hosts**
  - Geranium
  - Many other herbaceous plants
  - Potato
- **Favorable environment:** Warm weather



### Diseases of Greenhouse Crops Ralstonia Wilt

- **Control**
  - Start with clean propagation materials
  - Follow strict sanitation procedures when working with plant materials
    - Keep plants from different sources separated
    - Disinfect pruning tools
    - Disinfect hands when working with plants

### Diseases of Greenhouse Crops *Ralstonia Wilt*

- **Control**
  - If you suspect you have the disease, contact the PDDC/MI DATCP
    - Confirm the disease
    - Remove symptomatic plants
    - Remove co-mingled plants
    - Remove contaminated plant debris
    - Disinfest greenhouses after production

### Diseases of Greenhouse Crops *Foliar Nematode*

- **Cause:** *Aphelenchoides* spp.
- **Hosts**
  - Wide host range
  - Houseplants: African violets, ferns, begonia, chrysanthemum
  - Landscape plants: Hosta, coral bells
- **Favorable environment:** Rain



### Diseases of Greenhouse Crops *Foliar Nematode*

- **Control**
  - Start with clean propagation materials
  - Follow strict sanitation procedures when working with plant materials
  - Remove symptomatic plants
  - Remove contaminated plant debris
  - Avoid overhead irrigation
  - Hot water treatments (10 minutes at 125°F)

### Diseases of Greenhouse Crops *Cactus Cyst Nematode*

- **Cause:** *Cactodera* spp.
- **Hosts**
  - Cacti
  - Other succulents
- **Favorable environment:** None



*Diseases of Greenhouse Crops*  
**Cactus Cyst Nematode**

- **Control**
  - *Start with clean materials*
  - *Use soil-less growing media or pasteurized soil*
  - *Discard infected plants*

*Diseases of Greenhouse Crops*  
**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  
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