

USDA Forest Service State and Private Forestry

## Forest health including identification and management of insects and diseases and impacts of natural disturbances

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Northeastern Area  
State and Private Forestry

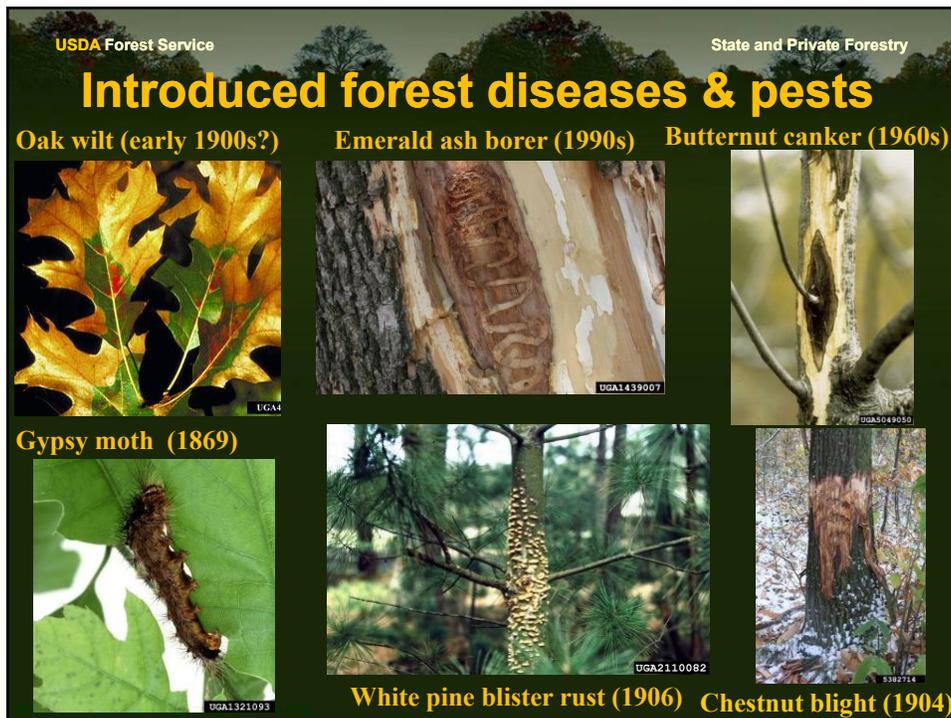
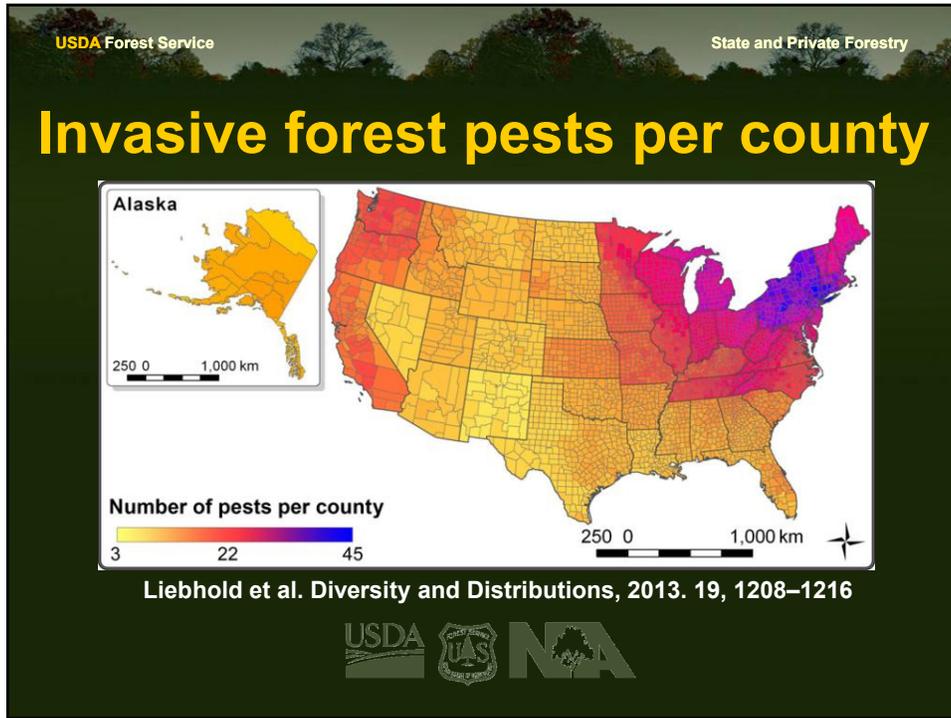


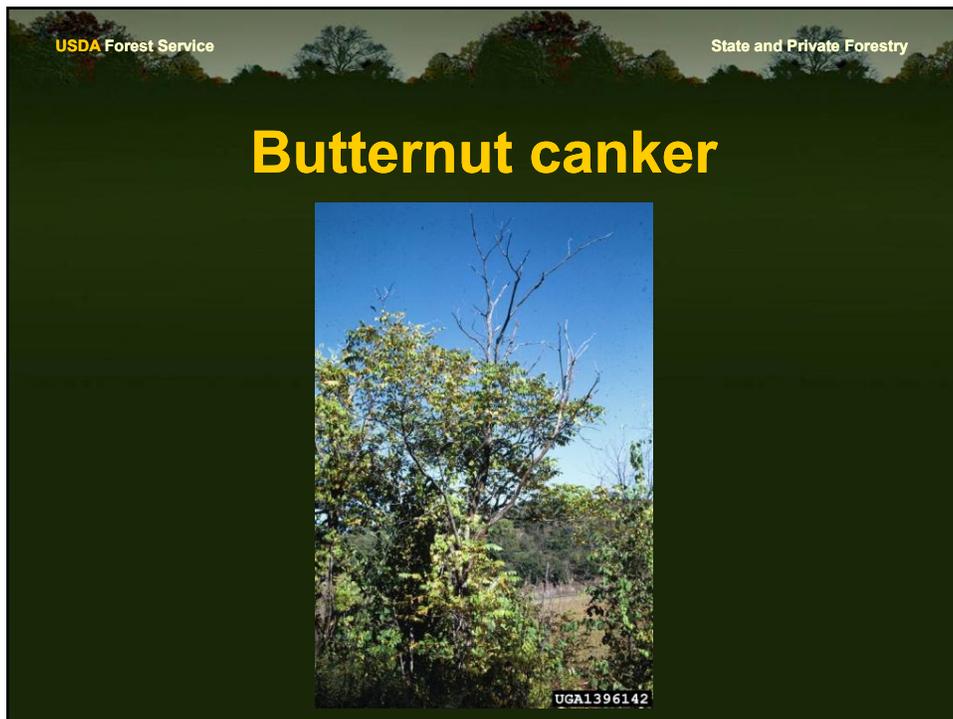
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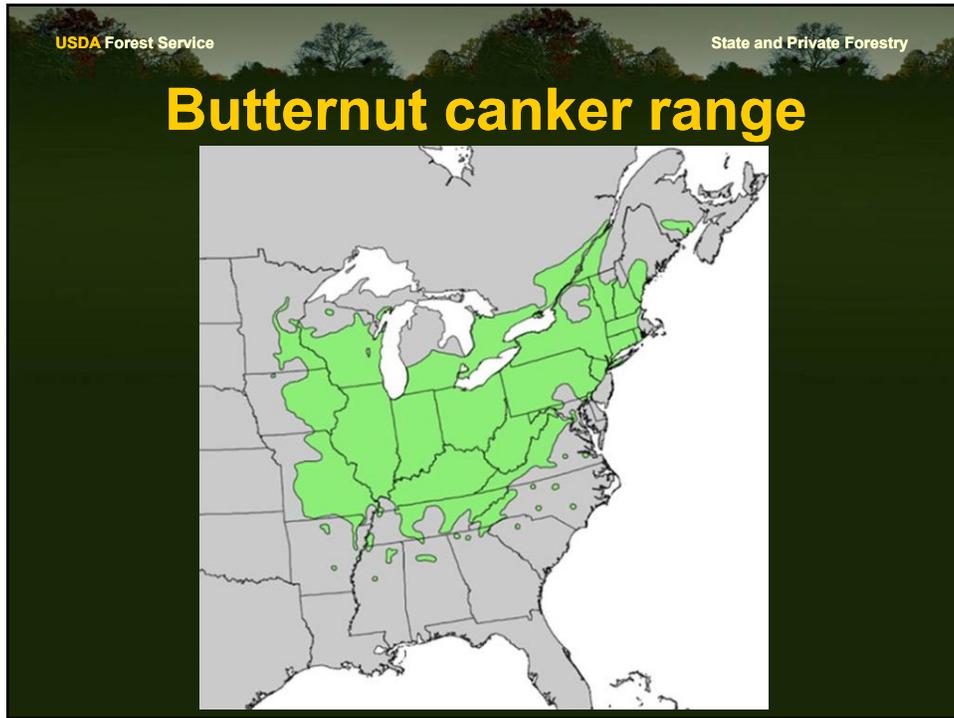
## Outline

- Invasive pests
  1. Butternut canker
  2. Gypsy moth
  3. Oak wilt
  
- Native pests
  1. Anthracnose
  2. Phomopsis
  3. Hickory decline









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## Gypsy moth and Armillaria root rot



UGA1321093

5550990

UGA3047008

UGA1057023

2 lined chestnut borer

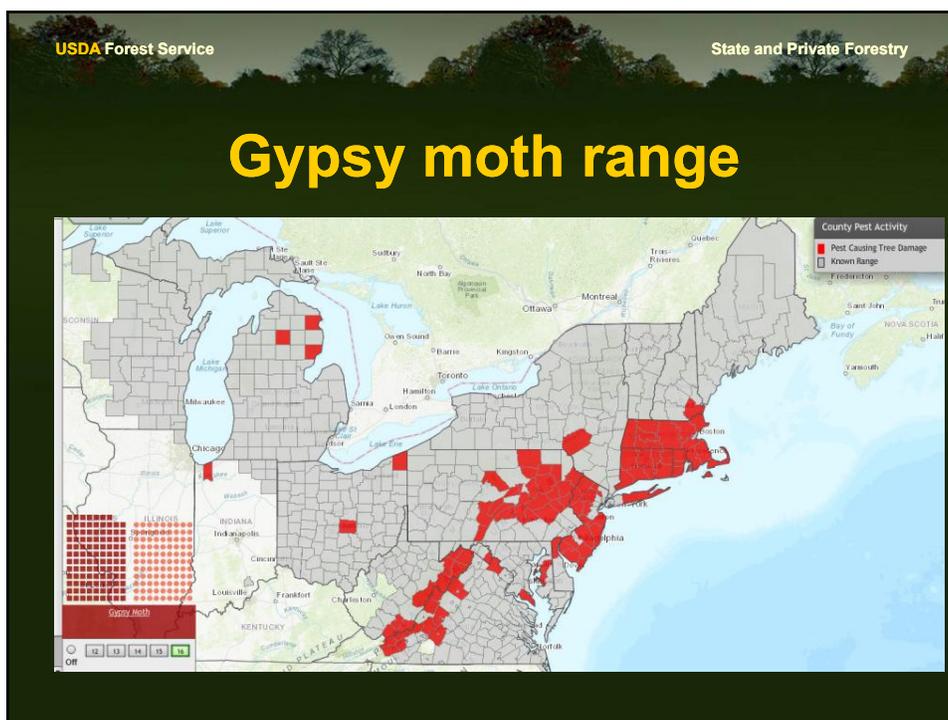
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## Gypsy moth and Armillaria root rot



5367187

UGA5027092



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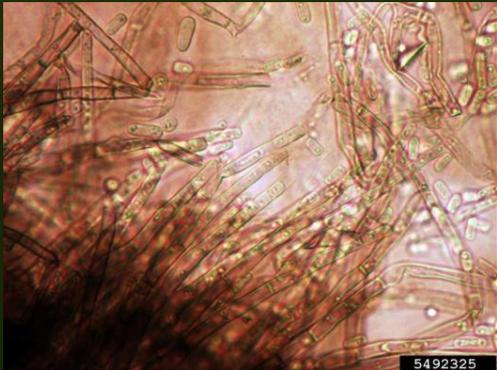
## Gypsy moth silviculture

1. Reduce density of favored species (oak) and increase the number of non-favored species (maple, birch, hickory)
2. Improve the growing conditions for residual trees with intermediate thinnings
3. Between gypsy moth outbreaks, salvage dead trees and thin live trees

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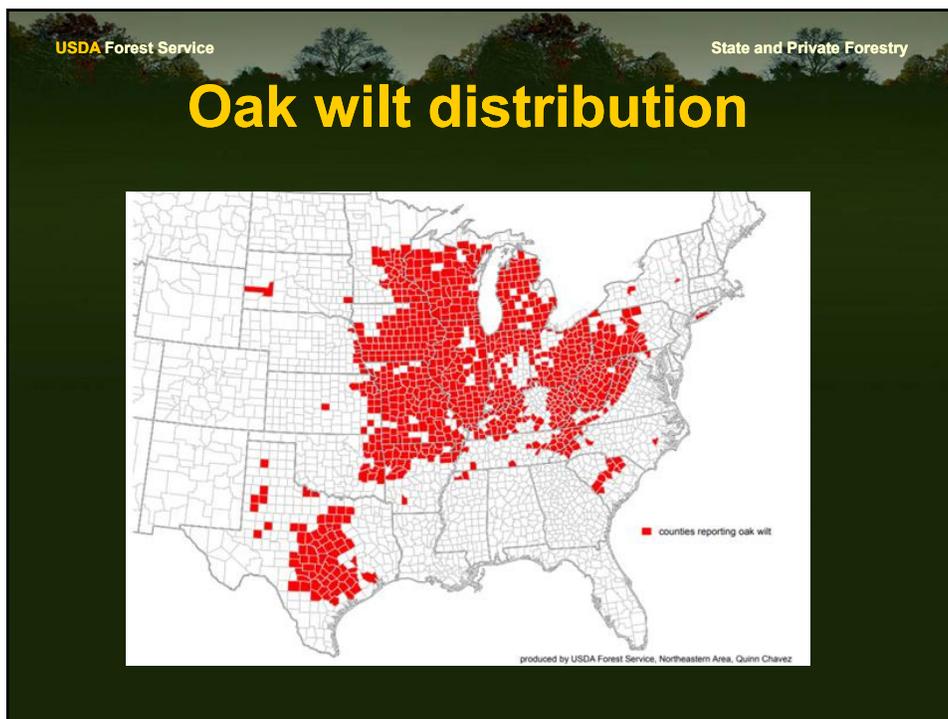
## Oak wilt pathogen

*Bretziella fagacearum*  
*Ceratocystis fagacearum*

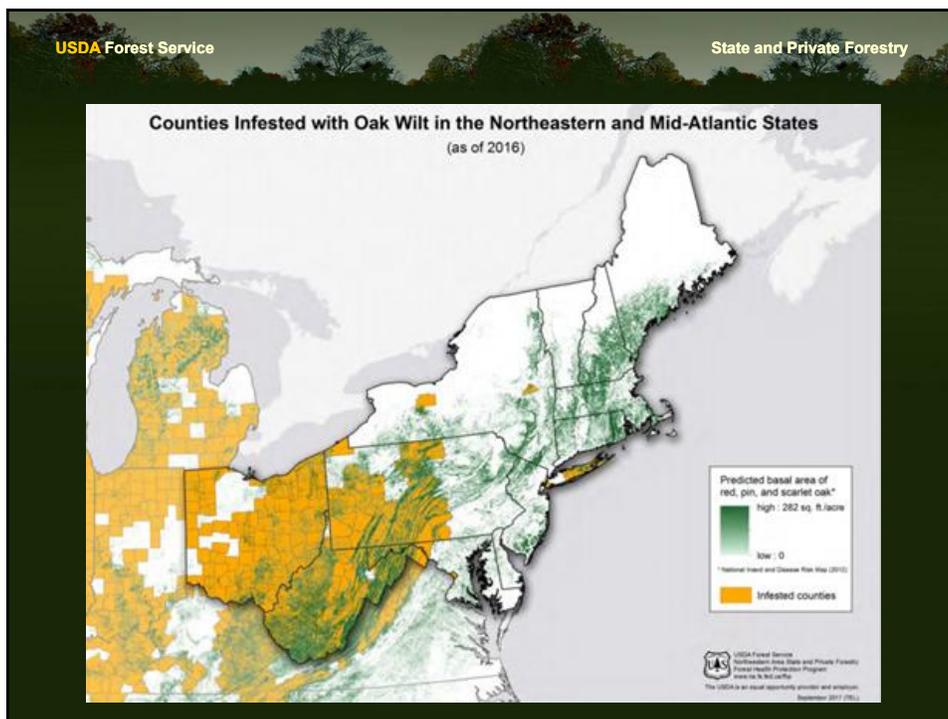


5505241 5492325

Sandra Jensen, Bugwood



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- ## Hosts
- | <u>Red oaks:</u>                                 | <u>White oaks:</u>                          |
|--|---|
| 1. Northern red oak<br>( <i>Quercus rubra</i> ), | 1. White oak ( <i>Q. alba</i> )             |
| 2. Pin oak ( <i>Q. palustris</i> )               | 2. Swamp white oak<br>( <i>Q. bicolor</i> ) |
| 3. Scarlet oak<br>( <i>Q. coccinea</i> )         | 3. Chestnut oak<br>( <i>Q. montana</i> )    |
| 4. Black oak<br>( <i>Q. velutina</i> )           | 4. Post oak ( <i>Q. stellata</i> )          |
|  | 5. Bur oak<br>( <i>Q. macrocarpa</i> )      |

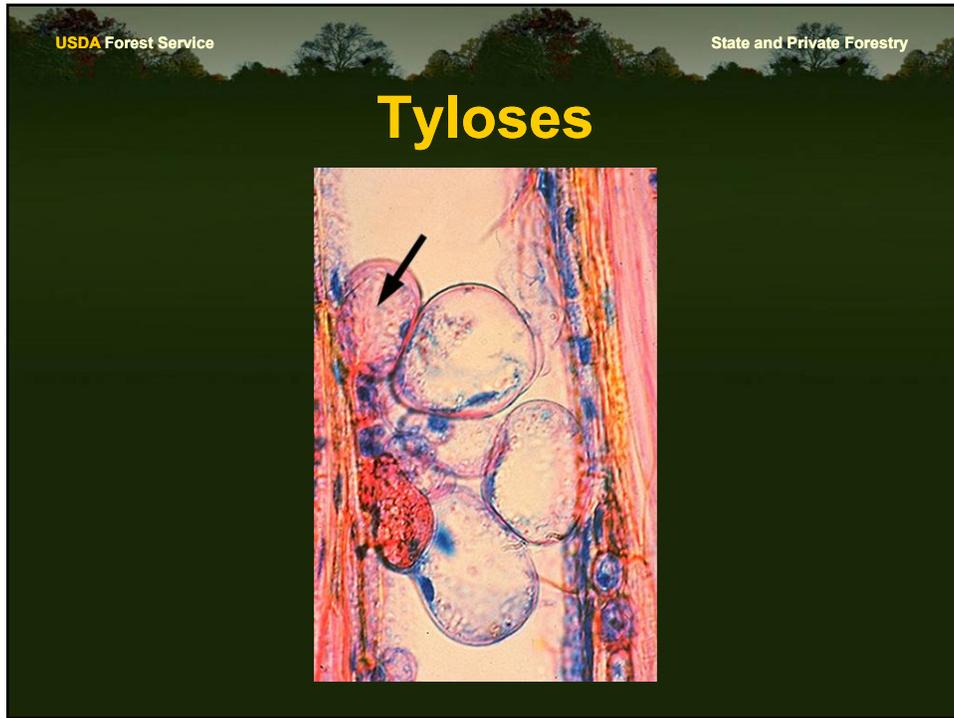


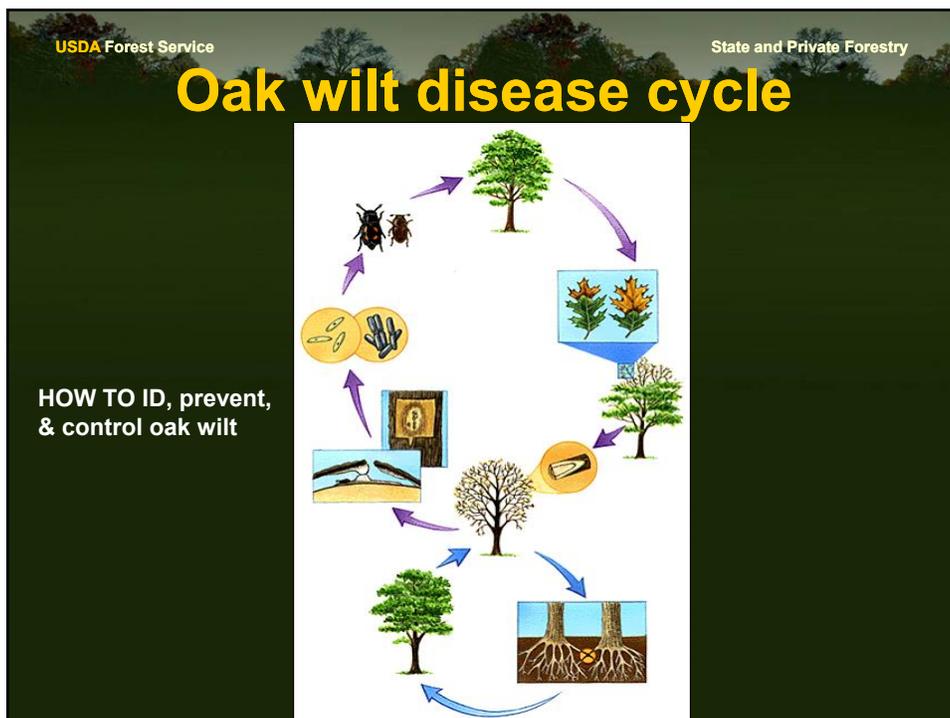
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## Vascular wilts

- Wilts are caused by bacterial or fungal colonization of xylem vessels
- Disrupt water movement-wilt
- Tyloses are produced by the plant that plug up the xylem vessels
- Fungal spores, hyphae, and polysaccharides plug up vessels
- Fungi produce enzymes and toxins that degrade plant cell walls and kill parenchyma cells

The slide features a dark green background with a forest scene at the top. The title 'Vascular wilts' is in large yellow font. The list items are in white font. The USDA Forest Service logo and text are in the top left and right corners.





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## Oak wilt pressure pads



UGA5253097 UGA0725093

Joe Obrien, Bugwood John Gibbs, Bugwood

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## Oak wilt pathogen vectors

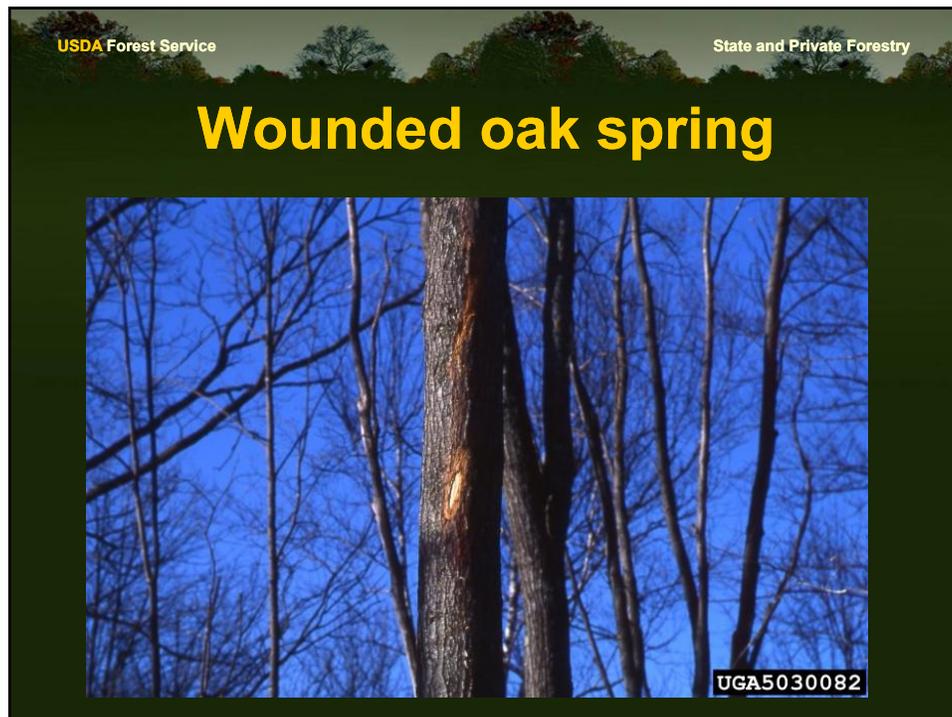
Nitidulid beetles



*Colopterus truncatus* *Carpophilus sayi*

*Carpophilus* spp.  
Mohammed El Damir, Bugwood

5444836



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## Control

- Prevention is most effective
- In areas with oak wilt:

**Do NOT prune trees between April and July when sap beetles are active! If necessary, paint over wounds**



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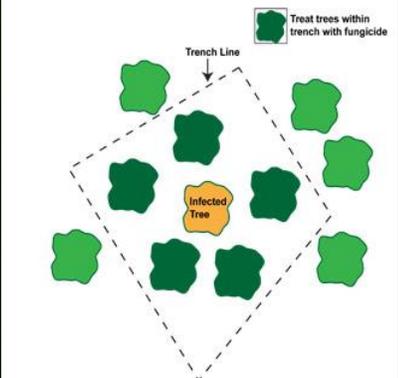
## Site factors affecting oak wilt

- Topography
- Soil
- Tree species composition

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## Trenching-vibratory plow

1. Trench
2. Cut Trees-chip, debark, burry
3. Herbicide



The diagram shows a central yellow circle labeled 'Infected Tree' surrounded by several green circles representing other trees. A dashed line, labeled 'Trench Line', forms a diamond shape around the infected tree. A legend indicates that the green circles represent 'Treat trees within trench with fungicide'.



A photograph shows a man operating a yellow vibratory plow in a forest setting. The plow has large, treaded tires and a long, curved blade. A small text box in the bottom right corner of the photo reads 'UGA5034061'.

Fungicide and a vibratory plow can be used together to control oak wilt.

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## Bruhn Method of Root Graft Barrier Line Placement

Combined d.b.h. (inches) <sup>1</sup>	Intertree Distance (feet)		Combined d.b.h. (inches) <sup>1</sup>	Intertree Distance (feet)	
	Loamy sand	Sandy		Loamy sand	Sandy
2	3.1	3.9	18	27.8	34.9
4	6.2	7.8	20	30.9	38.8
6	9.3	11.6	22	34.0	42.7
8	12.4	15.5	24	37.1	46.6
10	15.4	19.4	26	40.2	50.4
12	18.5	23.3	28	43.2	54.3
14	21.6	27.2	30	46.3	58.2
16	24.7	31.0	32	49.4	62.1

Combined diameters = diameter of diseased tree at 4.5 feet from the ground, added to the diameter of the tree in question.

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Trench Line  
 Infected Tree  
 Treat trees within trench with fungicide

Fungicide and a vibratory plow can be used together to control oak wilt.

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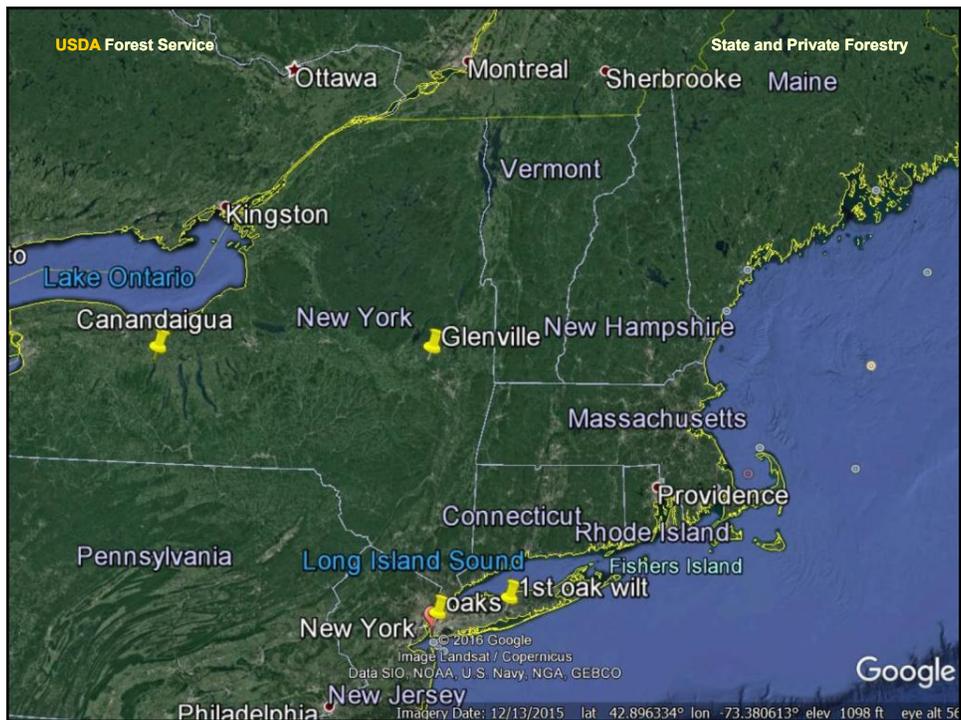
# Root rupture

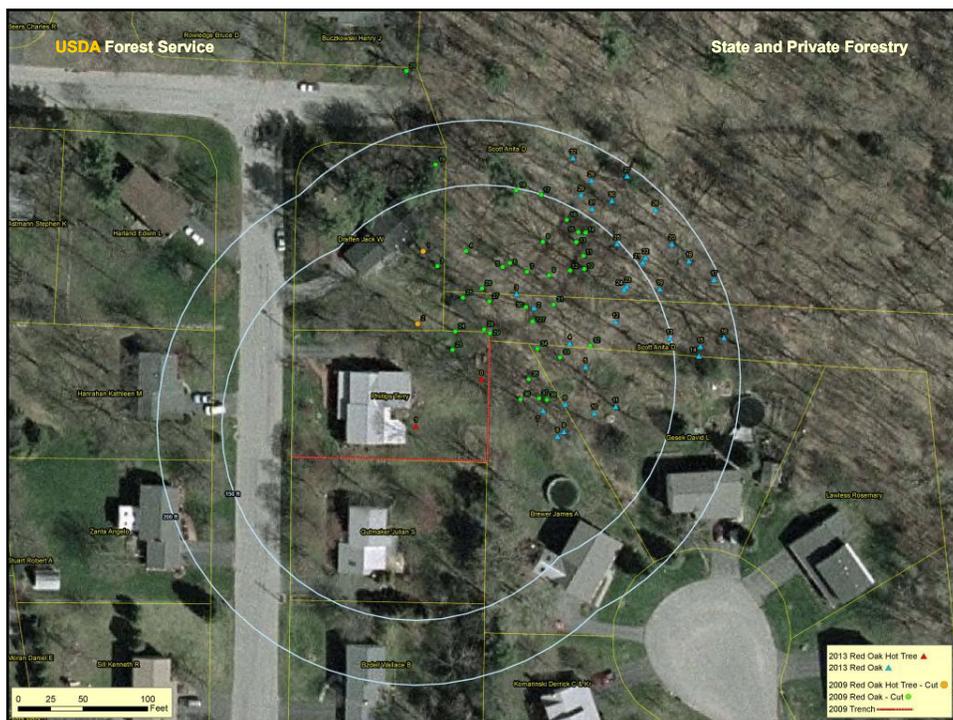


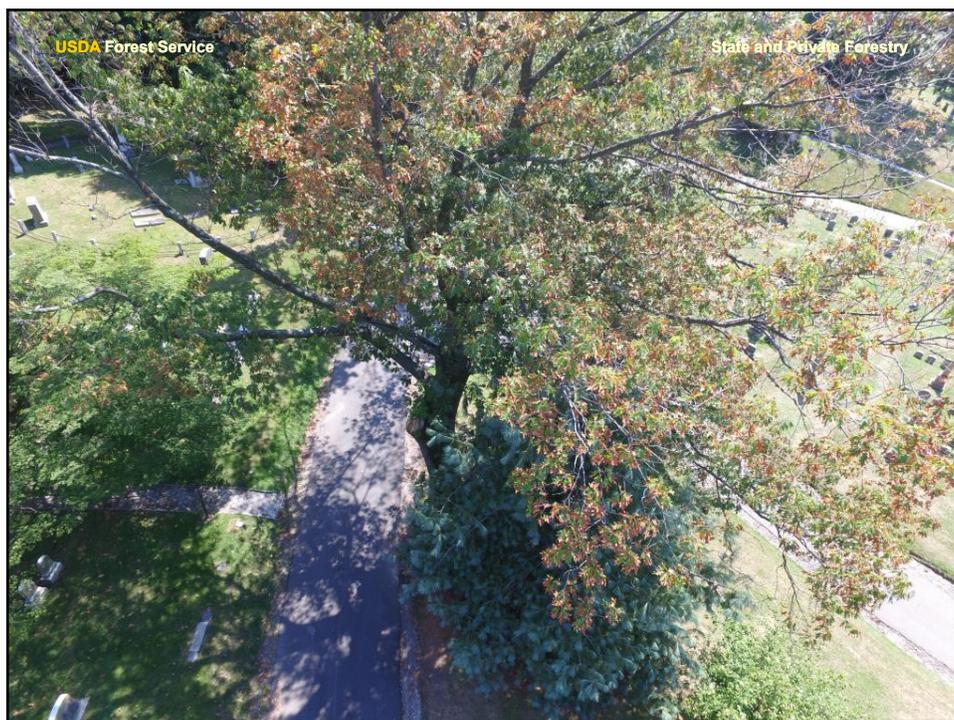
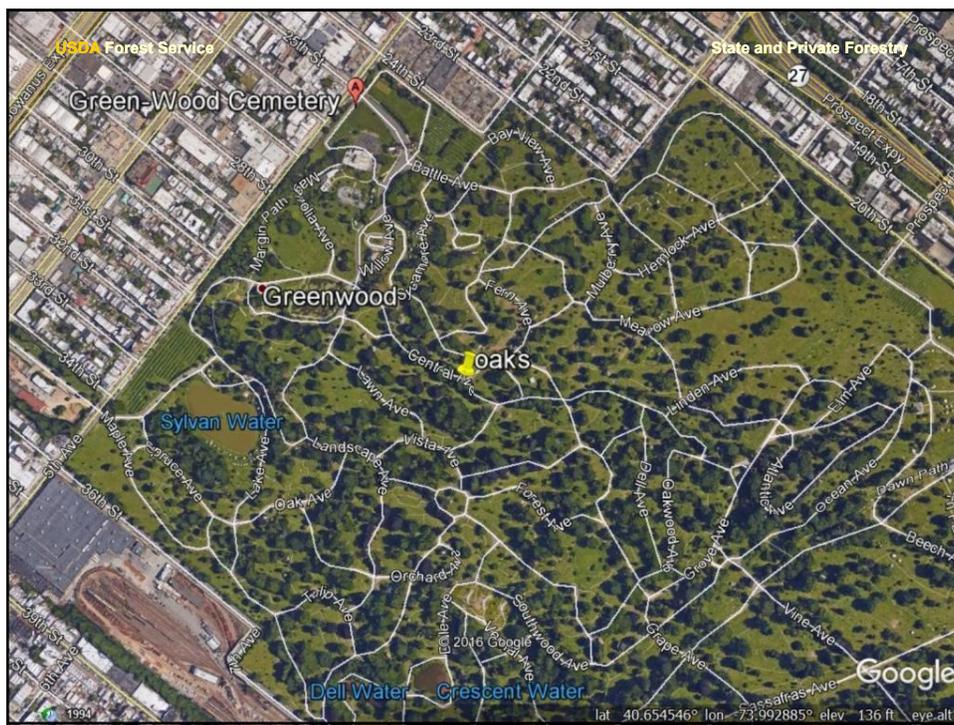
1. Cut trees-chip, debark, burry
2. Severe stumps



UGA5030077









## Oak wilt management

- Remove infected trees and debark, chip, or dry and cover wood
- In affected areas, avoid injury to oak during spring and summer
- In infected areas, limit disease spread by disrupting root grafts
- Do not move infected wood



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## Oak anthracnose

*Apiognomonia errabunda*

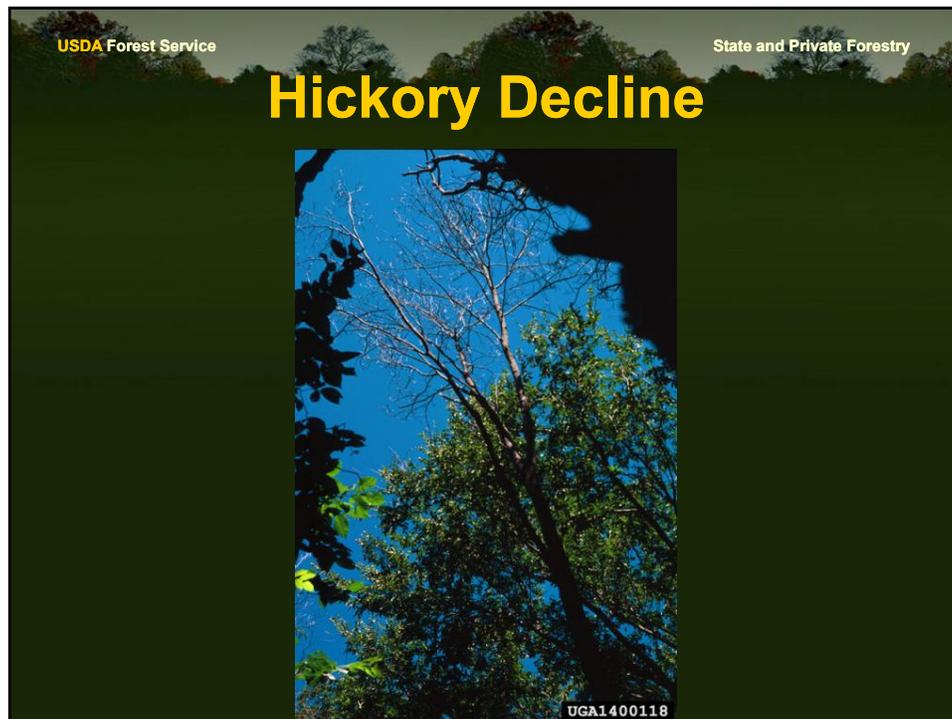


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## Phomopsis gall on hickory





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## Hickory Decline

Iowa, Maryland, Missouri, New York,  
Pennsylvania, West Virginia, and Wisconsin

- Drought, flooding, overtopping
- Hickory back beetle (*Scolytus quadrispinosus*)
- Canker fungus (*Ceratocystis smalleyi*)

This slide has a dark green background with a faint image of a forest at the top. It contains the same 'USDA Forest Service' and 'State and Private Forestry' logos as the first slide. The title 'Hickory Decline' is centered in large yellow font. Below the title, the text 'Iowa, Maryland, Missouri, New York, Pennsylvania, West Virginia, and Wisconsin' is listed in white. At the bottom, there is a bulleted list of three causes in white text.



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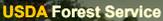
## Hickory Decline Management

- Reduce stand density in overstocked stands
- In affected stands, reduce hickory basal area to <20%
- Sanitation of beetle attacked trees

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Thank you for your attention!!  
Questions????

**USDA** **NFA**



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