



Diseases to Anticipate in 2017

**Margery Daughtrey
Cornell Univ-LIHREC**

VIRUS

GALLS

RUSTS

VASCULAR WILTS

LEAF SPOTS

CANKERS

BUTT ROT

NEEDLECASTS

RUSTS







Pear-trellis Rust





Pear Trellis Rust

Gymnosporangium sabiniae

(syn. *G. fuscum*)

On Chanticleer, 2009



Riverhead, NY



Comice Pear

UNIQUE TRAIT

Late maturity of aeciospores

in pear trellis rust



4 mo. maturation

OPTIONS



Find resistant callery pears (?)

Spray junipers (Oct-Dec) (?)

Spray pears (May?)

Eliminate nearby junipers (**which?**)



Juniperus chinensis
'Robusta Green'

2014
Nursery
L.I., NY

PEAR TRELLIS RUST

D. Gilrein image

April 27, 2015



Lynn Hyatt image



J. chinensis 'Robusta Green'
Pear trellis rust



Juniperus chinensis
'Robusta Green'

Landscape
Suffolk Co., NY

Pear trellis rust

Juniperus chinensis
'Robusta Green'
Riverhead Landscape
May 16





Pear-trellis rust (*G. sabinae*) in Switzerland
Highly Susceptible Junipers (Siegfried, 2002)

Juniperus chinensis 'Keteleeri'

J. chinensis 'Robusta Green'

J. media × Gold Sovereign

J. media × Pfitzeriana (Aurea and Compacta)

J. media × Swissgold

J. sabina 'Blue Danube'

J. sabina 'Tamariscifolia'

J. scopulorum 'Old Gold'

Pear Trellis Rust (*G. sabinae*)

Resistant Junipers in Switzerland (Siegfried, 2002)

Juniperus chinensis 'Blaauw'

J. chinensis 'Blue Alps'

J. chinensis 'San Jose'

***J. chinensis* 'Kaizuka' (= *J. chinensis* 'Torulosa')**

J. media × 'Mint Julep'

J. media × 'Pfitzeriana Glauca'

J. communis - all

J. virginiana 'Hetz', 'Grey Owl', 'Canaerti', 'Kim'

J. conferta 'Blue Pacific'

June 2011 – anthracnose + rust



Colletotrichum acutatum

Pyrus calleryana 'Cleveland Select'

Spray
Treatment
For Rusts...



Fungicide Management

Chlorothalonil – if you test first on host

Propiconazole – if you test first on host

Mancozeb – labeled for rust on pear

3 applications 7-14 day intervals



HAWTHORN RUST – *Gymnosporangium globosum* Will look just like the pear rust

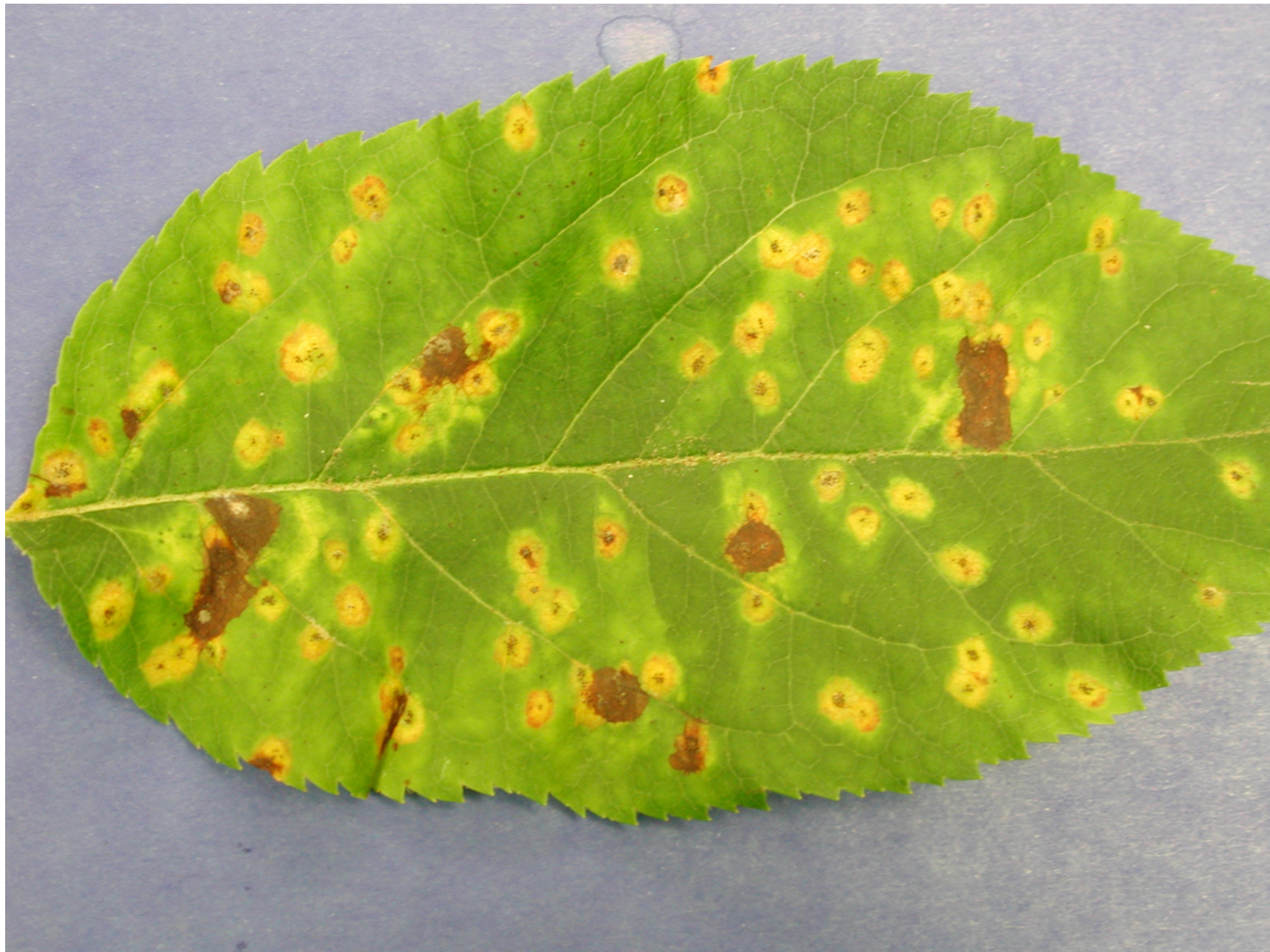


Quince rust on juniper - *Gymnosporangium clavipes*



Cedar-apple rust

Gymnosporangium juniperi-virginiana





NEW



**2004 - *Gymnosporangium yamadae*
Japanese apple rust
noted in DE and PA on *Malus toringo*.**

seen widespread in Northeast 2009

Japanese Apple Rust

Collections at Beltsville:

NJ Bergen Co. 2009

NY Margaretville Delaware Co. 2009

MD Beltsville 2006

DE Wilmington 2004, 2009

PA Media 2004

Also reported from CT

Also reported from Manhattan

Telial hosts reported for *Gymnosporangium yamadae* (Japanese apple rust) worldwide

Juniperus chinensis

J. chinensis var. *kaizuka*

J. chinensis var. *procumbens*

J. chinensis var. *sargentii*

**Accidentally found 2 junipers
involved in NY!**



J. Chinensis 'Robusta Green' in nursery and landscape
Pear trellis rust
AND Japanese apple rust



Juniperus chinensis var. *kaizuka*
Host of Japanese apple rust

Went looking for the stage on Malus 2015



Riverhead, Aug. 23

Japanese apple rust

Gymnosporangium yamadae





Riverhead, Aug. 23





**Southampton
Summer 2015**





Easthampton
Sept. 9



Japanese apple rust (*G. yamadae*)

J. chinensis 'Robusta Green'

J. chinensis var. *kaizuka*

Malus spp.

Apparently widespread.

Other hosts?

Is cedar-apple rust still relevant?

Treating for Rust Diseases

Alternate systemic fungicides

(strobilurins – watch out for

Heritage on apple –

BannerMAXX)

And contact materials (copper,

mancozeb, chlorothalonil)

CANKERS



PLANES

Platanus x acerifolia

[*P. occidentalis* × *P.
orientalis*]

Massaria disease

Splanchnonema platani

(previously *Massaria platani*)

Or

Macrodiplodiopsis desmazieresii



Mike Miecznikowski image

Characteristics

- Upper surface of branch affected (send in the drones!)
 - Brown multi-celled asexual spores
 - 40-50 μm long x 12.5 to 17.5 μm wide
 - Sometimes brown ascospores
 - 67-75 x 17.5 to 20 μm
- Spores on bark or cambium
- Opportunistic basidiomycetes contributing?
Other fungi are there, too!

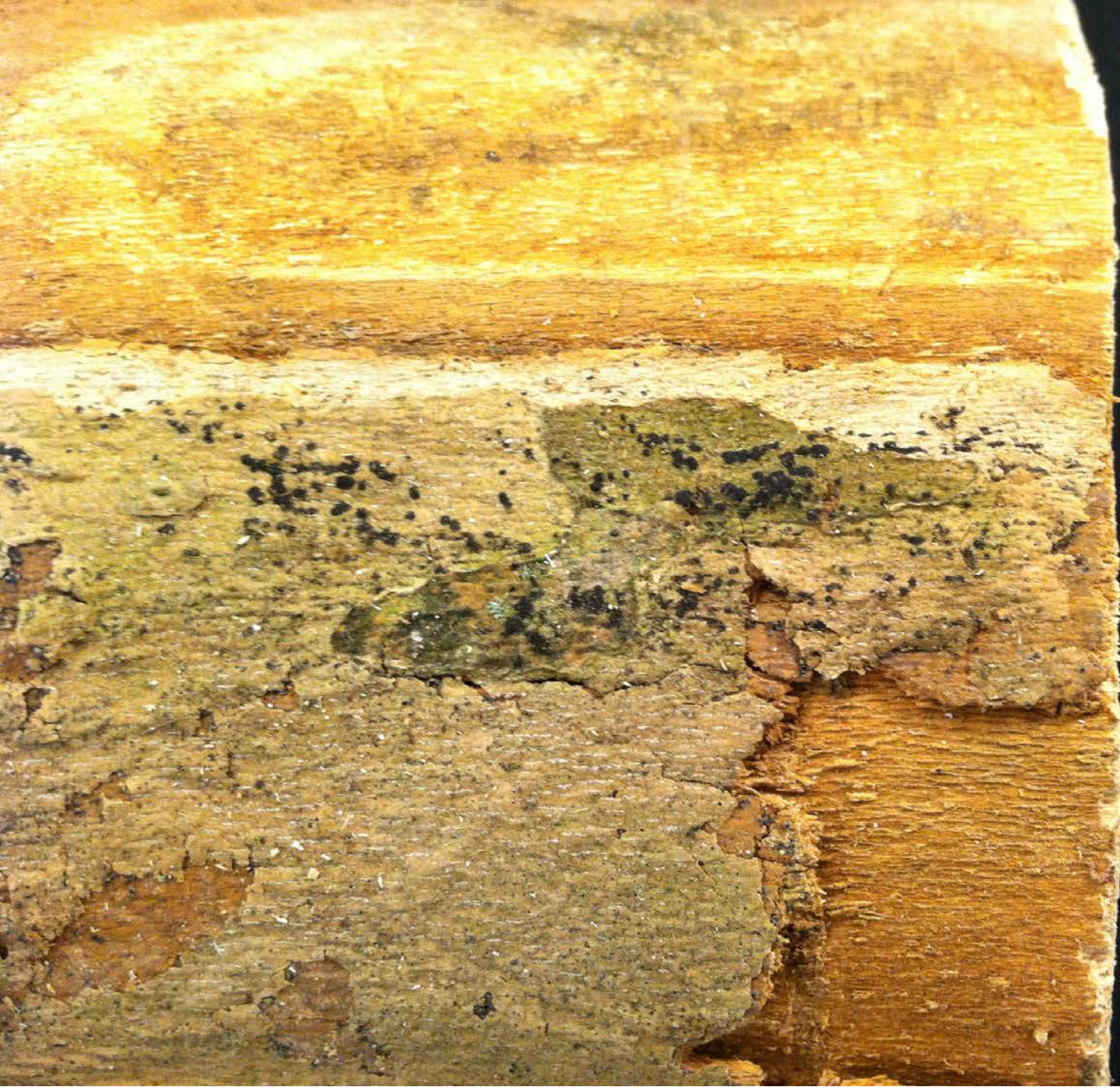


Samples
from
Brooklyn
and
The Bronx



Adriana Jacykewycz sample

NYC Parks





Blue Atlas Cedar – Sirococcus shoot blight
Also see Botryosphaeria and Diplodia tip blight



Diplodia Tip Blight





Sporulation of *Diplodia sapinea*



Diplodia pinea

|

*Sphaeropsis
sapinea*

|

Diplodia pinea

|

*Diplodia
sapinea*

Diplodia Control with Fungicides

3336 + spreader-sticker

Spectro

Camelot

Protect

Junction

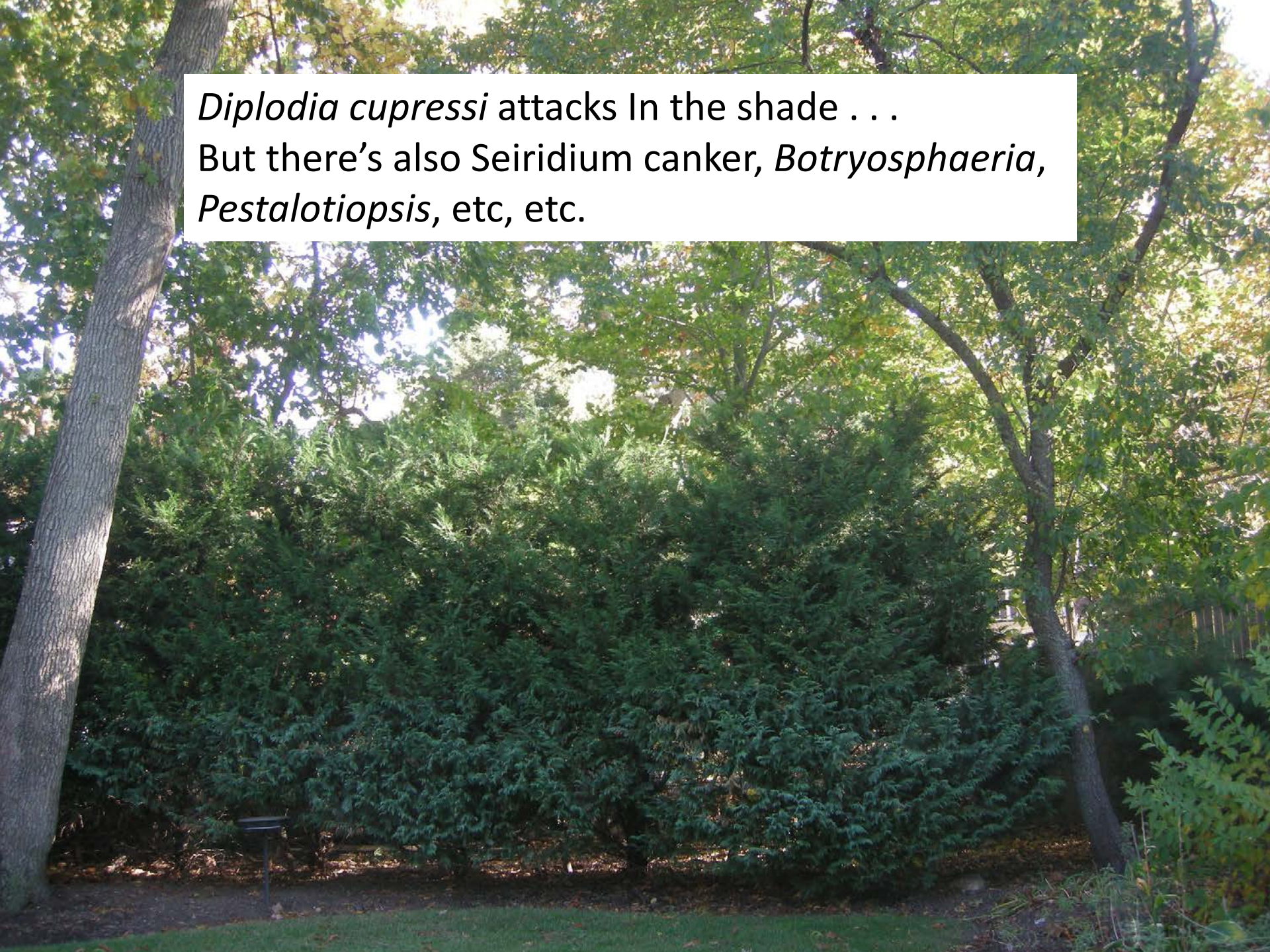
BannerMAXX

Just before budbreak+2 more @10 days



Leyland cypress
Diplodia cupressi

Diplodia cupressi attacks In the shade . . .
But there's also Seiridium canker, *Botryosphaeria*,
Pestalotiopsis, etc, etc.





Glen Stanosz image

Diplodia cupressi on juniper
(*Juniperus scopulorum*)

Pathogen reported in IA, KS, NY, PA



Brown rot
Monilinia

Brown Rot Control with Fungicides

BannerMAXX

Dithane

Junction

Daconil

Spectro

3336

Pageant

Bacillus subtilis

When blossoms open & in 10 days

LEAF SPOTS,
NEEDLE CASTS

On Doug fir



**Rhabdocline needlecast
DOUG FIR**

Rhabdocline needlecast

The fungus sporulates on needle undersides



Swiss needlecast

Phaeocryptopus gaumanii



Swiss needlecast



Rhabdocline needlecast

Improve air movement around tree

Treatments:

TIME: before new growth is 1/2 in. long

Continue at 3-4 week intervals until July 1

Copper hydroxide, chlorothalonil, Spectro 90

Swiss needlecast, too (same timing):

Mancozeb, chlorothalonil, Spectro

On spruce

Rhizosphaera needlecast



CBSpruce



Rhizosphaera needlecast

*****Colorado blue spruce**

Englemann spruce

White spruce

Austrian, mugho, E. white pines

Doug fir, true firs

Norway spruce pretty resistant

Rhizosphaera needlecast

Rhizosphaera kalkoffii

Avoid drought stress

Improve air movement around tree

Needs 48HR leaf wetness to infect



Rhizosphaera needlecast

Treatments:

chlorothalonil (Daconil, etc) [**not on CBS**]

chlorothalonil + thio-me=Spectro

coppers

mancozeb (Protect, etc)

TIME: new shoots 1 1/2" long

Repeat in 3 weeks

If wet, continue

+ IRRIGATION MANAGEMENT

BUTT ROT



***Kretzschmaria
deusta***

(Called
Ustilina
in the past)



GALLS









Exobasidium gall

VIRUS



Rose Rosette
Virus

A. Windham
image



Rose Rosette Disease

A. Windham image



Glyphosate Symptoms Mimic Rose Rosette Disease
Roundup Mimicry



Dawn O'Brien image

Rose Rosette

Multiflora rose

CHECKLIST

- Witches' broom
- Hyper-thorniness
- Gradual decline
- Red stems
- Glyphosate injury unlikely???



VASCULAR

WILTS



Verticillium wilt



Cotinus



Verticillium wilt



Bottlebrush buckeye



MN



WI

DED



D. E. D.



MN



WI

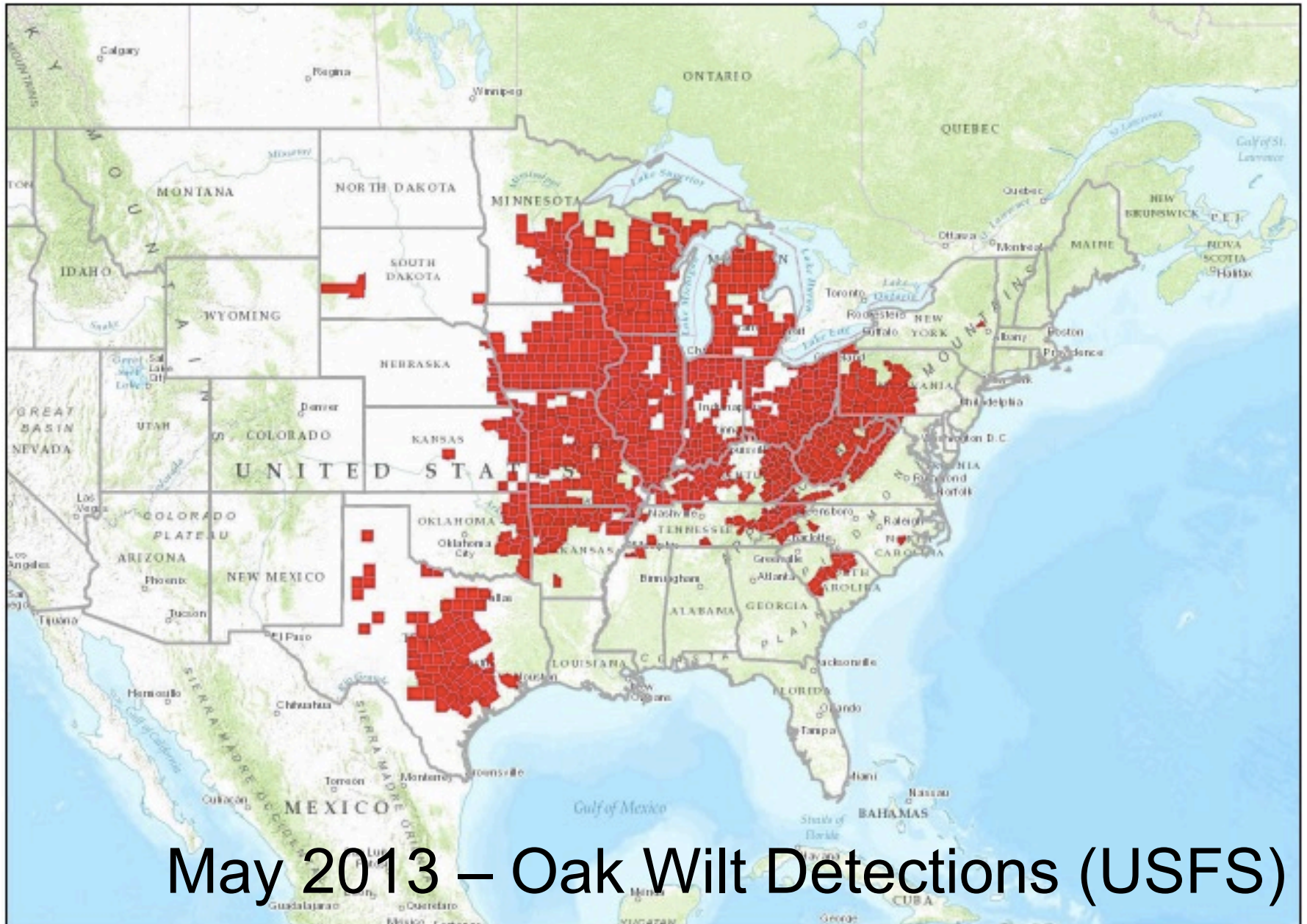
*Ceratocystis
ulmi*



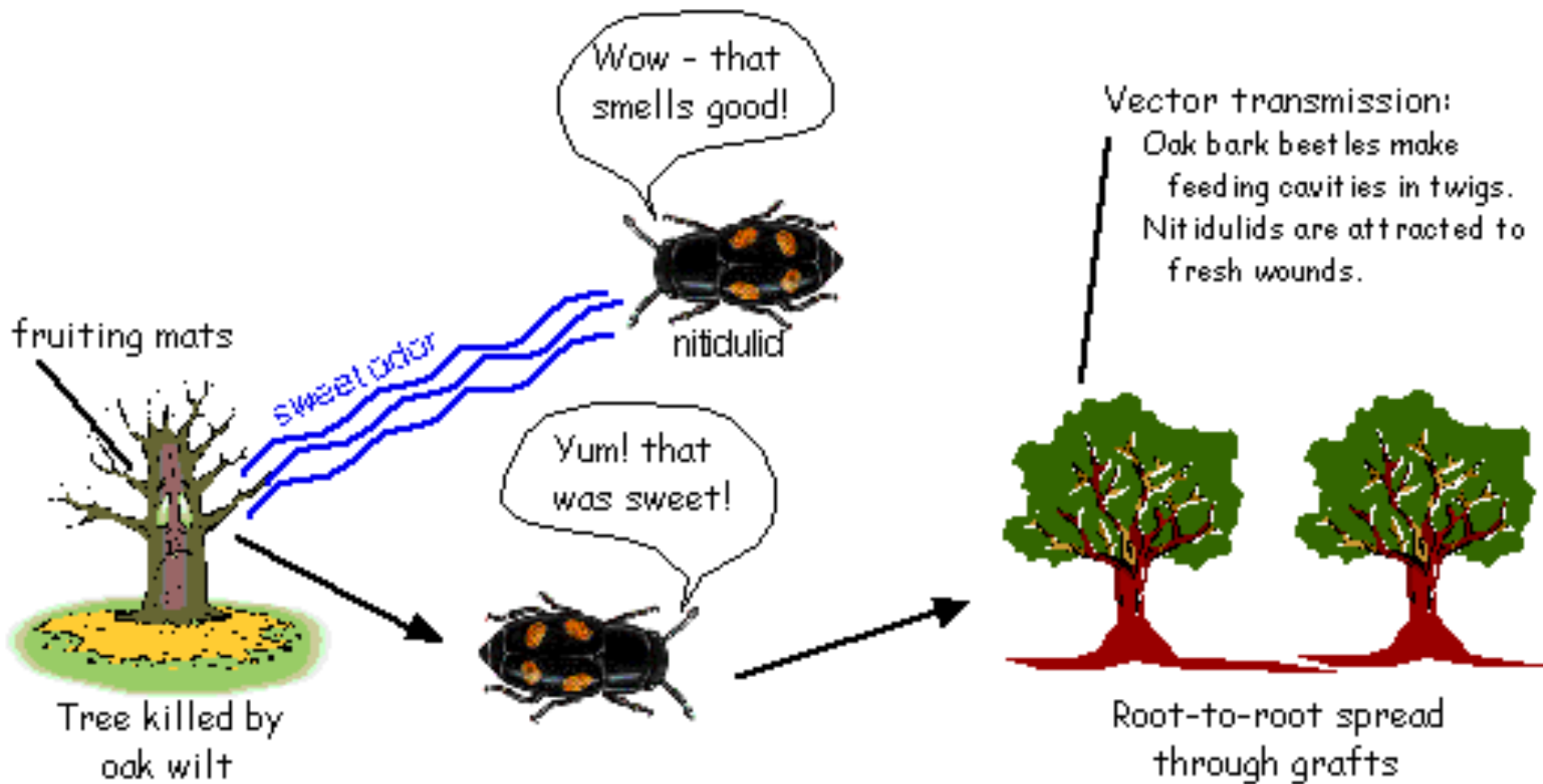
Oak Wilt – a Serious Disease

- Oak wilt – caused by *Ceratocystis fagacearum* (imperfect state *Chalara* sp.)
- Systemic, lethal disease of oaks
- Vectored by sap-feeding beetles
- All *Quercus* sp. are affected

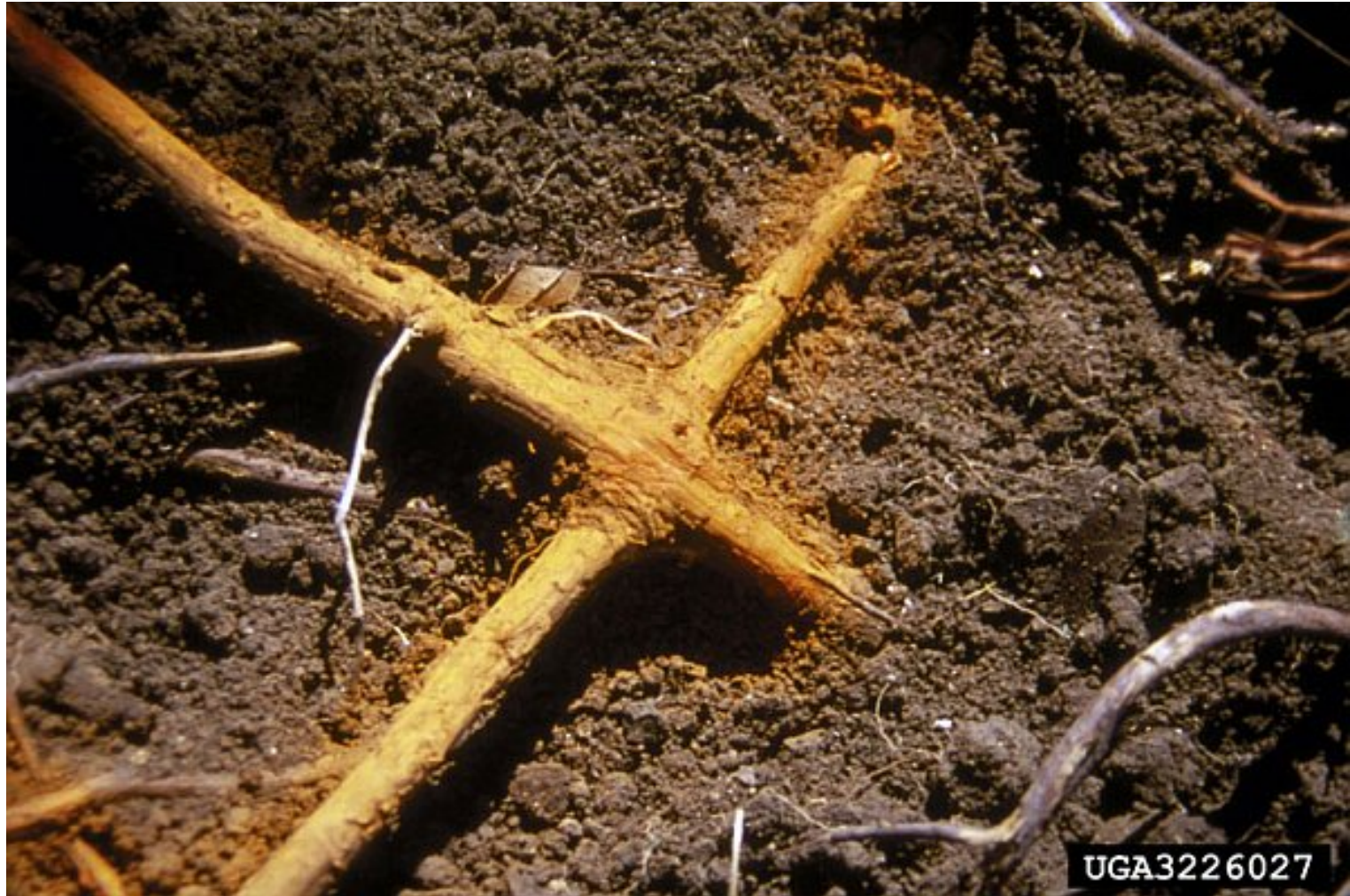
Distribution of Oak Wilt in the U.S.



Two Ways to Spread



Disease Transmission



Root grafts from infected tree to healthy tree.

Photo credit: Bugwood



Oak Wilt in the Landscape

J. Juzwik image USFS

Root Grafting- Movement from Tree to Tree



Fungal Mats Produced by Red Oak Group



- Host: Northern red oak, *Quercus rubra*
- Fungal mat under the bark
- See bark beetle tunneling – also implicated

Photo: APS

Sap Beetles Attracted to Wounds

- Attracted to sap smell from wounds
- Storm damage
- Pruning wounds
- Spike wounds
- Lightning strikes



Red Oaks vs White Oaks

- Red oak group more susceptible to infection than trees in white oak group
- White oaks can more readily wall off the fungus



Symptoms



Leaf wilt, necrosis on red oak.



J. Juzwik image, USFS

Sampling Techniques



D. Miller images

- Send 6-8 in long branches
- Send twig with leaves to examine
- Bring to lab same day as collect sample
- Ship overnight with ice packs
- Ship Monday - Wednesday

Discoloration of vascular bundles



Images: D. Miller & K. Stebner, Davey Institute



Oak wilt on Acidified PDA

Managing Oak Wilt

Prune in winter only

Use wound dressing if necessary to
prune in the spring or summer

Never move firewood



Oak Wilt Can be Confused with

Anthracnose

Spider mite feeding injury

Black oak gall wasp

2-lined chestnut borer

Tubakia leaf spot

Bacterial leaf scorch

Drought

Armillaria root rot, etc.



- Two-lined chestnut borer, *Agrilus bilineatus*
- Native beetle attacks stressed trees

Photo: U.S. Department of Agriculture

Bacterial leaf scorch of oak (*Quercus rubra*)



marginal
discoloration & a
dull red or yellow
halo between
scorched and
green tissues.

(photo, A. B.
Gould)



Joshua tree
Yucca brevifolia