

Horticulture 334

Diseases of Greenhouse Crops

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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 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 Root/Crown Rots

- Pathogens

- | | |
|-----------------------------|------------------------------|
| – <i>Pythium</i> spp. | – <i>Fusarium</i> spp. |
| – <i>Phytophthora</i> spp. | – <i>Cylindrocarpon</i> spp. |
| – <i>Rhizoctonia solani</i> | – <i>Thielaviopsis</i> 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-Al
 - 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

- | | |
|----------------------------|-----------------------------|
| – <i>Erysiphe</i> spp. | – <i>Microsphaera</i> spp. |
| – <i>Uncinula</i> spp. | – <i>Sphaerotheca</i> spp. |
| – <i>Phyllactinia</i> spp. | – <i>Podosphaera</i> spp. |
| – <i>Blumeria</i> spp. | – <i>Brasiliomyces</i> spp. |
| – <i>Oidium</i> spp. | – <i>Ovulariopsis</i> 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*
- *Bremia sphaerosperma*

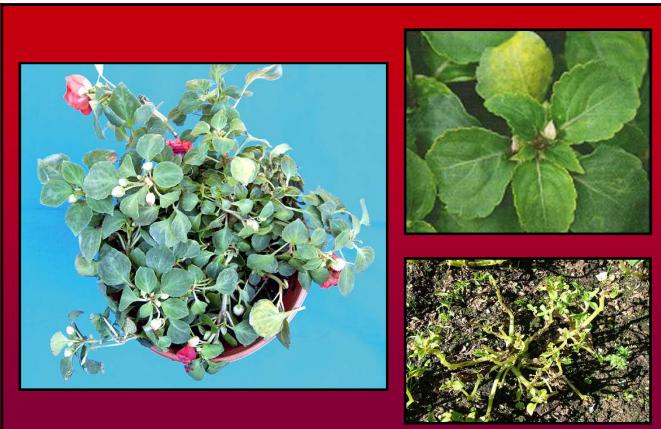
- Hosts

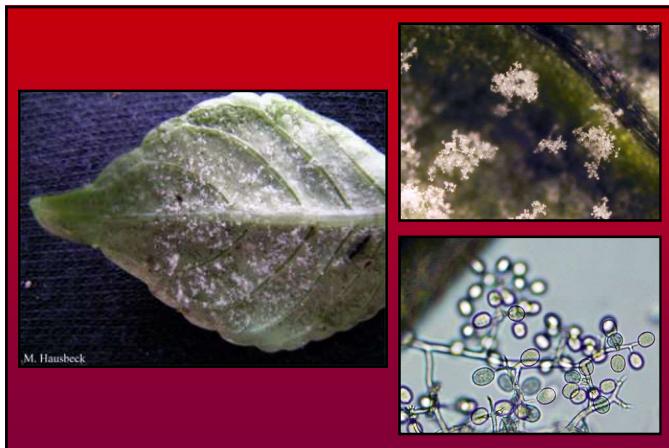
- Standard garden impatiens (*I. walleriana*)
- Balsam impatiens (*I. balsamina*)
- Jewelweed (*I. pallida*, *I. capensis*)
- New Guinea impatiens (*I. hawkeri*) (resistant/tolerant)

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
- Disinfest 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)
 - 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)
 - Trisodium phosphate (14 dry oz/gal)
 - 20% low fat dry milk (Carnation®) +
 - 0.1% polysorbate 20 (9½ cups + ¾ tsp/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	– Ivy
– Begonia	– Dieffenbachia
– Geranium	
- Favorable environment: High moisture



Diseases of Greenhouse Crops

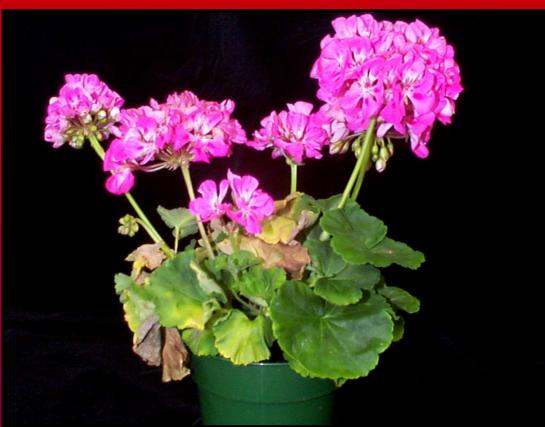
Bacterial Leaf Spots and Blights

- Control
 - Start with clean propagation materials
 - Follow strict sanitation procedures when working with plant materials
 - Remove symptomatic plants
 - Remove contaminated plant debris
 - Disinfect 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/WI DATCP
- Confirm the disease
- Remove symptomatic plants
- Remove co-mingled plants
- Remove contaminated plant debris
- Disinfect greenhouses after production

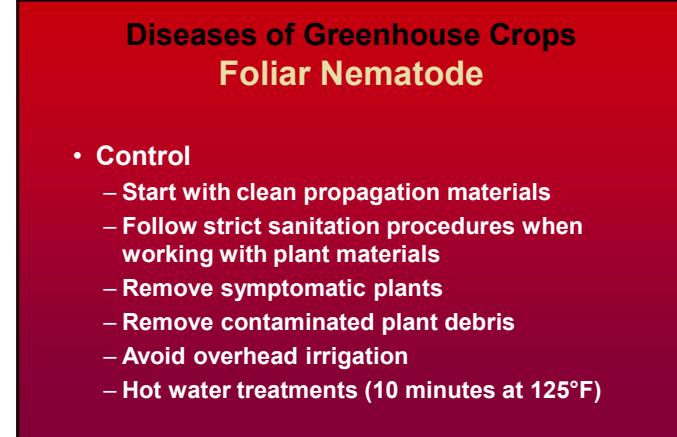
Diseases of Greenhouse Crops Foliar Nematode

- 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 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
<https://pddc.wisc.edu>

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