

Pest Monitoring and Options for Peach Pest Control



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Great Plains Growers Conference, St. Joseph, MO on 7 January, 2016

Outline

Spray Guides (online)

Pesticide Efficacy Table (handout)

Non-Pyrethroid Options

Symptoms, Monitoring and Identification (handout)

Biology (handout)

Predict Pests Emergence Using Degree Days

Recommended Control

Mating Disruption

Discussion

2015 SOUTHEASTERN PEACH, NECTARINE & PLUM PEST MANAGEMENT AND CULTURE GUIDE

Online: <http://www.ent.uga.edu/peach/PeachGuide.pdf>

Midwest Fruit Pest Management Guide 2016

Combined MW tree and small fruit/grape guides:

Online: <https://ag.purdue.edu/hla/Hort/Documents/ID-168.pdf>

Peach Insecticide And Miticide Classes And Efficacy Ratings

Source: 2015 SE Peach, Nectarine & Plum IPM & Culture Guide

Online: <http://www.ent.uga.edu/peach/PeachGuide.pdf>

<i>Common Name (MOA #)</i>	<i>Trade Name(s)</i>	<i>Scale</i>	<i>Thrips</i>	<i>Oriental fruit moth</i>	<i>Plum curculio</i>	<i>Plant or Stink bugs</i>	<i>June beetles, etc.</i>	<i>Mites</i>	<i>Borers</i>
<i>abamectin</i> (6)	Agri-Mek	-	-	-	-	-	-	++++	-
<i>acetamiprid</i> (4A)	Assail	+++	++	++++	++	++	+++++	-	+++
<i>beta cyfluthrin</i> (3A)	Baythroid XL	-	+	+++++	++++	+++	++++	-	++
<i>bifenazate</i> (UN)	Acramite	-	-	-	-	-	-	+++++	-
<i>buprofezin</i> (16)	Centaur	+++++	-	-	-	-	-	-	-
<i>carbaryl</i> (1A)	Sevin	-	-	+++	++	++	+++++	-	+++
<i>chlorantraniliprole</i> (28)	Altacor	-	-	+++++	++	-	-	-	+++
<i>chlorpyrifos</i> (1B)	Chlorpyrifos Lorsban	+++	-	-	-	-	-	-	+++++
<i>clofentezine</i> (10A)	Apollo	-	-	-	-	-	-	++++	-
<i>clothianidin</i> (4A)	Belay	-	+	++	++++	+++	++++	-	++
<i>cyfluthrin</i> (3A)	Renounce Tombstone	-	+	+++++	+++	+++	++++	-	++
<i>cyfluthrin</i> (3) + <i>imidacloprid</i> (4A)	Leverage	-	+	++++	+++	+++	++++	-	++
<i>cyhexatin</i> (12B)	Vendex	-	-	-	-	-	-	+++	-
<i>diazinon</i> (1B)	Diazinon	+++	+	++++	++	++	++++	-	+
<i>esfenvalerate</i> (3A)	Adjourn Asana	-	+	+++++	+++ - +++++	++	++++	-	++
<i>etoxazole</i> (10B)	Zeal	-	-	-	-	-	-	++++	-
<i>fenpropathrin</i> (3A)	Danitol	-	++	+++++	++++	++++	++++	++	++
<i>flubendiamide</i> (28)	Belt	-	-	+++++	++	-	-	-	+++
<i>formetanate</i> (1A)	Carzol	-	+++	-	-	++++	-	+++	-
<i>gamma cyhalothrin</i> (3)	Proaxis	-	+	+++++	++ - +++++	+++	++++	-	++
<i>hexythiazox</i> (10A)	Savey	-	-	-	-	-	-	++++	-

<i>Common Name (MOA #)</i>	<i>Trade Name(s)</i>	<i>Scale</i>	<i>Thrips</i>	<i>Oriental fruit moth</i>	<i>Plum curculio</i>	<i>Plant or Stink bugs</i>	<i>June beetles, etc.</i>	<i>Mites</i>	<i>Borers</i>
<i>horticultural oils</i>	miscellaneous	+++ - +++++	-	-	-	-	-	++	-
<i>imidacloprid (4A)</i>	Couraze Nuprid Pasada Provado	-	-	-	-	-	+++	-	-
<i>indoxacarb (22A)</i>	Avaunt	-	-	++++	++++	-	-	-	+
	Isomate-L (pheromone mating disruption ties)	-	-	-	-	-	-	-	+++ to ++++
<i>lambda cyhalothrin (3A)</i>	Lambda-T Silencer Taiga Z Warrior	-	+	+++++	++++	++	++++	-	+
<i>lambda-cyhalothrin + thiamethoxam (3A + 4A)</i>	Endigo ZC	-	+	++++	++++	+++	++++	-	
<i>malathion (1B)</i>	Malathion	+	+	++	++	+	+	+	+
<i>methomyl (1A)</i>	Lannate	-	++	++	+	++	++	-	-
<i>novaluron (15)</i>	Rimon	-	+	++++	+	+	-	-	+
<i>permethrin (3A)</i>	Ambush Pounce	-	+	+++++	++	++	++++	-	+
<i>phosmet (1B)</i>	Imidan	-	-	+++++	+++++	+++	++++	-	+
<i>pyridaben (21A)</i>	Nexter	-	-	-	-	-	-	++++	-
<i>pyriproxyfen (7C)</i>	Esteem Knack	+++++	-	++	-	-	-	-	-
<i>spinetoram (5)</i>	Delegate	-	++++	++++	-	-	-	-	+
<i>spinosad (5)</i>	SpinTor Entrust	-	++	++	-	-	-		-
<i>spirodiclofen (23)</i>	Envidor	-	-	-	-	-	-		-
<i>spirotetramat (23)</i>	Movento	+++++	-	-	-	-	-	-	-
<i>thiamethoxam (4A)</i>	Actara	-	+	++	++++	+++	++++	-	-
<i>zeta cypermethrin (3A)</i>	Mustang	-	+	+++++	++++	++	++++	-	++

Non-Pyrethroid Options for Peach Insect Control

E = Excellent G = Good F = Fair — no activity

	PHI	REI	Scales	Plant bug	Plum Curc.	OFM	Jap. beetle	Stink bug
Actara	14 d	12 h	G	E	E	F	E	G
Assail	12 d	12 h	G	G	G	G	E	G
Belay	21 d	12 h	G	E	E	F	E	G
Provado	0	12 h	F	—	—	—	E	—
Avaunt	14 d	12 h	—	—	E	E	F	—
Imidan	14 d	3 d	F	F	E	E	E	F
Altacor	10 d	4 h	—	—	F	E	—	—
Delegate	7 d	4 h	—	—	F	E	—	—
Esteem	14 d	12 h	E	—	—	G	—	—
Centaur	14 d	12 h	E	—	—	—	—	—
Diazinon	21 d	4 d	G	G	G	G	F	F
Lorsban	—	24 h	E	—	—	—	—	—
Movento	7 d	24 h	E	—	—	—	—	—


PEACH PLANT SYMPTOMS AND ARTHROPOD IDENTIFICATION

Dr. Donn Johnson and Barbara A. Lewis

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HANDOUT

Plant Symptoms	When and How to Look	Arthropod Description	Common Name
Altered fuzz on fruit, ooze feeding puncture (catfacing)	Mid-March to harvest inspect fruit, look at white sticky traps hung from lower limb	Bug, sucking mouthpart, 1/4", yellow "Y" on back, mottled brown	Tarnished plant bug
May to harvest feeding form clear ooze (no catfacing)	Mid-April to harvest inspect fruit for bugs or damage or check baited yellow pyramid trap	Bug, sucking mouthpart, 3/4", green or brown, stink when handled	Brown stink bug Dusky stink bug Green stink bug
Altered fuzz on fruit, egg under fuzz, larva tunnels in fruit, damage called catface scar, no ooze	April 1: tether gray funnel traps with commercial bait to perimeter peach trunk, weekly check traps for weevils & 300 fruit for damage	Adult weevil, 1/4", brown snout, 3 pr humps on back, Larva, 1/4", white, legless, brown head	Plum curculio
Fruit surface has sawdust-like larval dropping or frass and dying terminals have brown wilted leaves (brown flagging)	Mid-March, set out pheromone traps, check weekly for moths, accumulate degree degree-days (DD) after 1" moth catch, fruit and twig damage occurs by 500, 1,300, 2,200 and 3,100 DD	Moth, 1/4", sooty gray, white to pinkish Larva, 3/4", legs	Oriental fruit moth
Tunnel below bark below soil line on trunk	Mid-April, set pheromone traps, once traps catch moths, drench trunk with insecticide	Moth, 1-1/4", female has orange band on abdomen; male has yellow bands on black abdomen Larva, 1-1/2", white, 6 legs	Peachtree borer
Tunnel below bark in wounds on scaffold limbs	April 1, set pheromone traps, if moths captured, apply insecticide drench to scaffold wounds at pink each year	Clearwing moth, 1", both sexes have yellow bands on black abdomen Larva, 1", white, 6 legs	Lesser peachtree borer
Scales on limbs and limbs dead	April 1, wrap double sticky tape around scale-infested limbs and check weekly for yellow crawlers	Adult yellow female is legless, has circular gray scale covering 1.4 mm diameter, yellow males are winged and yellow crawlers have 6 legs	San Jose scale

	Mar		Apr			May		Jun	Jul	Aug	Sep
Peach	D	P	B	PF	SO	Thin	PH	H A R V E S T			
Scales						 					
Spider mites											
Plum curculio											
Stink bug			 								
Oriental fruit moth											
Lesser PTBorer											
Greater PTBorer							 				

HANDOUT

Weekly, Check for these Peach Pests:

- **Mid-March**

- Oriental fruit moth – set trap in tree

- **Apr 1**

- Lesser peachtree borer - set trap in tree & check scaffold wounds for pupal skins

- Plum curculio – tie black pyramid trap to perimeter tree trunk on ground

- Stink bug - set yellow pyramid trap between perimeter trees on ground

- **May 1**

- Check scale crawler – set trap on limb

- Greater peachtree borer – set trap in tree



From mid-May on, start checking for spider mite infested peach leaves that are bronzing



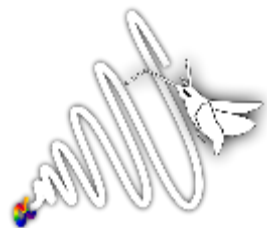
Trap & Pest Management Suppliers



<http://www.agbio-inc.com/>

Alpha Scents, Inc.:

<http://www.alphascents.com/>



GEMPLER'S®

[http://www.gemplers.com/
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[http://www.greatlakes
ipm.com/](http://www.greatlakesipm.com/)



[http://www.iscatech.com/
exec/index.html](http://www.iscatech.com/exec/index.html)

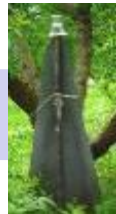


<http://www.scentry.com/>

Monitoring Form

Mean numbers per trap or Percentage damage per 300 fruit

	San Jose Scale		Plum Curculio		Stink Bug		Peachtree Borers		Oriental Fruit Moth
Date	Males/ trap	Crawlers / tape trap	Adults /trap	% new damage	Adults /trap	% new damage	Greater PTB	Lesser PTB	Males/ trap



Physiological Time (degree-days = DD)

Source: <http://ipm.ucdavis.edu/WEATHER/ddphenology.html>

- Poikilothermic – insects are cold-blooded
- Physiological time (expressed in DD)
 - Number of heat units accumulated daily between the lower (LDT) and upper (UDT) developmental thresholds required to complete growth before molting to next stage
- **Why use a phenology model?**
 - Predict time of pest emergence
 - Pest damage rarely occurs on the same calendar date every year

How to Calculate Degree Days (DD)

$$DD = \frac{\text{daily Max} + \text{daily Min}}{2} - X = \frac{80 + 50}{2} - 50 = 75 - 50 = 15 \text{ DD}$$

Base Temperatures:

X = 45°F for Oriental fruit moth

X = 50°F for plum curculio

X = 51°F for San Jose scale

Spray after:

> 400 DD since 1st trap catch, egg hatch starts

> 200 DD since 2 days > 70°F with PC trap catch will be start of egg hatch

> 600 DD since 1st male in trap = peak of crawler emergence


Max/Min chart – use your daily thermometer readings to determine daily DD (Ex. for Plum Curculio)



PLUM CURCULIO DEGREE DAYS (50°F LOWER BASE, 88°F UPPER BASE) AT VARIOUS DAILY MAXIMUM AND MINIMUM TEMPERATURES																				
Max Min	54	56	58	60	62	64	66	68	70	72	74	76	78	80	82	84	86	88	90	92
20	0	1	1	2	2	3	3	4	5	5	6	7	8	9	9	10	11	12	13	14
22	2	1	1	2	2	3	3	4	6	6	6	7	8	9	10	10	11	12	13	14
24	0	1	1	2	2	3	4	4	6	6	7	7	8	9	10	11	11	12	13	14
26	0	1	1	2	2	3	4	4	6	6	7	7	8	9	10	11	12	12	13	14
28	0	1	1	2	2	3	4	4	6	6	7	8	8	9	10	11	12	13	14	15
30	0	1	1	2	2	3	4	5	6	6	7	8	9	10	10	11	12	13	14	15
32	0	1	1	2	3	3	4	5	6	6	7	8	9	10	11	11	12	13	14	15
34	0	1	1	2	3	3	4	5	6	7	7	8	9	10	11	12	13	14	14	15
36	0	1	1	2	3	4	4	5	6	7	8	8	9	10	11	12	13	14	15	16
38	0	1	1	2	3	4	4	5	6	7	8	9	10	11	11	12	13	14	15	16
40	0	1	2	2	3	4	5	6	6	7	8	9	10	11	12	13	14	15	16	17
42	0	1	2	2	3	4	5	6	7	7	8	9	10	11	12	13	14	15	16	17
44	0	1	2	3	3	4	5	6	7	8	9	10	11	12	13	14	15	15	16	17
46	0	1	2	3	4	5	5	6	7	8	9	10	11	12	13	14	15	16	17	18
48	1	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
50	1	2	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19



Oregon State University Online Phenology DD models <http://uspest.org/cgi-bin/ddmodel.us?>

Then click  for weather station on map near you. Pick model for OFM or SJS or codling moth for plum curculio (both 50F)

EW8162 Saint Joseph MO station: E8162 APRSWXNET elev: 941 ft lat/long: 39.7419 -94.8400

Select location by clicking on pin in Google Map above

San Jose scale [tree fruits]
[Rice etal \(1982\)](#)

Model category: all models Select model: [\(see list\)](#) San Jose scale [tree fruits] Rice etal (1982) [\(model params\)](#)

Output in: Fahrenheit °F

Start: Jan 1 2015 End: Aug 1 same yr

Starting date instructions: **first male scale from overwintering generation**

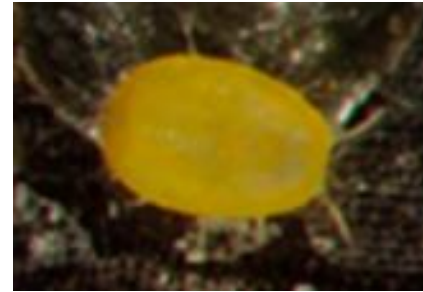
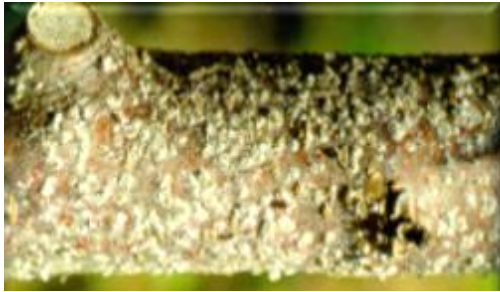
Model validation status: **partly validated** Region(s): **Pacific Northwest**

[Click here to CALC/RUN full model w/daily output](#)

Potential Reasons for Scale Problems

- No yearly use of bud swell Superior oil with or without insecticide effective against SJS
 - Coverage can be difficult on older trees (increase gallonage)
- Over-reliance on pyrethroid insecticides for general insect control. Pyrethroids are harmful to SJS parasitoids and are known to aggravate scale problems.
- Abnormal weather conditions, often mild winters result in low overwinter scale mortality.
- Nearby source of scales (unsprayed trees) allows for wind-assisted movement of crawlers into orchards.

San Jose Scale



Biology:

- Overwinter on limbs and trunk under scale cover
- Early-Apr., males emerge, fly, mate with females, and females lay amber eggs under cover
- May = crawlers hatch, form cover 9 days later

Scouting: see next slide

San Jose Scale on Limb



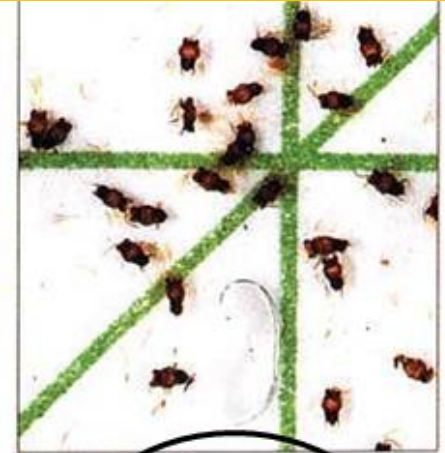
Tape Trap for Crawlers Wrapped on Limb



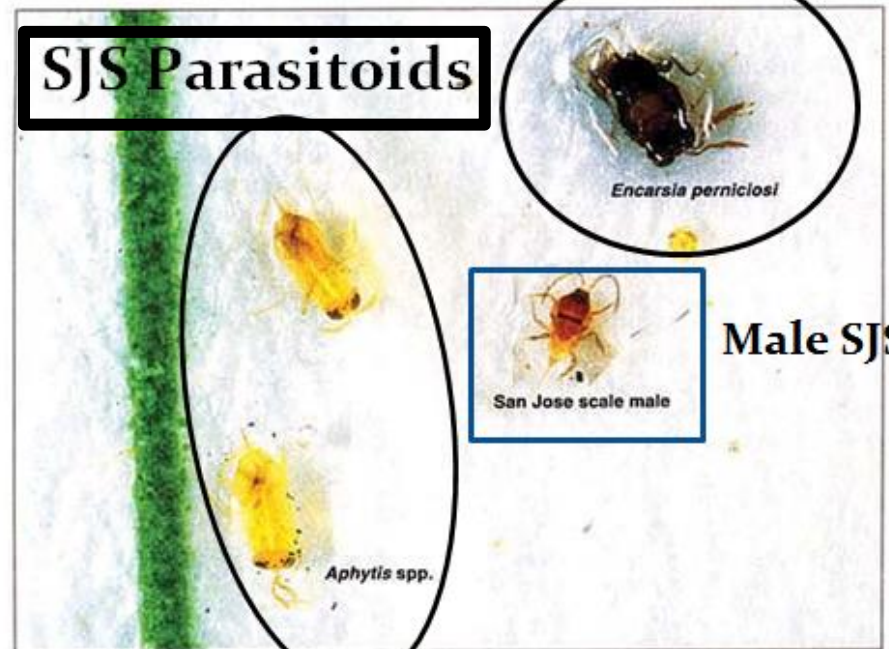
Crawlers on Tape



Pheromone trap for males



SJS Parasitoids



San Jose scale has become an increasingly damaging pest in many almond-growing regions of California. However, the numbers trapped in the study orchards, located in Merced and Stanislaus counties, were very low. Clockwise from top left, Sticky traps are used to monitor San Jose scale males; the numbers of a key San Jose Scale parasitoid, *Encarsia perniciosi*, were significantly higher in the BIOS orchards; the abundance of another San Jose scale parasitoid, *Aphytis* spp., did not vary significantly between BIOS and conventional orchards.

San Jose Scale DD Model

=====EVENTS TABLE=====		
1.	305 DD after 1st male from OW gen:	100 degree-days until first crawler
2.	405 DD after 1st male from OW gen:	first crawler emergence
3.	605 DD after 1st male from OW gen:	UC Davis rec. crawler treatment
4.	723 DD after 1st male from OW gen:	first second instars
5.	936 DD after 1st male from OW gen:	first pupae
6.	1031 DD after 1st male from OW gen:	1st male catch next generation
7.	1050 DD after 1st male from OW gen:	first mating next generation
8.	1455 DD after 1st male from OW gen:	first crawlers second generation



Arkansas San Jose Scale 2010:

DD Base/Upper = 51/90°F; Male flight at 130 DD since Jan. 1
1st crawlers emerge from 400 to 700 DD after 1st male flight;

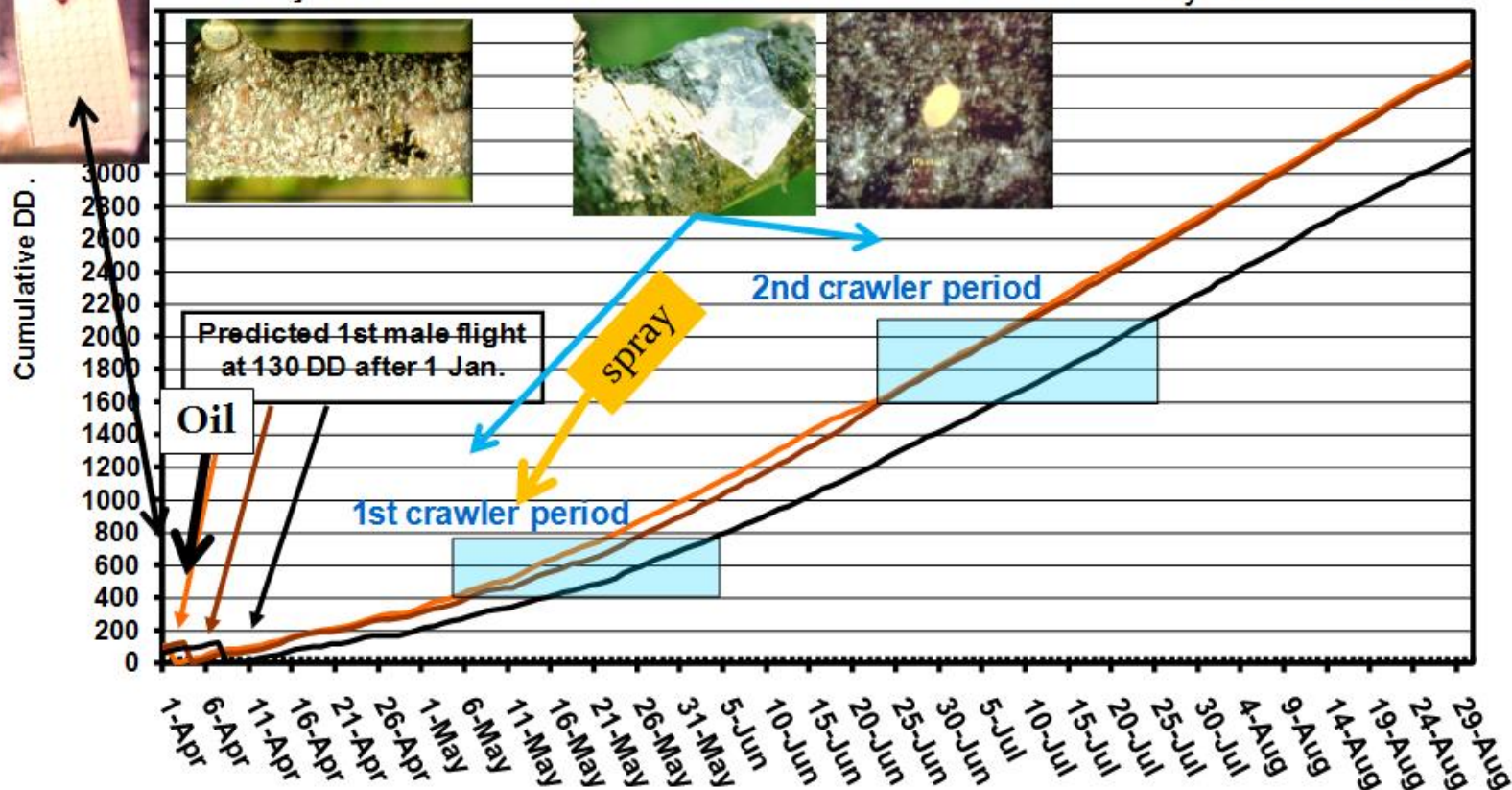
2nd crawlers emerge after 1587 DD



Scaly limb

Hope Clarksville Fayetteville

Line color is in degree-days for these cities



Insecticides for crawlers: Exteem, Centaur, Movento, Assail, Belay, Admire Pro

Alternatives To Chlorpyrifos for Adult Scale

EPA may cancel Lorsban use

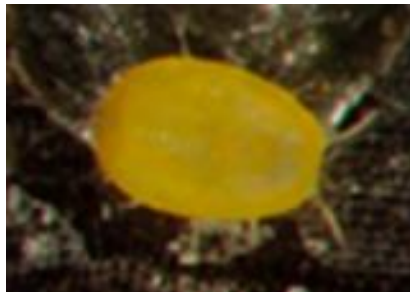
Control SJS on all bearing and non-bearing trees:

- April and May, reduce pyrethroid use to protect SJS parasitoids
- Near bud swell:
 - If low scale density use 1% to 1.5% oil alone
 - If moderate to hi scale density apply 1% to 1.5% Superior oil with Diazinon 4E
- 95% leaf fall, apply 1% to 1.5% Superior oil
- Best scale kill by applying oil between 28° to 65°F with no cold snap in 2- to 3-day forecast
- ***Do not apply a sulfur-containing fungicide within two weeks of an oil application***

Alternatives To Chlorpyrifos for Scale Crawler Control

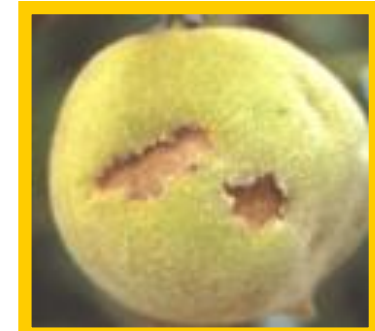
When crawlers are detected on trees:

- Mid-May apply Esteem (4-5 oz/A) or Centaur (2.15 lbs/A) at peak of 1st gen crawler emergence
- Late-June, apply Esteem or Centaur or Assail if 2nd gen. crawlers present
- Post-harvest, apply Diazinon when crawlers present



Plum Curculio DD Model

- Adult weevils overwinter in debris especially in adjacent woodlots or unmowed orchard
- Mid-Mar. adults begin dispersing to orchard after **two days exceeding 70°F** (biofix date)
- Early April:
 - **100-600 DD** - feed and lay eggs = white spots
 - **200 to 800 DD** - eggs hatch, larvae tunnel into fruit, catfacing damage, exit fruit, pupate in soil
- Early-June, **1200 DD** summer adults emerge, feed on fruit, lay eggs and larvae tunnel in fruit



Plum Curculio Monitoring

After 1st day in March $\geq 70^{\circ}\text{F}$:

- Tether four pyramid traps to perimeter peach trees adjacent to woods
- Twice weekly, check traps for PC adults



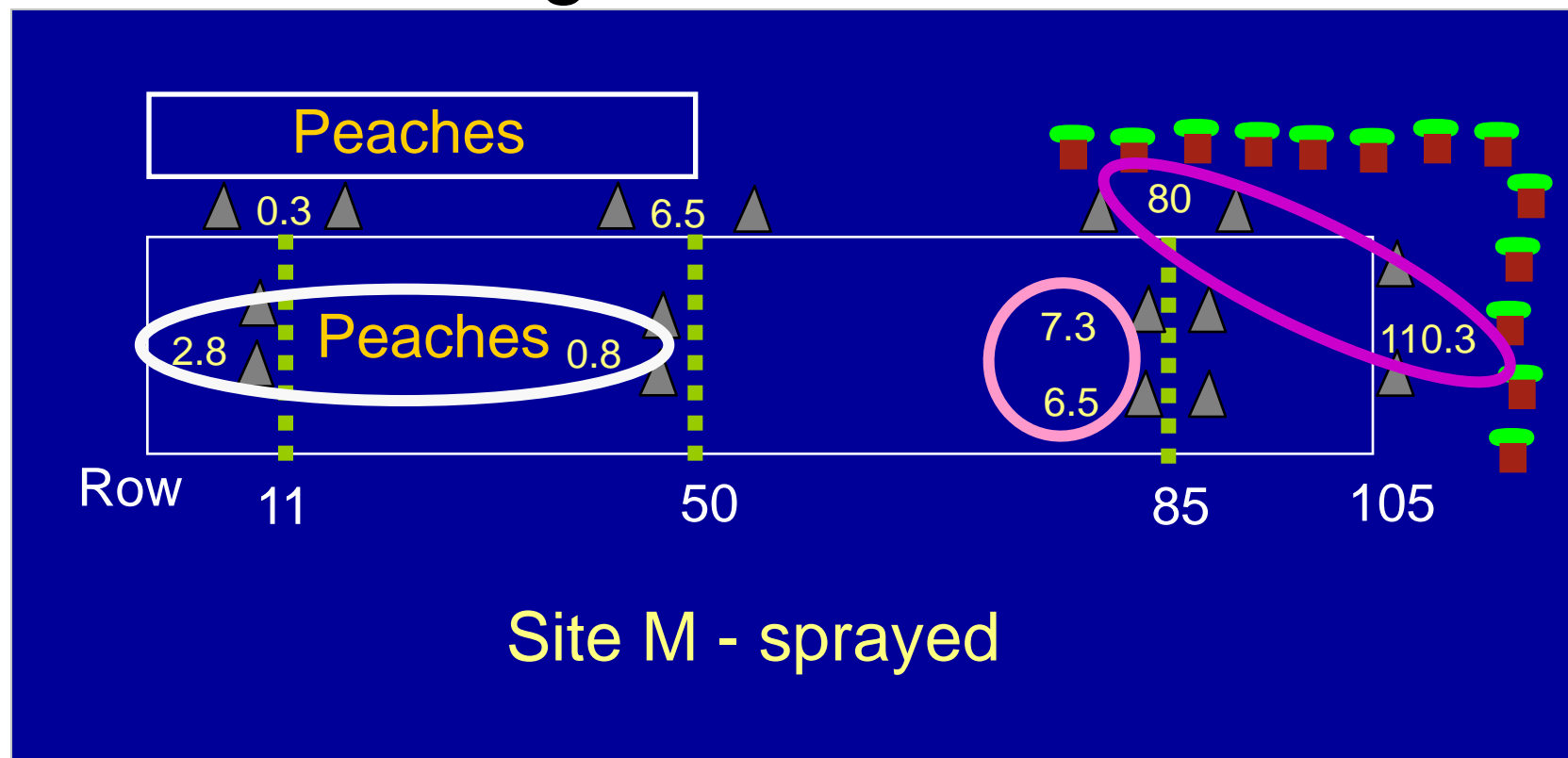
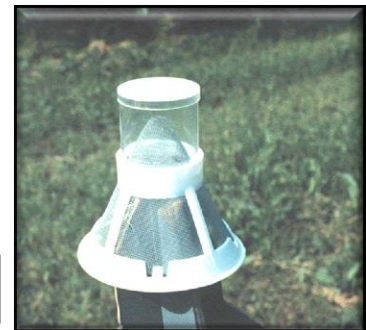
New PC damage
on peach
(white fuzz spots)

Time to spray

- Weekly, check 300 fruit for **new PC damage**
- Economic threshold (spray): $\text{ET} > 1 \text{ PC/trap/week}$ or $\text{ET} > 1\% \text{ new PC damage}$



More Season Total Catch of Plum Curculio Adults in Pyramid Traps (▲) in Orchard Edge than Interior



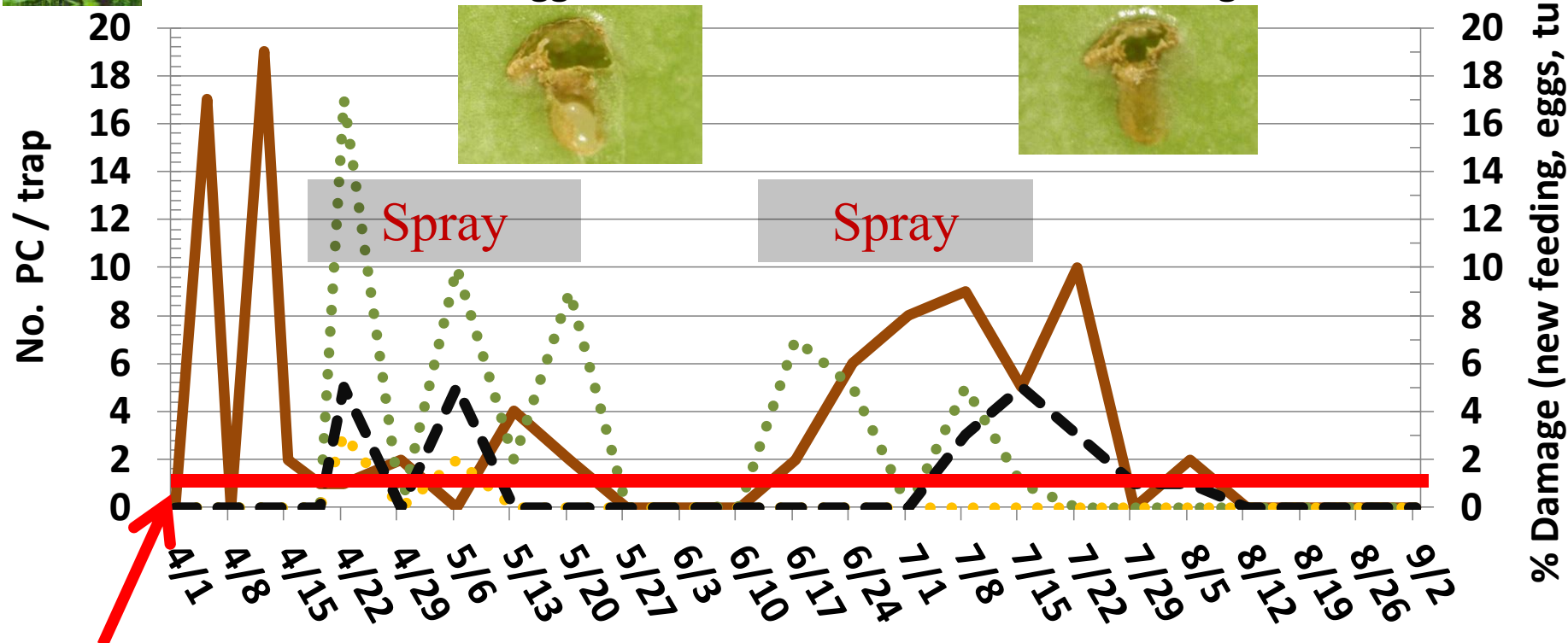
Clarksville 2011

— Plum curculio/trap

••• % PC eggs

••• % new PC damage

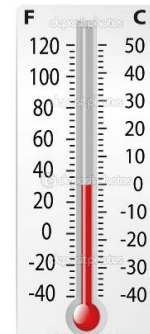
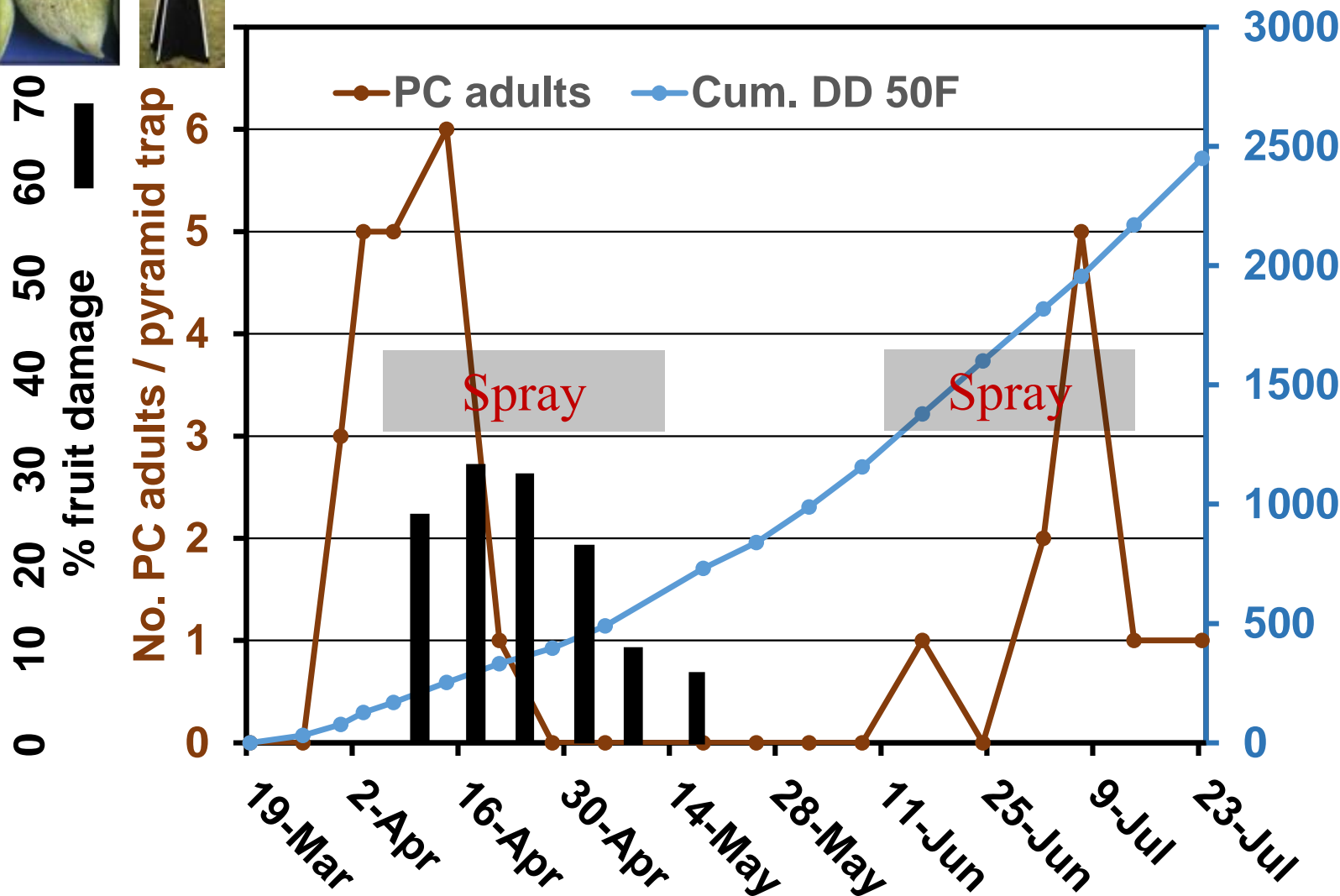
—•— % PC tunneling



ET = 1 PC/trap/week



SWREC Station at Hope, AR 2015



2015 SOUTHEASTERN PEACH, NECTARINE AND PLUM PEST MANAGEMENT AND CULTURE GUIDE

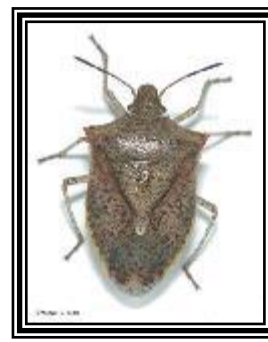
Online: <http://www.ent.uga.edu/peach/PeachGuide.pdf>

Recommended insecticides - Plum curculio:

- **Imidan, Actara and Belay provide excellent control and longer early season residual control of plum curculio than pyrethroids.** Rotation of Imidan, Actara, or Belay and Avaunt with pyrethroids should help protect the resistance-prone pyrethroid class
- **Actara (MOA 4A), Belay (MOA 4A) and Avaunt (MOA 22)** are effective, reduced risk, organophosphate replacements
- **Delay Pyrethroid use until May or later to preserve natural enemies: Baythroid, Mustang, Proaxis, Tomstone, Warrior**



Stink Bugs



- Mid-April to May, move into orchard, puncture fruit causing catface damage
- Late May and early June, mate, lay egg mass and nymphs develop



- After pit hardening to harvest, clear thread of ooze exudes from stink bug puncture

Stink Bug Monitoring

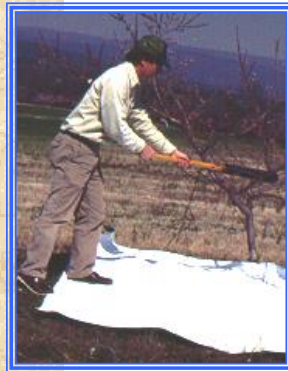
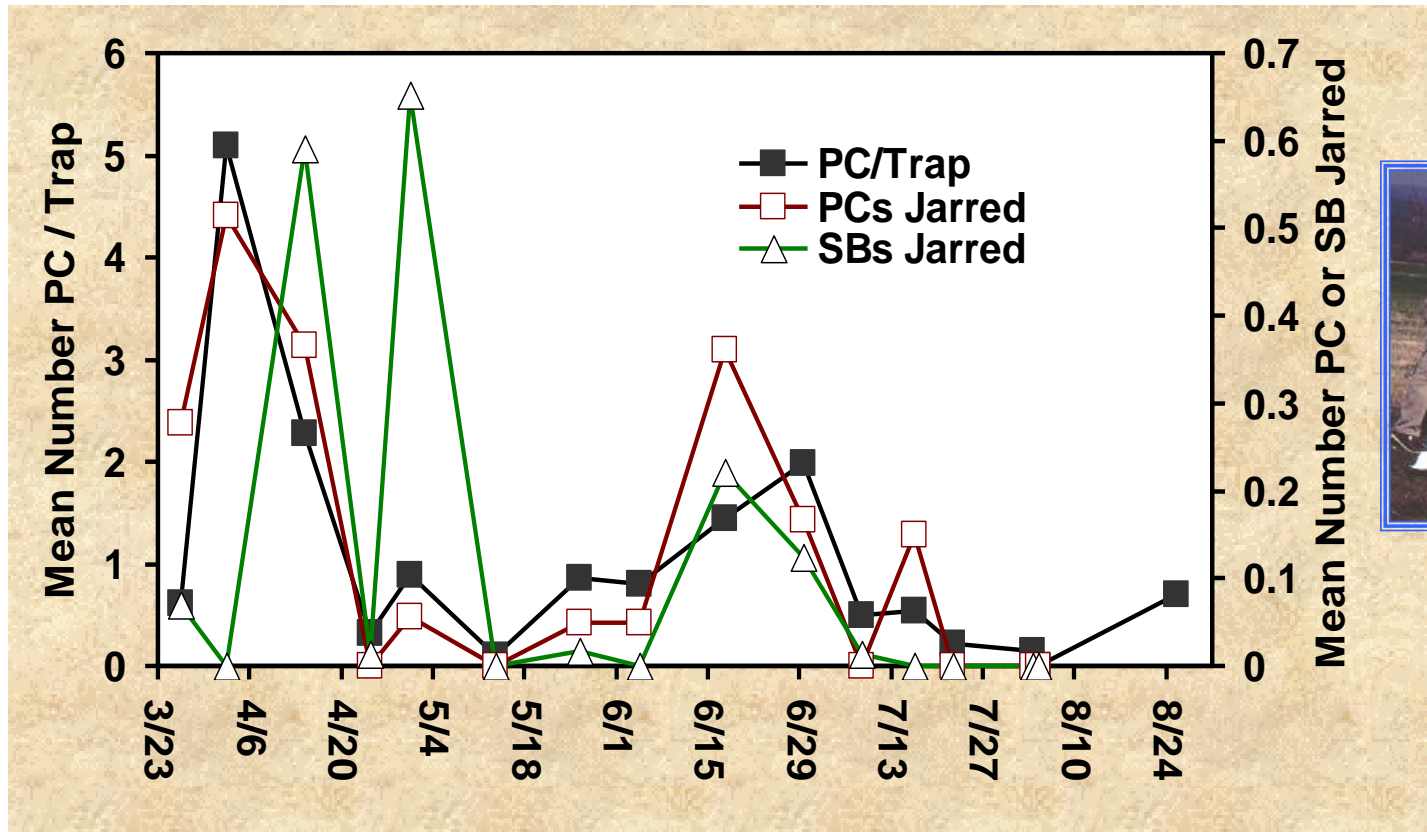
Petal fall:

- Set out brown stink bug yellow pyramid traps in perimeter and bait with lure of aggregation pheromone
- Record weekly counts of:
 - Stink bugs / trap or /limb jar and % new fruit damage



DEAD-INN stink bug trap \$18 ea

Monitoring Shows Similar Timing of Catches of Plum Curculio and Stink Bugs



2015 SOUTHEASTERN PEACH, NECTARINE AND PLUM PEST MANAGEMENT AND CULTURE GUIDE

Online: <http://www.ent.uga.edu/peach/PeachGuide.pdf>

Tentative economic threshold for SB:

- Spray if > 10 SB/baited yellow trap or
- Spray if > 1 SB / limb jarring or > 1% new catfacing

Recommended insecticides - Stink bug:

- Pyrethroids: Danitol, Actara, Baythroid, Belay, Endigo, Renounce or Tombstone, Leverage (mixture)
- Imidan (organophosphate)

Cultural control: less bugs in orchard if weed-free ground cover in and around orchard

Oriental Fruit Moth Biology/Monitoring

- Mid-March, set out pheromone trap inside orchard, check weekly
- Mid-March - moths emerge, mate and lay eggs on leaves
- April, 1st generation larvae bore into terminal tips and some fruit
- Summer, 2nd and 3rd generations enter fruit
- Mid-August & September, larvae enter new succulent terminals
- In September, larvae go to overwintering sites

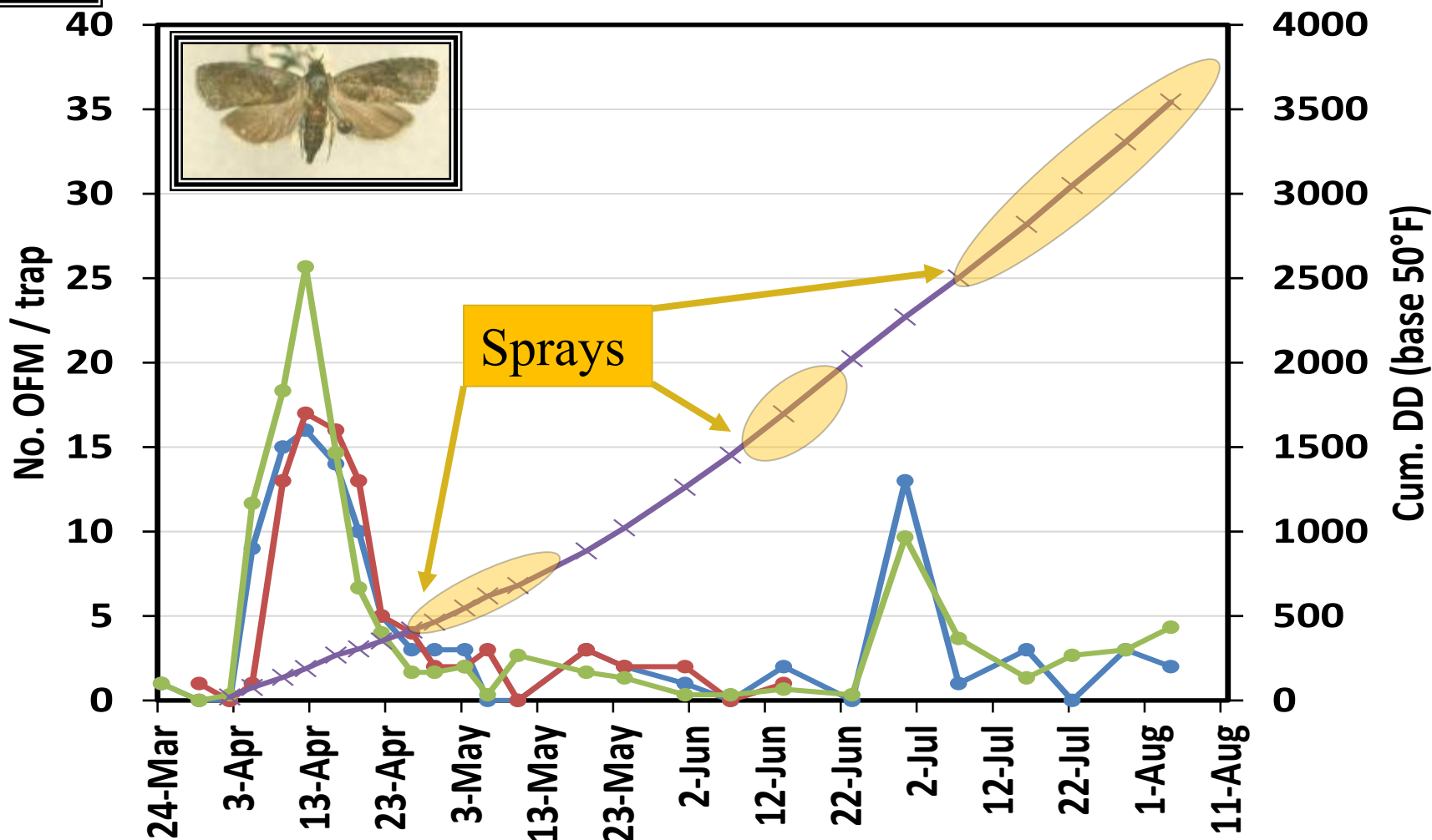


**RELATIONSHIP BETWEEN DEGREE-DAY ACCUMULATIONS
AFTER BIOFIX AND BIOLOGICAL EVENTS OF ORIENTAL
FRUIT MOTH
(45°F LOWER BASE, 90°F UPPER BASE)***

Cumulative degree-days	Biological Event
175	first adult emergence
250	first eggs laid
325 to 425	peak adult emergence
525	peak egg laying
950	first emergence of second generation adults
1,100	first eggs laid by second generation
1,300 to 1,425	peak emergence of second generation adults
1,500	peak egg laying by second generation adults
1,900	first emergence of third generation adults
2,200 to 2,450	peak emergence of third generation adults
2,500	peak egg laying by third generation adults
* Modified from Michigan State University Fact Sheet	

Oriental Fruit Moth Trap Catch

Fayetteville, AR 2010



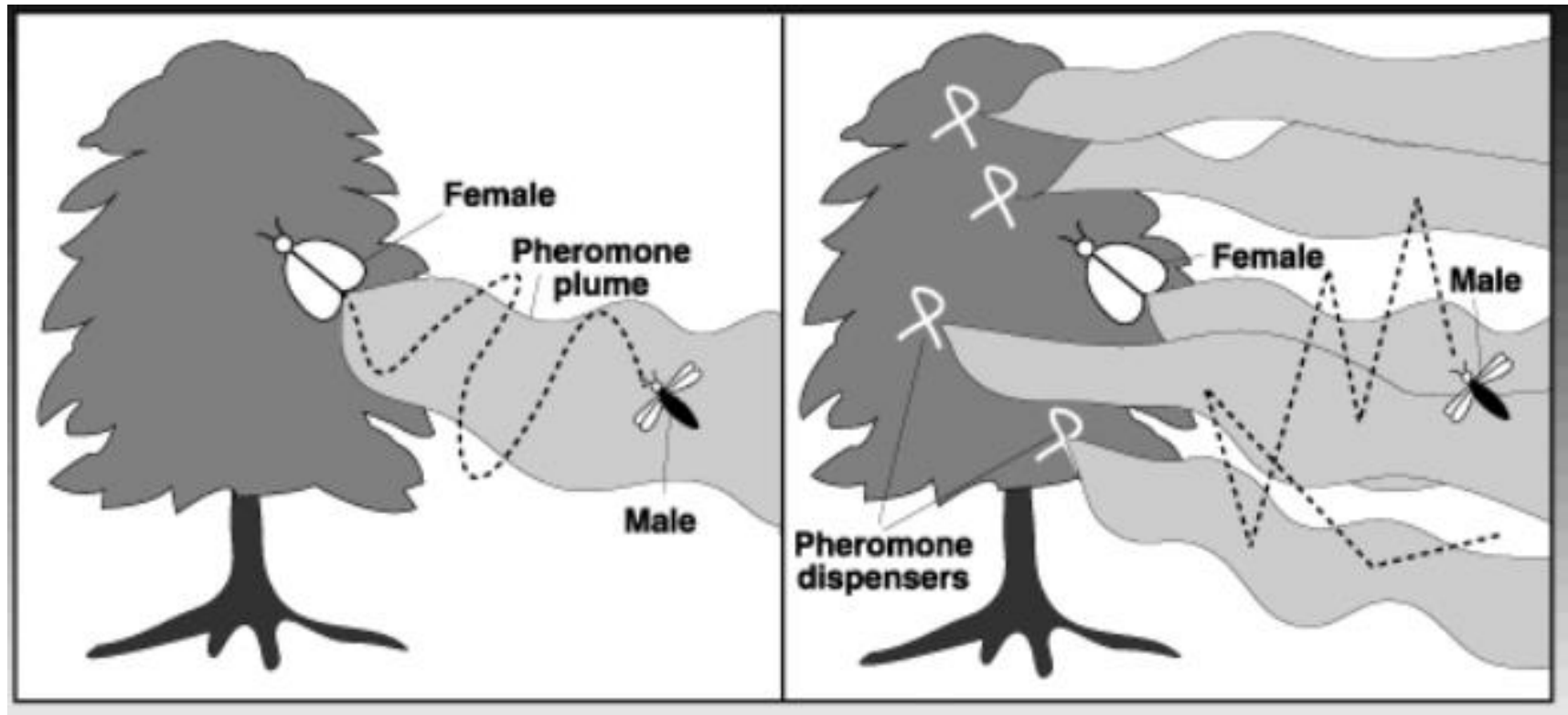
2015 SOUTHEASTERN PEACH, NECTARINE AND PLUM PEST MANAGEMENT AND CULTURE GUIDE

Online: <http://www.ent.uga.edu/peach/PeachGuide.pdf>

Recommended insecticides - Oriental fruit moth:

- Imidan (organophosphate)
- Spinosad - Delegate
- Pyrethroids: Asana, Baythroid, Warrior, Mustang
- **Mating disruption (MD)**: multiple point sources of sex pheromone dispensed in orchard given:
 - Orchard must exceed 5 acres
 - Works best in fairly square blocks
 - Narrow blocks have edge effects – females outside can mate and enter orchard and lay eggs in edge trees)
 - Low pest density (apply insecticide to reduce density then use MD)

How Mating Disruption Works



<http://jenny.tfrec.wsu.edu/opm/displaySpecies.php?pn=-80>

Mating Disruption

- 1986, OFM pheromone was registered for MD
- Since 1990, MD controlled OFM in $> 10,000$ acres of peaches
- Control of oriental fruit moth with pheromone mating disruption (MD) often better than with conventional insecticidal control.
- MD is being tested against peachtree borers

OFM Mating Disruption Options



Isomate OFM TT
(100 per acre)



CheckMate OFM F
(1-1.3 oz/A)
Suterra



CheckMate OFM
(100-150 per acre)



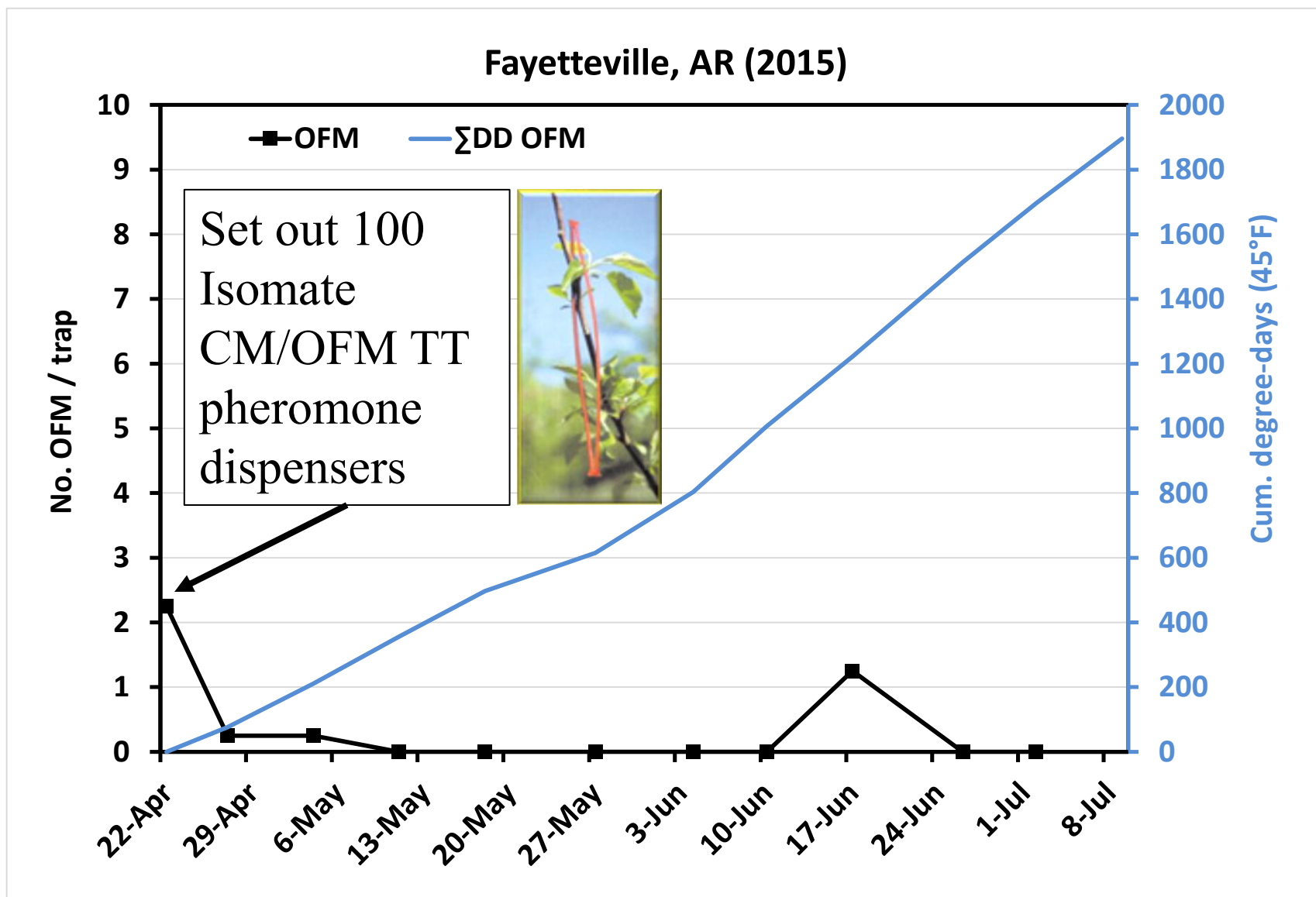
No-Mate OFM
(100 per acre)



CheckMate Puffer OFM
(1 puffer/acre)

Place dispensers in tree at first trap catch of moths in pheromone trap

Mating Disruption of OFM – no wormy fruit

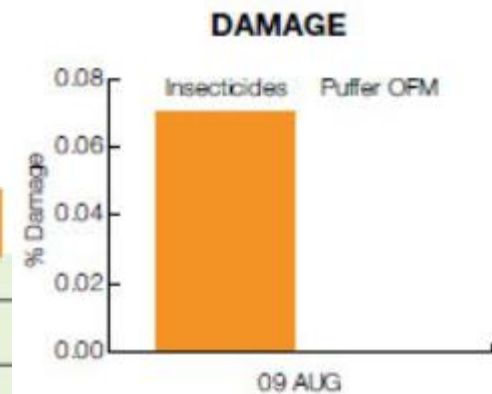
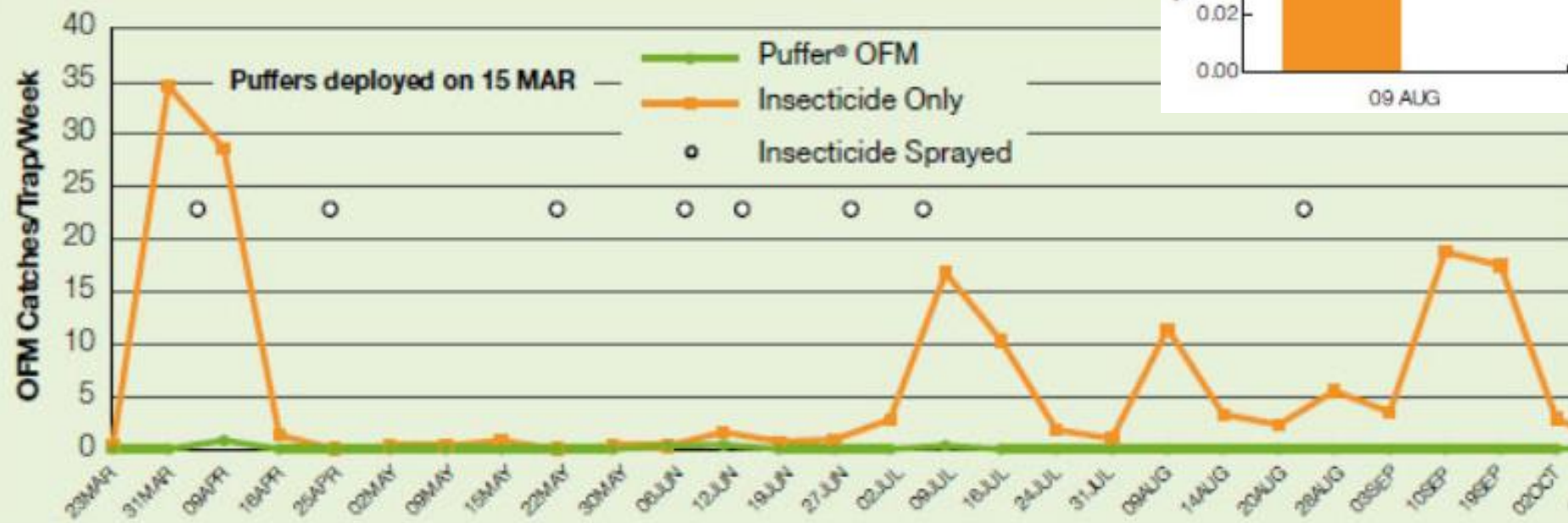




Mating Disruption: Sutter Puffers

<http://suterra.com/wp-content/uploads/2014/05/puffer-efficacy.jpg>

AVERAGE NUMBER OF ORIENTAL FRUIT MOTH PER TRAP IN PEACHES



Mating Disruption Dispensers available from Great Lakes IPM

<u>DESCRIPTION</u>	<u>FIELD LIFE</u>	<u>ORDER NO.</u>	<u>QTY</u>	<u>PRICE</u>	<u>ACRES TREATED</u>
Codling Moth	120-140 Days	ISM-C+	400/pk	\$ 100.00	1
Codling Moth Flex	Full Season	ISM-CM FLEX	400/pk	\$ 105.00	1 - 2
CM Twin Tube	120-140 Days	ISM-CTT	400/pk	\$ 200.00	2
CM Mist (CM Mist includes 1 pheromone can, 1 emitter, and 1 hanger. Use 1-2 cans per acre).	Full Season	ISM-CM Mist	1 Can	Call for Pricing	1/2-2
CM/OFM Twin Tube	180 Days	ISM-CM/OFM TT	400/pk	Call for Pricing	2
Dogwood Borer	Full Season	ISM-DWB	500/pk	\$ 200.00	3.3
Grape Root Borer	Full Season	ISM-GRB	600/pk	Call for Pricing	6
Oriental Fruit Moth Rosso	120 Days	ISM-OFM Rosso	400/pk	\$ 156.00	2
Oriental Fruit Moth TT	180 Days	ISM-OFMTT	200/pk	\$ 125.00	1-2
Peachtree Borer Dual	180 Days	ISM-PTBD	500/pk	Call for Pricing	3.3

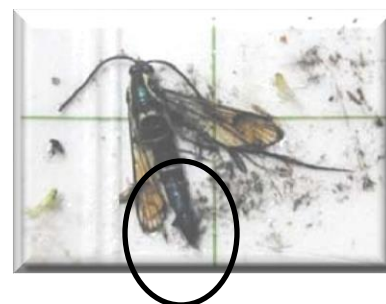
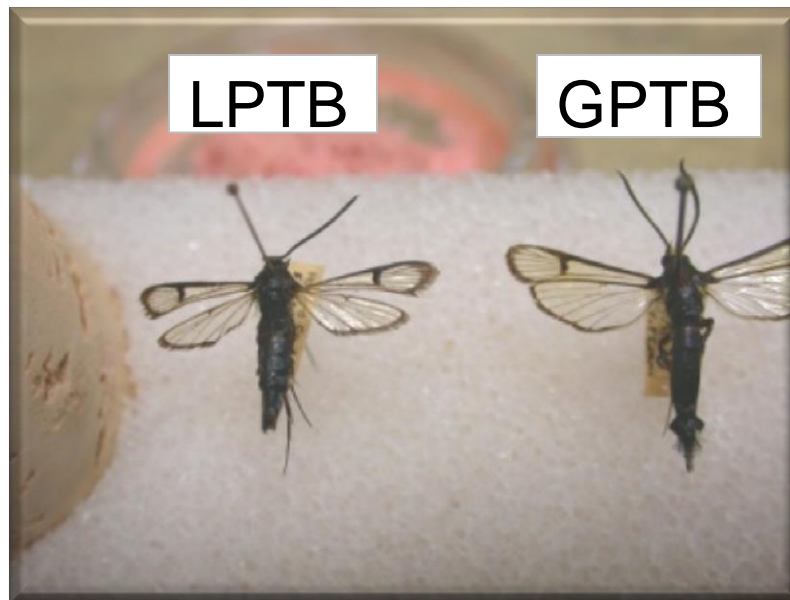
Registered for use in a few states

Need growers to request state registration

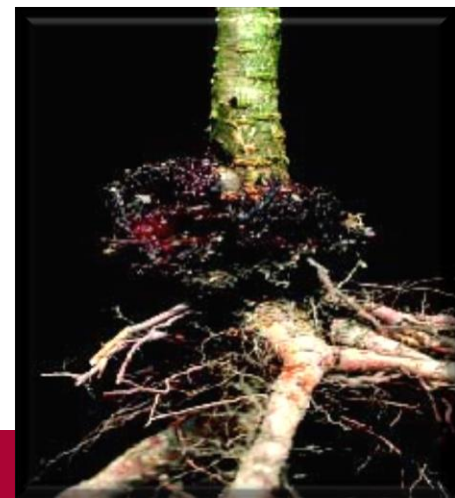
ISOMATE PRODUCTS ARE REGISTERED IN THE FOLLOWING STATES:

C+	CA, CO, MI, MT, WA
CTT	CA, CO, ID, MI, MN, OR, WA, WI
CM FLEX	AZ, CO, ID, IL, MI, NM, OH, OR, UT, WA
CM MIST	CA, ID, MI, OH, OR, WA
CM/OFM TT	IL, MI, OH
DWB	MI, OH
GRB	FL, TN
OFM ROSSO	CA, CO, ID, IL, MI, MO, OH, OR, WA
OFM TT	CA, MI
PTB DUAL	AZ, IL, MI, OH

Lesser and Greater Peachtree Borers



GPTB In trap



Lesser Peachtree Borer Biology/Monitoring



- **Late-March**, hang pheromone trap inside orchard and check weekly
- April to August, adults emerge & lay eggs by wounds on scaffold limbs
- Look for pupal skins in limb wounds
- All summer, larvae tunnel in scaffold limbs
 - Limb strength reduced
 - Pathogens enter limb (death)

Greater Peachtree Borer Biology/Monitoring



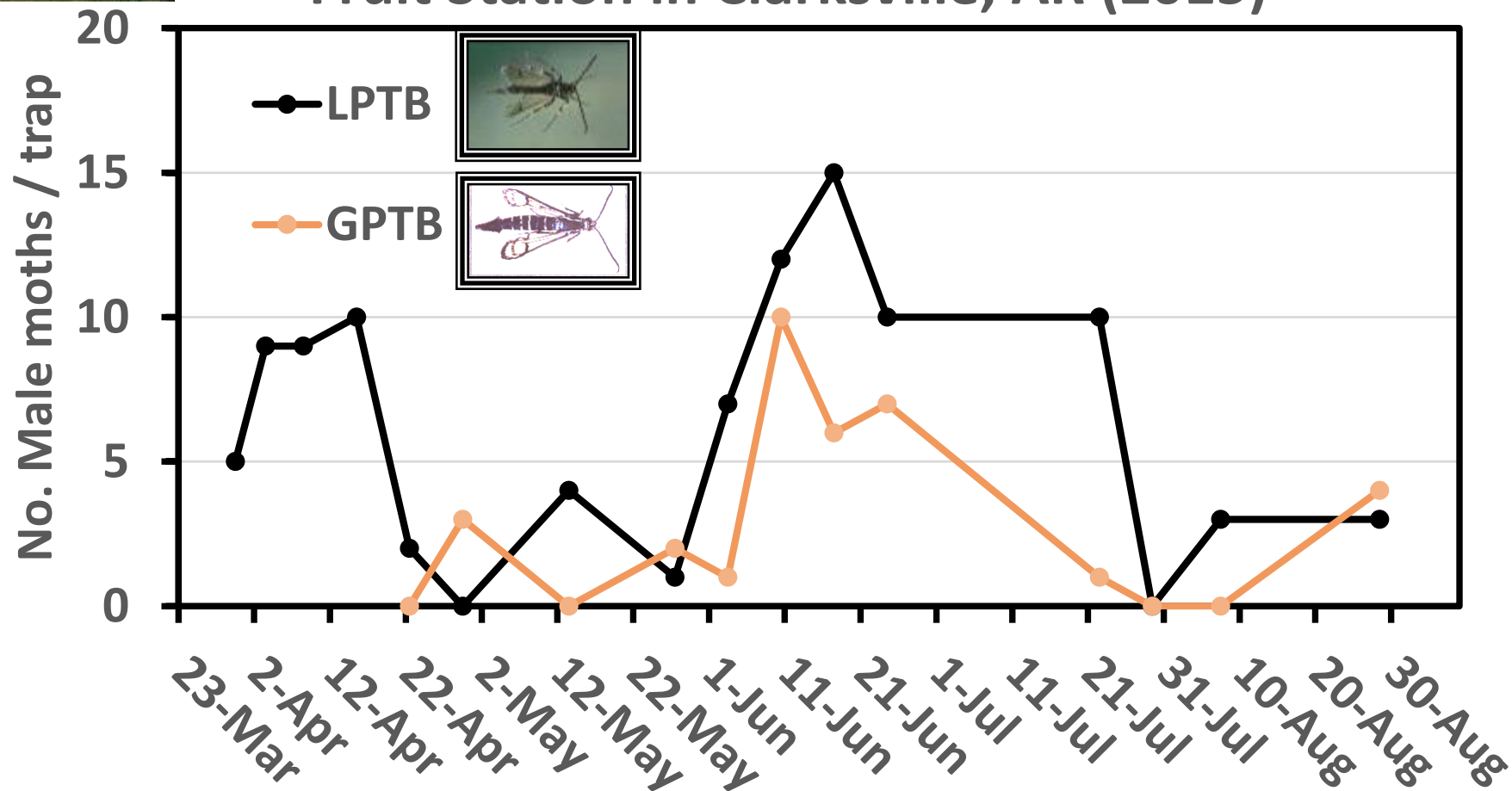
- **Early-May**, hang pheromone trap inside orchard and check weekly
- **May to August**, adults emerge and lay eggs on trunk
- **Mid-May to next April**, larvae tunnel lower trunk below soil
 - Tree vigor reduced
 - Small trees girdled & killed



Lesser and Greater Peachtree Borers



Fruit Station in Clarksville, AR (2015)



LPTB Control by Lorsban (may be banned)

Possible Alternatives?

- Pre-bloom, 1.5% Superior oil + chlorpyrifos spray of LPTB
- April - May, hi-rate pyrethroid applications during peak LPTB trap captures
- **Mating disruption**
- Entomopathogenic nematodes and fungi

GPTB Control by Lorsban (may be banned)

Any Alternatives?

- After harvest, but no earlier than 1 July, use handgun to apply Lorsban to drench lower trunk and soil (100 gal./acre)

ACKNOWLEDGEMENTS

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Discussion?