

Green Thumb Gardening 2018

Diseases in the Garden

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Diseases in the Garden Daylily Leaf Streak

- Cause: Aureobasidium microstictum
- Host: Daylily



Diseases in the Garden Daylily Leaf Streak

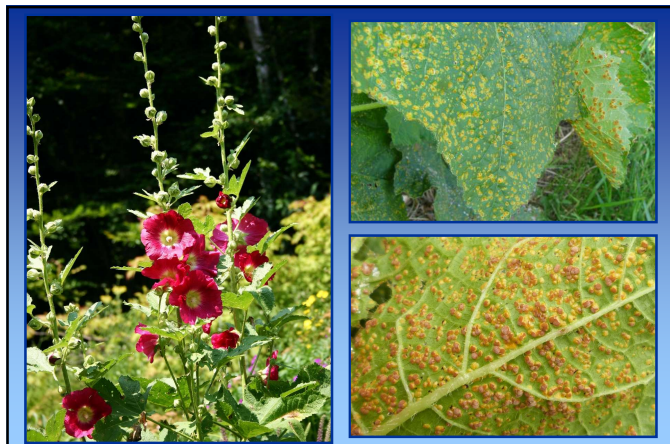
- Control
 - Promote rapid drying of leaves
 - Divide large clumps
 - Plant less densely
 - DO NOT overhead water
 - Remove diseased leaves and plant debris
 - Burn (where allowed)
 - Deep bury
 - Hot compost

Diseases in the Garden Daylily 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)
 - Apply at 7-14 day intervals

Diseases in the Garden Hollyhock Rust

- Pathogen: Puccinia malvacearum
- Hosts
 - Hollyhock
 - Other plants in the mallow family
- Favorable environment
 - Wet weather
 - Cool to moderate temperatures



Diseases in the Garden Hollyhock Rust

- **Control**
 - Buy rust-free hollyhock plants
 - Grow rust resistant hollyhock varieties
 - Remove weedy mallow species
 - Promote rapid drying of leaves
 - Plant less densely
 - Thin existing plant stands
 - DO NOT overhead watering
 - DO NOT overwater

Diseases in the Garden Hollyhock Rust

- **Control**
 - Remove diseased leaves and plant debris
 - Burn (where allowed)
 - Deep bury (landfill)

Diseases in the Garden Hollyhock Rust

- **Control**
 - Use fungicides to prevent infections
 - Chlorothalonil, mancozeb, myclobutanil, tebuconazole, triticonazole
 - Alternate active ingredients (FRAC Codes)
 - Apply during periods of high moisture (particularly early in the growing season)
 - Apply at 7-14 day intervals

Diseases in the Garden 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 in the Garden **Impatiens Downy Mildew**

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

Diseases in the Garden **Impatiens Downy Mildew**

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

Diseases in the Garden **Impatiens Downy Mildew**

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

Diseases in the Garden **Foliar Nematode**

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



Diseases in the Garden **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 in the Garden Foliar Nematode

- **Control**
 - Disinfest contaminated materials
 - 70% alcohol
 - Commercial disinfectants
 - 10% bleach
 - Hot water treatments (10 minutes at 125°F)
 - DO NOT use nematicides

Diseases in the Garden 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 anything**
- **Favorable environment: High humidity**



Diseases in the Garden Powdery Mildew

- **Control**
 - Remove and destroy plant debris
 - Burn (where allowed)
 - Deep bury
 - Hot compost
 - Reduce humidity
 - Plant less densely/thin existing stands
 - Grow vining plants on a trellis
 - Use resistant cultivars/varieties

Diseases in the Garden Powdery Mildew

- **Control**
 - Use fungicides to prevent infections
 - Dithiocarbamates, myclobutanil, propiconazole, tebuconazole, thiophanate-methyl
 - Sulfur, neem oil, other plant-based oils
 - 1.5 Tbsp baking soda + 3 Tbsp light-weight horticultural oil in 1 gal water
 - Alternate active ingredients (FRAC codes)
 - Apply when humidity is >60-70%
 - Apply every 7-14 days

Diseases in the Garden **Aster Yellows**

- **Pathogen:** *Aster yellows phytoplasma*
- **Hosts**
 - Many plants in the *Asteraceae* (aster family)
 - Many other plants in many other plant families
- **Favorable environment:** None
- **Vector:** *Aster leafhopper*



Diseases in the Garden **Aster Yellows**

- **Control**
 - Remove diseased plant material and debris
 - Hot compost
 - Bury
 - Burn (where allowed)
 - Control leafhopper vector (?)



Diseases in the Garden **Virus Diseases**

- **Causes**
 - Tobacco mosaic virus (TMV)
 - Cucumber mosaic virus (CMV)
 - Impatiens necrotic spot virus (INSV)
 - Tomato spotted wilt virus (TSWV)
 - Hosta virus X (HVX)
 - Tobacco rattle virus (TRV)

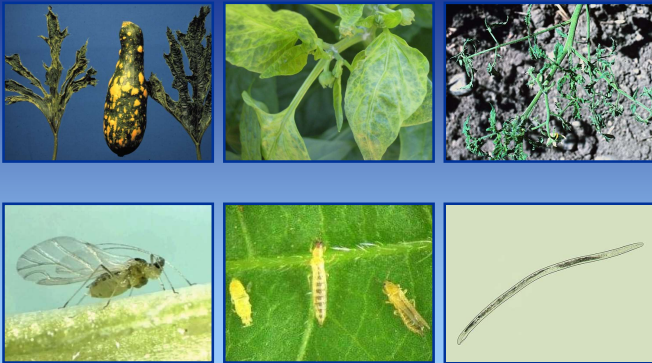
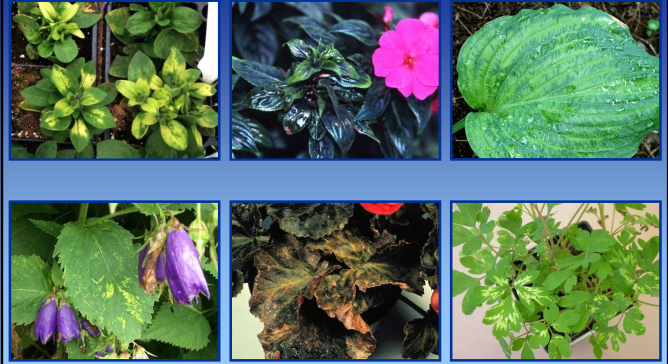
Diseases in the Garden **Virus Diseases**

- **Hosts**
 - Many herbaceous ornamentals (TMV, CMV, INSV, TSWV, TRV)
 - Many vegetables (TMV, CMV, INSV, TSWV, TRV)
 - Hosta (HVX)
- **Favorable environment:** None

Diseases in the Garden Virus Diseases

• Transmission

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



Diseases in the Garden Virus Diseases

• Control

- Buy plants from reputable sources
 - Inspect plants for viral symptoms
 - Test plants for viruses
- Plant resistant/tolerant varieties
 - Plant based resistance
 - Plant based tolerance
 - Genetically modified plants
- Grow non-susceptible plants

Diseases in the Garden Virus Diseases

• Control

- Keep new and established plants separated
- Keep weeds under control
- DO NOT smoke around plants
- Wash hands routinely with soap and water

Diseases in the Garden Virus Diseases

• Control

- Disinfect 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 (9½ cups + ¾ tsp/gal)
 - Trisodium phosphate (14 dry oz/gal)
 - Alcohol dip followed by flaming

Diseases in the Garden Virus Diseases

- **Control**
 - Remove diseased plants and plant debris
 - Burn (where allowed)
 - Deep bury (landfill)
 - Hot compost
 - **DO NOT** use chemical controls on plants
 - **DO NOT** attempt to control nematodes
 - **DO** improve insect control where practical

Diseases in the Garden Southern Blight

- **Pathogen:** *Sclerotium rolfsii*
- **Hosts**
 - Many herbaceous annuals and perennials
 - Many vegetables
 - Some woody ornamentals
- **Favorable environment**
 - Warm soil temperatures
 - Wet soils



Diseases in the Garden Southern Blight

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

Diseases in the Garden Southern Blight

- **Control**
 - Amend soil with organic matter (?)
 - Use fungicides for control
 - Contract with a professional pesticide applicator
 - Azoxystrobin, flutolanil, flutolanil + thiophanate-methyl, PCNB, tebuconazole, triadimefon
 - Alternate active ingredients (FRAC codes)
 - Apply 14 – 28 day intervals
 - Pray for a really, really, REALLY cold winter

Diseases in the Garden Herbicide Injury

- **Causes**
 - Growth regulator herbicides
 - 2,4-D
 - Dicamba
 - Other herbicides
- **Affected plants**
 - All vegetables
 - Tomatoes

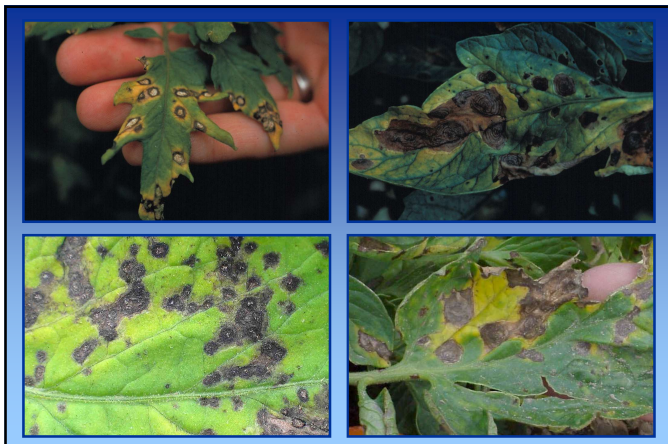


Diseases in the Garden Herbicide Injury

- **Management**
 - **DO NOT** use herbicides
 - If you or your neighbors do use herbicides, make sure that you or they
 - Follow application directions exactly
 - Apply herbicides at low wind speeds (< 5 mph)
 - **DO NOT** apply herbicides too close to sensitive plants
 - Apply herbicides at low pressure
 - Use amine rather than ester forms of herbicides

Diseases in the Garden Fungal Leaf Blights

- **Causes**
 - *Septoria lycopersici* (Septoria leaf spot)
 - *Alternaria solani* (early blight)
 - *Phytophthora infestans* (late blight)
- **Hosts**
 - Tomato
 - Potato (early blight, late blight)
- **Favorable environment:** Cool, wet weather



Diseases in the Garden Fungal Leaf Blights

- **Control (early blight, Septoria leaf spot)**
 - Remove and destroy infested debris (burn, bury, hot compost)
 - Move tomatoes to new location
 - Plant resistant varieties
 - Space plants far apart
 - Mulch around the base of plants
 - **DO NOT** over-mulch

Diseases in the Garden Fungal Leaf Blights

- **Control (early blight, Septoria leaf spot)**
 - **DO NOT** overhead water
 - Remove infected leaf tissue
 - Use fungicides to prevent infections
 - Chlorothalonil, mancozeb
 - Copper
 - Alternate active ingredients (FRAC codes)
 - Apply at 7-14 days intervals

Diseases in the Garden Fungal Leaf Blights

- **Control (late blight)**
 - Remove and destroy
 - Infected plants, fruits, tubers
 - Volunteer tomato and potato plants
 - Weed hosts
 - **DO NOT** use last year's potatoes as seed potatoes
 - **DO** use certified seed potatoes

Diseases in the Garden Fungal Leaf Blights

- **Control (late blight)**
 - Grow resistant tomato varieties
 - “Late Blight Management in Tomato with Resistant Varieties”
<http://www.extension.org/pages/72678/late-blight-management-in-tomato-with-resistant-varieties#.VVNSsPIVhBd>

Diseases in the Garden Fungal Leaf Blights

- **Control (late blight)**
 - Use fungicides to prevent infections
 - Chlorothalonil, mancozeb
 - Copper
 - Alternate active ingredients (FRAC codes)
 - Start applications based on Blitecast (<http://www.plantpath.wisc.edu/wiveqdis/>)
 - Apply at 7-14 day intervals

Diseases in the Garden Blossom End Rot

- **Cause: Calcium deficiency**
- **Affected plants**
 - Tomato
 - Pepper
 - Eggplant
 - Cucurbits (cucumber, squash, pumpkin)
- **Favorable Environment: Drought**



Diseases in the Garden Blossom End Rot

- **Management**
 - Test soil to determine calcium level
 - Add calcium as needed
 - Bone meal
 - Egg shells
 - NOT lime (usually)
 - Water plants adequately and uniformly

Diseases in the Garden Black Rot

- **Cause:** *Xanthomonas campestris* pv. *campestris*
- **Hosts:** Crucifers
 - Brussels sprouts, cabbage, collards
 - Broccoli, cauliflower, kale, kohlrabi, rutabaga, turnips
- **Favorable environment:** Wet weather



Diseases in the Garden Black Rot

- **Control**
 - Buy high quality (certified pathogen-free) seed or transplants
 - Heat treat seeds
 - 35 min, 122°F (Brussels sprouts, cabbage, collards)
 - 20 min, 122°F (broccoli, cauliflower, kale, kohlrabi, rutabaga, turnips)

Diseases in the Garden Black Rot

- **Control**
 - Routinely rotate crops
 - DO NOT grow host plants in an infested areas
 - Plant non-hosts in infested areas
 - Fertilize properly (particularly nitrogen)
 - DO NOT overhead water
 - DO NOT handle plants when wet

Diseases in the Garden **Black Rot**

- **Control**
 - Remove and dispose of contaminated plants
 - Burn (where allowed)
 - Deep bury
 - Hot compost
 - Decontaminate infested items
 - 10% bleach
 - 70% alcohol
 - Commercial disinfectants

Diseases in the Garden **Black Rot**

- **Control**
 - Use bactericides to prevent infections
 - Copper
 - Apply at 7-14 days intervals
 - Tolerant bacterial strains are a problem

Diseases in the Garden **Common Smut**

- **Cause:** Ustilago maydis
- **Host:** Sweet corn
- **Favorable environment**
 - None (ear infections)
 - Hail (leaf and stalk infections)



Diseases in the Garden **Common Smut**

- **Control**
 - Plant resistant varieties
 - Reduce physical damage to corn plants
 - DO NOT use chemical or biological controls
 - Give up on your corn and eat the smut (huilacoche)

Diseases in the Garden **Common Scab**

- **Cause:** Streptomyces scabies
- **Hosts**
 - Potato
 - Carrot
 - Other root crops
- **Favorable environment:** High soil pH



Diseases in the Garden Common Scab

- **Control**
 - Plant scab-free potato stock
 - Routinely rotate crops
 - DO NOT grow host plants in an infested areas
 - Plant non-hosts in infested areas
 - Move potatoes to another location
 - Plant scab resistant varieties
 - Lower soil pH
 - DO NOT use chemical or biological controls

Diseases in the Garden Walnut Toxicity

- **Cause: Juglones**
 - Black walnut
 - Butternut
 - Hickory
- **Affected plants**
 - Many vegetables
(Tomato, potato, pepper, eggplant)
 - Many herbaceous ornamentals



Diseases in the Garden Walnut Toxicity

- **Management**
 - DO NOT plant sensitive vegetables (or other plants) near walnut trees
 - Plant tolerant vegetables

• Beans	• Beet	• Carrot
• Corn	• Melon	• Onion
• Parsnip	• Squash	
 - Plant sensitive vegetables (and other plants)
 - in raised beds
 - in pots

Diseases in the Garden Walnut Toxicity

- **Management**
 - Keep walnut leaves and fruits out of your garden
 - DO NOT compost walnut leaves and fruits
 - Remove volunteer walnut trees
 - Remove mature walnut trees (?)

***Diseases in the Garden
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
<http://pddc.wisc.edu>***

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