



Life Without AZM: Pest Management Options for Cherry Growers in 2013

Larry Gut





Current programs:

- *Effective and economical*
- *Primarily OP (e.g., AZM) & pyrethroid-based*



Regulatory changes

➤ Phase-out for AZM:

Ratcheting down of annual application rates

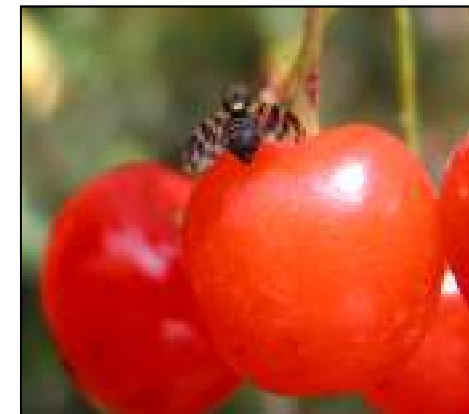
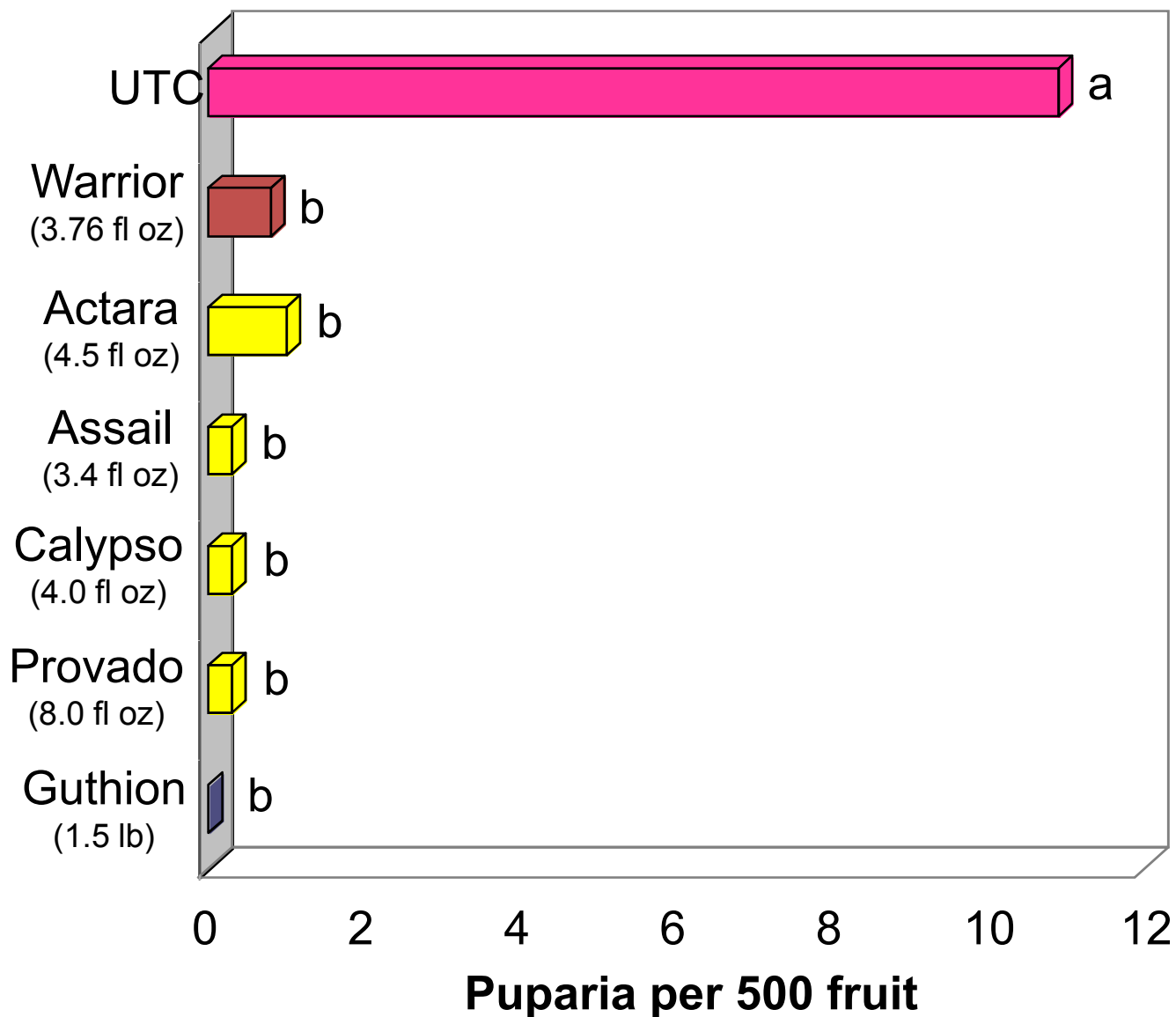
1.5 lbs ai/A in 2008 & 2009, 0.75 lbs ai/A in 2010-2012

Use of existing stocks extended to Sept 30, 2013





Newer compounds for CFF control



Application timings:
Catch + 7d, 14d later

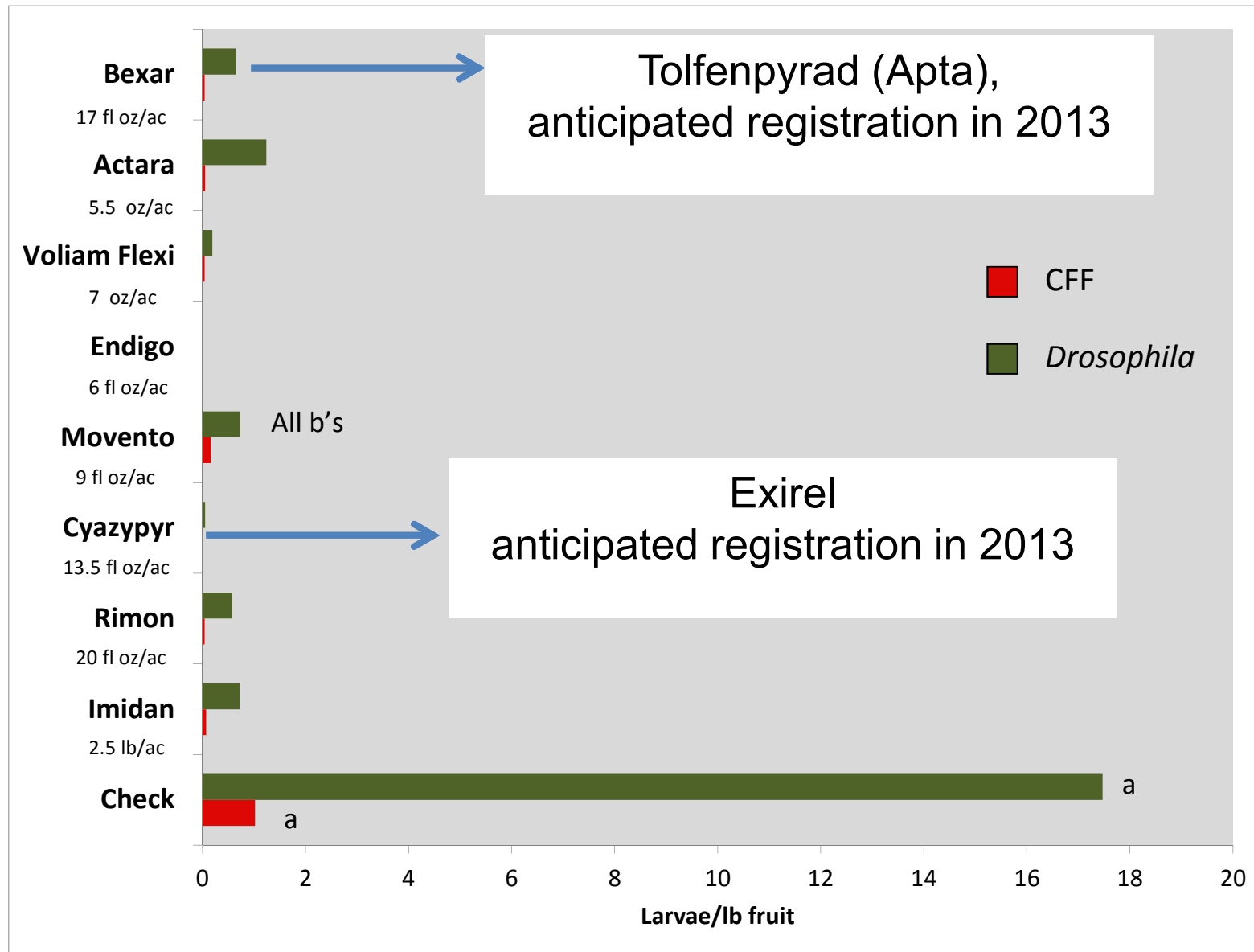


Evaluation:
Collect 500 fruit, place
over sand, count
emerging pupae





Control of CFF and *Drosophila* in tart cherry-2011





Chemical Control of Cherry Fruit Fly

- After oviposition eggs are under skin and protected.
- Conventional contact poisons (Guthion) toxic to flies.
- Timed for adult egg laying period (7-10 days after first emergence).
- Residual activity important due to immigrating flies.





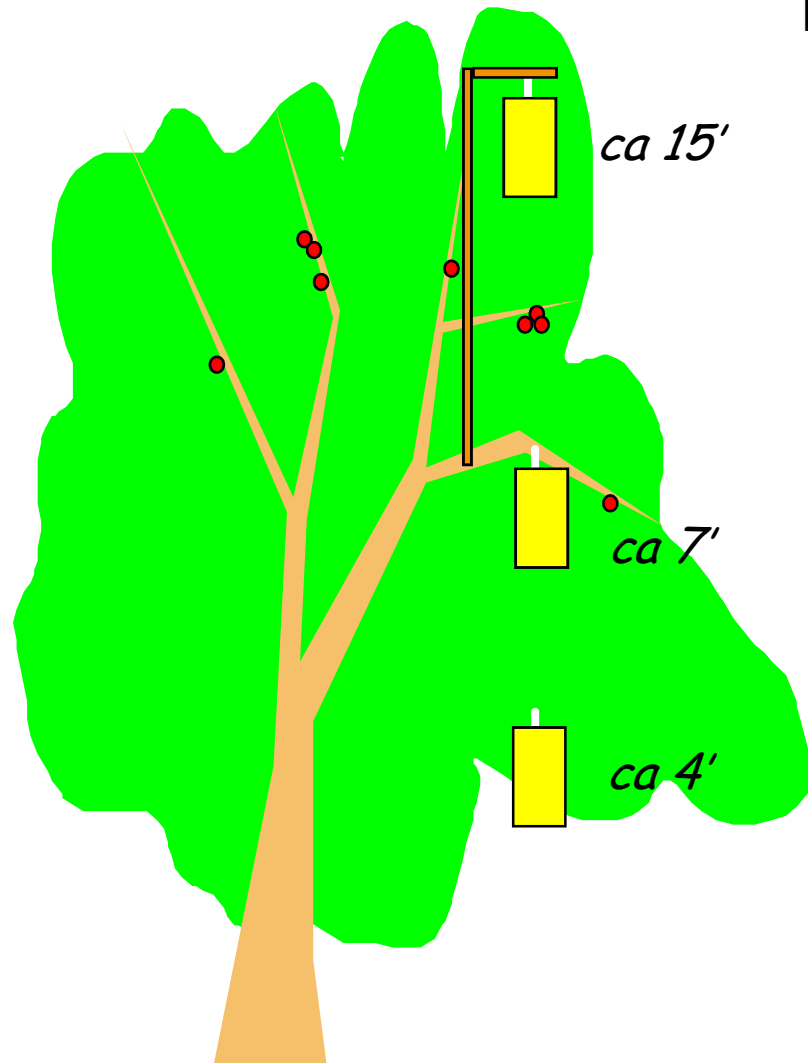
Alternative Compounds

- Compounds requiring ingestion are timed for pre-oviposition period after first emergence.
- Oviposition deterrents need to be applied before emergence and coverage maintained through flight.

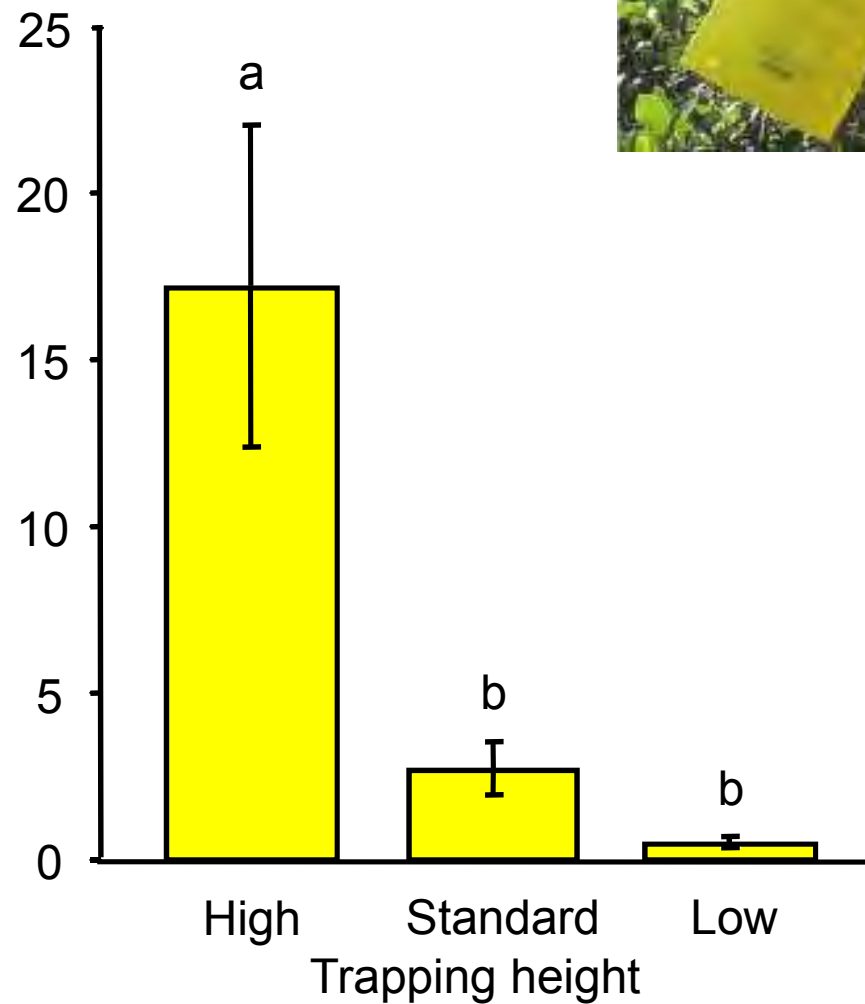


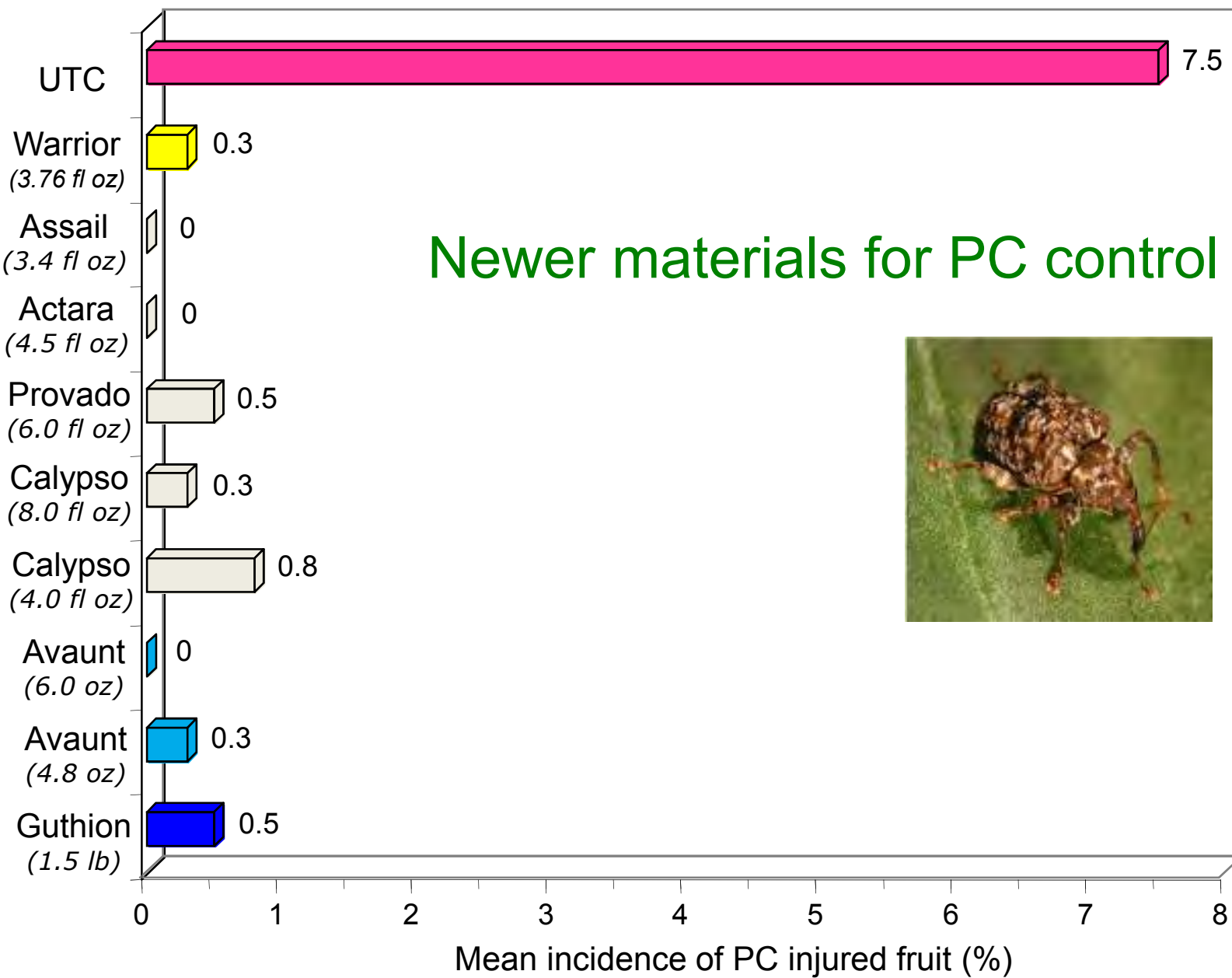


Monitor for CFF Adults



Mean No. of Flies per Trap \pm SEM

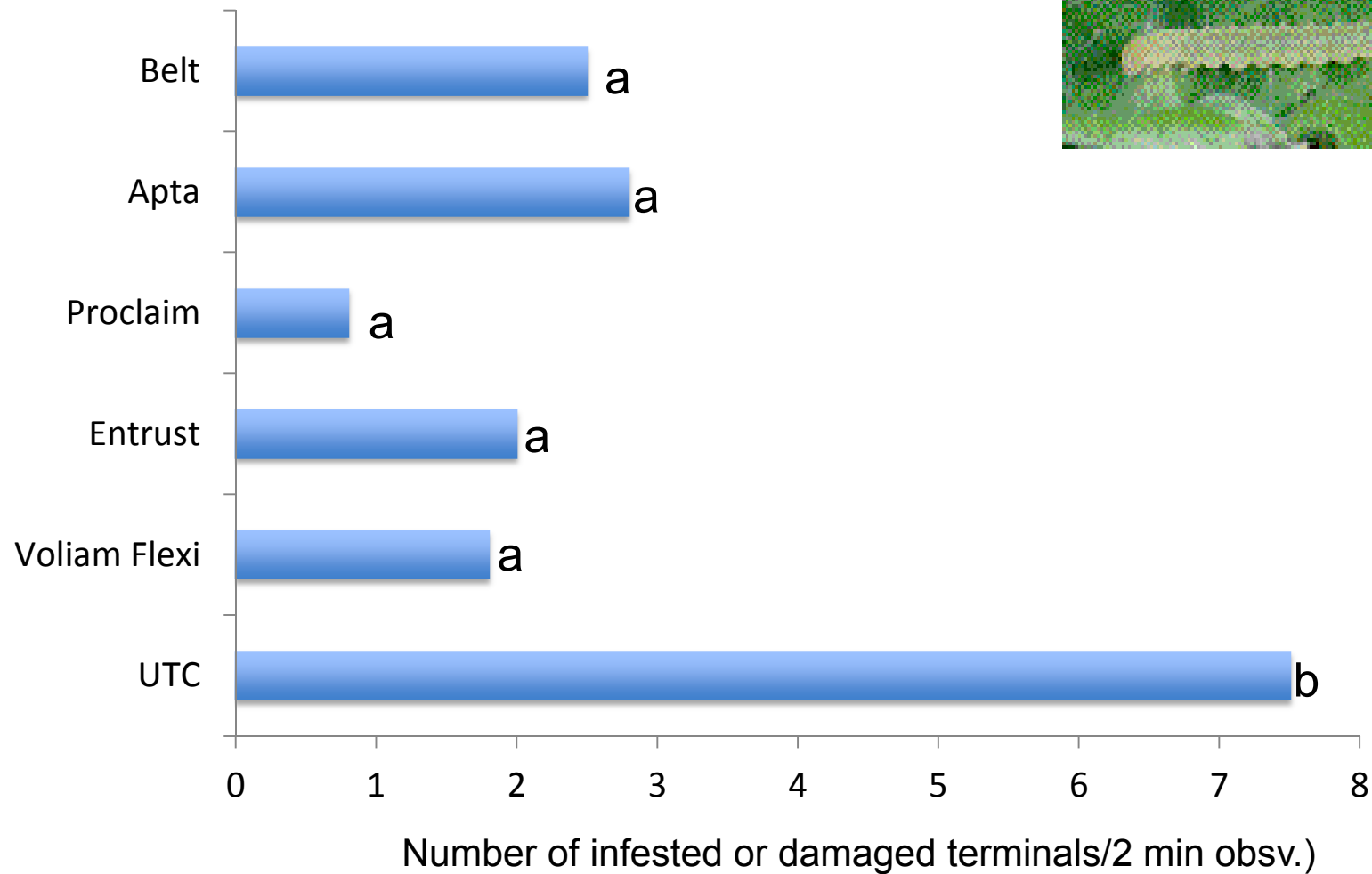






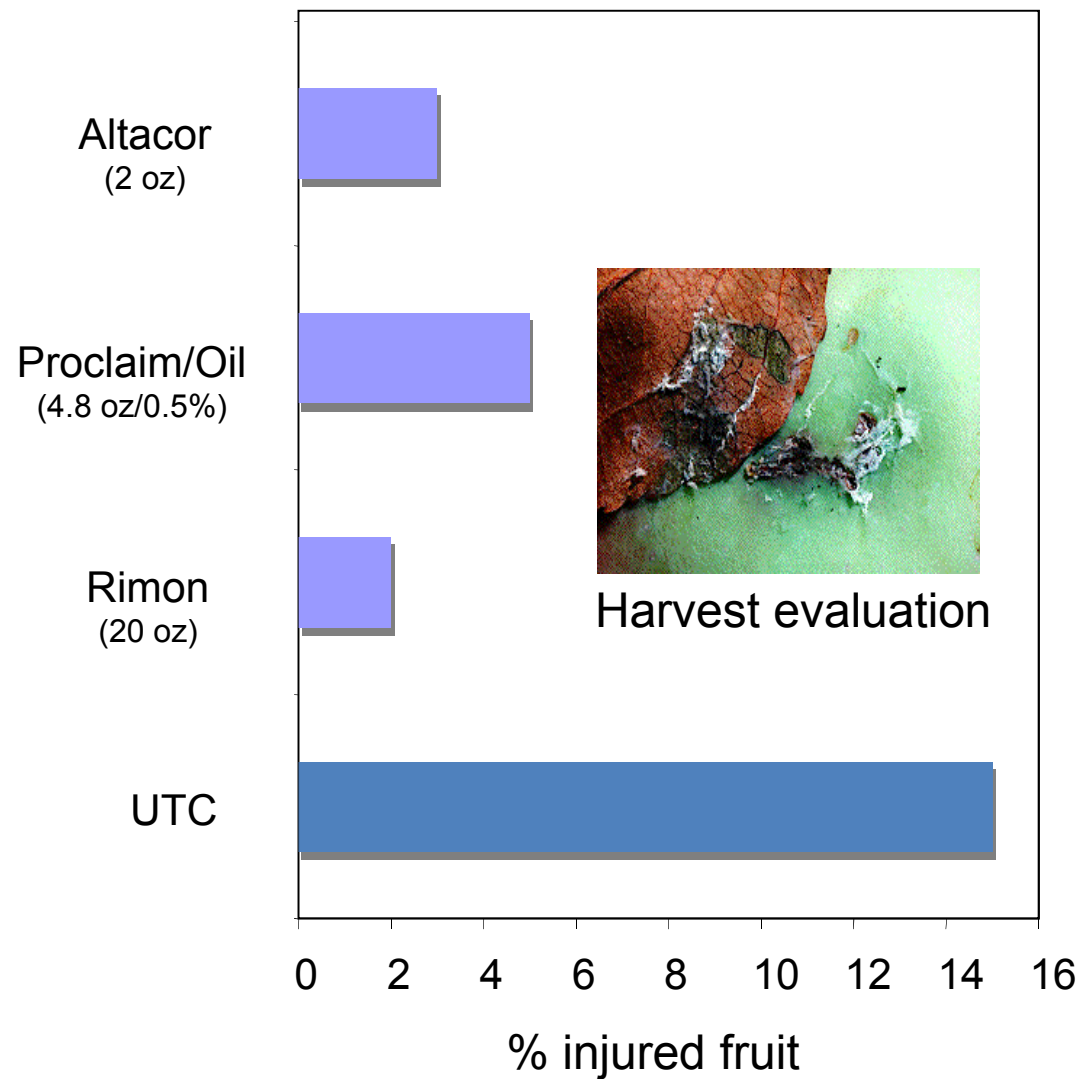
OBLR efficacy trials in cherry

- Small plots – 4 replicates
- 1 application on June 2
- Assessed 11 days post-treatment



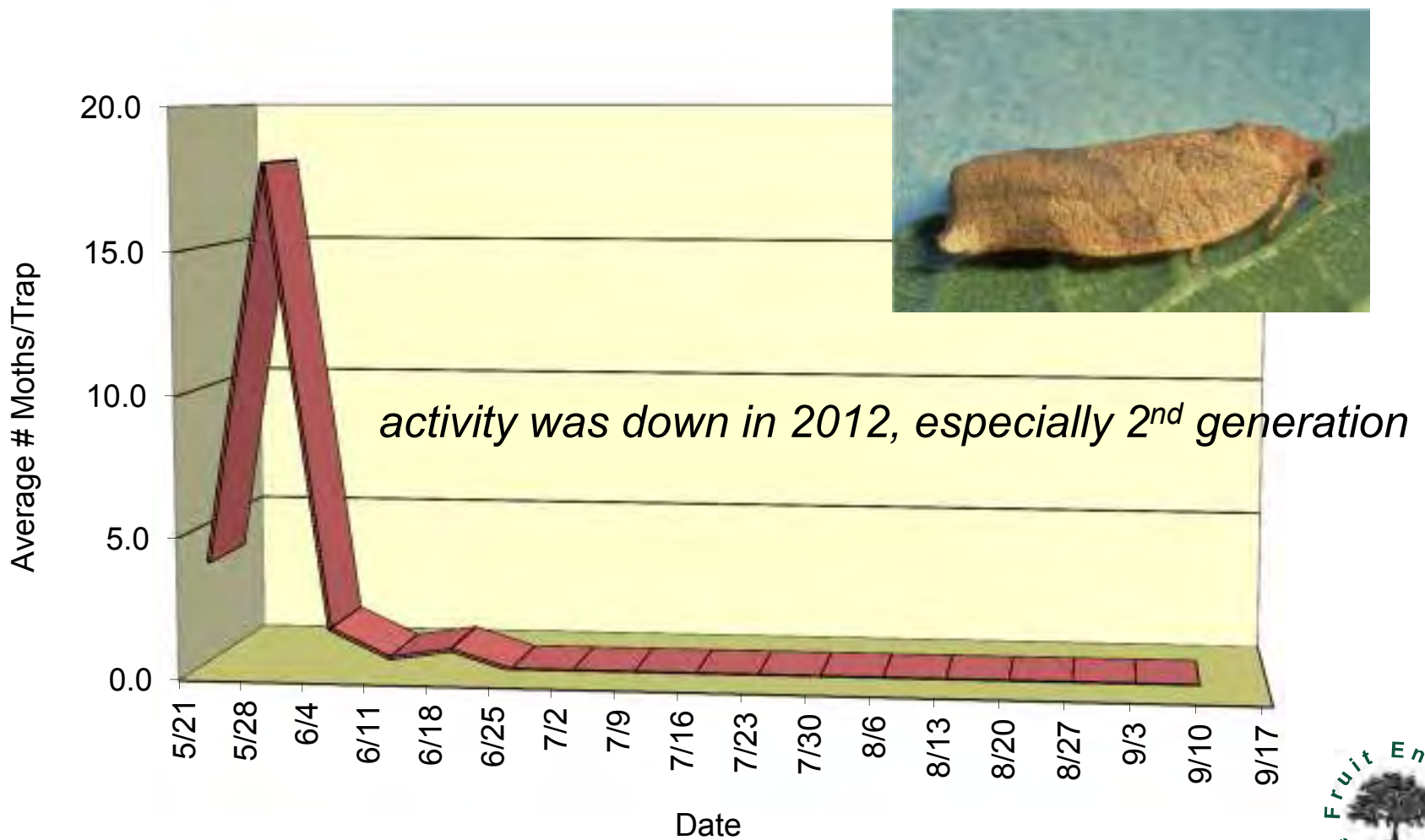


OBLR efficacy trial in apple





Monitor for adult OBLR





Building a program

Insecticide	CFF	PC	OBLR	GFW	BCA	SJS
Avaunt		***	*	*	*	
Intrepid			**	***		
Esteem			**	**		***
Delegate	** *	*	***	***		*
Rimon	**	*	***	***		
Altacor	**		***	***		
Belt			***	***		
Admire	** *	*			***	*
Actara	** *	***			***	*
Assail	** *	***			***	**
Movento	**				***	***
Pyrethroid	**	**	**	**	**	**
Imidan	***	***	*	**	*	**



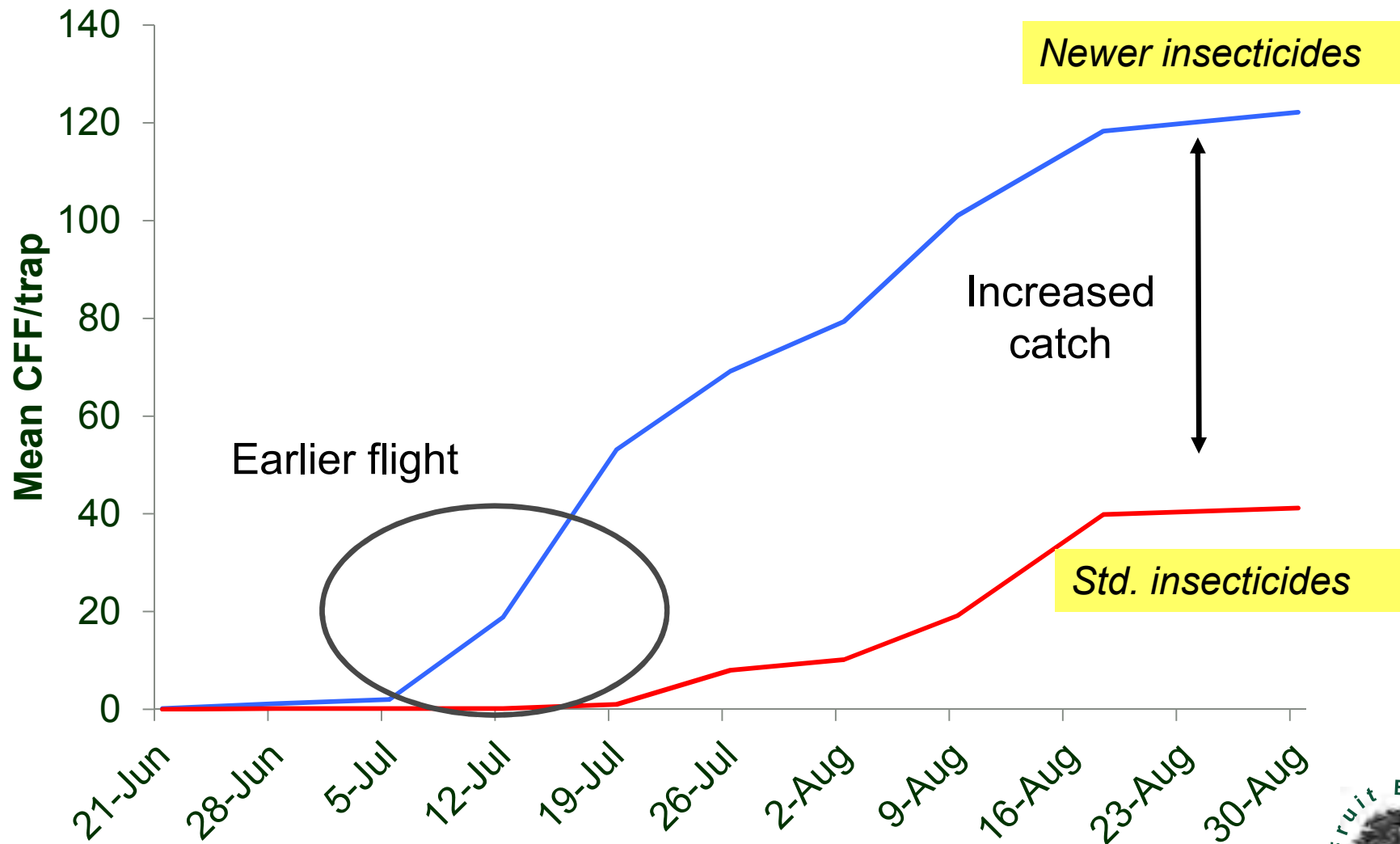
Building a program

<i>Insecticide</i>	<i>Label rate</i>	<i>Timing</i>	Target pest(s)
Delegate 25 WG	4.5 - 7 oz/ac	Late bud burst/	Fruitworm
Altacor 35 WDG	3 - 4.5 oz/ac	Petal-fall	Leafrollers
Belt 4 SC	3 - 4 oz/ac		
Rimon 0.83 EC	20-40 oz/ac		
Avaunt 30 WG	5 - 6 oz/ac	Shuck split	Plum curculio
Assail 30 SG	5.3 - 8 oz/ac	350 DD after bloom	
Actara 25 WG	4.5 - 5.5 oz/ac	12 mm fruit	Cherry fruit fly
Assail 30 SG	5.3 - 8 oz/ac		Plum curculio
Guthion 50WP	1.5 lb/ac		
Admire 2 F	6 - 8 oz/ac	20-22 mm fruit	Cherry fruit fly
Delegate 25 WG	4.5 - 7 oz/ac		



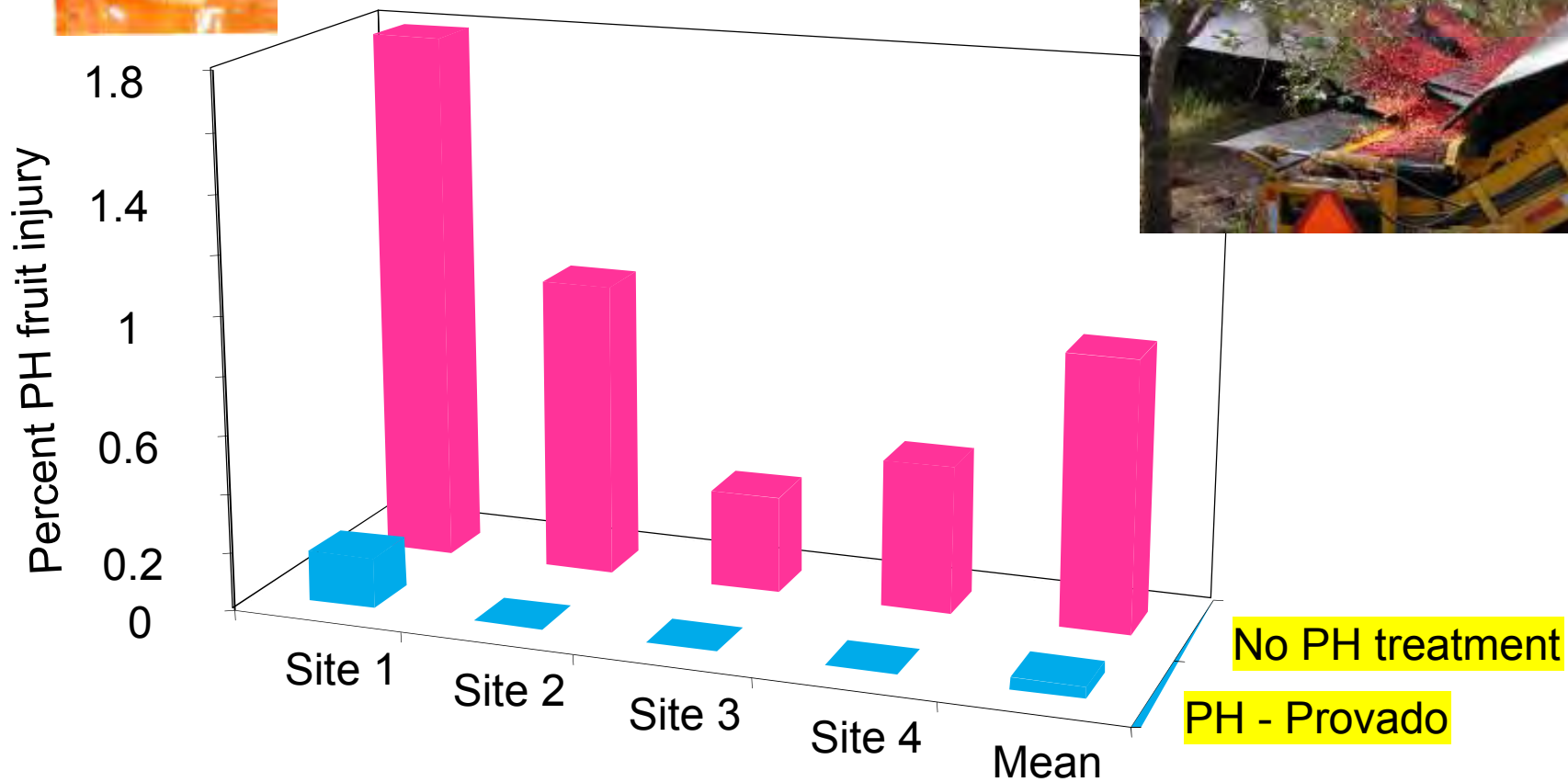


Change in CFF activity in some orchards relying on new insecticides for control





Post-harvest treatment

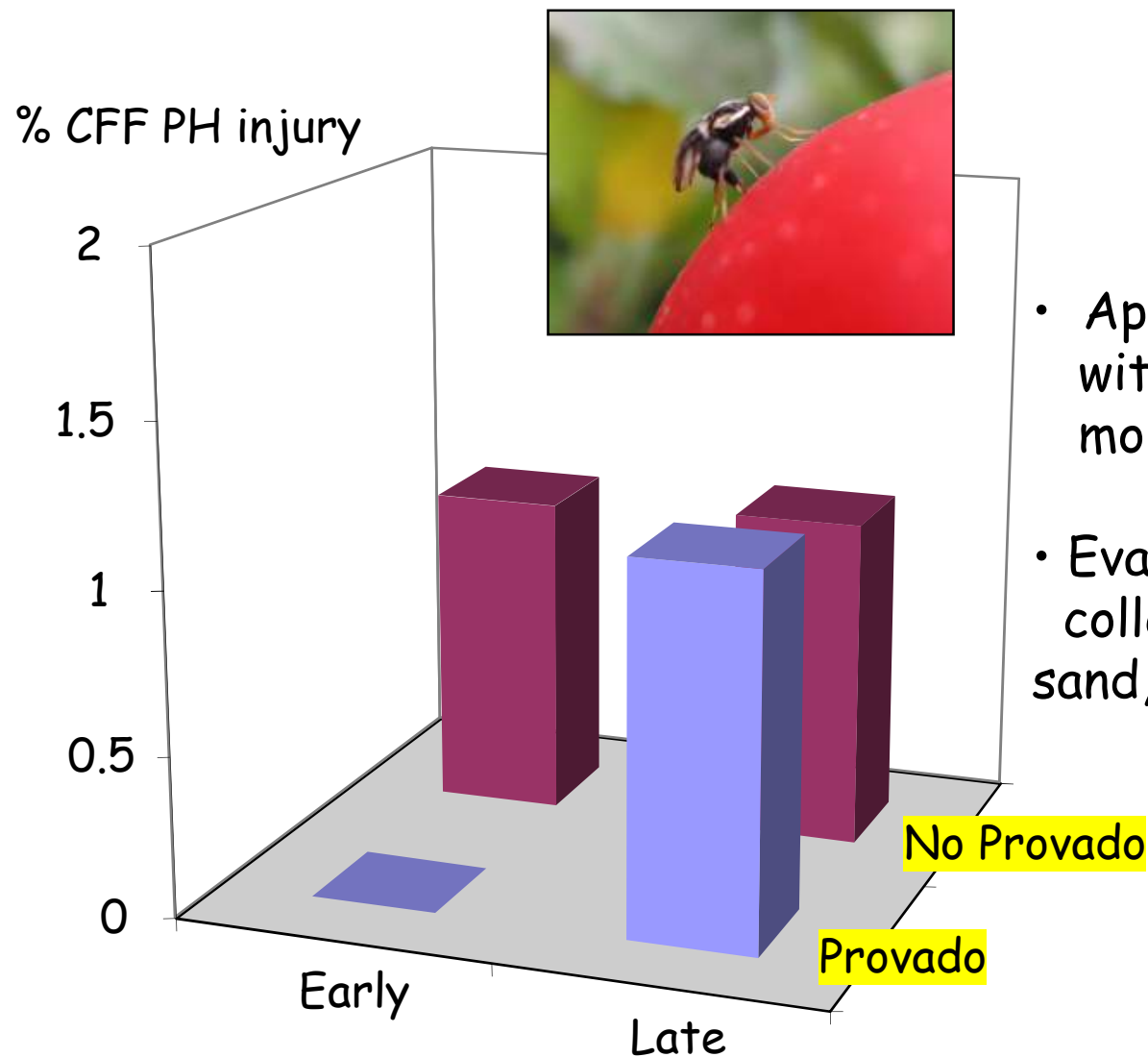


- Similar results in 2010 and 2011 on-farm trials





Timing for post-harvest management of CFF



- Application timings: within 7d post-harvest, more than 7d post-harvest
- Evaluation: collect 500 fruit, place over sand, count emerging pupae



Spotted wing drosophila: A new concern

- Unlike native vinegar flies, SWD females lay eggs in intact fruit, using serrated ovipositor.
- Adult flies live for 3-9 weeks, and females can lay over 300 eggs.



Serrated ovipositor of a female WD fly

Highest risk

Cherries

Strawberries

Raspberries

Nectarines

Blueberries

Blackberries

Peaches

Grapes



Lower risk

Pears

Apples

Tomato

Alternate hosts

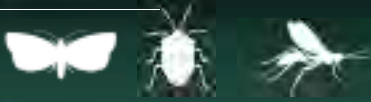
Wild plants similar to crops

Snowberry

Elderberry

Others in Michigan?





MI Survey and Detection Program

In 2012:

- Two trap types
- Over 120 traps deployed in 12 counties
- SWD captured in >75% of sites



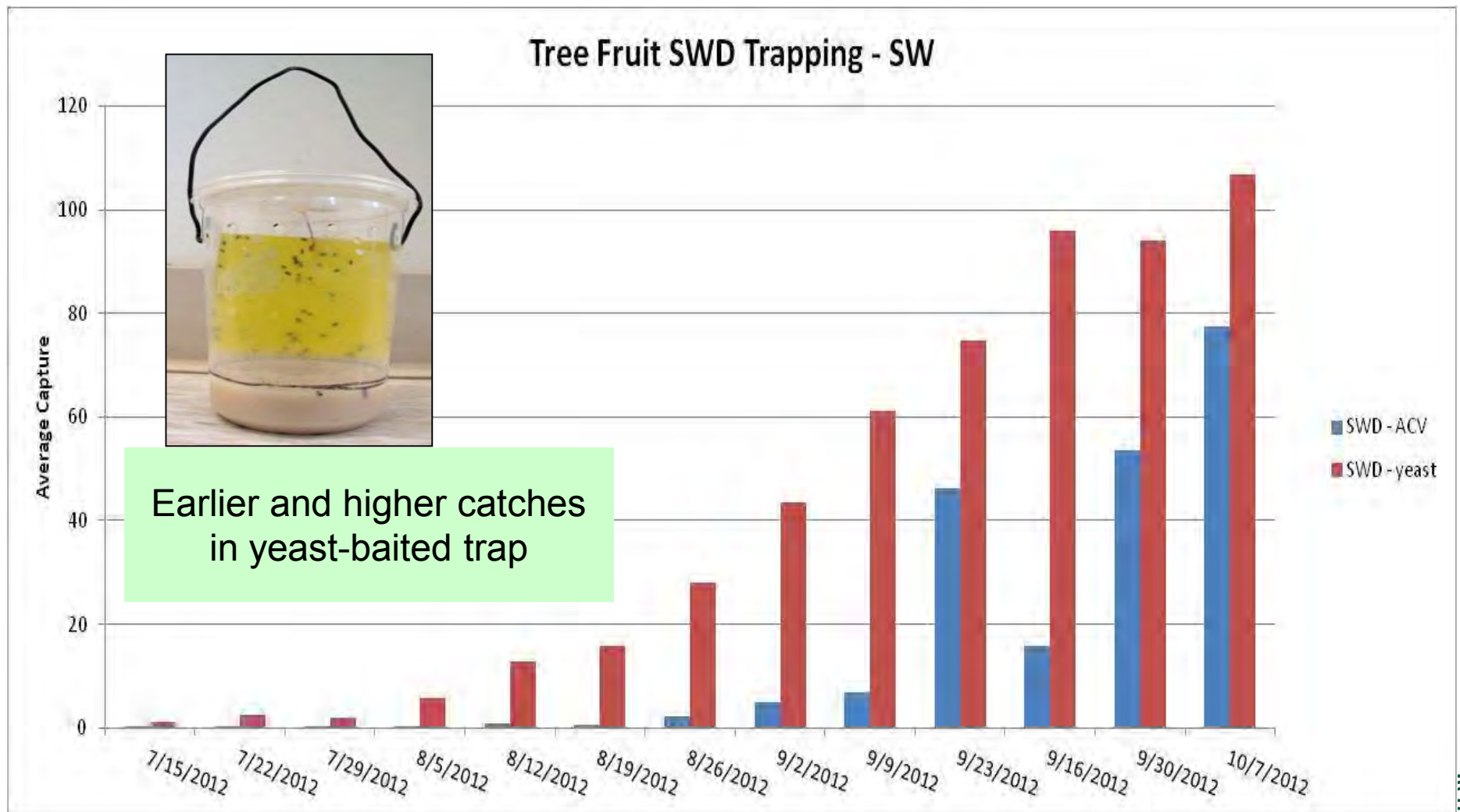
Yeast-baited



ACV-baited

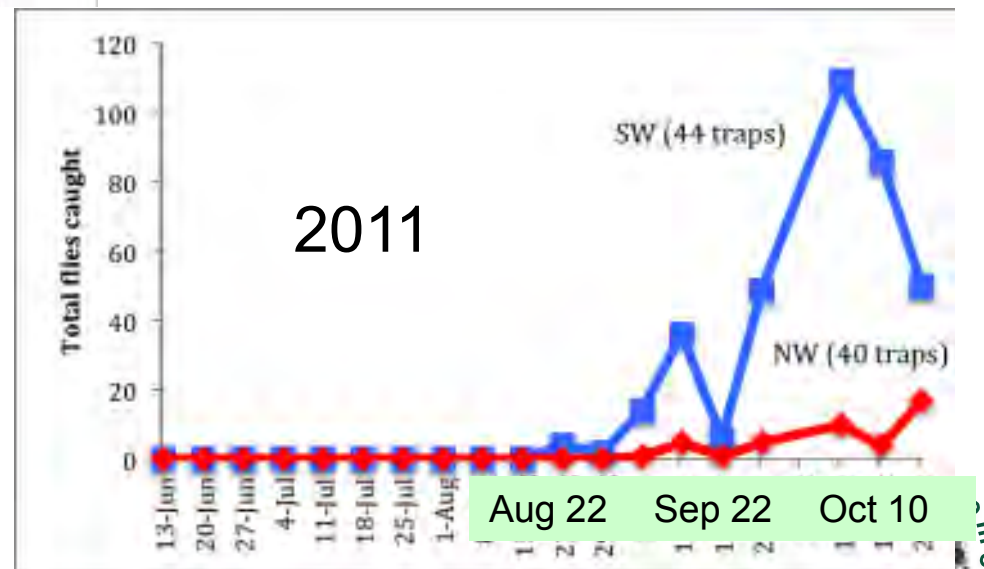
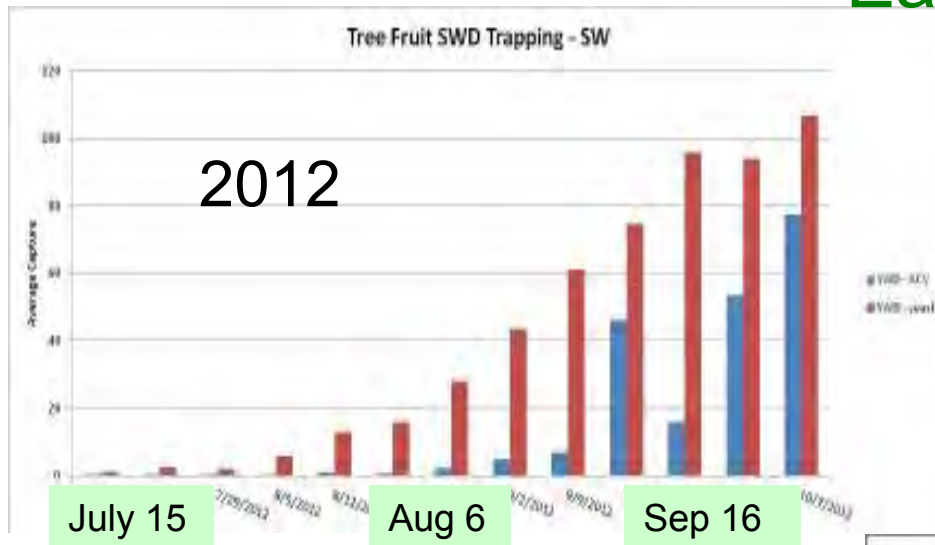


SWD Trapping: ACV vs Yeast baited





Timing of SWD activity in cherry: Earlier in 2012



entomology



Fruit infestation



Cherries

- SW - few fruit, no infestation
- NW – 5/5 orchards with infested fruit (4 sweet, 1 tart)

Blueberries infested



Raspberries:
Heavily infested





Field bioassay trials, 2012 (R. Isaacs, blueberries)



Treatments applied to small plots using a backpack sprayer.

Shoots with 20 leaves and 10 fruit picked at 1, 3, 5, 7, 10 DAT.

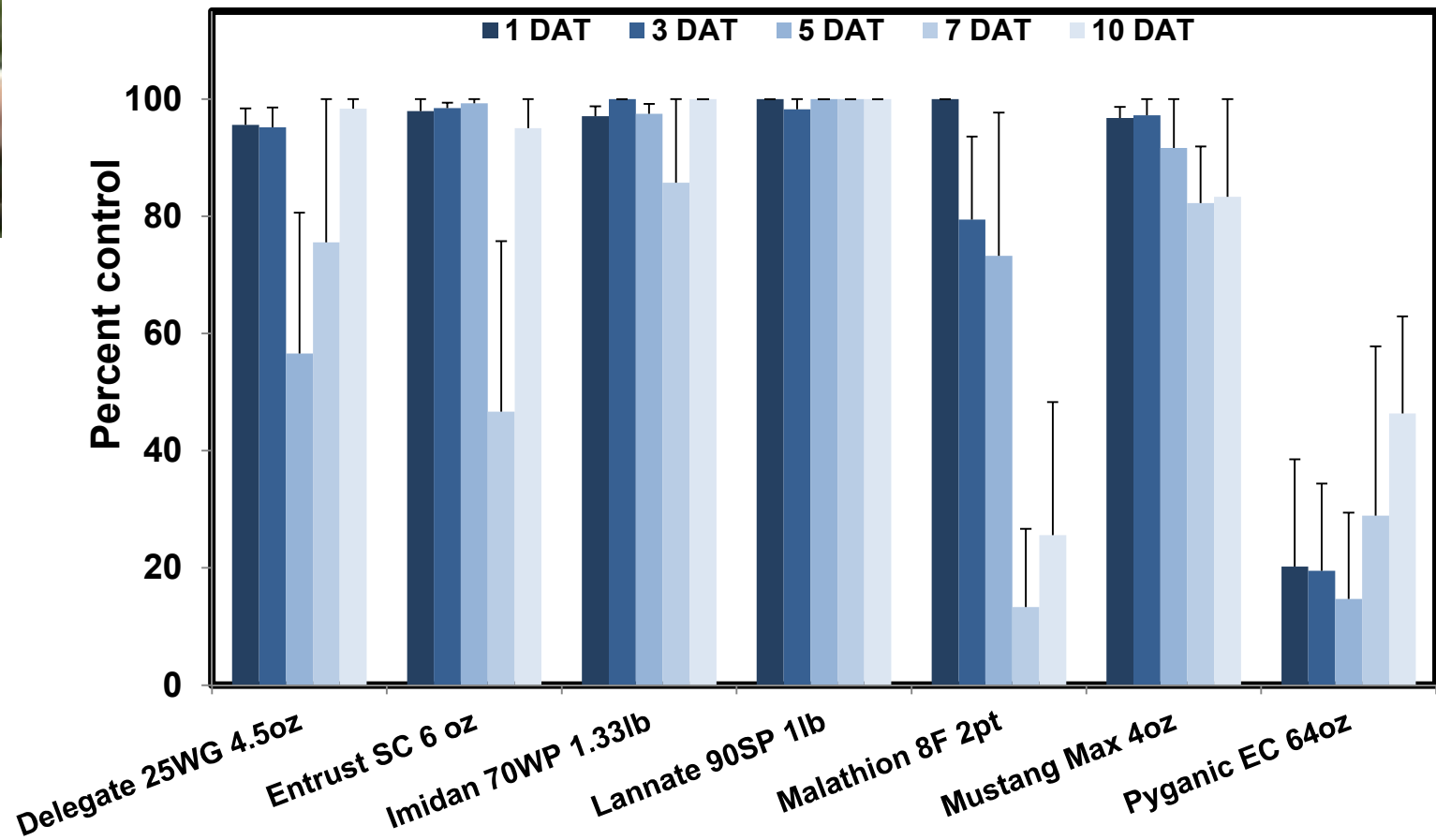
Add 5 male, 5 female SWD for 7 days.

Measure % fly mortality at 48 hours, number of larvae after 9 days.



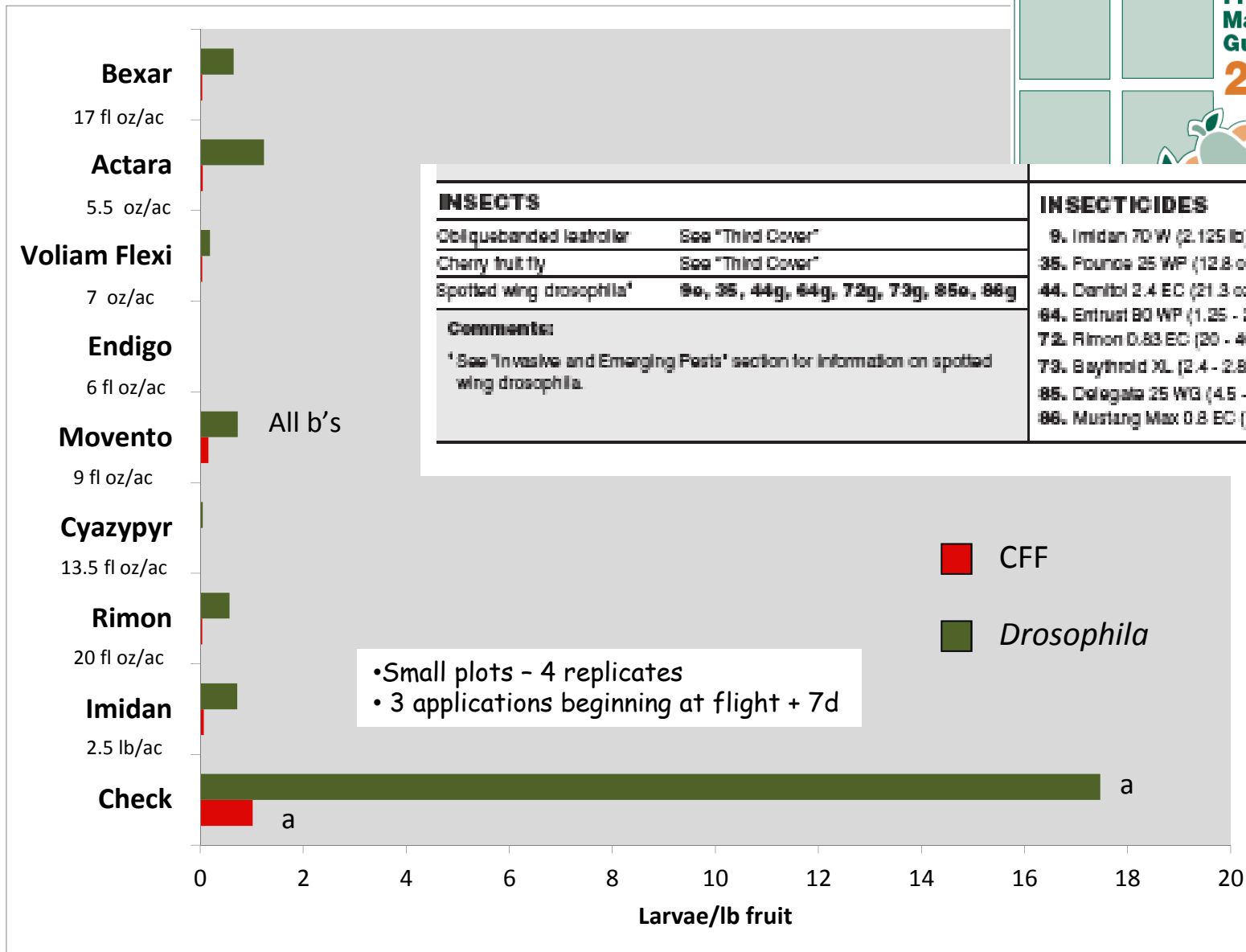


Field trials – residual control, 2012





Control of *Drosophila* in tart cherry



INSECTS		INSECTICIDES	
Obliquebanded leafroller	See "Third Cover"	9. Imidan 70 W (2.125 lb)	
Cherry fruit fly	See "Third Cover"	35. Pounce 25 WP (12.8 oz)	
Spotted wing drosophila ^a	9a, 35, 44g, 64g, 72g, 73g, 85a, 86g	44. Danitol 2.4 EC (21.3 oz)	
Comments:		64. Entrust B0 WP (1.25 - 2.5 oz) Δ RR	
^a See 'Invasive and Emerging Pests' section for information on spotted wing drosophila.		72. Rimon 0.83 EC (20 - 40 oz)	
		73. Baythroid XL (2.4 - 2.8 oz)	
		85. Delegate 25 WG (4.5 - 7 oz) RR	
		86. Mustang Max 0.8 EC (4 oz)	

• Small plots - 4 replicates
 • 3 applications beginning at flight + 7d

■ CFF
 ■ *Drosophila*





Detection of a new invasive: Fig Fruit Fly

MICHIGAN STATE UNIVERSITY	Diagnostic Services East Lansing, MI 48824 www.msu.edu/diag		



Final Report
Dr. Jim Zaboltny con:

Final Report

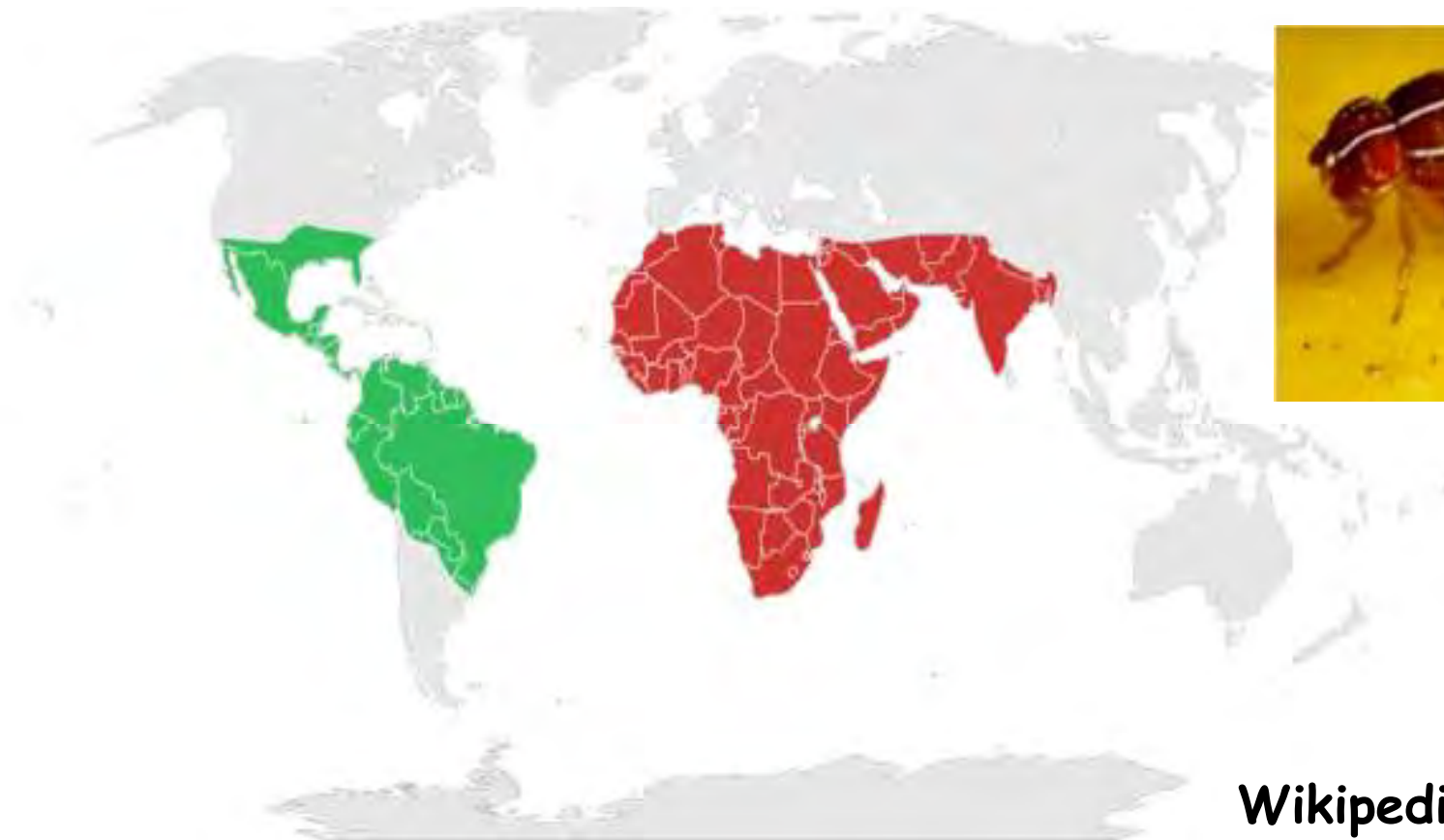
Dr. Jim Zaboltny confirmed this new county record (Ottawa) for *Zapriounus indianus*





Fig Fruit Fly - *Zaprionus indianus* (Gupta)

- Native to Africa, the Middle East, and southern Eurasia
- Spread to Western Hemisphere (Brazil-1999), and into the USA (Florida – 2005; CA, GA and AZ – 2006; OK and SC – 2007)



Wikipedia





Biology

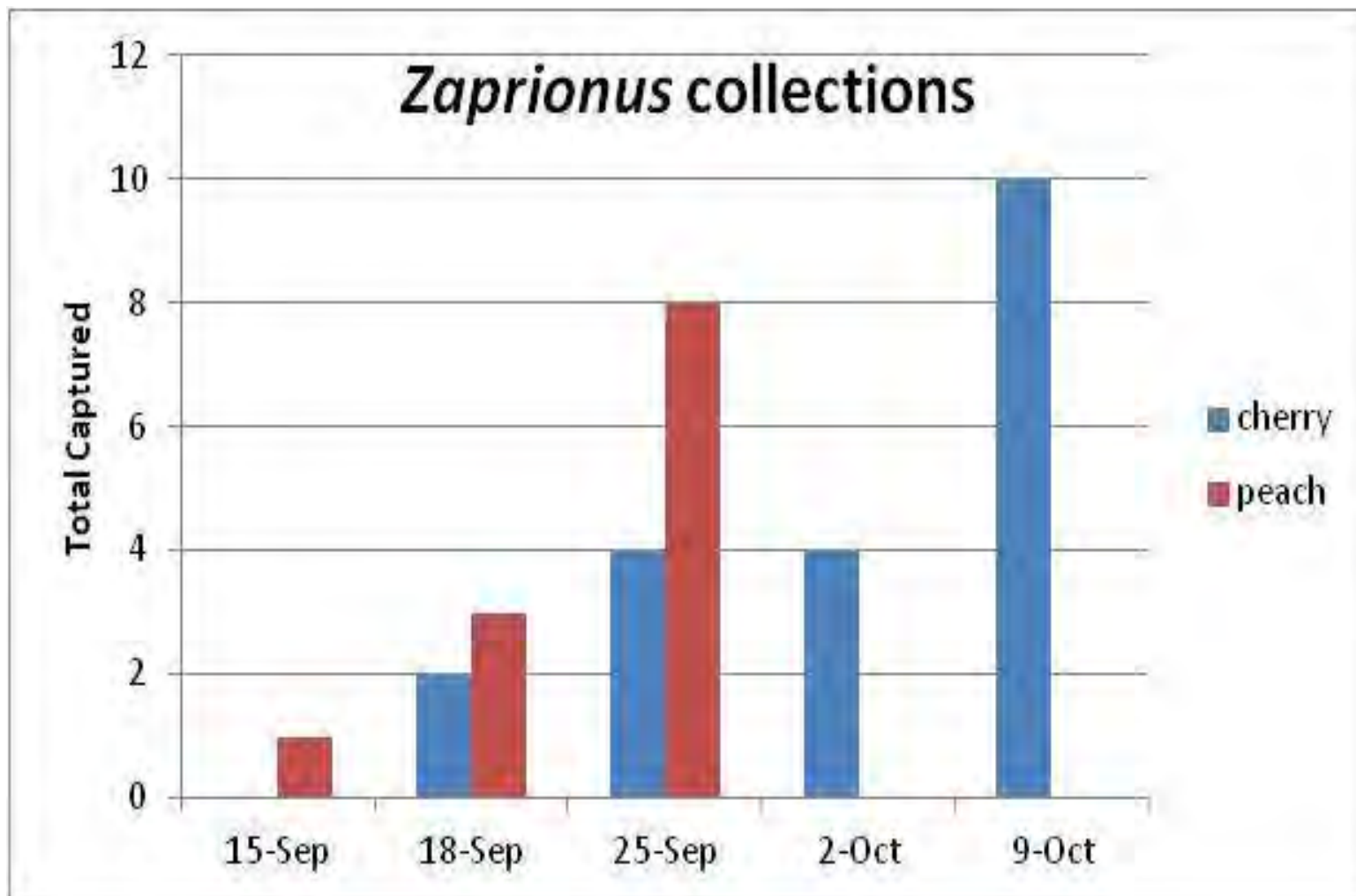
- Generally found on injured and rotting fruit (on tree or ground)
- In native regions found infesting 74 fruit species, fig, banana, guava, persimmon, avocado, citrus, etc. (also peach in western hemisphere)
- Adult longevity – avg. 80-90 d
- Females lay about 60 eggs
- Egg to adult – 35-40 days
- Multiple generations / year





Fig Fruit Fly Detection in MI

Total collected = 32





*Thanks to the many who have
contributed to these efforts*



*Peter and Mike
many grower
cooperators*

*John Wise & the
TNRC crew*

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