

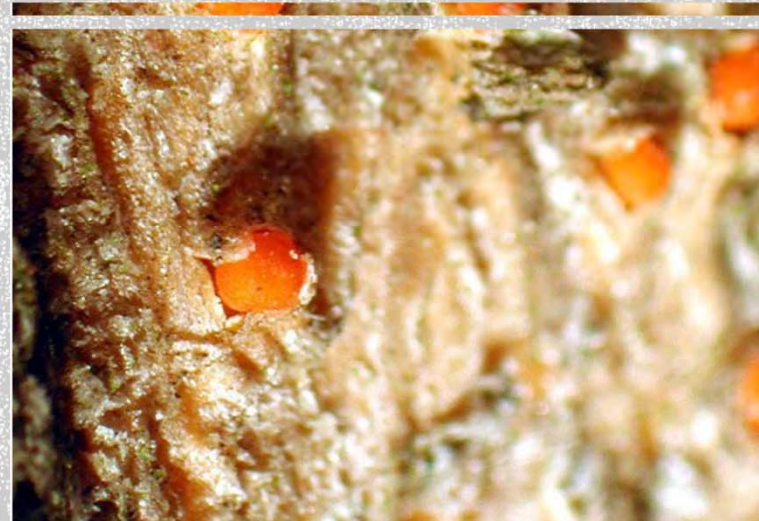


# CANKER DISEASES OF LANDSCAPE TREES

Marion Murray



Utah State  
University  
IPM Program



EXTENSION   
UtahStateUniversity™

## General Canker Info

## General Canker Management

Cytospora

Bacterial Canker

Hypoxylon Canker

Thousand Cankers Disease

A few miscellaneous cankers

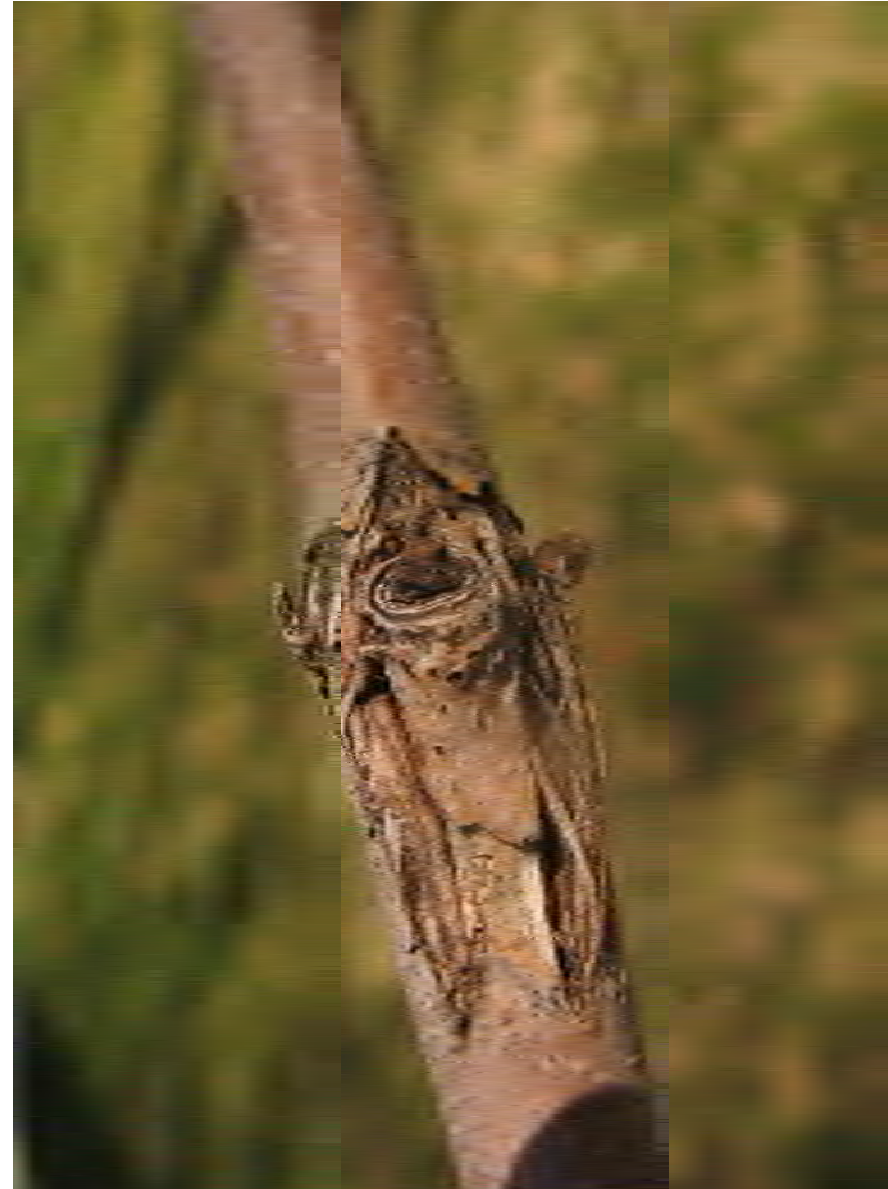
Look-alikes

# CANKERS

Pathogen (fungus or bacteria) grows  
in bark and cambium

Localized necrosis

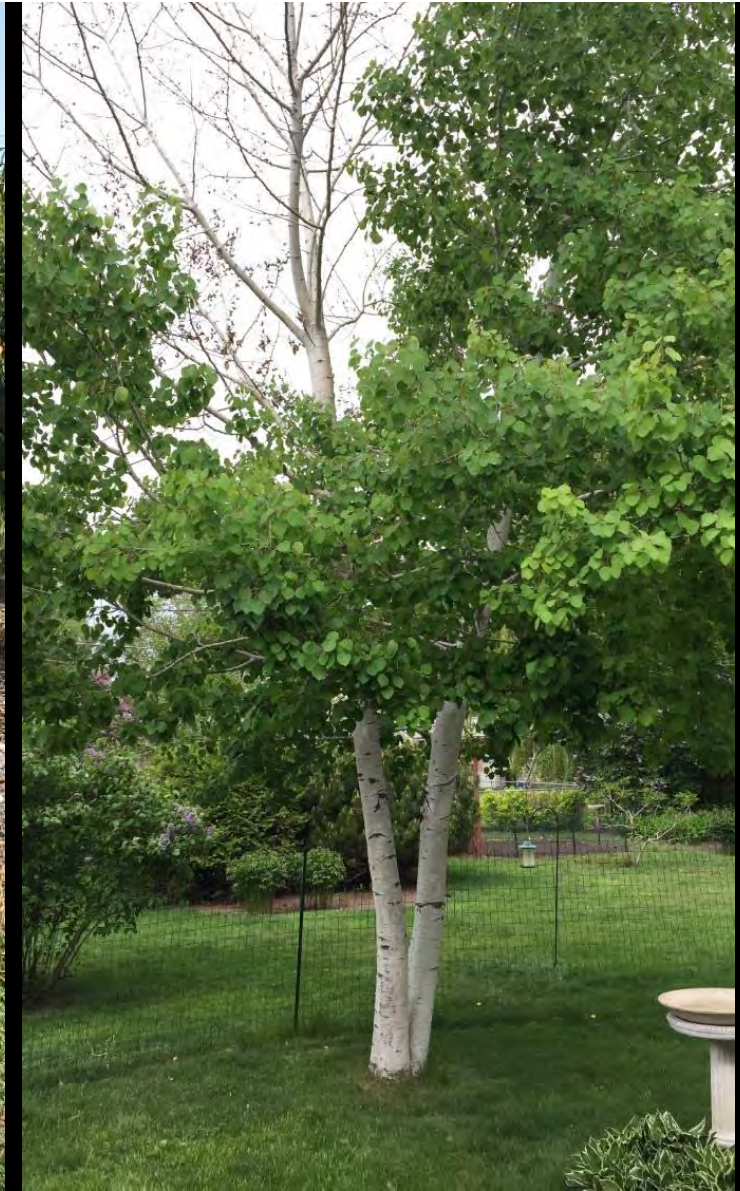
Variable in disease severity



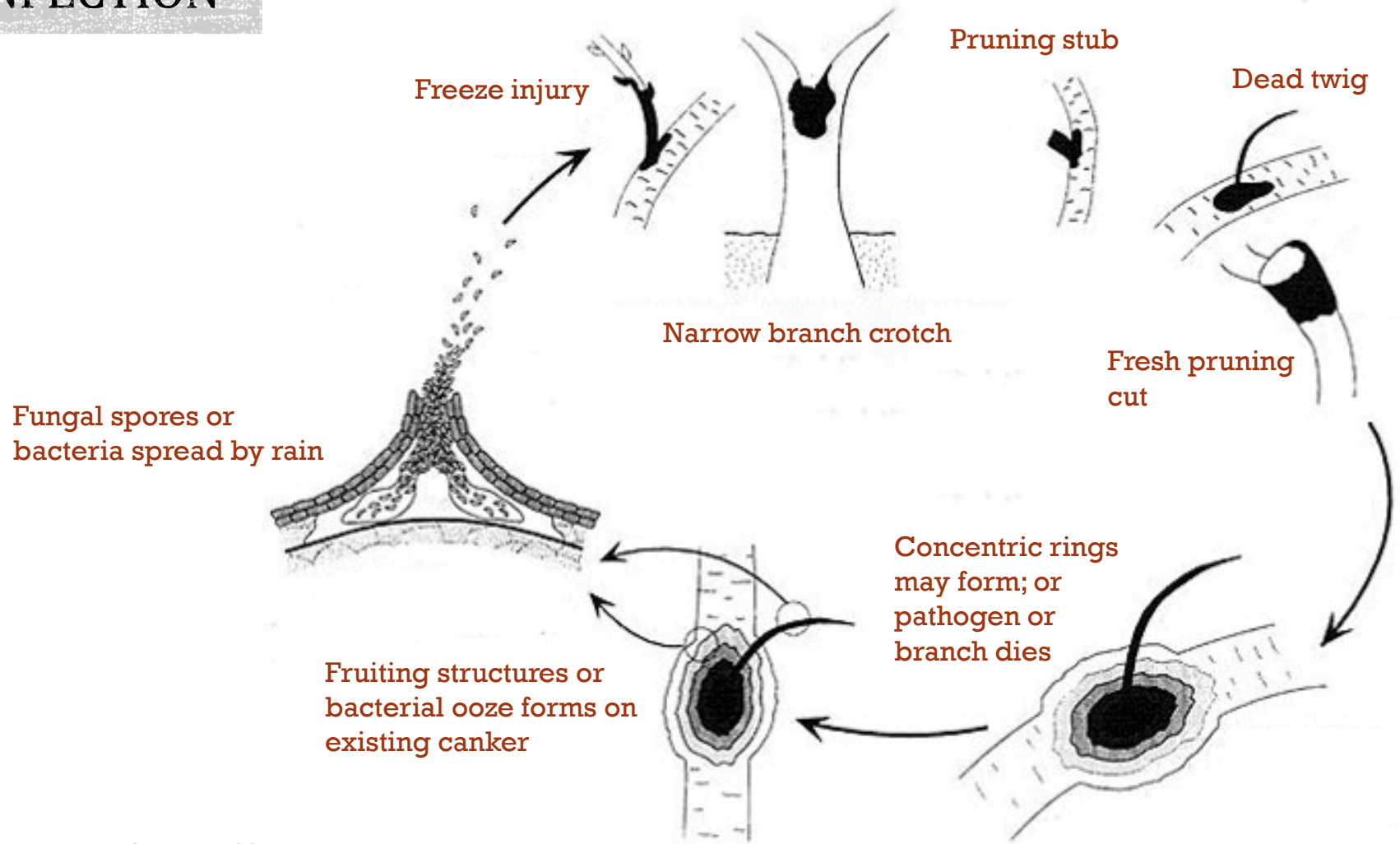








# CANKER INFECTION



Biggs & Grove, Leucostoma Canker of Stone Fruits Disease Cycle; APS



# TYPES OF CANKERS

Annual cankers

Perennial Target cankers

Perennial Diffuse cankers

# ANNUAL CANKERS

Pathogen is active for only one season, then dies

Stressed or injured trees can get multiple cankers

Little impact on tree growth

Penn State Department of Plant Pathology & Environmental Microbiology  
Archives, Penn State University, Bugwood.org

*Fusarium* canker on birch



# PERENNIAL TARGET CANKERS

Balanced  
interaction of  
fungus and  
host

Pathogen  
grows when  
tree is  
dormant



<https://twitter.com/HereBeSpiders11>



# PERENNIAL DIFFUSE CANKERS

Often opportunistic fungi that can survive as saprophyte

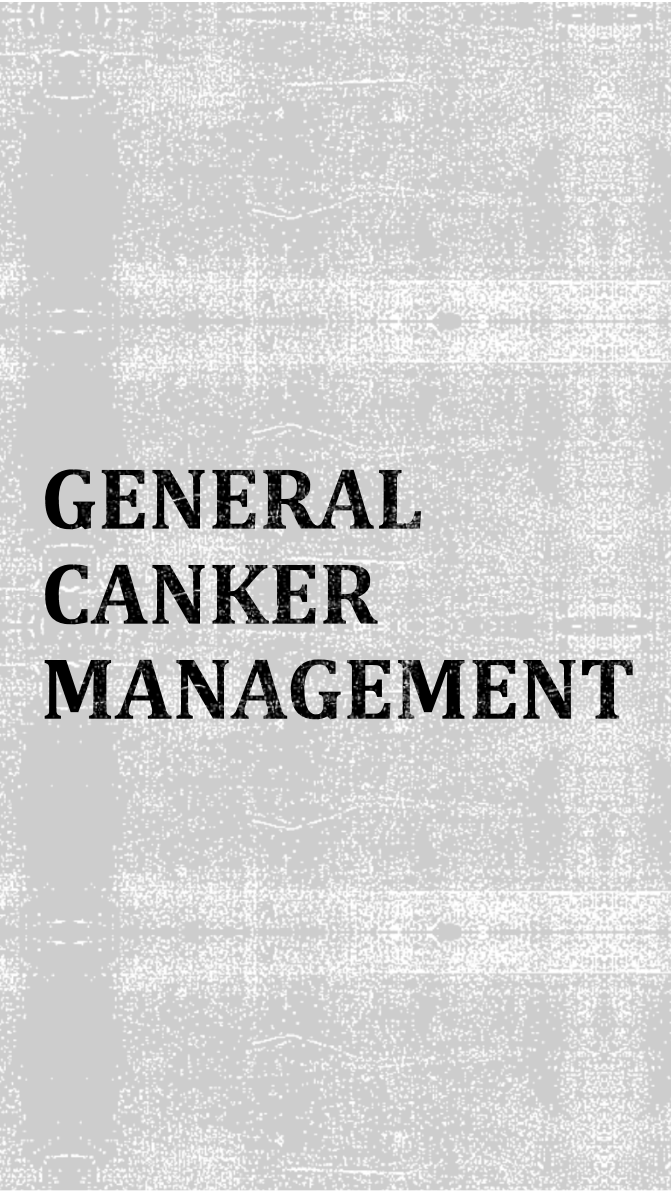
Can become aggressive pathogens

Host unable to respond or produce a callus wall

Expands during the growing season

George Hudler, Cornell University, Bugwood.org





# GENERAL CANKER MANAGEMENT

Sanitation – remove existing cankers

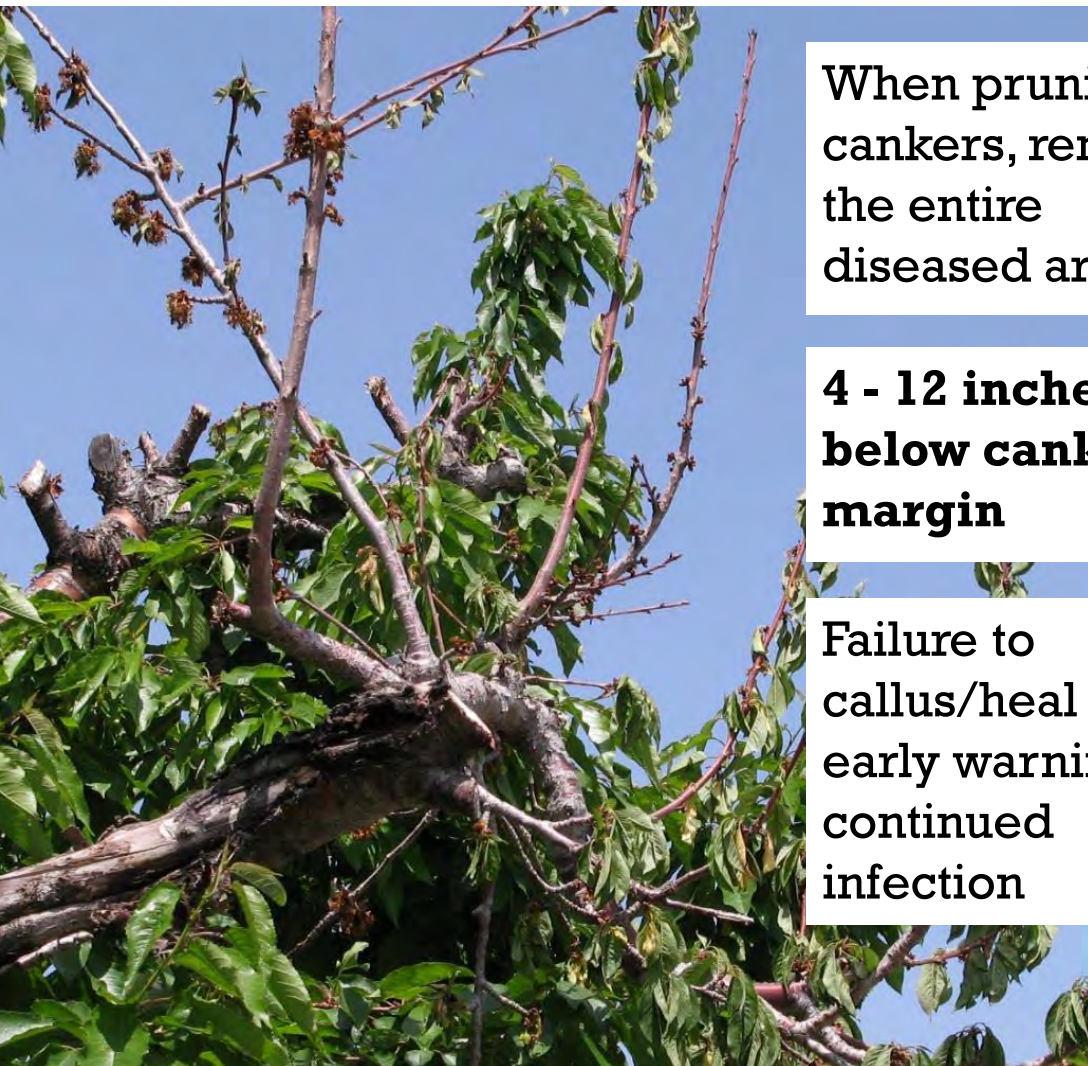
Proper pruning practices

Improve tree vigor

Trees stressed by drought or nutrient deficiencies more susceptible

Fungicides?

# CANKER MANAGEMENT - SANITATION



When pruning out cankers, remove the entire diseased area

**4 - 12 inches below canker margin**

Failure to callus/heal = early warning of continued infection

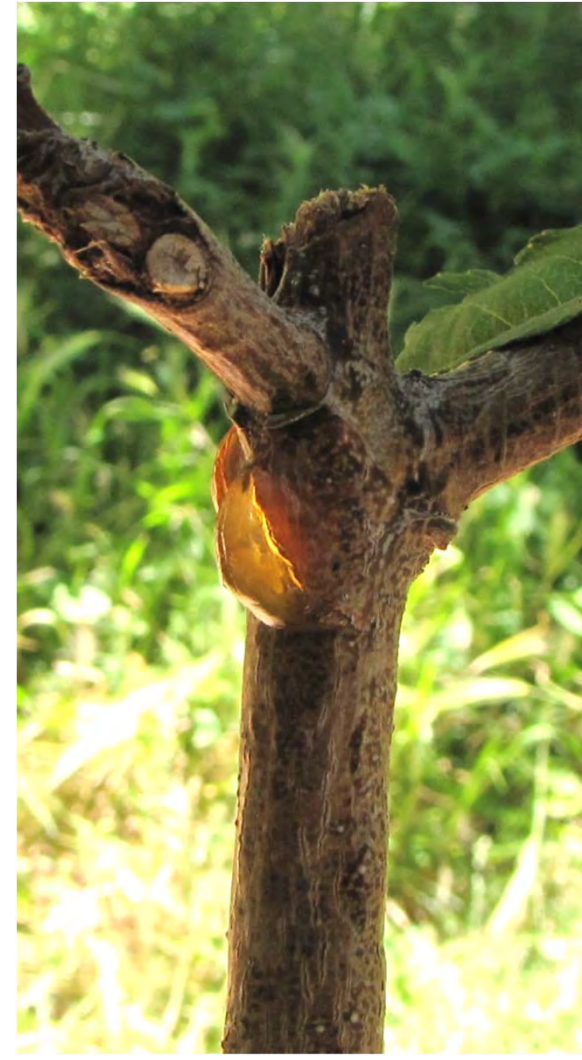




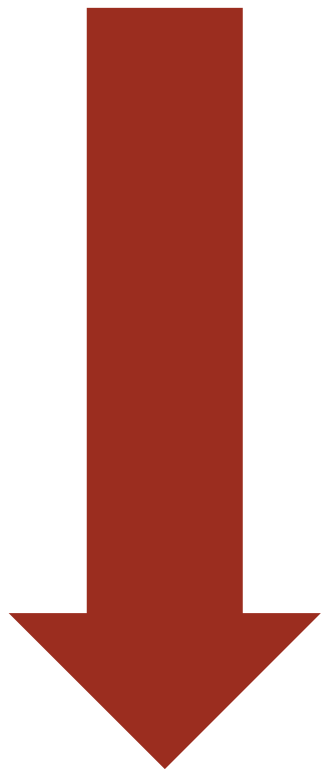




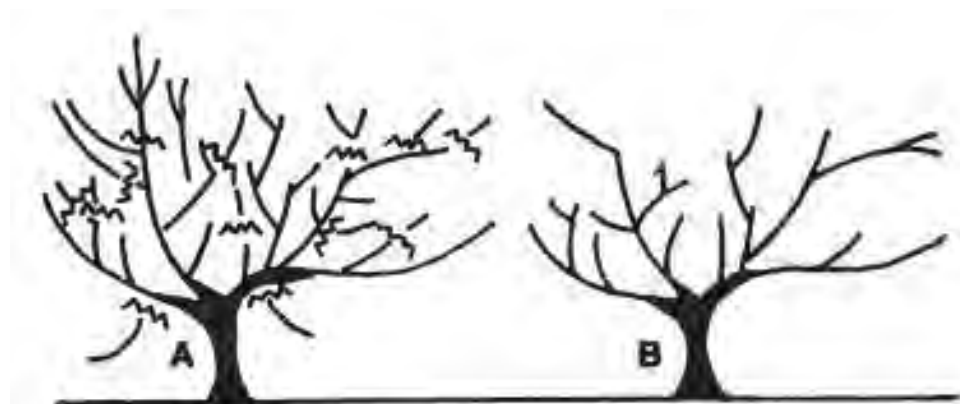
# CANKER MANAGEMENT - PROPER PRUNING



# CANKER MANAGEMENT - PROPER PRUNING



50%









# CANKER MGMT – SANITATION AND PRUNING SUMMARY

Remove diseased limbs 4 - 12 inches below margin of canker

Disinfect between cuts during growing season pruning of annual or diffuse canker types

Proper pruning can result in 50% fewer cankers

Make clean cuts and angle flat cuts

Prune non-hardy trees after threat of severe cold temps

Do not prune in wet weather



# CANKER MANAGEMENT – DIRECT TREATMENT



# FUNGICIDES?

Few injectable fungicide labeled for a variety of canker diseases

Fungisol (Mauget)

Future directions – stimulating tree resistance

Phosphorus acids (ArborFos, Whippet, etc.)

Plant activators - ActiGard 50 WG

Labeled for fire blight cankers



# CYTOSPORA

Over 500 different species of Cytospora

Over 60 trees and shrub hosts



CYTOSPORA ON *POPULUS* SPP.



# CYTOSPORA ON SPRUCE



# CYTOSPORA ON SPRUCE

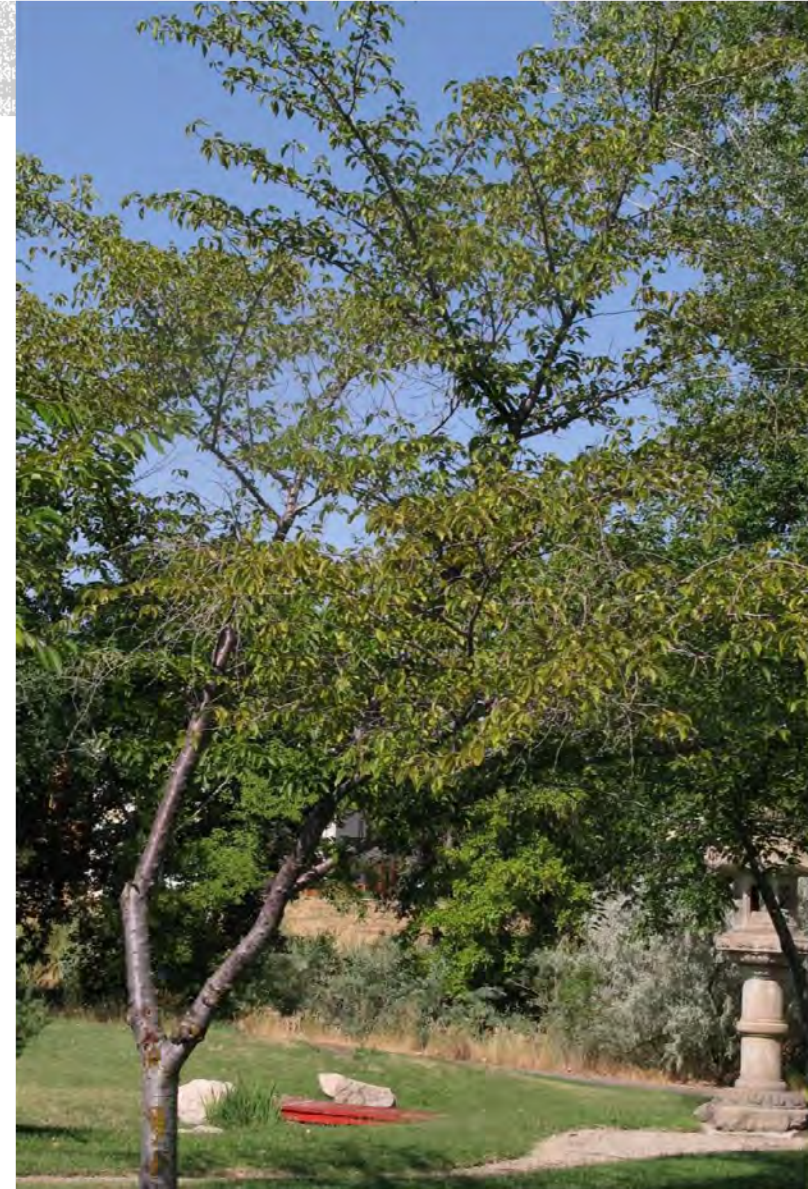


University of Arkansas Plant Health Clinic

# CYTOSPORA ON *PRUNUS* SPP.

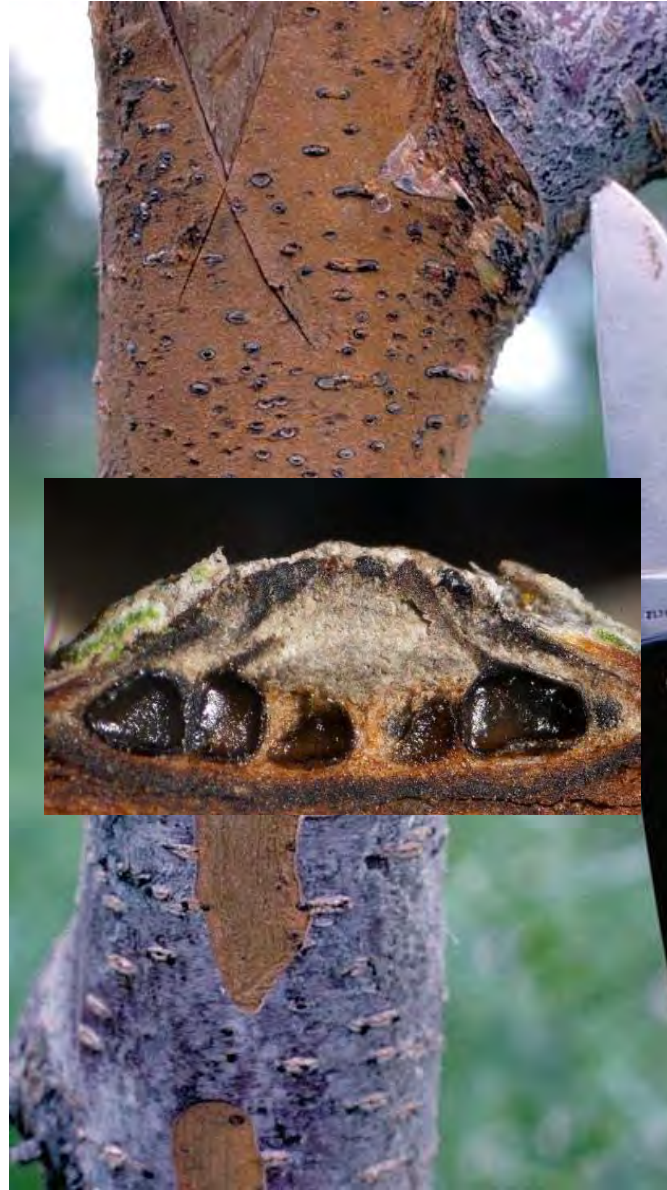


# CYTOSPORA ON *PRUNUS* SPP.



Survives for many years on  
dead bark as **pycnidia**

Spores may be released year-  
round



# CYTOSPORA MANAGEMENT

Sanitation

Good pruning practices

Maintain tree health with optimal watering and fertilization

Fungicides?



# CYTOSPORA MANAGEMENT, PEACH/NECTARINE

Research from Colorado State University, Dr. Jane Stewart and colleagues

**GOAL: Reduce cytospora population and prevent further spread**

**Paint trunks with 50% - 80% white latex paint plus **Captan or Topsin** – at planting; repeat at least 3 years**



# FUNGICIDE - SPRAYING EXISTING CANKERS

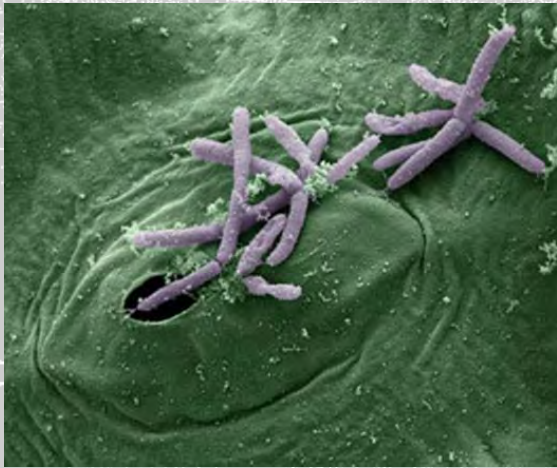
50% - 80%  
white latex  
paint mixed  
with Captan or  
Topsin

OR

Surround  
mixed with  
lime sulfur



# BACTERIAL CANKER



James Kremer and Sheng Yang He  
via Howard Hughes Medical Institute

*Pseudomonas syringae*

*Prunus* spp. (ornamental cherry,  
Manchurian apricot, peach, plum, etc.)

Bacteria survive as epiphyte on plant and  
other surfaces







Bacterial Canker



Cytospora



# MANAGEMENT OF BACTERIAL CANKER

Sanitation – remove existing cankers

Proper pruning practices

Improve tree vigor

trees stressed by drought or nutrient deficiencies more susceptible

**Copper applied at budbreak in spring or fall has limited effect**

# **HYPOXYLON CANKER**





# HYPOXYLON CANKER

*Biscogniauxia atropunctatum* (and other species)

Survives as endophyte in healthy trees

Research showed that of black/red oaks:

57% branches colonized

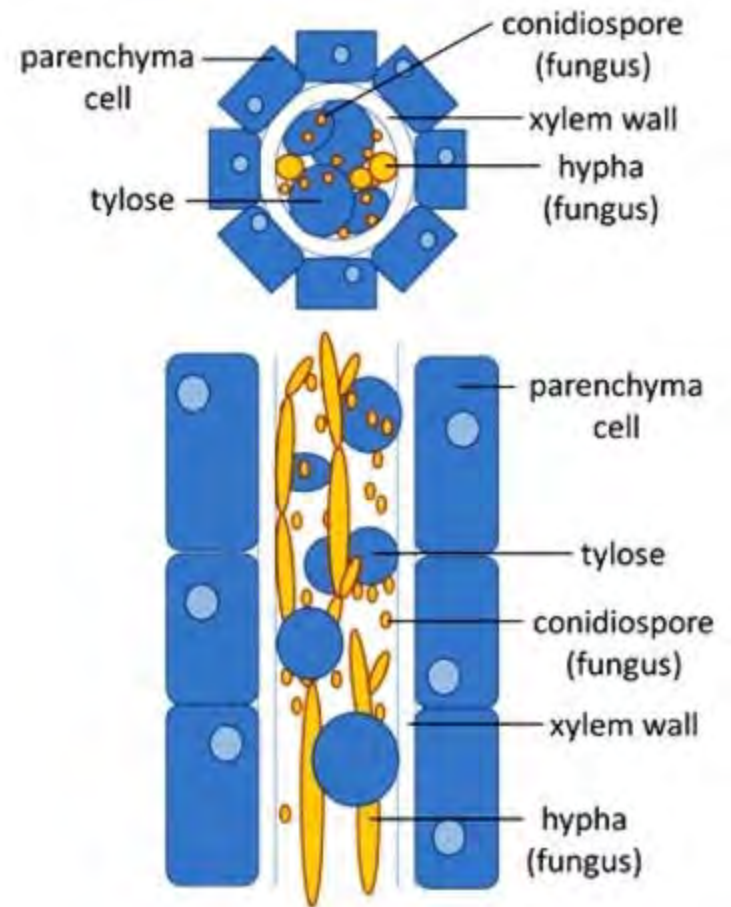
11% trunks colonized

Endophyte behavior not understood

Dormant state?

Feeding on dead cells?

Feeding on live cells?



# HYPOXYLON CANKER

**Trigger** to convert to Pathogenic stage:

Increase in gases ( $O_2$  and  $CO_2$ ) in the xylem

**drought**

stem girdling

root diseases

root loss injury

mechanical injury

Woody tissue quickly colonized and sapwood is decayed (white rot)

May take several years



Sherrie Smith, University of Arkansas Cooperative Extension



Missouri Botanical Garden



Molly Giesbrecht, Texas A&M AgriLife Extension



# HYPOXYLON CANKER

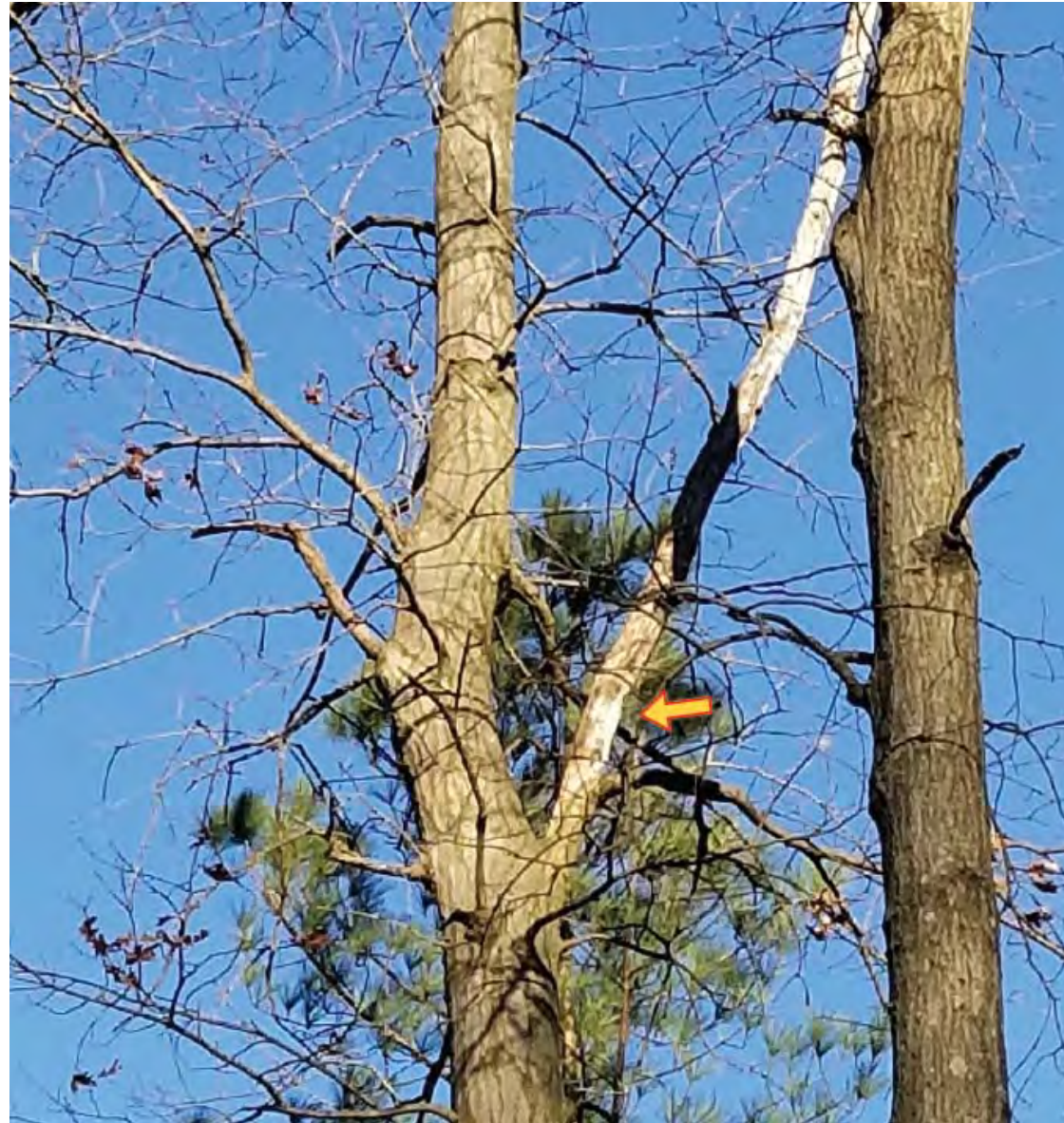
In wet weather, spores cause new infections

On healthy trees  
(endophytically)

Or as pathogen **through wounds**

Localized cankers  
Death of branches

Recovery possible through  
proper care and pruning





Southern Region Extension Forestry



Ronald Billings, Texas A&M Forest Service, Bugwood.org



Joseph O'Brien, USFS, Bugwood.org

# HYPOXYLON CANKER MANAGEMENT

**Proper site selection of newly planted trees**

**Reduce tree/drought stress**

Watering

Vertical mulching

**Disinfect saw between cuts**

8 to 12 inches below visible infection

**Remove trees with over 15% of crown affected (or with trunk cankers)**

Efficacy of removing debris, dead wood, stumps has not been determined



[airspade.com](http://airspade.com)

# THOUSAND CANKERS

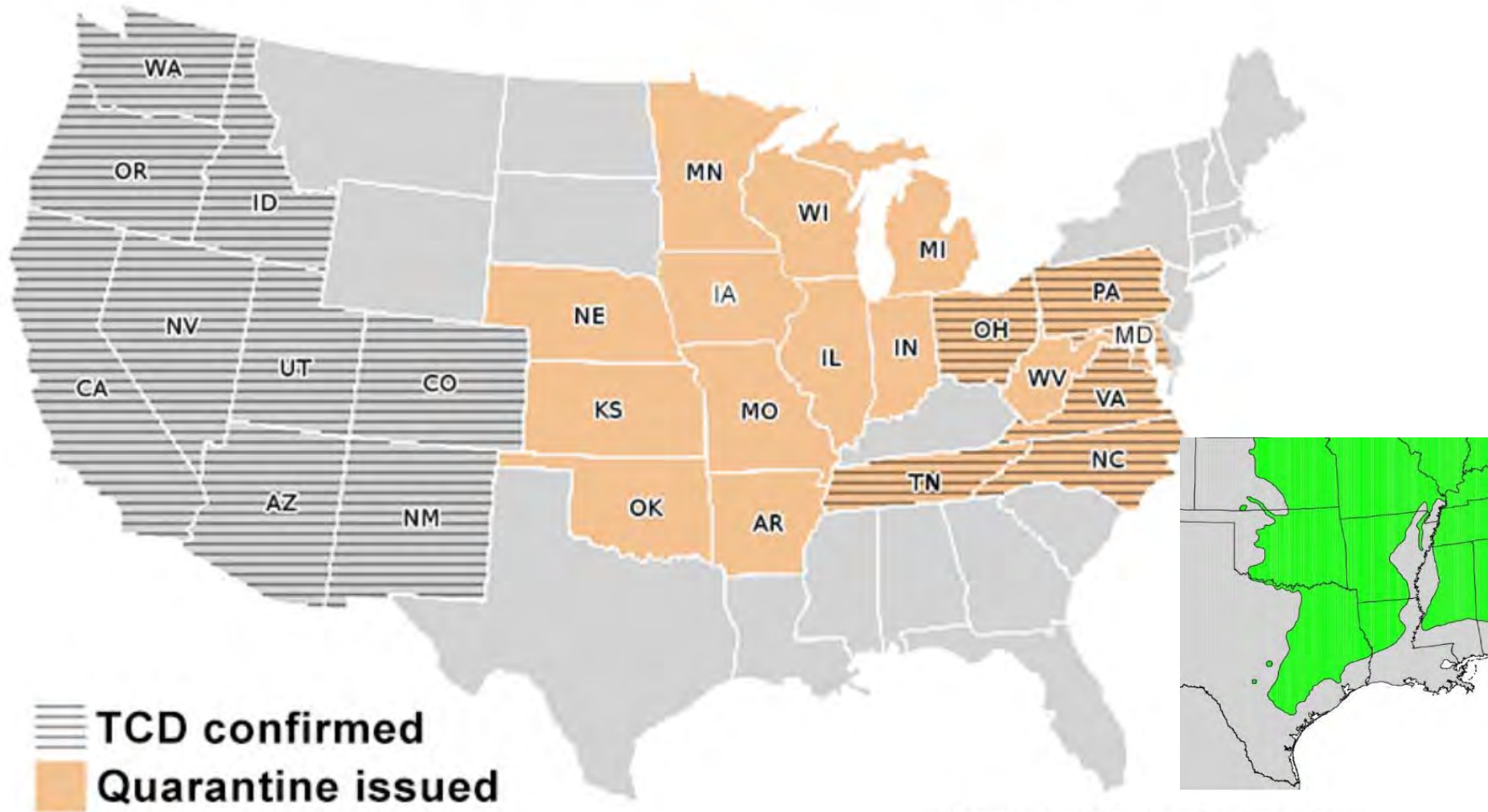
Fungal disease (*Geosmithia*) vectored by walnut twig beetle

Arizona walnut is native host

theorized that beetles recently “jumped ship” to black and other walnut species



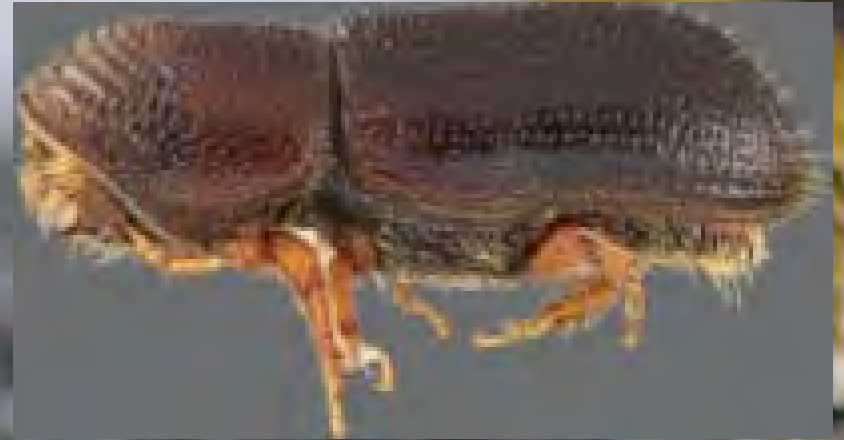
## Distribution of Thousand Cankers Disease as of August 1, 2017.



Source: [www.thousandcankers.com](http://www.thousandcankers.com)



walnut twig beetle (native)



Ned Tisserat, CSU



23,040

Ned Tisserat, CSU





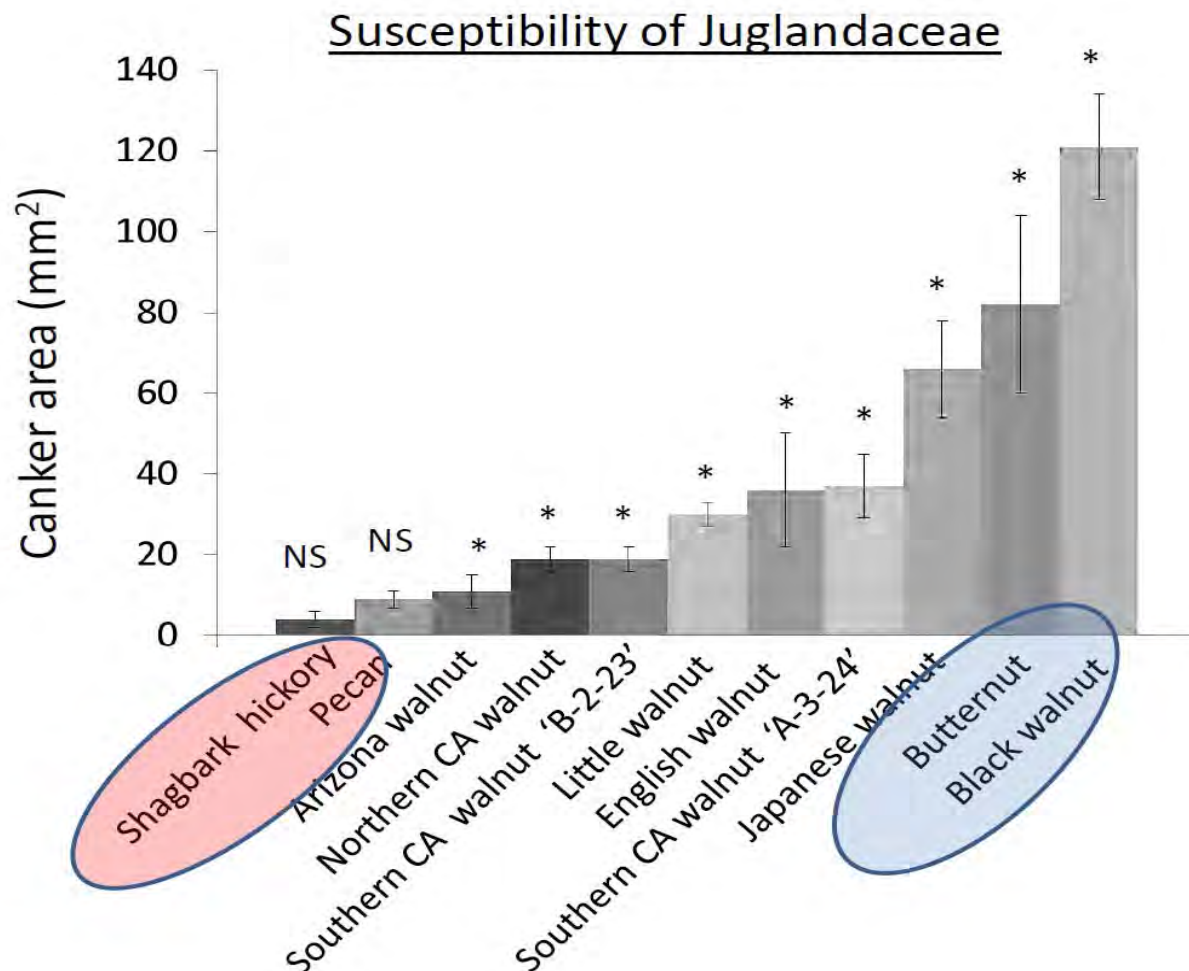


### Susceptible:

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

### Not Susceptible:

- Pecan
- Hickory





# THOUSAND CANKERS MANAGEMENT

Trunk sprays and injections not very effective

Effective twig beetle lure indicates presence

Prevention of spread:

remove infected trees before 50% mortality

do not move untreated walnut lumber

chip wood or remove woodpiles

currently, no Texas firewood quarantine

**DON'T MOVE  
FIREWOOD.org**





**MISC.  
CANKERS**

# PITCH CANKER

*Fusarium* species

Virginia pine, loblolly pine

Copious resin flows from trunk cankers and wood beneath cankers is resin-soaked

High nitrogen predisposes pines to infection

## Management

- Genetic resistance
- Fungicide injections of phosphorus acid (ArborFos)



# BOTRYOSPHAERIA CANKER

*Botryosphaeria* spp.

Over 200 hosts

**dogwood**  
**redbud**

apple  
cherry  
beech  
elm  
horsechestnut  
madrone  
maple  
oak



Prune and remove branches with visible cankers.



# GARDENIA CANKER

*Phomopsis gardeniae*

Wilted, dull-green foliage

Flower buds fail to open and drop

Foliage may develop leaf spots





- Drip-irrigate
- Chlorothalonil for leaf spots
- Plant in a different location



Joey Williamson, Clemson Extension

# CANKER-STAIN DISEASE OF LONDON PLANETREE

*Ceratocystis plantani* (a wilt disease)

Can be lethal to London plane (*Platanus x acerifolia*)

Spreads via pruning, infested wood chips and sawdust, root-to-root contact





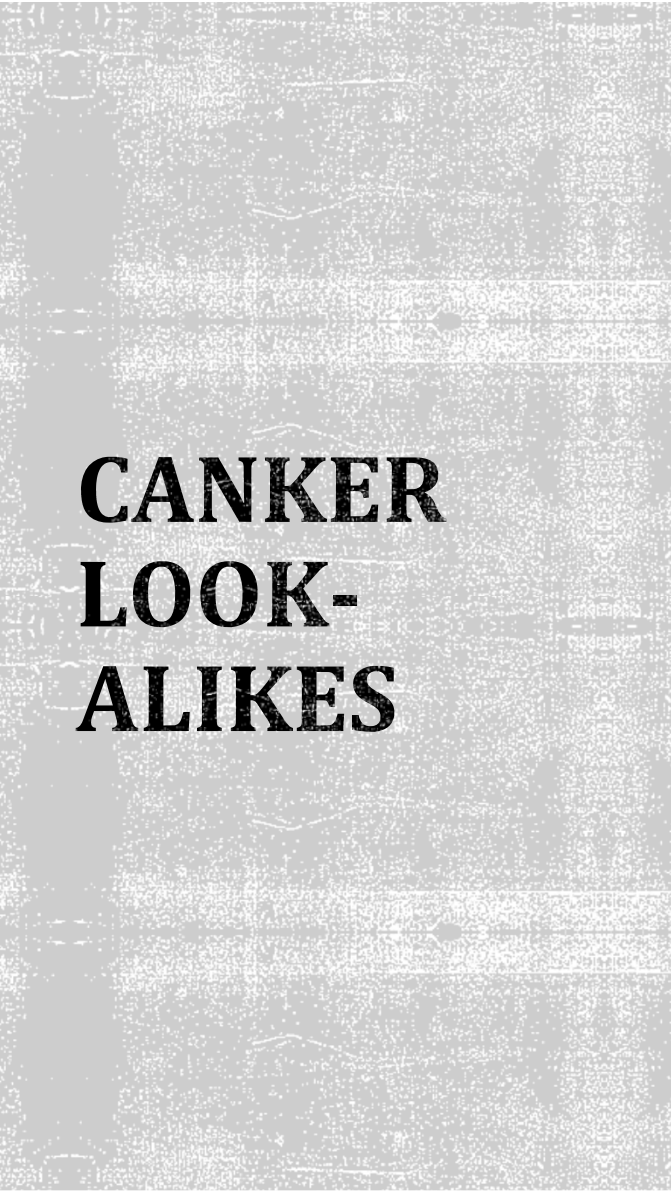


EPPO Global Image Database, Maxime Guerin (Plante & Cité)

Fungicide injections for anthracnose may help



EPPO Global Image Database, Maxime Guerin (Plante & Cité)



**CANKER  
LOOK-  
ALIKES**

# FLATHEADED BORERS



# FLATHEADED BORERS



# SUNSCALD/COLD INJURY









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Logan, UT  
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"Hello, Emily. This is Gladys Murphy up the street. Fine, thanks . . . Say, could you go to your window and describe what's in my front yard?"



"Holy moley, Loretta! Not only is it still there, look what it did to the end of my stick!"