Citrus Health Management Areas

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www.flchma.org

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Past Experiences Managing Asian citrus psyllid

- **Easy to kill…Hard to control !!!**

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Insecticide Use for Psyllid Control

- **Brazil:** varying success using 6 to 26 applications per season (Belasque et al. 2008)
- **Asia:** worst-case situations up to 52 applications per year (Beattie and Holford 2008)
- **Florida:** much variation; on average 6 to 10 applications per year

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Primary reasons for repeated applications?

- **Short residual of pesticide control**
  - Foliar applied insecticides
- **Psyllid movement behavior**

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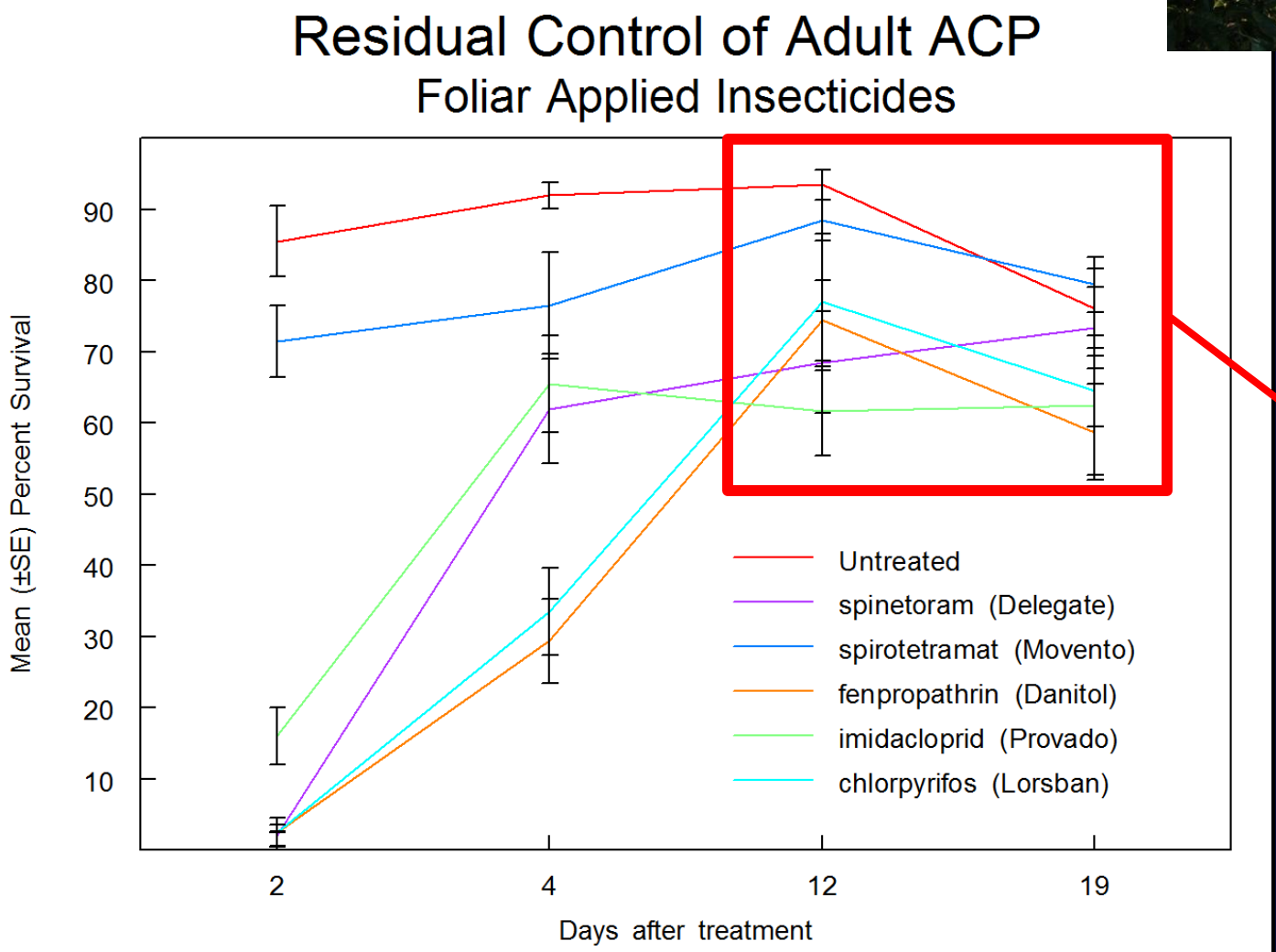
ACP Caging Study

Daniela Okuma, Rosana Serikawa (UF,CREC 2010)



> 60% survival following exposure 12 DAT

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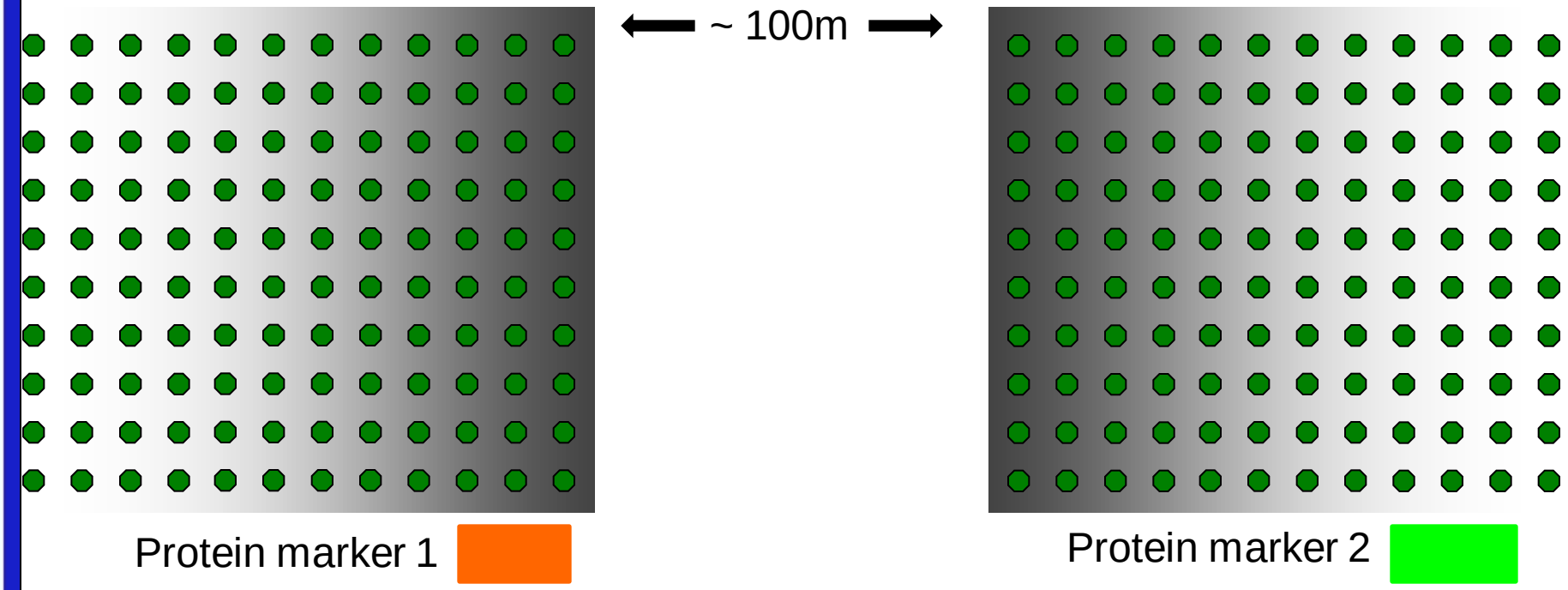
Psyllid Movement

Boina et al. 2009. Environ. Entomol. 38: 1250-1258

ACP movement between adjacent groves (3 days)



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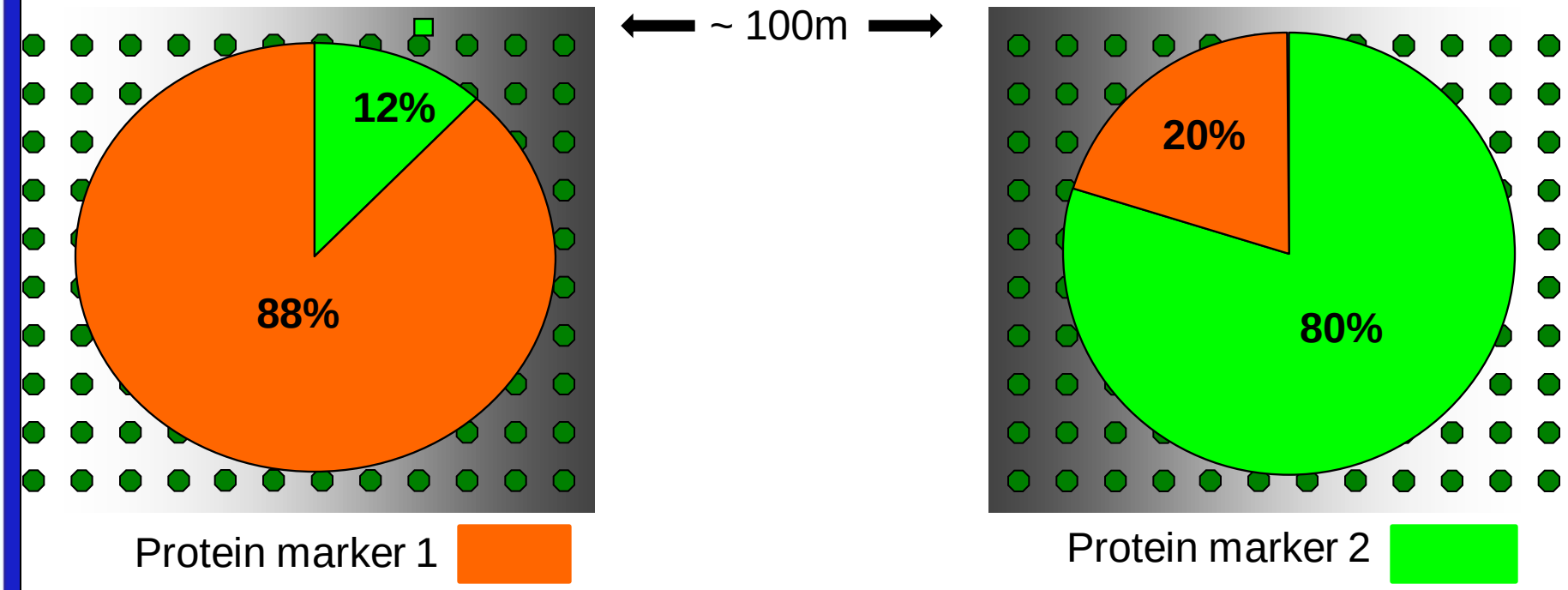
Psyllid Movement

Boina et al. 2009. Environ. Entomol. 38: 1250-1258

ACP movement between adjacent groves (3 days)



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Reasons for failed control?

- Collectively, these results explain how the lack of residual control combined with psyllid movement can result in the need for frequent repeated insecticide applications.

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How to improve ACP control?

- **Implementation of area-wide ACP control programs**
  - Coordinated effort
  - Simultaneous treatment of groves in a “large” area
  - Delay psyllid recolonization of groves
- **Goals:**
  - Greater reduction in overall psyllid populations
  - Reduce the need for frequent reapplication of pesticides

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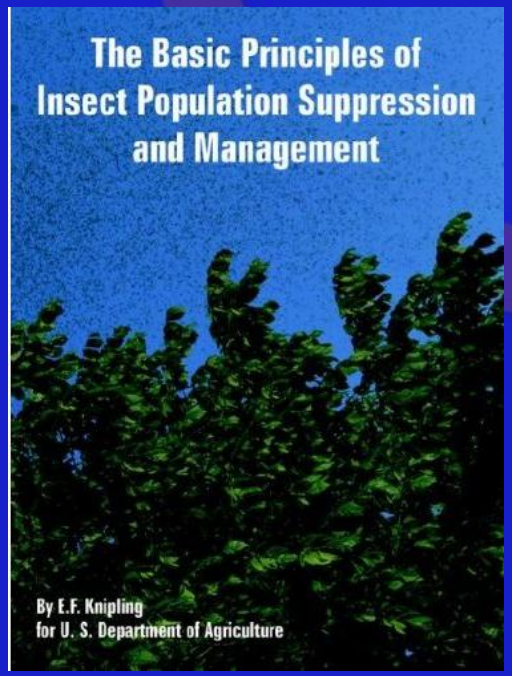
Basis of Area-wide Control

(Knipling 1979)



Basic Principle of Total Population Control:

"Uniform suppressive pressure applied against the total population of the pest over a period of generations will achieve greater suppression than a higher level of control on most, but not all, of the population each generation"

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Key Features

Grove-by-Grove Approach

- Targeting portion of population
- Refugia left for immigrants (reapplication of insecticides)
- Pests with limited mobility
- Low value crop with medium to high pest tolerance
- Reactive approach to pest presence
- Complicates pesticide resistance management

Area-Wide Approach

- Targeting entire population
- No refugia for immigrants (reduction in insecticide use)
- High pest mobility
- High value crop with low pest tolerance
- Proactive approach to pest presence
- Facilitates pesticide resistance management

(Summarized from: Hendrichs et al. 2007)

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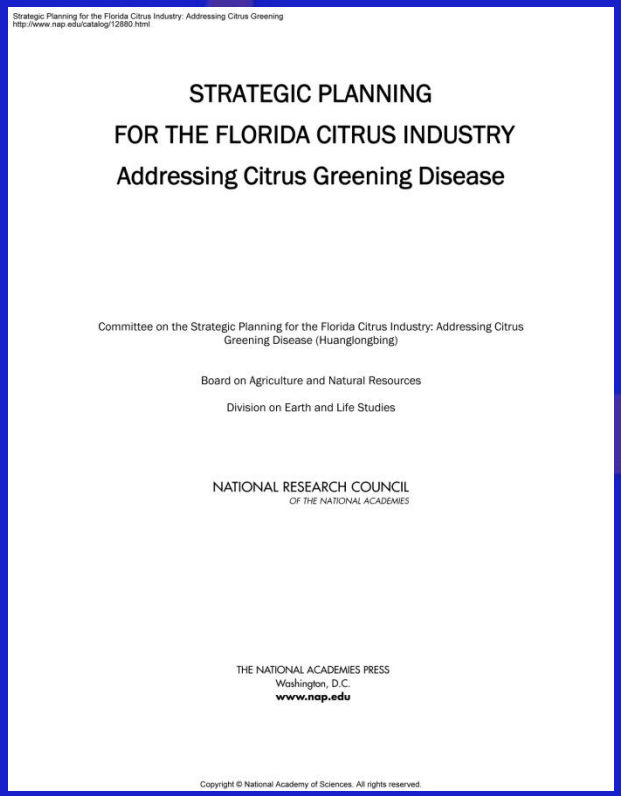
Creation of Citrus Health Management Areas


Strategic Planning for the Florida Citrus Industry: Addressing Citrus Greening
http://www.nap.edu/catalog/12880.html

STRATEGIC PLANNING
FOR THE FLORIDA CITRUS INDUSTRY
Addressing Citrus Greening Disease

Committee on the Strategic Planning for the Florida Citrus Industry: Addressing Citrus Greening Disease (Huanglongbing)

Board on Agriculture and Natural Resources

Division on Earth and Life Studies

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High Priority Recommendation (O-1):

- **Creation of Citrus Health Management Areas (CHMAs)**
  - Facilitate the coordination of psyllid control and other HLB management practices

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Implementation of CHMAs (Florida)

- **CHMA program is currently in the early stages of implementation**
- **Goals:**
  - Define CHMA areas throughout Florida
  - Coordinate timing of pesticide applications
  - Coordinate MOAs of pesticide applications to manage pesticide resistance development

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Implementation of CHMAs (Florida)

- **Coordination provided by:**
  - University of Florida **(UF-IFAS)** Extension
  - Florida Department of Agriculture & Consumer Services, Division of Plant Industries **(FDACS-DPI)**
- **Grower participation will be necessary but is VOLUNTARY**
- **Grower acceptance and participation is crucial for success of Area-wide control programs (Heinrich et al. 2007).**

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Other CHMA Participants

- **UF-IFAS**
  - Serve as an information resource for developing plans of action
    - Extension specialists (entomology, horticulture, pathology, etc…), Extension agents
  - Provide infrastructure to facilitate grower communication of activities and results
    - Development of website for each CHMA
    - Email listserv notifications
    - County agent printed newsletters

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Other CHMA Participants

- **FDACS – Division of Plant Industries**
  - Support provided by personnel from the regional CHRP offices
    - GIS mapping of defined CHMA's
    - Routine psyllid monitoring of CHMA's to prove effectiveness

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Steps in CHMA Establishment

- **Growers request assistance**
  - Contact should be made with CHMA coordinator

  (Currently contact local IFAS Extension County Agents)

- **Planning meeting(s)**
  - Growers identify groves to participate in a CHMA
  - Geographic area of CHMA defined on map
  - Tentative psyllid control program decided upon for upcoming season *(for grower planning purposes)*
  - Follow-up meetings as needed to finalize plan or to motivate more participation

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CHMA Meeting Goals

Topics for discussion

- **Defining (mapping) the CHMA**
  - Size of the CHMA is not the deciding factor in defining the area
  - Spatial distribution of groves in an area
  - Defining a psyllid "population" and targeting that population for control

"…large geographic areas are not a prerequisite for the area-wide approach…addressing the pest population…involves managing them at the population level…" (Hendrichs et al 2007)

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CHMA Meeting Goals

Topics for discussion

- **Defining (mapping) the CHMA**
  - Must be practical!!!
  - Coordination of efforts across the defined area in a timely manner must be possible
  - Logistical Considerations
    - Growers with groves in different areas
    - Caretakers with groves across the state
    - Limitations of equipment and time
    - Harvesting schedules (fresh vs. processed fruit)

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Lake / Orange Counties
Citrus Health Management Area
Central Lake / North Orange CHMA

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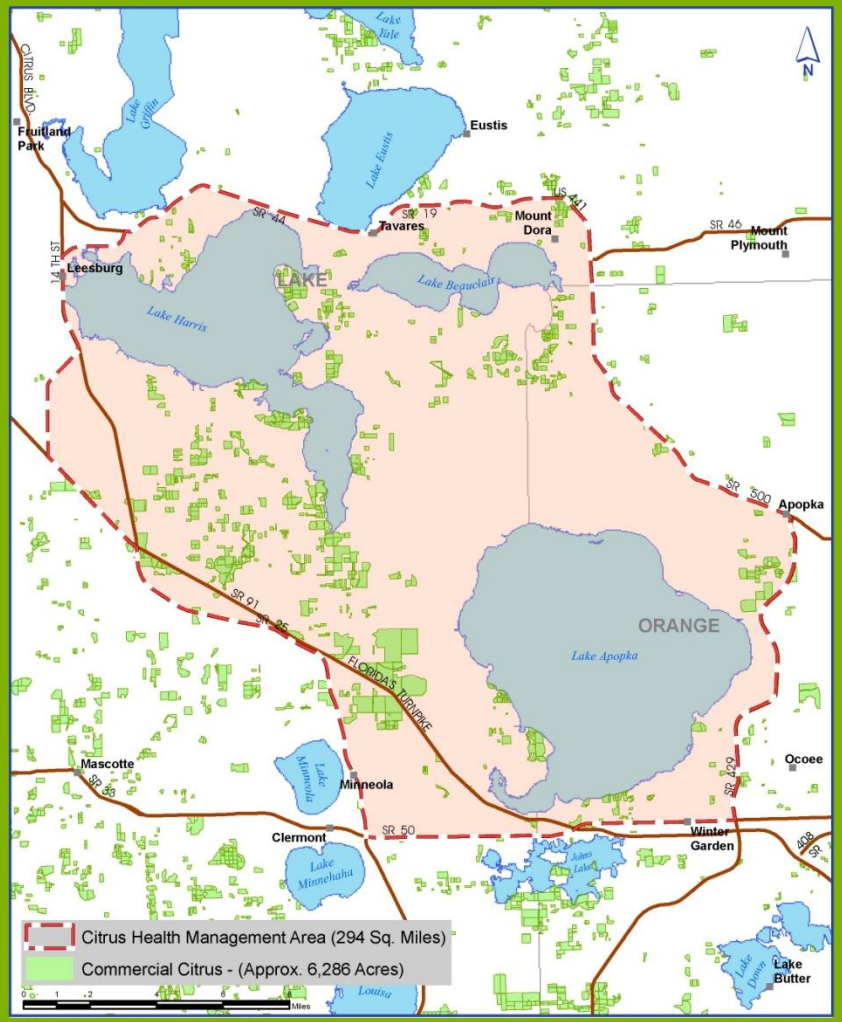
Division of PLANT INDUSTRY
Fresh from Florida. Protection through Detection
Florida Department of Agriculture & Consumer Services
Charles H. Bronson, Commissioner



Map Prepared By: Matthew Albriton 11/10/2010

Lake / Orange Counties
Citrus Health Management Area
South Lake / West Orange CHMA

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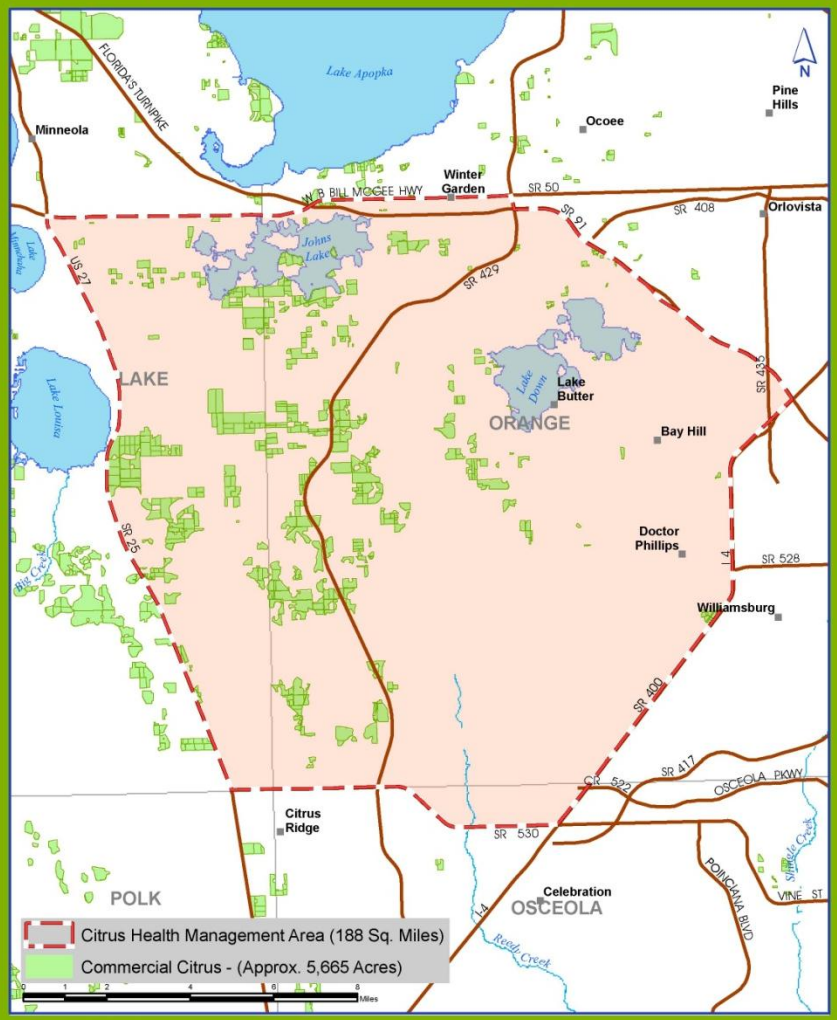
Division of PLANT INDUSTRY
Fresh from Florida. Protection through Detection
Florida Department of Agriculture & Consumer Services
Charles H. Bronson, Commissioner



Map Prepared By: Matthew Albriton 10/27/2010

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CHMA Meeting Goals
Topics for discussion

- **Developing a plan of action**
  - Timing and Frequency of applications
    - Coordinate as many sprays as feasible
  - Rotation of Pesticide Modes of Actions (MOAs)
  - Application methods

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Citrus Health Management Areas (CHMA's): Guide to developing a psyllid management plan

Michael E. Rogers, Philip A. Stansly and Lukasz L. Stelinski

Table 1: Planning template for CHMAs where most fruit harvesting expected in the months of Jan, Feb, Mar, May or June

Month	Timing	Product[3]	Comments
November / December	After last flush of the season	Organophosphate[1]	*Optimal time for coordinated spray*; first dormant spray; serves as a clean up spray to eliminate adult ACP going into the overwintering period.
January / February	Prior to first flush of season	Pyrethroid[2]	*Optimal time for coordinated spray*; second dormant spray; prior to first flush in spring control ACP that overwintered as adults or reproduced on unexpected winter flushes.
March (bloom period)	Depending on pest pressure	several options	Do not use pyrethroid since previously used. Do not use an organophosphate which is planned for the next application. Products that can be sprayed during bloom include Micromite and Portal but should only be applied when new flush is present since these products only control psyllid nymphs (not adults).
April	Immediately post bloom	Organophosphate[1]	*Possible time for coordinated spray using an OP*; this time is the first opportunity to control adult psyllids that developed on flush associated with bloom when most insecticides cannot be applied due to label restrictions preventing application during bloom. Growers in CHMAs not participating in a coordinated spray at this time may choose to use a product with a different mode of action.
May	Depending on pest pressure	Various options	Could use a pyrethroid since not previously used. Other options include Movento, Delegate (if leafminer present) or carbaryl.
June	1st summer oil spray	Various options	Depending on the product used in the previous spray, numerous products (see Table 2) could be added to the summer oil sprays as well as tank mixed with other products depending on the life stages of psyllid controlled by each product and other pests requiring control such as leafminer or rust mites. During this time it may be difficult to coordinate sprays with the same mode of action, but coordination of the timing of summer oil sprays by growers within a CHMA could still be a feasible goal.
July	2nd summer oil spray	Various options	
August / September	Prior to fall flush	Pyrethroid[2]	*Possible time for coordinated spray using a pyrethroid*; Control psyllids that may have developed on sporadic summer flushes prior to the fall flush period when psyllid populations can rapidly increase. Growers in CHMAs not participating in a coordinated spray at this time may choose to use a product with a different mode of action.
October	Depending on pest pressure	Various options	Do not use pyrethroid since previously used. Do not use an organophosphate which is planned for next application. Options include Movento, Delegate, and carbaryl.

[1] Organophosphate insecticides that can be used for psyllid control include Dimethoate, Imidan, Lorsban, Malathion and various generic formulations of these products.

[2] Pyrethroid insecticides currently registered for use in Florida citrus include Danitol and Mustang.

[3] Refer to Table 2 for information on product rates, application methods, psyllid life stages controlled and effective application methods.

Citrus Health Management Areas (CHMA's): Guide to developing a psyllid management plan

Michael E. Rogers, Philip A. Stansly and Lukasz L. Stelinski

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Table 2: Pesticide use information for developing psyllid management programs.

Chemical class	Active ingredient	Product	Rate/A	Application methods[1]	REI	PHI	Comments
Products that control all psyllid life stages (eggs, nymphs and adults)							
Carbamates	aldicarb	Temik 15 G	33 lbs	Soil	48 hrs	0; 30 days (lemons)	Slow acting on adult psyllids; product scheduled to be cancelled Dec 31, 2011.
	carbaryl	Sevin XLR	1.5 qts	Air, lv, ss	12 hrs	5 days	Short residual; fresh fruit for export should avoid use due to European MRL issues.
	oxamyl	Vydate	2 qts	ss	48 hrs	7 days	Short residual; fresh fruit for export should avoid use due to European MRL issues.
Organophosphates	chlorpyrifos	Lorsban	5 pts	Air, lv, ss	5 days	21 days	
	dimethoate	Dimethoate 4E	1 pt	Air, lv, ss	10 days	15-45 days	Consult label for buffering instructions when pH is greater than 7.
	malathion	Malathion 5	2 pts	Air, lv, ss	12 hrs	7 days	
	phosmet	Imidan	1.0 lb	Air, lv, ss	24 hrs	7 days	Consult label for buffering instructions when pH is greater than 7.
Pyrethroids	fenpropathrin	Danitol 2.4EC	1 pt	Air, lv, ss	24 hrs	1 day	
	zeta-cypermethrin	Mustang	4.3 fl oz	Air, lv, ss	12 hrs	1 day	
Neonicotinoids	imidacloprid	Admire Pro 4.6F	7-14 fl oz	Soil drench	12 hrs	0 day	Important to minimize use of foliar applications to prevent insecticide resistance development to maintain use for young tree care.
	imidacloprid	Provado 1.6F	10-20 fl oz	ss	12 hrs	0 day	
	thiamethoxam	Actara 25 WG	4.0-5.5 fl oz	ss	12 hrs	0 day	
	thiamethoxam	Platinum 75 SG	1.83-3.67 fl oz	Soil drench	12 hrs	0 day	
Spinosyns	spinetoram	Delegate WG	4 oz	lv, ss	4 hrs	1 day	Apply with 2% oil v/v. Also controls leafminer
Products that control psyllid immature stages only (eggs and/or nymphs)[2]							
Benzoylureas (growth regulator)	diflubenzuron	Micromite 80 WGS	6.25 oz	lv, ss	12 hrs	21 days	Apply with 2% oil v/v. Also provides control of leafminer and rustmites.
METI insecticides	fenpyroximate	Portal	4.0 pts	ss	12 hrs	14 days	Provides suppression of rustmites.
Petroleum distillates	petroleum oil	numerous	2% v/v	ss	12 hrs	0 days	Provides suppression of leafminer and rustmites.
Tetramic acid derivatives	spirotetramat	Movento 240 SC	10 fl oz	ss	24 hrs	1 day	Systemic activity provides extended control of nymphal populations. Must use surfactant.

[1] air=aerial application; lv=low volume application; ss=speed sprayer / traditional airblast application.

[2] To obtain control of adult psyllids, these products may be combined with products listed above.

Central Highlands 17/27 CHMA: 2010-11 Coordinated Psyllid Spray Plan

Month	Application Window Targeted[1]	Chemical Class[2]	Comments
November / December	**Nov 8-19**	Organophosphate	Possible OP product options: chlorpyrifos (Lorsban), dimethoate, malathion, phosmet (Imidan)
January / February	**Jan 31-Feb 14**	Pyrethroid	Pyrethroid product options: fenpropathrin (Danitol), zeta-cypermethrin (Mustang)
March (bloom period)			
April	Immediately post bloom (DATES TBA)	Organophosphate	Possible OP product options: chlorpyrifos (Lorsban), dimethoate, malathion, phosmet (Imidan)
May	Depending on pest pressure	Various options	Growers are encouraged to add psyllid control products to their planned summer oil or nutritional spray programs. Make sure to not apply the same chemical class back-to-back keeping in mind the products planned to be used during the coordinated sprays in April and August/September windows.
June	1st summer oil spray	Various options	
July	2nd summer oil spray	Various options	
August / September	Prior to fall flush (DATES TBA)	Pyrethroid	Pyrethroid product options: fenpropathrin (Danitol), zeta-cypermethrin (Mustang)
October	Depending on pest pressure	Various options	Do not use pyrethroid since previously used. Do not use an organophosphate which is planned for next coordinated spray in Nov.

[1] Four Coordinated sprays planned for 2010-2011 are highlighted in yellow. All growers in the Central Highlands 17/27 CHMA are encouraged to treat their groves in this 2 week window.

[2] In order to prevent pesticide resistance, growers are encouraged to use a product from the specified chemical class.

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Application Methods




- **Growers not limited to only one application method so long as…**
  - Product of choice is effective using the preferred application method
  - Application can be completed in the designated time frame
  - Some application methods can reduce overall costs, particularly when growers work cooperatively

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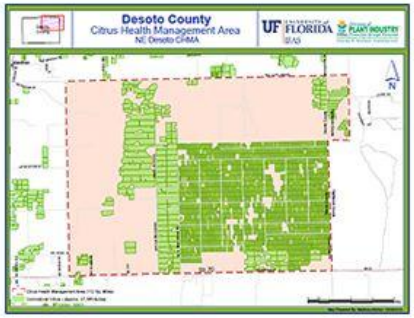
Citrus Health Management Areas (CHMA's)

NE Desoto CHMA



(click to enlarge map)

- Planned pesticide applications
- Report of acres treated
- Psyllid scouting reports
- Grower forum - (online CHMA discussion board for registered growers)
- Join the CHMA – (to receive automated emails notices of new information updates)

NE Desoto CHMA Contacts

Jerry Newlin – OCLP
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shf@crec.ifas.ufl.edu

Latest News

9/29/10 Next coordinated application being planned for late Oct / early Nov.

6/23/10 NE Desoto CHMA program for next 12 months posted

< CHMA Home

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Purpose of CHMA website (www.flchma.org)

- **Facilitate communication between growers**
- **Reference point for information of upcoming CHMA events**
- **Tool to convince non-participants to join the effort**
  - Demonstration of benefit (psyllid scouting reports)
  - Educate growers (absentee growers)

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More Information

Visit the Florida CHMA Website:

http://www.flchma.org

Additional Questions:

mrgrs@ufl.edu

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