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

- **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

Damping-Off/Seedling Blights

- **Pathogens**
  - *Pythium* spp.
  - *Fusarium* spp.
  - *Phytophthora* spp.
  - *Cylindrocarpon* spp.
  - *Rhizoctonia solani*
  - *Thielaviopsis* spp.

- **Hosts:** Anything and everything

- **Favorable environment:** Cool, wet soils

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

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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

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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
  - Erysiphe spp.
  - Uncinula spp.
  - Phylactinia 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, mycobutanil, 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
  – Disinfest contaminated areas
    • Commercial disinfectants
    • 10% bleach
    • 70% alcohol

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® (2⅓ Tbsp + 2⅓ Tbsp/gal)
    • Trisodium phosphate (14 dry oz/gal)
    • 20% low fat dry milk (Carnation®) + 0.1% polysorbate 20 (9⅛ cups + ¾ tsp/gal)
    • Alcohol dip followed by flaming
  – 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
• 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/WI DATCP
  - Confirm the disease
  - Remove symptomatic plants
  - Remove co-mingled plants
  - Remove contaminated plant debris
  - Disinfest greenhouses after production

**Foliar Nematode**

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

**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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