# Invasive and Emerging Diseases of Landscape Trees

Extension
UtahStateUniversity

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Extension IPM Program

## NOT PRESENT IN UTAH

- Bacterial scorch (found in southern Utah)
- Pine wilt
- Oak wilt
- Beech leaf disease

## PRESENT IN UTAH

- Foliar issues on conifers
- Thousand cankers

# Bacterial Scorch

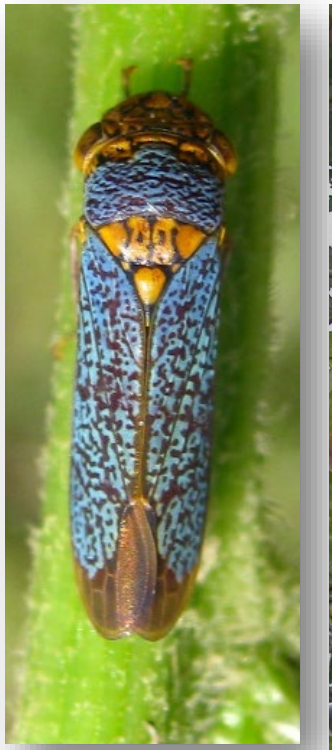
*Xylella fastidiosa*

Wide host range

Not yet identified in northern Utah

- Occurs on chitalpa in southern Utah

Spread by spittlebugs, leafhoppers, treehoppers (exact species unknown)

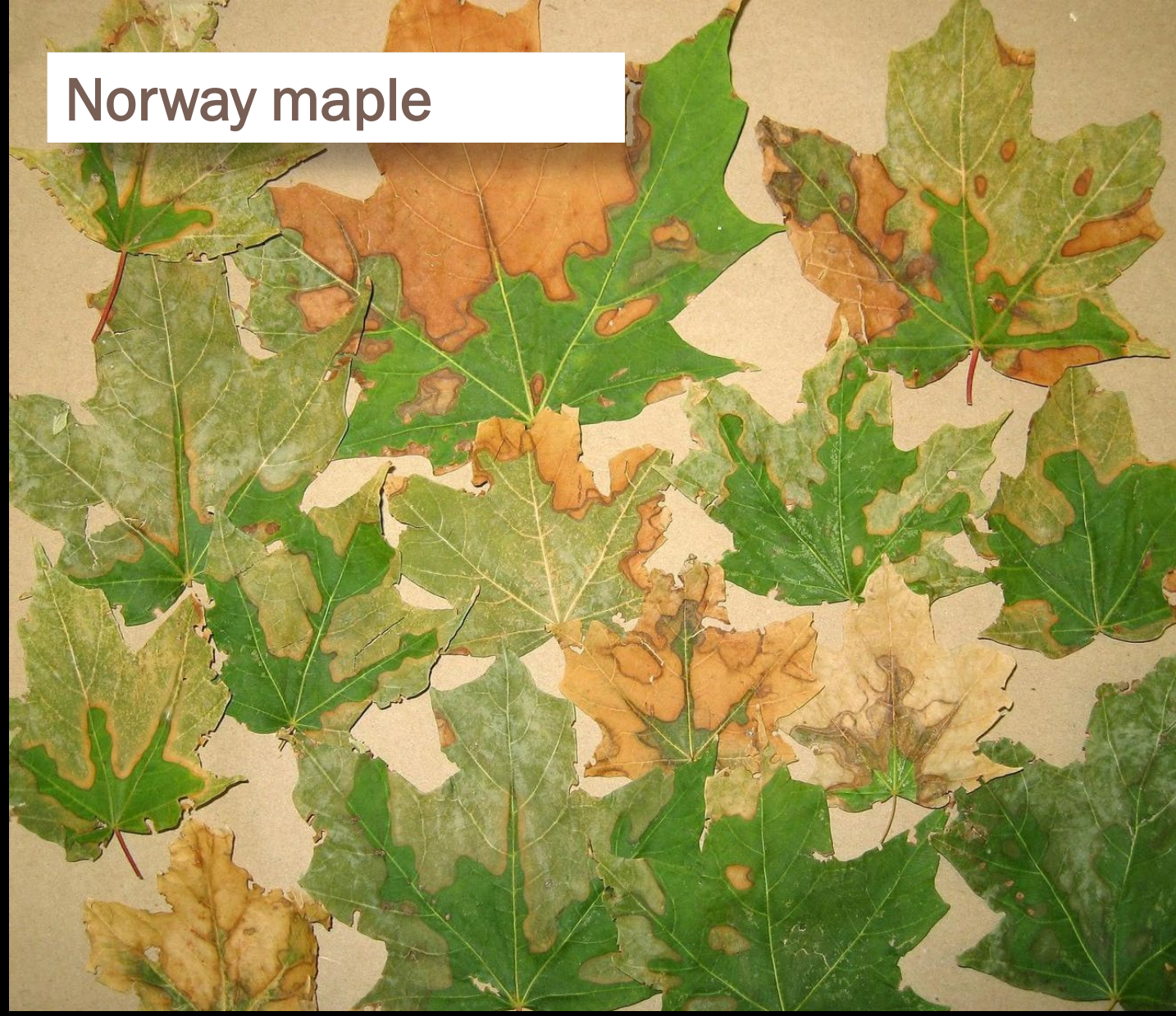


# Chitalpa

Elm

Sweetgum


Red oak


Norway maple

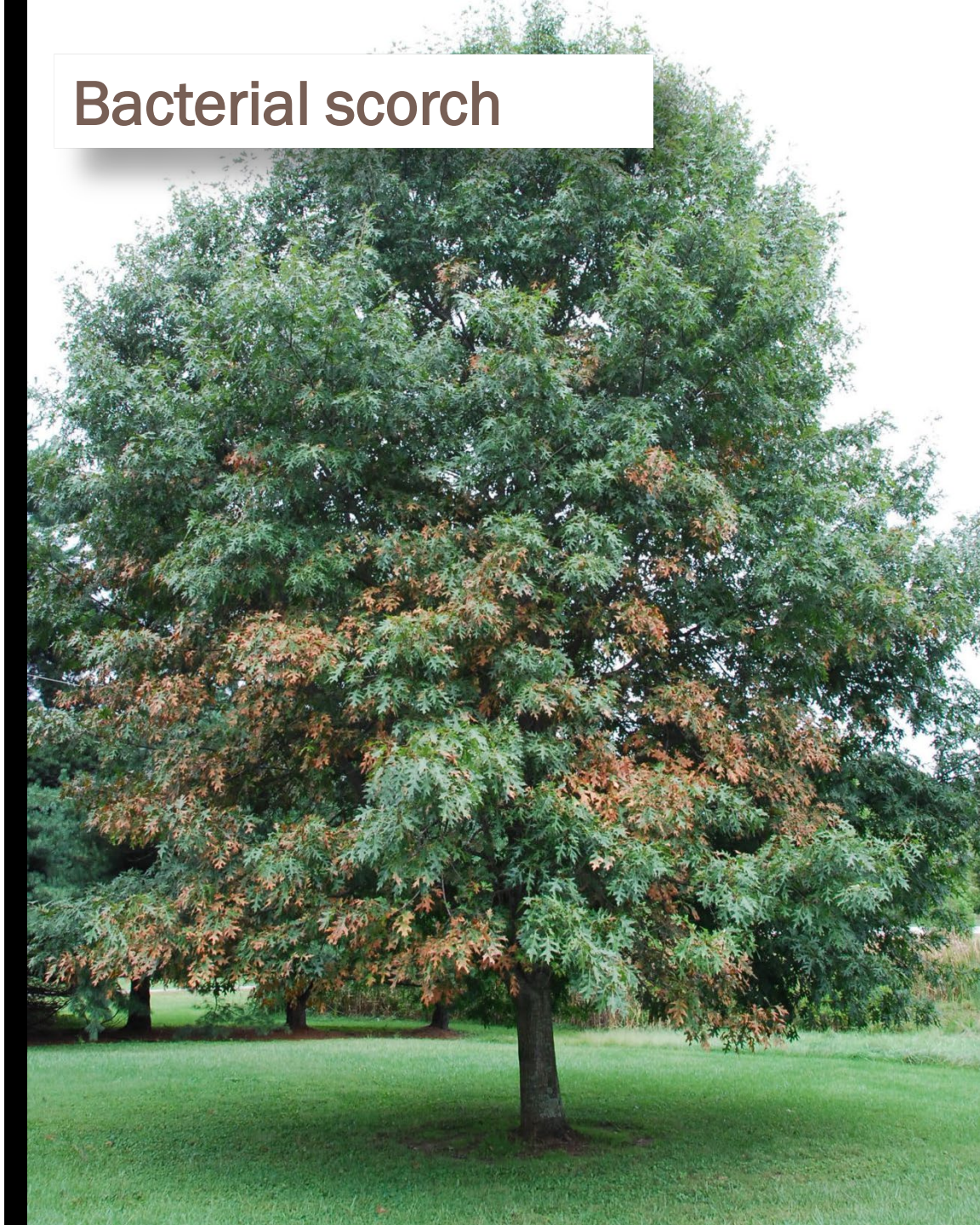
leaf drop and refoliation

thin crown

dieback, decline

symptoms reappear each year after initial infection


Abiotic leaf scorch


Bacterial scorch


Dogwood


Linden


Horsechestnut

# Bacterial Scorch Management

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Prune out symptomatic branches and dead wood

Trunk injections of oxytetracycline (antibiotic)

- delay symptom expression
- not a cure
- re-applied annually

Replacement

- tulip-poplar, linden, katsura, zelkova, ash, catalpa, Turkish filbert

# Pine Wilt

Caused by pine-wood nematode (*Bursaphelenchus*) vectored by pine sawyer beetles (*Monochamus* sp.)

Native to North America and spreading to non-native hosts

Affected trees wilt, turn brown, and die in as little as 3 weeks.

Scotch Pine (*Pinus sylvestris*)

Austrian Pine (*P. nigra*)

Mugo Pine (*P. mugo*)

5-needled pines
moderately susceptible

Native western pines
resistant

# White-spotted pine sawyer


# Pine Wilt Management

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Early tree removal

Do not keep firewood from infected trees

Chip or burn

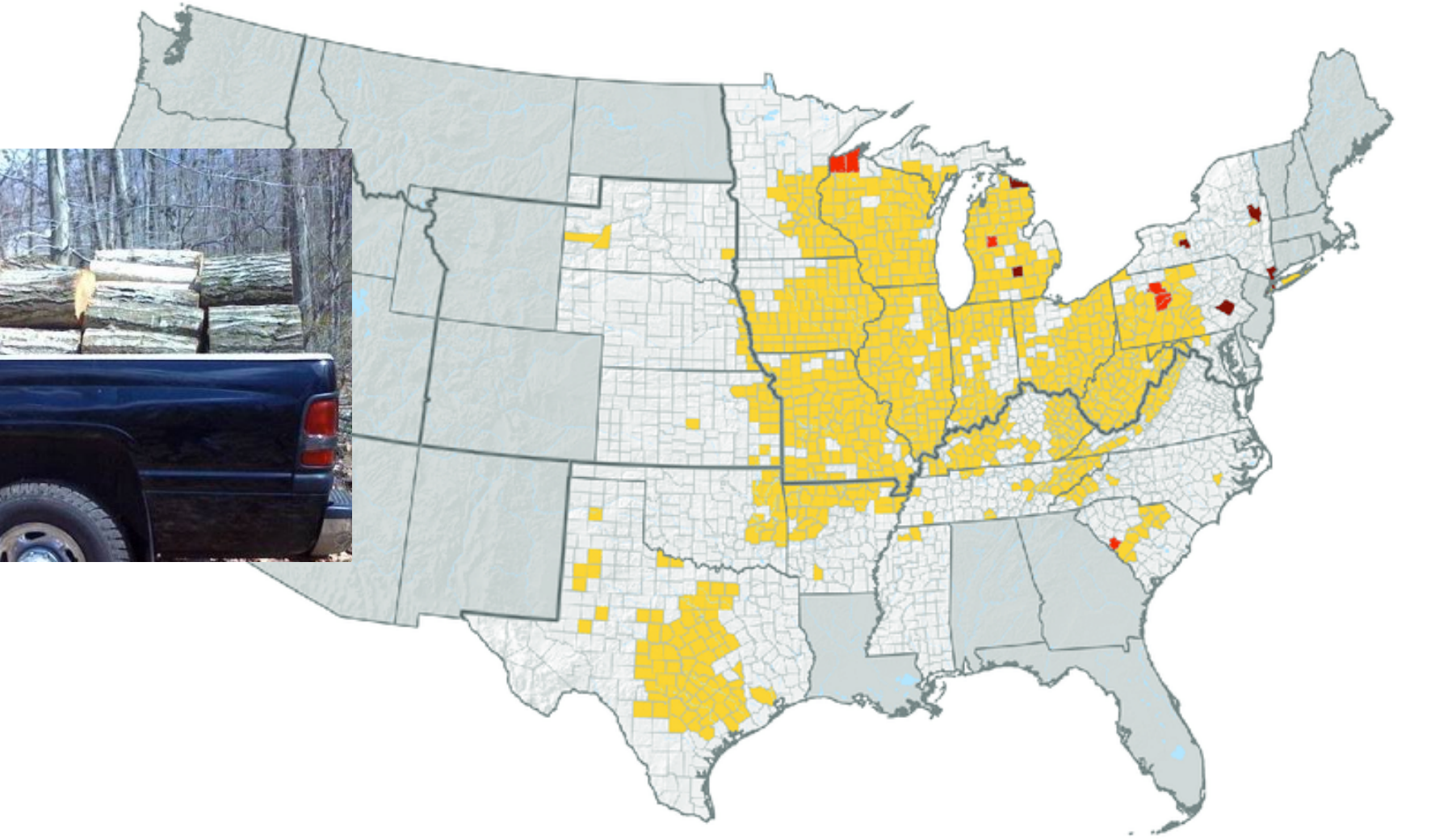
Abamectin injections (by a professional) as preventive against pine sawyer

# Oak Wilt

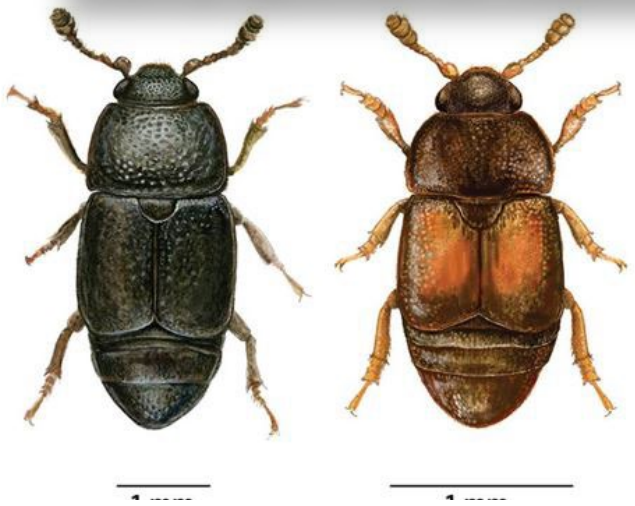
Caused by a fungus - *Bretziella fagacearum*

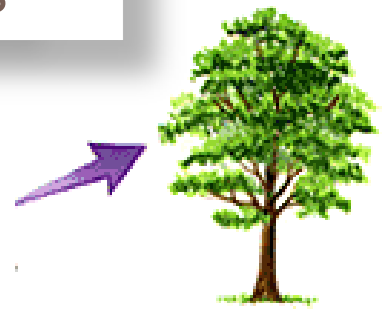
Affects almost all oak species, but especially red oaks

# Oak Wilt Distribution



Species of sap beetles feed on fungal mats or oak bark beetles carry spores to healthy trees

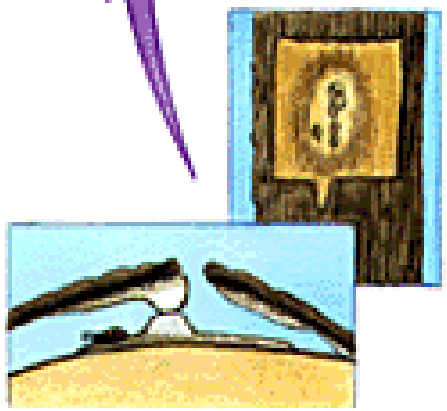




If spores land on wounds, they germinate and spread through xylem

Tree wilts, wood stains, and tree dies

Fungal mats form



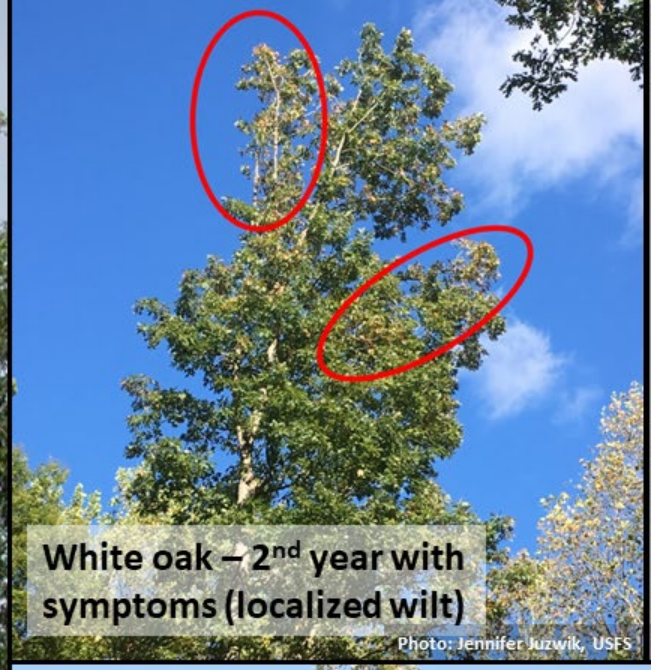
Bronzing of leaves progresses to center

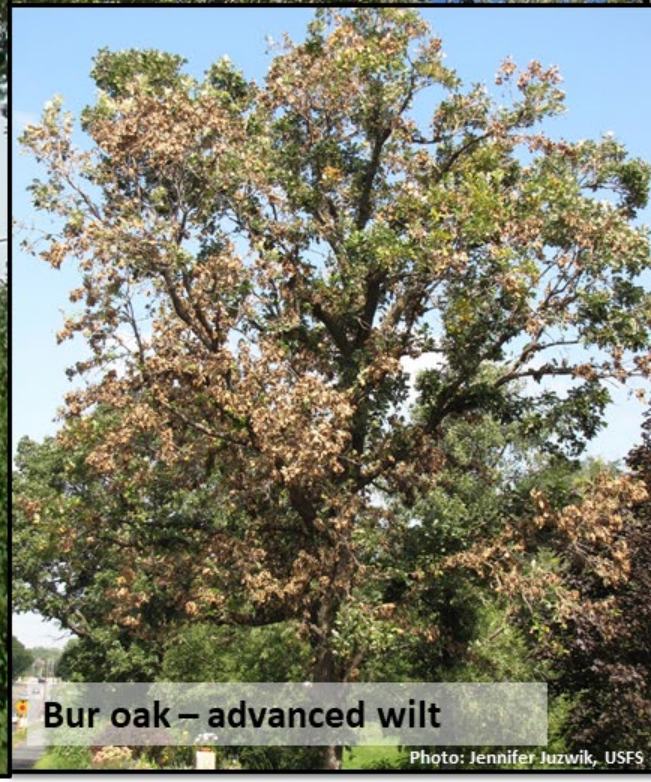
Base of leaf remains green



Dead branches start at top of tree (red oak) or scattered (white oak)

Red oaks die in one year; white oaks over several

Wood staining similar to verticillium wilt

Mats of mycelium appear on dying trees

Vertical cracks in the bark may indicate of a mat underneath


Opening a “window” to reveal an oak wilt mat underneath a bark crack


Leaf scorch


Anthracnose


Leaf blister

# Beech Leaf Disease

Caused by a newly-named **nematode**, *Litylenchus crenatae* subsp. *mccannii*

The disease and nematode may be associated with a fungus and 4 bacterial species

Affects all beech species

First noticed in Ohio in 2012; causal agent named in 2019

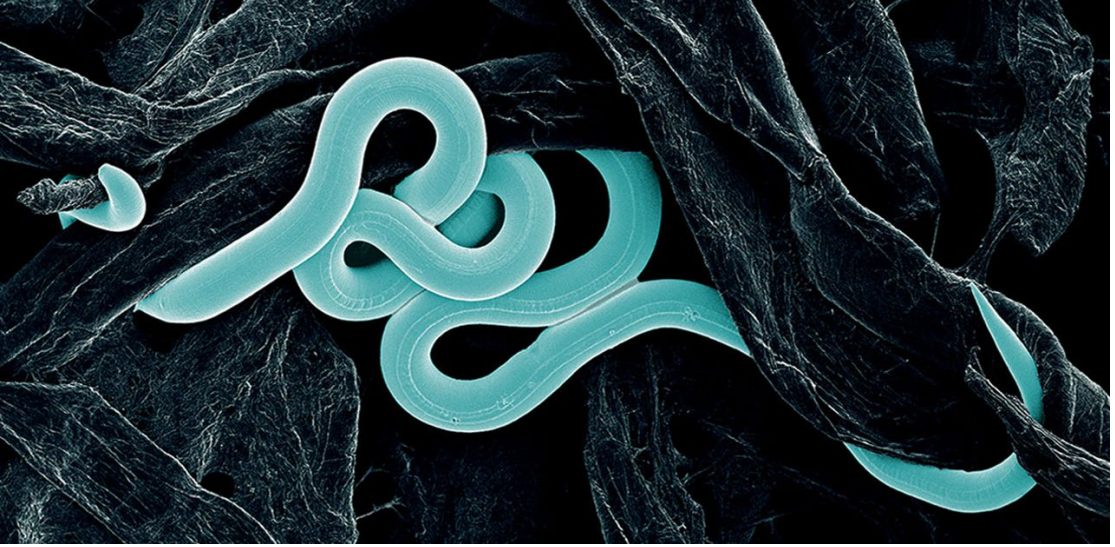
Nematodes live inside buds in winter

In spring, leaves emerge fully symptomatic, but no nematodes found in leaves;

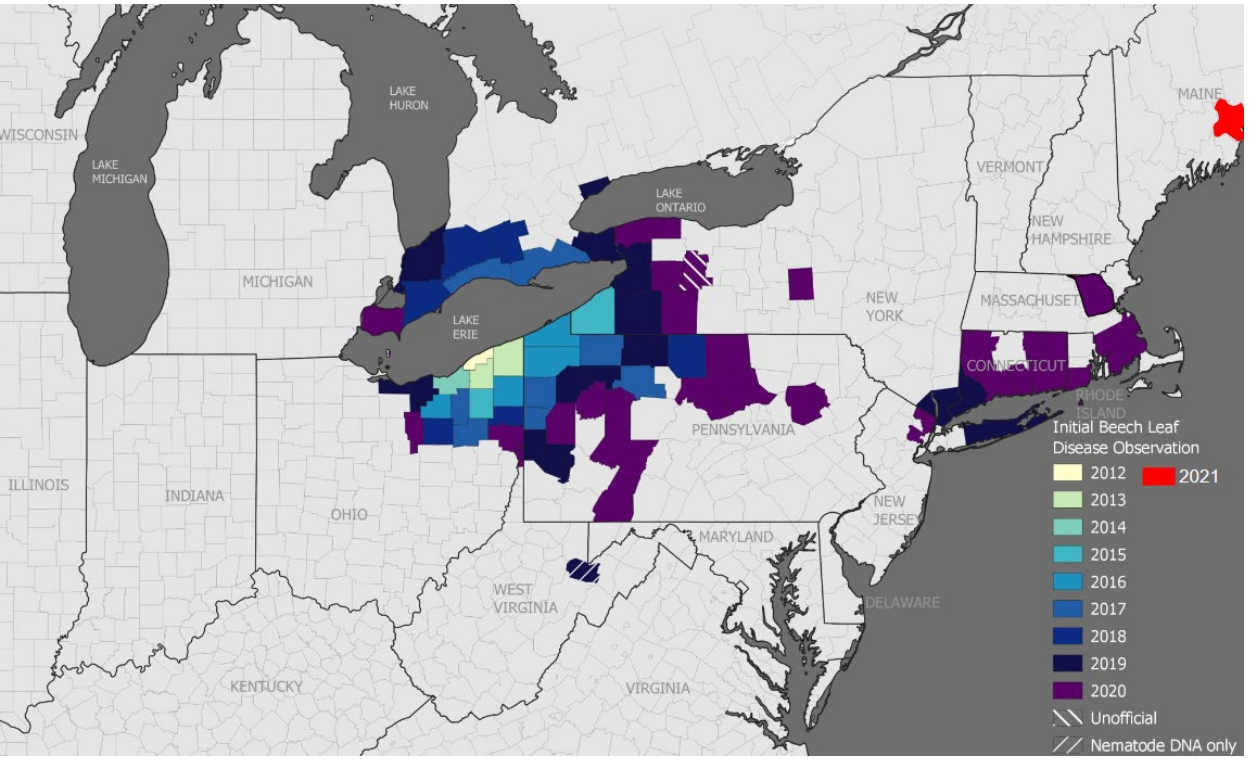
- DNA IS found in leaves; eggs?

By July, nematodes can be found

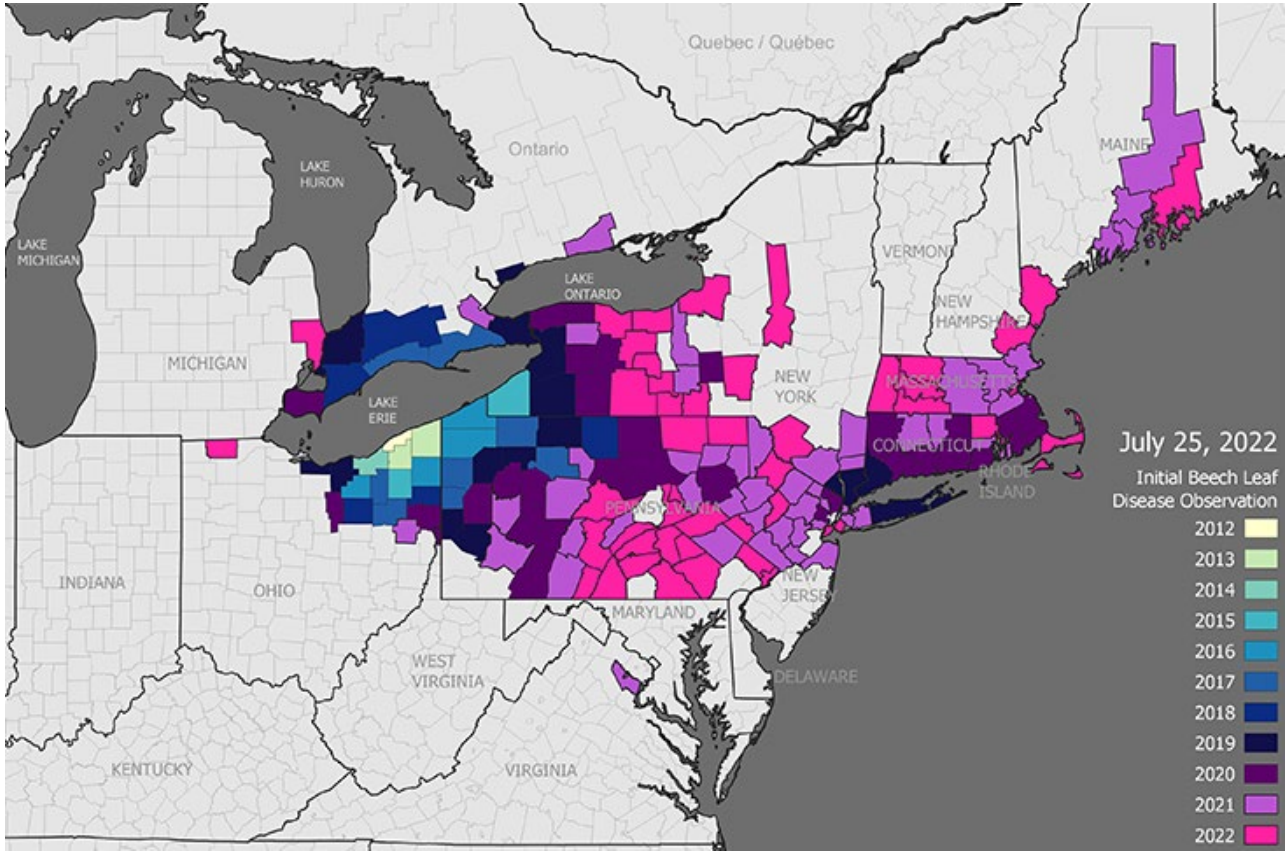
Spread is unknown – water splash, birds, insects



# 2021




# July, 2022




Woolly beech aphid


Eriophyid Mite


Anthracnose

# Emerging Diseases Present in Utah

# Identifying Foliar Diseases on Conifers

Foliar diseases can affect healthy as well as stressed trees

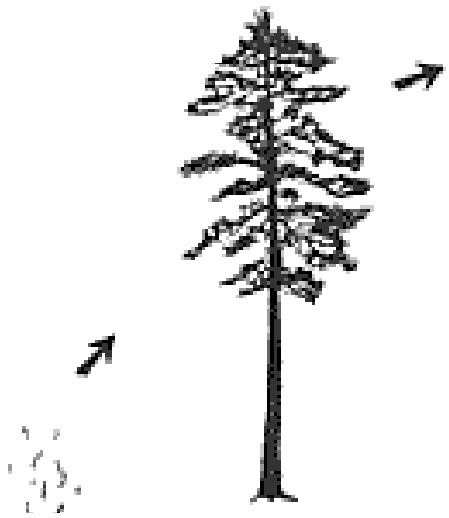
- dense plantings and young vigorous trees
- wet conditions (valleys, streams, drainages)

Can be confused with

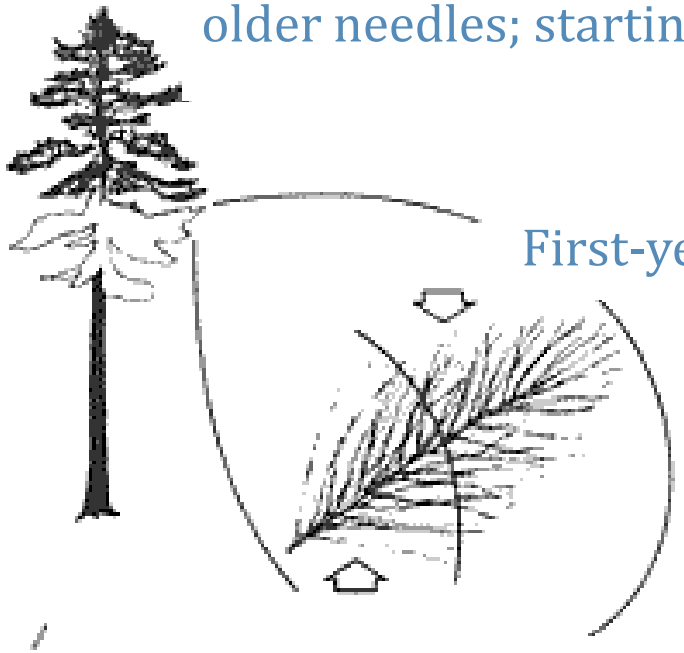
- winter desiccation
- scorch
- other environmental causes

# Conifer Foliage Disease Life Cycle

Newly infected needles remain green.



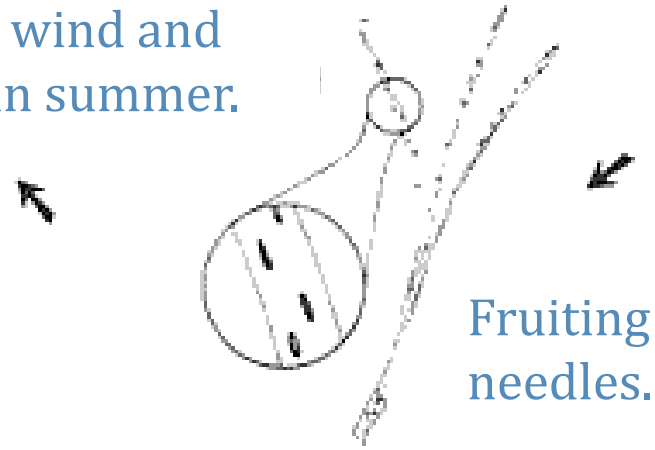
Symptoms appear the following spring on older needles; starting with lower branches.



First-year needles are green.

Second-year needles are brown.

Spores disseminated by wind and rain to healthy needles in summer.



Fruiting bodies form on dead and dying needles.

# Pine Needle Cast

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*Lophodermella* spp.

lodgepole, ponderosa

# Rhizosphaera Needlecast

*Rhizosphaera kalkhoffii*

Spruces

Older needles brown to purple in spring, eventually dropping in late summer

Symptoms more severe on lower branches

# SNEED

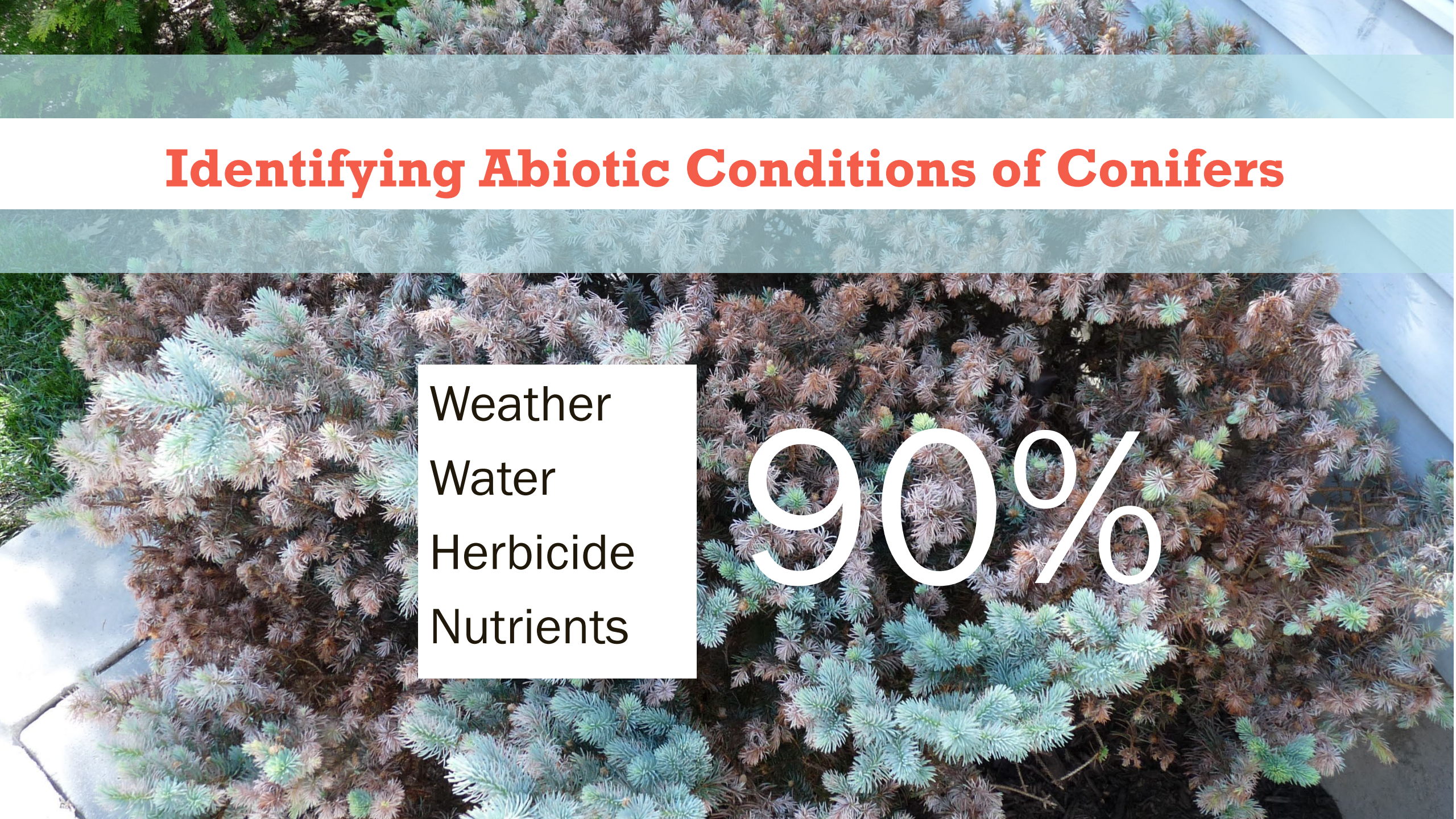
"Sudden/Spruce needle drop"

*Setomelanomma holmii* found on twigs; not widely accepted as causal agent

Older needles turn yellow, brown, and then drop over the summer

Trees already stressed

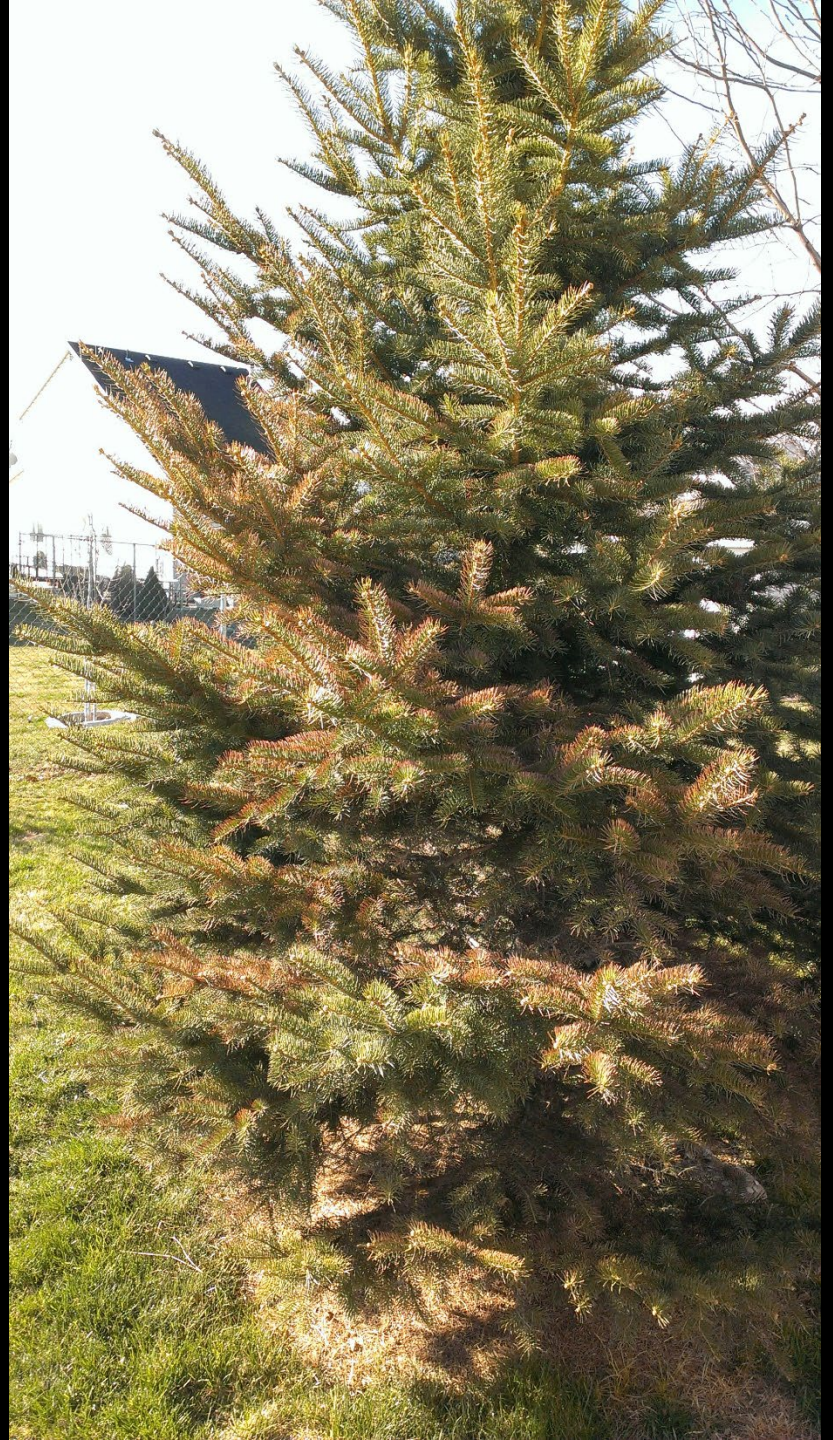
# Identifying Abiotic Conditions of Conifers



# Abiotic Injury

Winter desiccation

Summer scorch



# Abiotic Injury

Freeze damage

# Thousand Cankers

Fungal disease (*Geosmithia*) vectored by walnut twig beetle

Arizona walnut is native host

- theorized that beetles moved to black and other walnut species

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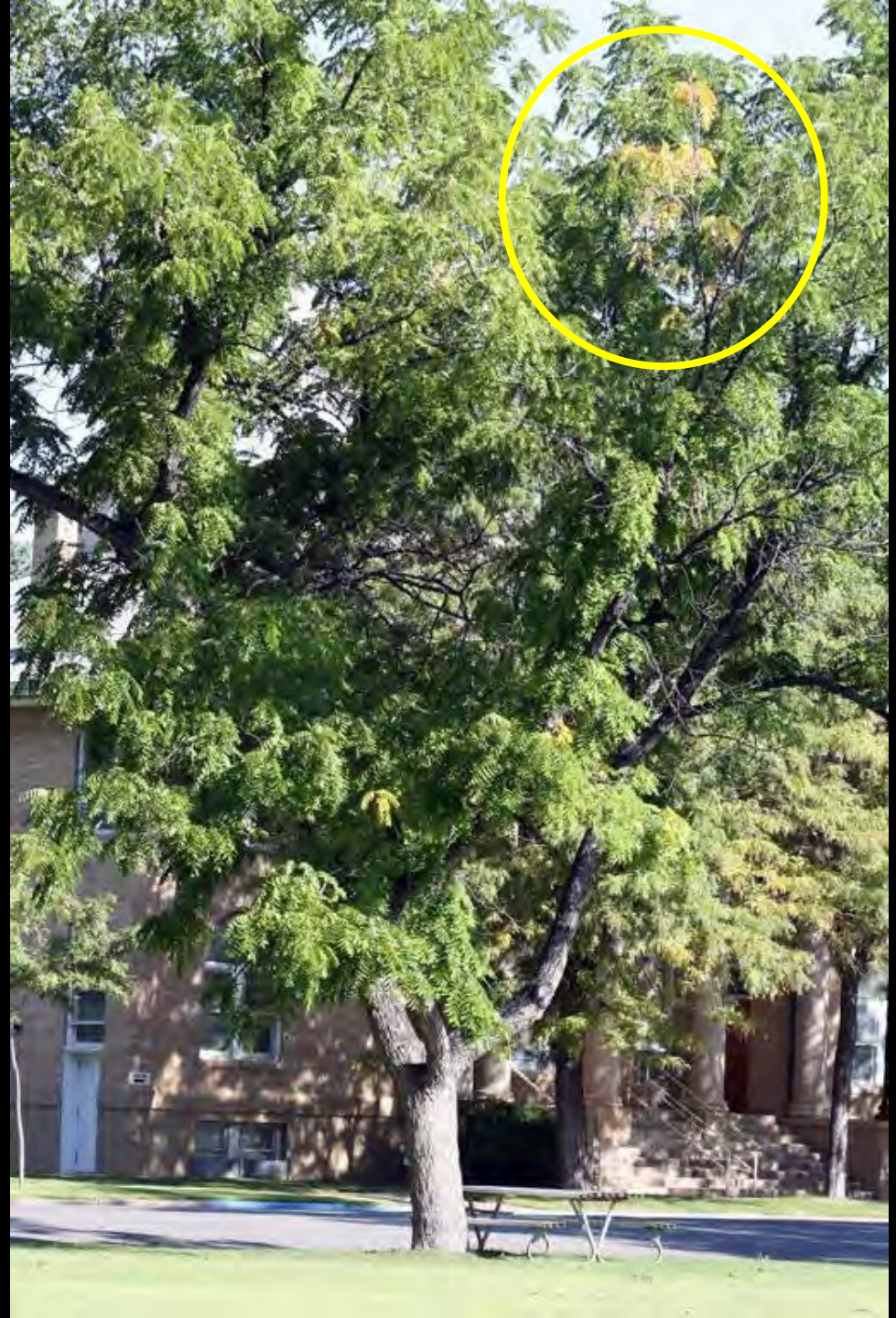
# Walnut twig beetle

# Cankers



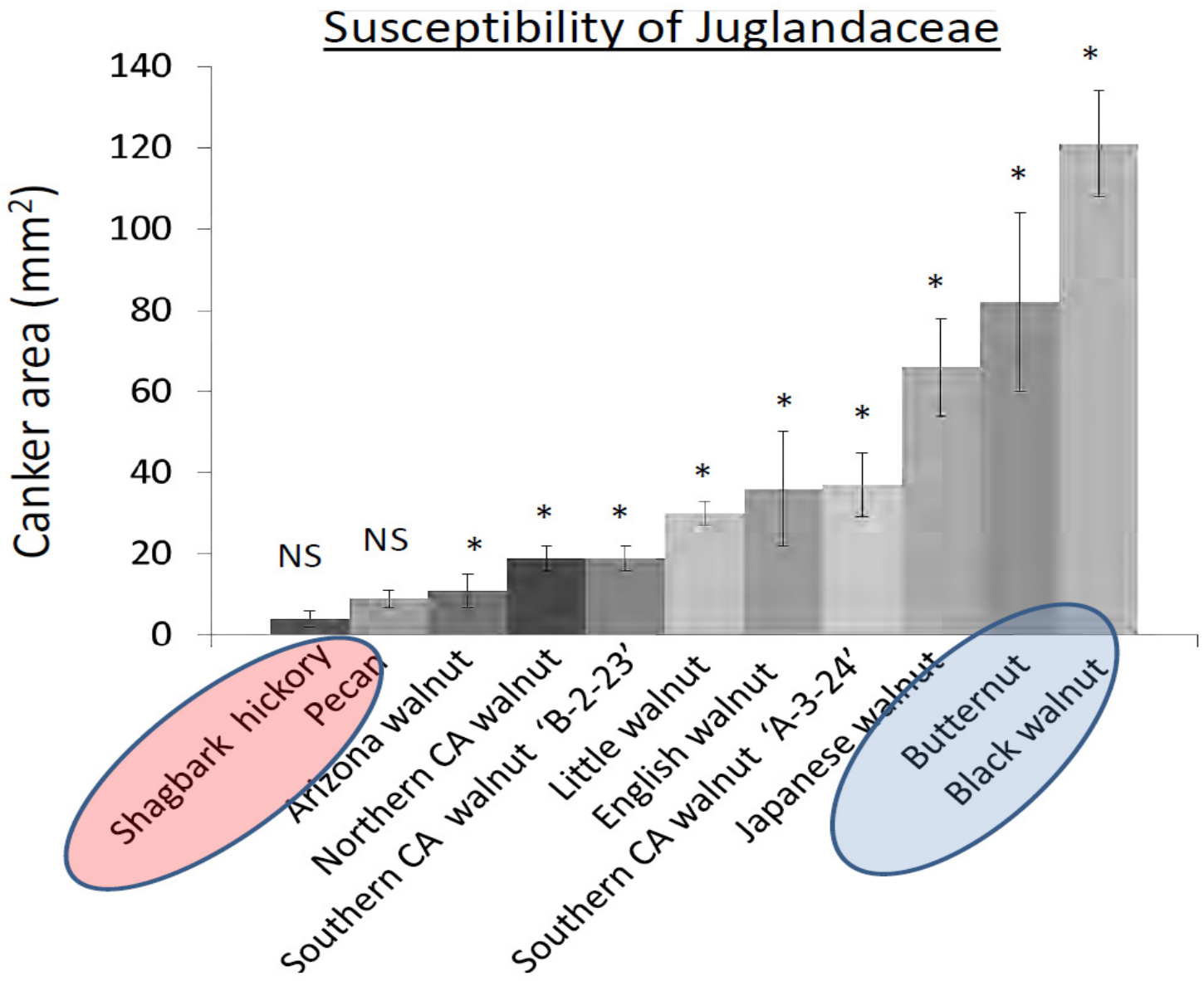

356

## Susceptible:

- Black walnut
- Butternut
- Japanese walnut
- Persian/English walnut
- Texas (Little) walnut (*Juglans microcarpa*)
- Wingnut (*Pterocarya* spp.)

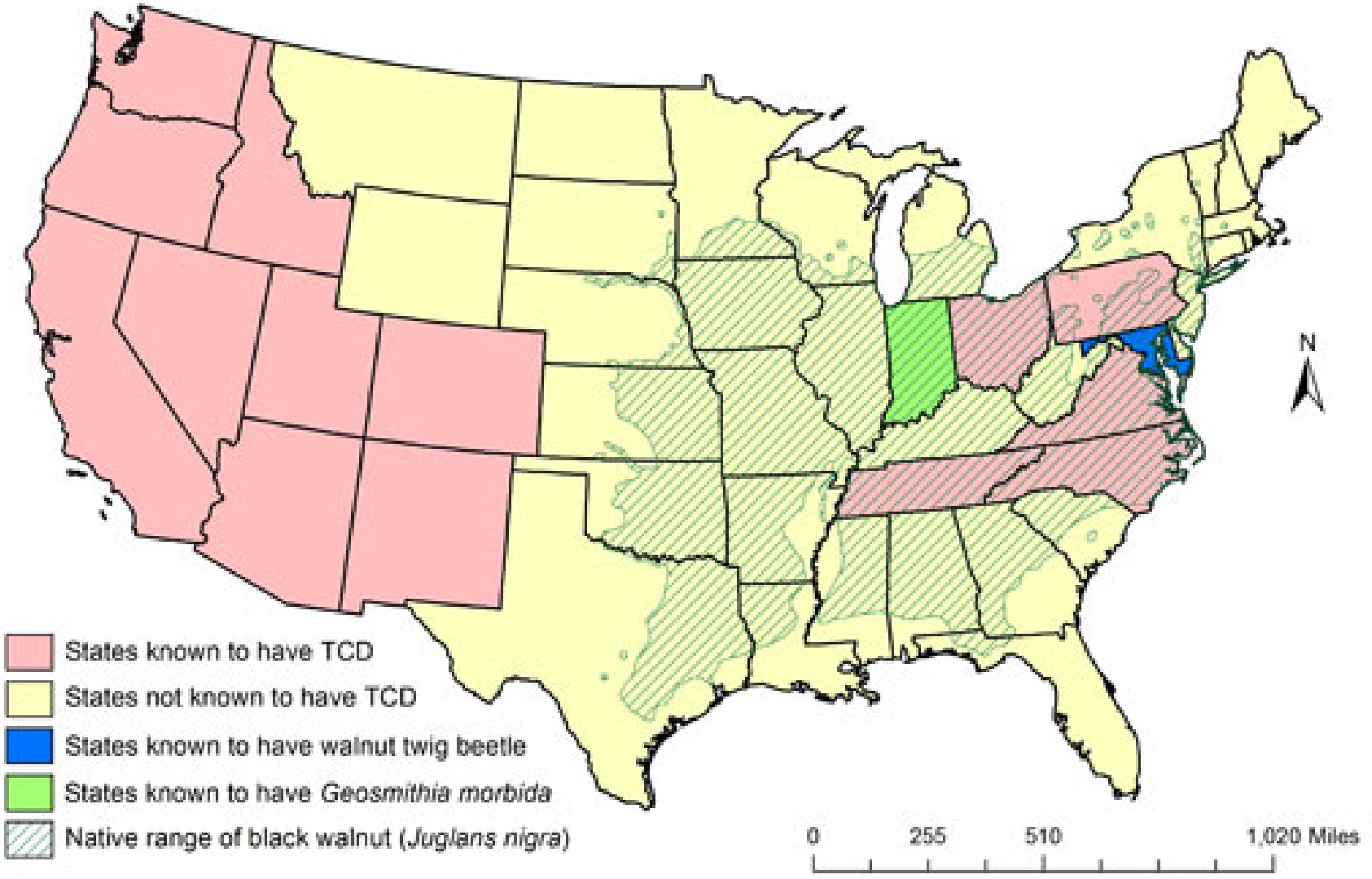
## Not Susceptible:

- Pecan
- Hickory




Curtis Utley, et al. 2013. Susceptibility of Walnut and Hickory Species to *Geosmithia morbida* Plant Disease 97:5, 601-607

# Native Range of Black Walnut
# & States Known to Have Thousand Cankers Disease (TCD)




Europe: Italy is known to have TCD.

# Thousand Cankers Management

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Prevention of spread:

- remove infected trees
- do not move untreated walnut lumber
- chip wood to prevent beetle spread

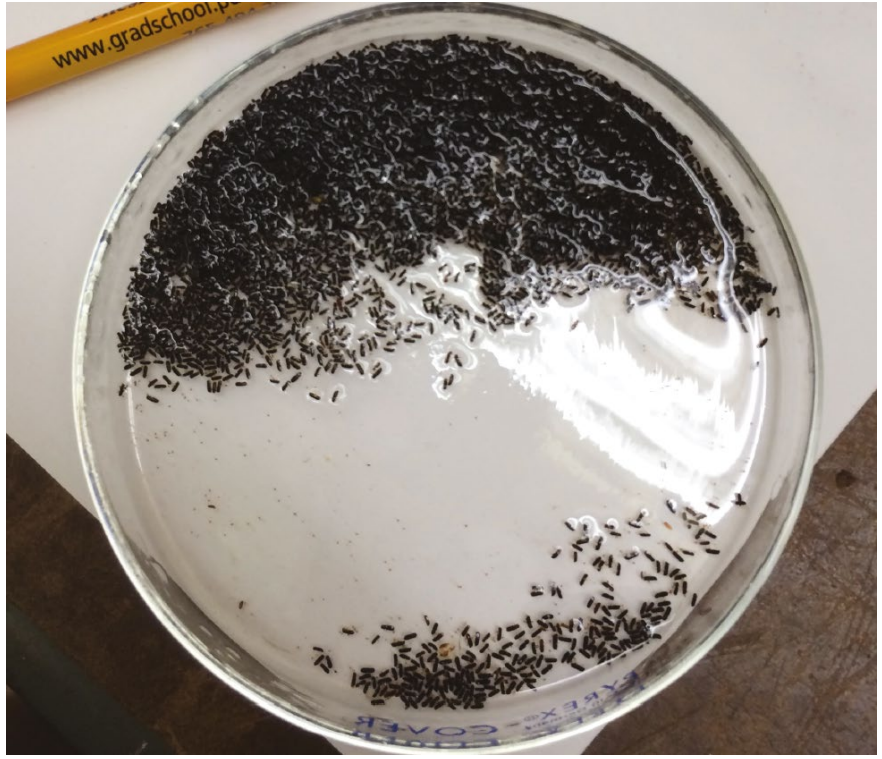
Injection of emamectin benzoate and propiconazole (several brands of both)

Trunk sprays not effective

## Washington black walnut orchard

Single or double rate of emamectin benzoate (Tree-age G4) was more effective than when combined with propiconazole (Propizol)

Found phytotoxicity with Propizol use




# Summary

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## Diseases not present in Utah

Bacterial scorch – high chance of seeing

Pine wilt – moderate chance of seeing

Oak wilt – low chance of seeing

Beech leaf disease – low chance of seeing

## Diseases present in Utah

Foliar issues on conifers – most are abiotic issues; look for fruiting bodies on needles

Thousand cankers – getting worse

# Unsure of Identification?

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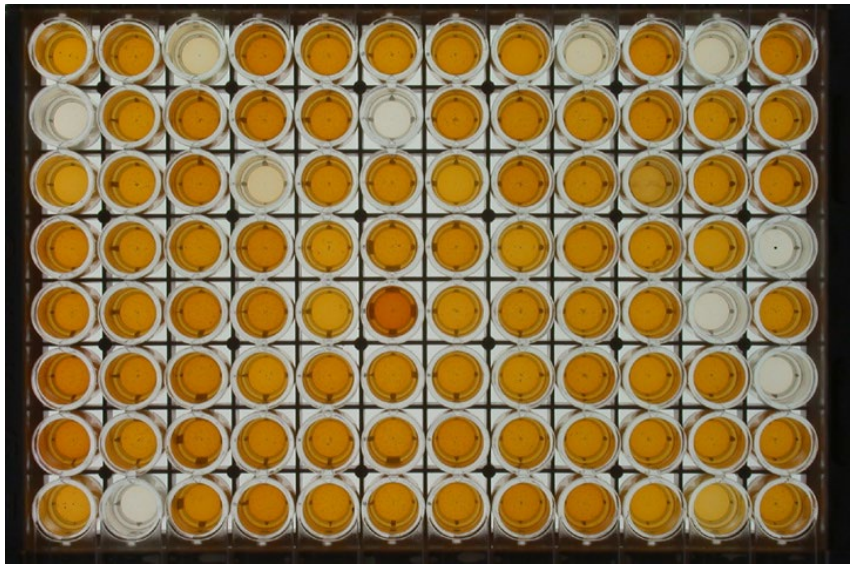
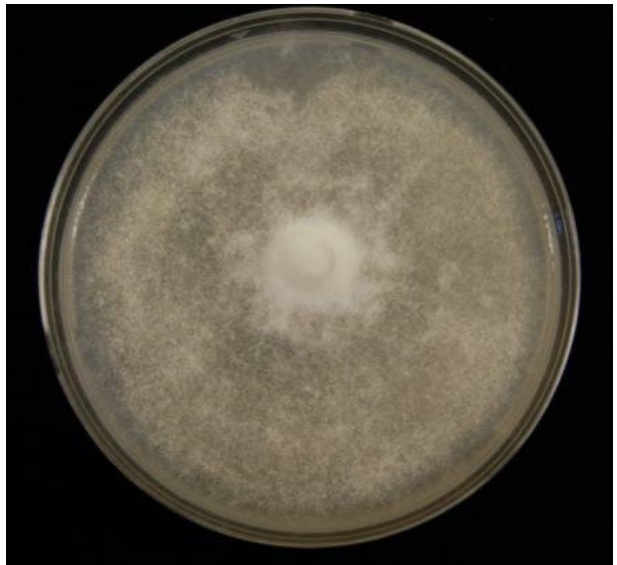
Send samples to your county Extension office, or to the Utah Plant Pest Diagnostic Lab (UPPDL) in Logan:

utahpests.usu.edu/uppdl





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