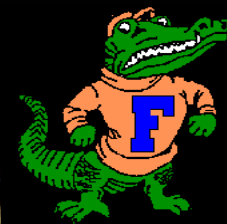


# BIOSUPPRESSION/CONTROL OF ASIAN CITRUS PSYLLID *Diaphorina citri* (Hemiptera: Psyllidae)



Greening Summit  
2008



Jawwad Qureshi and Phil Stansly  
University of Florida/IFAS  
Immokalee, FL



# Florida Citrus: 1998-2008

- Asian citrus psyllid discovered - 1998
- Generalist predators increase in response
- Species specific parasitoids released 1999-2001 and 2007
- Insecticides tested
- Huanglongbing (Citrus greening disease) discovered - 2005



# Important Predators

## Ladybeetles-Coccinellidae

Adults



*Curinus coeruleus*



*Olla v-nigrum*



*Harmonia axyridis*



*Cycloneda sanguinea*

Larva

*Olla v-nigrum*



P. Stansly

Psyllid Nymphs



M. Rogers

# Important Predators

## Lacewings - Chrysopidae

*Chrysoperla* spp.



Adult



Psyllid  
Nymphs

Larvae



*Ceraeochrysa* spp.

P. Stansly

# Parasitoid: *Tamarixia radiata*

Adult



Egg



Larva

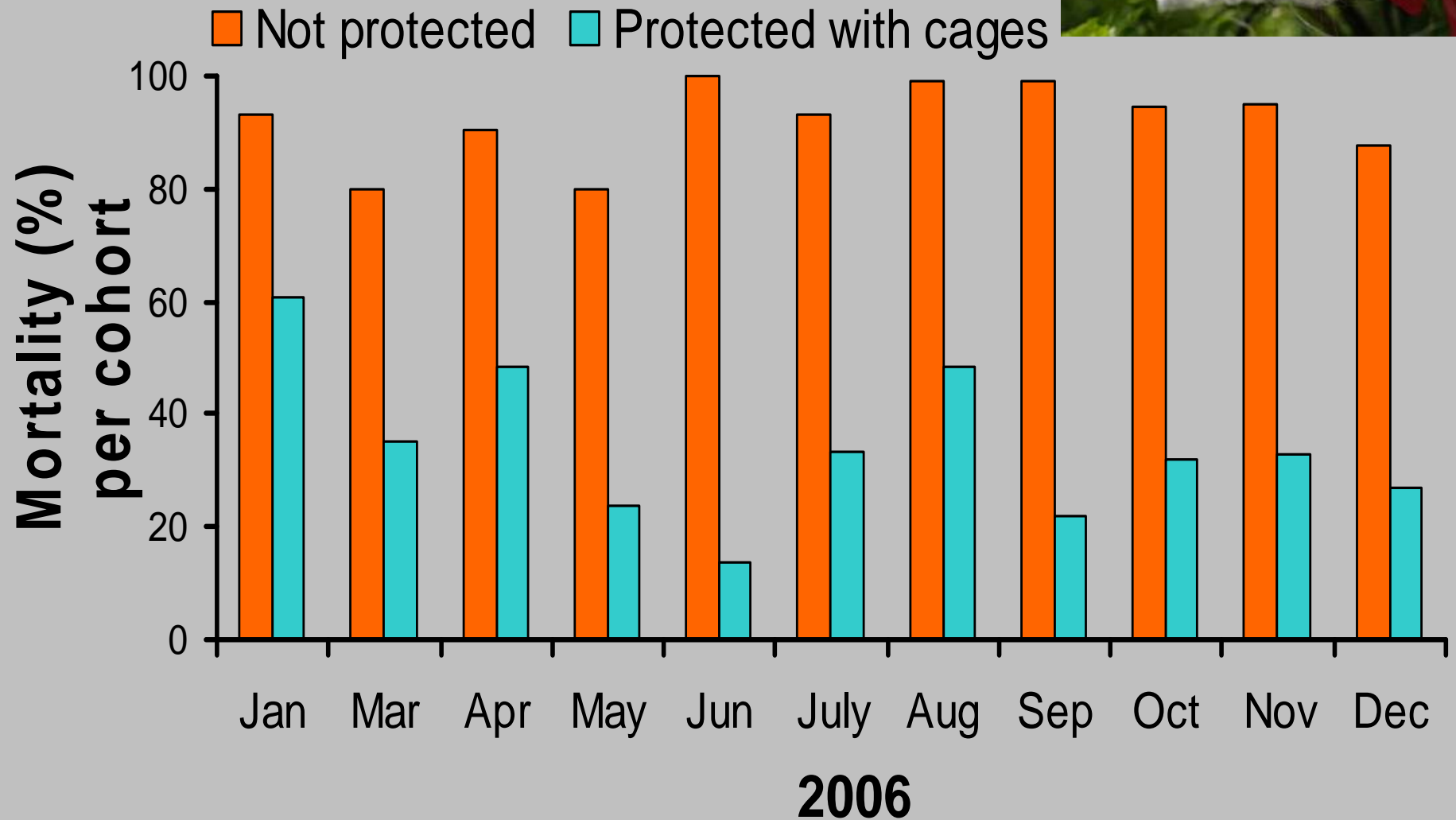


Alberto Urbaneja

Prepupa



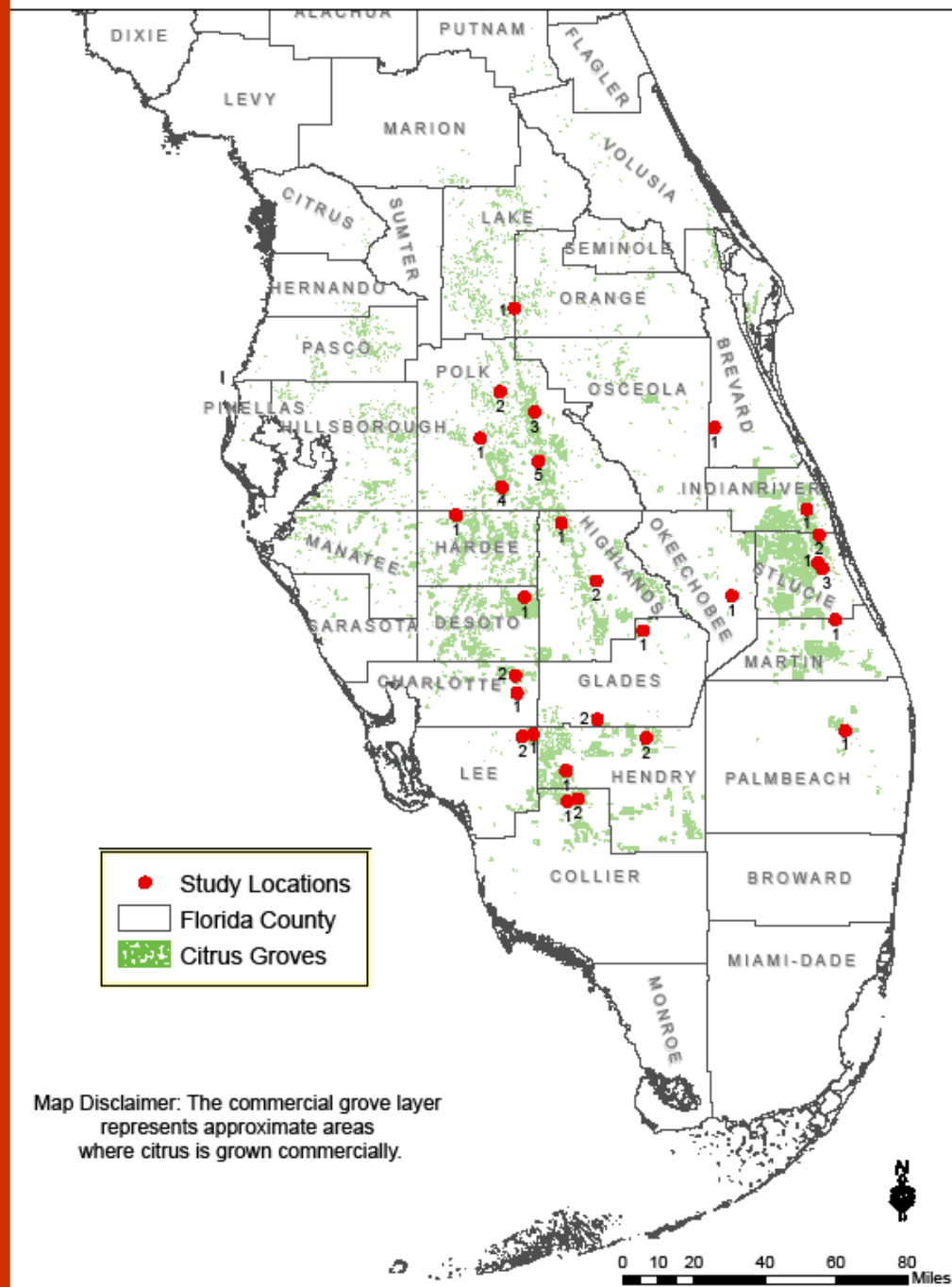
# The Psyllid Faces Significant Natural Mortality



# Ladybeetles initially attracted to psyllid nymphs, then leave as psyllids are consumed: Cumulative Abundance of 4 Species, May-Oct 2006



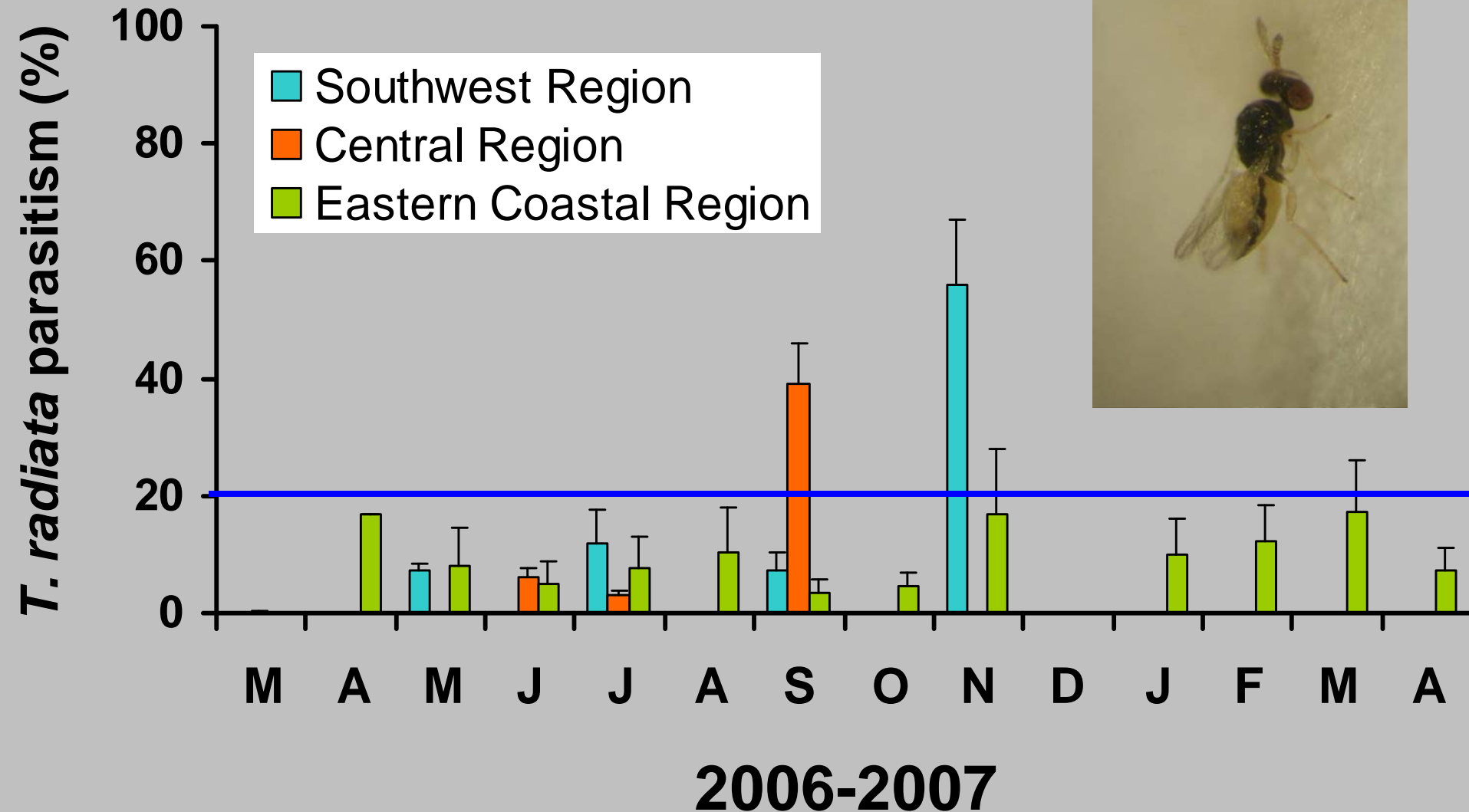
- **Parasitoid**  
*Tamarixia radiata*  
is established in  
Florida.
- **Found in 26 of the  
28 groves across  
16 counties.  
2006-2007**



**Qureshi, Stansly,  
Rogers & Hall 2008**

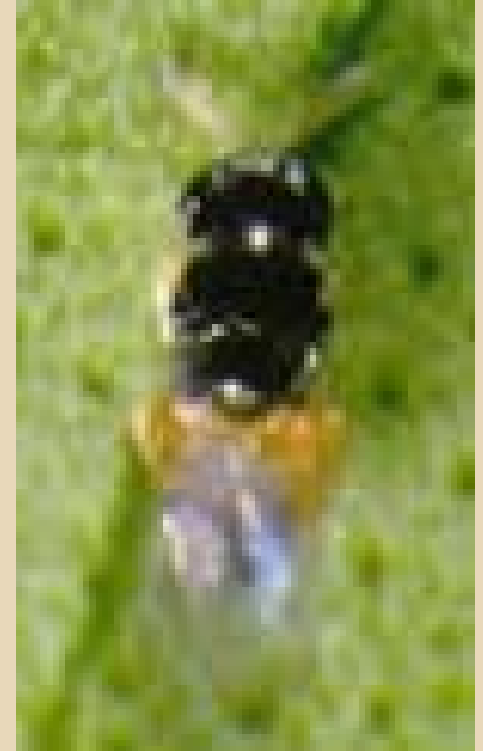


Parasitism rates were low, particularly during spring and summer (< 20%) and improved during Fall (39-56%) at some locations



# Release of *Diaphorencyrtus aligarhensis* from Guangdong China, 2007

J. Qureshi & E. Rohrig



# Activity of Psyllid Natural Enemies: Summary

- An estimated 88% psyllid nymphs in the field are consumed over the year by predators, principally ladybeetles and lacewings.
- Predation is greatest during the growing season.
- The parasitoid *Tamarixia radiata* is widely distributed but contributes little to mortality of psyllid nymphs except possibly late season.
- Additional parasitoids are being sought and released



# Compatibility with Insecticides

Foliar



Soil Incorporation

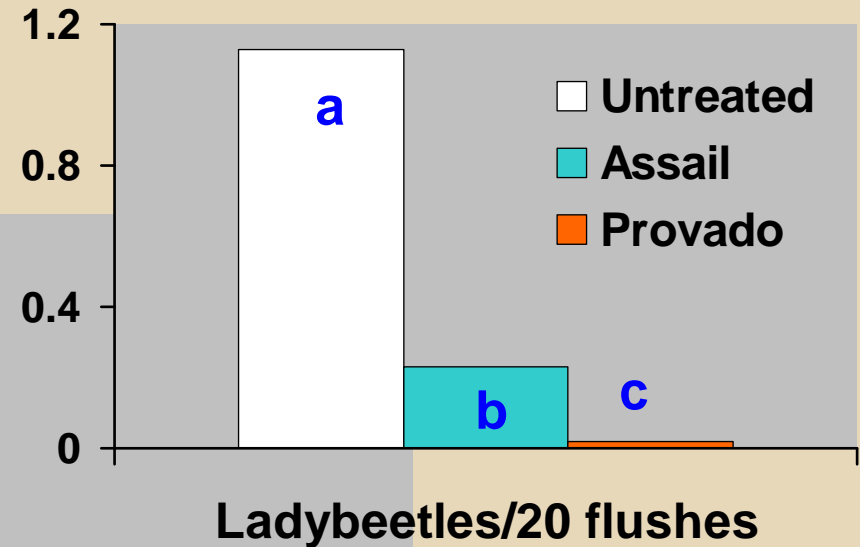
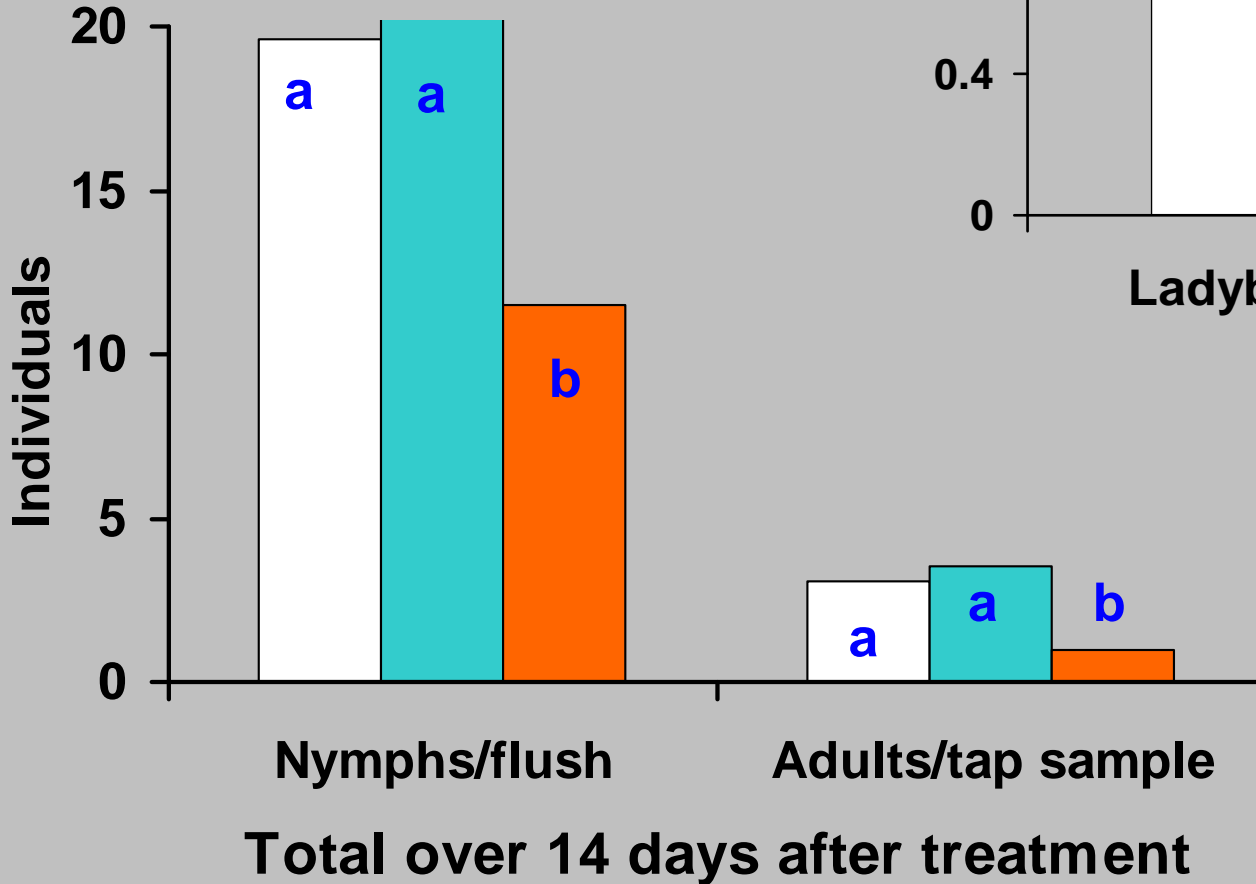


Drench

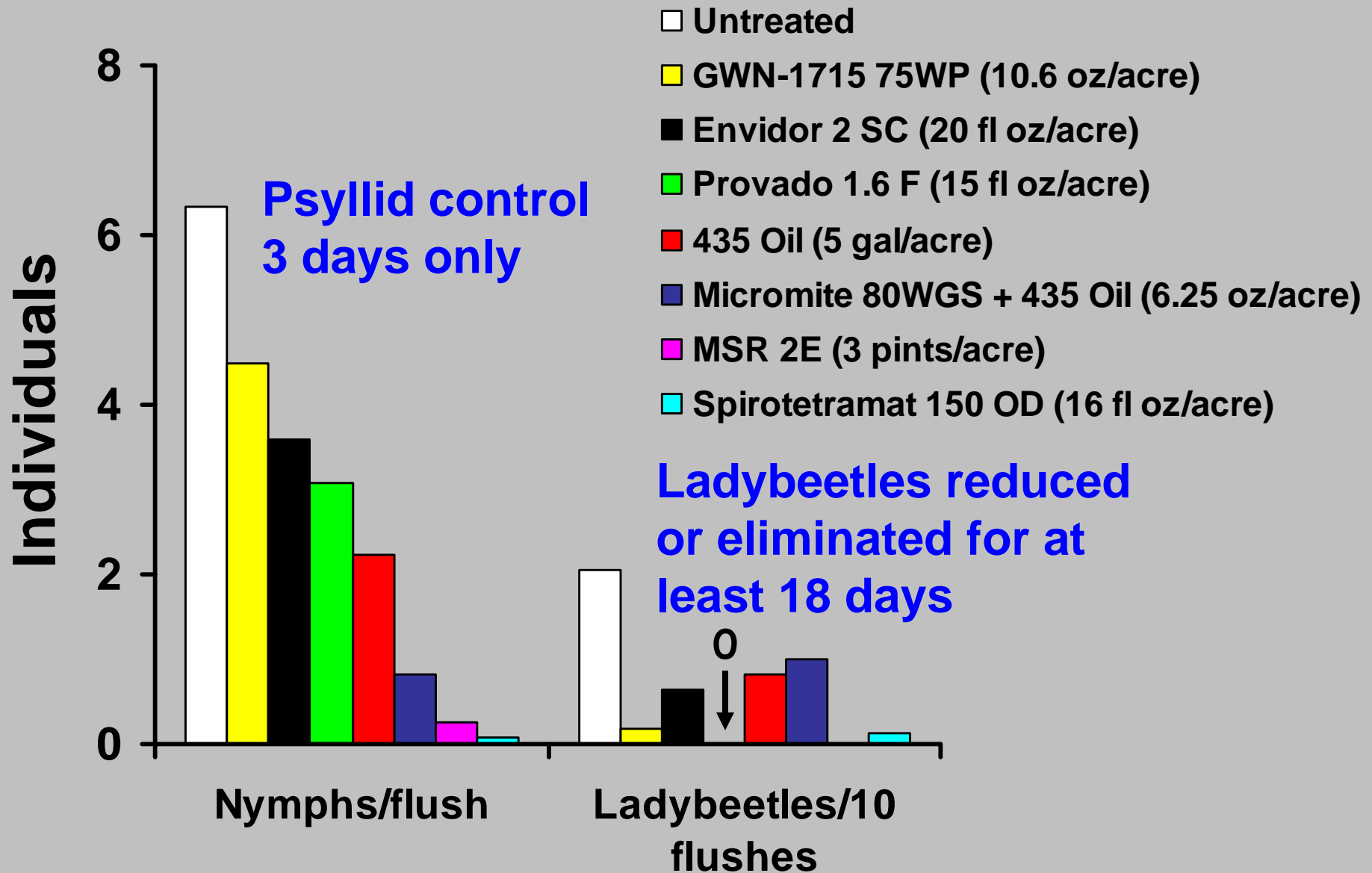


# Foliar Applications: Effects on Psyllid and Ladybeetles, June 2006

Assail 30 SG (0.131 lbs AI/Acre)  
Provado 1.6 F (0.125 lbs AI/Acre)



# Foliar Applications: Effects on Psyllid and Ladybeetles, Sept. 2006



# Foliar Sprays during the Growing Season: Conclusions and Implications

- Psyllid protection is short term with possible long term impacts to beneficial insects.
- Reduced natural enemy activity could set into motion a treadmill of increasing applications to maintain control.
- Compatible strategies are required that conserve beneficial insects to help manage psyllids, greening, and other pests:

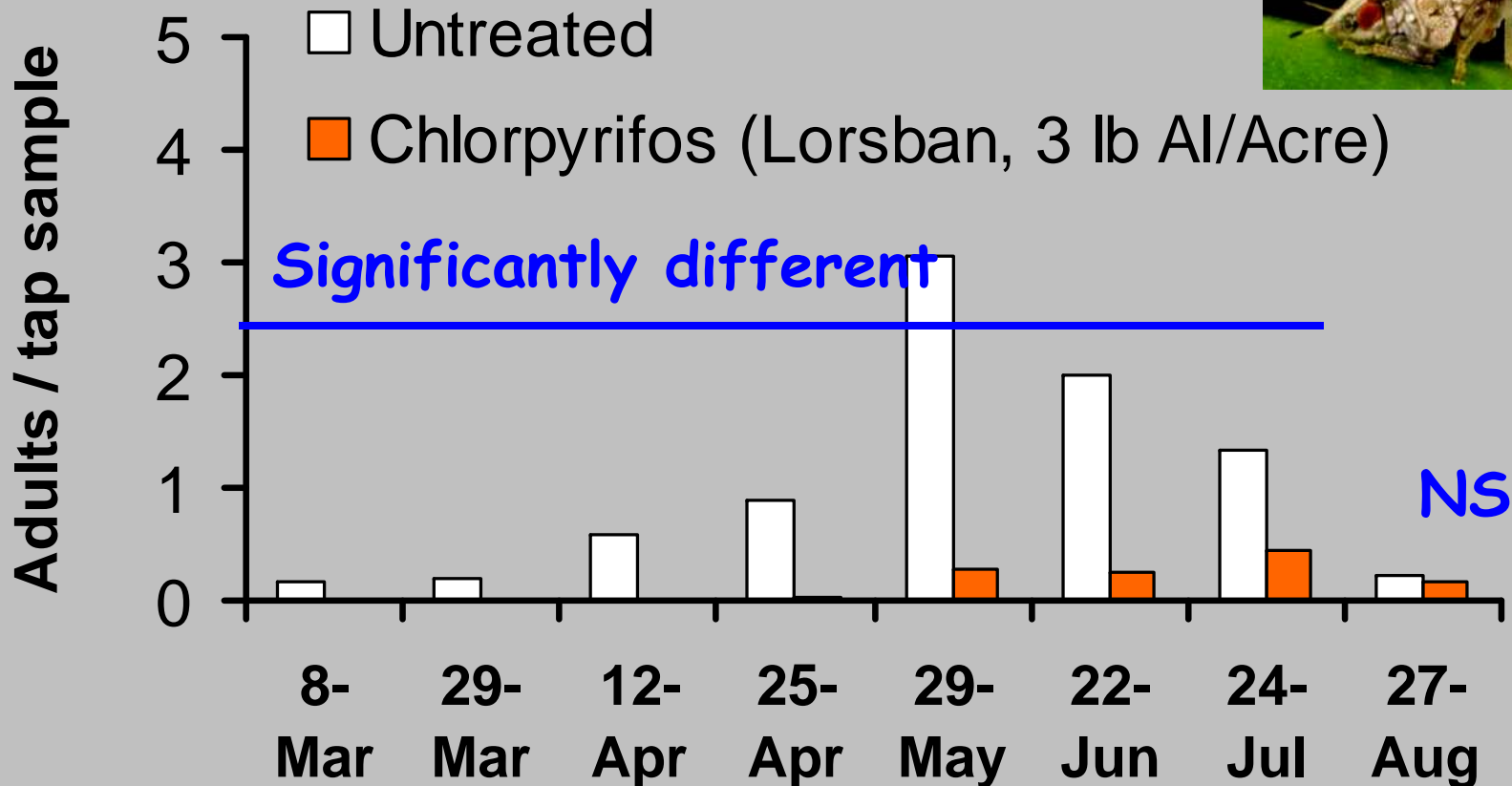
**Dormant Sprays**

**Systemic Insecticides**



# Dormant Season Foliar Applications Effects on Psyllid, 2007

Silver Strand North, Immokalee, FL

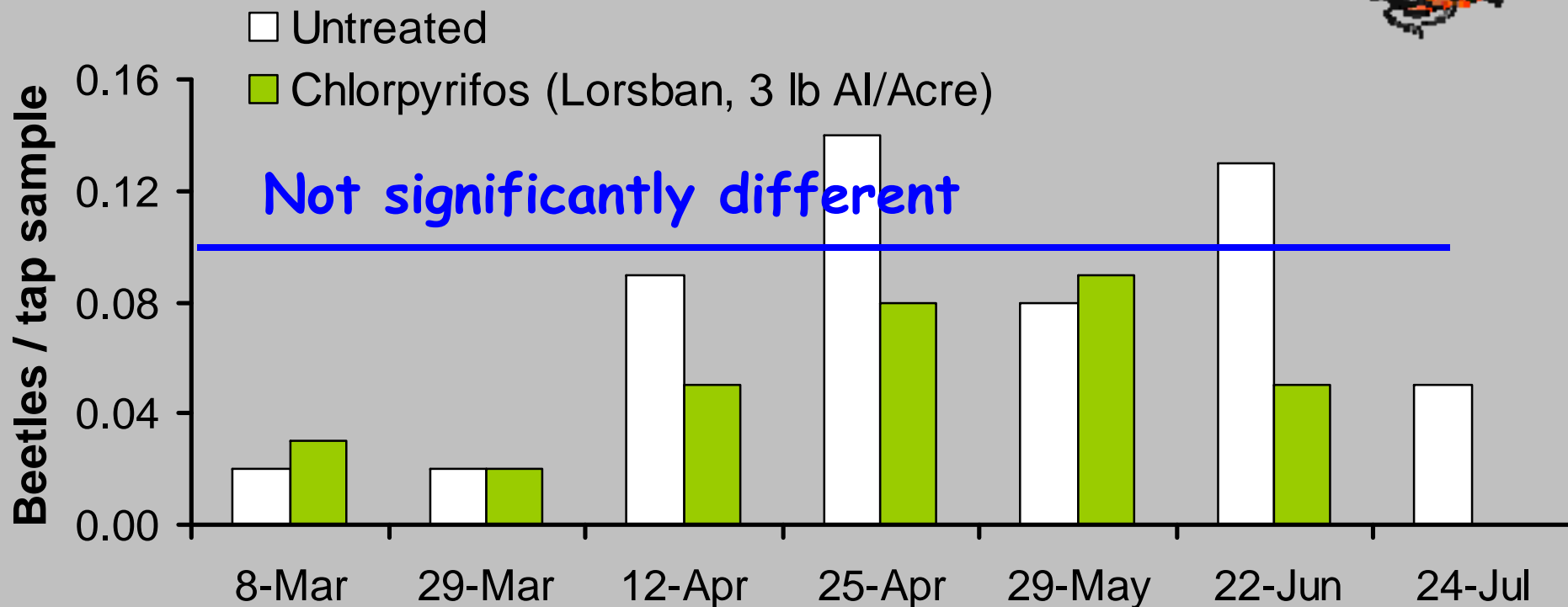


Application Jan, 15



# Dormant Season Foliar Applications Ladybeetles on Treated and Untreated Trees, 2007

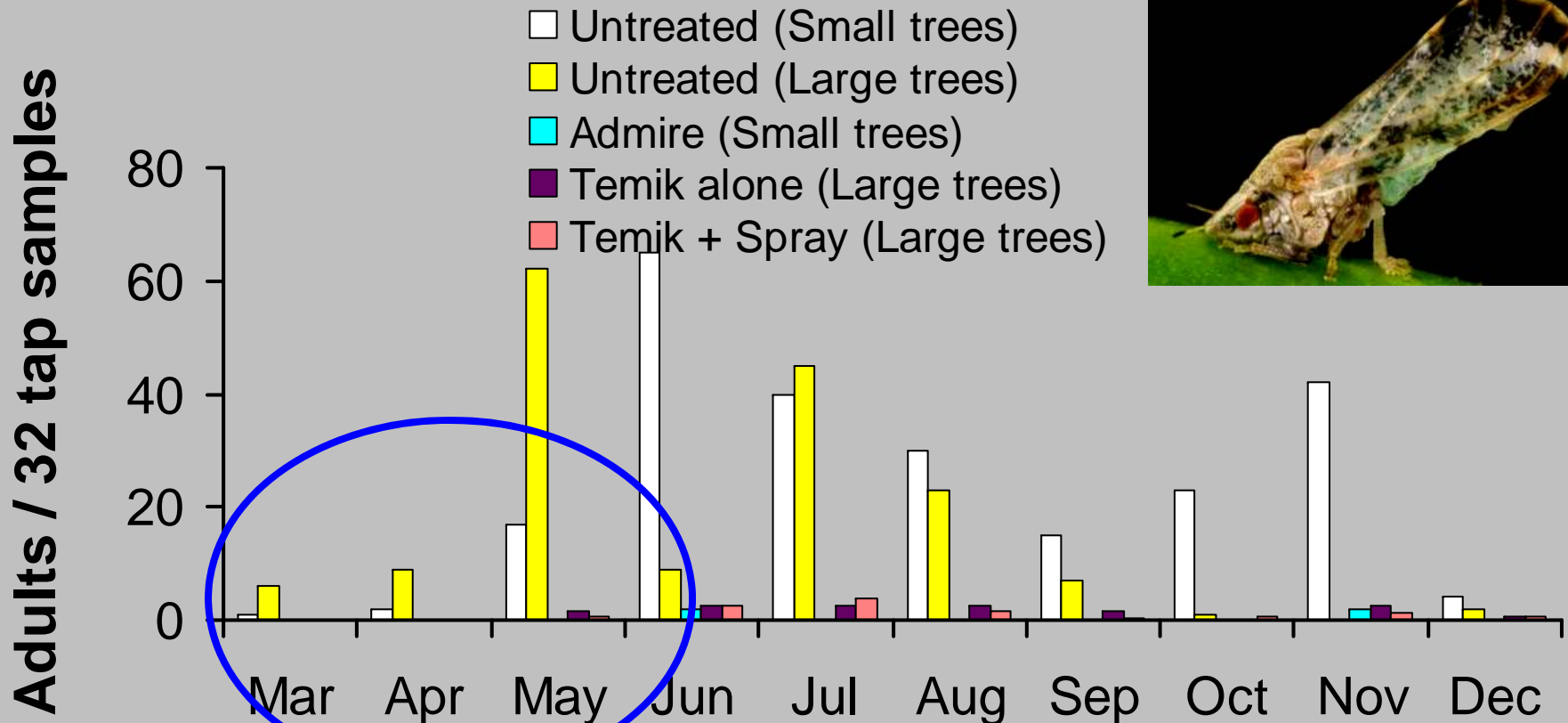
Silver Strand North, Immokalee, FL



Application Jan, 15

# Dormant Season Foliar Applications Effects on Psyllid, 2007

SWFREC, Immokalee, FL

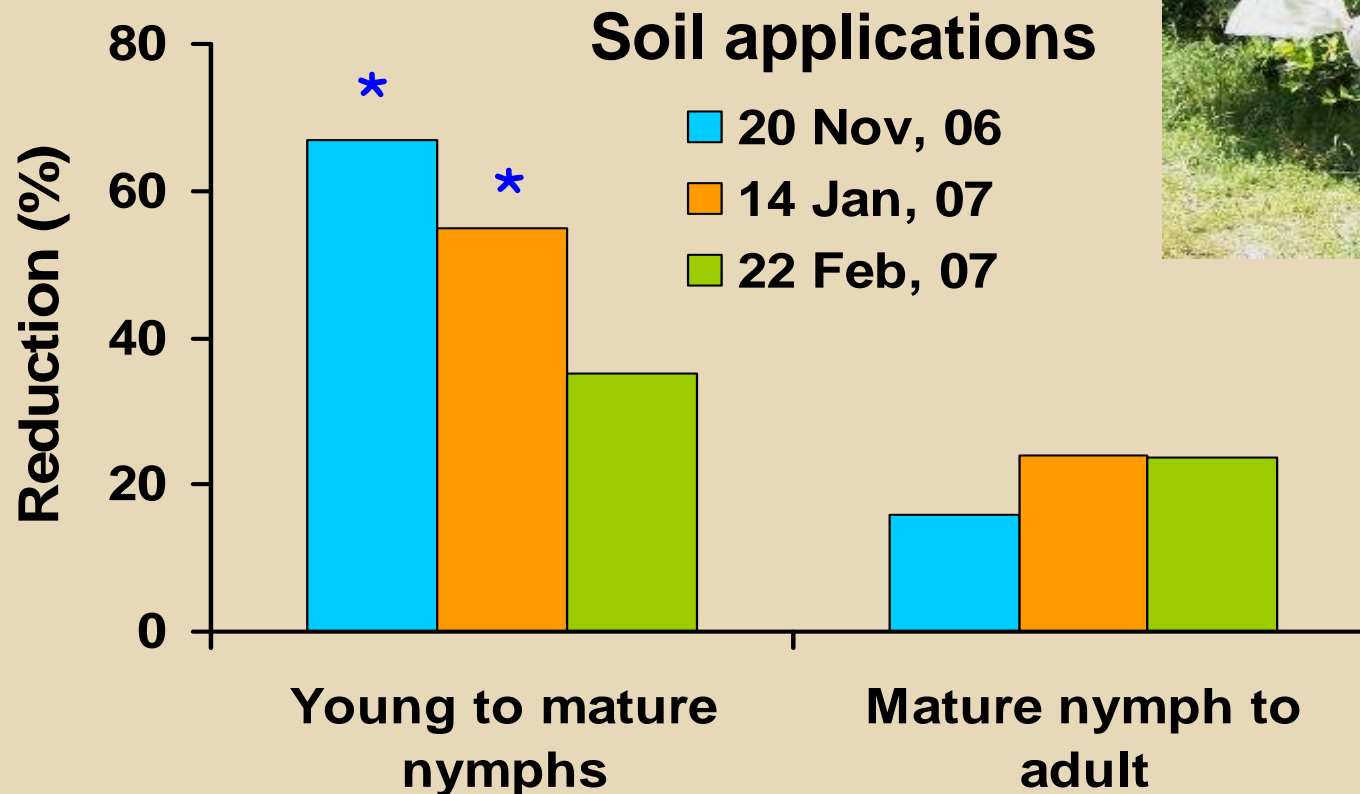


Applications: End of Jan 07

# Timely Aldicarb (Temik 15G, 33 lbs/Acre) Applications: Effects on Psyllid Nymphs, 2007

Silver Strand North, Immokalee, FL

Nymphs developed from 1<sup>st</sup> instar to adult on treated and untreated trees

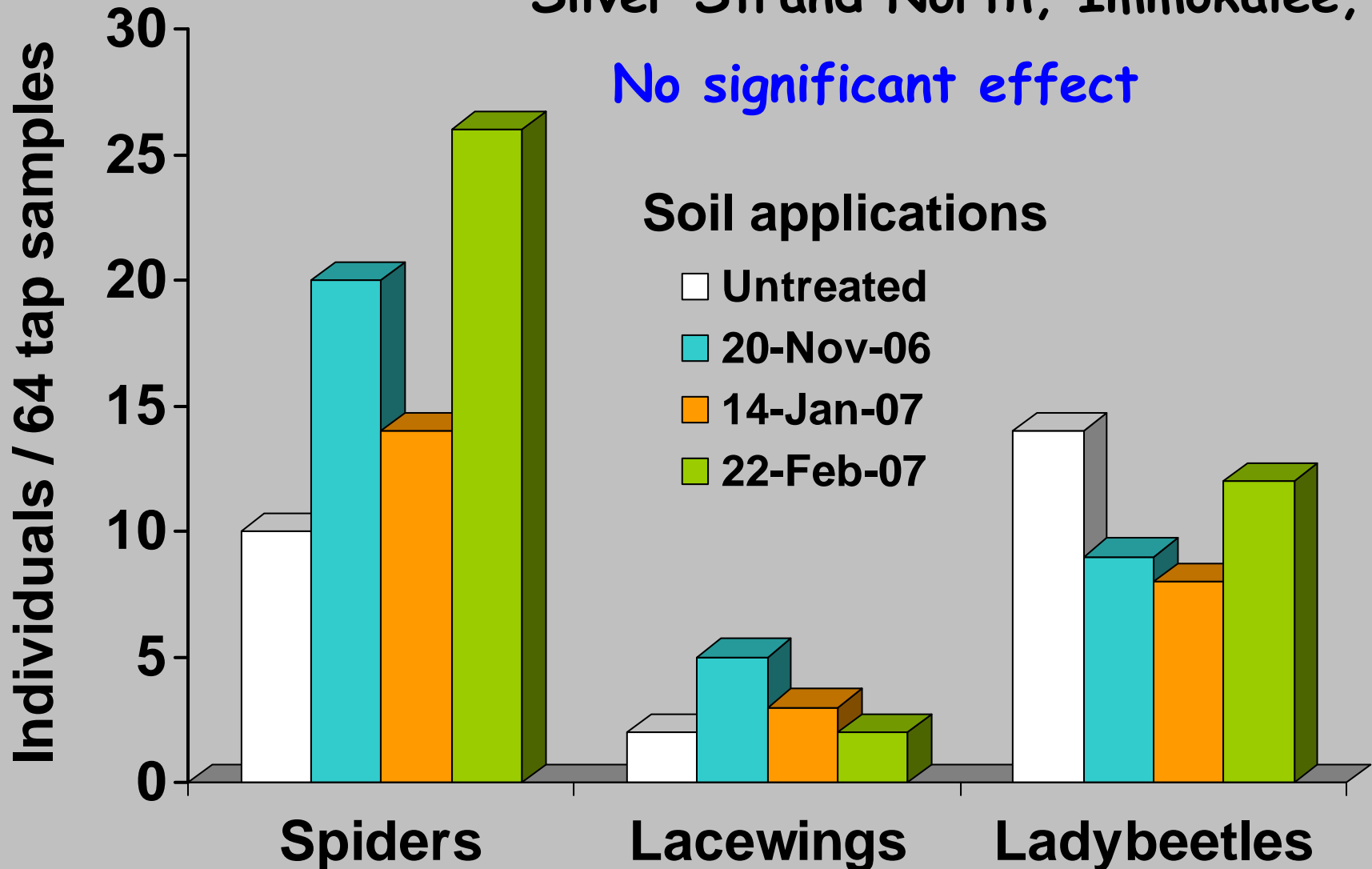


\* Significantly different from control

# Predators in Aldicarb (Temik 15G, 33 lbs/Acre) Treated and Untreated Trees, 2007

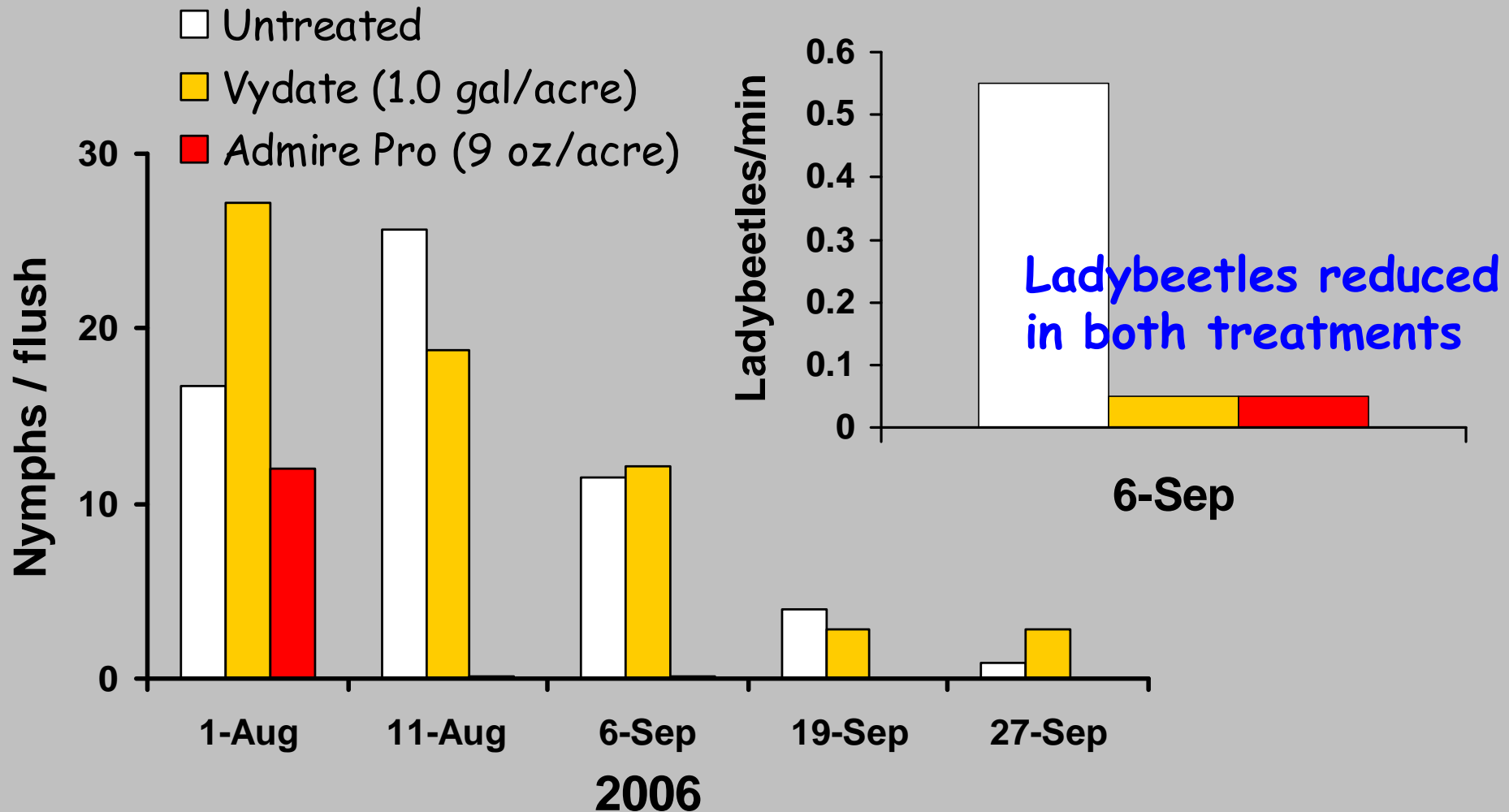
Silver Strand North, Immokalee, FL

No significant effect



# Drench Applications on Young Trees: Effects on Psyllids and Ladybeetles, 2006

1<sup>st</sup> application (July 21, 2006, no rain) SWFREC, Immokalee, FL  
2<sup>nd</sup> application (August 21, 2006), Vydate only



# Conclusions and Implications

- **Spring flush** provides unlimited food to overwintering population of psyllid resulting in a massive first generation and emigration of the pest and possible major spread of the disease.
- **Control of overwintering psyllid** adults with effective foliar applications during tree dormancy **protects spring flush and provides long lasting psyllid suppression.**
- **Generalist predators** are not abundant during late fall and winter and are therefore at low risk from such applications, but return in spring to help maintain psyllid control.

# Conclusions and Implications

- **Temik 15 G applied 2-3 months before spring flush** and imidacloprid to young trees controls psyllids without eliminating generalist predators.
- **Maximum protection** in spring flush will reduce psyllid pressure and necessity of insecticide applications later in the year.
- **Reduced insecticide use** on mature trees during the growing season will provide refuge for natural enemies and **enhance** the effectiveness of ladybeetles, lacewings, parasitoids and bees.



# Acknowledgements

- Funding: Florida Citrus Production Research Advisory Council, Insecticide industry particularly Bayer Cropscience, and Dow Agrosience for large scale studies
- All participating growers and companies particularly Barron Collier Company for large scale studies.
- Dan Pool for Temik applications.
- B. Cowley, A. Arevalo, M. Triana, B. Kostyk, R. Riefer

