



Tart Cherry Integrated Orchard Management Project

Michigan State University • University of Wisconsin - Madison
Utah State University • Cornell University • Haley Consulting Services

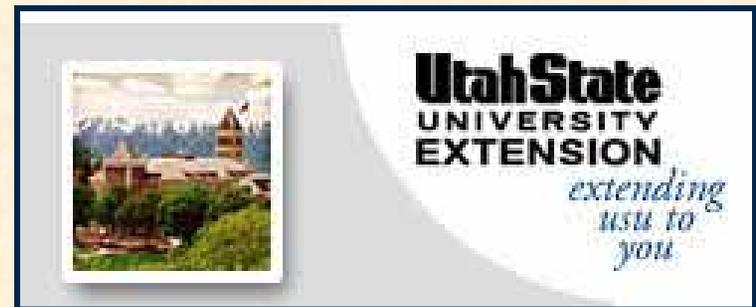
A collaborative research project funded by USDA CSREES
Risk Avoidance and Mitigation Program

2004 Utah research update

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Utah State University

Extension Entomologist



Utah TC IOMP

- USDA Funding: Oct 2003 – Sep 2007 (4 years)

- Project Budget:

- Total grant: \$1.4 mill.

- Utah's portion: \$94,686

• 1 grad student (3 yr)	\$48,000
• 2 undergrad students (4 yr)	\$29,760
• Benefits (8.3%)	\$ 6,456
• Supplies	\$ 5,900
• Travel	\$ 4,170
• Pub costs	\$ 400



Utah Research Objectives

- I. Develop alternatives to organophosphate (OP) insecticides for insect management
 1. Western cherry fruit fly
 - On-farm (registered materials)
 - USU Kaysville Research Farm (unregistered or unproven materials)
 2. Plum curculio
 - Home yards and wild plum thickets
 - Biological control (insect parasitic nematodes)
 - Lab bioassays and field trials

Utah Research Objectives

- II. Optimize control timing with alternative tactics
- III. Economic analysis
- IV. Outreach
 - 1. UT TC industry
 - 2. USU Extension staff
- V. TC IOMP Project Team
 - 1. Ray Rowley, grower rep.
 - 2. Diane Alston, research/extension rep.



Control of Western Cherry Fruit Fly with Alternative Insecticides

1. Three on-farm trials with Provado

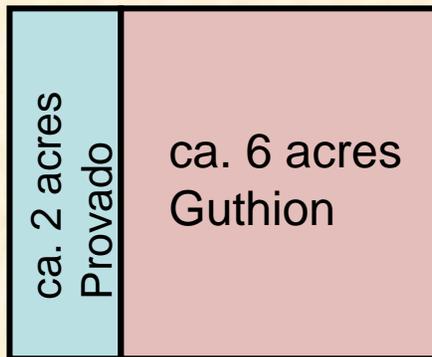
- Grower cooperators:
(Payson, Santaquin, Genola)
- Alternative insecticide: Provado vs. Guthion, Imidan, Dimethoate
- Provado (imidacloprid)
 - Neonicotinoid
 - Contact, stomach
 - Neurotoxin, antifeedant
 - Systemic



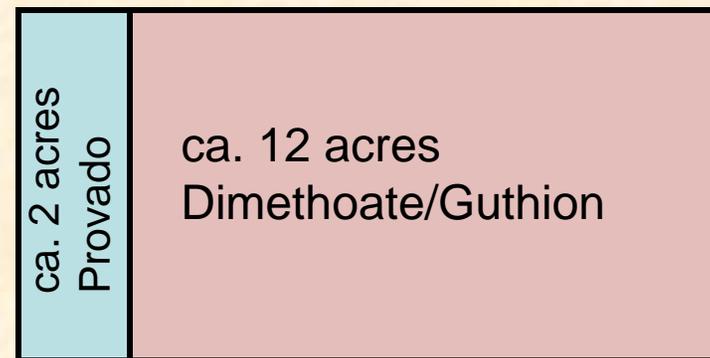
On-Farm Trial Plots

 = Provado plot

Genola



Payson



Santaquin



Fruit Injury



- No fruit injury!
- In-season: Larval emergence from fruit
 - 5 samples of 100 fruit per date (500 fruit)
 - 7 fruit collection dates:
May 25; Jun 2, 8, 16, 22, & 28; Jul 13
- Harvest: Growers reported no floating larvae, injury, or down-grading of fruit
- All treatments were effective for eliminating larval injury

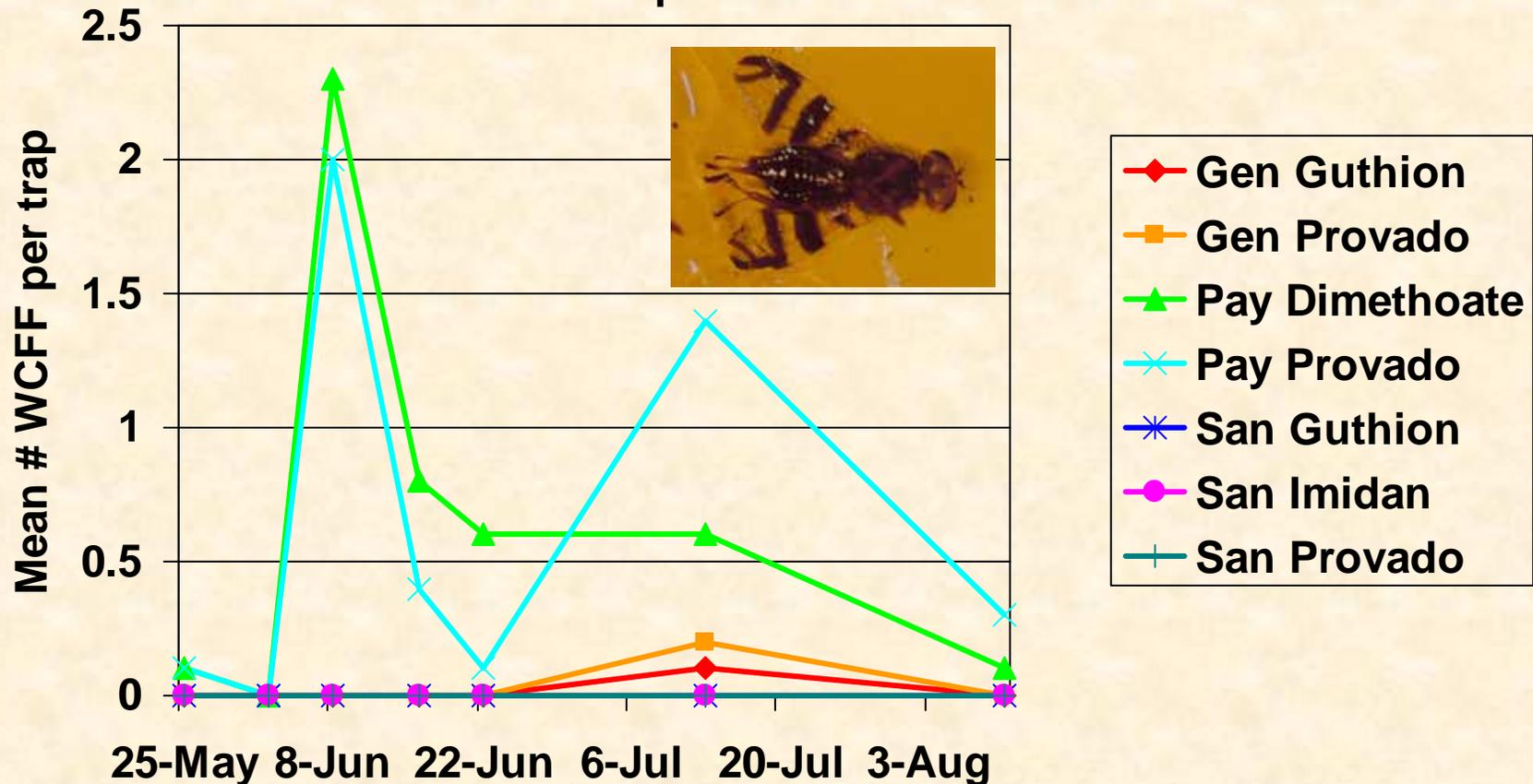
WCFF Adult Trap Catch

- 16 traps placed in each treatment plot
 - 8 on borders (2 per side)
 - 8 within interior (evenly distributed)
- AM Pherocon (yellow sticky trap)
 - + Ammonium carbonate bait box



How did insecticides influence WCFF adult densities?

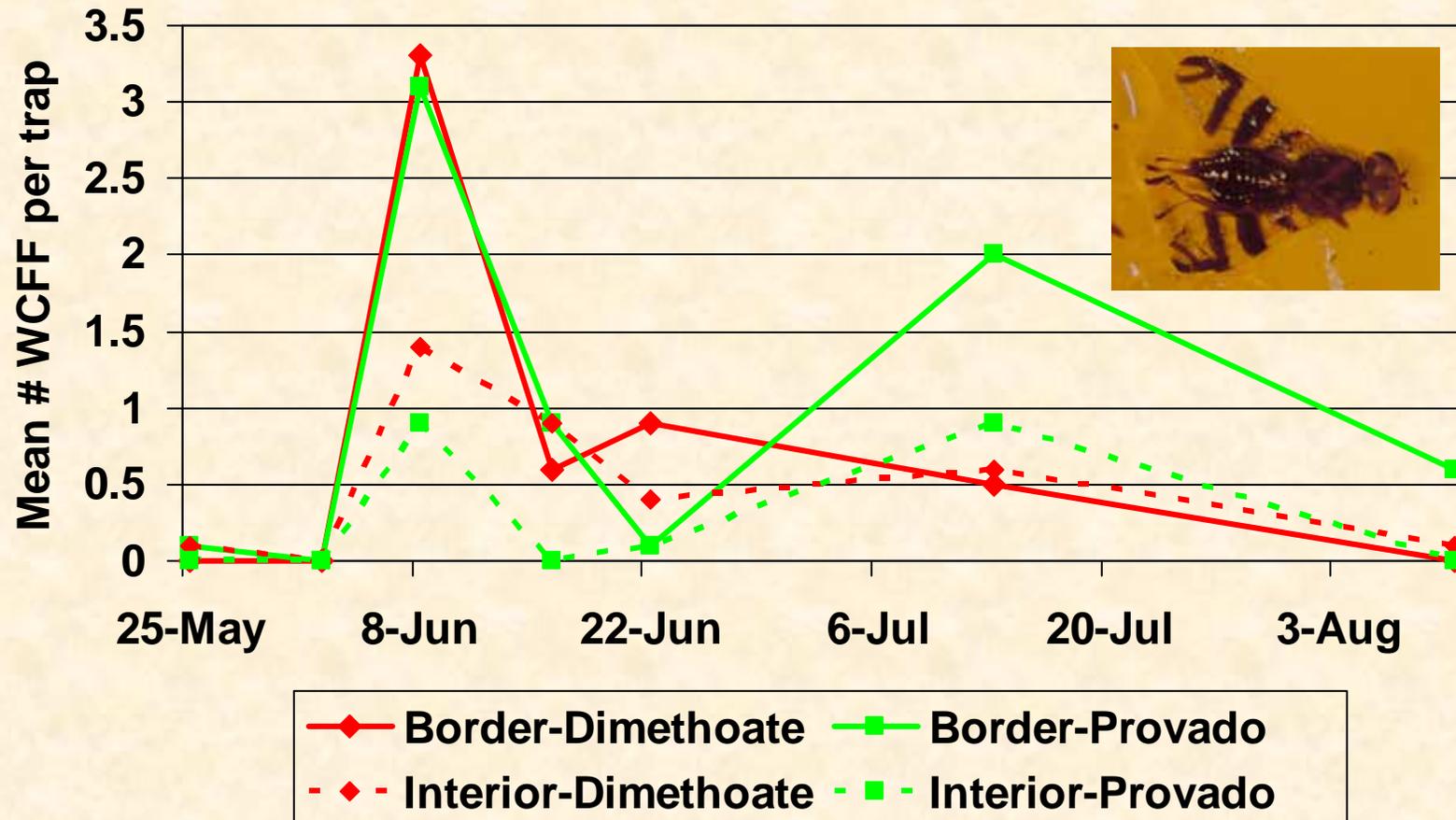
WCFF Trap Catch – All Sites



Substantial WCFF pressure at one site; low numbers at a second site
No consistent difference in adult catch among insecticide treatments
Despite adult activity at two sites, no fruit injury

Was source of WCFF a factor in trap catch counts?

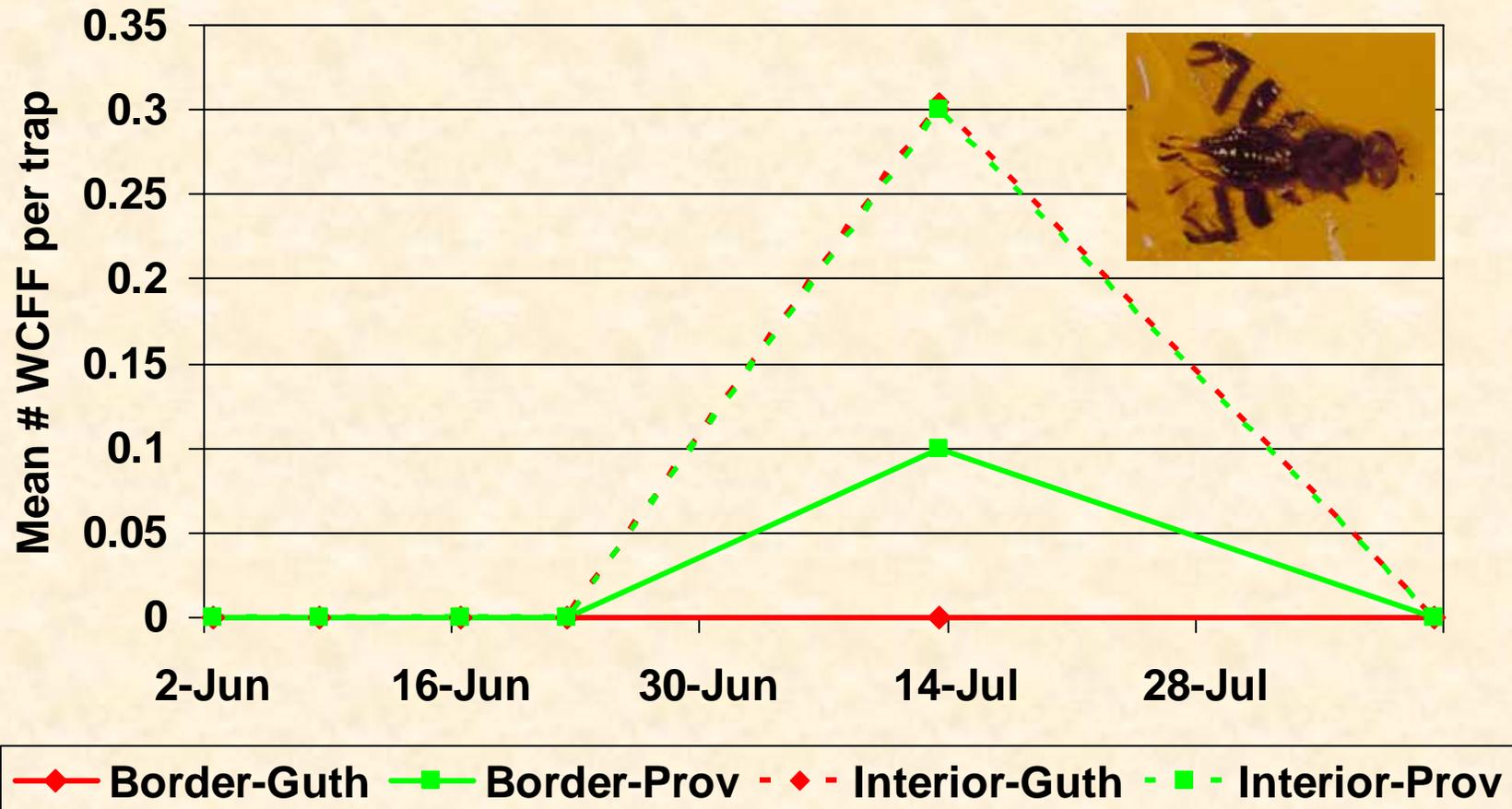
Trap Catch on Borders vs. Interiors: Payson



Trap catch generally higher on borders in both Dimethoate and Provado plots (trend for higher border catch in Provado late in the season)

Was source of WCFF a factor in trap catch counts?

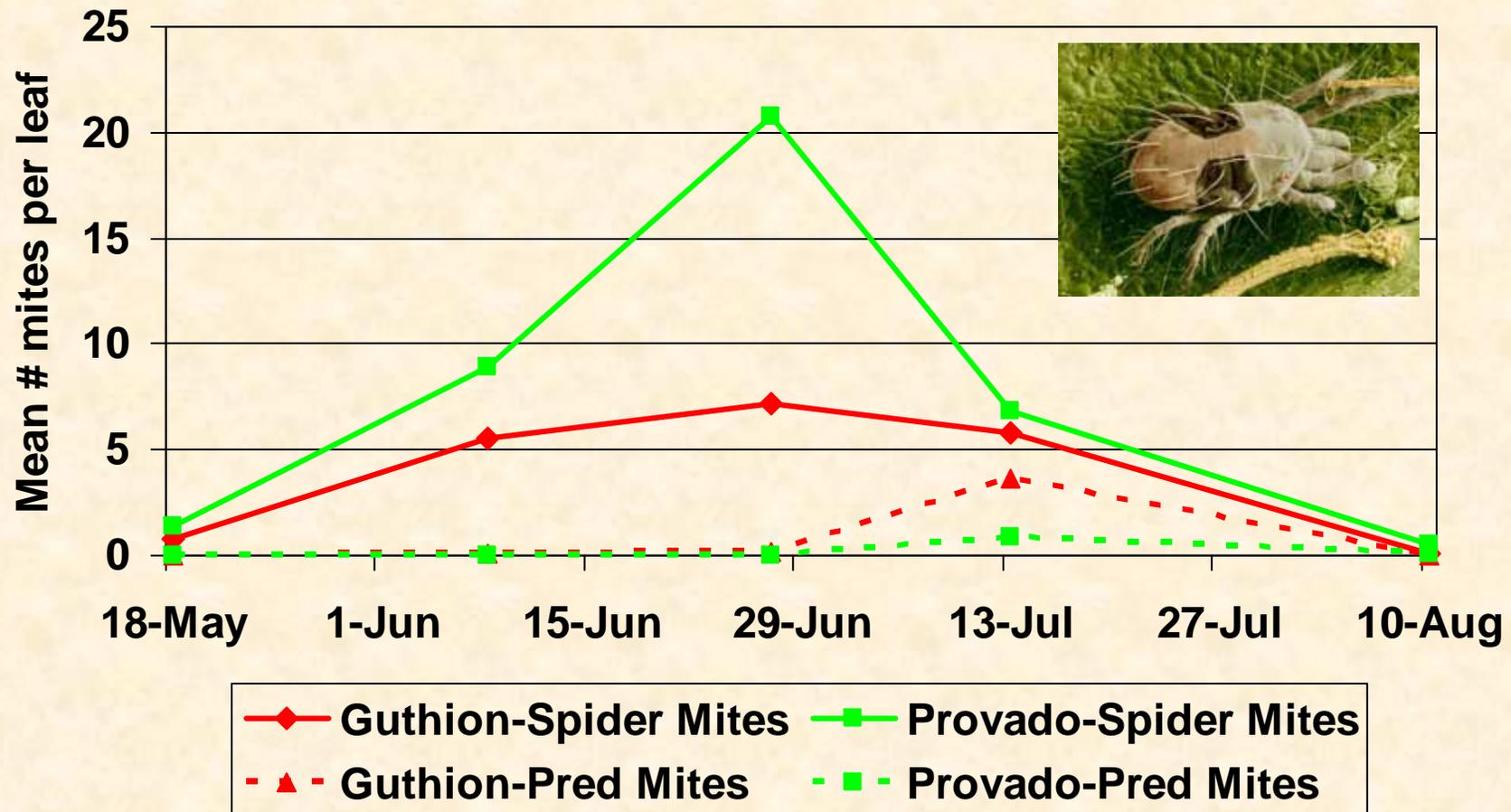
Trap Catch on Borders vs. Interiors: Genola



Trap catch higher in interiors in both Guthion and Provado plots
In 2003, 3x more WCFF caught in interiors vs. borders (12 orchards)

Did insecticides influence mite population densities?

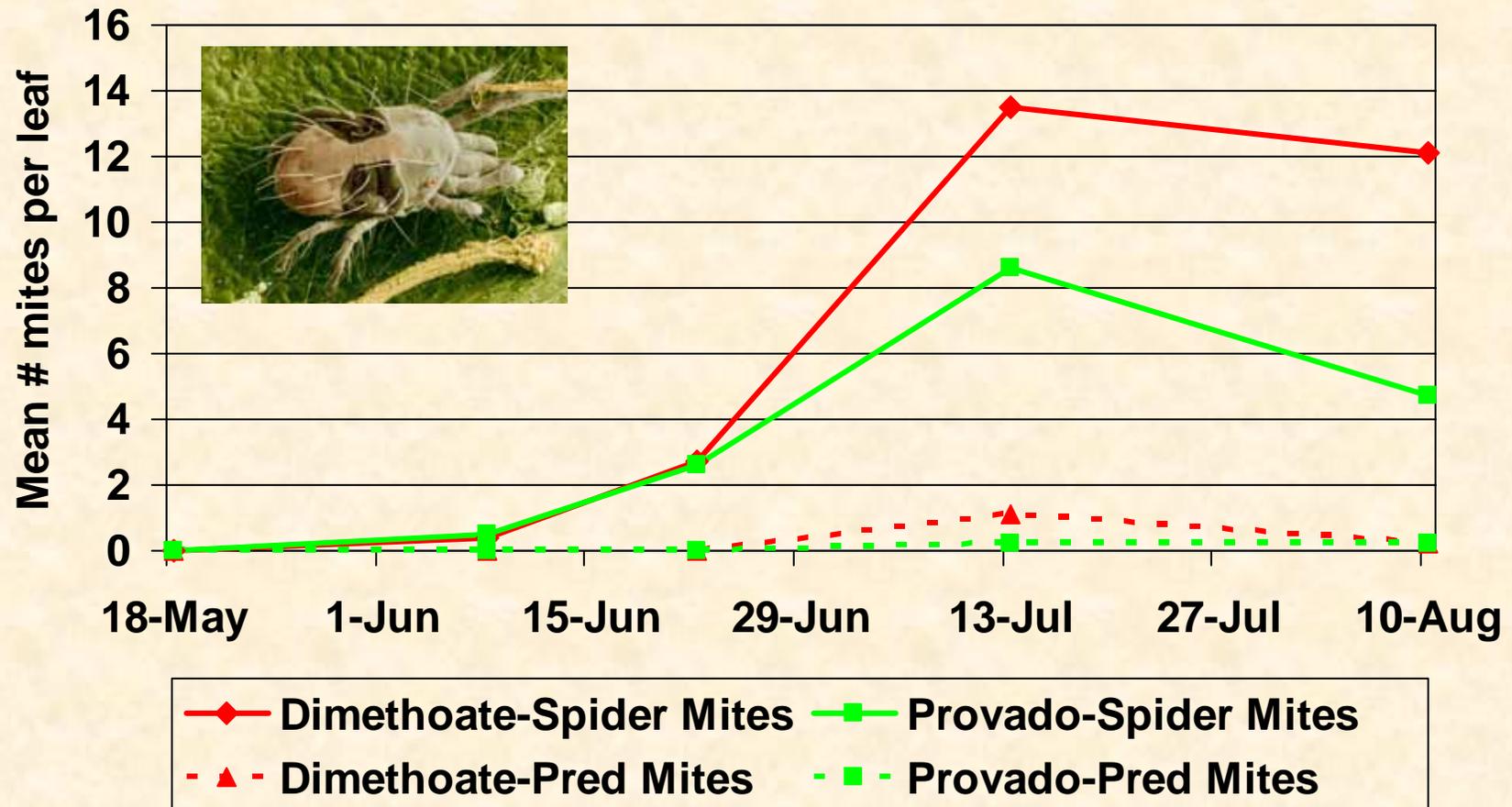
Genola – Economic mite populations



Provado increased spider mite densities vs. Guthion
Pred mites increased in mid July – too late

Did insecticides influence mite population densities?

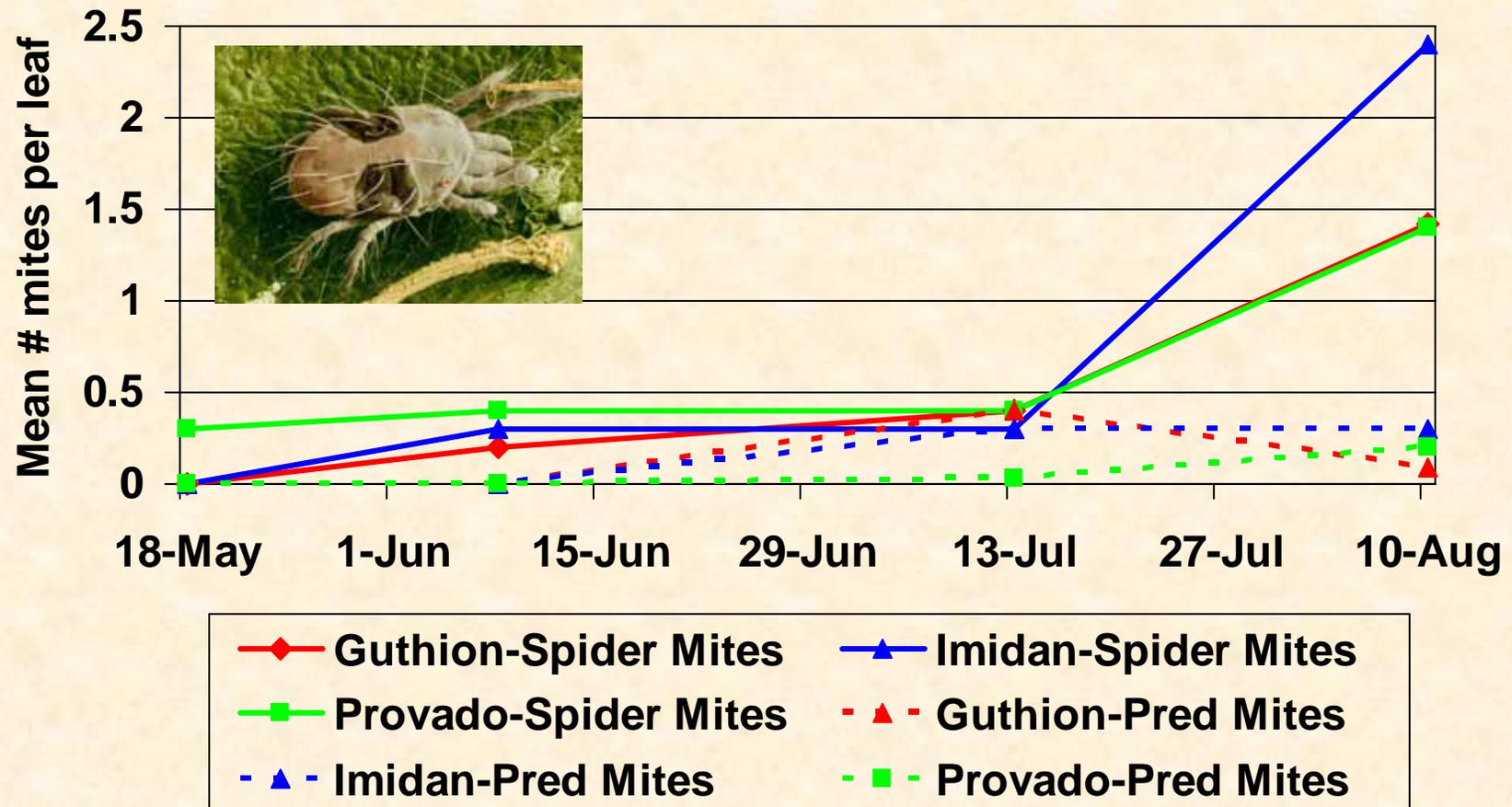
Payson – Near economic mite populations



Dimethoate increased spider mite densities vs. Provado

Did insecticides influence mite population densities?

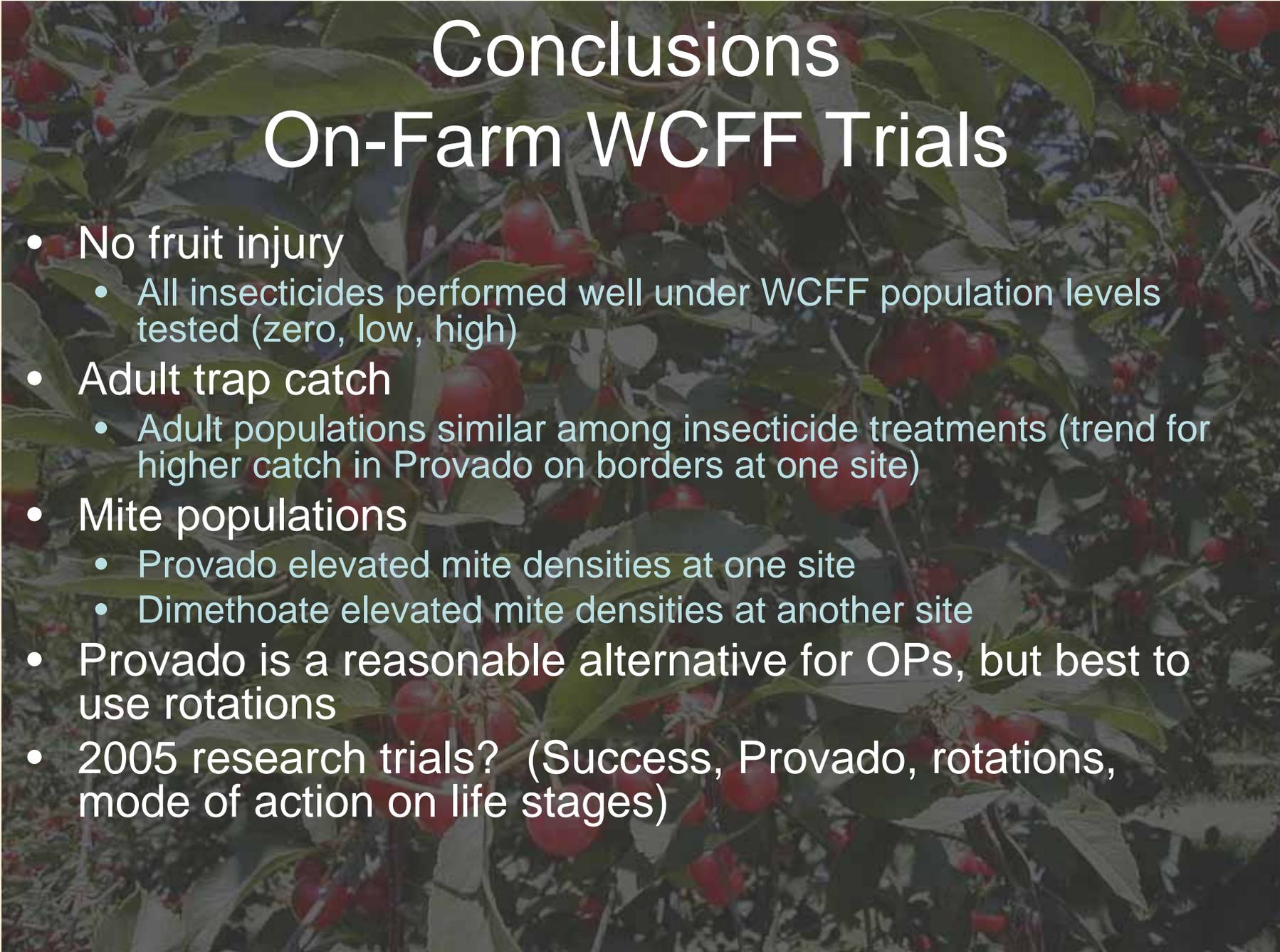
Santaquin – Well below economic mite populations



No differences among treatments

Insecticide Economics

- Provado (7 d PHI)
 - Rate: 6 oz/A Price: \$521/gal Cost: \$24/A/appl.
- Guthion 50 W solupak (15 d PHI)
 - Rate: 1.5 lb/A Price: \$10.80/lb Cost: \$16/A/appl.
- Imidan 70 W (7 d PHI)
 - Rate: 2.5 lb/A Price: \$6.85/lb Cost: \$17/A/appl.
- Dimethoate 4 EC (28 d PHI)
 - Rate: 2 pt/A Price: \$38.40/gal Cost: \$10/A/appl.
- Diazinon 4 Spray (21 d PHI)
 - Rate: 4 pt/A Price: \$28.81/gal Cost: \$14/A/appl.



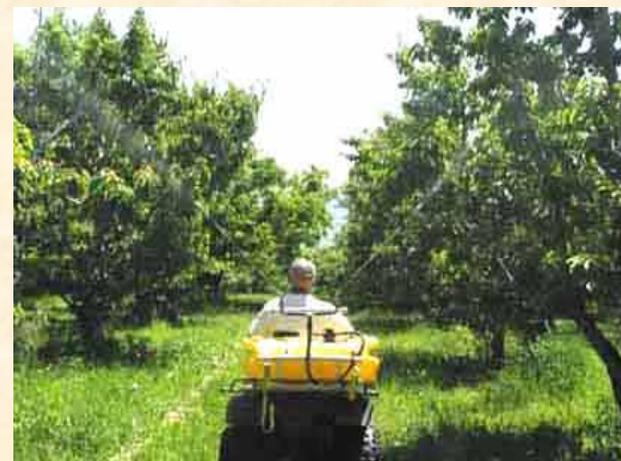
Conclusions

On-Farm WCFF Trials

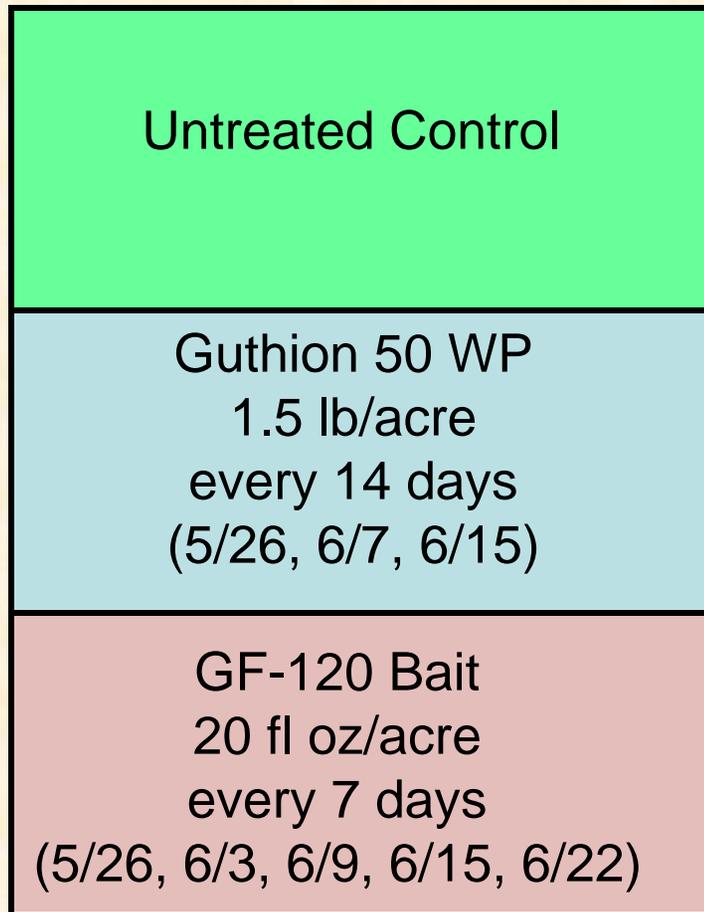
- No fruit injury
 - All insecticides performed well under WCFF population levels tested (zero, low, high)
- Adult trap catch
 - Adult populations similar among insecticide treatments (trend for higher catch in Provado on borders at one site)
- Mite populations
 - Provado elevated mite densities at one site
 - Dimethoate elevated mite densities at another site
- Provado is a reasonable alternative for OPs, but best to use rotations
- 2005 research trials? (Success, Provado, rotations, mode of action on life stages)

Control of Western Cherry Fruit Fly with Alternative Insecticides

2. Dow GF-120 NF Naturalyte Bait
 - USU Kaysville Research Farm
 - Facts about the bait:
 - Feeding attractant + 0.02% spinosad
 - Large droplets (5 mm or 0.2 inch)
 - 0-day PHI, 4-hour REI
 - 4-wheeler, 15 gal spray tank with electric pump and handgun (ca. \$250 sprayer assembly)
 - D-3 nozzles, 10-12 mph
 - 20 fl oz bait product/acre (1:5 dilution; bait:water) (\$12.80/A/appl.)
 - Applied to both sides of every row
 - Reapply every 7 days



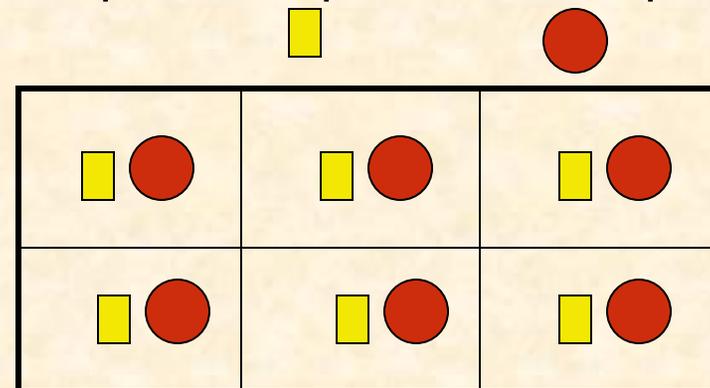
Research Trial Plots



Plot size: 0.7 acre
(9 rows x 14 trees)

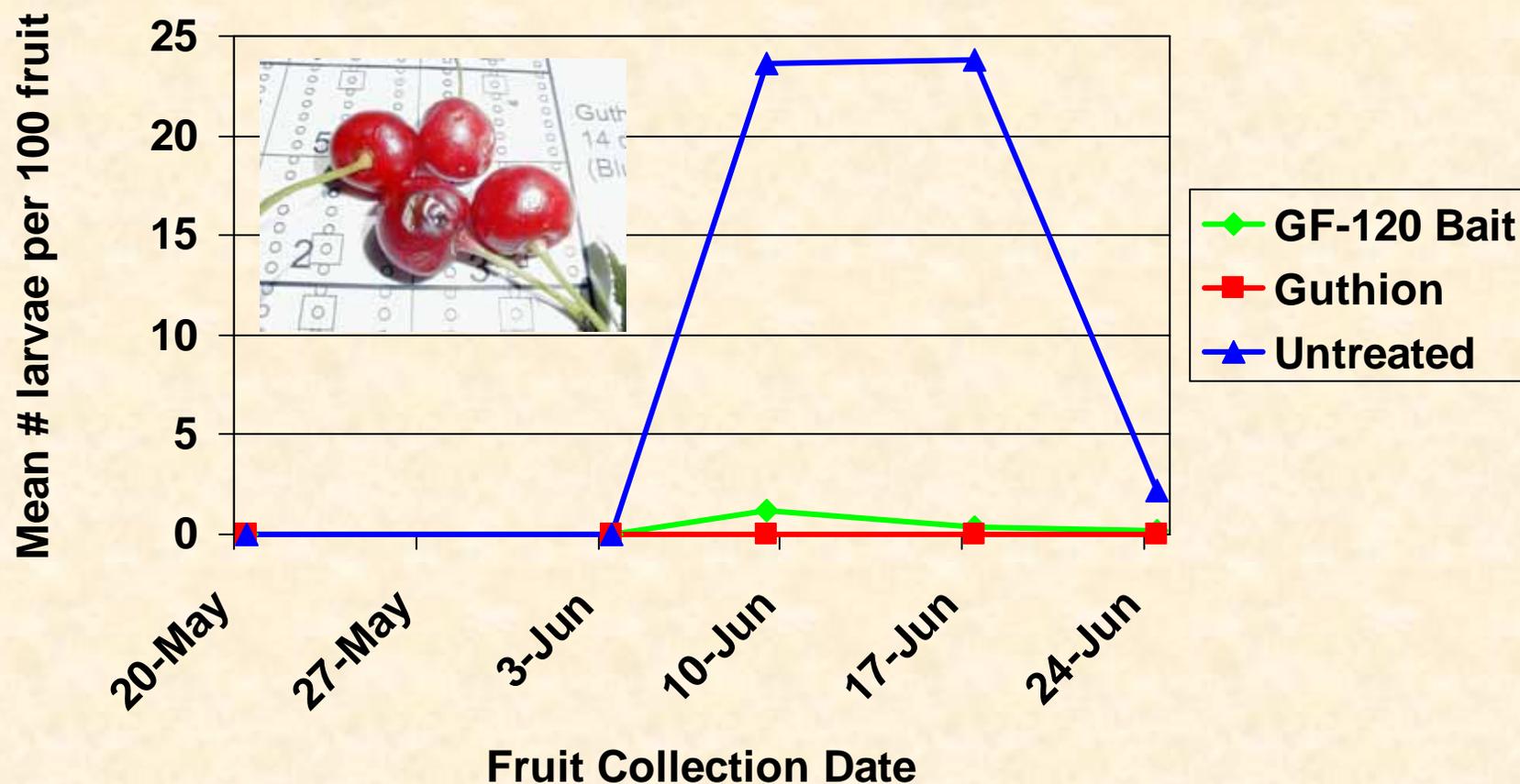
Biofix (First Fly Catch): May 17
High population pressure

Subplots: Trap & Fruit Sample



In-Season Fruit Injury

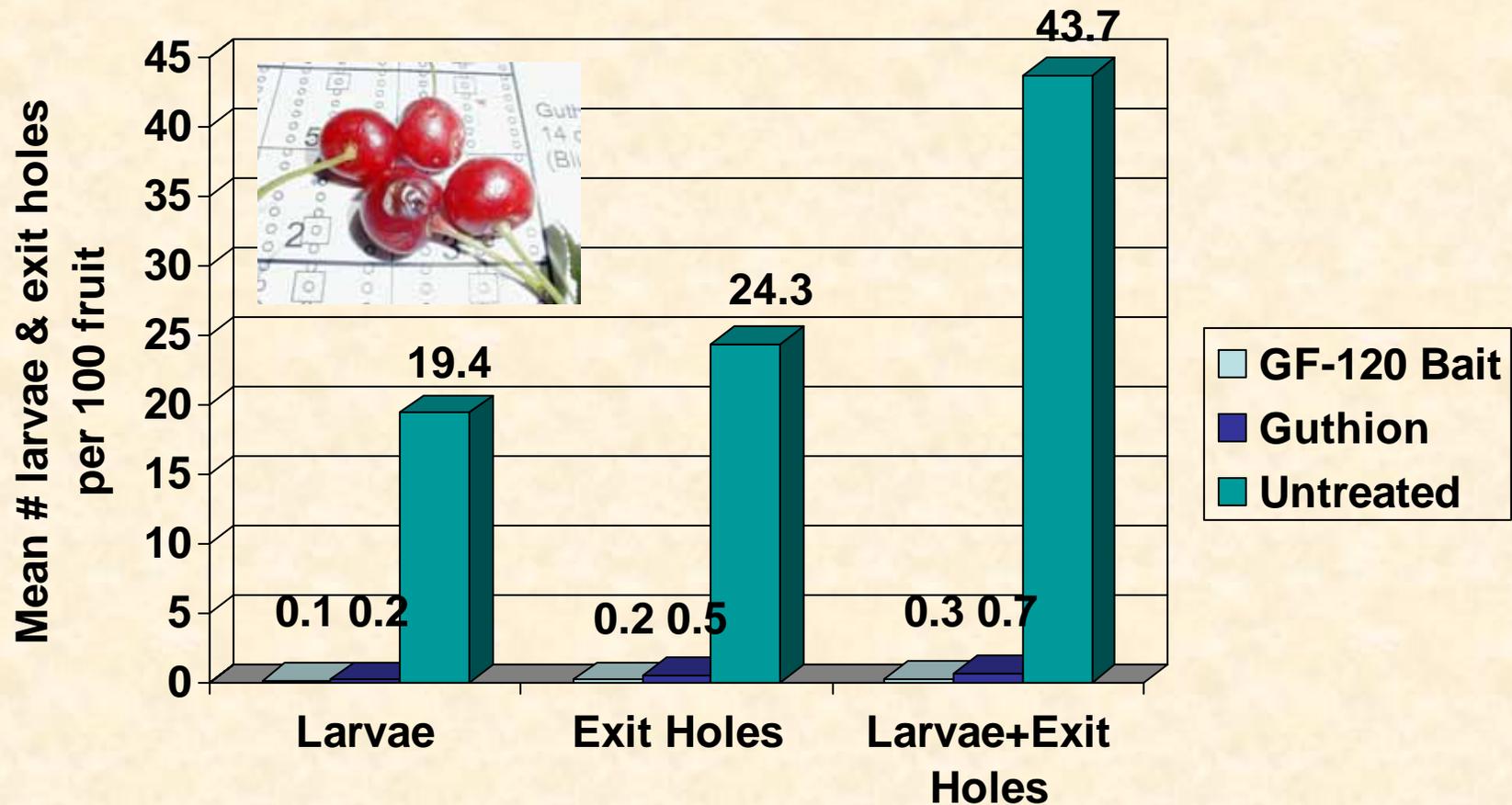
May 20 – Jun 24, 2004



High injury in Untreated (up to 24 larvae per 100 fruit)
Low injury in GF-120 Bait (0.2-1.2 larvae per 100 fruit)
No injury in Guthion

Harvest Fruit Injury

June 30, 2004

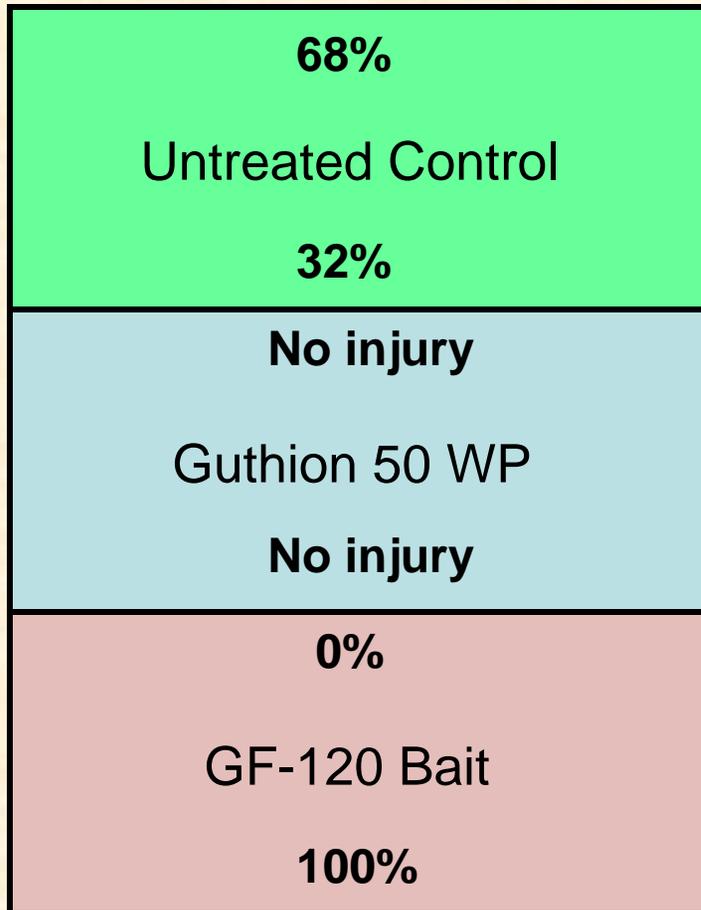


High injury in Untreated

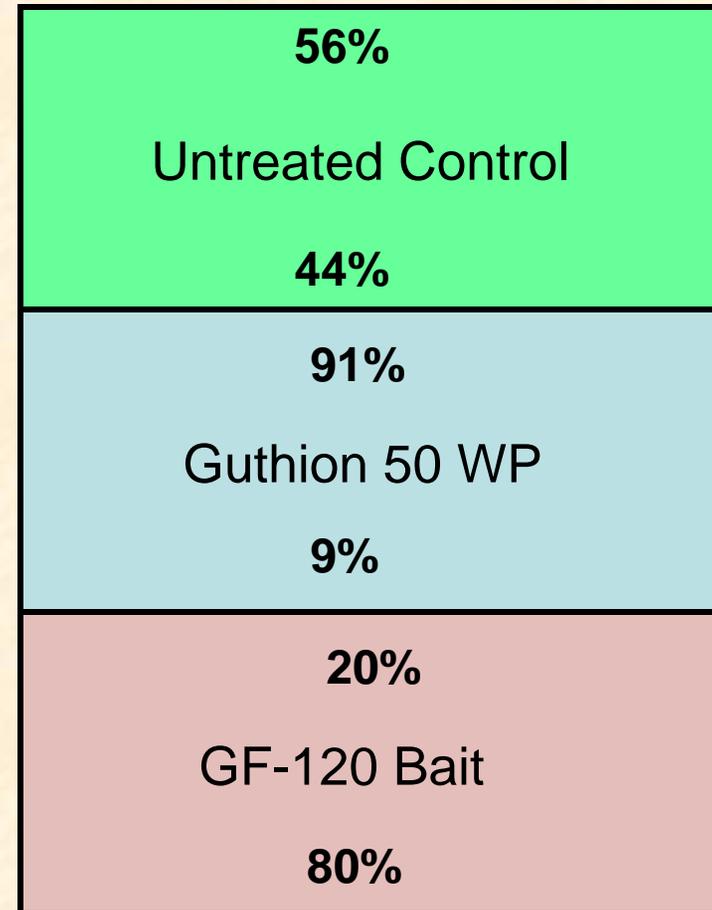
Low injury in GF-120 Bait and Guthion

Influence of fly source on fruit injury

In-Season



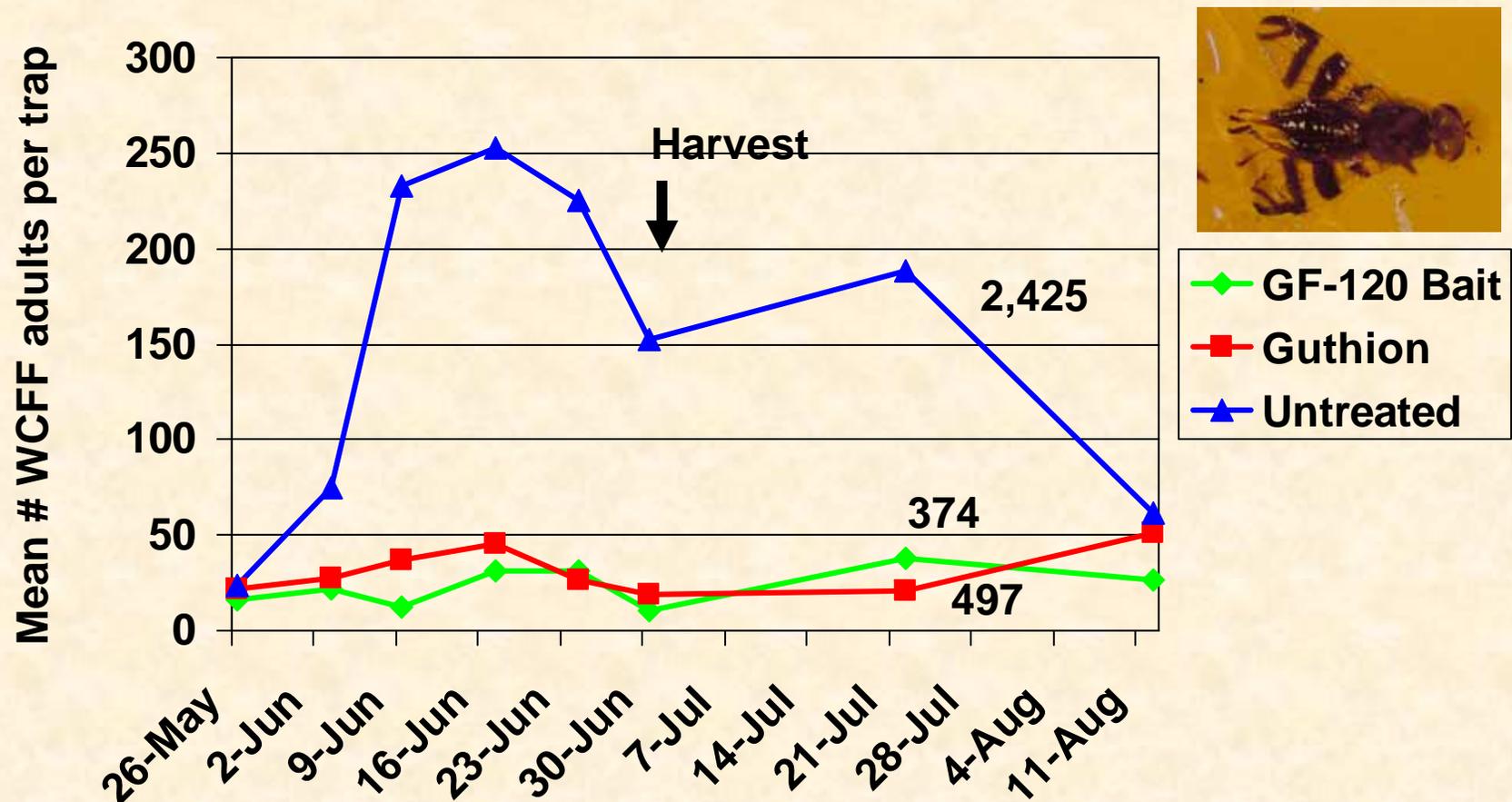
Harvest



WCFF injury came from Untreated plot and exterior sources
Low injury in Guthion plot affected adjacent plots

How did insecticides influence WCFF adult densities?

WCFF Trap Catch - Kaysville



GF-120 Bait and Guthion dramatically suppressed WCFF pops.
Guthion: 76% flies caught next to Untreated
GF-120 Bait & Guthion suppressed populations post-harvest

Conclusions

GF-120 Bait Trial

- Bait controlled WCFF as well as Guthion under high population pressure
 - In-season injury (up to ca. 1.2% vs. 0%)
 - Harvest injury (ca. 0.3% vs. 0.7%)
- Post-harvest residual control
- Promising for sites with low populations and isolation from outside sources
- Organic, safe product, concern for wash-off
- Cost: \$12.80/A/appl. X 5 appl. = \$64/A
- Quick application time (2-5 min per acre)