

DISEASE, DOGS AND DRONES



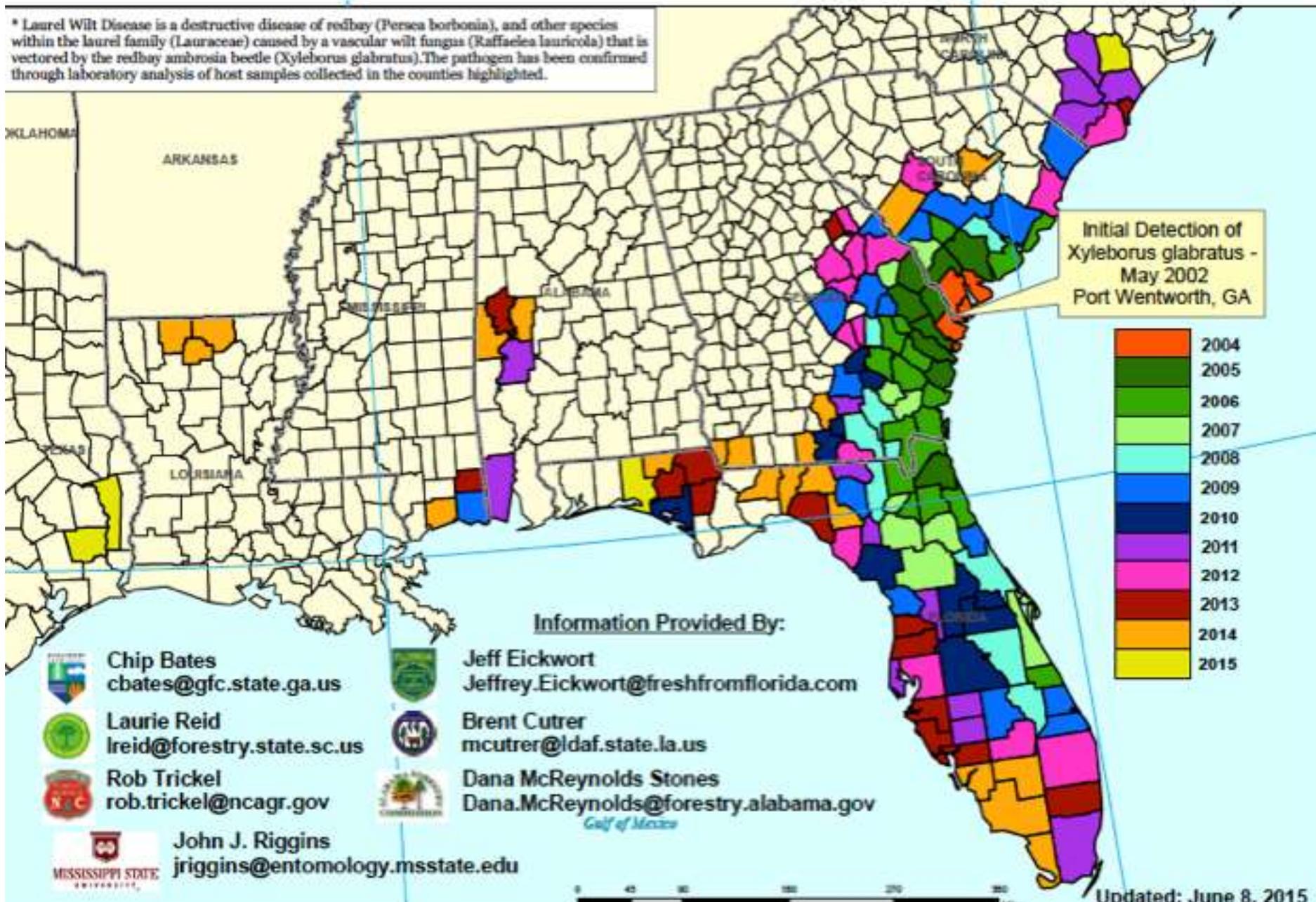
FIU Laurel wilt working group

DeEtta Mills, Kenneth Furton, Jennifer Gebelein,
Julian Mendel, Alison Simon, Christina Burns,
Carlos Pulido



Distribution of Counties with Laurel Wilt Disease* by year of Initial Detection

* Laurel Wilt Disease is a destructive disease of redbay (*Persea borbonia*), and other species within the laurel family (*Lauraceae*) caused by a vascular wilt fungus (*Raffaelea lauricola*) that is vectored by the redbay ambrosia beetle (*Xyleborus glabratus*). The pathogen has been confirmed through laboratory analysis of host samples collected in the counties highlighted.



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

- 2004
- 2005
- 2006
- 2007
- 2008
- 2009
- 2010
- 2011
- 2012
- 2013
- 2014
- 2015

Information Provided By:

 Chip Bates
cbates@gfc.state.ga.us

 Laurie Reid
lreid@forestry.state.sc.us

 Rob Trickel
rob.trickel@ncagr.gov

 John J. Riggins
jriggins@entomology.msstate.edu

 Jeff Eickwort
Jeffrey.Eickwort@freshfromflorida.com

 Brent Cutrer
mcutrer@ldaf.state.la.us

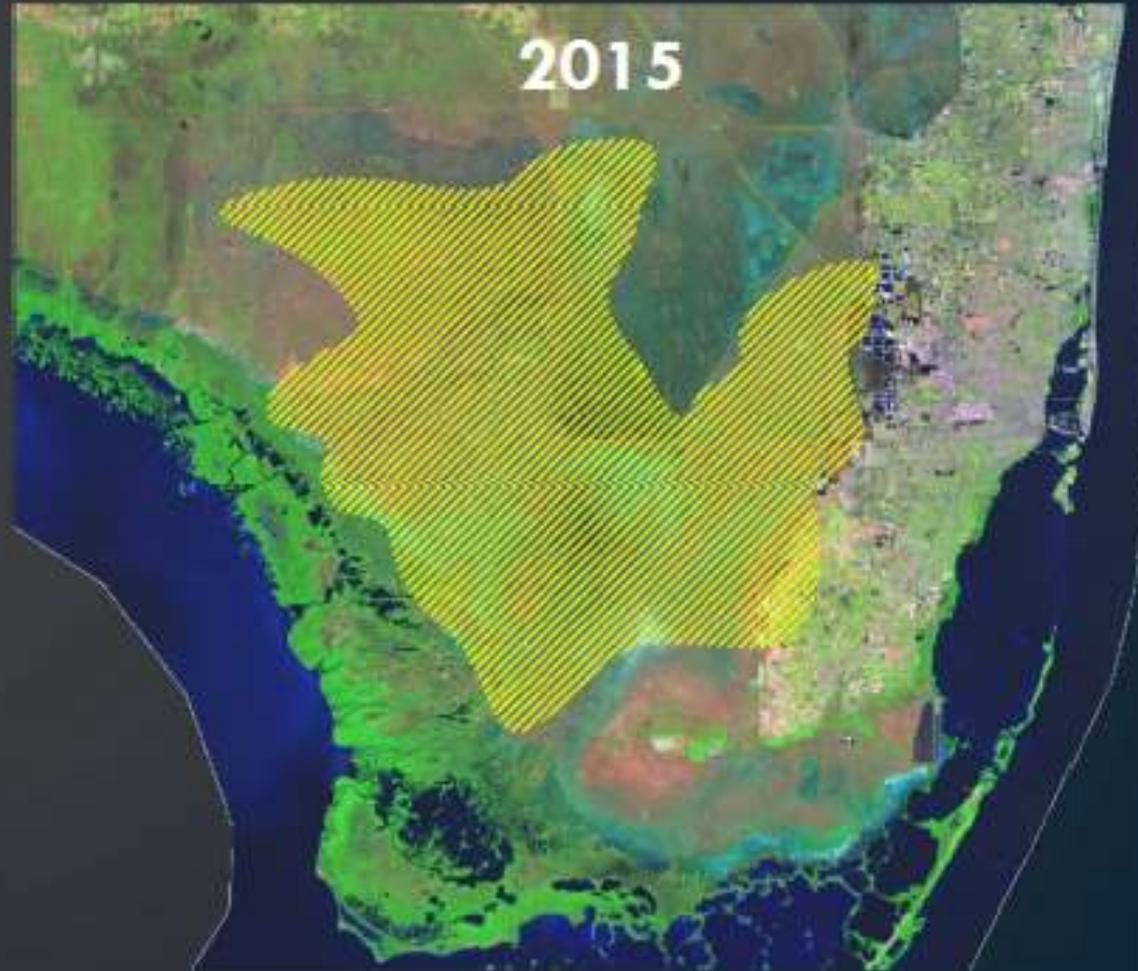
 Dana McReynolds Stones
Dana.McReynolds@forestry.alabama.gov
Gulf of Mexico



Updated: June 8, 2015

Extent of Occurrence 2015

- 372,052 ha



1/2016
14 1994 2016

$N25^{\circ}35'42''$

$W 80^{\circ}25'30''$

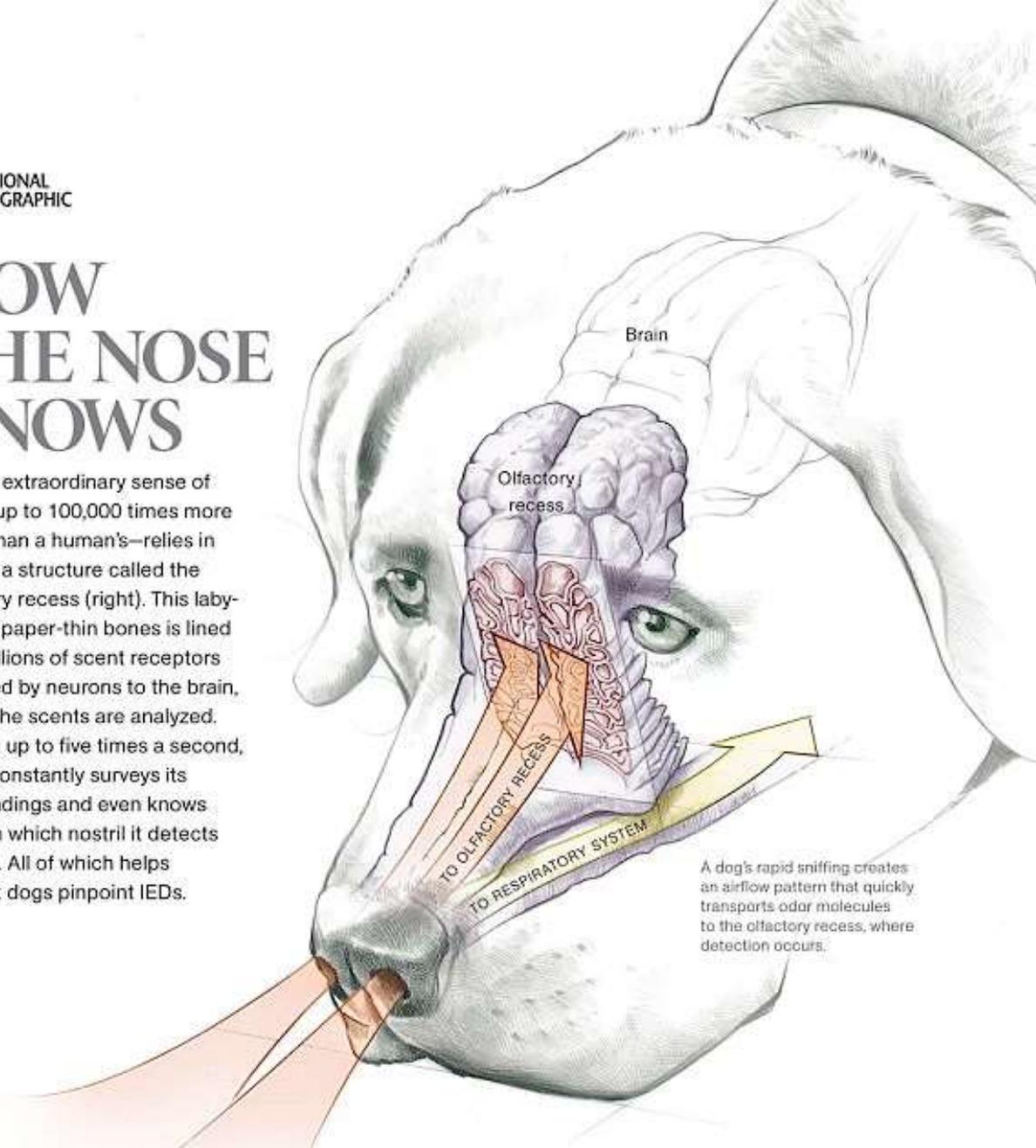


1994

Imagery Date: 1/23/2016 $25^{\circ}35'36.89'' N$ $80^{\circ}25'28.68'' W$ elev 12 ft eye alt 298

HOW THE NOSE KNOWS

A dog's extraordinary sense of smell—up to 100,000 times more acute than a human's—relies in part on a structure called the olfactory recess (right). This labyrinth of paper-thin bones is lined with millions of scent receptors attached by neurons to the brain, where the scents are analyzed. Sniffing up to five times a second, a dog constantly surveys its surroundings and even knows through which nostril it detects a scent. All of which helps combat dogs pinpoint IEDs.



A dog's rapid sniffing creates an airflow pattern that quickly transports odor molecules to the olfactory recess, where detection occurs.

Same nose, different uses!!



*Member of the U.S. Customs & Border Protection Beagle Brigade inspecting luggage for agriculture contraband.
(Photo courtesy of Customs & Border Protection)*

1st step: Selection of potential detector dogs



After screening 60!



**Start with
something they
like = reward**



**Ask them to
perform a task**



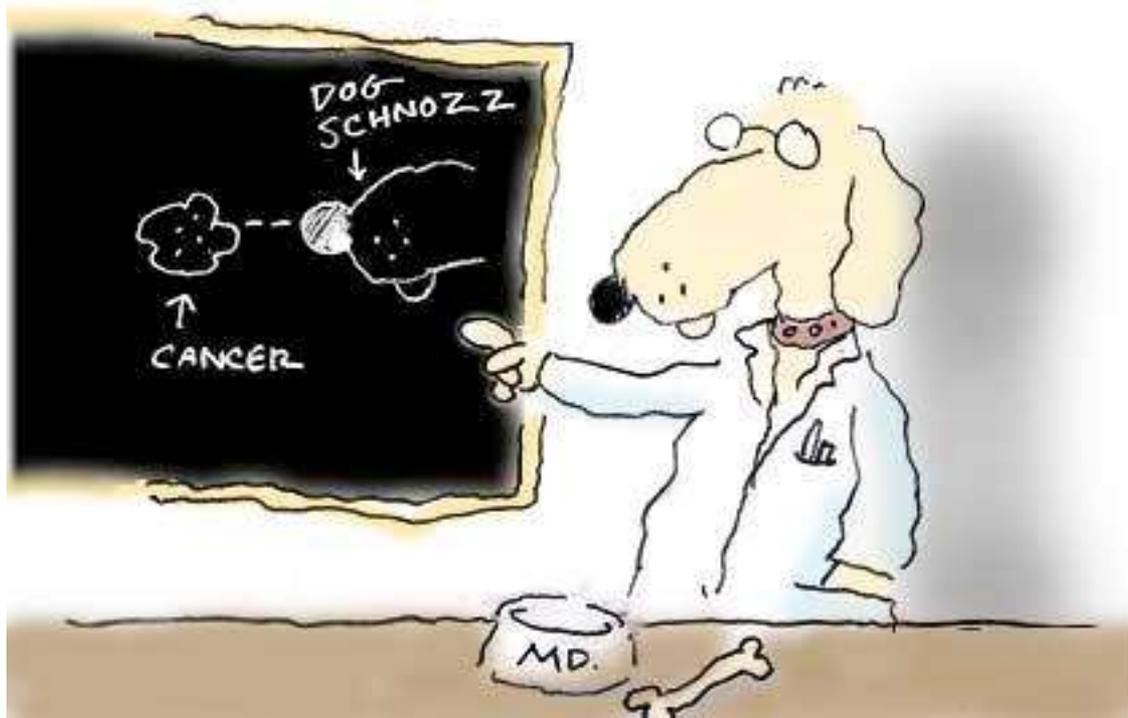
**Positive
reinforcement**



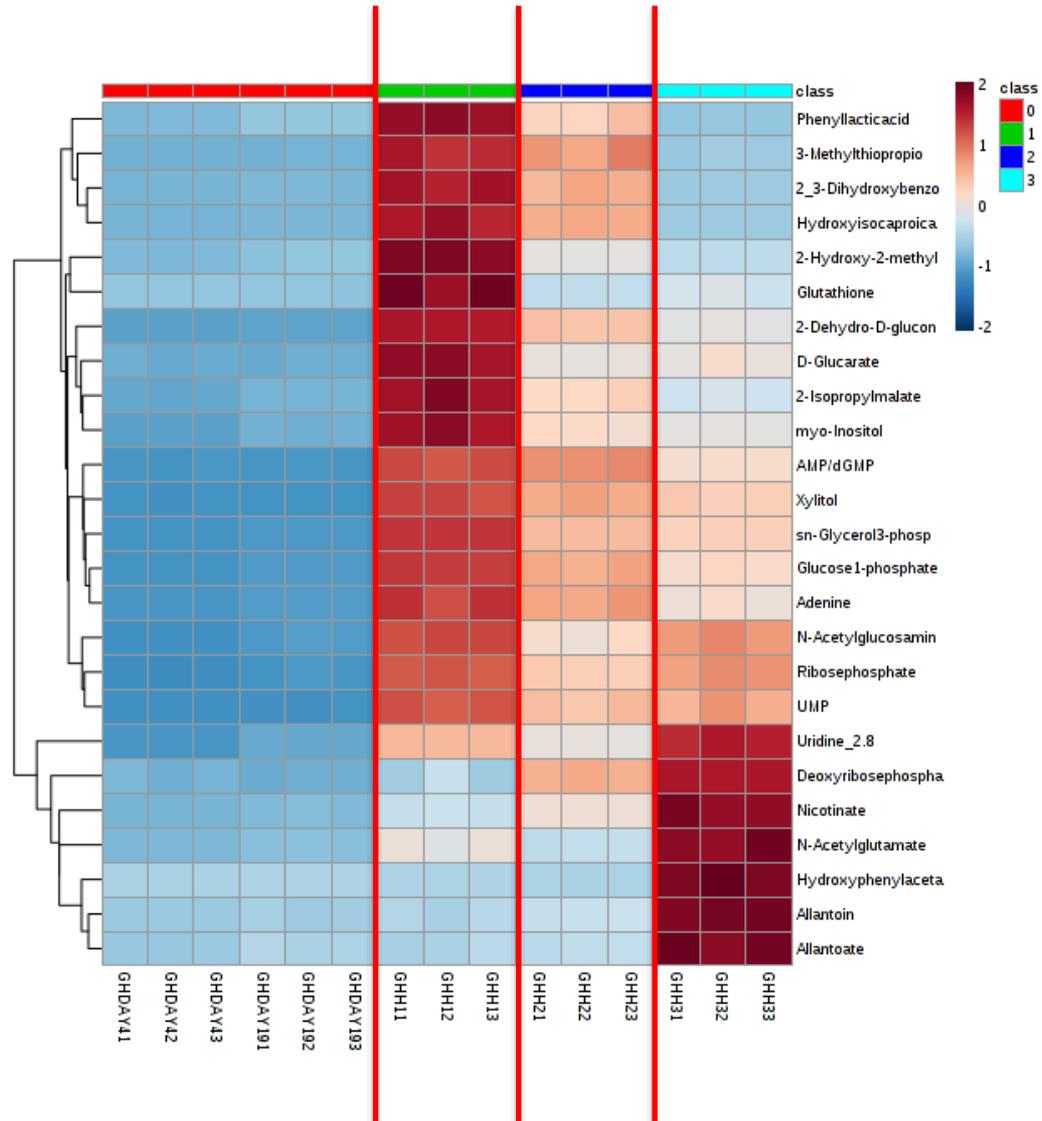




The science behind the detection!



Fungal Growth Dynamics



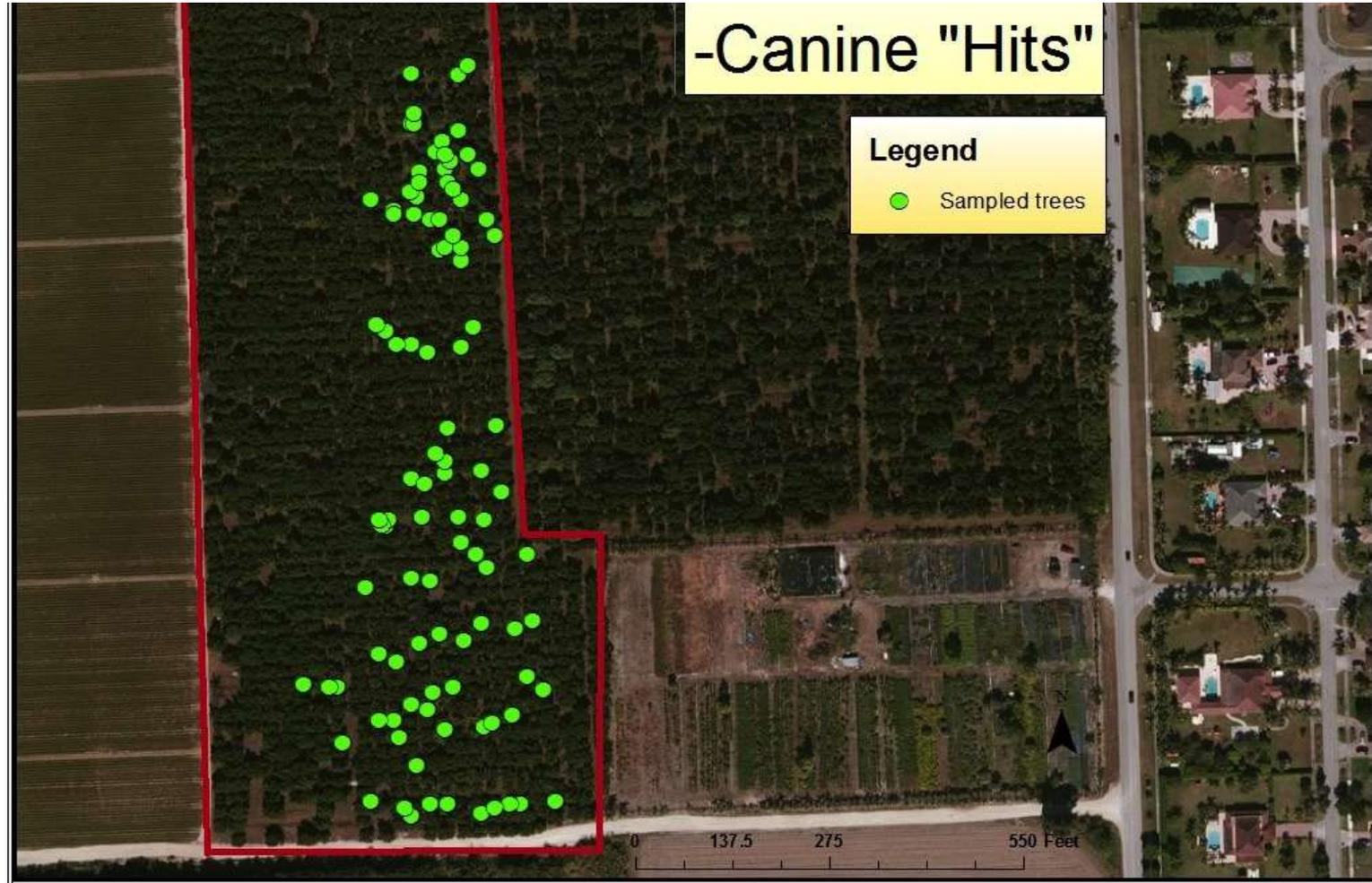


Deployment results in nine different groves affected with laurel wilt

	# Trees detected	# Trees still healthy	# Trees Progressed to wilt	Percentage progressed to wilt (%)
Treated	155	151	4	2.52
Untreated	10	3	7	70

- ~58% of root samples yielded positive DNA results
 - Non-invasive sampling
- Pre-symptomatic AND treated trees identified by canines had ~97% survival rate

Control grove: no treatment



TREE 56 Alerted to (A) 2-3 Weeks after detection (B&C)



A



B



C

Results

# of pre-symptomatic trees w/canine alerts	# of trees visually progressed to Wilt	# of trees with Early/Possible wilt
100	22	9

NOTABLE FACTS:

- All alerted trees were pre-symptomatic/non-symptomatic
- Trees showed signs at 2-3 weeks post alert, others 4-6 weeks post alert = 31
- Grove completely sanitized cutting study short, owners decision

UF-TRECs interactive tools

The screenshot shows a web browser window with the URL `agecon.centers.ufl.edu/documents/LAUREL_WILT/lwcontrolcosts.html`. The page header features the Agricultural Economics Extension logo with the tagline "Improving Your Bottom Line". A navigation menu includes "Introduction", "Laurel W Impact", "Management Strategies", "Control Costs", and "Total Cost". The left sidebar lists various resources such as "Ag-Econ Home", "Commodity Analyses", "Research and Extension", "Wholesale Market Reports", "Interactive Tools", "Laurel Wilt Disease", "Business Finder", "Farmers Newsroom", "Contact", and "Related Links". The main content area displays a calculator image and the title "Control Costs Calculator". Below this, a text block states: "For more information on the associated costs to control the Laurel Wilt disease, please click on the boxes below for more info." At the bottom, there are six orange buttons arranged in three rows: "Macro infusion" and "Direct Jet" in the first row; "Quik Jet" and "IV Bag" in the second row; and "Bark directed" and "Soil Drench" in the third row. The footer includes the UF-CTA and University of Florida logos.

Agricultural Economics Extension
"Improving Your Bottom Line"

Introduction Laurel W Impact Management Strategies Control Costs Total Cost

Control Costs Calculator

For more information on the associated costs to control the Laurel Wilt disease, please click on the boxes below for more info.

Macro infusion Direct Jet

Quik Jet IV Bag

Bark directed Soil Drench

UF-CTA
UNIVERSITY of FLORIDA

Economics of canine detection

-early intervention to save the trees

Activity	1 tree detected	2 trees detected	3 trees detected	4 trees detected	5 trees detected	10 trees detected
Canines deployed (5 acre grove)	\$150	\$150	\$150	\$150	\$150	\$150
TILT [®] treatment	\$25	\$50	\$75	\$100	\$125	\$250
Sum	\$175	\$200	\$225	\$250	\$275	\$400
Value saved	\$475	\$950	\$1425	\$1900	\$2375	\$4750

Funding sources

Florida Department of Agriculture and Consumer Services



iINNOVATIVE DETECTION CONCEPTS



Redland Ahead/Second Chance Canines



McNair, NIGMS-RISE Fellowships to students