

The Protect U.S. Train-the-Trainer  
Webinar will begin at 3:00pm.



**protect u.s.**  
community invasive species network

*First Detectors Protecting U.S. from Pests*



Ug99 - WSR



Citrus Greening



Bagrada Bug



Citrus Psyllid



Laurel Wilt

# Protect US: *What's it about?*

**Martin A. Draper**

National Program Leader

National Institute of Food and Agriculture



**protect u.s.**  
community invasive species network

*First Detectors Protecting U.S. from Pests*



Spotted wing Drosophila larvae emerging from blueberry fruit (D. Bruck)

# ***Recognizing threats!***

- Opportunity created in the Food, Conservation and Energy Act of 2008 (Farm Bill).
- Enhancing pest detection to protect US agriculture.
- An organizational partnership with APHIS-PPQ, Land-grant universities, and NIFA
- And many other contributors and partners...



**protect u.s.**  
community invasive species network

*First Detectors Protecting U.S. from Pests*



# Some of our Partners



National Institute of Food and Agriculture  
(NIFA)



**Center for Invasive Species  
and Ecosystem Health**

Center for Invasive Species and Ecosystem Health



Local and Regional Integrated  
Pest Management programs (IPM)



U.S. Department of  
Homeland Security (DHS)



USDA-APHIS-PPQ



Extension Disaster  
Education Network  
(EDEN)



U.S. Forest Service



Cooperative Agriculture Pest  
Survey Program (CAPS)



National Plant Board (NPB) and  
State Departments of  
Agriculture



National Plant Diagnostic Network



USDA Agricultural Research  
Service



**protect u.s.**  
community invasive species network

*First Detectors Protecting U.S. from Pests*





# ***Responding Appropriately***

- Pests are entering the country at increasing and alarming rates.
- Citizen scientists are a critical and underused resource.
- The First Detector Network is a part of the NPDN – Protect US will be an extension of that effort.
- This network will extend training to less traditional audiences.



**protect u.s.**  
community invasive species network

*First Detectors Protecting U.S. from Pests*



# ***Responding Appropriately***

- Early recognition is improved with more eyes!
- We need every set of eyes we can “enlist.”
- Do you know when something looks “*funny*”?
- What should you do next?
- A rapid public response can save crop loss!



**protect u.s.**  
community invasive species network

*First Detectors Protecting U.S. from Pests*



# ***Responding Appropriately***

- Early recognition is improved with more eyes!
- We need every set of eyes we can “enlist.”
- Do you know when something looks “*funny*”?
- What should you do next?
- A rapid public response can save crop loss!

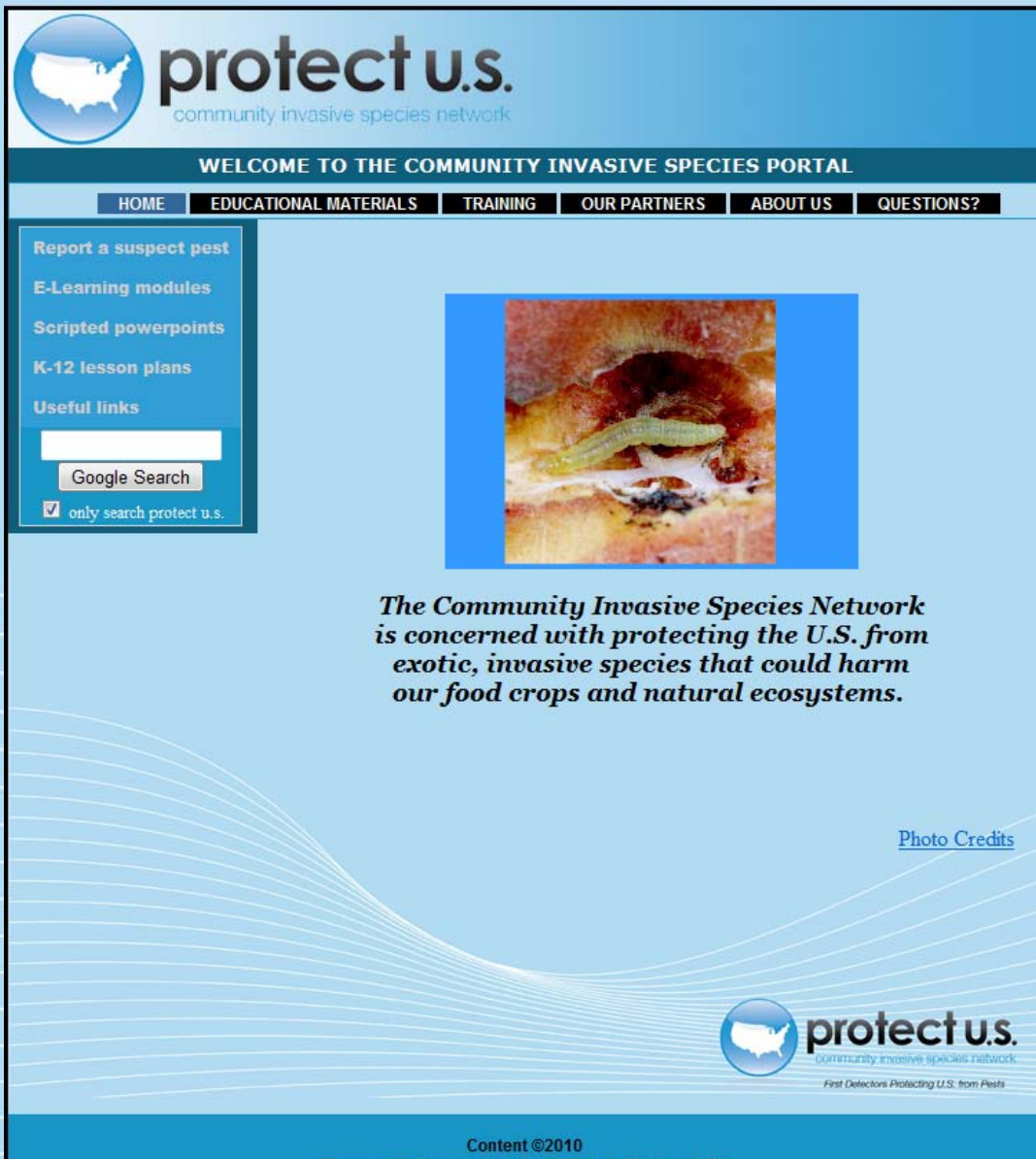
**... and money!**



**protect u.s.**  
community invasive species network

*First Detectors Protecting U.S. from Pests*





# Protect U.S. Web Overview

Protect U.S.

The Community Invasive  
Species Network

[www.protectingusnow.org](http://www.protectingusnow.org)

Stephanie Stocks  
Protect U.S. Coordinator  
University of Florida





**protect u.s.**  
community invasive species network

## WELCOME TO THE COMMUNITY INVASIVE SPECIES PORTAL

[HOME](#) [EDUCATIONAL MATERIALS](#) [TRAINING](#) [OUR PARTNERS](#) [ABOUT US](#) [QUESTIONS?](#)

[Report a suspect pest](#)

[E-Learning modules](#)

[Scripted powerpoints](#)

[K-12 lesson plans](#)

[Useful links](#)

Google Search

☒ only search protect u.s.

### Educational Materials

Protect U.S. has developed scripted PowerPoints, e-learning modules, and K-12 lesson plans on various exotic invasive topics. Each of these will be modified for different target audiences (general public, small farmers, crop advisors, educators and students, etc.). The specific target audience will be noted in the material listed. Click on each of these links to explore the Protect U.S. educational materials.

Interested in authoring a Protect U.S. module? Download the [author guidelines](#).

[Scripted PowerPoint Presentations](#)

[E-Learning Modules](#)

[K-12 Lesson Plans](#)

"Protect U.S. has produced several education video clips for use in their educational material. The clips are housed at the Protect U.S. you tube site. [Click here to view them.](#)"



**protect u.s.**  
community invasive species network  
First Detectors Protecting U.S. from Pests

Content ©2010  
Community Invasive Species Network (Protect U.S.)  
©2010 University of Florida

## Educational Materials



**protect u.s.**  
community invasive species network

*First Detectors Protecting U.S. from Pests*



**protect u.s.**  
community invasive species network

## WELCOME TO THE COMMUNITY INVASIVE SPECIES PORTAL

[HOME](#)[EDUCATIONAL MATERIALS](#)[TRAINING](#)[OUR PARTNERS](#)[ABOUT US](#)[QUESTIONS?](#)[Report a suspect pest](#)[E-Learning modules](#)[Scripted powerpoints](#)[K-12 lesson plans](#)[Useful links](#)  
☒ only search protect u.s.

### PowerPoint Presentations

The following PowerPoint presentations (with speaker notes) have been released::

- Overview: Invasive Species that Affect Plants
  - [Download for PowerPoint versions 97-2003](#)
  - [Download for PowerPoint versions 2007-2010](#)
  - [Download the PDF with notes](#)
- Laurel Wilt and the Redbay Ambrosia Beetle, *Xyleborus glabratus*
  - [Download for PowerPoint versions 97-2003](#)
  - [Download for PowerPoint versions 2007-2010](#)
  - [Download the PDF with notes](#)

Protect U.S. is also creating PowerPoint presentations on the following topics:

- Citrus Greening Disease (*Huanglongbing*) and the Asian Citrus Psyllid, *Diaphorina citri*
- Plant Biosecurity
- Thousand Cankers Disease
- Wheat Stem Rust, Ug99
- Spotted Wing Drosophila, *Drosophila suzukii*
- Giant African Snail, *Achatina fulica*
- Potato psyllids and their Pathogen Vectoring Concerns
- Exotic Pests of Concern for Ornamental Plants
- Common and Exotic Pests of Concern for Stone Fruits

Links to the Powerpoints will be provided once released.

[Back to Educational Materials](#)

## Scripted Presentations



**protect u.s.**  
community invasive species network

*First Detectors Protecting U.S. from Pests*




# Scripted Presentation: Overview: Invasive Species that Affect Plants

## Scripted Presentation: Laurel Wilt and the Redbay Ambrosia Beetle, *Xyleborus glabratus*

1 Overview: Invasive Species that Affect Plants  
2  
3  
4  
5  
6  
7  
8  
9  
10

### Wheat Losses-Who is Affected?



- Developing countries
- Food animal producers
- Everyone

Source: Jean Robinson, Gainesville, FL  
Source of chart: Food and Agriculture Organization of the United Nations (2010)  
<http://www.fao.org/hunger/en>

Undernourishment in 2009, by region (millions)

Region	Undernourishment (millions)
Total	1.02 billion
Developed countries	15
Near East and North Africa	42
Latin America and the Caribbean	53
Sub-Saharan Africa	295
Asia and the Pacific	642

protect u.s.  
community invasive species network


Wheat is a staple food commodity for people and animals. Worldwide wheat production for the 2010-2011 market year is estimated at 23,755 million bushels with the U.S. producing 2,208 million bushels. The U.S. alone is projected to use 940 million bushels of the wheat produced for food, 76 million bushels in seed, and 180 million bushels in feed and residual use. Also for the 2010-2011 market year, the U.S. projects that 1250 million bushels of wheat will be exported.

In poor developing countries, families may spend 60% of their income on food. As the cost of food rises and food becomes more scarce, malnutrition and starvation rates increase. The food insecure (i.e. individuals that may not have a reliable or affordable source of food) would be most impacted by a wheat loss crisis; however, everyone would be impacted. Remember that staple crops, such as wheat, are also important sources for feeding food animals (and possibly pet animals in some cases).

Wheat statistical information obtained from the USDA ERS ([www.ers.usda.gov](http://www.ers.usda.gov)) compiled by G. Vocke, E. Allen, and O. Liefert. <http://www.ers.usda.gov/data/wheat/YBtable05.asp> and <http://www.ers.usda.gov/data/wheat/YBtable03.asp>.

11  
12  
13  
14  
15  
16  
17  
18  
19  
20  
21

### Symptoms of the Disease



Click [here](#) to view video of symptoms.

protect u.s.  
community invasive species network

Symptoms of a disease are a response of the infected organism to the infection itself.

Initially, the disease symptoms of Laurel Wilt manifest as drooping leaves with a reddish or purplish discoloration to them. The symptoms may seem restricted to only part of the crown, but it soon spreads to the entire crown turning it completely brown. The dead leaves will usually stay attached to the tree for up to one year (and in some cases, longer). If you remove the bark, you will see black discoloration of the sapwood. Symptom progression may appear to be even faster once the trees begin to wilt.

In research on the disease cycle, trees that have been artificially infected have died in as little as eight weeks.

The image on the left shows a redbay with wilting and brown leaves across the crown. The right-hand image shows the dark streaking just under the bark that is symptomatic of the infection. Both of these symptoms are tied to infection of the vascular system of the tree.

Sources of information –  
<http://www.state.sc.us/forest/ldwilt.pdf>  
[http://www.fl-dof.com/publications/fh\\_pdfs/Laurel\\_Wilt.pdf](http://www.fl-dof.com/publications/fh_pdfs/Laurel_Wilt.pdf)  
<http://www.fs.fed.us/r8/foresthealth/laurelwilt/symptoms.shtml>



**protect u.s.**  
community invasive species network

## WELCOME TO THE COMMUNITY INVASIVE SPECIES PORTAL

[HOME](#)[EDUCATIONAL MATERIALS](#)[TRAINING](#)[OUR PARTNERS](#)[ABOUT US](#)[QUESTIONS?](#)[Report a suspect pest](#)[E-Learning modules](#)[Scripted powerpoints](#)[K-12 lesson plans](#)[Useful links](#)  
☒ only search protect u.s.

### E-Learning Modules

In order to take the e-learning modules, you need to create a username and password. Once you do this, you can take all the available e-learning modules using the same user name and password. By clicking on any of the titles below, you will be taken to an external site where the e-learning modules are housed. Choose "Take the On-Line Training Modules". This will take you to the login page where you will create your user name and password. Once you login, choose the e-learning titles under the Protect US heading. At the end of each e-learning module, you can take the accompanying quiz. A certificate of completion will be made available to you for download if you score a 70% or better on the quiz. Instructions for taking the quiz are found at the end of each module.

The following e-learning modules have been released:

- [Overview: Invasive Species that Affect Plants](#)
- [Laurel Wilt and the Redbay Ambrosia Beetle, \*Xyleborus glabratus\*](#)

Additional e-learning modules are also under development on the following topics:

- Citrus Greening Disease (*Huanglongbing*) and the Asian Citrus Psyllid, *Diaphorina citri*
- Plant Biosecurity
- Thousand Cankers Disease
- Wheat Stem Rust, Ug99
- Spotted Wing Drosophila, *Drosophila suzukii*
- Giant African Snail, *Achatina fulica*
- Potato psyllids and their Pathogen Vectoring Concerns
- Exotic Pests of Concern for Ornamental Plants
- Common and Exotic Pests of Concern for Stone Fruits

[Back to Educational Materials](#)

## E-Learning Modules with interactives and certificates of completion




**protect u.s.**  
community invasive species network

First Detectors Protecting U.S. from Pests



# E-Learning Module: Overview: Invasive Species that Affect Plants


Learn More Buttons




## Impacts of Asian Soybean Rust

- Overview: Invasive Species That Affect Plants
- Overview: Invasive Species That Affect Plants
- How Bad Can It Be?
  - When a Good Idea Goes Bad...
  - Asian Soybean Rust
  - What If...
  - Does Fruit Have Value?
- Invasive Species Are More Than Just An Agricultural Problem...
- Plant Biosecurity Additional Information
- Author and Date of Publication
- Reviewer Credits
- Our Partners
- References
- Evaluation


Plant pathogen [select agents](#) are believed to be some of the more potentially devastating plant diseases that could enter the U.S. with the potential to be used as bioterrorism weapons. Investigations concerning the origin and nature of the introduction of a potential USDA select agent and toxin are conducted by the FBI. The U.S. introduction of Asian soybean rust was not believed to be an act of terror, but most likely occurred through natural means, such as hurricane winds. As a select agent, university-based NPDN laboratories, state departments of agriculture, and the USDA-APHIS are prepared to respond to detections with appropriate communication and diagnostic protocols. Kudzu was found to be a potential overwintering source for the Asian soybean rust pathogen. An extensive multi-agency monitoring, education, and diagnostic program known as [ipmPIPE](#) was implemented in order to reduce potential losses and protect U.S. soybeans.

[Exit](#)[Previous](#)[Next](#)




## Asian Soybean Rust

In addition to serving as an invasive, kudzu may also serve as a reservoir for insect or disease problems. For example, Asian Soybean Rust, caused by the fungus *Phakopsora pachyrhizi*, overwinters on kudzu and then spread to soybeans. It was detected in the U.S. in 2004 and was on the USDA's select agent and toxin list at the time of its detection. Epidemiological models from Asian Soybean Rust outbreaks in Brazil (2001-2004) suggest that this disease could rapidly spread and destroy soybean crops in the South and throughout the Midwest. Estimated yield losses are from 10%-50%, and up to 80% if not managed properly.



[Learn More-Impacts of Asian Soybean Rust](#)[Learn More - Soybean Facts](#)

[Exit](#)[Previous](#)[Next](#)



# E-Learning Module: Overview: Invasive Species that Affect Plants

Rollover to Find  
Answers



Overview: Invasive  
Species That Affect  
Plants

Overview: Invasive  
Species That Affect  
Plants

Instructions

Overview: Invasive  
Species That  
Affect Plants

How Bad Can It Be?  
Evaluation

## Beneficial Or Detrimental Introductions

Click on or rollover the images with your mouse to find out if these introduced species were beneficial or detrimental.



Honeybees



Red fire ants



Ash whitefly



Oranges



## Beneficial Or Detrimental Introductions

Click on or rollover the images with your mouse to find out if these introduced species were beneficial or detrimental.

Overview: Invasive  
Species That Affect  
Plants

Overview: Invasive  
Species That Affect  
Plants

Instructions

Overview: Invasive  
Species That  
Affect Plants

How Bad Can It Be?  
Evaluation

Honeybees were introduced from Europe to the United States by colonists. They are considered to be a beneficial introduction because they produce honey and also because they are great pollinators (especially for food crops that such as blueberries, almonds, and raspberries).



Red fire ants



Ash whitefly



Oranges



Exit

Previous

Next

protect u.s.  
community invasive species network

Exit

Previous

Next



protect u.s.  
community invasive species network

First Detectors Protecting U.S. from Pests

# E-Learning Module: Laurel Wilt and the Redbay Ambrosia Beetle, *Xyleborus glabratus*

## Distribution Maps and Quiz Questions



### Redbay Review

- Laurel Wilt and the Redbay Ambrosia Beetle
- Laurel Wilt and the Redbay Ambrosia Beetle
- Instructions
- Overview
- Redbays
- Redbays
- Redbays
- The Culprit
- Redbay Ambrosia Beetle
- Disease Cycle
- Symptoms of the Disease
- Signs of the Disease
- Distribution In the U.S.
- Impact of the Disease
- Management of the Disease
- You Can Help!
- Additional Sources of Information
- Questions
- Author Credits and Date of Publication
- Reviewer Credits

Which of the following are images of redbay?



Correct!



Exit

Previous

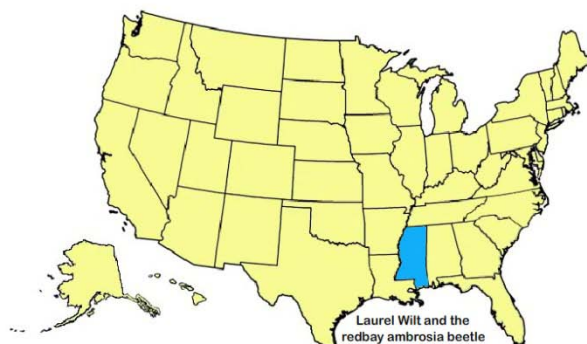
Next



### Distribution In the U.S.

Click on the states or rollover the map with your mouse to find what states have laurel wilt.

- Laurel Wilt and the Redbay Ambrosia Beetle
- Laurel Wilt and the Redbay Ambrosia Beetle
- Instructions
- Overview
- Redbays
- The Culprit
- Redbay Ambrosia Beetle
- Disease Cycle
- Symptoms of the Disease
- Signs of the Disease
- Distribution In the U.S.
- Impact of the Disease
- Management of the Disease
- You Can Help!
- Additional Sources of Information
- Questions
- Author Credits and Date of Publication
- Reviewer Credits



Laurel Wilt and the redbay ambrosia beetle are found in Mississippi, but in only one county as of December 2010.



Exit

Previous

Next



protect u.s.  
community invasive species network

First Detectors Protecting U.S. from Pests



[Report a suspect pest](#)

[E-Learning modules](#)

[Scripted powerpoints](#)

[K-12 lesson plans](#)

[Useful links](#)

☒ only search protect u.s.

## K-12 Lesson Plans

### [Videos used by Protect U.S. in their Educational Products](#)

"K-12 lesson plans will be developed over the course of the next year. Lesson plans will feature correlated National Science Education Standards (as well as Florida State Sunshine Standards), background information for the teacher, a scripted presentation that accompanies the lesson plan, and activities for reinforcement (including experiential activities).

The first lesson plan to be developed will be for grades 9-12. The topic will be Plant Biosecurity and will contain background information on agroterrorism incidents that occurred in the 20th century as well as information on the list of USDA Plant Protection and Quarantine Select Agents and Toxins. Information featured includes why these are select agents, why the USDA is focusing on them, what they could do if they are found in this country, and former select agents and what we are doing about them now that they are in the country. "

Link "National Science Education Standards" to this website -  
[http://www.nap.edu/openbook.php?record\\_id=4962](http://www.nap.edu/openbook.php?record_id=4962).

Link "Florida State Sunshine Standards" to this website -  
<http://www.floridastandards.org/homepage/index.aspx>.

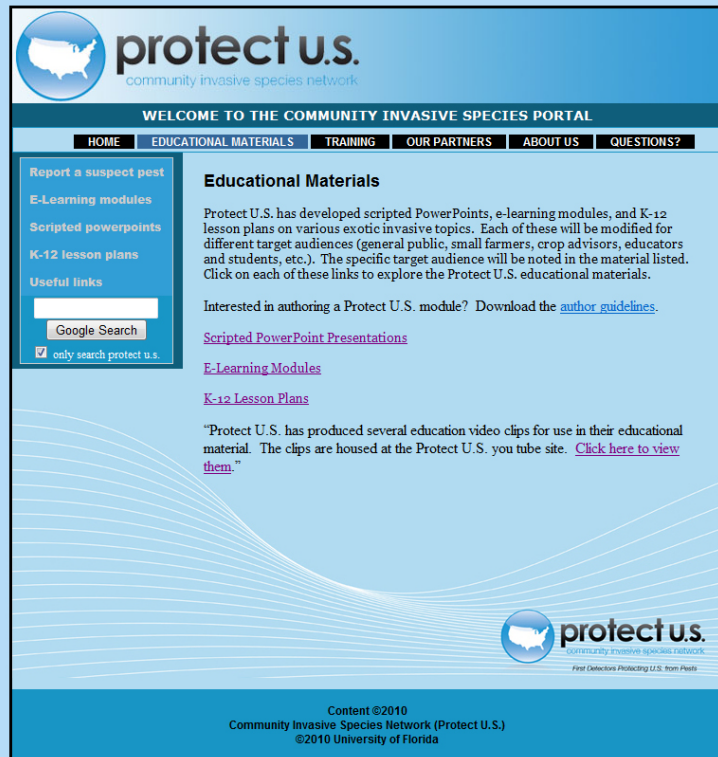
[Back to Educational Materials](#)

## K-12 Lesson Plans

- Target grades listed
- Correlated with NSES
- Scripted presentation for teacher to use or modify
- Student handout(s)
- Experiential activity
- E-learning module for the students with associated quiz



# Educational Videos



The screenshot shows the 'protect u.s.' website, which is the community invasive species network. The header includes the logo and navigation links: HOME, EDUCATIONAL MATERIALS, TRAINING, OUR PARTNERS, ABOUT US, and QUESTIONS?. The main content area is titled 'Educational Materials' and contains text about scripted PowerPoints, e-learning modules, and K-12 lesson plans. It also includes a search bar and a link to 'Scripted PowerPoint Presentations'. The footer contains copyright information for 2010.

**protect u.s.**  
community invasive species network

WELCOME TO THE COMMUNITY INVASIVE SPECIES PORTAL

HOME | EDUCATIONAL MATERIALS | TRAINING | OUR PARTNERS | ABOUT US | QUESTIONS?

Report a suspect pest  
E-Learning modules  
Scripted powerpoints  
K-12 lesson plans  
Useful links

Google Search  
☐ only search protect u.s.

**Educational Materials**

Protect U.S. has developed scripted PowerPoints, e-learning modules, and K-12 lesson plans on various exotic invasive topics. Each of these will be modified for different target audiences (general public, small farmers, crop advisors, educators and students, etc.). The specific target audience will be noted in the material listed. Click on each of these links to explore the Protect U.S. educational materials.

Interested in authoring a Protect U.S. module? Download the [author guidelines](#).

[Scripted PowerPoint Presentations](#)

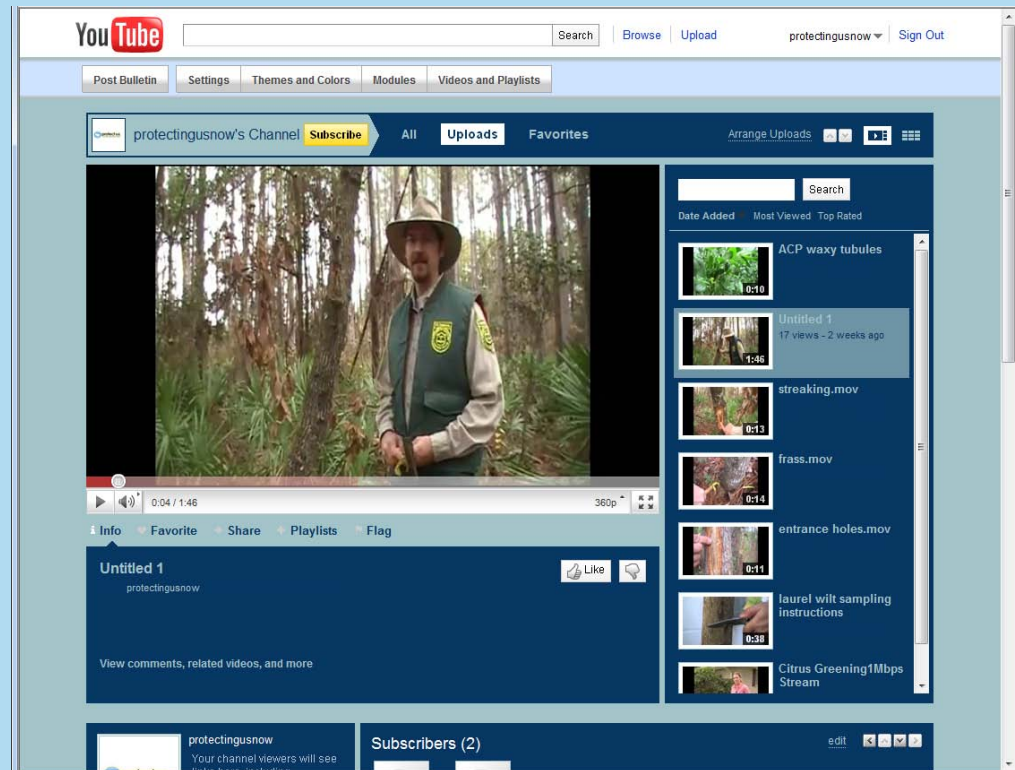
[E-Learning Modules](#)

[K-12 Lesson Plans](#)

"Protect U.S. has produced several education video clips for use in their educational material. The clips are housed at the Protect U.S. you tube site. [Click here to view them.](#)"

**protect u.s.**  
community invasive species network  
First Detectors Protecting U.S. from Pests

Content ©2010  
Community Invasive Species Network (Protect U.S.)  
©2010 University of Florida



The screenshot shows the YouTube channel page for 'protectingusnow'. The channel has a video titled 'Untitled 1' with 17 views, uploaded 2 weeks ago. The video player shows a man in a green vest and hat standing in a field. The channel page includes a search bar, a list of videos, and a subscribers count of 2.

**YouTube**

Search | Browse | Upload | protectingusnow | Sign Out

Post Bulletin | Settings | Themes and Colors | Modules | Videos and Playlists

protectingusnow's Channel | Subscribe | All | Uploads | Favorites

Arrange Uploads

Search

Date Added | Most Viewed | Top Rated

ACP waxy tubules  
Untitled 1  
17 views - 2 weeks ago  
streaking.mov  
frass.mov  
entrance holes.mov  
laurel wilt sampling instructions  
Citrus Greening1Mbps Stream

0:04 / 1:46  
360p

Info | Favorite | Share | Playlists | Flag

Untitled 1  
protectingusnow

Like

View comments, related videos, and more

protectingusnow  
Your channel viewers will see

Subscribers (2)

edit

Protect U.S. You Tube Channel –

<http://www.youtube.com/user/protectingusnow#p/a>



**protect u.s.**  
community invasive species network

## WELCOME TO THE COMMUNITY INVASIVE SPECIES PORTAL

[HOME](#) [EDUCATIONAL MATERIALS](#) [TRAINING](#) [OUR PARTNERS](#) [ABOUT US](#) [QUESTIONS?](#)

[Report a suspect pest](#)

[E-Learning modules](#)

[Scripted powerpoints](#)

[K-12 lesson plans](#)

[Useful links](#)

☒ only search protect u.s.

### Web Based Training

A train-the-trainer introductory webinar for the "Protect U.S. Community Invasive Species Network" will be held on Tuesday, February 8, 2011 at 3:00 p.m. ET, 2:00 p.m. CT, 1:00 p.m. MT, 12:00 p.m. PT and 9:00 a.m. Hawaii-Aleutian time zone. This session will provide basic information on the purpose, content and direction of the Protect U.S. project. It is expected that key participants will include IPM coordinators, NPDN first detector trainers, and other extension educators from 1862, 1890 and 1994 Land Grant Institutions. The training is also appropriate for other federal and state governmental agency employees involved in invasive species detection and management.

[For more information, click here.](#)

[Click here to register for the training session.](#)

### Local Training

[PowerPoint presentations](#), with speaker notes, are provided for educators to use at local training sessions under '[educational materials](#)'. Educators are asked to cite the authors, date of publication, and the website ([www.protectingusnow.com](http://www.protectingusnow.com)). Training materials will be periodically updated, but educators are responsible for considering the date of publication as a reference for use of materials since invasive species information (for example, distribution details) may change rapidly.

The Community Invasive Species Network does not specifically offer local training, but you may [contact your local Cooperative Extension Office](#) service or [search on the NPDN Training Site for upcoming local training sessions](#) of potential interest.



**protect u.s.**  
community invasive species network  
First Detectors Protecting U.S. from Pests

## Training



**protect u.s.**  
community invasive species network

*First Detectors Protecting U.S. from Pests*



## Useful Links

 **protect u.s.**  
community invasive species network

WELCOME TO THE COMMUNITY INVASIVE SPECIES PORTAL

HOME EDUCATIONAL MATERIALS TRAINING OUR PARTNERS ABOUT US QUESTIONS?

[Report a suspect pest](#)  
[E-Learning modules](#)  
[Scripted powerpoints](#)  
[K-12 lesson plans](#)  
[Useful links](#)

☒ only search protect u.s.

### Useful Links

The National Plant Diagnostic Network (NPDN) Training Site <http://cbc.at.ufl.edu>

The USDA Regional IPM Centers <http://www.ipmcenters.org/>

The Center for Invasive Species and Ecosystem Health <http://www.bugwood.org/>

Bugguide.net <http://bugguide.net/>

eXtension <http://www.extension.org/>

Extension Disaster Education Network (EDEN) <http://eden.lsu.edu/>

USDA, National Institute of Food and Agriculture (NIFA) <http://www.csrees.usda.gov/>

University of Florida, IFAS Featured Creatures <http://entnemdept.ufl.edu/creatures/>

 **protect u.s.**  
community invasive species network  
First Detectors Protecting U.S. from Pests

Content ©2010  
Community Invasive Species Network (Protect U.S.)  
©2010 University of Florida

## Report a Suspect Pest

 **protect u.s.**  
community invasive species network

WELCOME TO THE COMMUNITY INVASIVE SPECIES PORTAL

HOME EDUCATIONAL MATERIALS TRAINING OUR PARTNERS ABOUT US QUESTIONS?

[Report a suspect pest](#)  
[E-Learning modules](#)  
[Scripted powerpoints](#)  
[K-12 lesson plans](#)  
[Useful links](#)

☒ only search protect u.s.

### Report a Suspect Pest

#### What is a plant pest?

Any insect, mite, nematode, bacteria, fungi, virus, snail, or other biological organism that is damaging the plants in your yard, garden, farm or forest. Have you noticed unusual damage or pest activity in your yard or garden? It's possible that you could be the first person to report the occurrence of an exotic species in your county, state, or the U.S.

#### What is an exotic species?

An exotic species is any biological organism not known to be native to a given geographic region.

#### Are all exotic species considered invasive?

No. Exotic species are considered invasive only if they significantly change their new crop or ecosystem structure. This change can be either positive or negative. For example, kudzu has a negative impact on its adopted environment. Other introduced species include European honeybees. These are great pollinators and have a positive impact on an environment. Some exotic species are purposely introduced in order to control other exotic species. Exotic species that are purposely introduced to control other species are referred to as biological control agents. These would also have a positive impact on an environment.

#### How do I identify my pests?

Many books and electronic resources are available to assist you with identification. Your local Cooperative Extension Office is your source for region-specific pest identification resources. Go to the USDA, National Institute of Food and Agriculture (NIFA) website to locate [your local county Cooperative Extension Office](#). Our website, [www.protectusnow.com](http://www.protectusnow.com) will provide pest identification information on targeted species of concern.

The following national sites may also have links to additional resources or useful information:

- The National Plant Diagnostic Network (NPDN) Training Site <http://cbc.at.ufl.edu>
- The USDA Regional IPM Centers <http://www.ipmcenters.org/>
- The Center for Invasive Species and Ecosystem Health <http://www.bugwood.org/>
- Bugguide.net <http://bugguide.net/>
- University of Florida, IFAS Featured Creatures

 **protect u.s.**  
community invasive species network  
First Detectors Protecting U.S. from Pests



# Statistics

Home page	1204
Educational material page	323
Scripted powerpoint page	267
Invasive presentations (pdf, ppt, pptx)	2374
E-learning page	200
K-12 lesson plans page	107
Webinar announcement	269

**As of February 3, 2011 at 1:15 pm ET.**

Invasive presentation posted mid-October

Invasive e-learning module posted late January

Laurel wilt presentation and e-learning module posted late January



**protect u.s.**  
community invasive species network

*First Detectors Protecting U.S. from Pests*

**Please allow us a few minutes to  
load the next batch of  
presentations**



**protect u.s.**  
community invasive species network

*First Detectors Protecting U.S. from Pests*

# NPDN: First Detector Training Overview

Amanda Hodges, Ph.D.  
NPDN Training & Education,  
Program Area Manager





# Who is a First Detector?

- Cooperative Extension Personnel
- Crop Consultants
- Growers
- Master Gardeners
- Anyone Interested in Plant Management
- You!



Adrian Hunsberger, UF/IFAS,  
Miami-Dade County Extension  
Photo Credit: Julieta Brambila, USDA-APHIS-PPQ



# Training Delivery

- Traditional
  - Workshops
  - Field Days
  - Handouts
  - 2003–current
  - Over 11,000 Trained
- E–Learning
  - Asynchronous at–your–own–pace learning
  - 2008–current



**Objectives**

This module will introduce you to an invasive insect pest called the emerald ash borer (EAB). In this module, you will:

- learn about EAB and where it came from
- find out how it came to North America and how it is spread
- learn about the negative impacts EAB has on affected areas

Adult emerald ash borer on a leaf

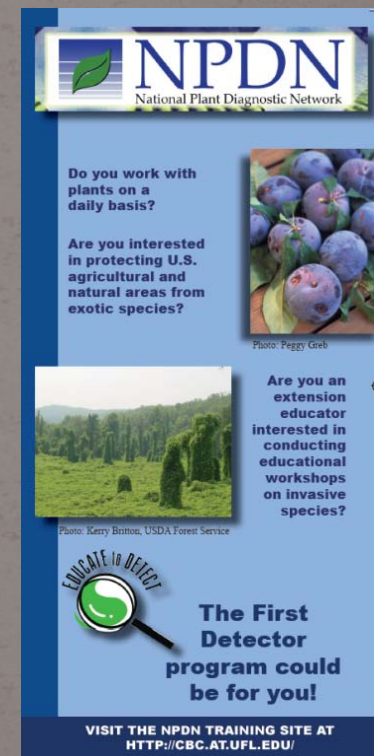
Navigation: Exit, Previous, Next

Logos: NPDN, IAS, Virginia Tech



# Traditional Training Resources

- PowerPoint presentations  
[http://www.npdn.org/first\\_detector](http://www.npdn.org/first_detector)
- Brochures
- NPDN Rulers
- Online Registration  
<http://cbc.at.ufl.edu/>
- First Detector Newsletter  
<http://www.sepdn.org/>
- Certificates of Completion
- Collaborative Pest Alerts and Identification Guides





## NPDN Web Ring

- National
  - [NPDN](#)
- Regional
  - [GPDN](#)
  - [NCPDN](#)
  - [NEPDN](#)
  - [SPDN](#)
  - [WPDN](#)
- PDIS
  - [PDIS Login](#)

## NPDN Portal

- [Home](#)
- [Employment Opportunities](#)
- [Exercise Resources](#)
- [-] [First Detector](#)
  - [Training Modules](#)
- [+] [Meeting Information](#)
- [+] [National Repository](#)
- [+] [Newsletter](#)

## Login Panel

- [NPDN Login](#)

[Home](#)

## Regional Training & Education Contacts

Name	Role	Office	Cell
<a href="#">Sharon Dobesh</a>	GPDN Regional Educational Coordinator		
<a href="#">Amanda Hodges</a>	SPDN Regional Educational Coordinator	352-273-3957	
<a href="#">Dick Hoenisch</a>	WPDN Regional Educational Coordinator		
<a href="#">Rachel McCarthy</a>	NEPDN Regional Educational Coordinator	607-255-4162	
<a href="#">Amy Peterson Dunfee</a>	NCPDN Regional Educational Coordinator		

## First Detector Training & Information

### NPDN Training Site News

- New! Thousand Cankers Disease, *Geosmithia morbida* Picture Clues [Download PDF \(4.6 MB file\)](#)
- [New! Screening Aid to Pest of Palms, LUCID® Key](#)
- The NPDN Training and Education Website (<http://cbc.at.ufl.edu/>) is under construction. Expect major changes to the web interface in September/October of 2010. More information regarding the learning objectives and purpose of the modules (available after you login) will be provided on the site. Also, traditional PowerPoint training modules will be moving from NPDN (<http://www.npdn.org/>) to the NPDN Training Site (<http://cbc.at.ufl.edu/>). Cross-posting will occur during the transitional period.
- Did you know that the NPDN crop biosecurity course and the NPDN chilli thrips, *Scirtothrips dorsalis*, module have been approved for continuing education credits with the Certified Crop Advisors (CCA) program? You can view the approval documentation [here](#). For further questions, contact the NPDN Training and Education Program Area Coordinator, [Amanda Hodges](#).
- Authors from Virginia Tech have partnered with NPDN to release a series of e-learning modules on the Emerald Ash Borer, *Agrilus planipennis*. The Emerald Ash Borer series of modules should be available on the NPDN Training Site (<http://cbc.at.ufl.edu/>) by September of 2010.
- The NPDN is a partner in a new community-based educational program, Protect U.S., that will be releasing several e-learning modules in 2010 and 2011. To learn more about Protect U.S., go to <http://www.protectingusnow.com/>

### NPDN E-Learning Author Guidelines

NPDN E-Learning Authorship Guidelines Revised, August 2010. [E-Learning Authorship Guidelines](#)

### About the First Detector Information Page

#### Questions Regarding First Detector Training?

Your state and regional contacts are your first source of information for First Detector training questions. National questions, in particular concerning the online crop biosecurity course (<http://cbc.at.ufl.edu>) can be directed to Amanda Hodges ([ahodges@ufl.edu](mailto:ahodges@ufl.edu)).

#### What's Available on the First Detector Information Page?

## Welcome to the NPDN Training Site

**Training for first detectors and resources for session organizers are available in several forms:**



[Register for NPDN First Detector Training Workshops](#)

The NPDN conducts numerous hands-on workshop training sessions each year.



[Take the On-Line Training Modules](#)

Interactive features include simulations, games and assessments for certification.



[View NPDN Training Session Data Management Facilities](#)

Tools for session, state, regional, and national coordinators.



For the latest updates on the NPDN First Detector Program, visit the [NPDN First Detector Information page](#). Also, you may sign up for the NPDN First Detector newsletter by e-mailing [Carrie Harmon](#).

Questions?? Please direct questions, comments, or suggestions relating to the NPDN First Detector Training program to [Amanda Hodges](#)



# In the News

form fields using the Hand tool

## FIRST DETECTOR NETWORK NEWS



**NPDN**  
National Plant Diagnostic Network



January 2011  
Volume 6, Issue 1

### New Educational Resource on Invasive Species Launched

Stephanie Stocks, Department of Entomology and Nematology, University of Florida

Protect U.S., the Community Invasive Species Network, was launched in October 2010. It is concerned with protecting the U.S. from exotic, invasive species through education. It is a collaborative partnership between the National Plant Diagnostic Network (NPDN), Regional Integrated Pest Management Centers, United States Department of Agriculture, Animal and Plant Health Inspection Service, Plant Protection and Quarantine (USDA-APHIS-PPQ), National Institute of Food and Agriculture (NIFA), the National Plant Board (NPB), your local Land Grant University Cooperative Extension Service, and other organizations involved in exotic species extension and regulatory activities. During 2010-2011, e-learning modules (for the general public) and scripted presentations (for educators) will be available on eleven invasive species (featuring some that are already in the U.S. and others that are not here, but for which we need to be aware), plant biosecurity, and select pest and pathogen topics (such as Laurel Wilt and the Redbay Ambrosia Beetle).

E-learning modules include games, interactive quizzes, and certificates of completion. K-12 lesson plans will also be available on select topics. These lesson plans will be correlated to the National Science Education Standards (NSES) as well as the Florida State Department of Education Sunshine State Standards. They will include background information and a scripted presentation for the teacher and an age appropriate experiential learning activity and handout(s) for the students along with a modified version of an e-learning module specifically designed for student use. Please check out their website at [www.protectingusnow.org](http://www.protectingusnow.org) for more information and to view a complete list of invasive species topics. Protect U.S. will also hold a train-the-trainer introductory webinar on Tuesday, February 8, at 3:00 p.m. ET, 2:00 CT, etc. Click [here](#) for a description of the webinar. See the training announcement on page four for information on registering for the webinar.

### Editors Note:

Happy New Year! You may have noted that the First Detector Newsletter was not sent out in November or December of 2010. We apologize for the inconvenience. Rachel Brown, one of the editors, has moved on to other responsibilities. We wish her all the best

and thank her for all her hard work. Stephanie Stocks will be taking over Rachel's duties on the newsletter. If you have any question, comments, or content to put in the newsletter, please contact her at [ssstocks@ufl.edu](mailto:ssstocks@ufl.edu) or 352-273-3958.

### Highlights:

- Protect U.S. website launched
- ID Source, a Gateway to Identification Resources on the Internet
- CPHST Announces Release of New Identification Tools
- SOS Detections in Texas and Louisiana
- Updated EAB Quarantines



# Pest Alerts

## National Pest Alert

### Tospoviruses (Family Bunyviridae, Genus Tospovirus)

Viruses in the genus *Tospovirus* cause significant worldwide crop losses. The genus name is derived from the name of its first member, tomato spotted wilt virus (TSWV). Initially observed in Australia in 1915, the spotted wilt disease of tomato was later shown to be of viral origin. The causal agent was designated TSWV, and considered to be the sole member of the tomato spotted wilt group of plant viruses until the identification and characterization of several similar viruses, including impatiens necrotic spot virus (INSV), in the early 1990's. More than a dozen tospoviruses have since been identified and characterized. Three tospoviruses, TSWV, INSV and iris yellow spot virus (IYSV), are known to occur in the United States.

**Transmission and Biology**

Tospoviruses are transmitted from plant to plant in a very specific manner by ten species of thrips. *Frankliniella occidentalis* (Western flower thrips) is a major vector of tospoviruses worldwide including those currently present in the United States (TSWV, INSV and IYSV), although under certain conditions *F. fusca* (tobacco thrips) and *Thrips tabaci* (onion thrips) may have a more significant role as a vector than *F. occidentalis*. These and other thrips species may be more or less important as vectors on a regional basis within the United States or in other parts of the world. In the case of TSWV, thrips can only transmit the virus if it is acquired during their larval stages although both larval and adult thrips are able to transmit the virus. Seed transmission is not known to occur.

**Host Range**

The host range of tospoviruses varies greatly with the virus species. TSWV has one of the widest host ranges of any plant virus, infecting more than 800 plant species, both dicots and monocots, in more than 80 plant families. The Solanaceae and Asteraceae families contain the largest numbers of TSWV-susceptible plant species. Major crops susceptible to TSWV infection are tomato, pepper, lettuce, potato, papaya, peanut, tobacco and chrysanthemum. TSWV also replicates in its thrips vector. In contrast, IYSV has a relatively restricted host range and is commonly found only in monocots such as onion, chive and leek. INSV has a more intermediate host

range, commonly infecting annual and perennial ornamental crops. Many tospovirus species also infect weeds, which are epidemiologically important hosts.

**Symptoms and Disease Development**

Leaf symptoms caused by most tospoviruses consist of necrotic (brown) and/or chlorotic (yellow) rings or ring patterns on many hosts (Fig. 1A, D-I). Necrotic and/or chlorotic lesions may also form on stems and wilting of leaves and stems can occur. Young leaves of TSWV-infected plants frequently turn brown and later develop numerous small, dark brown lesions (Fig. 1A). TSWV-infected plants may develop a one-sided growth habit or the entire plant may be stunted with drooping leaves suggestive of a vascular wilt. Growing tips may also die. Plants infected early in the season may produce no fruit, whereas plants infected after fruit set has occurred produce fruits with chlorotic or necrotic ringspots. In tomatoes, green fruit have slightly raised areas with faint concentric rings (Fig. 1B); on ripe fruit, these turn into obvious rings which become red and yellow/white (Fig. 1C). The chlorotic lesions are difficult to observe at the 'breaker' stage of picking but are highly visible at full color. Similar undesirable fruit color also may be observed with TSWV infection of pepper. INSV infection induces chlorotic or necrotic ringspots on leaves and stems (Fig. 1F). IYSV infection leads to chlorotic (sometimes with a distinct diamond shape) or necrotic lesions on the seed stalk and bulb leaves of onion, chive and leek (Fig. 1G).

**Identification of Tospoviruses**

Viruses in general and tospoviruses in particular can cause very similar symptoms requiring identification of the causal virus through the use of serological (antibody-based) or molecular tests at a disease diagnostic laboratory. It is important to consider that a single tospovirus species may vary greatly around the world. Thus, strains from different areas may differ in their reactions to antibodies against viral structural proteins. Light microscopy of viral inclusions bodies is also useful for tospovirus diagnosis.





































































































































































































































































































































# Field Identification Decks

## Mealybugs & Mealybug Look-Alikes of the Southeastern United States

Pink Hibiscus Mealybug  
*Maconellicoccus hirsutus*

001  
EXOTIC

### Pink Hibiscus Mealybug

*Maconellicoccus hirsutus*

#### Field Recognition

Body pink, about 3 mm long, no to few lateral (side) wax filaments, body fluid red to pink. Ovisacs are present covering pink to orange eggs. Feeding from pink hibiscus mealybug can cause twisted or distorted foliage. High populations may result in leaf drop.

#### Known Southeastern Distribution

Established in Florida (2002) and limited populations detected in Louisiana (2006) and Texas (2007).

#### Common Hosts

More than 200 known hosts occur, but the most common host detected to date is hibiscus. Pink hibiscus mealybug could be a problematic pest for some of major agronomic crops in the southeastern United States if established populations are nearby. Cotton, a close relative of hibiscus, is of particular concern.

## Pest Thrips of the United States: Field Identification Guide

004  
NATIVE

### Florida Flower Thrips

*Frankliniella bispinosa*

#### Field Recognition

Adult female: 1 mm, pale yellow with gray bands or spots on abdominal segments. Adult male: smaller than female, white to pale yellow. Florida flower thrips are typically found at the base of flower petals. Well-developed hairs or setae are present on the anterior part of the thorax for all *Frankliniella* species and absent in *Thrips* species, including onion thrips.

#### May be Confused with

Onion thrips and other *Frankliniella* species, especially western flower thrips and eastern flower thrips.

Florida Flower Thrips  
*Frankliniella bispinosa*

damage fruit when population densities are high. Damage may occur on fruits of certain varieties of grapefruit as a secondary vector for TSWV.

plants, and several vegetable crops such as roses, and ornamental cut flowers, such as yellow. It is suspected that Florida flower thrips moves to pines, pine, and oak.

2008

40 topics, 113 pages

2009

28 topics, 143 pages

Go to [http://www.npdn.org/first\\_detector](http://www.npdn.org/first_detector)



# LUCID<sup>®</sup> Keys

A Resource for Pests and Diseases of Cultivated Palms

## SCREENING AID TO PESTS

**HOME** KEYS FACT SHEETS GLOSSARY ABOUT» INSECT ANATOMY

### Flatid Planthopper

*Ormenaria rufifascia* is not considered a serious pest, although large populations can cause aesthetic damage due to the large amount of honeydew that supports extensive coatings of sooty mold on the host plants...

**FACT SHEET**



### About This Tool

The pages of this tool offer a variety of resources to aid the user in the identification of arthropod palm pests.



### Taxa Covered

This tool includes arthropod pests of palms from the U.S. and the Caribbean.



### Palm Resource

Learn more about the commodity-based resource *A Resource for Pests and Diseases of Cultivated Palms*.

OCTOBER 8, 2010



<http://itp.lucidcentral.org/id/palms/sap/>




# NPDN E-Learning

- Crop Biosecurity Course, 2008
- Special Topic Modules
  - Chilli thrips, *Scirtothrips dorsalis*, 2009
  - *Ralstonia solanacearum* Race 3, biovar 2, 2010
  - Emerald Ash Borer, *Agrilus planipennis*, 2010
  - Entomology Diagnostics Modules, December 2011
- Online at: <http://cbc.at.ufl.edu/>



# Mission of the NPDN



National Plant Diagnostic Network

Mission of the NPDN

- Introduction
- Crop Biosecurity and Its Importance
- NPDN and Its Partner Agencies
- First Detector's Role Evaluation


Glossary

Home Exit

Next ▶

## Introduction

This module will introduce you to the origin and mission of the National Plant Diagnostic Network (NPDN).



Oaks affected by Sudden oak death, *Phytophthora ramorum*. Rhododendron leaf shows Sudden oak death symptoms and serves as a host in the spread of this pathogen.

703 Participants

# Monitoring for High Risk Pests



National Plant Diagnostic Network

Monitoring For High-Risk Pests

- Introduction
- High-Risk Pests
- Select Agents
- USDA - APHIS
- Monitoring
  - Effective Monitoring
  - Specific Organisms
  - Scouting
  - Spatial Distribution
  - Incidence and Severity
  - Summary
  - Evaluation

Home Exit

◀ Previous Next ▶

## Incidence and Severity

Do you know the difference?

### Measuring Incidence and Severity

**"Incidence"** refers to the percentage of a crop that is affected by the plant pathogen. For example, 5% of a crop may be affected by a particular pathogen.



Out of 10 lettuce plants shown in this photo, 3 are diseased (30% incidence) with lettuce drop (caused by *Sclerotinia sclerotiorum*).

**"Severity"** refers to the percentage or degree of a plant area affected. For example, the severity of one pathogen could be serious, at 70% of the plant's overall area being affected.




Potato leaf with 25% disease severity (i.e., 25% of the leaf affected with disease, as shown in black)

570 Participants




# Diagnosing Plant Problems



National Plant Diagnostic Network

## Signs of Damage

Can you recognize the signs of damage?




Abundant Webbing from spider mites

Home Exit Previous Select All Correct Answers To Proceed

537 Participants


# Submitting Diagnostic Samples



National Plant Diagnostic Network

## Packaging Samples 1

Diagnostic labs receive thousands of specimens each year. Below, and on the next few screens, you can compare poorly-packed and well-packed samples.




Read on to learn what is right/wrong with these clinic specimens.

Home Exit Previous Next

504 Participants



# Photography for Diagnosis



National Plant Diagnostic Network

Photography For Diagnostics

- Learning Objectives List
- Introduction
- Bad Photos
- Good Photos
- Getting Started With Digital Photography
- Taking Photos In the Field
- Identify the Subject
- What Do I Photograph?
- How To Take the Best Possible Photos
- Capturing Close-ups
- Additional Tips
- Saving and Submitting Your Photos
- Evaluation

## Photograph Examples

Take a series of photos...







Photo shows the cultural system and environment for growing cabbage.



This photo shows the entire plant and the distribution of the problem on the plant (i.e., lower leaves).



Cabbage leaf with ruler indicates size and extent of leaf damage.




Close-up of plant damage with thumb used to show size/scale.

[Home](#) [Exit](#) [Previous](#) [Next](#)

494 Participants

# Disease and Pest Scenarios




National Plant Diagnostic Network

## Learning Objectives

The purpose of this module is to allow you to test your skills as a first detector. In this module you should be able to demonstrate the following:

- How to scout a field for a plant pest, plant pathogen, or weed problem.
- What is considered a high-risk plant pest, plant pathogen, or weed and when to collect a sample for submission.
- How to properly collect, package and send a high-risk plant pest, plant pathogen, or weed sample.
- How to conduct proper chain of communication and custody when submitting a high-risk plant pest, pathogen, or weed for diagnosis.



First Detectors discussing pest control in a field of staked tomatoes.

When you are Finished, Click Here to Take the Disease and Pest Scenarios Quiz

[Home](#) [Exit](#) [Previous](#) [Next](#)

271 Participants



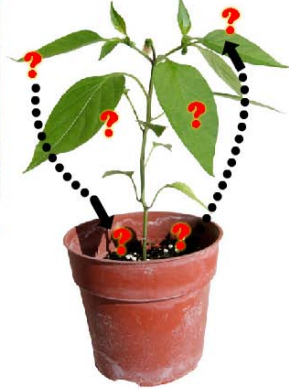
# Chilli Thrips

**NPDN**  
National Plant Diagnostic Network

**Life Cycle**

An Emerging Pest of Concern: Chilli Thrips

Chilli Thrips Life Cycle



**1st instar larva**

**Instructions:**  
Drag your mouse over the "?" located on the pepper plant.

Home Exit Previous Next

122 Participants

# *Ralstonia solanacearum*

**NPDN**  
National Plant Diagnostic Network

**Welcome**


Welcome to this *Ralstonia solanacearum* - Bacterial wilt dedicated program !

*R. solanacearum* causes bacterial wilts on a wide range of crops and ornamentals, including potato, tomato, and geranium.


It is one of the most damaging plant pathogenic bacteria worldwide, responsible for several \$ billion US losses yearly.

One subgroup of *R. solanacearum* called Race 3 biovar 2 (R3bv2) is not present in the United States, but is of high risk of introduction through infected geranium cuttings imported from off-shore production sites. If introduced, R3bv2 could seriously affect the potato industry. It has been listed as a Select Agent plant pathogen and is subject to the strictest biosecurity regulations in the US.


**Bacterial wilt of tomato**



**Brown rot of potato**



**Southern wilt of geranium**



Introduction  
Welcome  
History  
Program Overview  
Select Agents  
Ralstonia Project  
Training Module  
Thank You

Exit Previous Next

84 Participants



# NPDN Training Questions???

Amanda Hodges, Ph.D.

SPDN Associate Director

Assistant Extension Scientist

Entomology & Nematology Department

University of Florida

Office: (352) 273-3957

[achodges@ufl.edu](mailto:achodges@ufl.edu)

# Overview: Invasive Species that Affect Plants



**protect u.s.**  
community invasive species network

*First Detectors Protecting U.S. from Pests*



# Author Credits

- Amanda Hodges, PhD, SPDN Associate Director, NPDN Training and Education Program Area Manager, University of Florida, [achodges@ufl.edu](mailto:achodges@ufl.edu)
- Stephanie D. Stocks, MS, Protect U.S. Coordinator, University of Florida, [sstocks@ufl.edu](mailto:sstocks@ufl.edu)



**protect u.s.**  
community invasive species network

*First Detectors Protecting U.S. from Pests*

# Reviewer Credits

- Stephanie Bloem, Ph.D.  
Risk Analyst - Training Specialist  
USDA-APHIS-PPQ-CPHST
- Rachel L. McCarthy  
Education and Training Coordinator-Northeast Plant  
Diagnostic Network  
Department of Plant Pathology and Plant-Microbe Biology  
Cornell University
- Julieta Brambila  
Entomologist  
USDA-APHIS-PPQ



**protect u.s.**  
community invasive species network

*First Detectors Protecting U.S. from Pests*



# Terminology

- Invasive
- Introduced
- Beneficial
- Non-Native
- Native
- Exotic
- Pest
- Plant Biosecurity



**protect u.s.**  
community invasive species network

*First Detectors Protecting U.S. from Pests*



Overview: Invasive  
Species That Affect  
Plants

Overview: Invasive  
Species That Affect  
Plants

Instructions

Overview: Invasive  
Species That Affect  
Plants

How Bad Can It Be?  
Evaluation



## Native Or Introduced

Click on on rollover the images with your mouse to find out if they are native or introduced.



Bald Cypress



Opossum



Purple Coneflower



Horses



Brown anole



Water milfoil

Exit



Previous

Next



**protect u.s.**  
community invasive species network

First Detectors Protecting U.S. from Pests



# Learning Objectives

- Name and briefly describe examples of exotic, invasive species that have caused significant damage to U.S. agricultural and natural areas.
  - Weeds
  - Plant Pathogens
  - Arthropods



**protect u.s.**  
community invasive species network

*First Detectors Protecting U.S. from Pests*

# What are the Issues?



Photo Credit: Kerry Britton, USDA Forest Service  
<http://www.forestryimages.org/> , Image No. 0002156



**protect u.s.**  
community invasive species network

*First Detectors Protecting U.S. from Pests*



# Asian Soybean Rust



- 2004-Detected in U.S.
- Estimated yield losses from 10%-50%
- Kudzu as a potential overwintering source
- ipmPIPE  
<http://www.ipmpipe.org/>

Photo Credit: Reid Frederick, USDA ARS  
<http://www.bugwood.org/>, Image No. 1265017



**protect u.s.**  
community invasive species network

*First Detectors Protecting U.S. from Pests*



# Emerald Ash Borer

## *Agrilus planipennis*



Photo Credit:

Damaged ash trees: Daniel Herms, The Ohio State University,  
<http://www.invasive.org/> Image No. 5171038

Beetle: David Cappaert, Michigan State University, [www.bugwood.org](http://www.bugwood.org), #2106098



**protect u.s.**  
community invasive species network

*First Detectors Protecting U.S. from Pests*



# Learning Objectives

- Overall costs.
- The impact of invasive species on natural areas.
- The importance of exotic, agronomic pests to individuals not involved in the farming profession.
  - Be familiar with exotic pests that could threaten U.S. wheat as an example crop.



**protect u.s.**  
community invasive species network

*First Detectors Protecting U.S. from Pests*

# Wheat Losses-Who is Affected?



- Developing countries
- Food animal producers
- Everyone

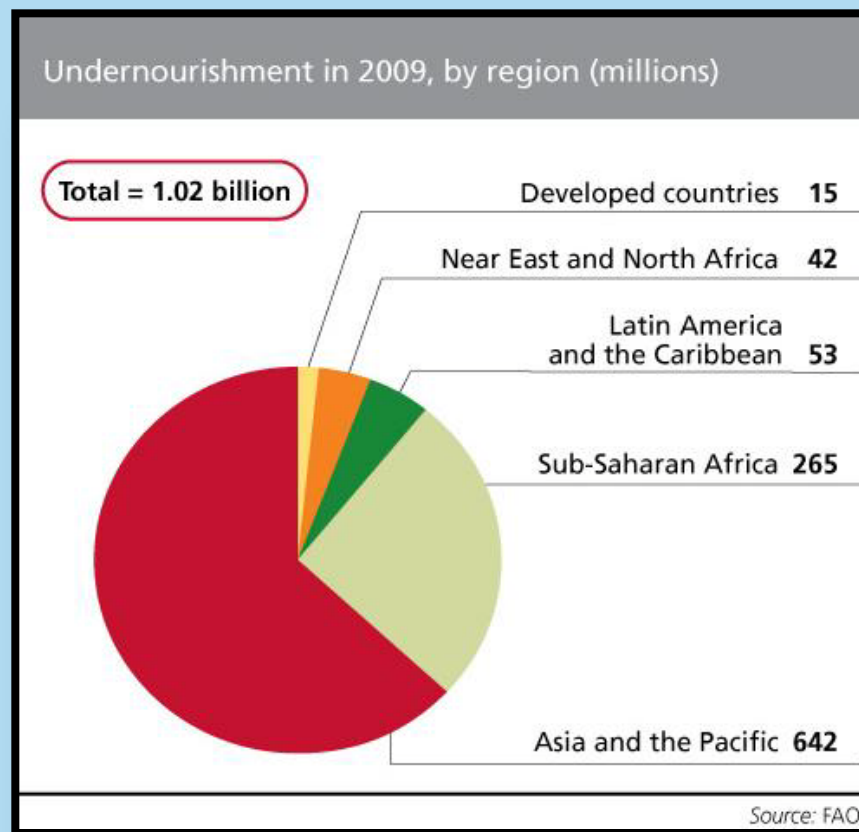


Photo: Jean Robinson, Gainesville, FL

Source of chart: Food and Agriculture Organization of the United Nations 2010

<http://www.fao.org/hunger/en/>



**protect u.s.**  
community invasive species network

*First Detectors Protecting U.S. from Pests*



# Learning Objectives

- Understanding the responsibilities and agencies involved in the following:
  - Regulatory
  - Cooperative Extension
  - Research



**protect u.s.**  
community invasive species network

*First Detectors Protecting U.S. from Pests*

# Plant Protection in the US- Begins at the Border, Ends with You!



Photo Credit: Department of Homeland Security, Customs and Border Patrol  
[http://www.cbp.gov/xp/cgov/newsroom/news\\_releases/archives/  
2008\\_news\\_releases/december\\_2008/12232008\\_2.xml](http://www.cbp.gov/xp/cgov/newsroom/news_releases/archives/2008_news_releases/december_2008/12232008_2.xml)



**protect u.s.**  
community invasive species network

*First Detectors Protecting U.S. from Pests*



# Learning Objectives

- Understand the importance of the private sector and the general public.



**protect u.s.**  
community invasive species network

*First Detectors Protecting U.S. from Pests*

# Finding the Module...

- Scripted Presentation
  - <http://www.protectingusnow.org/>
- E-Learning
  - Link available at:  
<http://www.protectingusnow.org/>
  - Module located under “Protect U.S.” at:  
<http://cbc.at.ufl.edu/>



**protect u.s.**  
community invasive species network

*First Detectors Protecting U.S. from Pests*



# The Asian Citrus Psyllid & Huanglongbing

Natalie Hummel, Ph.D.

Assistant Professor  
Extension Specialist  
Department of Entomology  
LSU AgCenter



**protect u.s.**  
community invasive species network

*First Detectors Protecting U.S. from Pests*



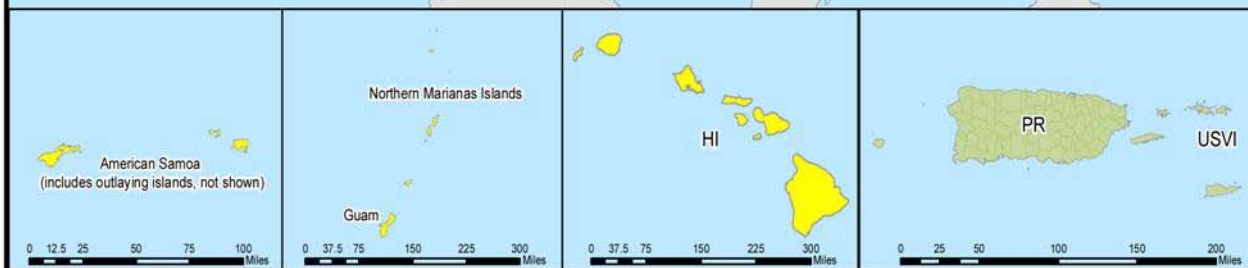
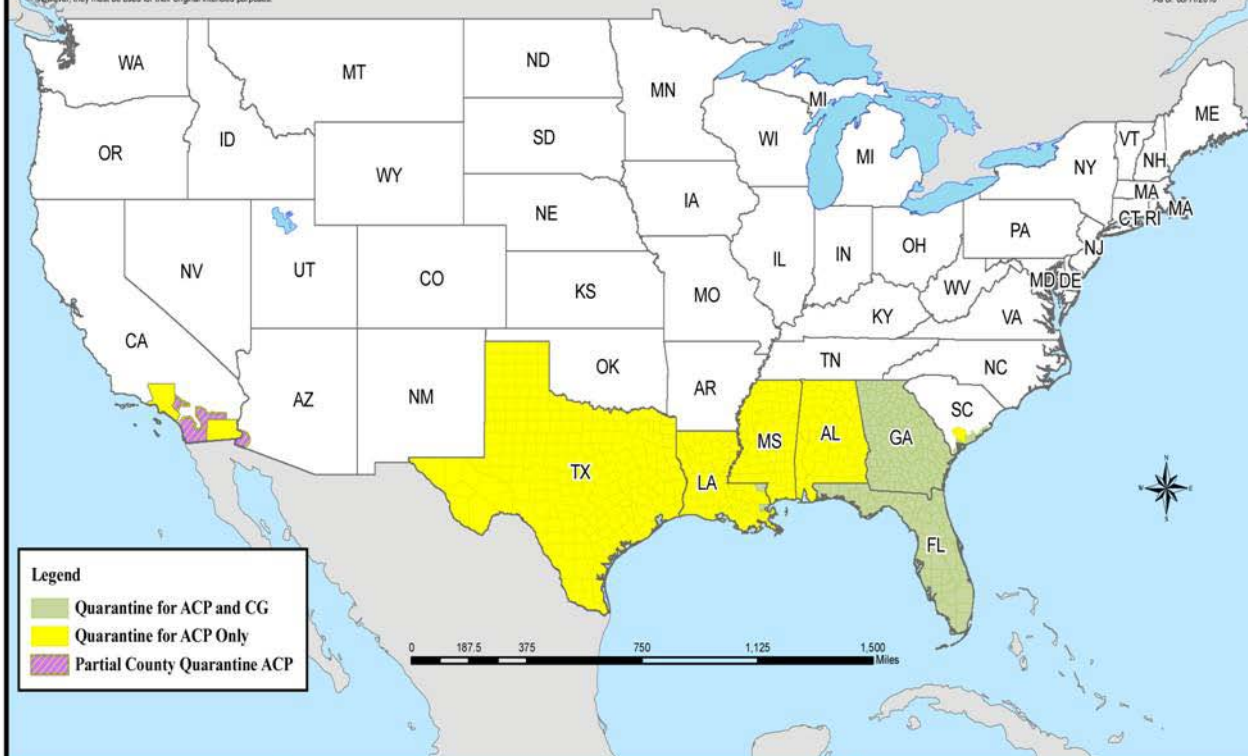
## National Quarantine Citrus Greening And Asian Citrus Psyllid



DISCLAIMER: The U.S. Department of Agriculture's Animal and Plant Health Inspection Service collected the data displayed for general agency purposes only. This data may be used by others. However, they must be used for their original intended purposes.

As Of: 10/08/2010

Author: Jamie Perie  
Title: GIS Specialist  
Data Source: PPQ ESRI  
As of: 9/11/2010



Map:

[http://www.aphis.usda.gov/plant\\_health/plant\\_pest\\_info/citrus\\_greening/downloads/pdf\\_files/nationalquarantinemap.pdf](http://www.aphis.usda.gov/plant_health/plant_pest_info/citrus_greening/downloads/pdf_files/nationalquarantinemap.pdf)



**protect u.s.**  
community invasive species network

First Detectors Protecting U.S. from Pests



# Introduction to the disease

- Causal organism and history
- Symptoms in fruit, trees, leaves
- How to distinguish from nutritional deficiencies



**protect u.s.**  
community invasive species network

*First Detectors Protecting U.S. from Pests*

# Huanglongbing (HLB)



“Yellow dragon” or  
“yellow shoot” disease



Dramatic “greening” on fruit

Image credits:

Tree: APS Compendium of Citrus Diseases 2<sup>nd</sup> edition, used with permission

Fruit: Gottwald et al., used with permission



**protect u.s.**  
community invasive species network

*First Detectors Protecting U.S. from Pests*



# Introduction to the vector

- Images of all life-stages
- The lifecycle
- Current range in the United States
- Other vectors of the disease
- How to distinguish from other common citrus pests
- Other hosts for disease
- Scouting video



**protect u.s.**  
community invasive species network

*First Detectors Protecting U.S. from Pests*

# Asian Citrus Psyllid

## *Diaphorina citri*

Wings held at 45° angle to leaf/stem

Pattern on wings

Red eyes

Black tips on antennae



Image credits:

Left: Natalie Hummel, LSU AgCenter

Right: Jeff Lotz, Florida Department of Agriculture and Consumer Services, [www.bugwood.org](http://www.bugwood.org), #5196081



**protect u.s.**  
community invasive species network

First Detectors Protecting U.S. from Pests



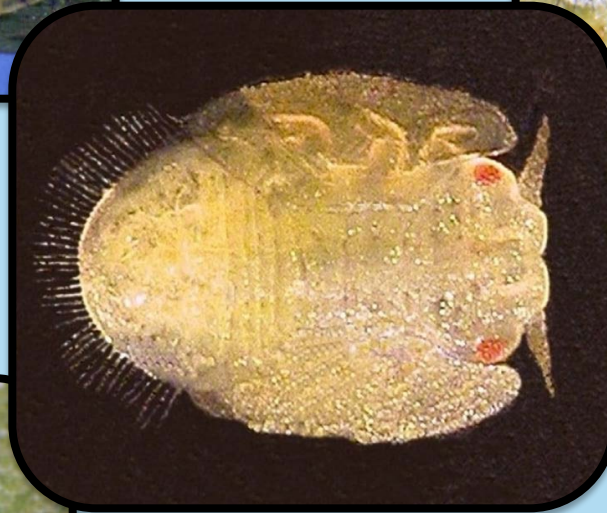
# There are other insects that attack citrus



Green scale nymph



citrus black fly nymph



Asian citrus psyllid nymph

citrus white fly nymph



Image credits:

Asian citrus psyllid nymph – David Hall, USDA  
Agricultural Research Service,  
[www.bugwood.org](http://www.bugwood.org), #5006084

Green scale nymph - Jeffrey W. Lotz, Florida  
Department of Agriculture and Consumer  
Services, [www.bugwood.org](http://www.bugwood.org), #5385208

citrus whitefly nymph and citrus blackfly nymph  
– Florida Division of Plant Industry Archive,  
[www.bugwood.org](http://www.bugwood.org), #5194033 and #5194011



**protect u.s.**  
community invasive species network

*First Detectors Protecting U.S. from Pests*

# Scouting flush for Asian citrus psyllid



Click [here](#) to view the video.

Image credits: Stephanie Stocks, University of Florida



**protect u.s.**  
community invasive species network

*First Detectors Protecting U.S. from Pests*



# Management of vector

- Basic principles
- IPM strategies
  - Biological control
  - Cultural control
  - Chemical control
  - Organic strategies



**protect u.s.**  
community invasive species network

*First Detectors Protecting U.S. from Pests*

# Regional control programs



**protect u.s.**  
community invasive species network

*First Detectors Protecting U.S. from Pests*



# What to do if you suspect CG?

- Contact information for federal agencies
- Reporting process



**protect u.s.**  
community invasive species network

*First Detectors Protecting U.S. from Pests*

# References provided

- Also provide contact information for NPDN
- Authors listed – contact us with any questions
- Content reviewer listed



**protect u.s.**  
community invasive species network

*First Detectors Protecting U.S. from Pests*



# Benefit of participating with Protect US

- Central portal for information
  - Improves efficiency
- Support to developing online training
  - Updateable
  - Can be accessed at any time by users
  - Provides user feedback



**protect u.s.**  
community invasive species network

*First Detectors Protecting U.S. from Pests*

# Questions?

- For more information, check out [www.protectingusnow.org](http://www.protectingusnow.org)
- You can also contact:
  - Stephanie D. Stocks, University of Florida, [sstocks@ufl.edu](mailto:sstocks@ufl.edu)
  - Amanda Hodges, SPDN, University of Florida, [achodges@ufl.edu](mailto:achodges@ufl.edu)



**protect u.s.**  
community invasive species network

*First Detectors Protecting U.S. from Pests*



# Author Credits

- Natalie Hummel, Ph.D.  
Assistant Professor  
LSU AgCenter
- Don Ferrin, Ph.D.  
Associate Professor  
LSU AgCenter
- Edited by Stephanie Stocks, Protect U.S. Coordinator,  
University of Florida



**protect u.s.**  
community invasive species network

*First Detectors Protecting U.S. from Pests*

# Recognizing and Responding to Wheat Stem Rust

Erick De Wolf

Kansas State University

Department of Plant Pathology



**protect u.s.**  
community invasive species network

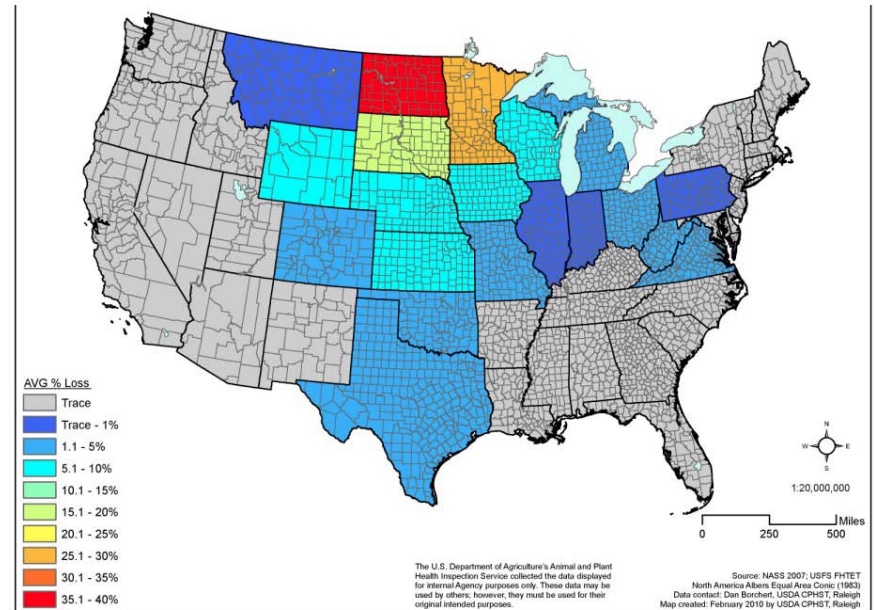
*First Detectors Protecting U.S. from Pests*



# History of Stem Rust

- Between 1900 and 1960, several severe outbreaks of stem rust occurred in the Great Plains, many Midwestern states, and Canada.

Average crop losses from wheat stem rust in 1919, 1935, and 1954



**protect u.s.**  
community invasive species network

*First Detectors Protecting U.S. from Pests*



# Recent Problems with Stem Rust

- In 1985-1986 more localized outbreaks affected wheat production the southern Great Plains.
- Stem rust also affects barley with recent epidemics occurring in northern Great Plains in 1989 and early 1990's



**protect u.s.**  
community invasive species network

*First Detectors Protecting U.S. from Pests*





# Remerging Threats Stem Rust

- Stem rust has been effectively managed for several decades with genetic resistance
- Each of these historical outbreaks was associated with a change in the population of the fungus that causes stem rust.
- New variants of stem rust have emerged in Africa

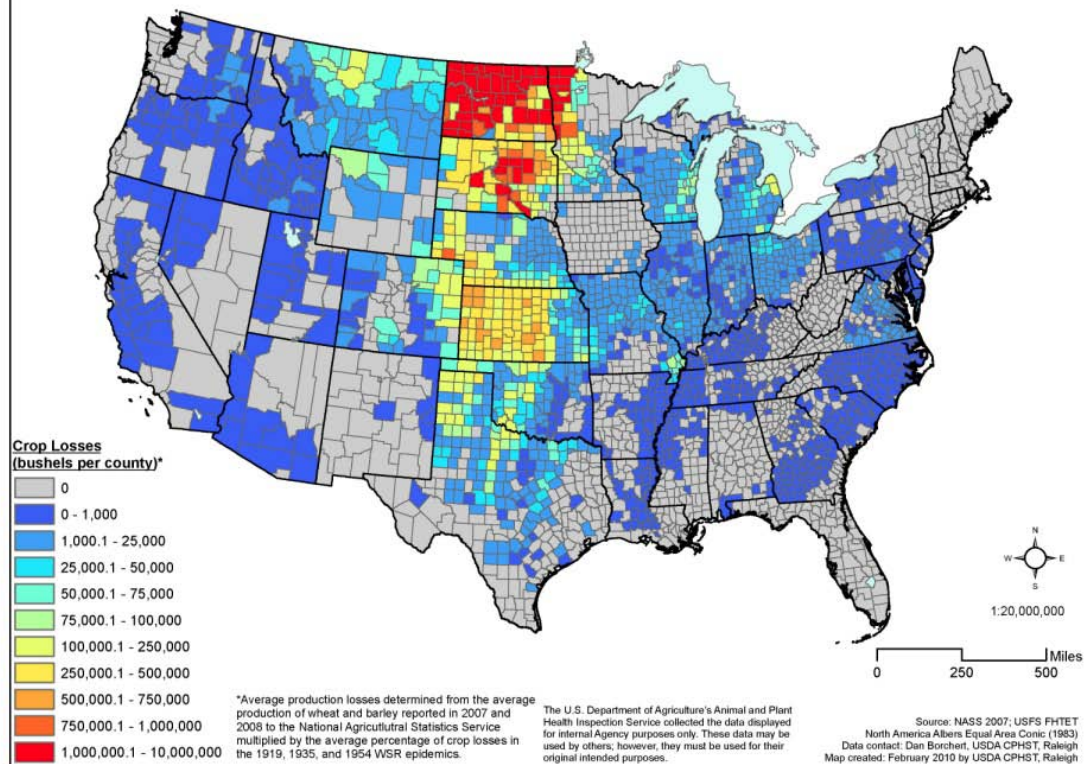


**protect u.s.**  
community invasive species network

*First Detectors Protecting U.S. from Pests*

# Current Estimate of Disease Risk

Average estimated crop losses from wheat stem based on current production



**protect u.s.**  
community invasive species network

First Detectors Protecting U.S. from Pests



# Recognizing Stem Rust

- Early detection of stem rust critical to the response in North America
  - Impact wheat breeding priorities and strategies
  - Influence in-season disease management



**protect u.s.**  
community invasive species network

*First Detectors Protecting U.S. from Pests*



# Recognizing – *Identification of Rust Diseases*

- The vegetative parts of the plant include the:
  - Stem
  - Leaf
  - Leaf sheath
- The leaf sheath wraps around the stem



**protect u.s.**  
community invasive species network

*First Detectors Protecting U.S. from Pests*



# Recognizing – *Identification of Rust Diseases*

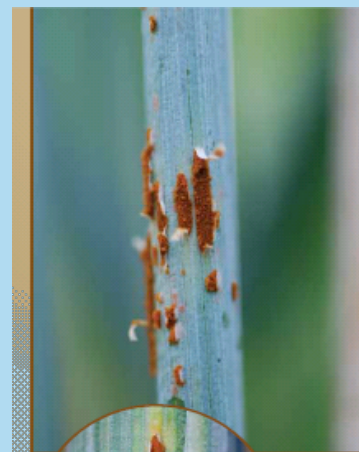
- There are three cereal rusts of concern:



Leaf  
Rust



Stripe  
Rust



Stem  
Rust



**protect u.s.**  
community invasive species network

*First Detectors Protecting U.S. from Pests*

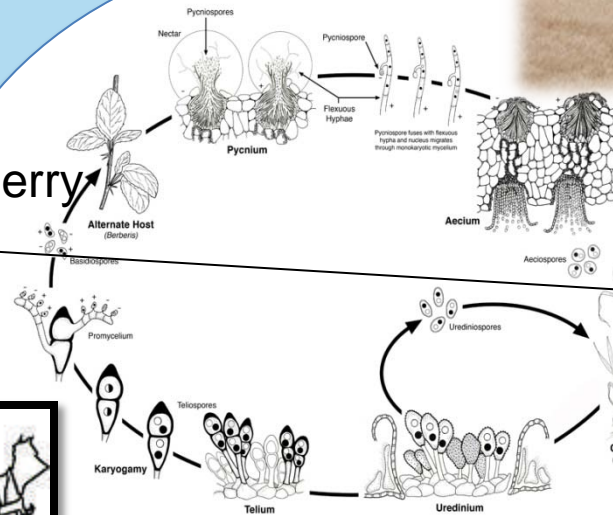
# Recognizing the Threat – *Wheat Stem Rust Life Cycle*

- Two Critical Stages

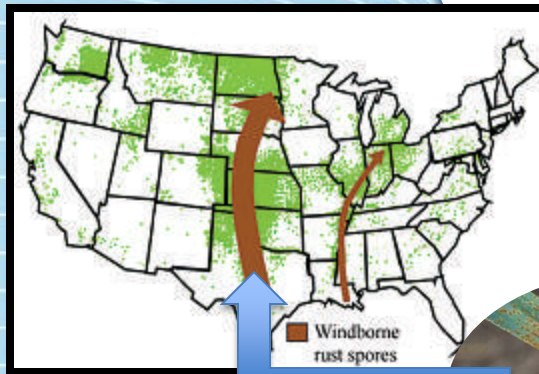
Barberry in a  
fencerow between  
wheat fields.



**Sexual stage: on Barberry**



**Asexual stage: on Wheat and Barberry**



Asexual spores can blown northward  
relatively quickly, moving from Texas to  
North Dakota in two to three months



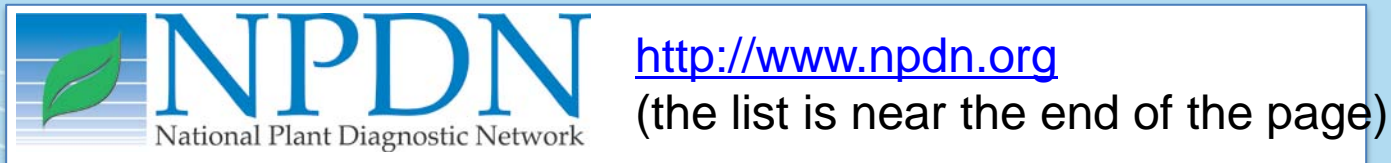
**protect u.s.**  
community invasive species network

First Detectors Protecting U.S. from Pests



# Responding

- For additional assistance identifying diseases of wheat or barley contact the state partner lab to NPDN or your local county extension office
- You can find a your state's NPDN lab by linking here:

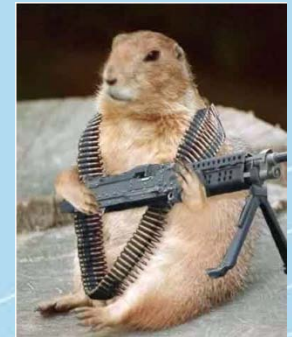


- You can find your local count extension office my linking here:



# Responding

- Early recognition and reporting of suspicious samples will allow appropriate grower responses to minimize spread and crop loss!



Enabling the deployment  
of Squirrel Force 7



**protect u.s.**  
community invasive species network

*First Detectors Protecting U.S. from Pests*





# Additional information resources

- For states of the U.S. that grow wheat and barley:
- Other sources of information:
  - USDA Cereal Disease Lab, St. Paul, MN
  - Borlaug Global Rust Initiative



**protect u.s.**  
community invasive species network

*First Detectors Protecting U.S. from Pests*

# Questions?

- For more information, check out [www.protectingusnow.org](http://www.protectingusnow.org)
- You can also contact:
  - Stephanie D. Stocks, University of Florida, [sstocks@ufl.edu](mailto:sstocks@ufl.edu)
  - Amanda Hodges, SPDN, University of Florida, [achodges@ufl.edu](mailto:achodges@ufl.edu)



**protect u.s.**  
community invasive species network

*First Detectors Protecting U.S. from Pests*




**Please allow us a few minutes to  
load the next batch of  
presentations**



**protect u.s.**  
community invasive species network

*First Detectors Protecting U.S. from Pests*

A pair of hands is shown holding a small green seedling with several leaves, growing out of a mound of dark soil. The background is dark and out of focus.

# Laurel Wilt and the Redbay Ambrosia Beetle: A new threat to southern ecosystems and guacamole

Carrie Lapaire Harmon

Southern Plant Diagnostic Network

and

UNIVERSITY OF  
FLORIDA



University of Florida Department of Plant Pathology



# What you need to know now

- Laurel Wilt affects redbay (*Persea borbonia*), an important species for coastal wildlife, and avocado (*Persea americana*), an important subtropical world crop.
- The disease is associated with an exotic ambrosia beetle (*Xyleborus glabratus*) and caused by a fungus (*Raffaelea lauricola*).
- Symptoms and signs of the disease and insect include wilted foliage, vascular discoloration, and sawdust tubes.
- The disease has been detected in Georgia, South Carolina, Florida, and Mississippi.
- No effective management tools currently exist for complete control of the disease



# The host: Redbay

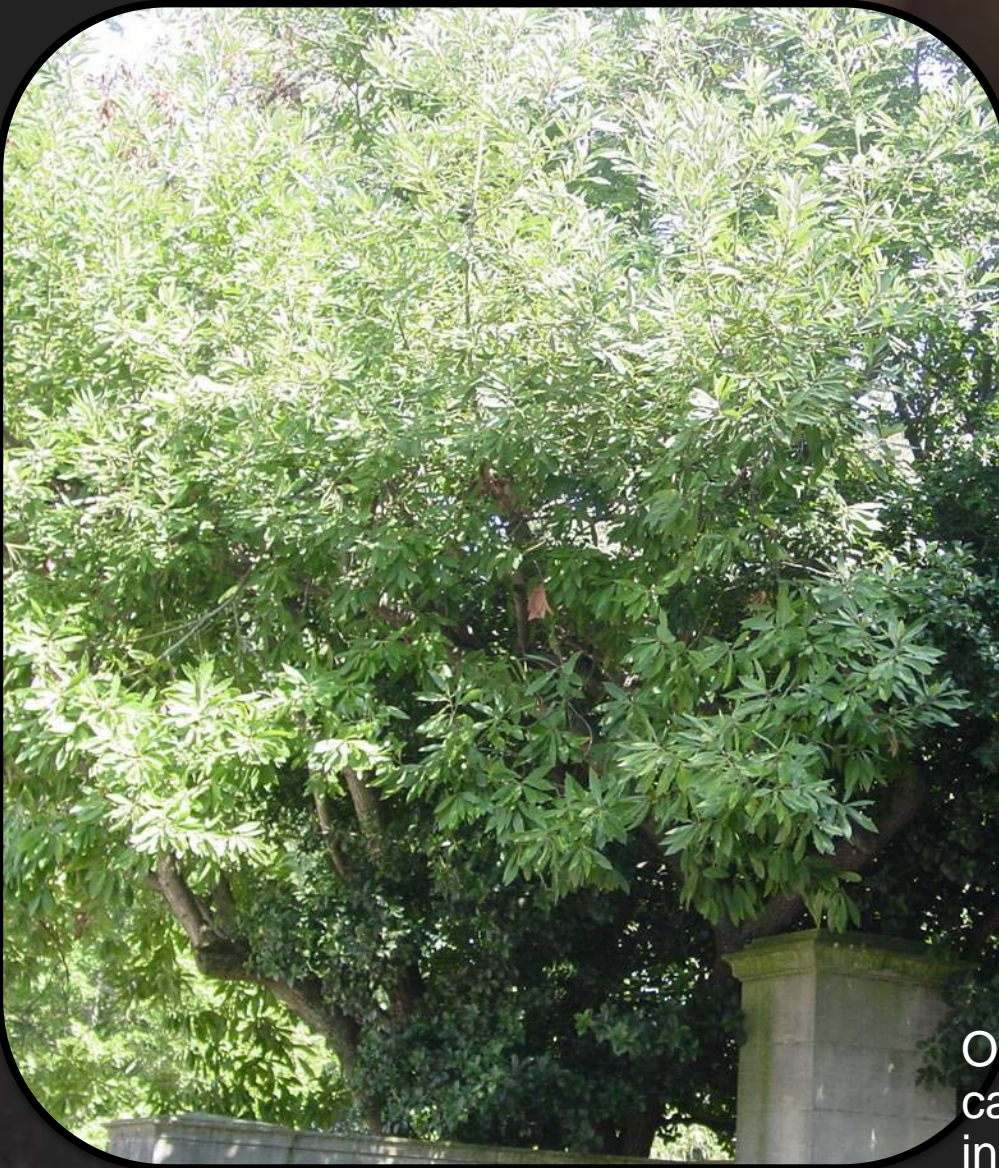
## *Persea borbonia*

Image credit:  
Ann Murray, University of Florida



Other members of the Lauraceae family can also be affected by the disease including: sassafras (*Sassafras albidum*), spicebush (*Lindera benzoin*), and swamp bay (*Persea palustris*).

Image credit:  
Gary Wade, University of Georgia





# Infected redbays, starting in 2003





# Save the guac!

## Avocado, *Persea americana*



“Simmonds”  
avocado 20  
days after  
inoculation

Image credit:  
Florida Department of Agriculture and Consumer Services, Division of Plant  
Industry

<http://www.savetheguac.com/>



# Impact



Image credit:  
CL Harmon, University of  
Florida

# 15 weeks



# New! *Raffaelea lauricola*



The fungal  
pathogen  
on APDA at  
2 weeks

A background image showing a pair of hands cupping a small green seedling with several leaves, growing out of a mound of dark soil. The image is slightly dimmed to serve as a background for the text.

# Redbay ambrosia beetle

## *Xyleborus glabratus*

- Exotic beetle from Asia
- Native hosts include:
  - Lauraceae : *Phoebe lanceolata*, *Lindera latifolia*, *Litsaea elongata*
  - Fagaceae: *Lithocarpus edulis*
  - Fabaceae: *Leucaena glauca*
  - Dipterocarpaceae: *Shorea robusta*



# Redbay ambrosia beetle

## *Xyleborus glabratus*



Image credit:

Top right: M. C. Thomas, Florida Department of Agriculture and Consumer Services,

[www.bugwood.org](http://www.bugwood.org), #1413004

Bottom Right: Andrew Derksen, Florida Department of Agriculture and Consumer Services,

[www.bugwood.org](http://www.bugwood.org), #5411465

Left: M. C. Thomas, Florida Department of Agriculture and Consumer Services,

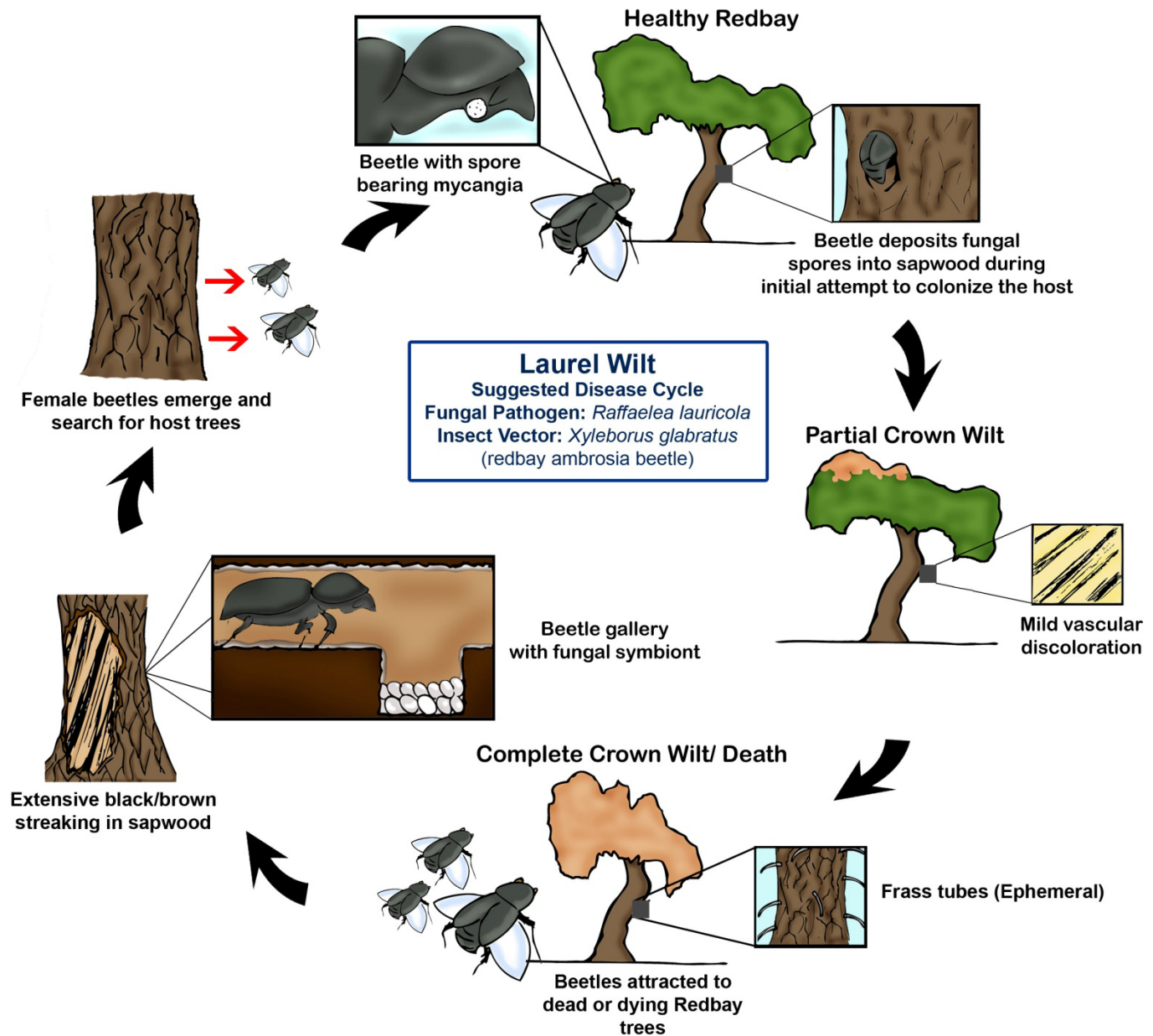
[www.bugwood.org](http://www.bugwood.org), #1413003



Image credit:

Jeffrey Lotz, Florida Department of Agriculture and Consumer Services, Division of Plant Industry

# Disease Cycle



M. Hughes<sup>1</sup>, J. Thomas, and A.E. Mayfield<sup>2</sup>  
mhughes741@ufl.edu      mayfiea@doacs.state.fl.us

Last Revised 9/21/09

<sup>1</sup>University of Florida, Institute of Food and Agricultural Sciences, Department of Plant Pathology, P.O. Box 110680, Gainesville, FL 32611

<sup>2</sup>Florida Department of Agriculture and Consumer Services, Division of Forestry, 1911 SW 34th Street, Gainesville, FL 32608



# Symptoms of the Disease



- Leaves turn reddish and remain on the tree for a while.
- Dark streaking underneath the bark (vascular tissue)

Image credit:

Left: Ronald F. Billings, Texas Forest Service, [www.bugwood.org](http://www.bugwood.org), #5383213

Right: A. Mayfield, Florida Department of Agriculture and Consumer Services, [www.bugwood.org](http://www.bugwood.org), #2199084



# Signs of the vector



Image credit:

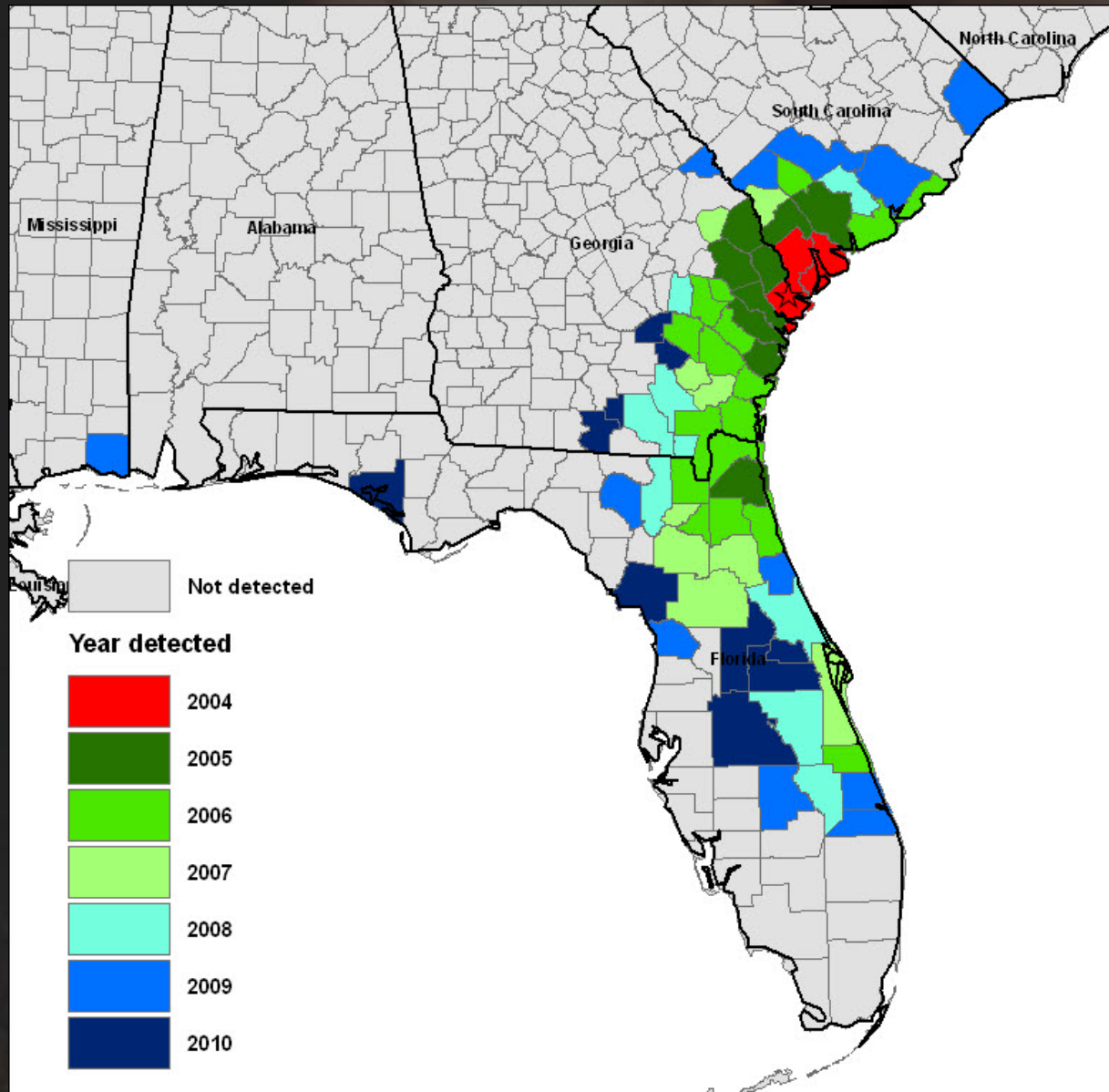
Top left: Albert (Bud) Mayfield, Florida Department of Agriculture and Consumer Services, [www.bugwood.org](http://www.bugwood.org), #2199086

Bottom left: James Johnson, Georgia Forestry Commission, [www.bugwood.org](http://www.bugwood.org), #2109039

Right: Albert Mayfield, Florida Department of Agriculture and Consumer Services, [www.bugwood.org](http://www.bugwood.org), #2199082



# Distribution in the US



Four states have confirmed the disease as of December 2010: South Carolina, Georgia, Florida, and Mississippi.

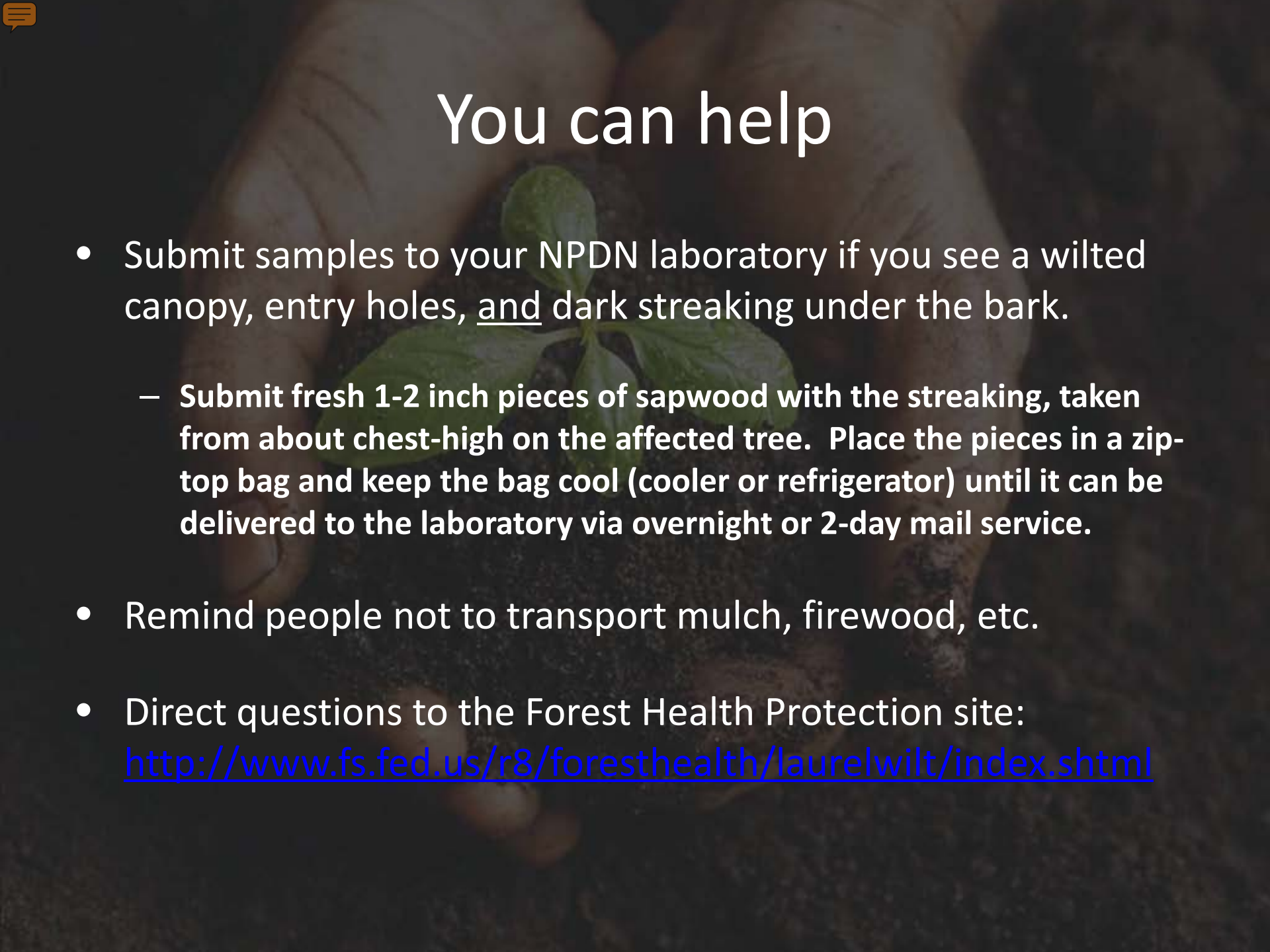
Map provided by Jeff Eickwort, Forest Biologist, Florida Department of Agriculture and Consumer Services, Division of Forestry.

A background image showing a pair of hands gently holding a small green seedling with four leaves, growing out of a mound of dark soil. The hands are positioned on either side of the seedling, with fingers slightly curled. The overall tone is soft and focused on the plant.

# Management


- Correct identification of the pathogen (and its vector) are of paramount importance in any management of a disease
- There are several barriers to the treatment of this disease
  - The beetle is a powerful flier
  - By the time symptoms appear, the beetle has likely infected many trees in the area
  - Pesticide use against the beetle is not recommended due to the numerous off-target species that would be affected
  - Biological controls are not known at this time
  - Human movement of infested plant material is aiding the long-distance spread of the vector.
  - Fungicide root infusions are expensive, only work for high-value single trees, and must be reapplied on a regular basis. Some phytotoxicity has been noted to some fungicide products.
- The suggestions made for treating or halting the spread of this disease are based on similar treatments for wilt diseases of other trees.





# You can help

- Submit samples to your NPDN laboratory if you see a wilted canopy, entry holes, and dark streaking under the bark.
  - **Submit fresh 1-2 inch pieces of sapwood with the streaking, taken from about chest-high on the affected tree. Place the pieces in a zip-top bag and keep the bag cool (cooler or refrigerator) until it can be delivered to the laboratory via overnight or 2-day mail service.**
- Remind people not to transport mulch, firewood, etc.
- Direct questions to the Forest Health Protection site:  
<http://www.fs.fed.us/r8/foresthealth/laurelwilt/index.shtml>

A pair of hands is shown holding a small green seedling with three leaves, growing out of a mound of dark soil. The background is a dark, textured surface.

For more information, check out the  
brand-new full-length Laurel Wilt  
module (with videos!) at  
[www.protectingusnow.org](http://www.protectingusnow.org)



# Plant Biosecurity

Stephanie Stocks  
Protect U.S. Coordinator  
University of Florida



**protect u.s.**  
community invasive species network

*First Detectors Protecting U.S. from Pests*

# Scripted Presentation

- Learning objectives
  - What does plant biosecurity mean?
  - Food supplies fluctuate due to many factors (weather, pests, disease, etc.)
  - How would you be affected if there was a food shortage?
  - What food demands do we expect in the future and do we have enough resources to do it all?



**protect u.s.**  
community invasive species network

*First Detectors Protecting U.S. from Pests*



# Scripted Presentation

- Learning objectives
  - What happens if somebody introduced a disease or pest on purpose?
    - Agroterrorism in the 20<sup>th</sup> century
      - World War II examples of rinderpest, anthrax, and glanders infections
      - Arab Revolutionary Council
      - Gosh Etzion
  - What is a select agent?



**protect u.s.**  
community invasive species network

*First Detectors Protecting U.S. from Pests*

# Scripted Presentation

- Learning objectives
  - What are USDA-APHIS-PPQ Select Agent and Toxin List
    - *Peronosclerospora philippinensis* (*Peronosclerospora sacchari*)
    - *Sclerophthora rayssiae var zeae*
    - *Phoma glycinicola* (formerly *Pyrenochaeta glycines*)
    - *Ralstonia solanacearum* race 3, biovar 2
    - *Rathayibacter toxicus*
    - *Synchytrium endobioticum*
    - *Xylella fastidiosa* (citrus variegated chlorosis strain)
    - *Xanthomonas oryzae*
      - What are they, what do they do, where are they, etc.



**protect u.s.**  
community invasive species network

*First Detectors Protecting U.S. from Pests*



# Updates

- Rough draft created by Amanda Hodges and Stephanie Stocks
- Submitted to Jim Stack (Kansas State University) who has agreed to co-author the presentation
- Once the final draft is ready, submitted to 3-4 technical reviewers and 1 non-technical reviewer



**protect u.s.**  
community invasive species network

*First Detectors Protecting U.S. from Pests*

# E-Learning Module

- Once all the reviews are back and changes are made, the e-learning module will be created
- Work with the authors to create interactives such as quizzes, choose the correct picture, rollover to find the information, distribution maps, etc.
- These will also be submitted to 3-4 technical and 1 non-technical reviewer



**protect u.s.**  
community invasive species network

*First Detectors Protecting U.S. from Pests*



# Lesson plan

- Target grades 9-12
- Includes: Scripted presentation for the teacher to use, handout(s) for the students, activity for the students (experiential), and e-learning module with associated quiz
- Locally tested?



**protect u.s.**  
community invasive species network

*First Detectors Protecting U.S. from Pests*

# Lesson plan

- Targeting NSES Life Science Standard: The Interdependence of Organisms
  - Living organisms have the capacity to produce populations of infinite size, but environments and resources are finite. This fundamental tension has profound effects on the interactions between organisms.
  - Human beings live within the world's ecosystems. Increasingly, humans modify ecosystems as a result of population growth, technology, and consumption. Human destruction of habitats through direct harvesting, pollution, atmospheric changes, and other factors is threatening current global stability, and if not addressed, ecosystems will be irreversibly affected.
- Can also include Natural Selection (life science standard), Science as Inquiry, Science and Technology, and Science in personal and Social Perspectives



**protect u.s.**  
community invasive species network

*First Detectors Protecting U.S. from Pests*



# Future E-Learning Modules and Project Direction

Susan T. Ratcliffe

Director, North Central IPM Center

University of Illinois Urbana-Champaign

# E-LEARNING MODULES

Coming in 2011



**protect u.s.**

community invasive species network

*First Detectors Protecting U.S. from Pests*



# Giant African Snail



# Spotted Wing Drosophila





# Exotic Pests of Concern for Ornamental Plants





# Thousand Cankers Disease



# Potato Psyllids and their Pathogen Vectoring Concerns



Developed by Susan Halbert, FL Dept. of Agriculture and Consumer Sciences



# Common and Exotic Pests of Concern for Stonefruits





# DEVELOPMENT OF FUTURE MODULES FOR INVASIVE PLANT PESTS AND ANIMAL BIOSECURITY

As funding permits, additional modules will be added to the site. If you are interested in developing an e-learning module, contact Amanda Hodges at [achodges@ufl.edu](mailto:achodges@ufl.edu).

Protect U.S. personnel will be contacting individuals to assist with content development and module reviews.

To view author guidelines, visit  
[www.protectingusnow.org](http://www.protectingusnow.org)