

Onion Thrips: Contributions of Life Stage Survival and Adult Dispersal to Populations on Plants



Diane Alston
Entomologist

Utah State University Extension
2007 Utah Onion Association Meeting



Why are onion thrips such a pest?

- Life history and ecology well-adapted to onions
 - Females reproduce asexually (parthenogenesis)
 - Short generation time (2-3 wk)
 - High mobility of adults
 - Rapid development of resistance to insecticides
 - Life stage survival strategies
 - Later larval instars are non-feeding & protected
 - Eggs are protected - females insert them into leaf tissue



Thrips sampling tools

1. Whole plant wash

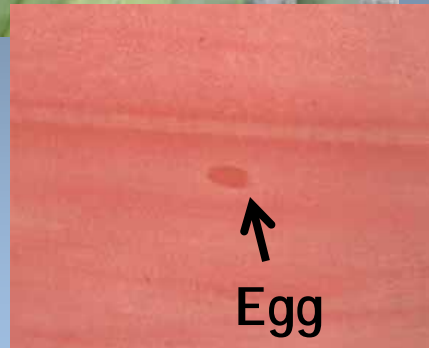


Larva



Adult

2. Stain 3rd leaf



↑
Egg

3. Aerial sticky traps



Adult

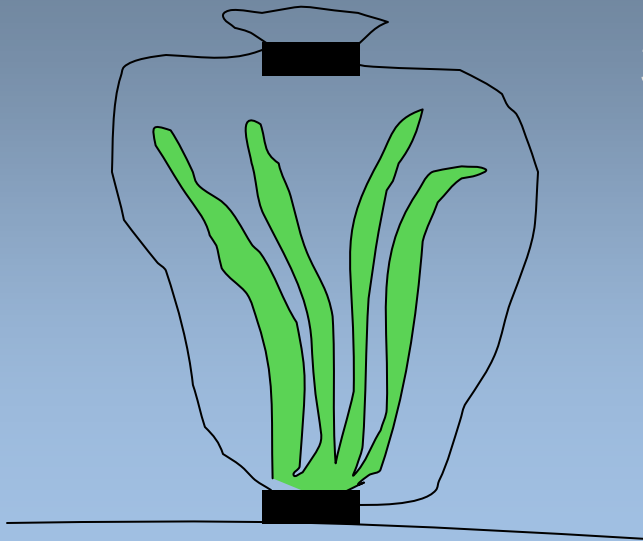
Thrips Survival vs. Immigration



Immediately after insecticides were applied

3 treatments:

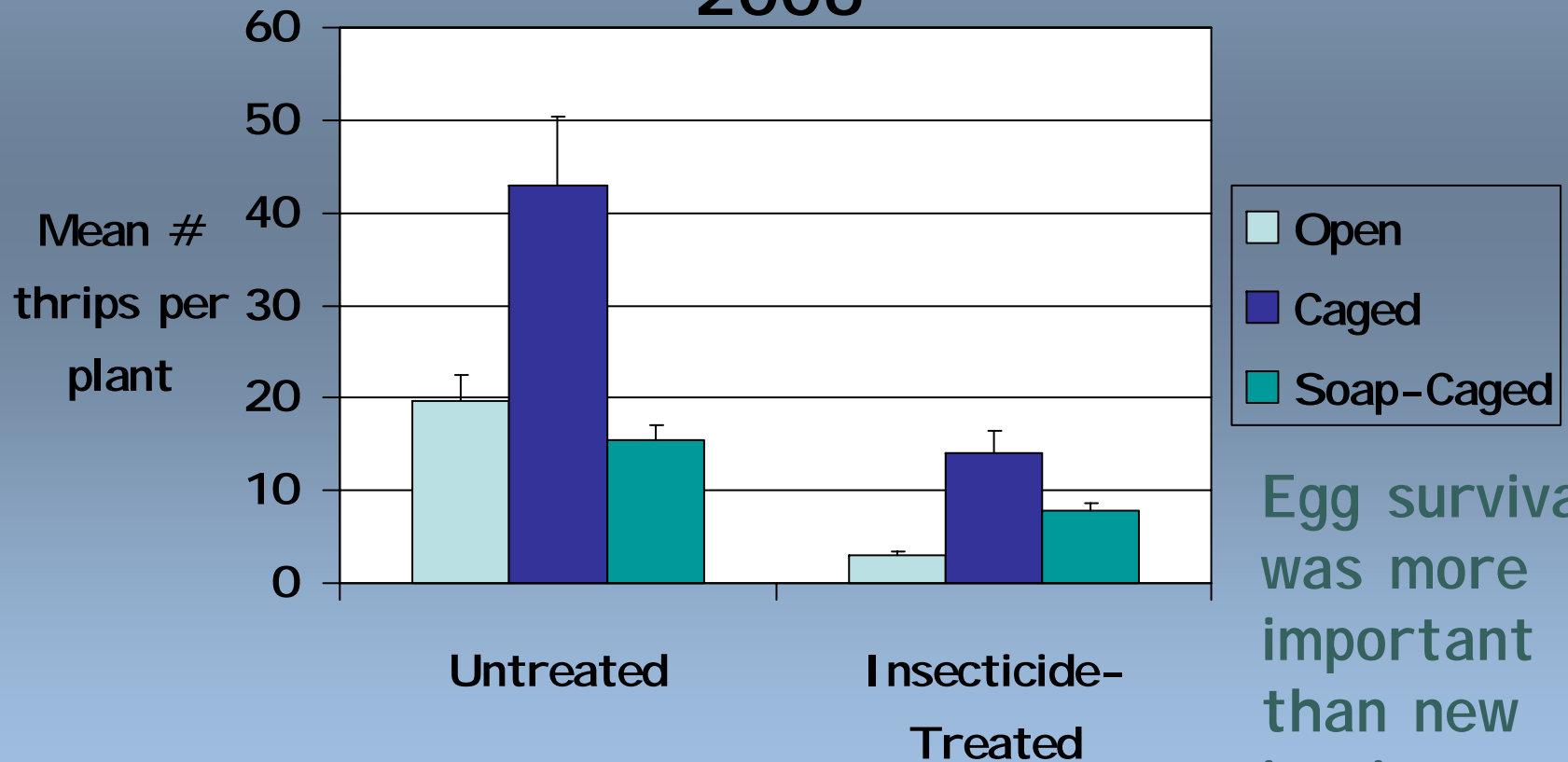
1. Open plants (allow immigration & natural enemies)
2. Cage plants (exclude immigrants & natural enemies)
3. Spray with soap and cage plants (remove motile stages & exclude new immigrants)



Importance of egg survival

Influence of exclusion (caging) on onion thrips populations on plants 2 wk after insecticides

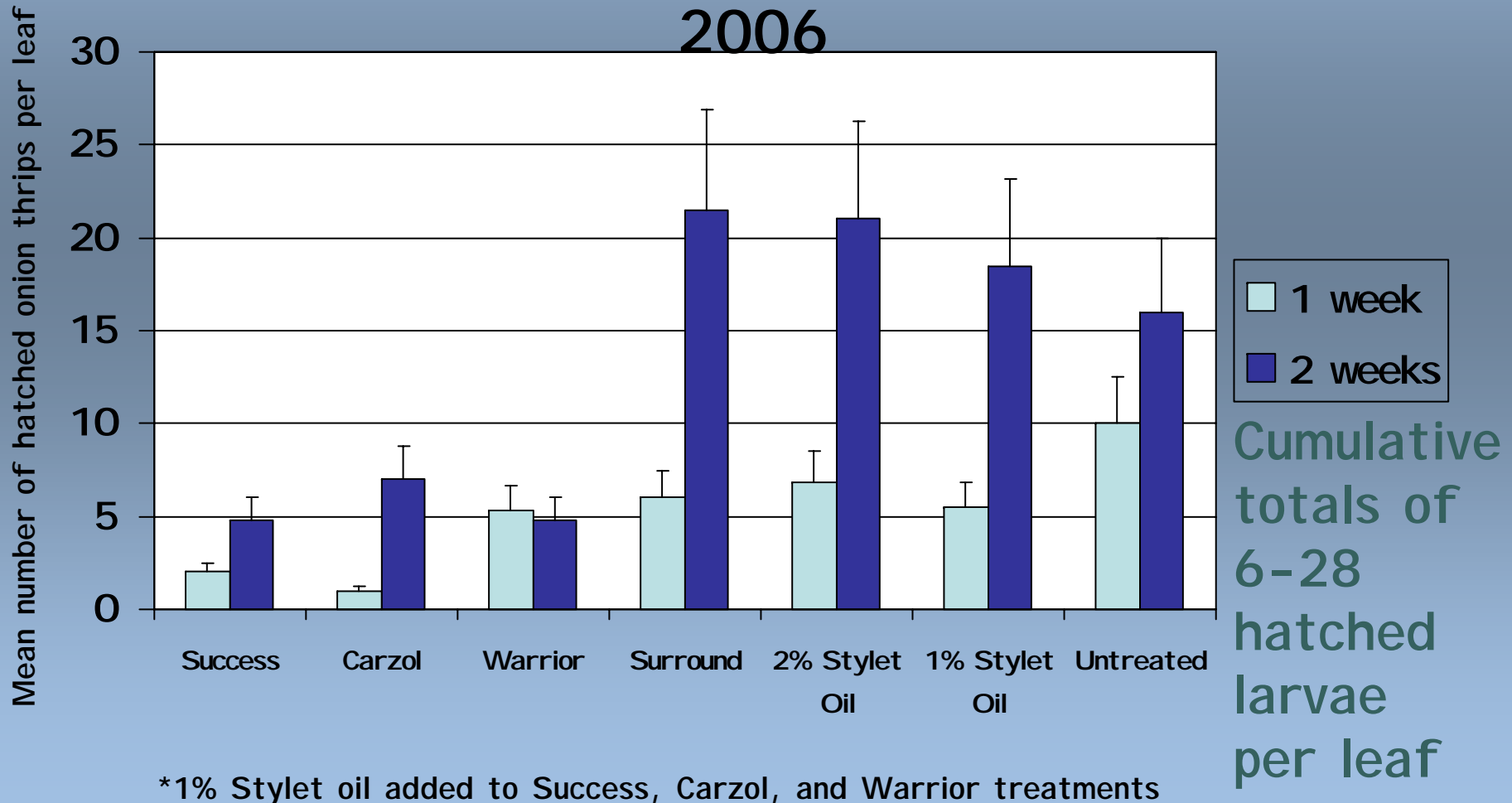
2006



Egg survival was more important than new immigrants

Importance of egg survival

Influence of insecticides on hatching of onion thrips eggs, 1 and 2 wk after insecticides



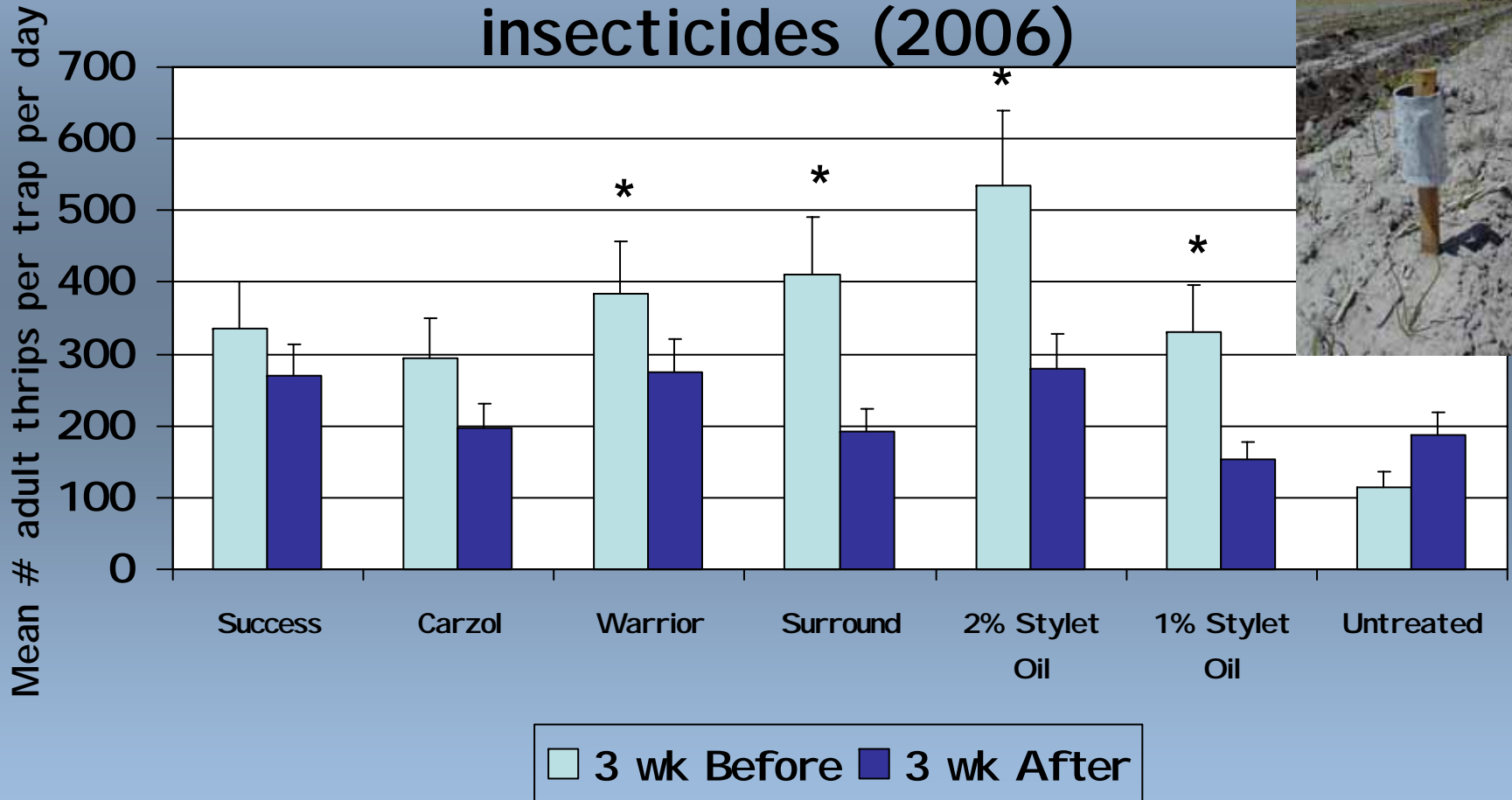
Composition of thrips populations on plants (2005-06)

Life stage on plant	% composition of total population
Eggs in leaves	60-75%
Larvae in neck	15-30%
Adults in neck	1-3%*

*Adults are underrepresented in whole plant wash samples

Importance of Immigrating Adults

Influence of insecticides on onion thrips adult dispersal: before compared to after insecticides (2006)



1% Stylet oil added to Success, Carzol, and Warrior treatments

Conclusions on importance of life stage survival and adult dispersal

- Eggs are a main contributor to populations on plants (hatch in 1-2 wk)
- Egg survival and immigrating adults following insecticide applications help perpetuate the population on onions
- Suppression strategies: include prevention of egg-laying and hatch

2006 Insecticide Efficacy Trial

2006 Kaysville Onion Thrips Biology and Control Trial

North ↓

Block 4		2	1	4	6	7	3	5
Block 3	5	4	2	3	7		1	6
Block 2	1	5	6	4	3	2		7
Block 1	3	1		7	2	6	5	4

Treatments (flag colors):

1. Success + 1% Stylet Oil (orange)
2. Carzol + 1% Stylet Oil (orange str)
3. Warrior + 1% Stylet Oil (pink)
4. Surround (pink stripe)
5. 2% Stylet Oil (blue)
6. 1% Stylet Oil (white stripe)
7. Untreated (white)

7 treatments x 4 blocks = 28 plots

Plot size:

15 ft (5 beds) x 20 ft

5 ft buffer in front and behind each plot

Dirt Road and Irrigation Line

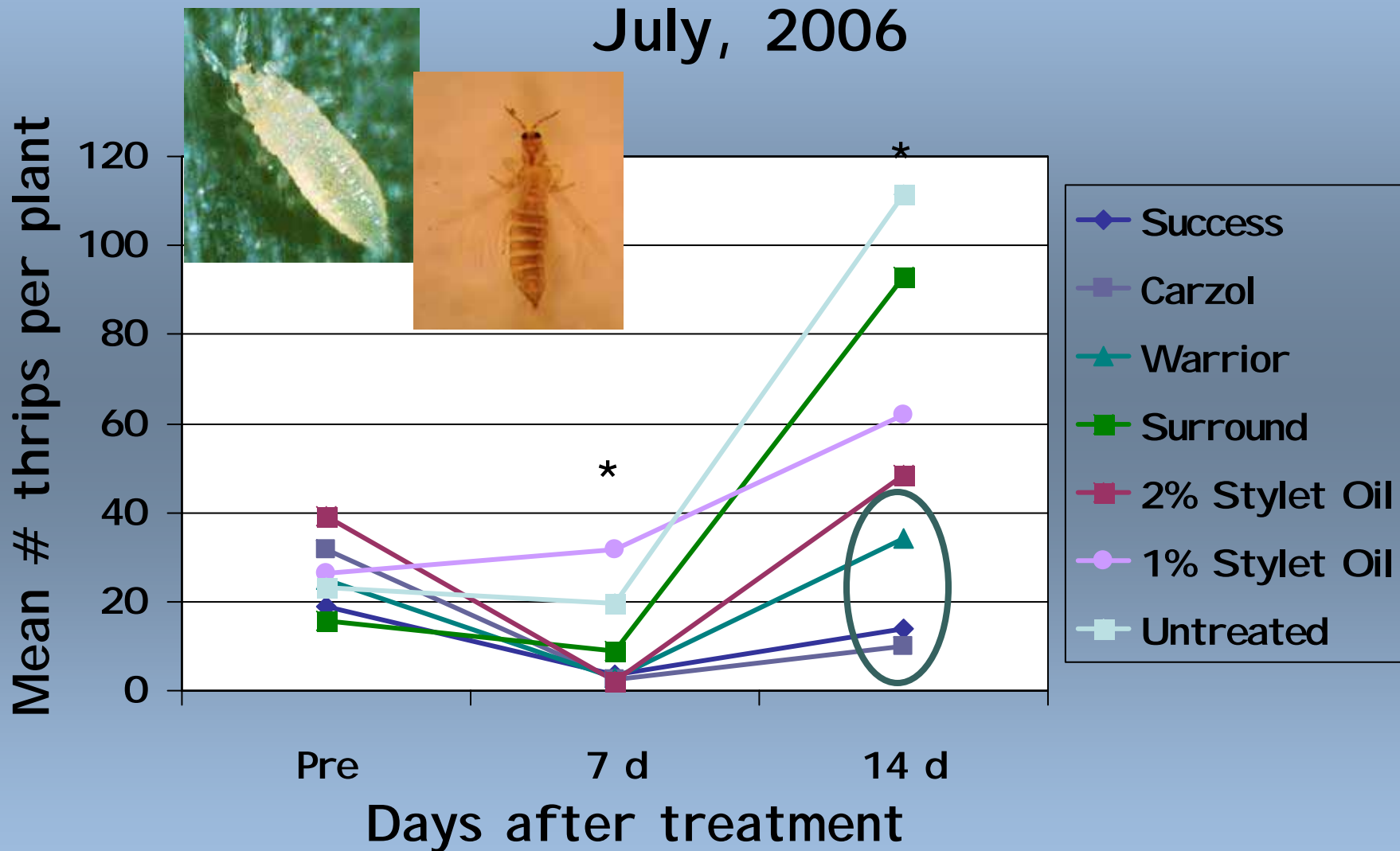
2006 Insecticide Efficacy Trial

1. Success 6 oz/acre + 1% Stylet Oil
2. Carzol SP 0.75 lb/acre + 1% Stylet Oil (not registered)
3. Warrior 3 fl oz/acre + 1% Stylet Oil
4. Surround WP 25 lb/acre
5. 2% Stylet Oil
6. 1% Stylet Oil
7. Untreated Control

Insecticide efficacy – Kaysville Research Farm

Motile thrips (Adults and Immatures)

July, 2006

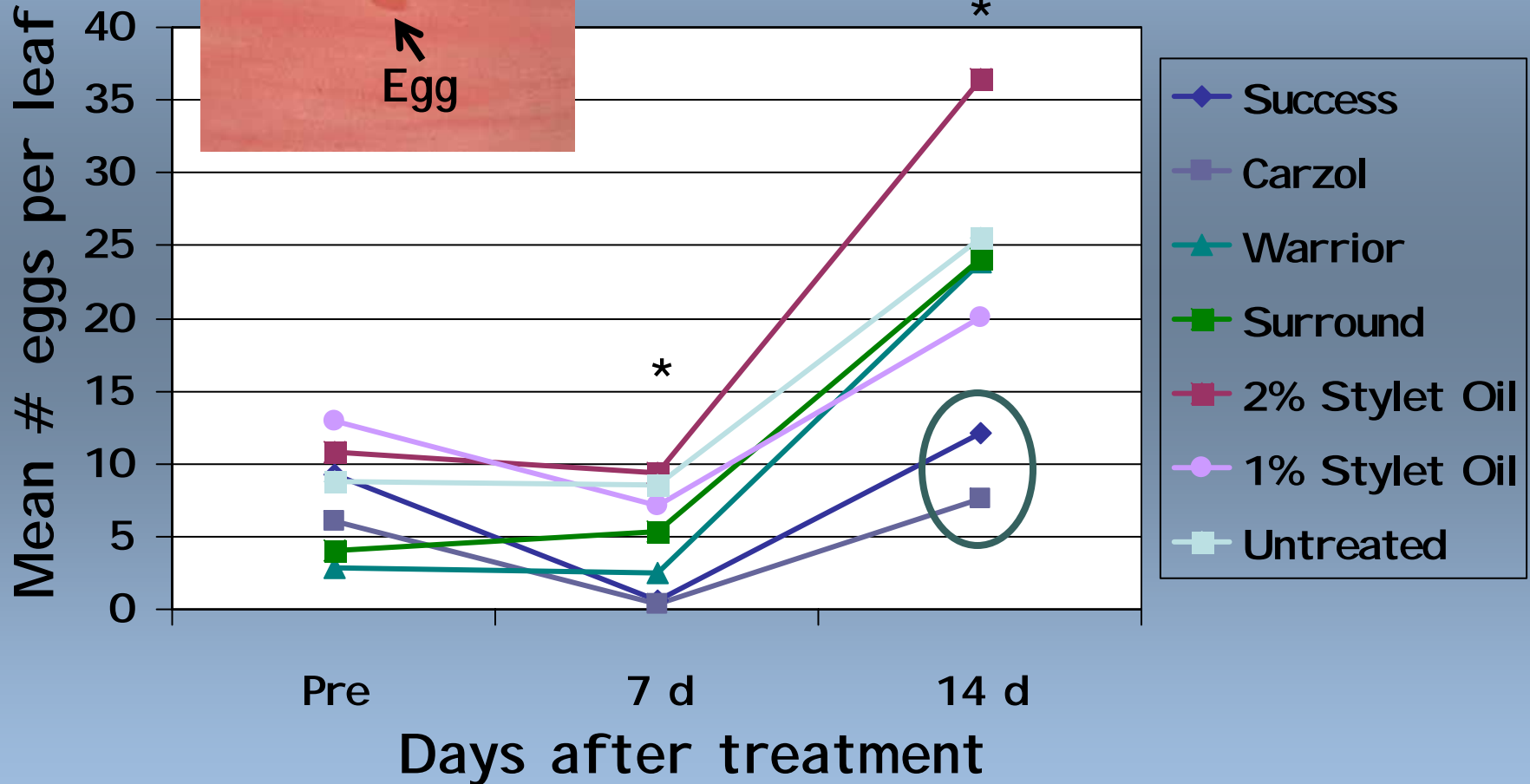


1% Stylet oil added to Success, Mustang, and Diatect treatments

Insecticide efficacy - Kaysville Research Farm

Eggs in Leaves

July, 2006



1% Stylet oil added to Success, Mustang, and Diatect treatments

Where do we go from here?

- Healthy, non-stressed plants
- Resistant/tolerant cultivars
- Prevention of egg-laying & hatch
 - Systemics, ovicides, larvicides
 - Protectants that repel oviposition



Morgan Reeder field on 2006 Tour

Research