Biology and Management of Avocado Thrips

Mark S. Hoddle,

Dept. of Entomology,

University of California, Riverside

Avocado Thrips, *Scirtothrips perseae* Nakahara (Thysanoptera: Thripidae)

- First discovered in CA in 1996 near Port Hueneme in Ventura Co.
- Similar to specimens found on smuggled avocados from Oaxaca at the Port of San Diego in 1971
- Undescribed species when first discovered. Officially named in 1997
- Appears to be monophagous in CA and native to Mexico & Guatemala

Avocado Thrips Feeding Damage

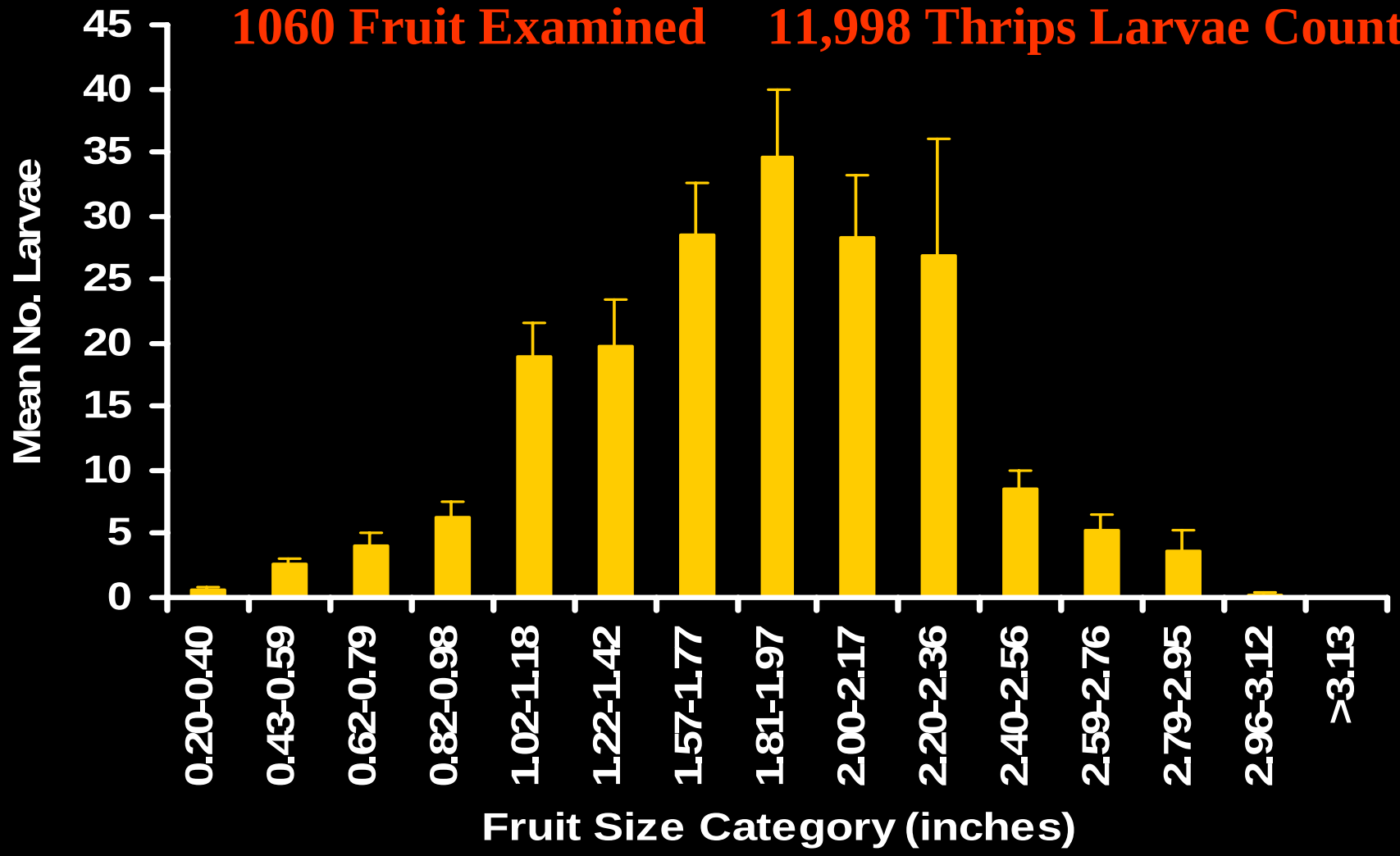
Leaf scarring

“Alligator Skin”
on small fruit

Elongate scarring
on maturing fruit

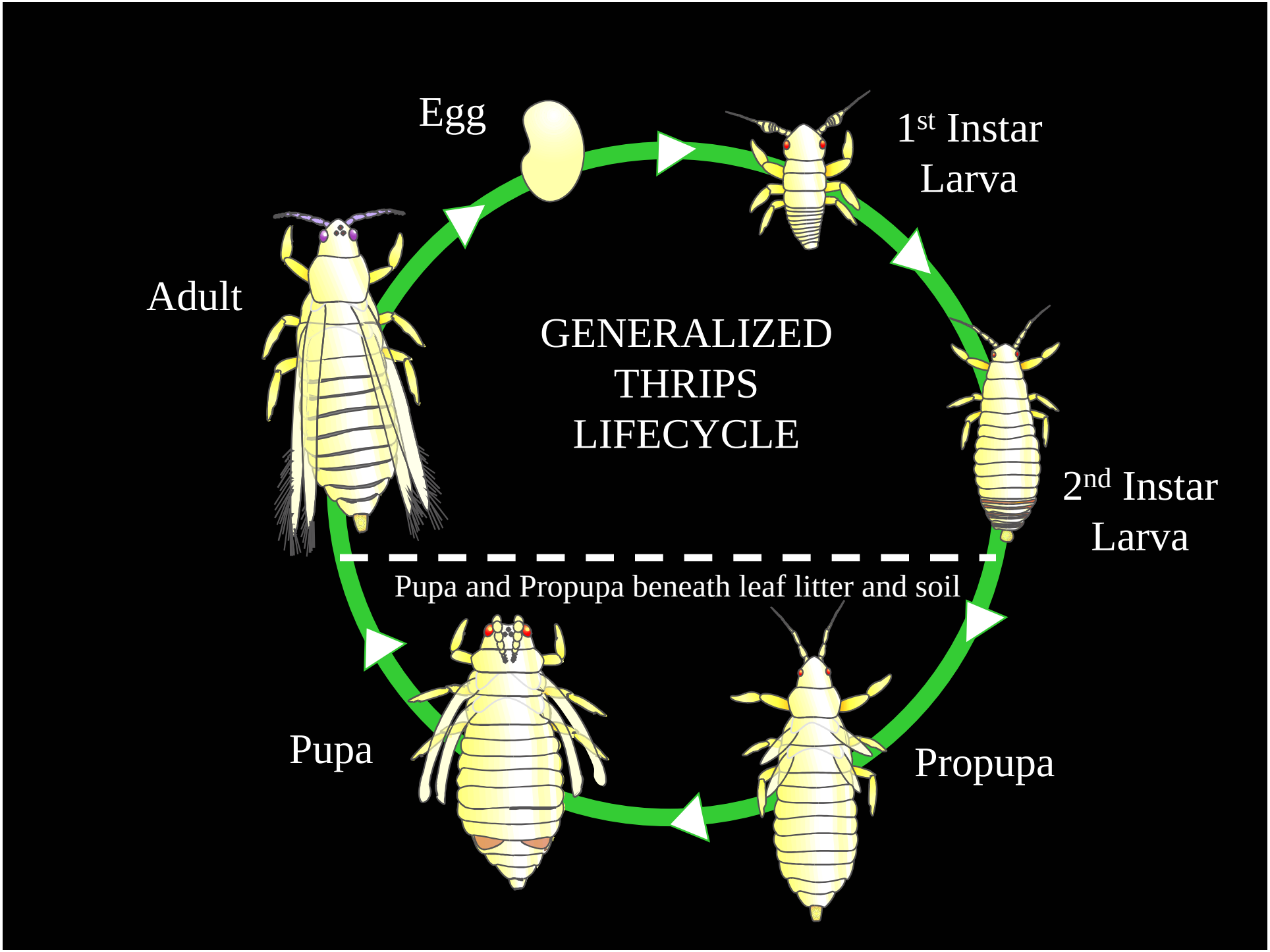
Distribution of Avocado Thrips (*Scirtothrips perseae*) in Central America

Mean No. Avocado Thrips Larvae Emerging in Each Fruit Size Category



Mulches for Avocado Thrips Control

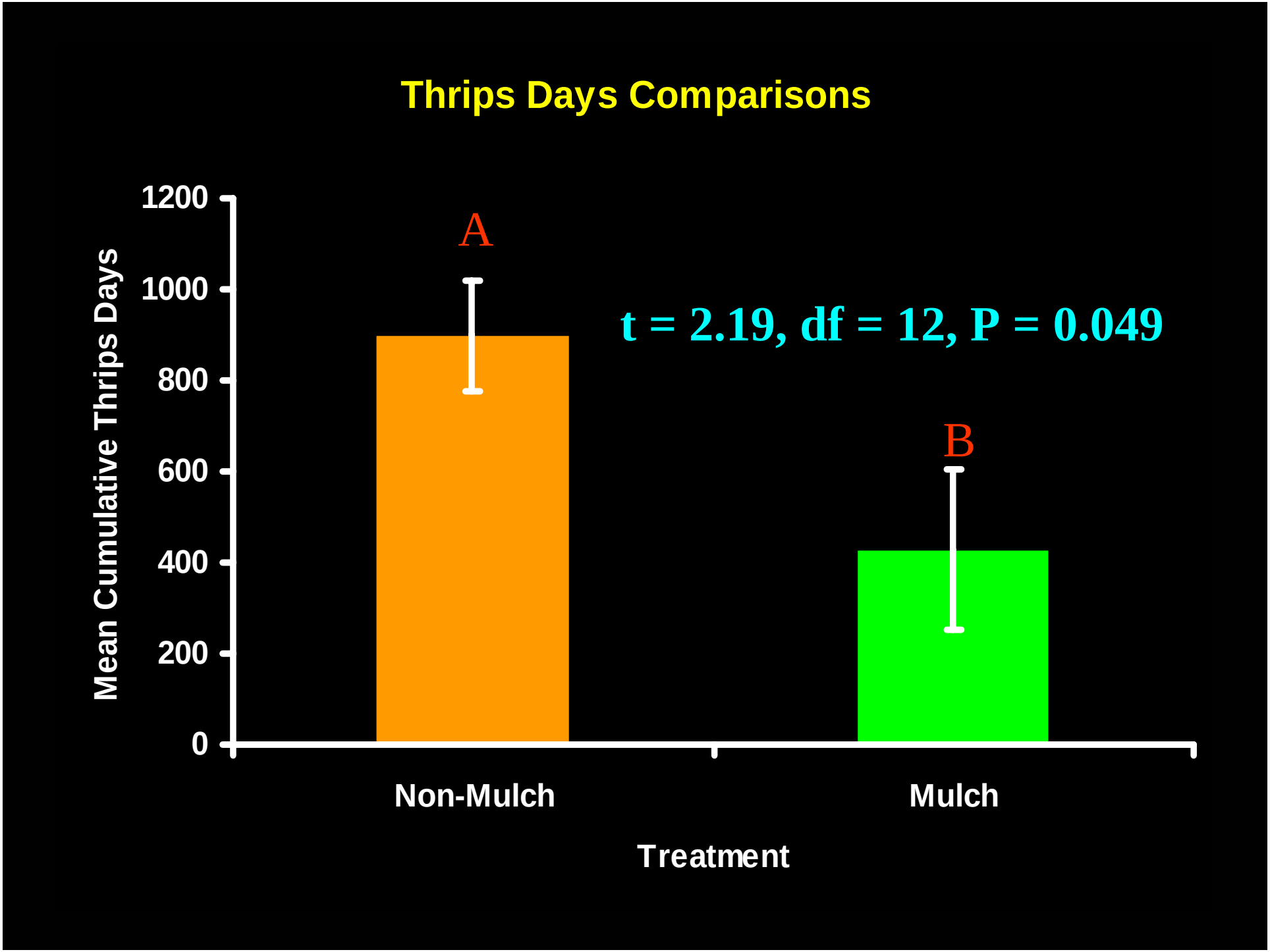
- Composted organic yard waste
  - Root rot control
  - Water retention
  - Improved soil fertility
  - Weed suppression
  - Improved plant growth
  - Thrips control????


Egg
1st Instar Larva
2nd Instar Larva
Propupa
Pupa
Adult
GENERALIZED THRIPS LIFECYCLE
Pupa and Propupa beneath leaf litter and soil

Mulched Plot

Unmulched Plot

Adult Avocado Thrips Trapped on Bottom of Traps


Thrips Days Comparisons
Mean Cumulative Thrips Days
1200
1000
800
600
400
200
0
A
B
t = 2.19, df = 12, P = 0.049
Non-Mulch
Mulch
Treatment

Overview of *Franklinothrips* Biology

- *Franklinothrips orizabensis* are predatory thrips native to CA and their home range stretches to Orizaba in MX
- They are generalist predators
  - Thrips
  - Whiteflies
  - Moth eggs
  - Mites & mite eggs
  - Avocado pollen & juice
- Two larval instars, & the two pupal stages occur within silk cocoons
- Adult stage are ant mimics and sex ratio varies depending on food quality
- Appear to be the most important natural enemy associated with outbreaks of avocado thrips

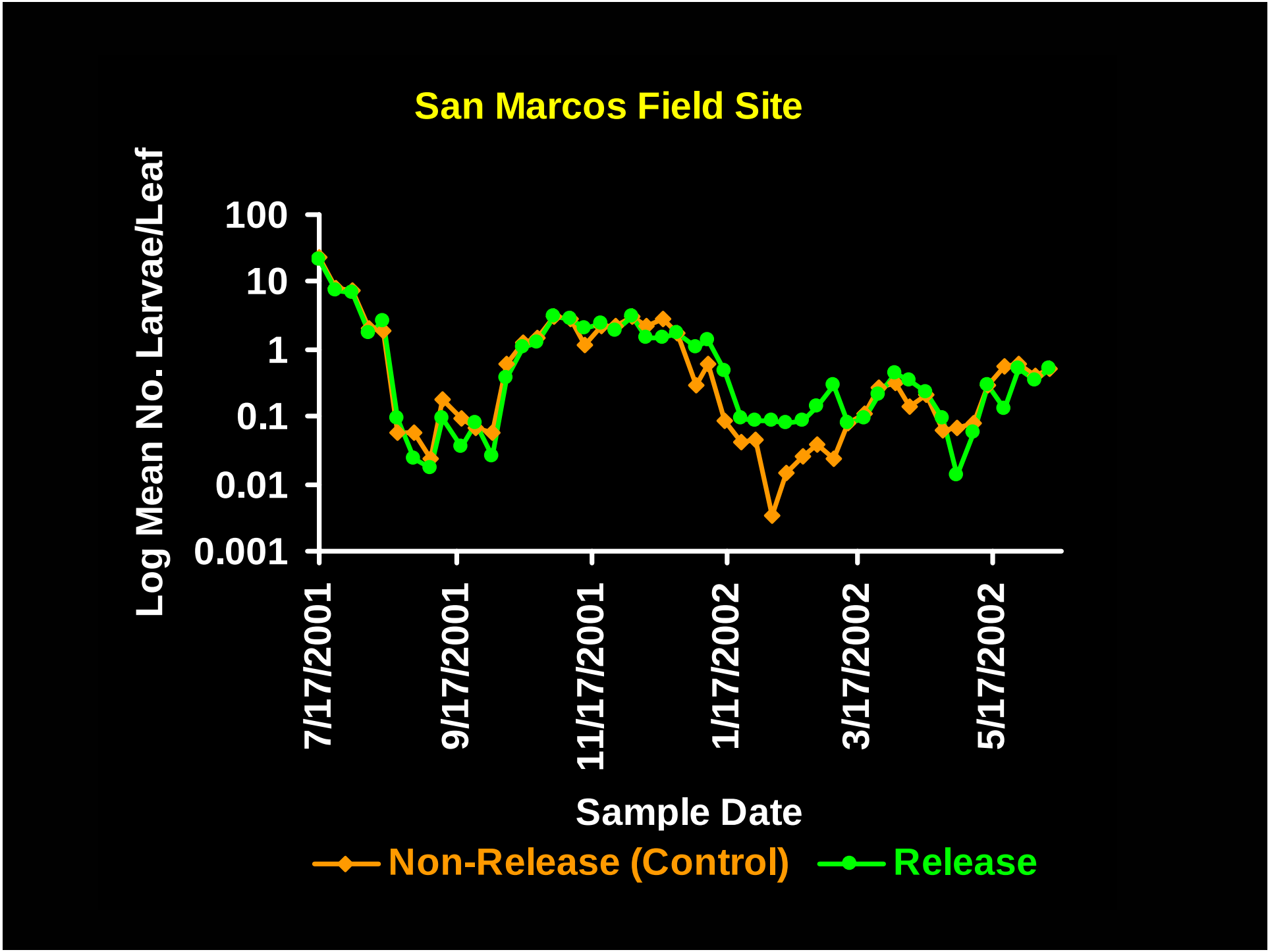
2nd instar larva

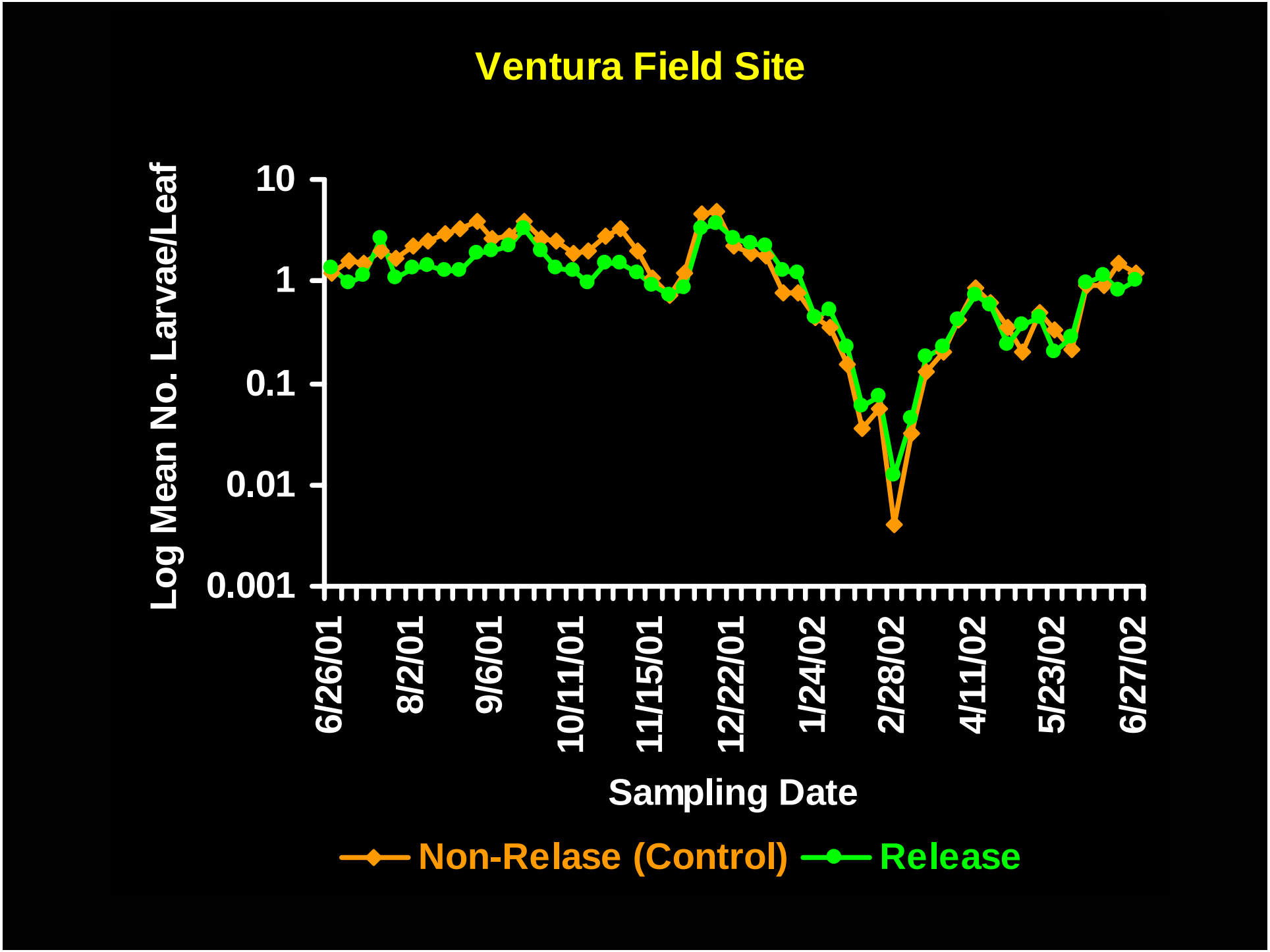
Silk pupal cocoon

Adult female

Franklinothrips Field Trials

- **Ventura**
  - **Trial started June 2001**
  - **Small trees 6-8 ft**
  - **Starting larval densities ~ 1.5 per leaf**
  - ***Franklinothrips* been released weekly**
  - **Targeted release rate 50 adults per tree**
  - **Predators being supplied by Buena Biosystems and American Insectaries**


San Marcos Field Site
Log Mean No. Larvae/Leaf
100
10
1
0.1
0.01
0.001
7/17/2001
9/17/2001
11/17/2001
1/17/2002
3/17/2002
5/17/2002
Sample Date
Non-Release (Control)
Release


Ventura Field Site
Log Mean No. Larvae/Leaf
10
1
0.1
0.01
0.001
6/26/01
8/2/01
9/6/01
10/11/01
11/15/01
12/22/01
1/24/02
2/28/02
4/11/02
5/23/02
6/27/02
Sampling Date
Non-Relase (Control)
Release

Determining the Longevity of *Franklinothrips* Adults in the Field

- Adult *Franklinothrips* males & females caged with varying amounts of food
  - Lots of food = 200 irradiated *Ephestia* eggs
  - Moderate (100 eggs – 50% of 1)
  - Low (50 eggs – 25% of 1)
  - Minimal (10 eggs – 5% of 1)
  - Leaf only
  - Nothing
- Longevity recorded daily
- Temperature recorded daily

Take Home Message

At an average field temperature of 22ºC (72ºF) male *Franklinothrips* will live on average for:

No Food:	**4 days**
Leaf:	**4.5 days**
5% Food:	**5 days**
25% Food:	**5.5 days**
50% Food:	**6 days**
100% Food:	**7 days**

Take Home Message

At an average field temperature of 22ºC (72ºF) female *Franklinothrips* will live on average for:

No Food:	**4 days**
Leaf:	**5 days**
5% Food:	**6 days**
25% Food:	**9 days**
50% Food:	**10 days**
100% Food:	**12 days**

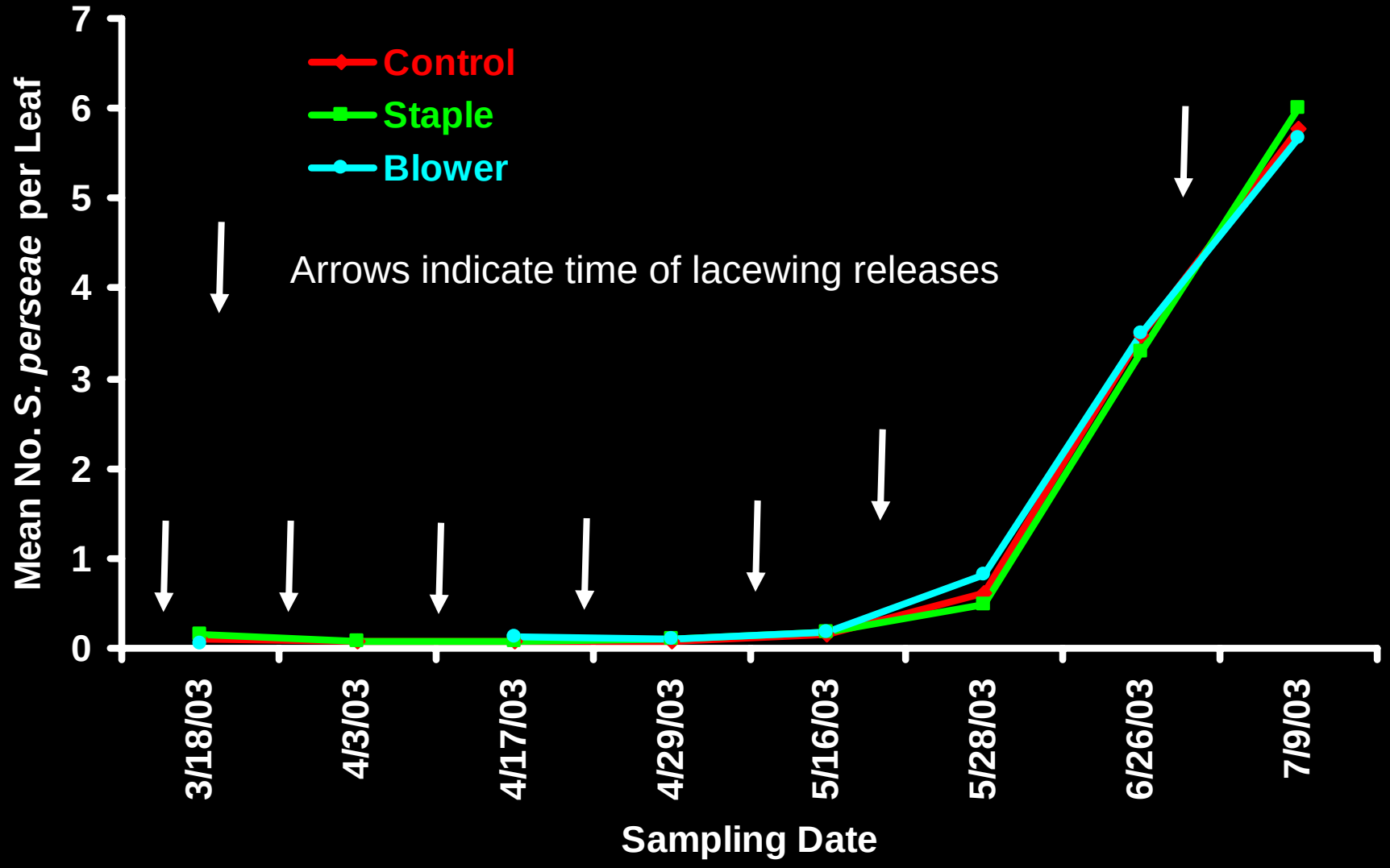
Lacewings For Control of Avocado Thrips

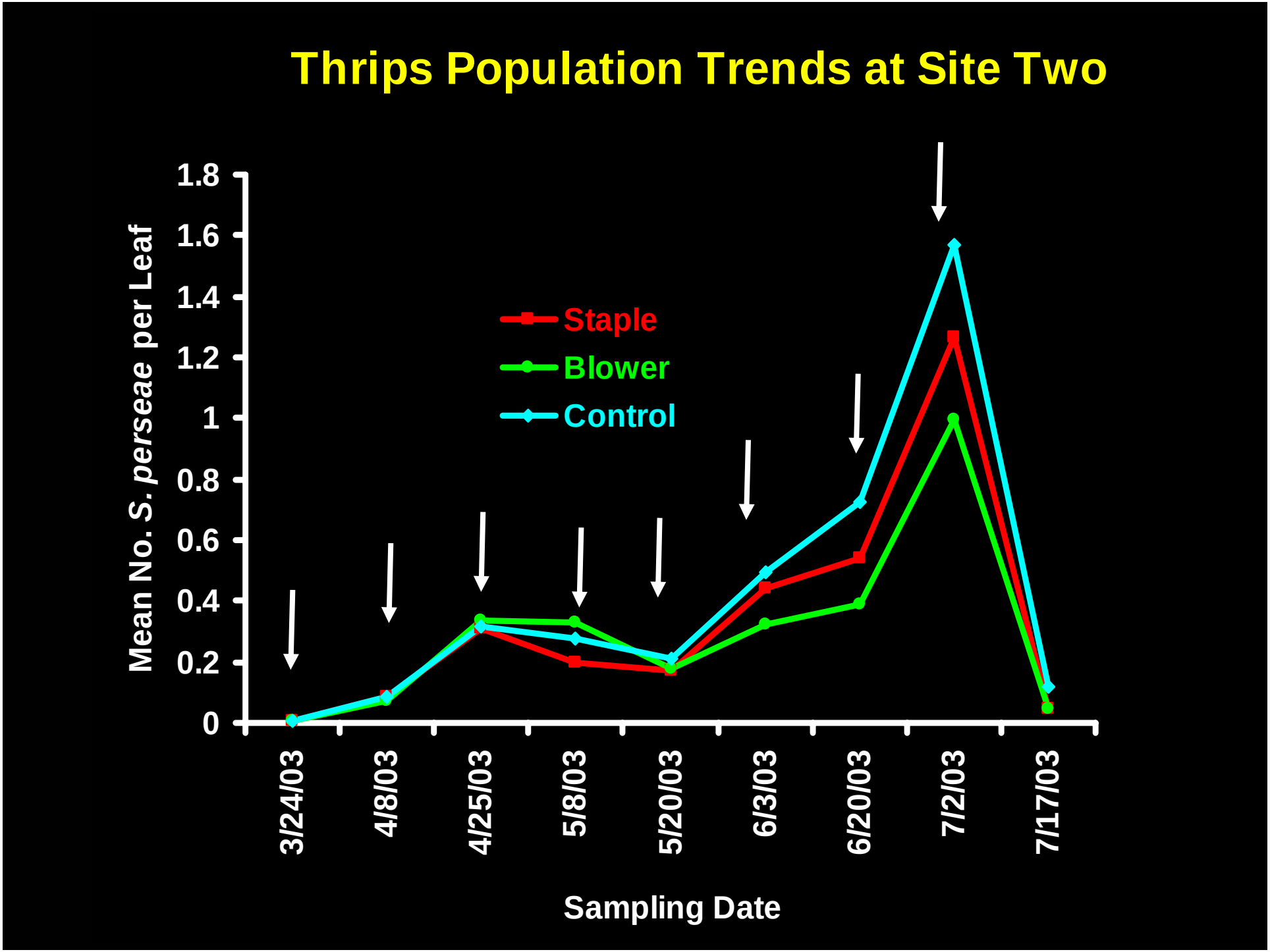
- Lacewing larvae voracious predators
- Consume a wide variety of soft bodied arthropods – mites, aphids, thrips, whiteflies
- Commercially available – eggs or larvae
- Typically adults are not predatory

Lacewing Field Trials

- Field trials were run by PCA's who regularly use lacewing eggs and get good control of avocado thrips
- Site One
  - San Marcos – lacewing eggs on paper stapled to leaves every other week over critical time period
- Site Two
  - Irvine – lacewing eggs held until 75% egg hatch then sprayed onto trees
- Trees sampled bi-weekly for thrips and predators, egg hatch rates and egg adherence to trees recorded
- Lacewing predation towards *Franklinothrips* studied

Thrips Population Trends at Site One




Thrips Population Trends at Site Two
Mean No. S. perseae per Leaf
1.8
1.6
1.4
1.2
1
0.8
0.6
0.4
0.2
0
Staple
Blower
Control
3/24/03
4/8/03
4/25/03
5/8/03
5/20/03
6/3/03
6/20/03
7/2/03
7/17/03
Sampling Date

Take Home Message

- Stapled eggs deployed at 4000 eggs per acre
- Blower method about 50,000 eggs per acre
- Staple method – 72% eggs hatched
- Blower method - 68% eggs hatched
- 35-96% eggs/larvae blown onto trees falls to the ground

Lacewing Longevity in the Field

Different amounts or types of food affects lacewing larvae survivorship times

Food	Longevity in Days
No food	1.5 days
Avocado leaf	1.5 days
Avocado pollen	2 days
15 *Ephestia* eggs	6 days
150 Ephestia eggs	14 days
300 *Ephestia* eggs	15 days

Lacewing & *Franklinothrips* Predation

Lacewing larvae show no preference for 1st or 2nd instar avocado thrips larvae

All three lacewing instars attack 1st instar *Franklinothrips* larvae

2nd & 3rd instar lacewing larvae attack 2nd instar *Franklinothrips*

***Franklinothrips* females are not attacked**

***Franklinothrips* does not attack lacewings**