



United States Department of Agriculture

# **CURRENT SITUATION, MANAGEMENT, AND ECONOMIC IMPACT OF CITRUS BLACK SPOT IN FLORIDA, US**

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**USDA APHIS PPQ  
CITRUS HEALTH RESPONSE PROGRAM**



## CITRUS BLACK SPOT (CBS) *Disease*

Caused by the fungus *Guignardia citricarpa* Kiely  
anamorph *Phyllosticta citricarpa* (McAlpine) Aa

The CBS pathogen, the anamorph name *P. citricarpa* has priority over the teleomorph name *G. citricarpa*, and it should be now used as the only identifier of this species.

Norvell LL, 2011. Fungal nomenclature. 1. Melbourne approves a new code. *Mycotaxon*, 116, 481-490.

# CITRUS BLACK SPOT (CBS) FIRST REPORTED IN FLORIDA MARCH 2010

... first record in United States

... first North American record



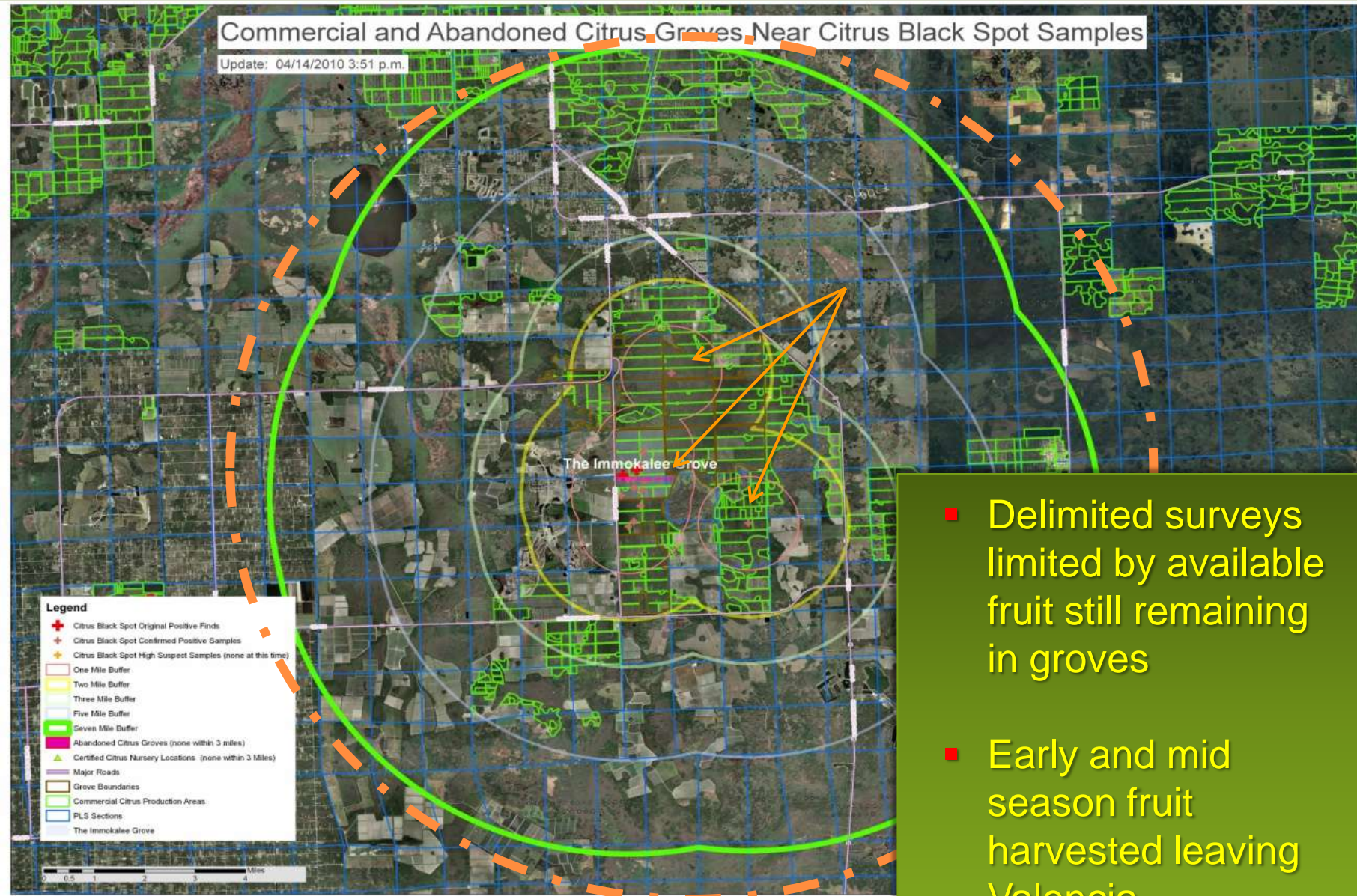
# Early Symptoms of Citrus Black Spot Valencia Sweet Orange



- First detection in commercial grove reported by grower as “suspicious symptoms”
- Further inspection by FDACS identified numerous trees, many with severe levels of infection
- FDACS and USDA AHIS PPQ confirmation using PCR
- Delimited survey

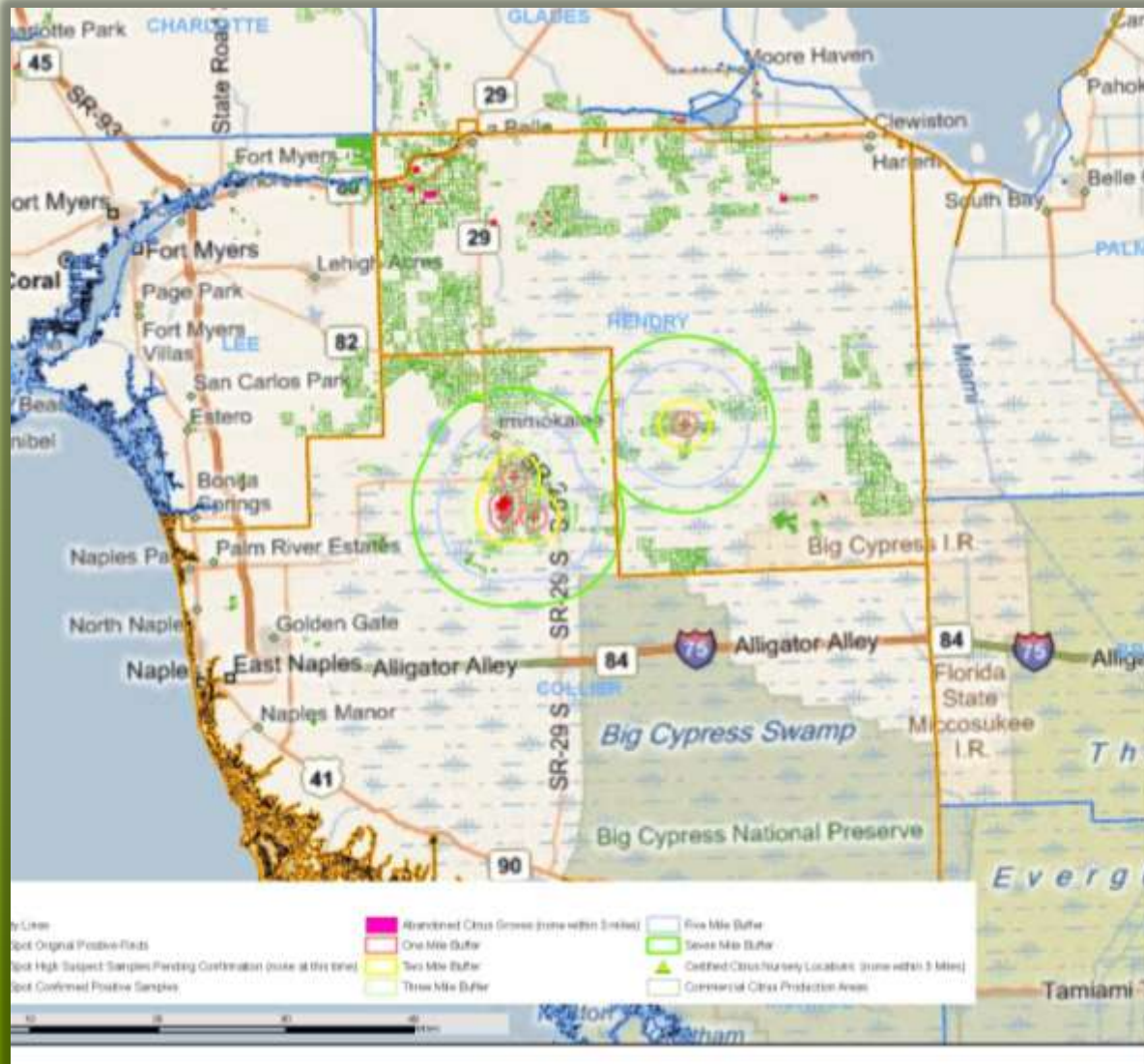


# DELIMITING SURVEYS IN SPRING OF 2010



- Delimited surveys limited by available fruit still remaining in groves
- Early and mid season fruit harvested leaving Valencia.

# SUMMARY OF 2009-10 SEASON



- CBS found in two SW Florida Counties (Collier & Hendry)
- Over 11,000 residential properties surveyed within & beyond 7-mile buffer
- Over 35,000 acres surveyed
- 4 Groves
- Grove blocks
  - 8 Valencia

# SUMMARY OF 2010-11 SEASON

## Collier County

+ Positive tree locations

One mile (1.6 km) arc

Positive blocks in 2010

New in 2011

2010 Quarantine boundaries

+ 2 Groves

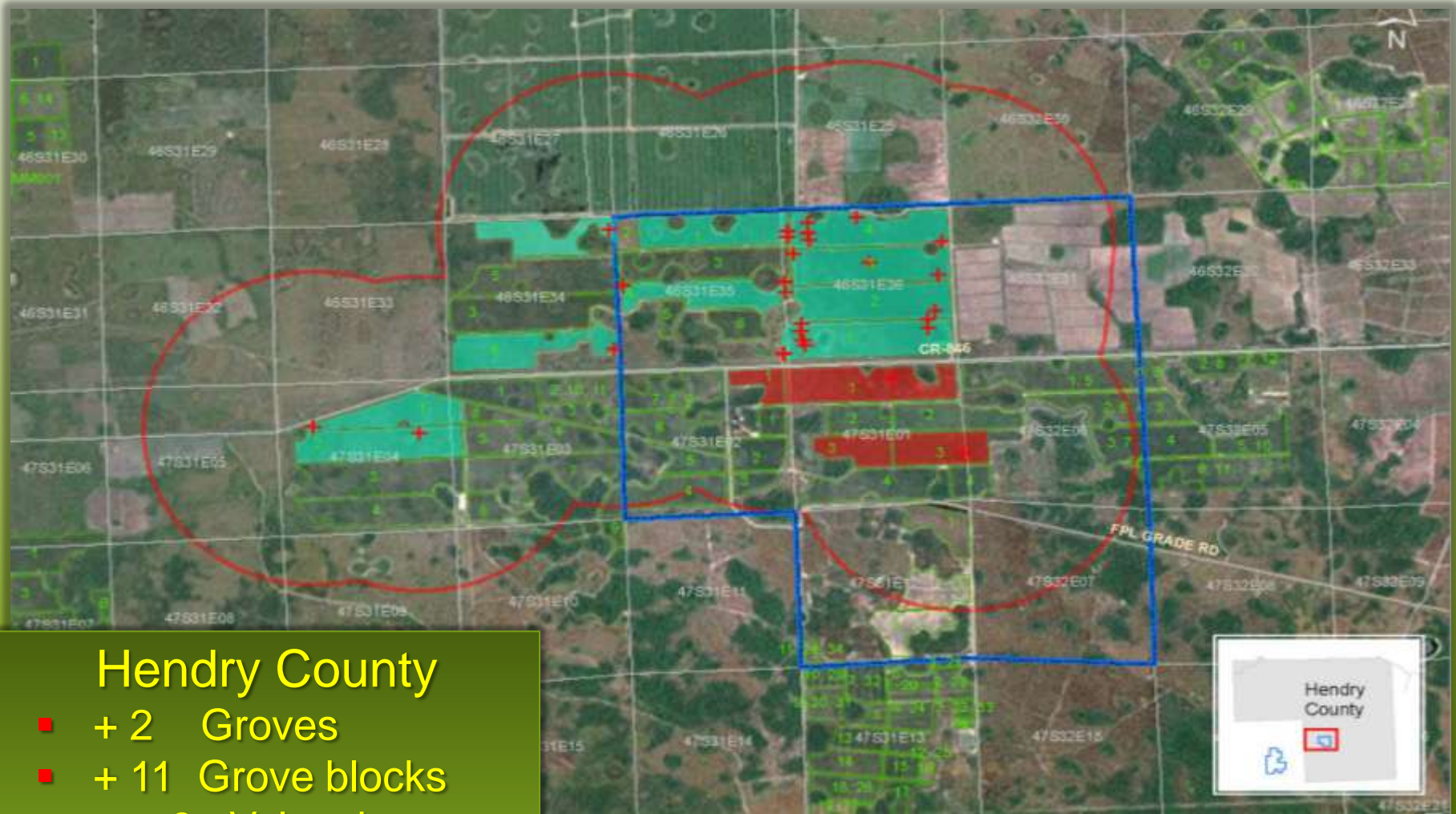
+ 15 Grove blocks

15 Valencia





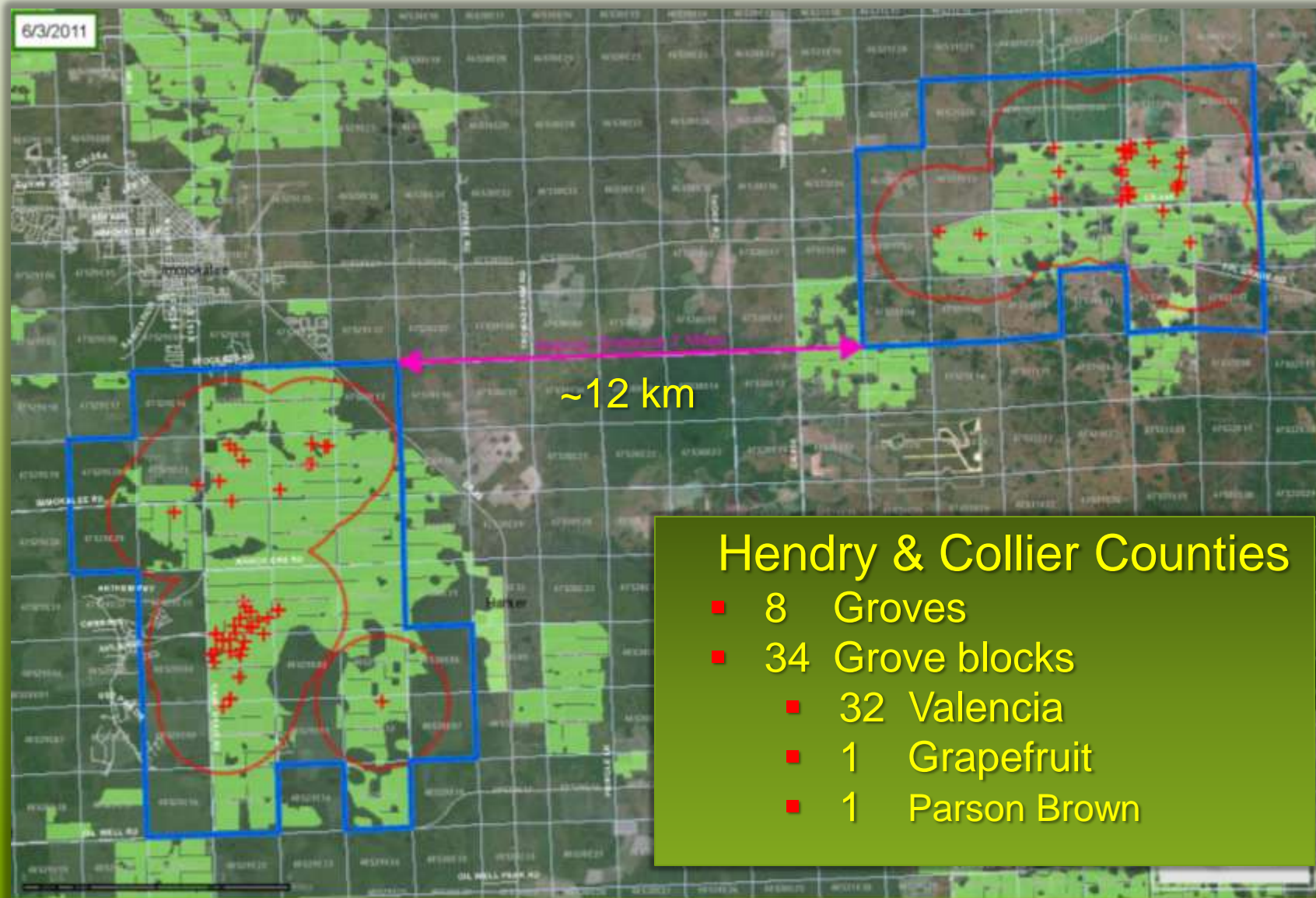
# SUMMARY OF 2010-11 SEASON



## Hendry County

- + 2 Groves
- + 11 Grove blocks
  - 9 Valencia
  - 1 Grapefruit
  - 1 Parson Brown

# COMBINED QUARANTINE 2010 - 2011



## Hendry & Collier Counties

- 8 Groves
- 34 Grove blocks
  - 32 Valencia
  - 1 Grapefruit
  - 1 Parson Brown

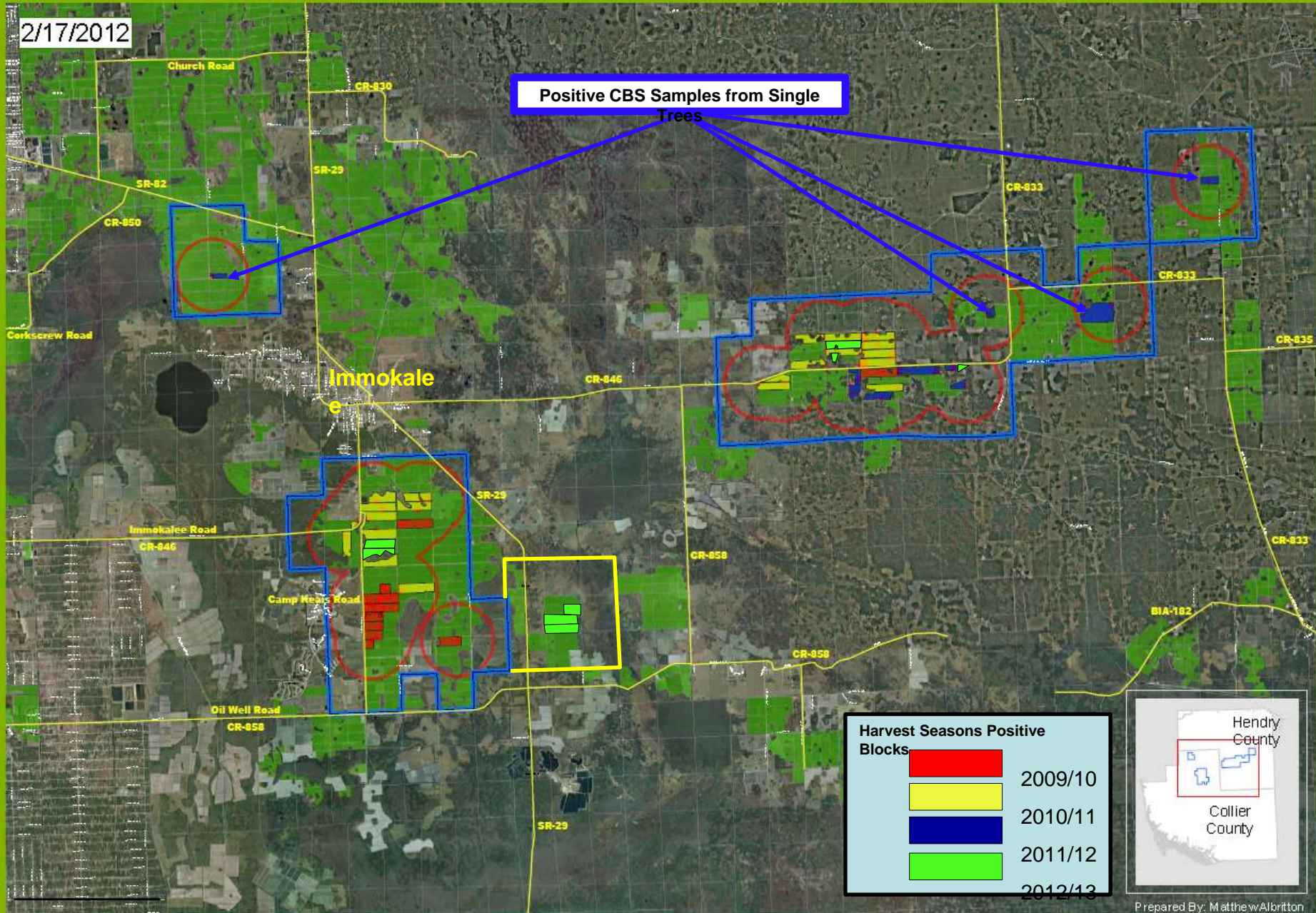


**Florida Citrus Black Spot**  
Quarantine Zone Map

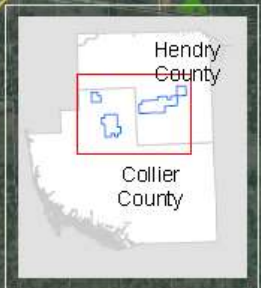


2/17/2012

Positive CBS Samples from Single Trees



Harvest Seasons Positive Blocks	
<span style="display:inline-block; width:20px; height:10px; background-color:red;"></span>	2009/10
<span style="display:inline-block; width:20px; height:10px; background-color:yellow;"></span>	2010/11
<span style="display:inline-block; width:20px; height:10px; background-color:blue;"></span>	2011/12
<span style="display:inline-block; width:20px; height:10px; background-color:lightgreen;"></span>	2012/13



Prepared By: Matthew Albritton

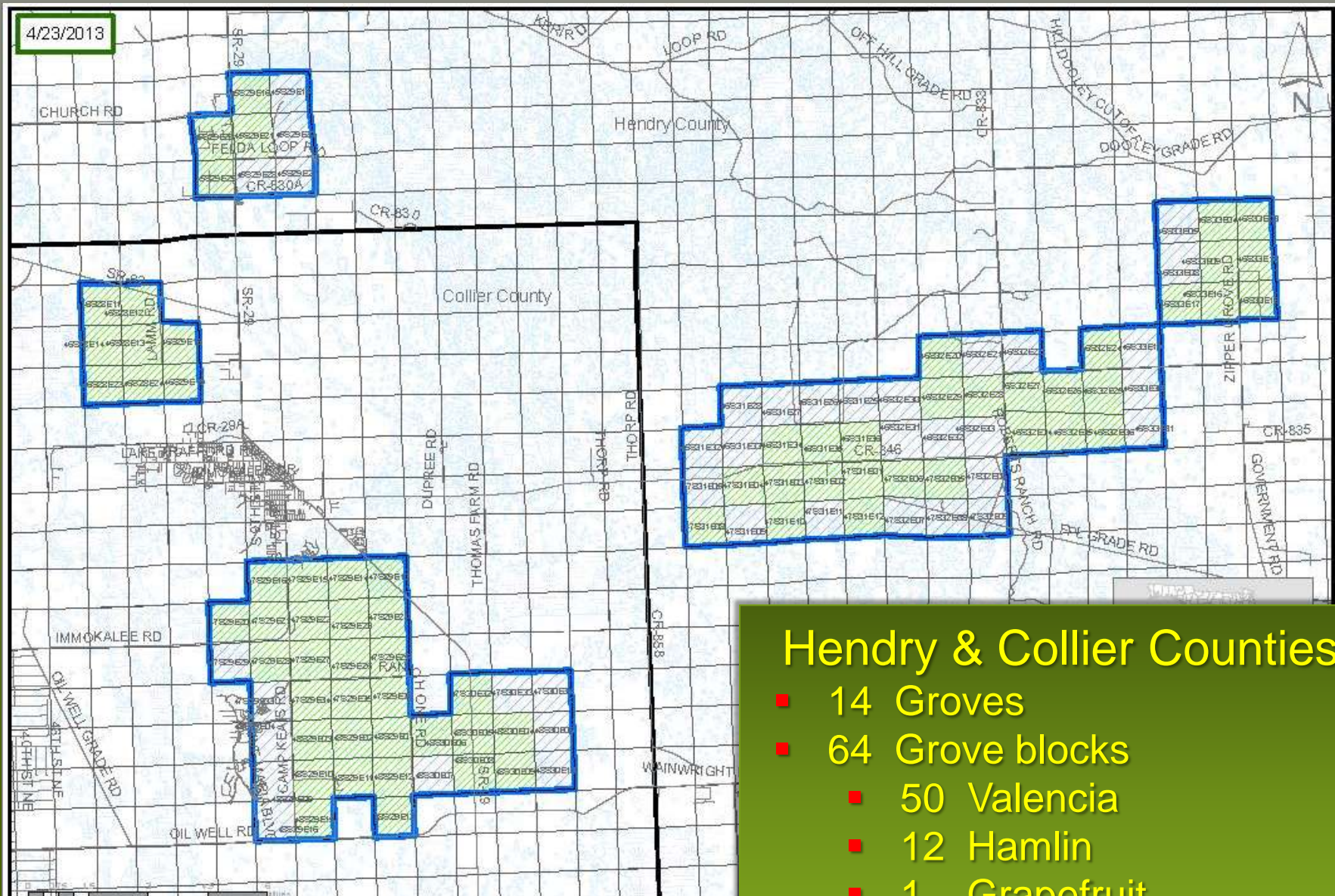
- + CBS Positive Locations
- One Mile Buffer
- Quarantine Boundary
- PLS Sections
- Commercial Citrus

# Florida Citrus Black Spot Quarantine Zone Map



# QUARANTINE LOCATIONS AS OF 2013

4/23/2013



## Hendry & Collier Counties

- 14 Groves
- 64 Grove blocks
  - 50 Valencia
  - 12 Hamlin
  - 1 Grapefruit
  - 1 Parson Brown



# CBS QUARANTINE FEDERAL ORDER

## FEDERAL ORDER

Quarantine for *Guignardia citricarpa* Kiely  
Causal Agent of Citrus Black Spot (CBS)

DA-2012-09  
March 16, 2012

The purpose of this Federal Order is to prevent the spread of the fungal plant pathogen *Guignardia citricarpa* authority provided by 5 U.S.C. 7712(a), which movement in interstate that the prohibition or the United States.

The Administrator of the necessary, in order to prevent the dissemination of CBS, to establish restrictions on the interstate movement of certain regulated Order. This Federal Order up 2011.

Federal Domestic Quarantine Order,  
*Guignardia citricarpa*, Causal Agent of (CBS)  
DA-2011-29; Expansion in March 2013

FOR INFORMATION AND ACTION  
DA-2013-08  
March 22, 2013

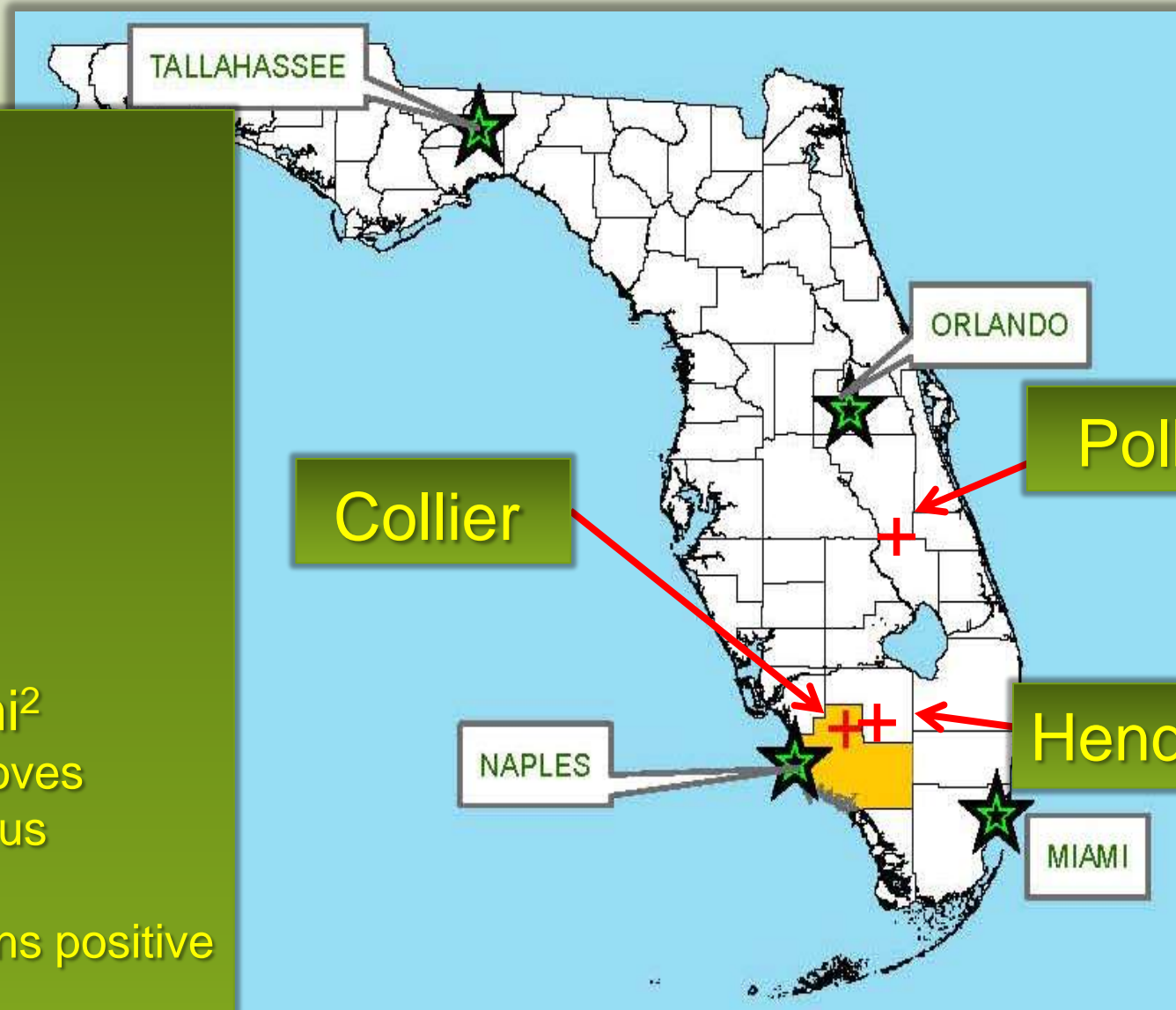
SUBJECT: APHIS Expands Citrus Black Spot (*Guignardia citricarpa*) Regulated Area in Florida

TO: STATE AND TERRITORY AGRICULTURAL REGULATORY OFFICIALS

Effective immediately, the Animal and Plant Health Inspection Service (APHIS) is expanding the regulated area in Florida for *Guignardia citricarpa*, the causal agent of citrus black spot (CBS). Due to additional detections of CBS during ongoing surveys conducted by APHIS and the Florida Department of Agriculture and Consumer Services, Division of Plant Industry (DPI), the regulated area will expand by nine sections in Collier County, eight sections in Hendry County, and one section in Polk County.

# QUARANTINE LOCATIONS AS OF 2013

- Collier
  - 48 mi<sup>2</sup>
- Hendry
  - 61 mi<sup>2</sup>
- Polk
  - 1 mi<sup>2</sup>
- Total 110 mi<sup>2</sup>
  - 73 w / groves
  - 37 no citrus
- 25 sections positive for CBS



Regulatory Response:

- Trailers must be covered before leaving a Federal / State quarantined area for CBS
- Leaves represent the greatest risk of disease transmission...
- Use of tarps reduce the risk of leaf debris from blowing out of the trailer during transit





# REGULATORY REQUIREMENTS

## Regulatory Responses:

- Field surveys required for fresh fruit shipments originating from groves from within the CBS quarantine
- Pre-harvest surveys required to show CBS areas of freedom.



## European Union (EU) requirement

- Field surveys required for fresh fruit shipments originating from groves throughout entire Counties with partial quarantines
- Expanded to entire County starting August 1<sup>st</sup>, 2013

# REGULATORY REQUIREMENTS PACKINGHOUSE

- Interstate movement of all fruit permitted as long as the following conditions are met:
  - The fruit must originate in a grove operating under a compliance agreement. (Florida Department of Agriculture and Consumer Services – Division of Plant Industry FDACS-DPI)
  - The fruit must be packed in a commercial packinghouse whose owner or operator has entered into a compliance agreement with USDA APHIS PPQ.
  - The fruit must be found to be free of leaves and other regulated plant material.
  - The fruit must be washed, brushed, and surface disinfested with approved treatment).
    - (1) Sodium Hypochlorite or
    - (2) Sodium O-Phenyl Phenate (SOPP) or
    - (3) Peroxyacetic Acid (PAA).
  - [Required fungicide treatment](#)
  - The fruit must be waxed.

# REGULATORY REQUIREMENTS PACKINGHOUSE

- 2013 Interstate movement of all fruit permitted as long as the following added measures are included to previous list of requirements:
  - Added measures include a fungicide treatment at the time of packing prior to waxing:
    - As a result of citrus black spot *Guignardia citricarpa*
      - fruit must be treated with label rates of imazalil and/or thiabendazole
    - As a result of sweet orange scab *Elsinoë australis*
      - fruit must be treated with label rates of one of the following fungicides: imazalil, thiabendazole or a combination of fludioxonil plus azoxystrobin

# REGULATORY REQUIREMENTS PACKINGHOUSE

- 2013 Exports to EU from within quarantine
  - Pre-harvest surveys required to show CBS areas of freedom
  - Packinghouse fruit inspections

LIMITED PERMIT  
USDA – APHIS – PPQ  
FOR EXPORT ONLY  
NOT FOR DISTRIBUTION IN  
THE UNITED STATES  
APHIS SEAL # \_\_\_\_\_



## **REGULATORY REQUIREMENTS**

### **ORCHARDS**

- TARP all fruit trailers coming out of Quarantine

### **PROCESSOR PLANTS AND PACKING HOUSES**

- REQUIRE decontamination of all CBS trailers & bins prior to leaving facility

### **DEBRIS DISPOSAL**

- All debris from plant may go to feed mill --OR--
- All debris hauled offsite under tarpaulins - dumped at certified dumpsites and buried

Monthly fungicide applications of copper and/or strobilurins will be needed from early May to mid-September

Strobilurins should be reserved for times when phytotoxicity from copper is a concern (temperatures  $<94^{\circ}$  F )

Strobilurins also should not be applied in two consecutive sprays to manage pathogen resistance



**Q<sub>1</sub>I (Strobilurin) Fungicides**  
moves translaminarily  
as well as *systemically*

Dewdney, M.M, Schubert, T.S., Estes, M.R. and Peres, N.A. 2013 *Citrus Black Spot* Florida Citrus Pest Management Guide (annual). University of Florida, Gainesville, FL. pp81-85

# Citrus Copper Application Scheduler

[← Back to tools](#)



The Citrus Copper Application Scheduler provides an estimated time period of remaining copper residue on various citrus cultivars. The estimate is based on inputs provided below. [more...](#)

[> Help screencast](#)

U.S. Units System

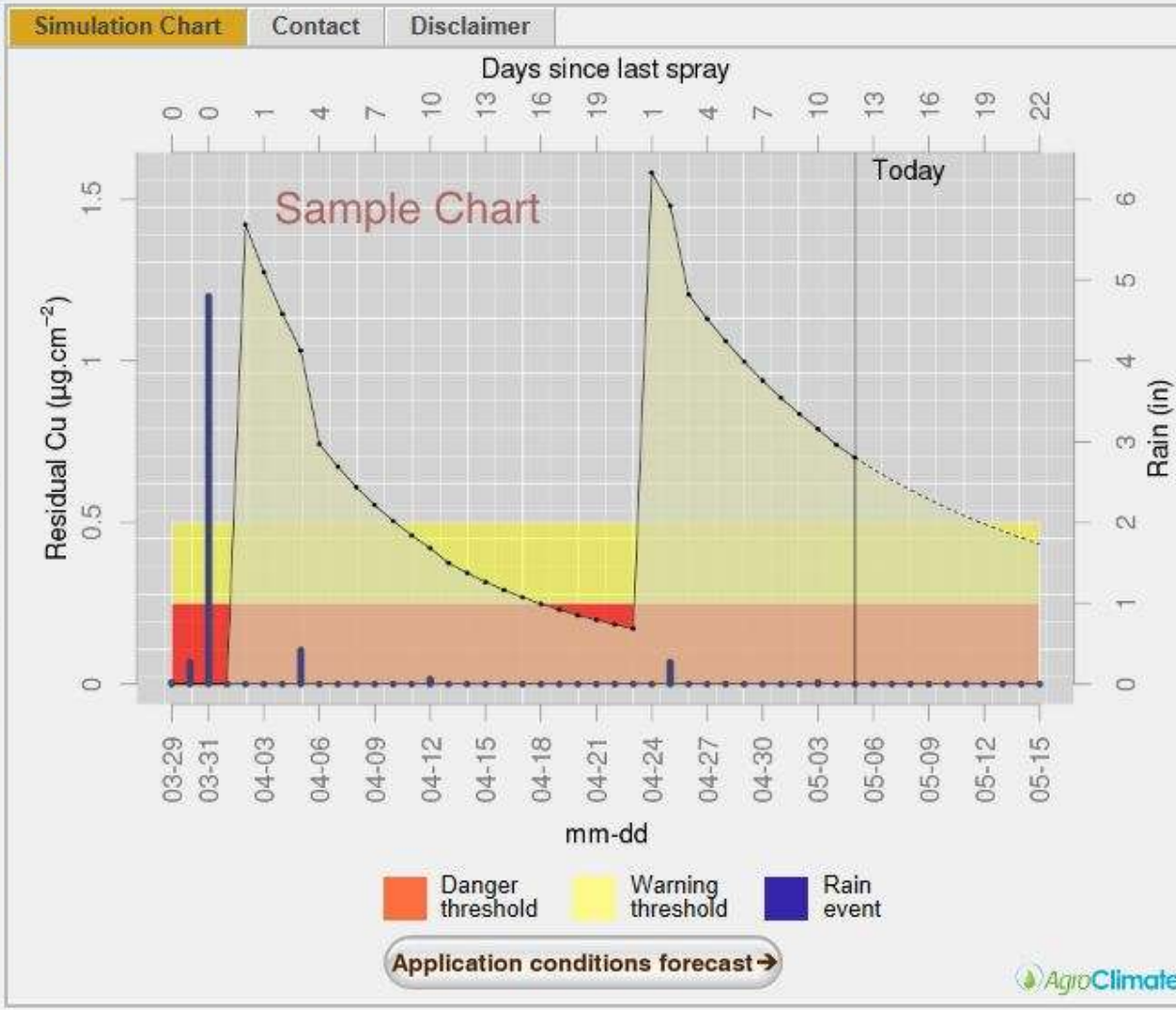
Select a weather Station:

Apopka

[> Upload your weather data instead](#)

Scion: Grapefruit

Bloom date:



EDIS PP289 A Web-Based Tool for Timing Copper Applications in Florida Citrus (<http://edis.ifas.ufl.edu/pp289>)

# DISEASE MANAGEMENT



## Management of leaf liter

- Leaves represent the greatest risk of disease transmission...
- Maintain proper irrigation timing to reduce stress and leaf drop
- Cultural practices to enhance leaf liter decay
  - 5% Urea
  - Mulching
- Remove declining trees
- Maintain a good nutritional program
- Open tree canopy by skirting to reduce periods of leaf wetness
- Use clean nursery stock







United States Department of Agriculture

## SURVEY PROTOCOLS

### **CBS DETECTION AND DELIMITING SURVEYS 2013**

100% of the commercial grove acreage within a 10-mile (16.09 km) radius of previous finds 106,350 A (43,038 ha)

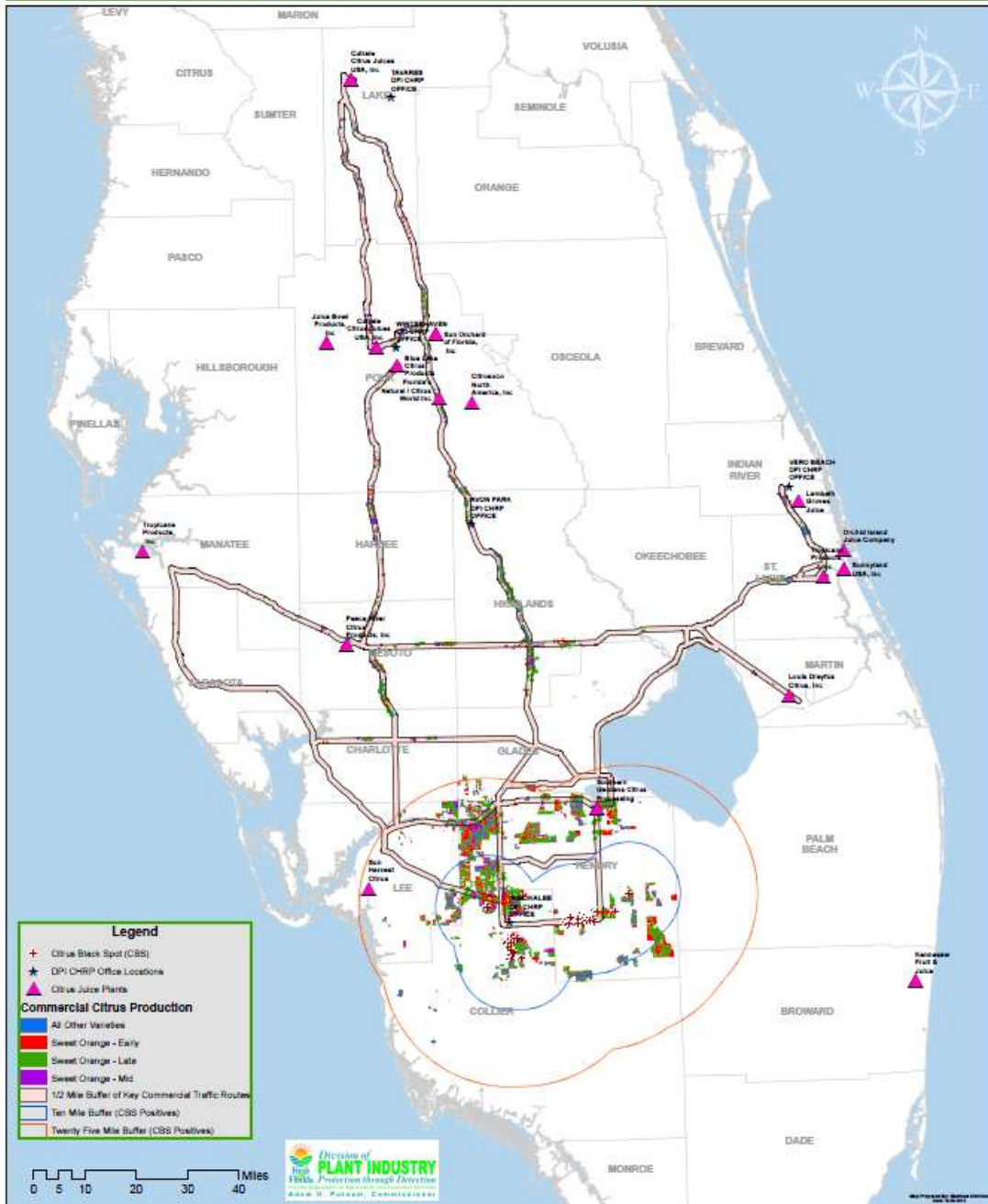
Transportation corridors originating from the CBS regulated area  
0.5 miles (0.805 km) from the center of the corridor  
58,473 A (23,663 ha)

Multi-pest survey (MPS) strategy employed to sweep remaining commercial citrus growing regions at sampling rate of 20% of the total acreage 114,000 A (46,134 ha).

A survey radius of 0.5 mile (0.805 km) around 38 citrus nursery stock facilities 9000 A (3642 ha)

**TOTAL 287,823 A ( 116,477 HA )**

# Citrus Black Spot Survey Map



Transportation corridors originating from the CBS regulated area

0.5 miles (0.805 km) from the center of the corridor  
 58,473 A (23,663 ha)

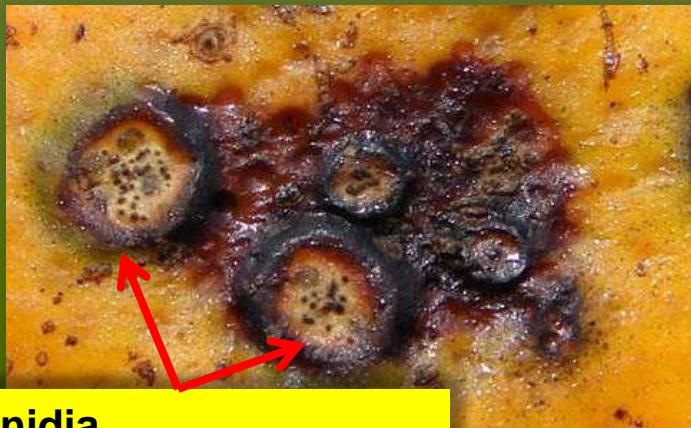
# CBS DETECTION AND DELIMITING SURVEYS 2013

Survey timing is scheduled as fruit matures (early, mid, late)

Surveys primarily focus on mature symptomatic fruit exhibiting “hard spot” lesions

Lemon blocks completed

**HARD SPOT:  
Most typical symptom**



**Pycnidia  
(fruiting bodies)**



**Pycnidia**

# ECONOMIC IMPACT OF CBS IN FLORIDA

- Increased production costs
  - Fungicide application
  - Tarping trailers leaving quarantine area
  - Leaf litter management
- Packinghouse
  - Fungicide treatment
  - Disposal of leaf litter and other citrus debris
  - Sanitizing bins
- Processors
  - Sanitizing trailers and tarps
  - Disposal of leaf litter and other citrus debris
- Field and Packinghouse inspections
  - Regulatory oversight

It is difficult to isolate the total economic impact of CBS since other disease/pest management programs overlap

- Asian citrus psyllid
- Citrus Greening Disease
- Citrus Canker
- Leaf minor



## CONCLUSION

- CBS is still an emerging issue in Florida
- May take years before the full impact of CBS is felt





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# THANK YOU



## ACKNOWLEDGEMENTS:

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