

LGMSC 2020

Cankers and Vascular Wilts of Landscape Trees

Brian D. Hudelson

Department of Plant Pathology
University of Wisconsin-Madison/Extension



Cankers and Vascular Wilts Dutch Elm Disease

- Pathogens
 - *Ophiostoma ulmi* (*Ceratocystis ulmi*)
 - *Ophiostoma novo-ulmi*
 - *Pesotum ulmi* (*Graphium ulmi*)
- Hosts: Elms (*Ulmus* spp.)
 - High susceptibility
 - American, Belgian, English, red, rock, September, European white, winged

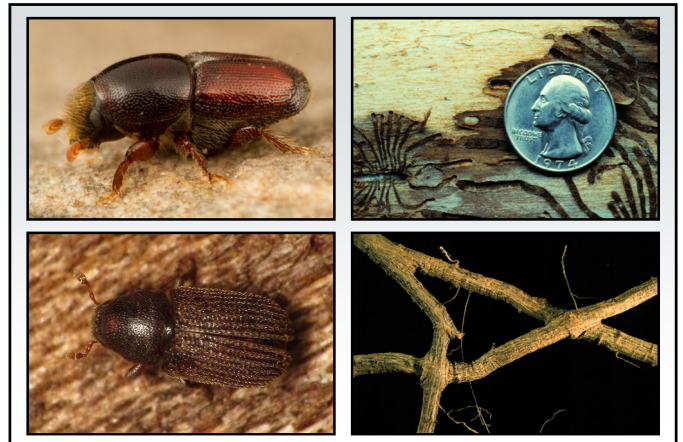
Cankers and Vascular Wilts Dutch Elm Disease

- Hosts
 - Intermediate susceptibility
 - Cedar, European field (smooth-leaf), wych (Scots)
 - Low susceptibility
 - Siberian, Chinese
- Favorable environment
 - Cool, wet conditions (for infection)
 - Hot, dry weather (for symptom development)



Cankers and Vascular Wilts Dutch Elm Disease

- Transmission
 - Elm bark beetles
 - *Scolytus multistriatus* (European)
 - *Hylurgopinus rufipes* (Native)
 - Root grafts
 - Major method of movement in elm groves
 - *Ophiostoma* spp. can reach the roots during the first season of infection



Cankers and Vascular Wilts Dutch Elm Disease

- **Control**
 - Remove diseased elms
 - Disrupt root grafts
 - Mechanically (vibratory plow or trenching machine)
 - Chemically (soil fumigant)
 - Physical barriers
 - Be careful using elm wood
 - Remove bark
 - Cover wood

Cankers and Vascular Wilts Dutch Elm Disease

- **Control**
 - Prune diseased branches
 - Decontaminate pruning tools (70% alcohol, disinfectants, bleach)
 - Use fungicides injections
 - Propiconazole, thiabendazole
 - Prophylactic or therapeutic
 - Inject every 12-24 months

Cankers and Vascular Wilts Dutch Elm Disease

- **Control**
 - Plant resistant elms
 - Crosses between American and other elms
 - True American elms varieties
 - ‘American Liberty’
 - ‘Independence’
 - ‘Princeton’
 - ‘New Harmony’
 - ‘Valley Forge’
 - Others

Cankers and Vascular Wilts Dutch Elm Disease

- **Control**
 - Treatments of dubious use
 - Tracing
 - *Verticillium dahliae* injections

Cankers and Vascular Wilts Oak Wilt

- **Pathogen**
 - *Bretziella fagacearum* (*Ceratocystis fagacearum*)
 - *Chalara* sp.
- **Hosts**
 - Red oak group: Red, black, pin
 - White oak group: White, bur, swamp white
 - Chinese chestnut

Cankers and Vascular Wilts Oak Wilt

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



Cankers and Vascular Wilts Oak Wilt

- **Transmission**
 - Oak bark beetles
 - *Pseudopityophthorus ninutissimus*
 - *Pseudopityophthorus pruinosis*
 - Sap beetles
 - *Carpophilus* spp.
 - *Colopterus* spp.
 - *Cryptarcha* spp.
 - *Epuraea* spp.
 - *Clischrochilus* spp.

Cankers and Vascular Wilts Oak Wilt

- **Transmission**
 - Root grafts
 - Major method of movement in clumps of oaks
 - Commonly form between trees in the same group
 - Red oak group: Red, black, pin
 - White oak group: White, bur, swamp white
 - Rarely form between trees in different groups
 - Movement of up to 20-25 ft/year



Cankers and Vascular Wilts Oak Wilt

- **Control**
 - DO NOT prune or wound oaks from bud break through 2-3 weeks past full leaf development
 - Disrupt root grafts
 - “Oak Wilt Management: What are the Options?” (<https://learningstore.extension.wisc.edu/>)
 - Mechanically (vibratory plow or trenching machine)
 - Chemically (soil fumigant)
 - Physical barriers

Cankers and Vascular Wilts Oak Wilt

- **Control**
 - Remove diseased (and healthy) trees
 - Decontaminate pruning tools (70% alcohol, disinfectants, bleach)
 - Be careful using oak wood
 - Remove bark
 - Cover wood

Cankers and Vascular Wilts Oak Wilt

- **Control**
 - Use fungicide injections
 - Propiconazole
 - Prophylactic or therapeutic
 - Inject every 12-24 months

Cankers and Vascular Wilts Verticillium Wilt

- **Pathogens**
 - *Verticillium dahliae*
 - *Verticillium albo-atrum*
 - Other *Verticillium* spp.
 - New *Verticillium* spp.

Cankers and Vascular Wilts Verticillium Wilt

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

Cankers and Vascular Wilts Verticillium Wilt

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



Cankers and Vascular Wilts 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
 - Clean up leaf litter
 - Avoid municipal mulches

Cankers and Vascular Wilts 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
 - Prevent stress
 - Prune diseased (wilted) areas

Cankers and Vascular Wilts Verticillium Wilt

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

Cankers and Vascular Wilts Nectria Canker

- Pathogens: *Nectria* spp.
- Hosts
 - Many woody ornamentals
 - Honey locust
- Favorable environment
 - Injuries/wounds
 - Wet weather



Cankers and Vascular Wilts Nectria Canker

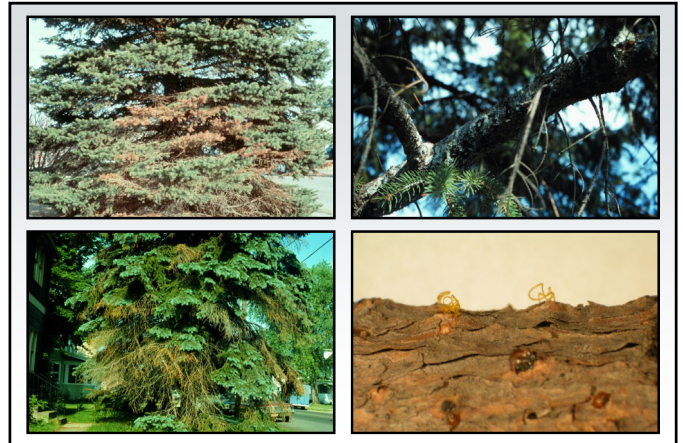
- **Control**
 - Choose well-adapted trees and shrubs
 - Reduce environmental stresses/injuries
 - Water and fertilize properly
 - Prune properly when maintenance pruning
 - “How to Properly Prune Deciduous Trees” (<https://hort.extension.wisc.edu/>)
 - “How to Properly Prune Deciduous Shrubs” (<https://hort.extension.wisc.edu/>)

Cankers and Vascular Wilts Nectria Canker

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

Cankers and Vascular Wilts Cytospora Canker

- **Pathogens**
 - *Leucostoma (Valsa) kunzei*
 - *Cytospora (Leucocytospora) kunzei*
 - *Cytospora* spp.
- **Hosts**
 - Spruces (particularly Colorado blue spruce)
 - Many other conifers
- **Favorable environment: Wet weather**



Cankers and Vascular Wilts Cytospora Canker

- **Control**
 - DO NOT plant Colorado blue spruce
 - DO NOT crowd trees when planting
 - Thin branches to increase airflow
 - Prevent tree stress
 - Prune diseased branches
 - Decontaminate pruning tools (70% alcohol, disinfectants, bleach)

Cankers and Vascular Wilts Cytospora Canker

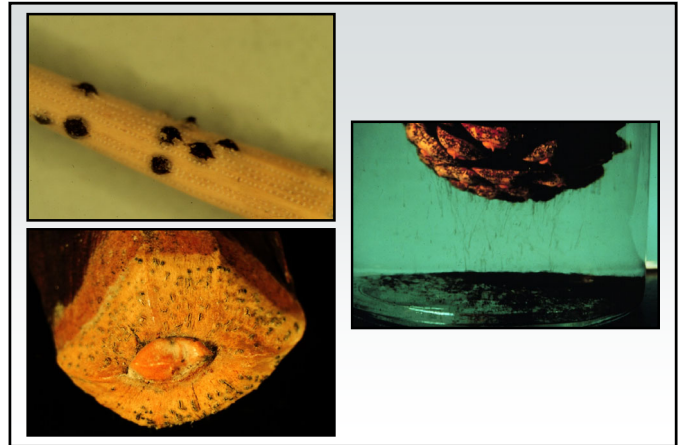
- **Control**
 - Destroy infected materials
 - Burn (where allowed)
 - Deep bury
 - DO NOT use fungicides

Cankers and Vascular Wilts
Diplodia Shoot Blight and Canker

- **Pathogens:** *Diplodia (Sphaeropsis)* spp.
- **Hosts (major)**
 - Austrian pine
 - Other pines: red, jack, Scots, mugo
- **Hosts (minor)**
 - Other conifers: cedars, cypresses, firs, spruces, junipers, yews

Cankers and Vascular Wilts
Diplodia Shoot Blight and Canker

- **Favorable environment**
 - Wet weather (for infection)
 - Drought (for extensive colonization)



Cankers and Vascular Wilts
Diplodia Shoot Blight and Canker

- **Control**
 - DO NOT plant Austrian pines
 - Prevent tree stress, particularly water stress
 - Thin branches to increase airflow
 - Prune diseased branches
 - Decontaminate pruning tools (70% alcohol, disinfectants, bleach)
 - Remove infected cones (?)

Cankers and Vascular Wilts
Diplodia Shoot Blight and Canker

- **Control**
 - Use fungicides to prevent infections
 - Thiophanate-methyl, chlorothalonil
 - Alternate active ingredients (FRAC Codes)
 - Apply from bud break through shoot elongation
 - Apply at 14 day intervals

Cankers and Vascular Wilts
Golden Canker

- Pathogen: *Cryptodiaporthe corni*
- Host: Pagoda dogwood
- Favorable environment
 - Water stress
 - Heat stress



Cankers and Vascular Wilts
Golden Canker

- Control
 - Prune diseased branches
 - Decontaminate pruning tools (70% alcohol, disinfectants, bleach)
 - Destroy infected materials
 - Burn (where allowed)
 - Deep bury

Cankers and Vascular Wilts
Golden Canker

- Control
 - Reduce plant stress
 - Consider tree placement
 - Water adequately
 - Fertilize appropriately
 - DO NOT use fungicides for control

Cankers and Vascular Wilts
Fire Blight

- Pathogen: *Erwinia amylovora*
- Hosts
 - Many woody rosaceous plants
 - Apple, crabapple, pear, mountain ash, cotoneaster
- Favorable environment
 - Wet weather (but not too wet)
 - Hail (or other wounding)



Cankers and Vascular Wilts Fire Blight

- Control
 - Plant resistant varieties
 - “Home Fruit Cultivars for Northern Wisconsin” (<https://learningstore.extension.wisc.edu/>)
 - “Home Fruit Cultivars for Southern Wisconsin” (<https://learningstore.extension.wisc.edu/>)
 - “Top Ornamental Crabapples for Wisconsin” (<https://hort.extension.wisc.edu/>)
 - Prune diseased branches

Cankers and Vascular Wilts Fire Blight

- Control
 - Decontaminate pruning tools (70% alcohol, disinfectants, bleach)
 - Destroy infected materials
 - Burn (where allowed)
 - Deep bury
 - DO NOT over-fertilize with nitrogen

Cankers and Vascular Wilts Fire Blight

- Control
 - Use bactericides to prevent infections (?)
 - Copper, streptomycin
 - Apply
 - Pre-bloom (copper)
 - During flowering (streptomycin)
 - Apply every
 - Two applications at spaced 4 days apart (copper)
 - Multiple applications spaced 3-4 days apart (streptomycin)

Cankers and Vascular Wilts Bacterial Canker

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



Cankers and Vascular Wilts Bacterial Canker

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

Cankers and Vascular Wilts
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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