Laurel Wilt Etiology in Pondspice, Pondberry and Camphortree

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Laurel Wilt, Hunting Island State Park, SC
(April, 2007)
Xyleborus glabratus carries Raffaelea lauricola, its fungal symbionts, in mandibular mycangia.
Distribution of Counties with Laurel Wilt Disease* Symptoms, by Year of Initial Detection

Initial Detection of Xyleborus glabratus - May 2002
Port Wentworth, GA

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*Sawfly Wilt is a fatal disease of redbay (Persea borbonia) and other species within the Lauraceae Family caused by a previously undescribed vascular wilt fungus (Raffaelea sp.) and associated with the attacks by the redbay ambrosia beetle (Xyleborus glabratus).
Pondspice
*(Litsea aestivalis)*
Pondspice

- Family Lauraceae
- Threatened species
- Large shrub
- Occurs in coastal plains where redbay is common.

Pondspice, Lady’s Island, SC
Field Assessments

Lady's Island in Beaufort County, SC

A site near Clyo, GA in Effingham County
Susceptibility Of Pondspice to *R. lauricola*
Pondspice

• Highly susceptible to laurel wilt disease

• Disease primarily observed in natural areas where redbay is also present

• Probably not a good reproductive host for *Xyleborus glabratrus*
Pondberry (Lindera melissifolia)

- Highly Clonal
- Lauraceae Family
- Understory Shrub
- Endangered Species

Pondberry in Clyo, GA
Pondberry

- Rarely attacked in their natural environment because of it’s small size
- Not a good brood host for *X. glabratus*
- Highly susceptible to laurel wilt disease in inoculation studies
Two inoculation studies were conducted to determine if *Raffaelea lauricola* could move systemically through rhizomes from an infected plant to other ramets.
Pondberry Fruit
Production of Pondberry Plants

- One pondberry plant was transplanted into a 15 gallon nursery pot
- 1:4 soil media ratio of coarse sand and peat
- Placed in partial shade
- Grown for three years
Growth / Sprouting of Pondberry

Early spring / Year 2

Mid-summer / Year 3
Inoculation Procedure

The stem of the original planted pondberry in each of four pots was wounded by drilling a hole one-half the diameter of the main stem, using 2.25 mm drill bit.
Inoculation Procedure (continued)

*R. lauricola* isolates were obtained from wilted redbay trees on Hilton Head Island, S.C. and were used for both inoculations.
Inoculation Procedure (continued)

Inoculation points on all seedlings were wrapped with Parafilm.
Symptom Development

- 14 days after inoculation
Symptom Development

• 24 days after inoculation
Symptom Development

- 45 days after inoculation
Symptom Development

72 days after inoculation
Examples of rhizomes/root systems
Sampling for *R. lauricola*

Inoculated Main Stem
- Stem
- Root collar
- Root connections with ramets

Ramets
- Stem
- Root collar
- Root connections with other ramets
Isolation of *R. lauricola*

Samples were surface sterilized and plated on Cycloheximide-Streptomycin Malt Agar (CSMA) select media.
R. lauricola was consistently recovered from the stem, root collar and root connections of dead and dying ramets that were connected to the main inoculated stem.
Pondberry plants in experimental test beds
Camphortree (Cinnamomum camphora)

- Member of the Lauraceae
- Native to Southeast Asia
- At one time cultivated in the United States
- Regarded as an invasive species in many coastal areas of the southeastern USA

Camphortrees, Jekyll Island, GA
Laurel wilt – Association of *X. glabratus* and *R. lauricola* with camphortree

Shoot dieback in camphortree caused by *R. lauricola*; Half Moon, Georgia; June, 2007

Dieback in camphortree, St. Simons Island, Georgia; July, 2014

Photo by C. Bates, GFC
Laurel wilt – Association of *X. glabratus* and *R. lauricola* with camphortree

Fraedrich, S. W., T. C Harrington and G. S. Best. 2014. *Xyleborus glabratus* attacks and systemic infections by *Raffaelea lauricola* associated with dieback of camphortree (*Cinnamomum camphora*) in the southeastern United States. Forest Pathology 45: 60-70
Beetle Attack
Raffaelea lauricola moves rapidly in the xylem of redbay

- All saplings inoculated with *R. lauricola* at 7 cm above ground level.
- Areas colored yellow indicate stem sections positive for *R. lauricola*

Source: Fraedrich, S. W., T. C Harrington and G. S. Best. 2014. *Xyleborus glabratus* attacks and systemic infections by *Raffaelea lauricola* associated with dieback of camphortree (*Cinnamomum camphora*) in the southeastern United States. Forest Pathology 45:60-70
Susceptibility of camphortree to wilt/dieback caused by *R. lauricola*

Source: Fraedrich, S. W., T. C Harrington and G. S. Best. 2014. *Xyleborus glabratus* attacks and systemic infections by *Raffaelea lauricola* associated with dieback of camphortree (*Cinnamomum camphora*) in the southeastern United States. Forest Pathology 45:60-70
Camphortrees at Jekyll Island, GA

Study site

X. glabratus toothpicks on camphortree
Stem traps on camphortrees
Jekyll Island, GA

Camphortree at Jekyll with stem traps for beetles. Sample of wood taken for evaluation of R. lauricola – was positive
For more information on laurel wilt:

www.fs.fed.us/r8/foresthealth/laurelwilt
www.srs.fs.usda.gov/pubs
www.public.iastate.edu/~tcharrin/