

Update on Insect and Mite Control



Diane Alston

Utah State University



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Acknowledge

- Thor Lindstrom
- Mike Reding
- Utah Agricultural Experiment Station, Kaysville

Topics

- Evaluation of Alternatives to Organophosphate (OP) Insecticides:
 - Codling Moth
 - Western Cherry Fruit Fly
 - Peach Twig Borer
- Spider Mite Control



Codling Moth Control

Evaluation of OP Alternatives

2002:

Calypso (Bayer; thiacloprid) - Chloronicotinyl

Novaluron (Crompton Uniroyal; chitin synthesis inhibitor) – IGR

2000:

Calypso - Chloronicotinyl

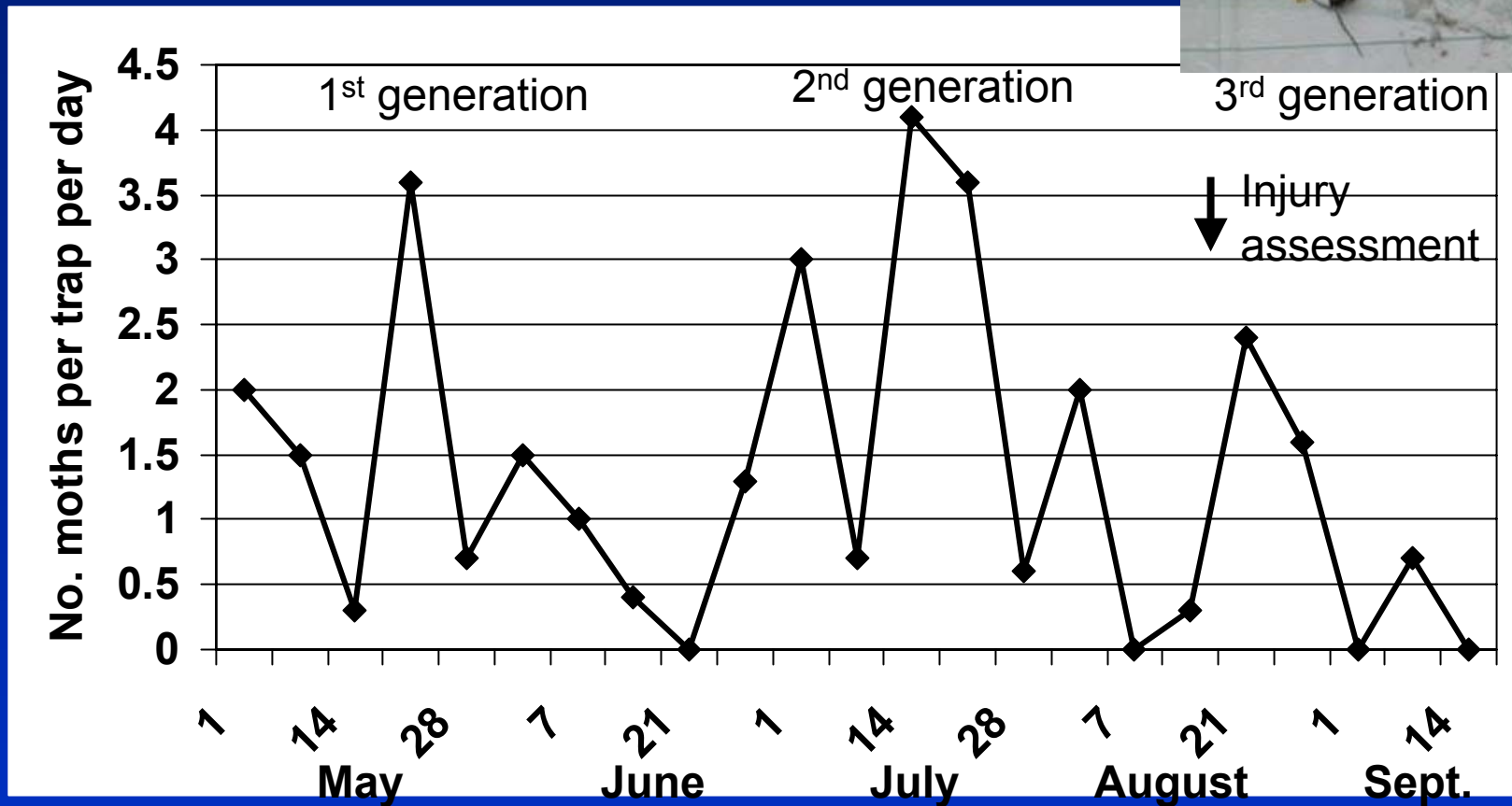
Guthion/Intrepid (Rohm & Haas; ecdysone disruptor) - IGR



2.1 acre mixed cultivar apple orchard,
Kaysville Farm

Small plots: 3 rows x 4-7 trees

Pheromone trap captures of male codling moth Kaysville, 2002



Guthion susceptible population

Treatments - 2002

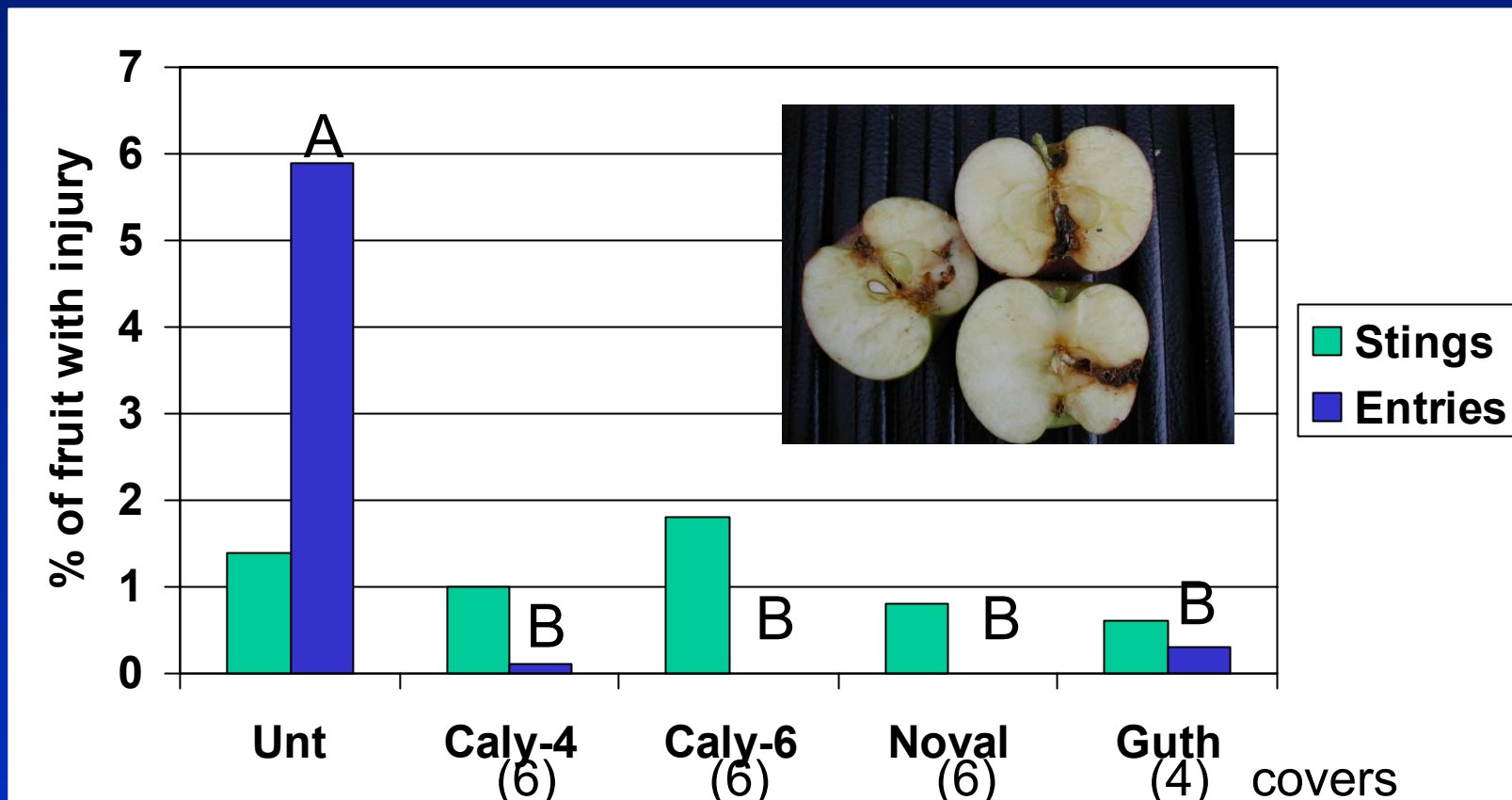
- Untreated

- Calypso 4SC (4 oz/A)] 3 covers/gen. – 250 DD
- Calypso 4SC (6 oz/A)] & 14 d interval
- May 30, Jun 13 & 17
- Jul 15 & 29, Aug 12

- Novaluron 7.5 WG (71 oz/A)] 3 covers/gen. – 50 DD
- & 14 d interval
- May 9 & 30, Jun 13
- Jul 9 & 20, Aug 7

- Guthion 50WP (2 lb/A)] 2 covers/gen. – 250 DD
- & 21 d interval
- May 30, Jun 20
- Jul 15, Aug 7

2nd Gen. Fruit Injury – Aug 21, 2002

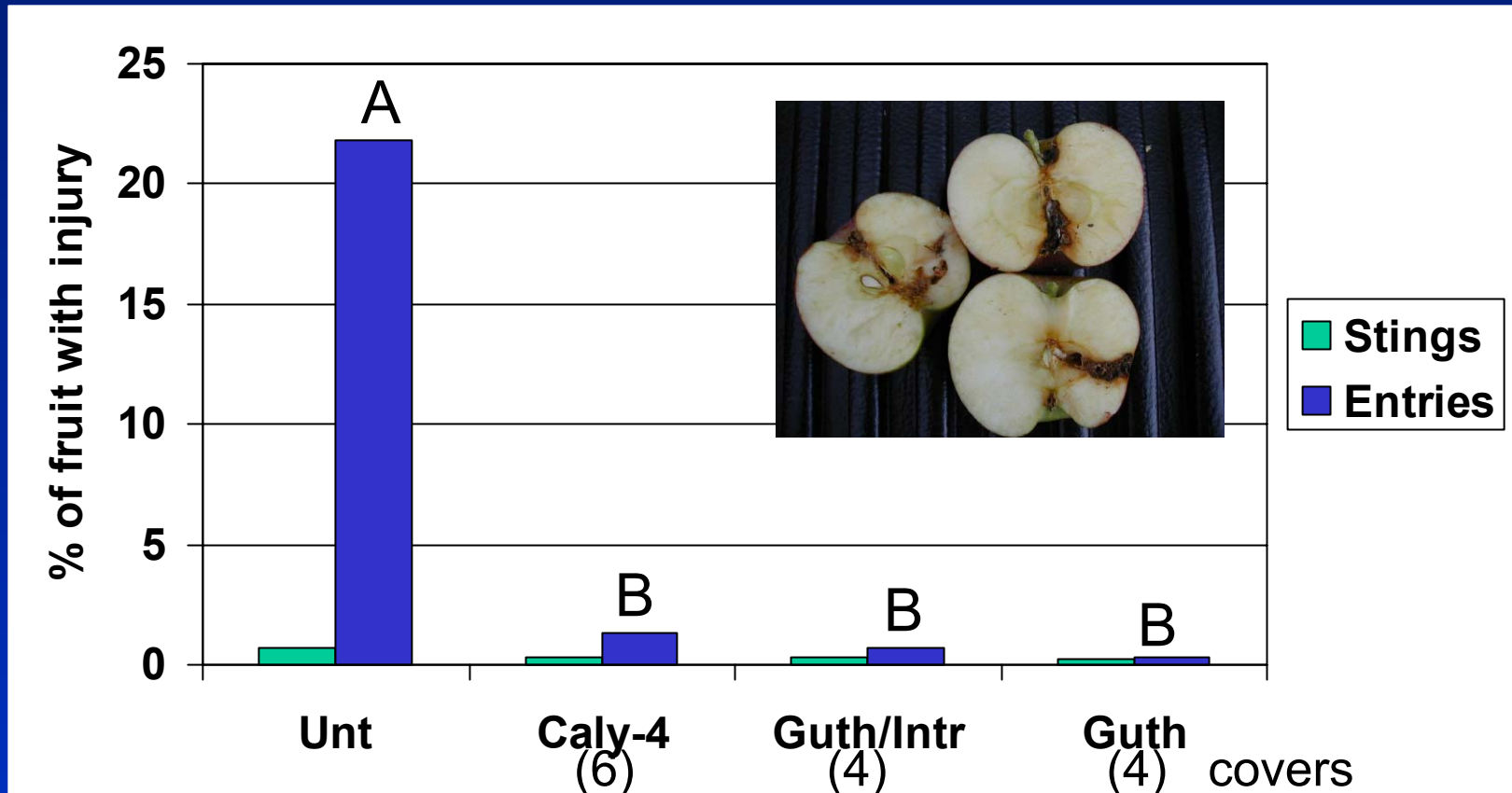


800 fruit evaluated per treatment
NS diff. among cultivars

Treatments - 2000

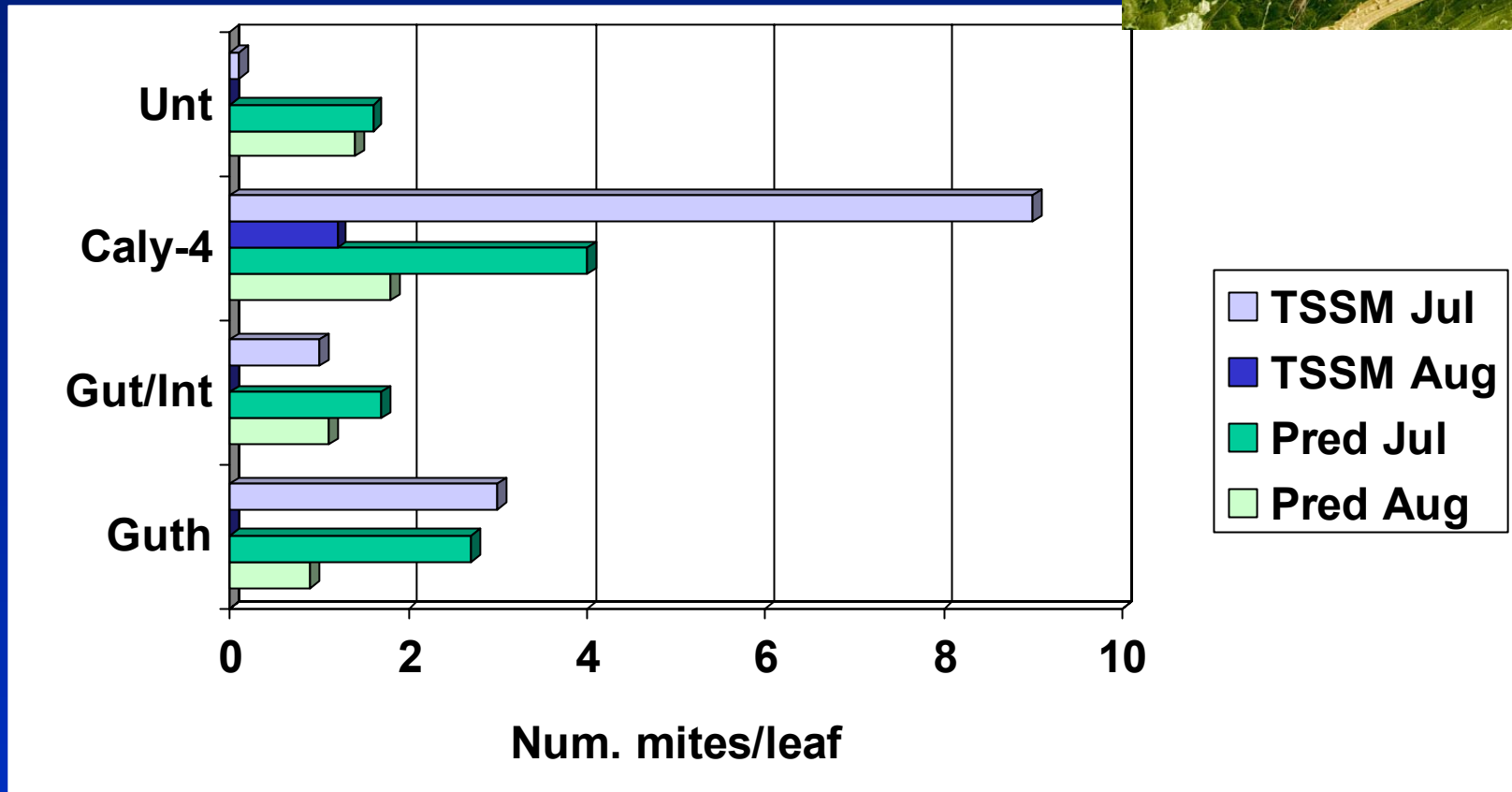
- Untreated
 - 3 covers/gen. – 250 DD
- Calypso 4F (4 oz/A)] & 14 d interval
 - May 26, Jun 10 & 22
 - Jul 13 & 27, Aug 9
- Guthion 50WP (2 lb/A)] 2 covers/gen. – 250 DD
 - rotated with Intrepid 2F (16 oz/A)] & 21 d interval
 - Guthion: May 26, Jul 13
 - Intrepid: Jun 16, Aug 3
- Guthion 50WP (2 lb/A)] 2 covers/gen. – 250 DD
 - & 21 d interval
 - May 26, Jun 16
 - Jul 13, Aug 3

2nd Gen. Fruit Injury – Aug 30 & Sep 12, 2000



2,700-3,000 fruit evaluated per treatment
Gala, Jonathan & Mutzu > Red Delicious

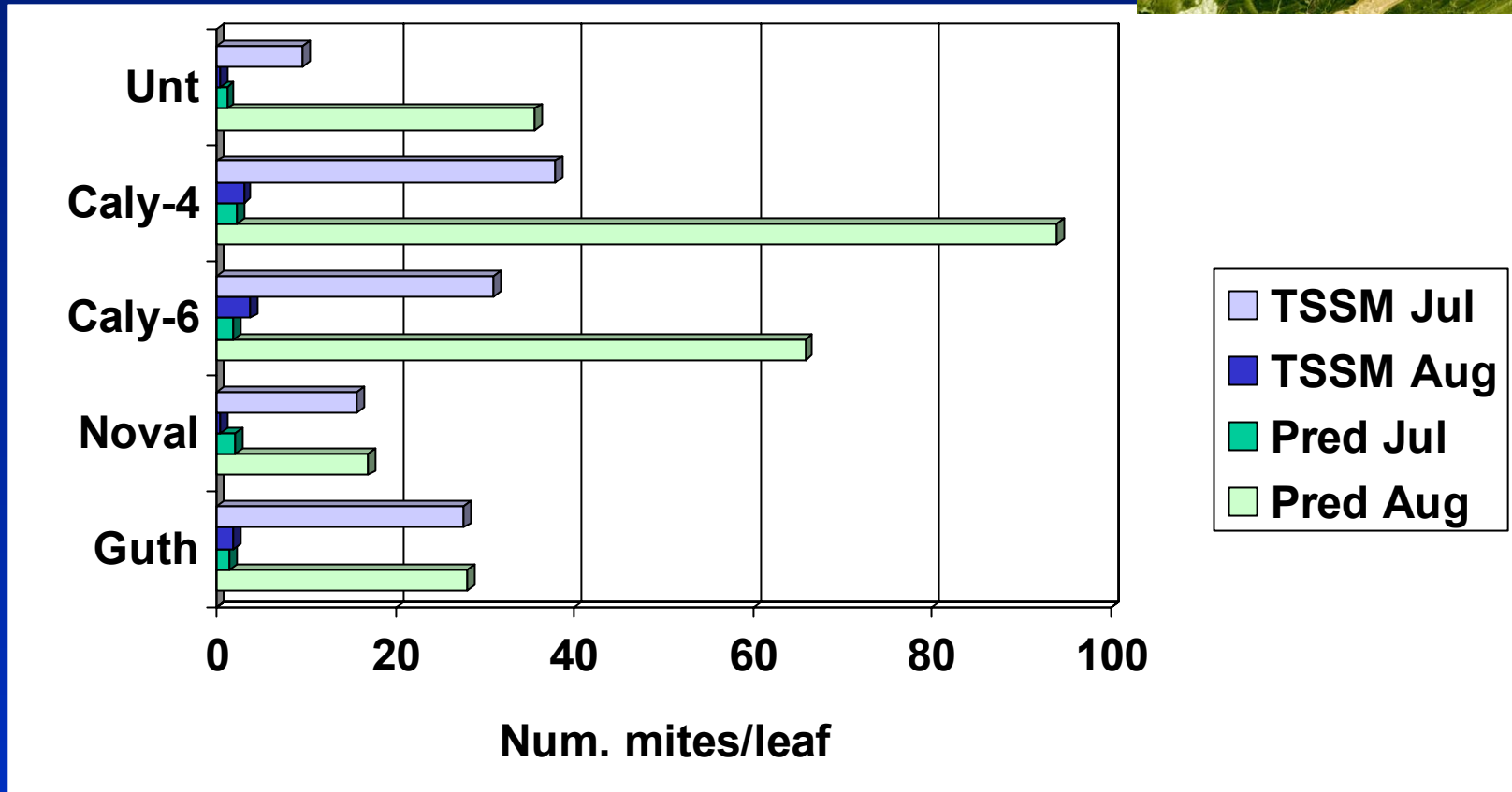
Effects on Mites - 2000



TSSM: Calypso > Others

Pred: NS

Effects on Mites - 2002



TSSM: NS

Pred: Calypso > Others

Demonstration of Codling Moth Control Guthion/Intrepid Rotation 2nd Gen. % Fruit Injury

Year	Crop	Cultivar	Stings	Entries
2001	Apple	Gala	3.0	1.0
		Jonathan	0	2.0
		Mutzu	1.0	1.0
		Pr Gold	0.9	0
		Idared	0	0
		Red Del	1.0	0.7
2002	Pear	G. Bartlett	9.0	0

Entire orchards treated (apple: 2 acres; pear: 1 acre)

Summary of OP Alternatives for Codling Moth

- Mating Disruption
- Registered Insecticides (in combination with MD or other materials or for low to moderate CM pressure):
 - Assail 70WP – Chloronicotinyl – contact and ingestion, 12 h REI
 - Avaunt – Oxadiazine – ingestion, some translaminar, 12 REI
 - Intrepid 2F – IGR – target egg-laying, 4 h REI
 - Danitol 2.4EC – Pyrethroid – low rates and cost, disruptive to natural enemies, 24 h REI
 - Dimilin 2L – IGR (pear only) – target egg-laying, 12 h REI

Summary of OP Alternatives for Codling Moth

- Unregistered Insecticides (under development)
 - Calypso 4SC – Chloronicotinyl, contact & ingestion – concern for mite stimulation
 - Novaluron 7.5 WG – IGR, target egg-laying



Future of Guthion

- Bayer is reducing registration to 5 crops:
 - Apple
 - Pear
 - Cherry
 - Peach
 - Almond
- Will pursue registrations beyond 2005

Western Cherry Fruit Fly

Evaluation of OP Alternatives



Western Cherry Fruit Fly Control Evaluation of OP Alternatives

Insecticide	% fruit injury at harvest		
	2000	2001	2002
Provado 1.6 F*	0 B	0 C	0.001 B
Calypso 4F*	0 B	0.08 B	---
Success*	0 B	---	---
Guthion 50WP /Sevin XLR ⁺	0 B	0 C	0 B
Untreated	0.33 A	2.75 A	94.1 A
<i>P</i> > <i>F</i>	<0.0001	<0.0001	<0.0001

*Reapplied every 14 d for 3 applications

⁺Reapplied every 14 d; 2 appl. Guthion & 1 appl. Sevin

Alternatives to OPs for Western Cherry Fruit Fly

- Registered:
 - Success (spinosad) – 7-10 d interval
 - Sevin (carbaryl) – 7-10 d interval
- Unregistered:
 - Provado (imidacloprid) – 14 d interval
 - Assail (acetamiprid) – reg. on apple/pear
 - Efficacy on apple maggot (AM)
 - Spinosad bait – AM, WHF



Peach Twig Borer

Control of Over Wintered and Summer Generations with Success (spinosad)



Peach Twig Borer Summer Control

Insecticide	% fruit injury at harvest	
	2000*	2001 ⁺
Success 6 fl oz/acre	0.6 B	0
Thiodan 50WP 4 lb/acre Guthion 50WP 2 lb/acre	0 B	---
Untreated	9.1 A	---
<i>P</i> > <i>F</i>	0.006	---

*Jun 12 & Jul 27

⁺Jun 15 & Jul 31

Peach Twig Borer Full-Season Control - 2002

Insecticide	Appl. Date	% flagged shoots	% fruit injury	% cat-facing injury
Success*	Apr 23 ⁺	0	0	1.1
	Jun 20			
	Jul 29			
Oil+Lorsban	Apr 5 ⁼	0	0	0.5
Success*	Jun 20			
	Jul 29			

*6 fl oz/acre

⁺bloom (>60F)

⁼calyx gr-first pk

Spider Mite Control in Apple and Tart Cherry - 2002



Different Mite Systems



Apple

Apple rust mite



Tart Cherry

Acramite (bifenazate; Uniroyal)
Oils

All treatments applied Jul 17 (oils: Jul 23)

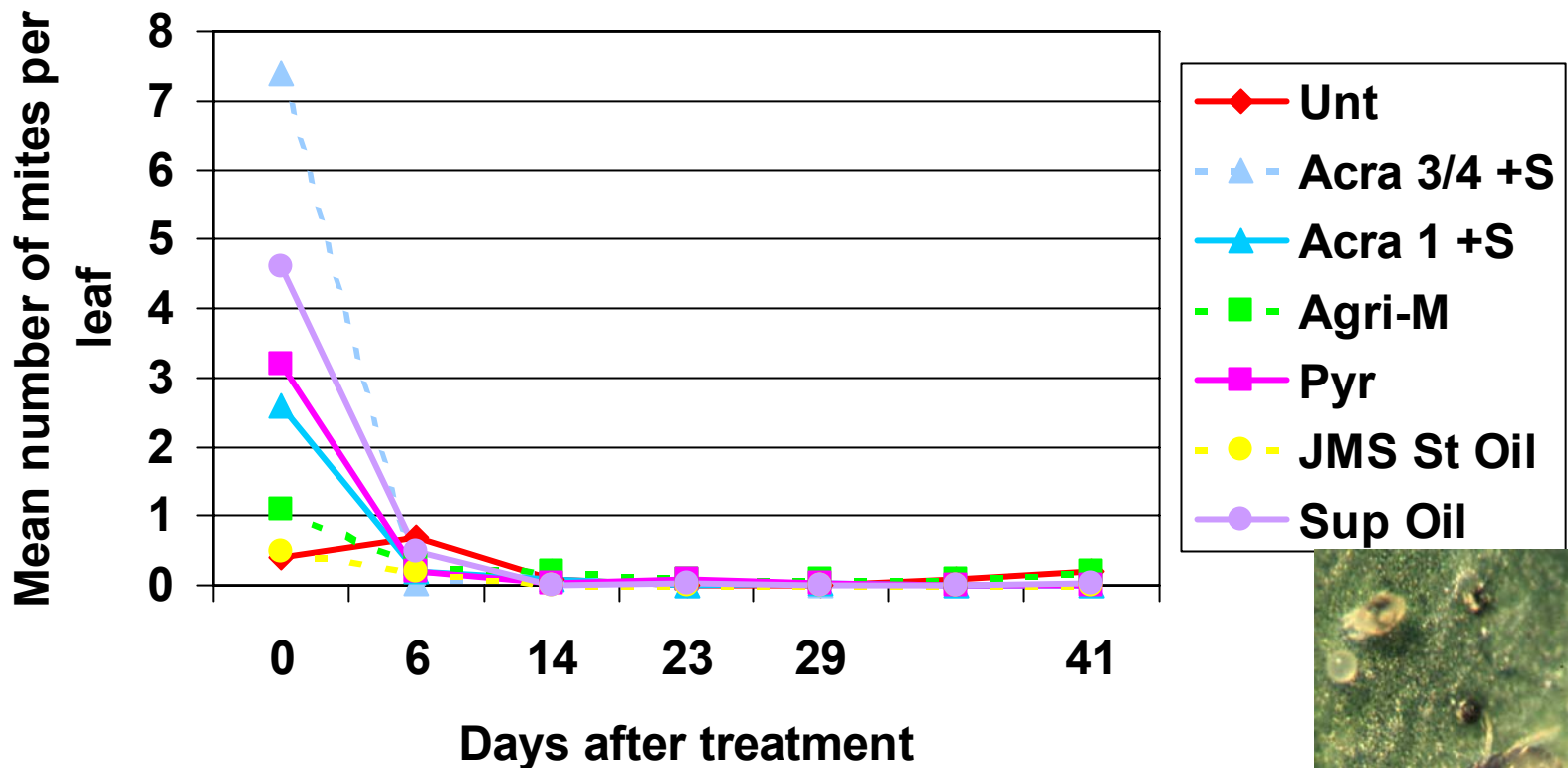
Single-tree plots: 7 trts. X 4 reps. = 28 plots

Apple Treatments

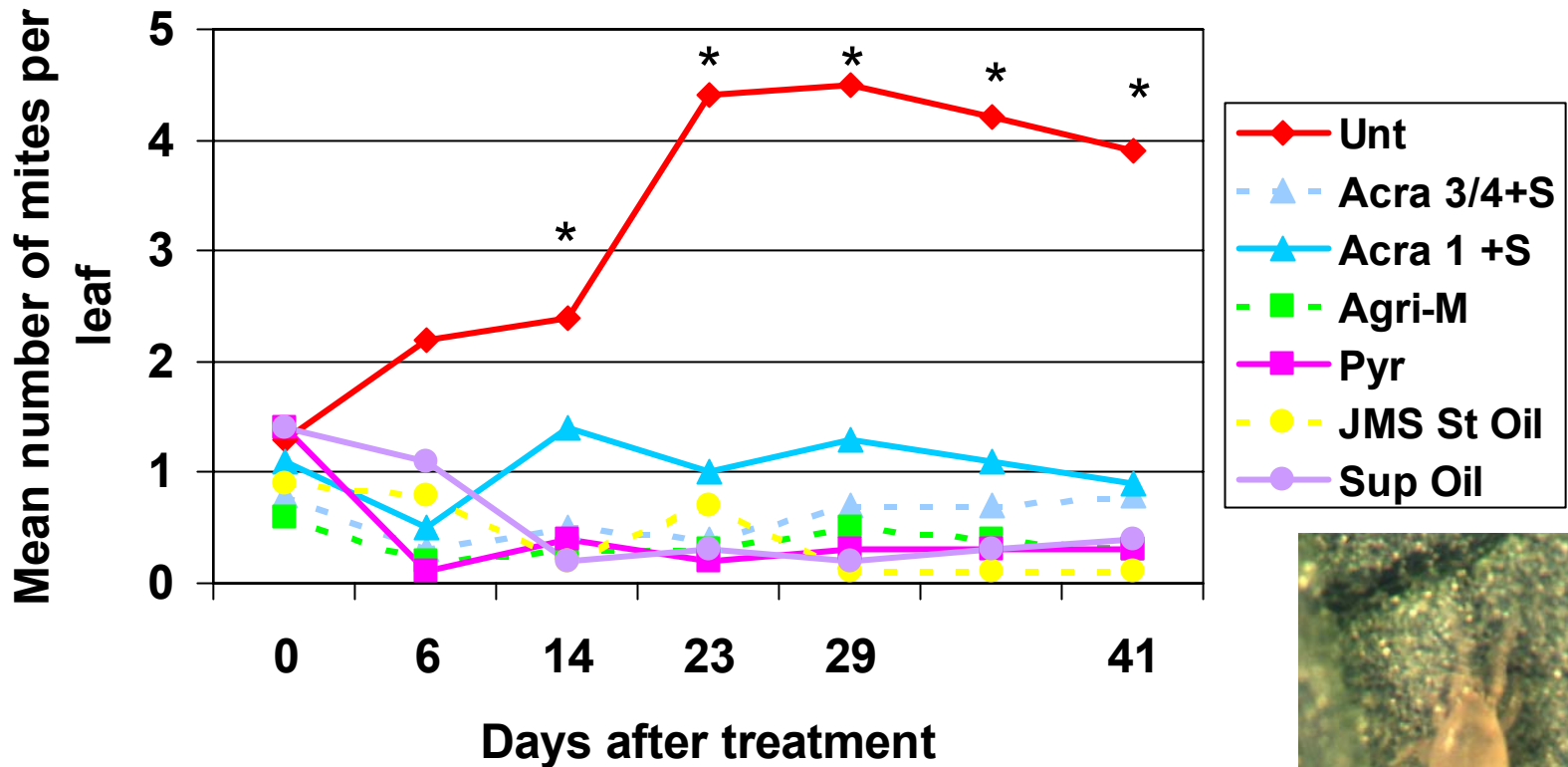
- Untreated
- Acramite 50W (0.75 lb/A) + Silwett L-77
- Acramite 50W (1 lb/A) + Silwett L-77
- Agri-Mek 0.15EC (16 oz/A) + 0.25% oil
- Pyramite 60W (10 oz/A)
- JMS Stylet Oil (1.5%) – 2 appl.
- Supreme Oil (1.5%) – 2 appl.



Apple - Phytophagous mites (TSSM, ERM, BM) per leaf



Apple - Predaceous mites (*Typhlodromus* + *Zetzellia*) per leaf



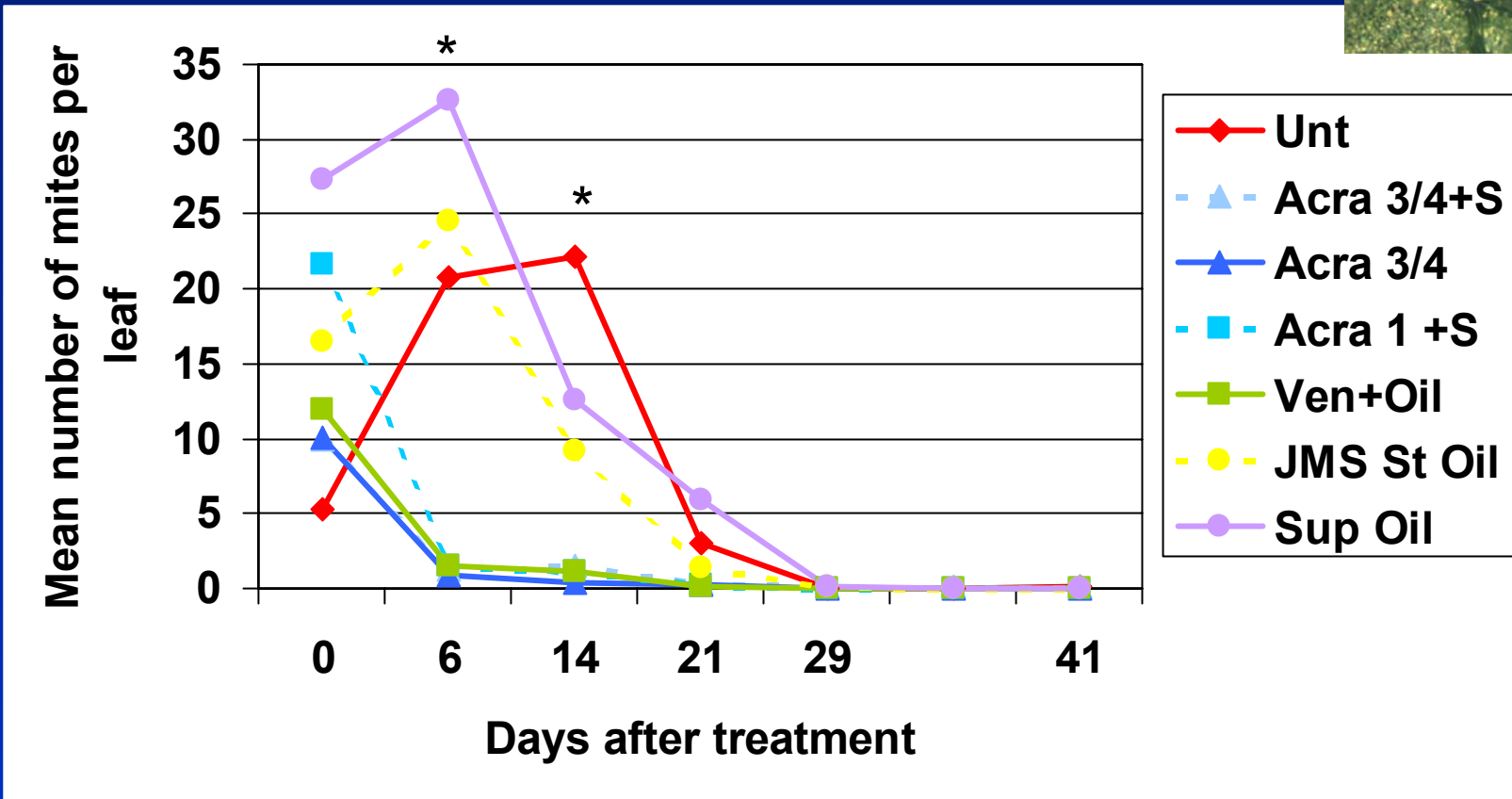
*Indicates a significant difference between treatments on these dates

Tart Cherry Treatments

- Untreated
- Acramite 50W (0.75 lb/A) + Silwett L-77
- Acramite 50W (0.75 lb/A)
- Acramite 50W (1 lb/A) + Silwett L-77
- Vendex 50W (2 lb/A) + 0.25% oil
- JMS Stylet Oil (1.5%) – 2 appl.
- Supreme Oil (1.5%) – 2 appl.

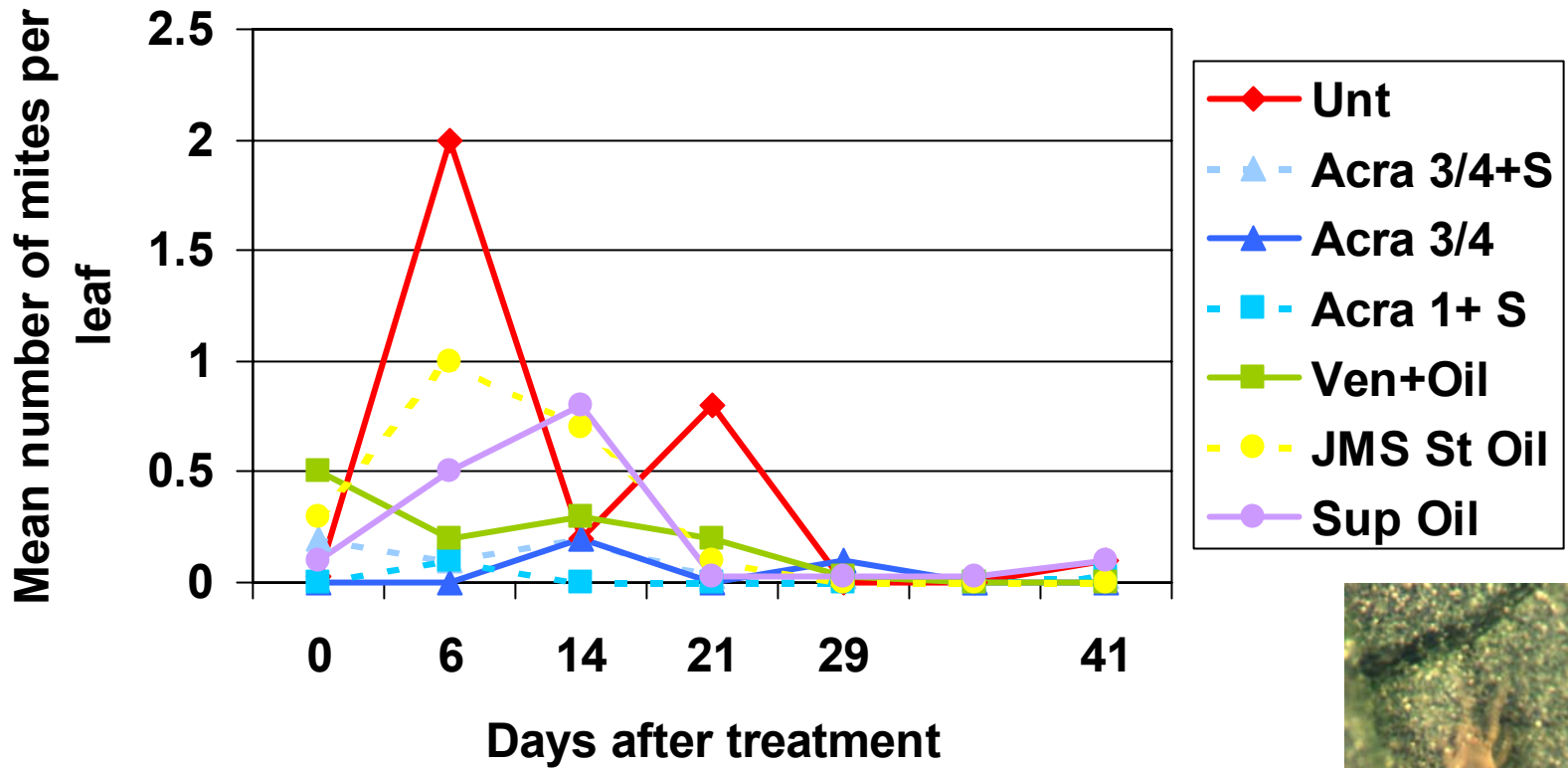


Tart Cherry - Phytophagous mites (TSSM) per leaf



*Indicates a significant difference between treatments on these dates

Tart Cherry - Predaceous mites (*Typhlodromus*) per leaf



Conclusions

- **Apple:** NS – Biocontrol in Untrt plots was as good as acaricides, but SM densities were low (<8/leaf)
- **Tart Cherry:** Sig. – For 14 DAT, Acramite (3/4 & 1lb/A) & Vendex+oil < JMS Stylet oil & Supreme oil < Untrt; SM densities were high (5-32/leaf)
- **Pred Mites:** All acaricides lowered pred. mite densities; low availability of prey
Untrt>Oils>Acramite>Others

How Do You Move to Non-OP Based Insect Control?

- On-Farm Trials
 - Begin small and work up
 - Gain experience under different conditions
- Learn About New Materials
 - Pest pressure important
- Multi-Faceted Systems

