Forest Health Dynamics Laboratory Update

Luis Mendez and Dr. Lori Eckhardt

Forest Health Dynamics Laboratory, School of Forestry and Wildlife Sciences, Auburn University, Auburn AL

Forest Health Coop Diagnostic Laboratory Services - Overview

- History
- Weather Data
- Laboratory Sample Analysis
- Results

History

- Forest Health Cooperative began in 2008
- To bring together parties interested in maintaining forest health, productivity, and sustainability
- Membership for those managing for or purchasing forest products, wildlife and endangered species
- Address important and current forest health issues with real world management as a focus


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Homepage > Pine Needle Submission

Pine Needle Sample Collection and Submission Guide

Samples are recorded and processed routinely by the date and time in which they are received. All samples will be initially processed within five days of receipt with results available twenty-one days after processing. Some laboratory diagnostic techniques take longer than others, which may affect result punctuality.

Sample Collection

Tree disease diagnosis is largely dependent on the quality of the sample and on the relevant information provided by the submitter. Samples must be of sufficient quality and quantity to allow for proper laboratory testing and pertinent information, such as sample tree identification, is essential.

1. Samples should be collected from symptomatic trees showing thinning/transparent crowns, and foliage discoloration.

2. Samples should NOT be collected from dead trees; determining the casual agent from such trees is highly unlikey.

3. Submit a generous amount of sample material to allow for all required laboratory processes. Remove needles from the branch. Sterilize all tools between trees

4. Keep all samples seperated and cool until ready to be shipped, do not expose collected needles to high temperatures. Place samples in an envelope or paper bag

5. Include the following information: Tree species and age, Recent Silviculture, Location (GPS coordinates), Date of Collection, Stand Prevalence and Severity.

6. Samples may be delivered in person or mailed to the Forest Health Dynamics Laboratory, 602 Duncan Drive, Ste 3301, Auburn University, AL 36849.

7. When submitting samples by mail, either mail them early in the week to avoid weekend layovers or use an overnight service. Send us an email letting us know that you have sent us some samples, include pictures of the damage in the email. Dr. Lori Eckhardt (eckhalg@auburn.edu) and/or Luis Mendez (lmm0081@auburn.edu)

8. Samples should be mailed in an appropriate sized box, with padding, or in a padded envelop. Please write on the outside "Refrigerate Upon Arrival".

9. Complete a "Tree Disease Diagnostic Form" for each sample.

Contact us if you would to like to become part of a study where we would come to your property to collect monthly samples over the course of a year. This will help us in our studies to solve this problem!

Contact: Luis Mendez, Research Assistant I
Phone: (334) 844-1538 Email: lmm0081@auburn.edu

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2015
December
2016
January
February
March
April
May
June
July
August
September
October
November
December
Cumulative
2017
January
February
March
April
May
June
July
August
September
October
November
December
Cumulative
2018
January
February
March
April
May
June
July (coming soon)
August (coming soon)
September
October
November
December (coming soon)
Cumulative (coming soon)
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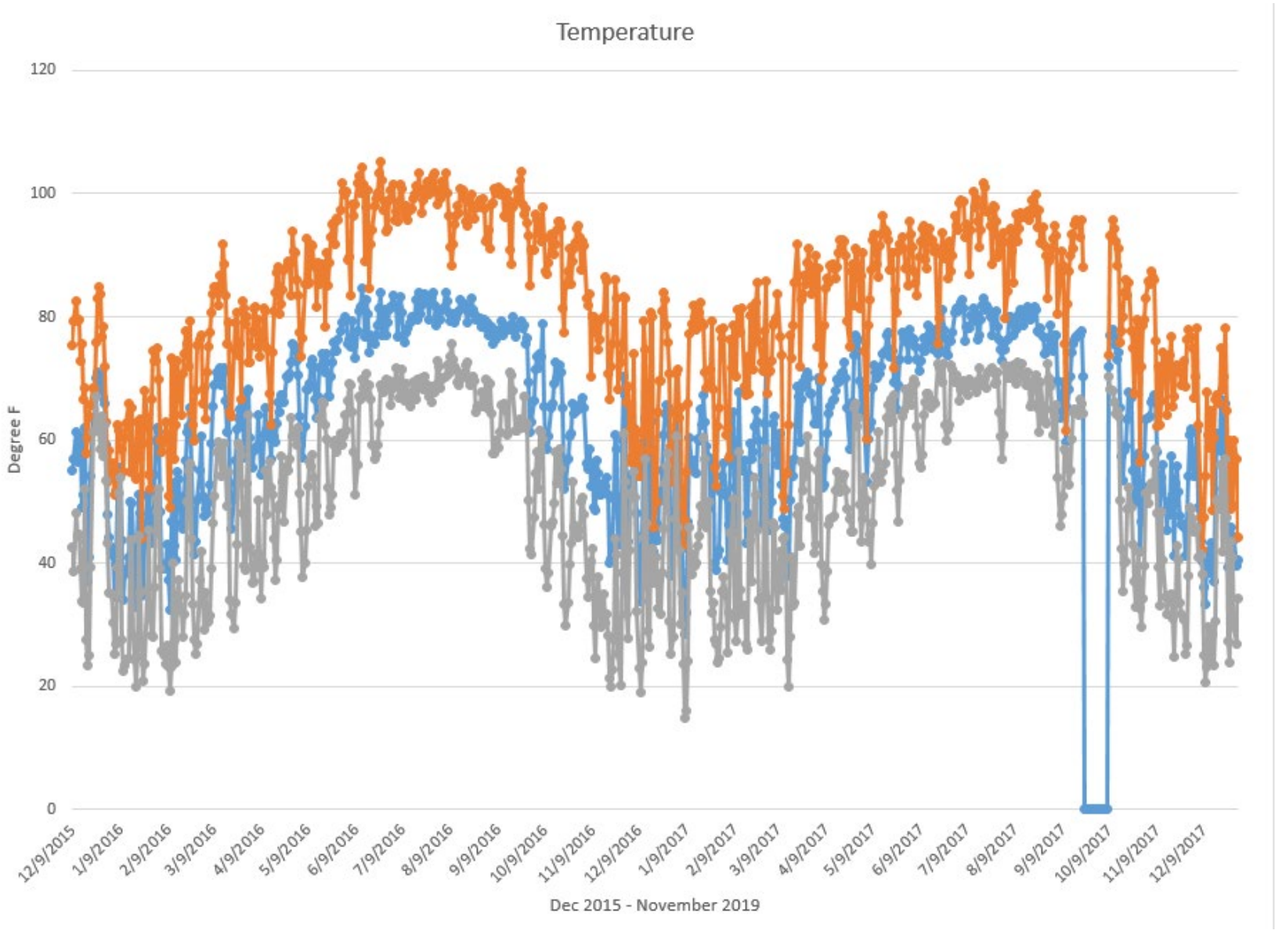
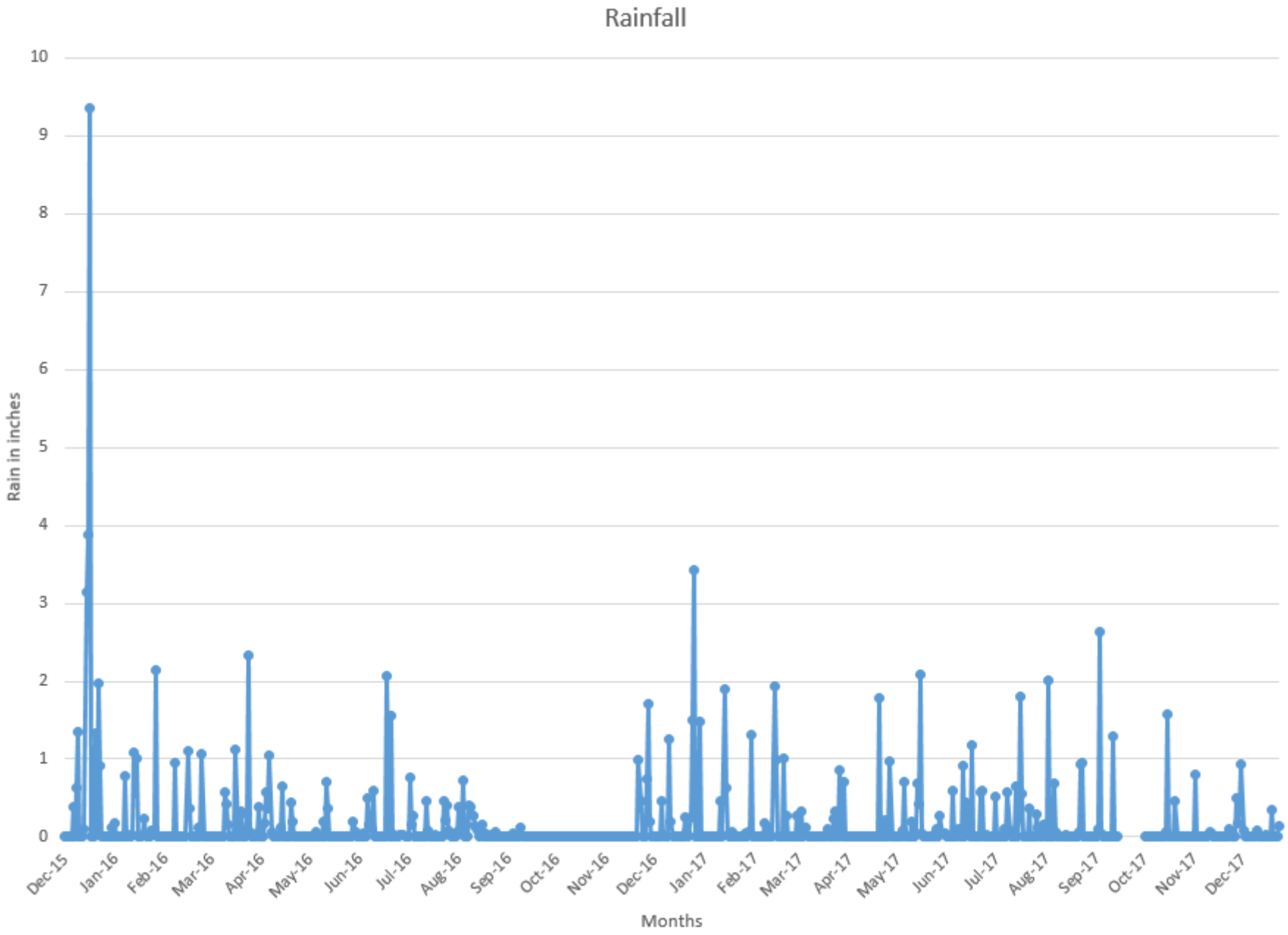
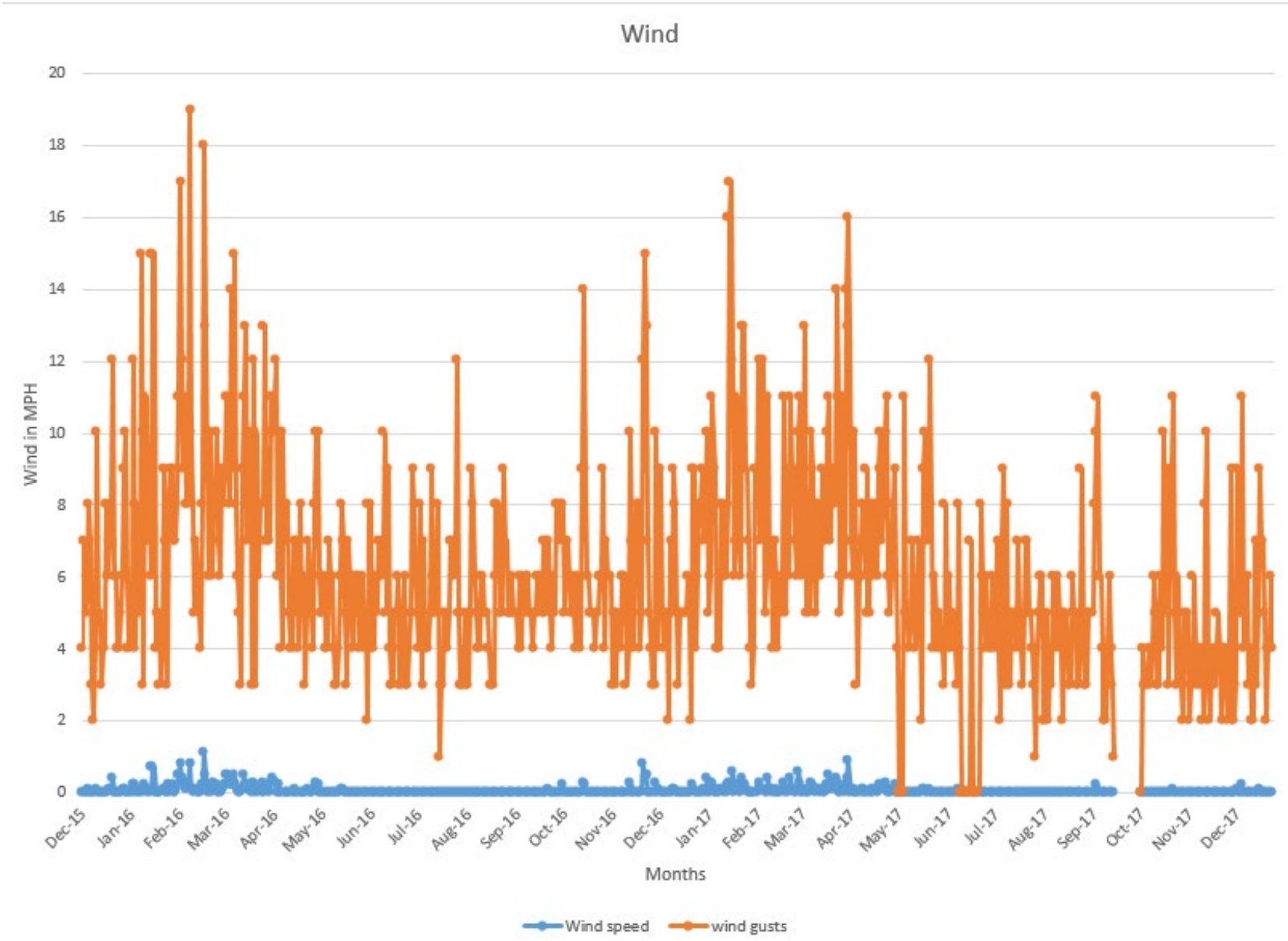
QPD site NOAA month report November 2018

	Temperature					Degree	Solar	RH	Rain	Wind	
Date	Mean	High	Time	Low	Time	Days	Rad	Mean	Fall	Speed	Gust
1-Nov	64.2	75.2	12:00p	54.3	02:30a	14.2	31.5	96	0.34	0	8
2-Nov	56.6	64.1	04:30a	39.1	12:00a	8.2	44.6	93	0.03	0	6
3-Nov	49.5	70.7	01:45p	34.4	07:15a	5.4	163.9	86	0.01	0	3
4-Nov	54.5	70.1	03:00p	34.3	07:15a	9.1	127.6	85	0	0	5
5-Nov	66.5	72.2	04:45p	62.5	07:00a	16.5	37.2	97	0.01	0	4
6-Nov	70.7	83.7	11:15a	58.4	12:00a	20.7	88.3	91	0.01	0	6
7-Nov	65	74.6	02:15p	57	03:15a	15	46.3	96	0.51	0	2
8-Nov	67.8	71.4	03:45p	65.3	12:30a	17.8	34.3	99	0.09	0	2
9-Nov	67.5	79.6	02:45p	53	12:00a	17.5	65.9	94	0.02	0	6
10-Nov	46.4	59.4	02:00p	33.1	12:00a	1.6	155.4	77	0	0	6
11-Nov	49.2	66.6	02:15p	33	12:15a	4	137.6	85	0	0	5
12-Nov	52.8	58	03:00p	50.2	05:00a	2.8	9.8	99	1.9	0	6
13-Nov	53.6	54.5	04:00p	51.3	12:00a	3.6	21	100	0.19	0	4
14-Nov	50.8	53.4	04:30p	48	05:15a	1.3	17	100	0.89	0	2
15-Nov	38	51.7	12:15a	29.5	12:00a	0	33.6	98	0.27	0	7
16-Nov	39.7	60.7	03:00p	27.8	07:15a	1.6	143.7	86	0	0	4
17-Nov	45.8	68	03:00p	29.5	07:30a	4.3	133.3	86	0	0	3
18-Nov	48.3	70.8	02:15p	37	02:30a	4.6	130.4	86	0	0	2
19-Nov	50.3	72.7	03:00p	34.6	07:45a	5.6	121.9	85	0	0	2
20-Nov	50.8	62	03:00p	35.4	12:00a	3.3	53.1	94	0.01	0	5
21-Nov	40.9	61.3	03:00p	29.3	07:45a	1.9	128.6	84	0	0	4
22-Nov	39.9	63.4	02:45p	27.4	05:45a	2.1	89.4	88	0	0	4
23-Nov	44.7	52.8	03:00p	30.7	02:45a	0.9	25.3	94	0	0	4
24-Nov	51.2	59.8	03:15p	45.6	12:00a	1.9	57.2	97	0.18	0	3
25-Nov	51.3	62.8	03:15p	43.4	07:15a	3.5	63	94	0.02	0	3
26-Nov	47.8	60.1	05:00a	30.8	11:30p	2.4	79	83	0	0	8
27-Nov	35.3	49.8	02:45p	25.5	12:00a	0	116.4	78	0.01	0.1	8
28-Nov	34.4	53.5	03:00p	21.4	07:15a	0.3	112.9	78	0	0	5
29-Nov	30.6	51.1	10:30a	27	07:00a	0	52	97	0	0	4


Temperature
120
100
80
60
40
20
0
Degree F
12/9/2015
1/9/2016
2/9/2016
3/9/2016
4/9/2016
5/9/2016
6/9/2016
7/9/2016
8/9/2016
9/9/2016
10/9/2016
11/9/2016
12/9/2016
1/9/2017
2/9/2017
3/9/2017
4/9/2017
5/9/2017
6/9/2017
7/9/2017
8/9/2017
9/9/2017
10/9/2017
11/9/2017
12/9/2017
Dec 2015 - November 2019
Mean
Max
Low


Rainfall
Rain in inches
10
9
8
7
6
5
4
3
2
1
0
Dec-15
Jan-16
Feb-16
Mar-16
Apr-16
May-16
Jun-16
Jul-16
Aug-16
Sep-16
Oct-16
Nov-16
Dec-16
Jan-17
Feb-17
Mar-17
Apr-17
May-17
Jun-17
Jul-17
Aug-17
Sep-17
Oct-17
Nov-17
Dec-17
Months


Wind
Wind in MPH
20
18
16
14
12
10
8
6
4
2
0
Dec-15
Jan-16
Feb-16
Mar-16
Apr-16
May-16
Jun-16
Jul-16
Aug-16
Sep-16
Oct-16
Nov-16
Dec-16
Jan-17
Feb-17
Mar-17
Apr-17
May-17
Jun-17
Jul-17
Aug-17
Sep-17
Oct-17
Nov-17
Dec-17
Months
Wind speed
wind gusts

Diagnostics Clinic

- Sample collection and submission guide
  - Provide an instruction set for collecting “good” samples for laboratory analysis
- Tree Diagnostics Form
  - Provide a detailed sample/site history to aid in diagnosis accuracy
- Members only page – Diagnostics Clinic
- Project Updates in process

Forest Health Cooperative
Forest Health Dynamics Laboratory
602 Duncan Drive, Suite 3301
Forestry and Wildlife Sciences Building
Auburn University, Auburn, AL 36849-5418
Luis Mendez (lmm0081@auburn.edu)
334-844-1538
https://fp.auburn.edu/ForestHealthCooperative/default.htm

Diagnostic Laboratory Use Only:
Date Received: _____
Received by:

Tree Disease Diagnostic Form

Please include ALL relevant data; maintain an office copy; submit original copy with specimen

Date Sample Collected: _____ Date Sample Shipped: _____ No. of Samples: _____

Sample Location - County, State: _____ Sample ID: _____

	Submitter Information	**Results Recipient** (If different than submitter)
Name:	_____	_____
Company:	_____	_____
Address:	_____	_____
City/Zip:	_____	_____
Phone No:	_____	_____
Fax No:	_____	_____
Email:	_____	_____

Tree and Site Information

Select ALL that apply

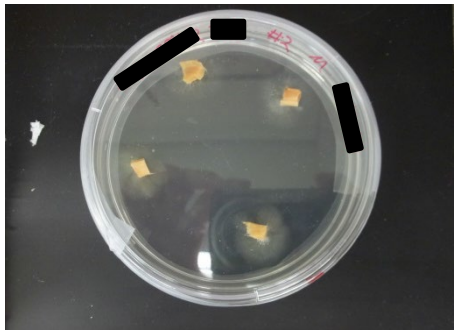
Tree Species:	___ Loblolly	___ Longleaf	___ Shortleaf	___ Slash	
Site Location:	___ Forest	___ Nursery	___ Greenhouse		___ Other:
Aspect:	___ N ___ NE	___ E ___ SE	___ S ___ SW ___ W	___ NW	
Slope %:	___ 0 - 5%	___ 5 - 10%	___ 10 - 15%	___ > 15%	
Soil Type:	___ Sand	___ Silt	___ Clay	___ Loam	_____
Age of Planting:	___ 0 - 10	___ 11 - 20	___ 21 - 30	___ 31 - 40	___ > 40
Foliage Symptoms:	___ Flagging	___ Thin	___ Wilted	___ Yellowed	___
Root Symptoms:	___ Insect Signs	___ Resinous	Other: ___ Rotted	___ Stained	___
Insect Attack:	___ BTB	___ Hylastes	Other:		
Insect Damage:	___ Boles	___ Branches	___ Ips	___ SPB	___ Termites
Stand Prevalence:	___ Entire	___ Localized	___ Foliage	___ Roots	_____
Severity of Damage:	___ Low	___ Medium	___ Scattered	___ % Affected	_____
		___ Fire	___ High	___ Severe	Weevils

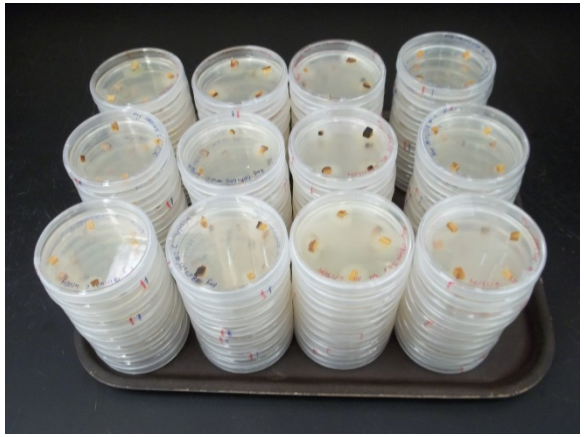
http://www.auburn.edu/academic/forestry_wildlife/foresthealthcooperative/

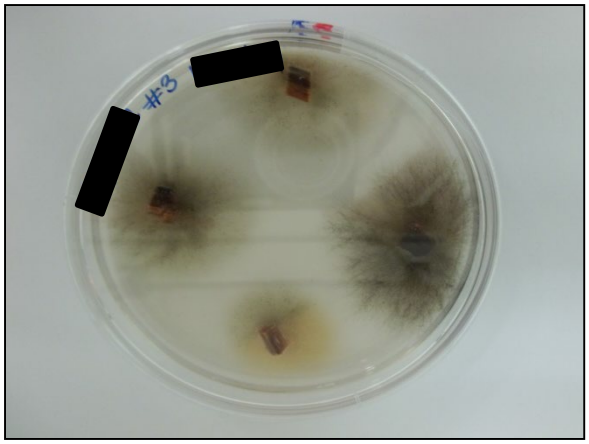
Field Consulting

- Travel to member's location
- Provide onsite diagnostic information
- Collect samples for laboratory analysis

Laboratory Sample Analysis







Results

Results available after a minimum of twenty-one days after sample is received

Results letter sent to member with description and relevant species information

Emerging Forest Pests and Sudden Oak Death Review

Luis Mendez and Dr. Lori Eckhardt

Forest Health Dynamics Laboratory, School of Forestry and Wildlife Sciences, Auburn University, Auburn AL

Euwallacaea sp.

Euwallacaea sp. not native to U.S.

Found in southern California in 2003, 2015 large-scale infestation at a regional park

Vectors *Fusarium euwallacaea*

Damage caused by larvae and fungus

Polyphagous


UCANR


UCR

Emerald Ash Borer

Family-Buprestidae (jewel beetles)

First detected in Michigan 2002

Damage caused by larvae

Ash tree mortality in the millions

Now in 33 states

Confirmed in Calhoun County, AL

Don’t Move Firewood

Limiting the movement of infested firewood could help control the spread

Infested trees can be treated with insecticides, quarantined, or destroyed onsite

Larvae

S-Shaped Gallery

D-Shaped Exit Hole

Adult

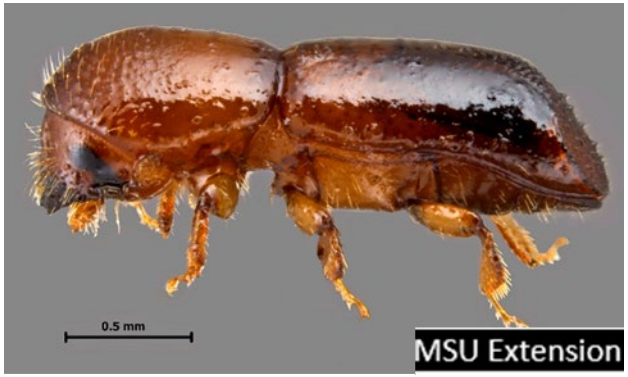
Laurel Wilt

Caused by *Raffaelea lauricola*

Family-Ophiostomatacea

Vectored by Red Bay ambrosia beetle, *Xyleborus glabratus*

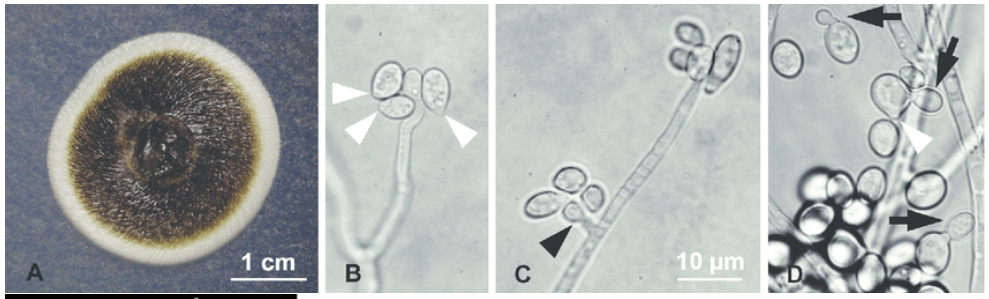
Spread via natural flight and firewood movement



Kills many species in the Lauraceae family

Symptom-green leaves wilting then turning red-brown

Has impacted Avocado industry in Florida



Simmons et al. 2016.

Elongated Hemlock Scale

Fiorinia externa

Native to Asia

Hosts: Firs, Hemlock, Spruce and Pines

Damage from large population feeding on needles

Elongate hemlock scale found in Oregon

Harmful pest might have hitched ride on Christmas trees

Dec 28, 2018 0

Invasive bugs found in MN Christmas decorations. What you should do if you bought some.

Oregon experts warn of invasive species that hitched a ride on N. Carolina Christmas trees

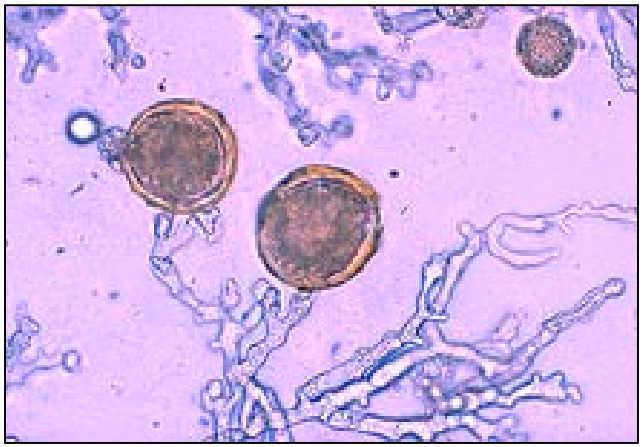
John Hendricks

Posted Jan 1, 2019 | 0

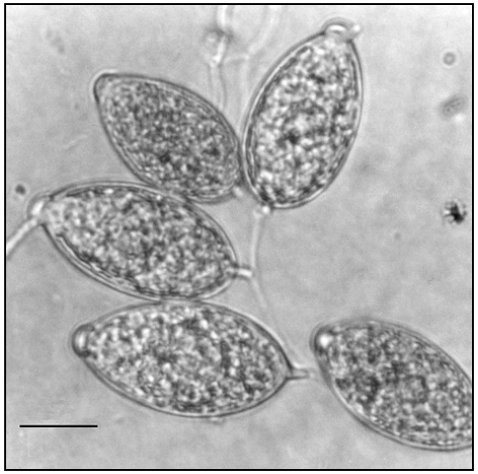
Sudden Oak Death

- First reported 1995 coastal region of central California with *Phytophthora ramorum* positively linked to the disease in 2001
- Fungus-like water mold (Oomycete)
- Spreads aerially and aquatically
- Pathogen has a wide host range
- Three expressions of the disease

Phytophthora ramorum

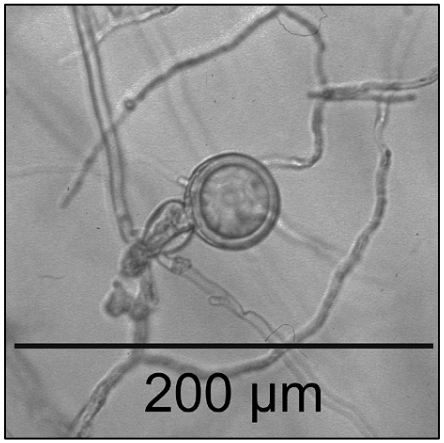


Chlamydospores



Sporangia

Oospore



Source: Steve Oak - USDA Forest Service Forest Health Protection

Risk To Our Forests

- *Phytophthora ramorum* persists in infected nurseries even after eradication measures.
- Inoculum is leaving infected nurseries via waste water
- A pathway from the water into terrestrial ecosystems is plausible
- Southeastern US climate is at least seasonally suitable for infection
- Eastern woody plants are susceptible

SOD Risk Map

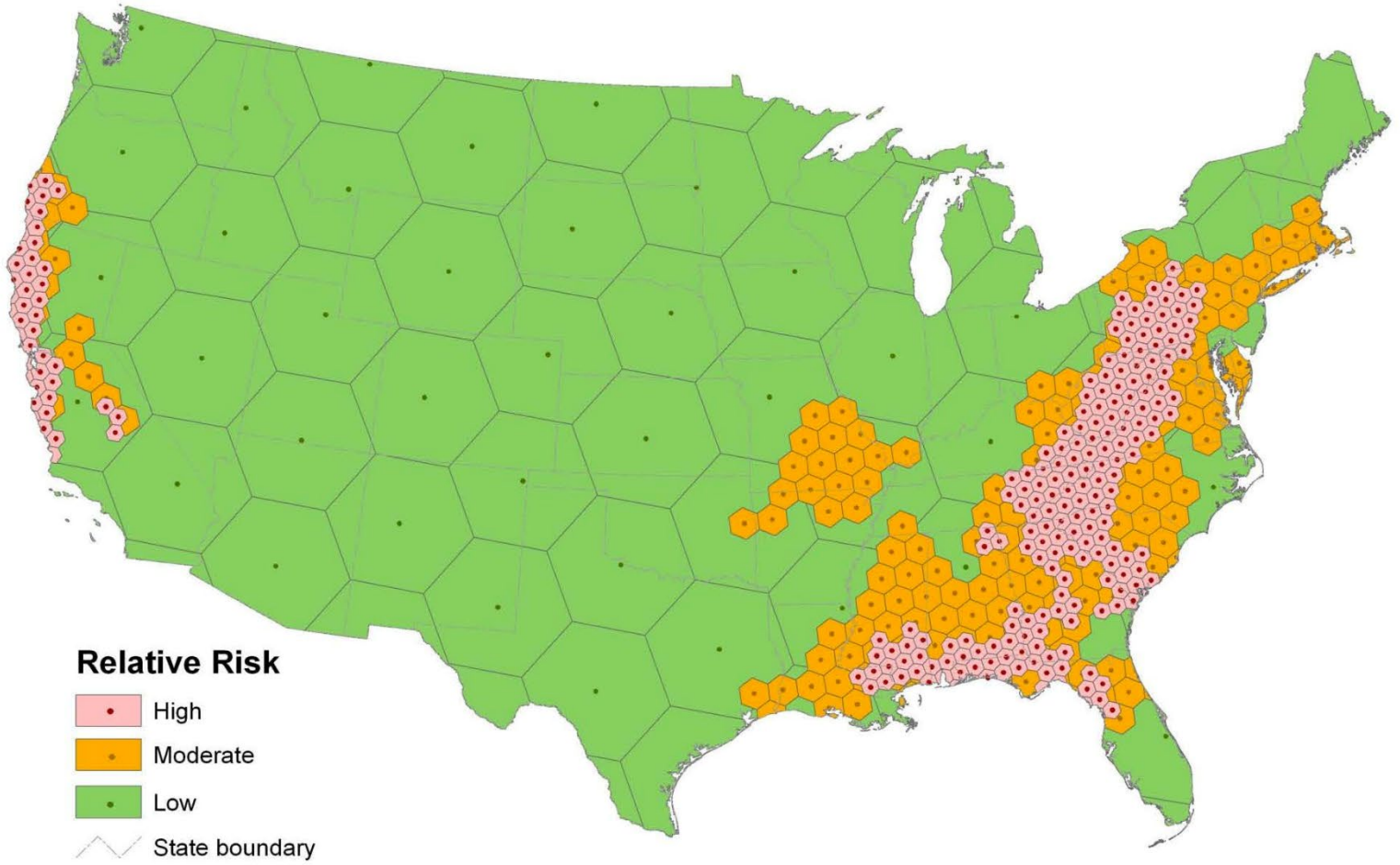


Figure 7.7 – New national risk map for sudden oak death (*Phytophthora ramorum*). State boundaries are included for reference.

DNR finds oak tree killing fungal pathogen in rhododendrons

POSTED 7:34 PM, MAY 22, 2019, BY JOE HOPKINS

Nursery where plants infected with 'sudden oak death' originated shipped to Nebraska, Iowa

Nebraska agriculture inspectors are following up with potentially infected nursery stock, according to state officials

285 Shares

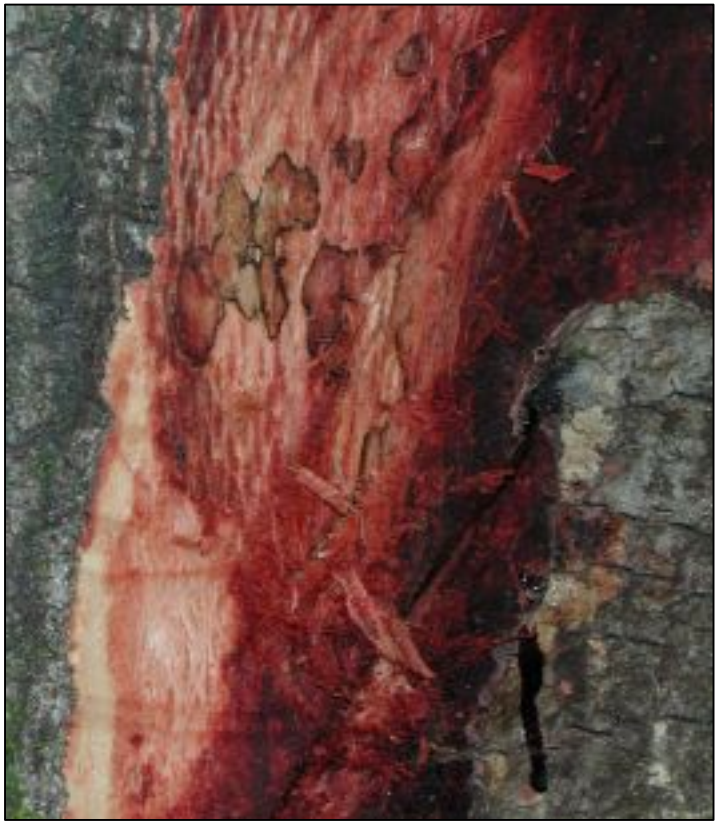
KETV 7 OMAHA | Updated: 5:47 PM CDT May 30, 2019

KDA: Kansas Walmarts destroyed plants infected with Sudden Oak Death and so should you

BY KAYLIE MCLAUGHLIN

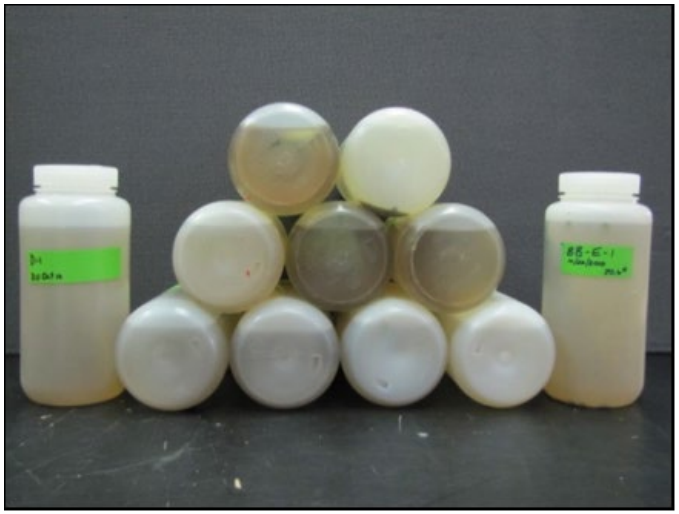
JUNE 07, 2019 03:53 PM, UPDATED JUNE 10, 2019 12:52 PM

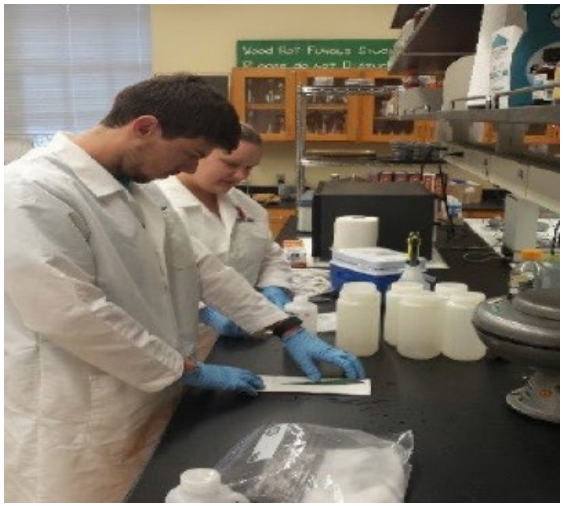
Phytophthora ramorum symptoms

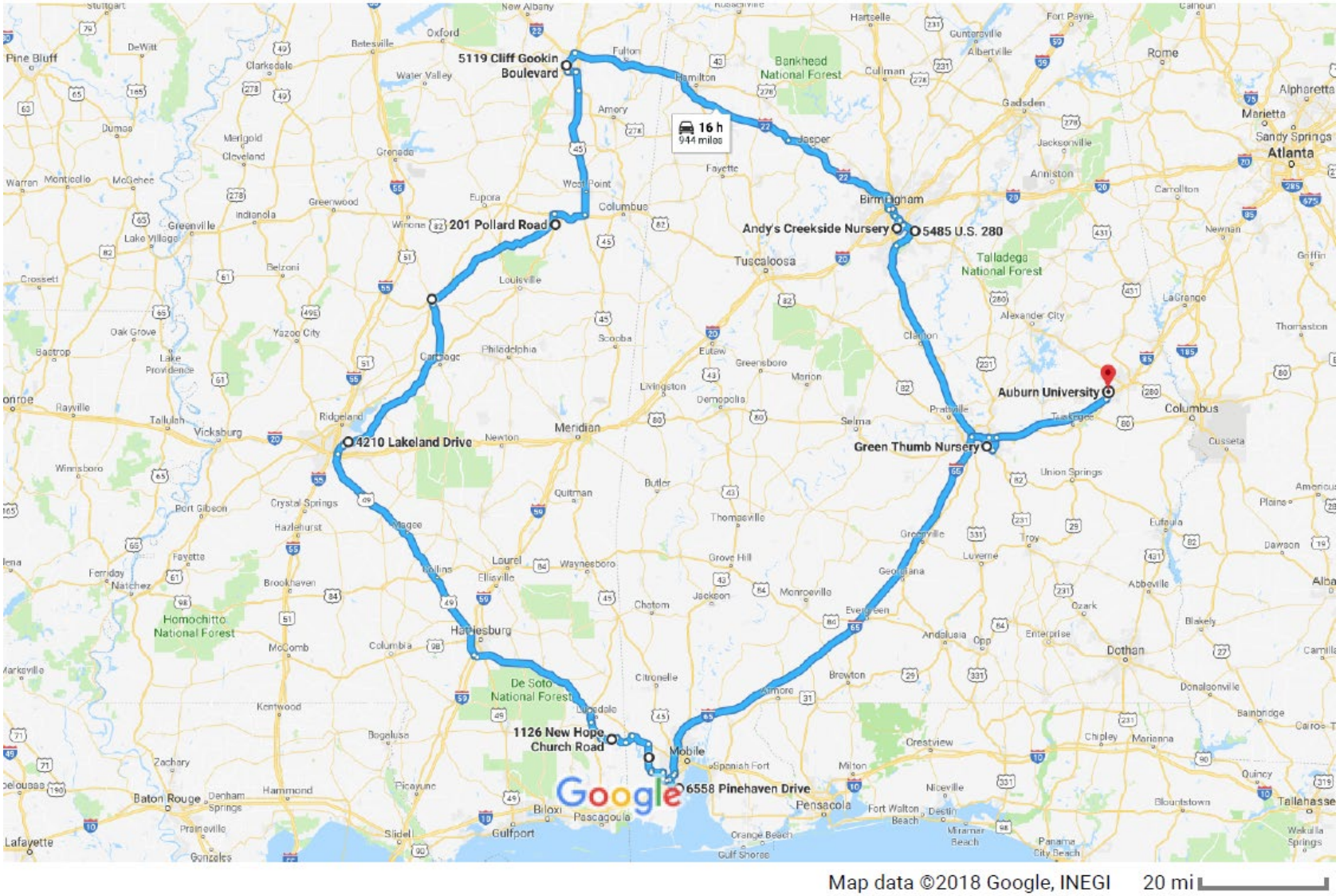


Source: Steve Oak - USDA Forest Service FHP

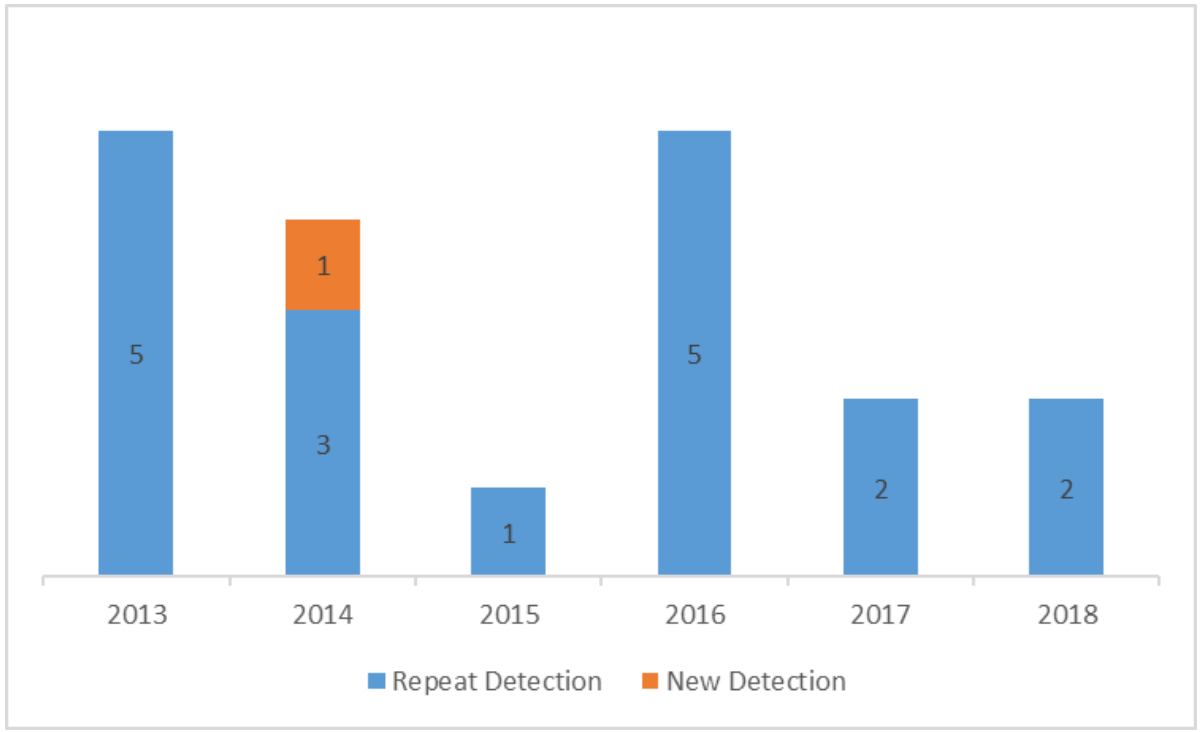
Field Sampling



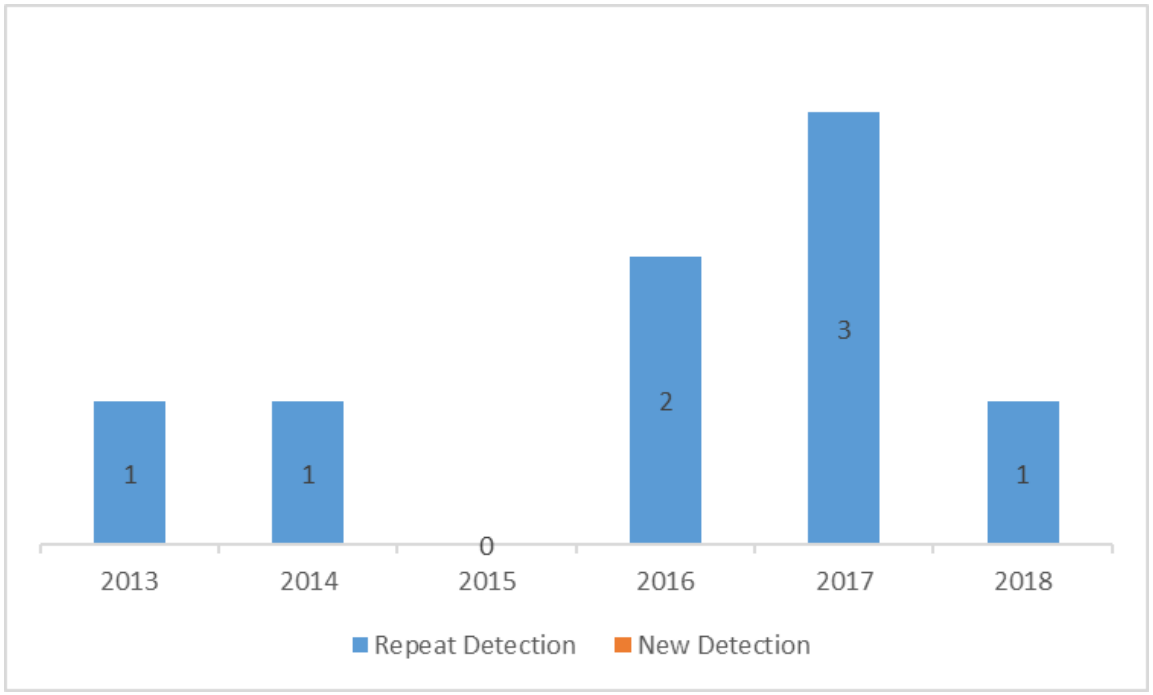



5119 Cliff Gookin Boulevard
16 h
944 miles
201 Pollard Road
Andy's Creekside Nursery
5485 U.S. 280
Auburn University
4210 Lakeland Drive
Green Thumb Nursery
1126 New Hope Church Road
6558 Pinehaven Drive
Google
Map data ©2018 Google, INEGI
20 mi

Bottle of Bait Survey
P. ramorum Detection by Year in Alabama



Bottle of Bait Survey
P. ramorum Detection by Year in Mississippi



Acknowledgements

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