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-leafed trees
    • Fruit trees (pome fruits, stone fruits)
    • Maples (Japanese, Korean)
    • Redbud
  – Evergreens
    • Yew
    • Boxwood
    • Arborvitae

Images of winter-injured plants.
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

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

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

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’
- 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

• 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

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

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

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#YVNSsPvhrB)

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

Tomato Fungal Leaf Blights

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)
- **Butternut Hickory** (16SrVII)
- **Lilac** (16SrIII-A/VII-A)

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

#### Phytoplasmas Diseases

- **Favorable environment**
  - High leafhopper populations

#### 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

• 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)

• 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
Virus Diseases

• Control
  – Remove weed hosts
  – Disinfest contaminated materials
    • 1% Sodium dodecyl sulfate (sodium lauryl sulfate) + 1% Alconox® (2½ Tbsp + 2½ Tbsp/gal)
    • Trisodium phosphate (14 dry oz/gal)
    • 20% low fat dry milk (Carnation®) + 0.1% polysorbate 20 (9¾ 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

• 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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