

2019 Responding to Horticulture Inquiries

2019 Plant Disease Update

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2019 Plant Disease Update Winter Injury

- **Causes**
 - Water stress
 - High winds
 - Extreme winter temperatures
 - Insufficient snow cover
 - Cycling winter temperatures
 - Ice

2019 Plant Disease Update Winter Injury

- **Affected plants**
 - Broad-leaved trees
 - Fruit trees (pome fruits, stone fruits)
 - Maples (Japanese, Korean)
 - Redbud
 - Evergreens
 - Yew
 - Boxwood
 - Arborvitae



2019 Plant Disease Update Winter Injury

- **Management**
 - Water trees and shrubs adequately
 - Plant trees and shrubs
 - Properly
 - In protected locations (sensitive plants)
 - Protect sensitive plants
 - Pray for
 - Lots of snow
 - A slow, gradual fall cool down and spring warm up

2019 Plant Disease Update Boxwood Blight

- **Cause**
 - *Calonectria pseudonaviculata*
 - *Cylindrocladium pseudonaviculatum*
(*Cylindrocladium buxicola*)
- **Hosts**
 - Boxwood
 - Pachysandra
- **Favorable Environment:** Cool, wet weather



2019 Plant Disease Update Boxwood Blight

- **Control**
 - Be cautious about holiday wreaths
 - Use shrubs other than boxwood
 - Buy locally produced boxwood
 - Buy from a reputable supplier
 - Avoid symptomatic plants

2019 Plant Disease Update Boxwood Blight

- **Control**
 - Grow resistant varieties
 - Hybrid boxwood 'Green Gem'
 - Common boxwood 'Katerberg' North Star®
 - Korean littleleaf boxwood
 - 'Eseles' Wedding Ring®
 - 'Franklin's Gem'
 - 'Winter Gem'
 - 'Wintergreen'

2019 Plant Disease Update Boxwood Blight

- **Control**
 - Keep new plants isolated
 - DO NOT replant in an area where boxwood blight has been a problem
 - Physically separate boxwood plantings
 - Space plants far apart
 - DO NOT overhead water
 - Prune out diseased branches

2019 Plant Disease Update Boxwood Blight

- **Control**
 - Disinfect pruning tools and other items (70% alcohol, 10% bleach, disinfectants)
 - Remove and destroy infected plants
 - Burn (where allowed)
 - Deep bury (two feet)/Double bag and landfill
 - DO NOT compost

2019 Plant Disease Update Boxwood Blight

- **Control**
 - Use fungicides to prevent infections
 - Chlorothalonil (alone or with propiconazole or thiophanate-methyl), fludioxonil, metconazole, tebuconazole
 - 7 day application intervals
 - Alternate active ingredients (FRAC codes)
 - Contact the PDDC if you believe you have found boxwood blight!

2019 Plant Disease Update Tomato 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



2019 Plant Disease Update Tomato Fungal Leaf Blights

- **Control (early blight, Septoria leaf spot)**
 - Remove and destroy contaminated debris
 - Burn (where allowed)
 - Deep bury
 - Hot compost
 - Move tomatoes to new location

2019 Plant Disease Update Tomato Fungal Leaf Blights

- **Control (early blight, Septoria leaf spot)**
 - Plant resistant varieties
 - Space plants far apart
 - Mulch around the base of plants
 - DO NOT overmulch

2019 Plant Disease Update Tomato Fungal Leaf Blights

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

2019 Plant Disease Update Tomato Fungal Leaf Blights

- **Control (late blight)**
 - Remove any infected plants and plant parts
 - Infected tomato/potato plants including fruits and tubers
 - Volunteer tomato and potato plants
 - Weed hosts
 - Destroy any infected plants and plant parts
 - Burn (where allowed)
 - Double bag and landfill

2019 Plant Disease Update Tomato Fungal Leaf Blights

- **Control (late blight)**
 - DO NOT use last year's potatoes as seed
 - DO use certified seed potatoes
 - 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#.VVNSsPIVhBc>)

2019 Plant Disease Update Tomato 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/wivegdis/>)
 - Apply at 7-14 day intervals

2019 Plant Disease Update Phytoplasmas Diseases

- **Examples**
 - Aster yellows
 - Ash yellows
- **Causes: Miscellaneous phytoplasmas**
- **Hosts**
 - Many herbaceous plants (aster yellows)
 - Ash, lilac (ash yellows)
 - "The more you look, the more you find."

2019 Plant Disease Update Phytoplasma Diseases



Cranberry
(16SrIII-J/XV/XV-B)



Squash
(16SrIII-B)



Elm
(16SrVII*)



Ash
(16SrVII-A)



Grape
(16SrVII-A*)



Butternut
(16SrVII-A)



Bitternut Hickory
(16SrVII*)



Lilac
(16SrIII-A/VII-A)

2019 Plant Disease Update Phytoplasmas Diseases

- Favorable environment
 - High leafhopper populations



2019 Plant Disease Update Phytoplasmas Diseases

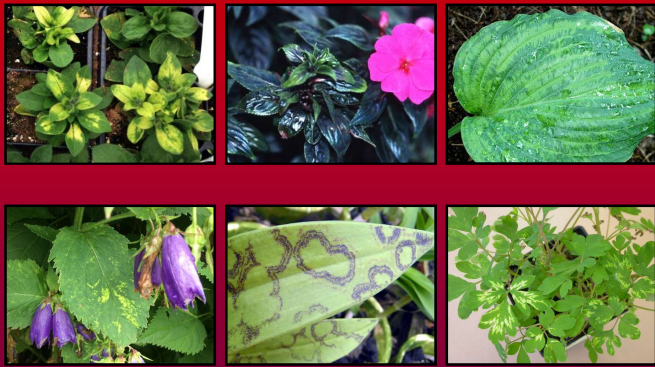
- Control
 - Remove infected plants
 - Destroy infected materials
 - Compost
 - Bury
 - Burn (where allowed)
 - Avoid growing susceptible plants
 - Use insecticides for leafhopper control (?)

2019 Plant Disease Update 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)

2019 Plant Disease Update Viral Diseases

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



2019 Plant Disease Update 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)



2019 Plant Disease Update 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

2019 Plant Disease Update Viral Diseases

- **Control**
 - Remove weed hosts
 - Disinfest contaminated materials
 - 1% Sodium dodecyl sulfate (sodium lauryl sulfate) + 1% Alconox® (2½ Tbsp + 2¼ 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

2019 Plant Disease Update Viral Diseases

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

2019 Plant Disease Update Verticillium Wilt

- **Causes**
 - *Verticillium dahliae*
 - *Verticillium albo-atrum*
 - *Verticillium nonalfalfae*
 - Other *Verticillium* spp.
 - New *Verticillium* spp.

2019 Plant Disease Update Verticillium Wilt

- **Hosts**
 - Many woody ornamentals
 - Common: Maple, ash, redbud, smokebush
 - Newer: Seven son flower, wafer-ash, buttonbush
 - Many herbaceous plants
 - Common: Purple coneflower, blazing star
 - New: Vervain ('Quartz White')
 - Many vegetables
 - Tomato, potato, pepper, EGGPLANT, cucurbits

2019 Plant Disease Update Verticillium Wilt

- **Favorable environment**
 - Cool, wet weather (for infection)
 - Hot, dry weather (for symptom development)





2019 Plant Disease Update Verticillium Wilt

- **Control**
 - Avoid *Verticillium*-infested areas
 - Pretest soils/mulches/composts for the presence of *Verticillium*
 - Fumigate heavily infested soils
 - Keep broad-leaf weeds under control
 - Avoid municipal mulches

2019 Plant Disease Update Verticillium Wilt

- **Control**
 - Use immune/resistant plants
 - CONIFERS: Pines, spruces, firs, junipers
 - DECIDUOUS TREES/SHRUBS: Beech, birch, ginkgo, hackberry, hawthorn, hickory, honey locust, mountain ash, white oak, bur oak, poplar, serviceberry, sycamore, willow
 - HERBACEOUS ORNAMENTALS: Call for info.
 - Prevent stress
 - Prune diseased (wilted) areas

2019 Plant Disease Update Verticillium Wilt

- **Control**
 - Decontaminate pruning tools (70% alcohol, 10% bleach, disinfectants)
 - Make plants comfortable until they die
 - Remove and destroy diseased plants
 - Burn (where allowed)
 - DO NOT use fungicides

2019 Plant Disease Update Bacterial Canker

- **Causes**
 - *Pseudomonas syringae* pv. *syringae*
 - *Pseudomonas syringae* pv. *mors-prunorum*
- **Hosts:** Stone fruits (plum, cherry, peach)
- **Favorable environment**
 - Wet weather
 - Cold temperatures
 - Wounding



2019 Plant Disease Update Bacterial Canker

- **Control**
 - Minimize wounding
 - Prune diseased branches
 - Decontaminate pruning tools (70% alcohol, disinfectants, 10% bleach)
 - Destroy infected materials
 - Burn (where allowed)
 - Deep bury
 - DO NOT use bactericides

2019 Plant Disease Update Black Rot

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



2019 Plant Disease Update 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)

2019 Plant Disease Update 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

2019 Plant Disease Update Black Rot

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

2019 Plant Disease Update Black Rot

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

2019 Plant Disease Update Slime Molds



Physarum sp.



Fuligo sp.



Stemonitis sp.



2019 Plant Disease Update Other Fungi/Fungal Allies



Giant Puffballs



Lichens



Stinkhorns



Bird's Nest Fungi



Sooty Mold



Stinkhorns

2019 Plant Disease Update 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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