

CAPS Survey Report

Year:	2012
State:	Louisiana
Cooperative Agreement Name:	Citrus Commodity Survey
Cooperative Agreement Number:	12-8422-0990-CA
Project Funding Period:	January 1, 2012 to December 31, 2012
Project Report:	CAPS Survey Report
Project Document Date:	February 7, 2013
Cooperators Project Coordinator:	State Survey Coordinator (SSC)
Name:	J. Brett Laird
Agency:	Louisiana Department of Agriculture and Forestry
Address:	P.O. Box 3596
City/ Address/ Zip:	Baton Rouge, Louisiana 70821-3596
Telephone:	985-543-4024
E-mail:	brett_l@daf.state.la.us

Quarterly Report	<input type="checkbox"/>
Semi-Annual Accomplishment Report	<input type="checkbox"/>
Annual Accomplishment Report	<input checked="" type="checkbox"/>

- A. Write a brief narrative of work accomplished. Compare actual accomplishments to objectives established as indicated in the work plan. When the output can be quantified, a computation of cost per unit is required when useful.

The Louisiana Department of Agriculture and Forestry (LDAF) entered into a Cooperative Agreement with the United States Department of Agriculture (USDA), Animal Plant Health Inspection Service (APHIS), Plant Protection and Quarantine (PPQ) in 2012 to conduct a visual survey for 13 Citrus Commodity Pests. LDAF conducted this survey according to survey guidelines set forth by the USDA, APHIS, PPQ in 2012. LDAF's Agriculture and Environmental Science (AES) division is divided into 7 districts across the state and 4 of those districts located in citrus producing parishes were utilized to conduct this survey. LDAF AES inspectors conducted this survey in 25 parishes. The inspectors concentrated on surveying citrus trees in the Spring and citrus Fruit in the Fall. There were 45 inspections performed in the Spring and 43 inspections performed in the Fall. There were 49 samples submitted to either Louisiana State University (LSU) or the PPQ office in Baton Rouge taken from 17 inspection sites throughout the year. Dr. Nick Singh of LSU conducted most of the initial screening of these samples but was on extended leave in the later part of the year and samples were sent to the PPQ office in Baton Rouge for initial screening. The majority of the leaf samples were forwarded to Dr. Craig Webb's (PPQ) laboratory at Kansas State University. The insect samples were forwarded to Eric White's (PPQ) laboratory in New Orleans for identification and then forwarded to Dr. Craig Webb's lab for citrus greening testing. There were 7 Asian Citrus Psyllid (ACP) and 9 citrus blackfly samples positively identified. These samples originated from Jefferson, Orleans and St. Bernard parishes. St. Bernard parish is a new parish record for ACP and has been entered into the NAPIS database to reflect this. All other samples were negative for the targeted pests.

Funding Amount	Total Number of Traps	Cost Per Unit
Proposed = \$36,500.00	Proposed = N/A	Proposed= N/A
Actual = \$36,500.00	Actual = N/A	Actual = N/A

1. Survey methodology (trapping protocol):

	Common Name	Scientific Name
Pest:	Citrus Black Spot Sweet Orange Scab Fruit Piercing Moth Passion Vine Mealy Bug Orange Spiny Whitefly Citrus Blackfly Citrus Weevil Chili Thrips Asian Citrus Psyllid Citrus Canker Citrus Greening (African Strain) Citrus Greening (Asian Strain) Citrus Variegated Chlorosis Strain	<i>Guignardia citricarpa</i> <i>Elsinoe australis</i> <i>Eudocima fullonia</i> <i>Planococcus minor</i> <i>Aleurocanthus spiniferus</i> <i>Aleurocanthus woglumi</i> <i>Diaprepes abbreviatus</i> <i>Scirtothrips dorsalis</i> <i>Diaphornia citri, kuwayama</i> <i>Xanthomonas axonopodis pv. Citri</i> <i>Liberibacter spp.</i> <i>Liberibacter spp.</i> <i>Xylella fastidiosa</i>

	Proposed	Actual
Sites (Locations):	~ 100	88
Traps:	N/A	N/A

Number of Counties:	25
Counties:	<i>Assumption, Beauregard, Calcasieu, Cameron, East Baton Rouge, Iberia, Jefferson, Jefferson Davis, Lafayette, Lafourche, Livingston, Orleans, Plaquemines, St. Bernard, St. Charles, St. James, St. Martin, St. Mary, St. Tammany, Tangipahoa, Terrebonne, Vermilion, Washington, West Baton Rouge, West Feliciana.</i>

2. Survey dates:

	Proposed	Actual
Survey Dates:	January 1, 2012 to December 31, 2012	January 1, 2012 to December 31, 2012

3. Benefits and results of survey:

	Positive	Negative	Total Number
Traps	N/A	N/A	N/A

4. Database submissions:

NAPIS database entry was made for the Louisiana Citrus Commodity Survey on February 22, 2013 by Brett Laird (SSC, Louisiana). This same data will be entered into the IPHIS database by Karen Jenkins (PSS, Louisiana).

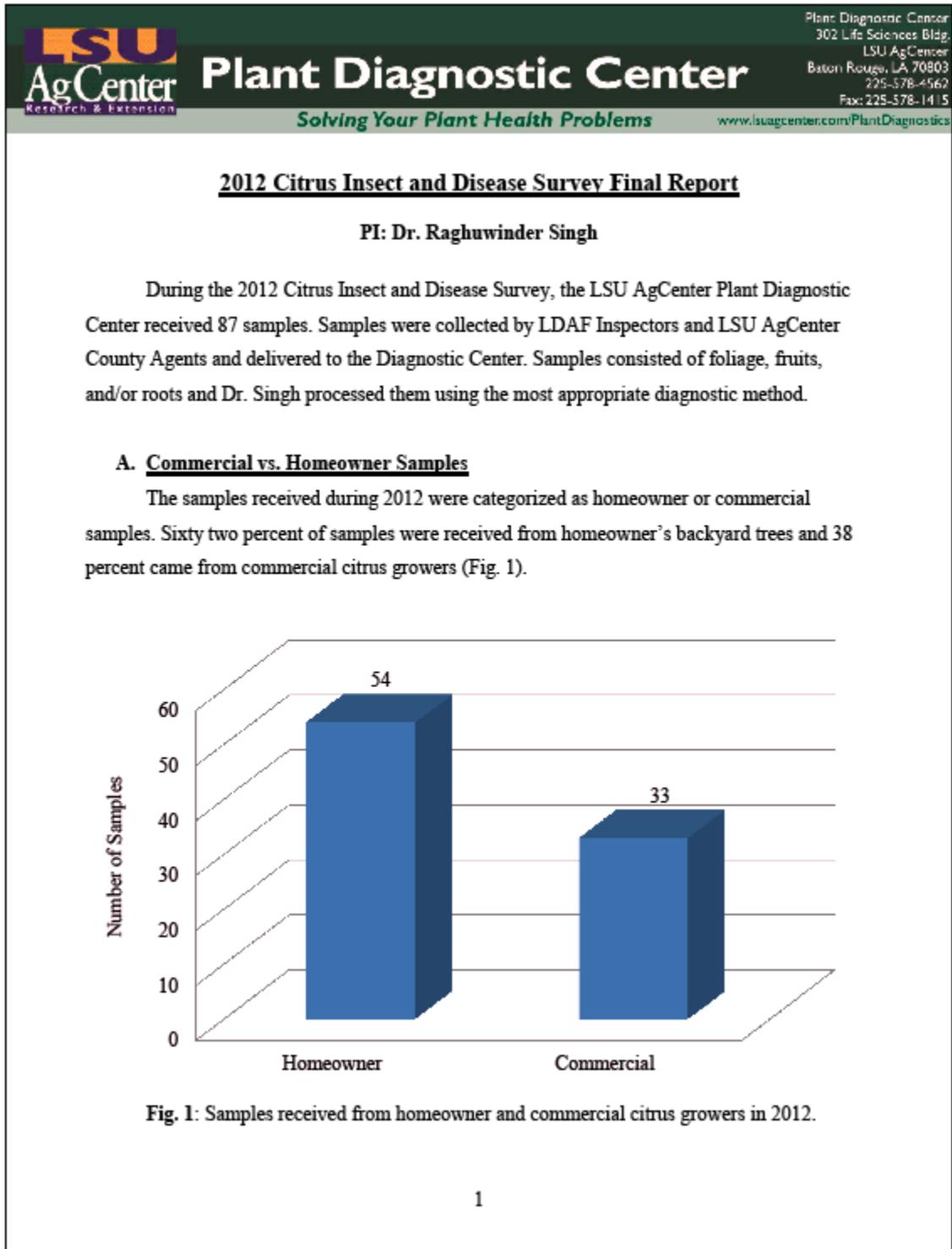
B. If appropriate, explain why objectives were not met.

All objectives in this survey were met or exceeded. Phone calls from concerned citrus tree owners were down this year compared to 2011 which resulted in a lower number of inspections.

C. Where appropriate, explain any cost overruns or unobligated funds in excess of \$1,000.

There were no unobligated funds for this survey. LDAF incurred expenses of \$2,256.00 in excess of the cooperative agreement award.

LSU received \$25,000 from LDAF through this Cooperative Agreement for equipment, supplies, labor and services provided throughout the survey year. Below is Dr. Raghuwinder Singh's Final Report:



B. Citrus Varieties:

The total samples were categorized into nine varieties of citrus including *Citrus* sp., grapefruits, kumquats, limes, lemons, oranges, pummelos, satsumas, and tangerines (Fig. 2). The majority of samples were satsumas (24) followed by oranges (20), *Citrus* sp. (11), lemons (9), grapefruits (6), kumquats (6), limes (6), tangerines (3), and pummelos (2).

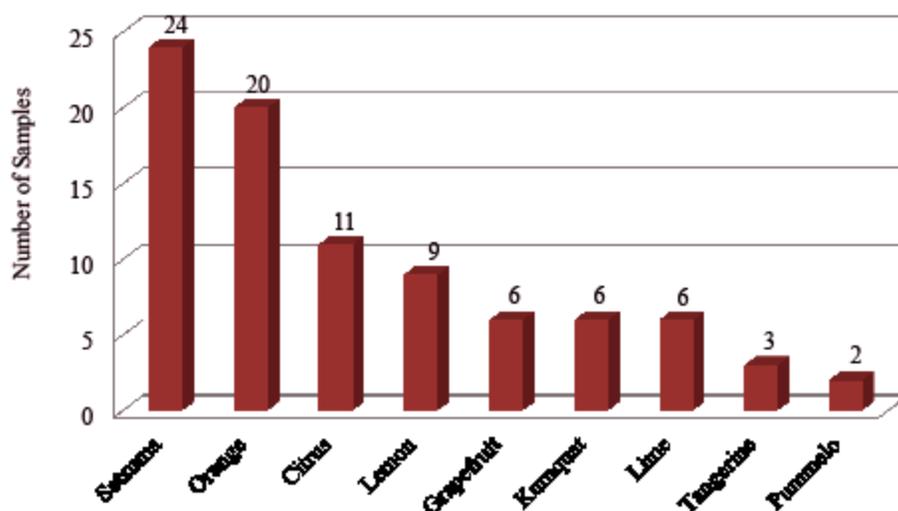


Fig. 2: Citrus varieties received in 2012.

C. Parish Sample Submission:

Samples in 2012 came from 13 parishes and 78% of these were submitted from four counties with majority of samples from Plaquemines (28) followed by Orleans (22), Jefferson (10), and St. Tammany (8). The rest (22%) of the samples came from Allen (1), EBR (5), Pointe Coupee (1), Rapides (1), St. Mary (1), St. Bernard (3), Tangipahoa (4), Terrebonne (1), and Vermillion (2) (Fig. 3).

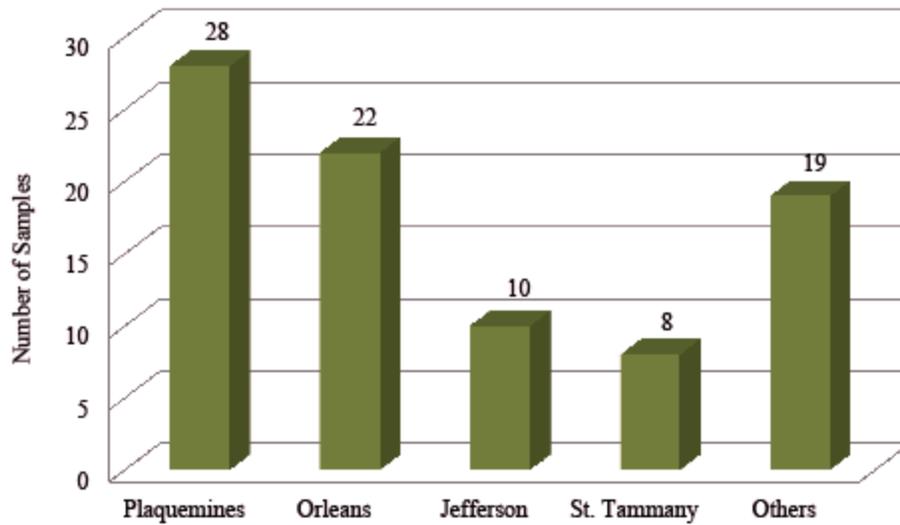


Fig. 3: Parish sample submission in 2012.

D. Sample Diagnoses:

Out of 87 samples, 38 samples were diagnosed as insects and mites followed by 21 disease, seven abiotic, and 21 with no pathogen detected (Fig. 4).

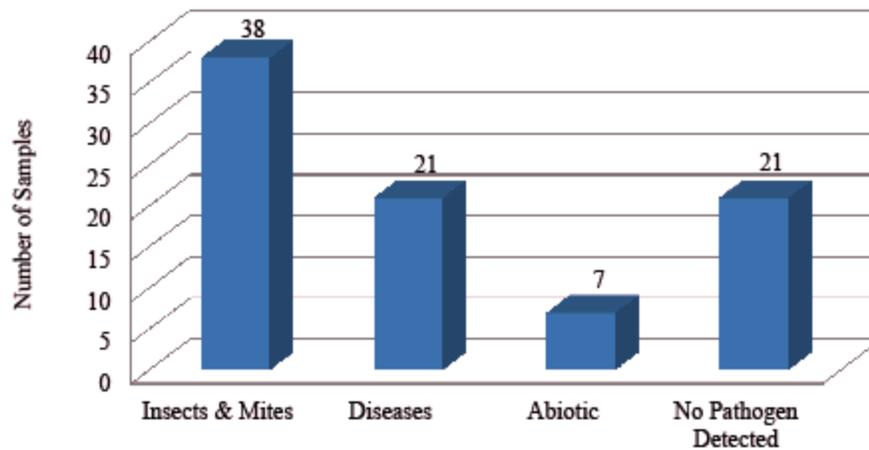


Fig. 4: Number of sample diagnoses in 2012.

E. Insect and Mite Sample Diagnoses

All samples were examined under a dissecting microscope to determine the presence of Asian and African citrus psyllid, brown citrus aphid, chili thrips, citrus longhorn beetle, citrus weevil, fruit piercing moth, glassy winged sharp shooter, Japanese wax scale, lobate lac scale, passion vine mealybug, spiny black fly, and white wax scale. None of the insect species listed above were found except Asian citrus psyllid (ACP) was found on 11 samples. The St. Bernard parish was a new parish record for ACP in 2012. Dr. Eric White at USDA New Orleans confirmed the ID of all 11 ACP specimens. Dr. Craig Webb at Kansas State University screened all 11 ACP specimens and confirmed negative for both Asian and American strains of greening. A number of other insect and mite species were also found and included citrus rust mites (6), blackfly (4), whitefly (3), tea scales (3), spider mites (2), aphids (1), and wax scale (1) (Fig. 5).

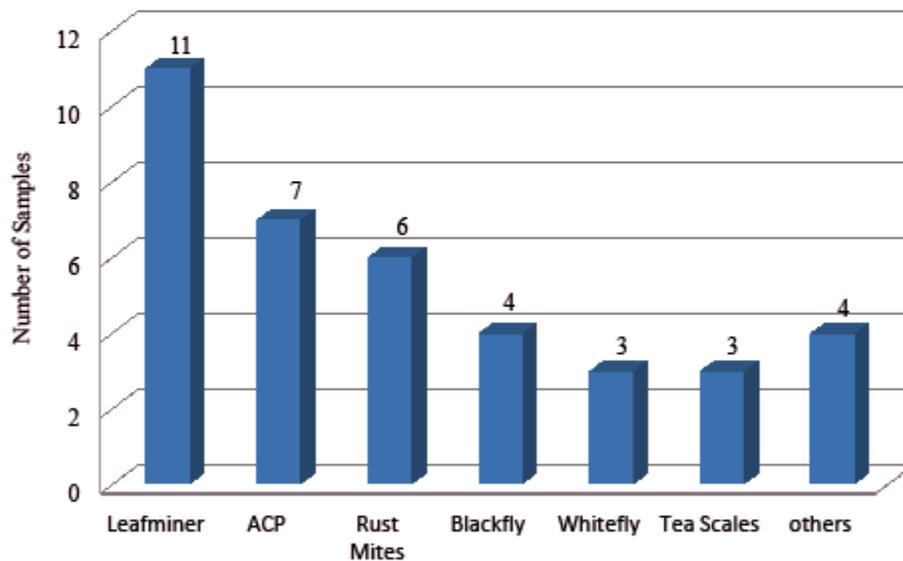


Fig. 5: Number of insects and mites samples diagnosed in 2012.

F. Disease Sample Diagnoses:

Samples were examined for citrus black spot, citrus canker, citrus greening, Citrus tristeza virus, Citrus variegated chlorosis, and citrus and sweet orange scab. Based on the symptoms, samples were subjected to cultural, serological, or molecular diagnostic methods. No signs and/or symptoms of citrus black spot, citrus canker, and Citrus variegated chlorosis were observed. Out of 26 samples tested for Citrus tristeza virus using ELISA, eight were found to be positive. Two root samples were tested positive for *Phytophthora* spp. One and four samples were tested positive for sweet orange and citrus scab, respectively with conventional PCR (10). Forty samples were screened for both strains of citrus greening using conventional PCR. Samples that were suspected for citrus greening were also forwarded to Dr. Craig Webb at Kansas State University for confirmation. All samples were confirmed negative for both strains of citrus greening. Twig dieback caused by *Colletotrichum* spp. and *Botryodiplodia* sp. was found on four and one sample, respectively. Heart/butt rot caused by *Ganoderma* sp. was detected on one sample (Fig. 6).

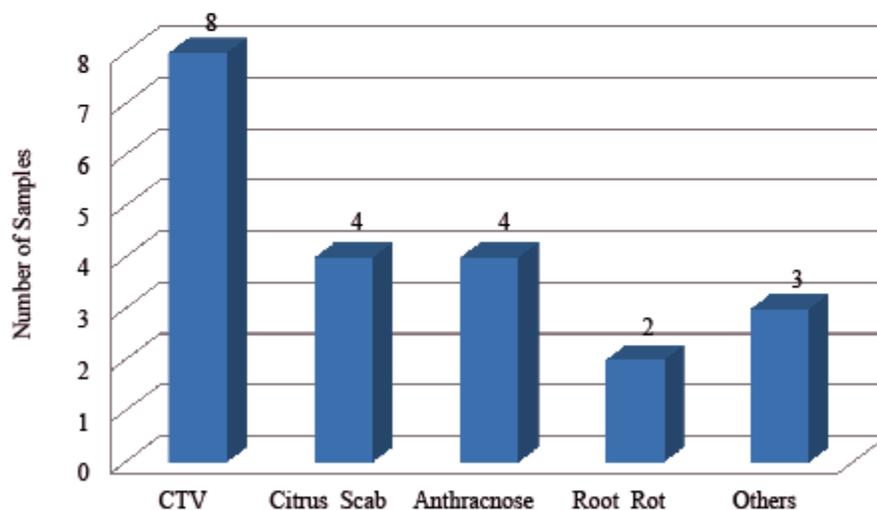


Fig. 6: Number of disease samples diagnosed in 2012.

G. Diagnostic Methods:

After receiving the samples, they were carefully examined under a dissecting microscope. Then based on the symptoms and client's request, each sample was processed using the most appropriate diagnostic technique including culture isolation, light microscopy, polymerase chain reaction (PCR), and serological assay (ELISA). The majority of samples were processed using PCR. DNA from 45 samples was extracted using DNeasy Plant Mini Kit according to manufacturer's guidelines. A total of 80 PCR reactions were conducted to detect Asian and American strains of *Candidatus Liberibacter* and 10 for citrus scab and sweet orange scab. A compound microscope was used to examine 29 samples for any signs of pathogen and/or pest present on the tissue. Serological assay such as ELISA was conducted on 28 samples. Seven samples were cultured to recover the fungal or bacterial pathogens. Several samples were diagnosed using more than one diagnostic method (Fig. 7).

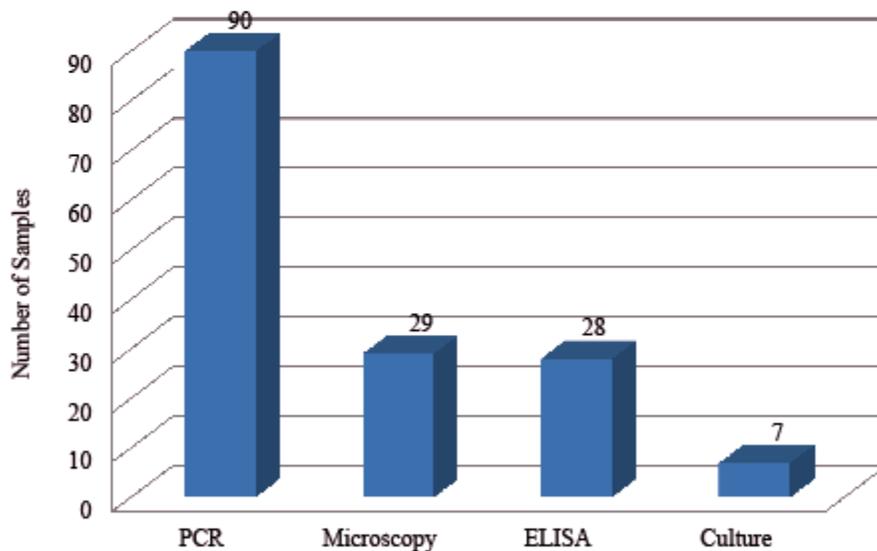


Fig. 7: Diagnostic methods or techniques used in 2012.

H. Student Worker

A student worker was hired at \$10 per hour rate to help prepare the samples for diagnostics.

I. Equipment Purchase

A NanoDrop was purchased to quantify and check the quality of DNA. The quality and quantity of DNA extracted from the tissue plays a vital role in the amplification of the desired product. NanoDrop is used to quantify and check the quality of the DNA.

J. Supplies

Supplies related to diagnostic methods (ELISA Kits, PCR reagents, Gel electrophoresis supplies, etc.) were also purchased to provide accurate and rapid diagnostic results.

Approved and signed by

Cooperator

Date: _____

ADODR

Date: _____