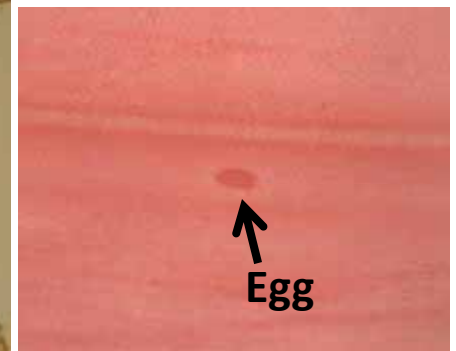


# Onion Thrips: Population Survey of Northern Utah Onion Fields - 2008

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Diane Alston  
USU Extension  
Utah Onion Association Meeting  
February 17, 2009



# Onion Thrips Fact Sheet

**UTAH PESTS fact sheet** Utah State University extension

Published by Utah State University Extension and Utah Plant Pest Diagnostic Laboratory 2017-118-0076 March 2008

## Western Striped Cucumber Beetle Western Spotted Cucumber Beetle

(*Acalymma vittatum* and *Diabrotica undecimpunctata undecimpunctata*)

Diane G. Abbot, Entomologist • James L. Bunnick, Weber County Agriculture Agent

**What You Should Know**

- Western striped cucumber beetle's body has 10 distinct dark longitudinal stripes, while western spotted cucumber beetle's is mottled black.
- Control of cucumber beetles needs to occur early.



**UTAH PESTS fact sheet** Utah State University extension

Published by Utah State University Extension and Utah Plant Pest Diagnostic Laboratory 2011-120-00 August 2008

## Squash Bug (*Anasa trita*)

Diane G. Abbot, Entomologist • James L. Bunnick, Weber County Agriculture Agent

**What You Should Know**

- In Utah, the squash bug primarily is a pest of squash and pumpkin.
- Adults include well-developed, colored, brown, and black spots on the back.
- Squash bugs are prone to develop resistance to insecticides and adults are difficult to kill.
- Best management is achieved by suppressing squash bug overwintering eggs and nymphs on the vine.
- Male and female adults and immature nymphs should be the first to die.
- The egg cluster on plants is the most common pest.



**Fig. 1. Mating pair of adult squash bugs!**



**Fig. 2. Immature squash bug nymphs!**

**What You Should Know**

Squash bug (*Anasa trita*) is a "bug" with piercing-sucking mouthparts (order Hemiptera) in the well-known bug family (Cercopidae). It is common throughout the U.S. and found from Canada to Central America. Adults (Fig. 1) emit a foul odor when disturbed and may be called "stink bugs." However, this stink bug is a different bug family. The most serious damage is done by nymphs. If the nymphs are not removed, they will feed on the plant and cause damage. Squash bugs are most common on squash and pumpkin. They are also found on other plants in the Cucurbitaceae family, such as melons, cucumbers, and zucchini. Squash bugs are most common on squash and pumpkin. They are also found on other plants in the Cucurbitaceae family, such as melons, cucumbers, and zucchini. Squash bugs are most common on squash and pumpkin. They are also found on other plants in the Cucurbitaceae family, such as melons, cucumbers, and zucchini.

**HOST PLANTS**

As cucurbits are hosts, but pumpkins and squashes are most sensitive. Melons, melons and ground are less sensitive. Squashes, melons and other cucurbits are also hosts. Squashes and melons are also hosts. Squashes and melons are also hosts.

**LIFE HISTORY**

There is one generation per year in northern Utah. A second generation may occur in southern Utah, but this may not be economically important.

**UTAH PESTS fact sheet** Utah State University extension

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## Onion Thrips (*Thrips tabaci*)

Diane G. Abbot, Entomologist • Daniel Drost, Vegetable Specialist

**What You Should Know**

- Onion thrips are the most injurious insect pest to onions in Utah.
- Immature and adult thrips prefer to feed on young onions in the inner neck of plants.
- Aluminum to severe thrips feeding causes reduced SWD yield.
- Insecticides are a major tool for their control, but thrips are prone to develop resistance.
- Long-term, sustainable management of thrips includes crop cultural practices, onion variety resistance, biological control, and insecticide resistance management.



**Fig. 2. Adult onion thrips have fringed or hairy wings and 7-segmented antennae!**

Onion thrips, *Thrips tabaci* (Order Thysanoptera, Family Thripidae), is a key insect pest in most onion production regions of the world. Immature and adult thrips feed with a puncture-and-suck behavior that removes leaf chlorophyll causing white to silver patches and streaks (Fig. 1). Thrips populations increase rapidly under hot, dry conditions and can lead to economic crop loss. The early bulb enlargement stage of onion growth is the most sensitive to thrips feeding. Insecticides have been the primary tactic for their management; however, repeated applications often lead to resistance in the thrips population, suppression of natural enemies, and unsuitable management. Life history characteristics of onion thrips that enhance their pest status include a short generation time, high reproductive potential, sexual reproduction by females (parthenogenesis), and occurrence of protected, non-feeding life stages. Recent research has shown that the majority of onion thrips on a plant are in the non-feeding egg stage (10-70% of total population on an onion plant during late June to August), and thus, not exposed to insecticides and other suppressive tactics. Multi-pronged pest management strategies that occur onion plant health and tolerance to thrips, in addition to suppressing thrips densities, have proven the most sustainable and economically viable.



**Fig. 1. Thrips feeding injury appears as white to silvery patches and streaks on leaves!**

**HOSTS**

Onion thrips have a broad host range that includes grasses and broadleaves. They are pests of agriculture, crops, home gardens, landscapes, and greenhouses. Many vegetable hosts include onion, garlic, leek, asparagus, cauliflower, bean, tomato, cucumber, and sprouting. Common field crop hosts include alfalfa, small grains, and corn. They may cause damage to seedling plants and some flowers.

# www.utahpests.usu.edu

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## UTAH PESTS

Utah's diverse landscape supports thousands of insects and plant pathogens. **UTAH PESTS** is your portal for learning more about pests and their beneficial counterparts around the state, and how Utah Extension personnel are working to provide a greater understanding of these organisms in our world.

Click on one of the web site links below to get started!

<p><b>integrated pest management</b></p> <p>Choose this site for the <a href="#">plant pest advisories</a>, the <a href="#">PM Mini-Grant program</a>, <a href="#">weather data</a>, and much more.</p>	<p><b>plant diseases</b></p> <p>Choose this site for a multitude of fact sheets on diseases and disorders of <a href="#">field crops</a>, <a href="#">fruits</a>, <a href="#">ornamentals</a>, <a href="#">herbs</a>, and <a href="#">vegetables</a>.</p>
<p><b>insects and their relatives</b></p> <p>This site will help to shed some light on the insect world, with <a href="#">fact sheets</a>, <a href="#">images</a>, <a href="#">slide shows</a>, and more.</p>	<p><b>utah plant pest diagnostic lab</b></p> <p>The UPPDL, the only lab of its kind in Utah, is here to identify and provide management recommendations for your pest problems.</p>

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# Western Region SARE Grant:

## 2008: Survey of commercial onion fields

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- Describe onion thrips population dynamics in commercial onion fields
  - 9 farms / 15 fields (2 transplanted, 13 seeded)
- Relationship of crop management practices to thrips densities (N, irrigation, insecticides)
- Relationship of thrips densities to Iris Yellow Spot Virus (ISYV) incidence

# Why are onion thrips such a pest?

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- Life history and ecology well-adapted to onions

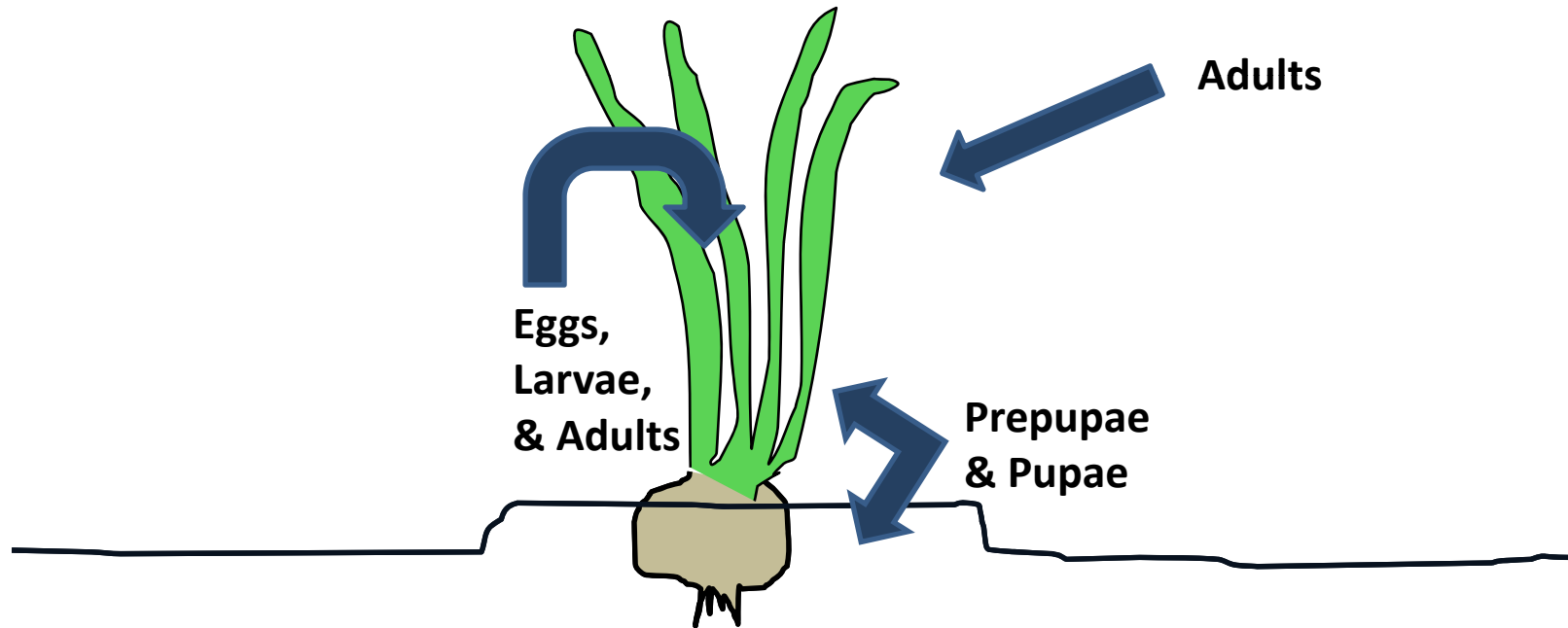
- Females reproduce asexually (parthenogenesis)
- Short generation time (2-3 wk)
- High mobility of adults
- Rapid development of resistance to insecticides
- Life stage survival strategies
  - Later larval instars are non-feeding & protected (“prepupae” & “pupae”)
  - Eggs are protected – females insert them into leaf tissue



Thrips life stages

# Sources of onion thrips

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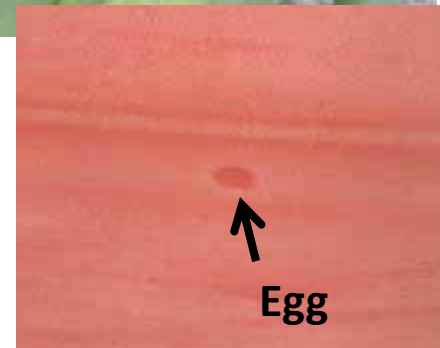
# Thrips sampling tools

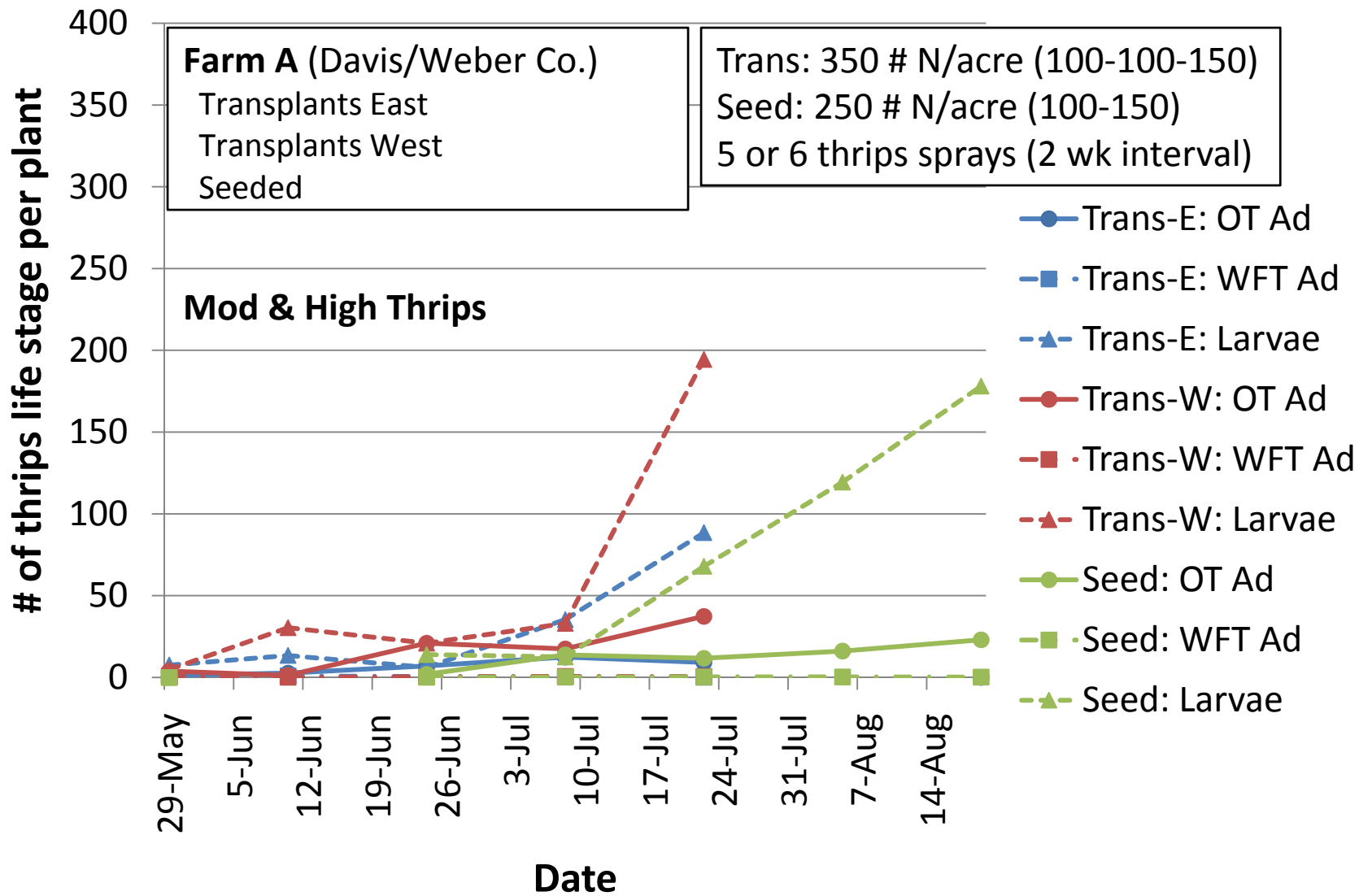
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## 1. Whole plant wash

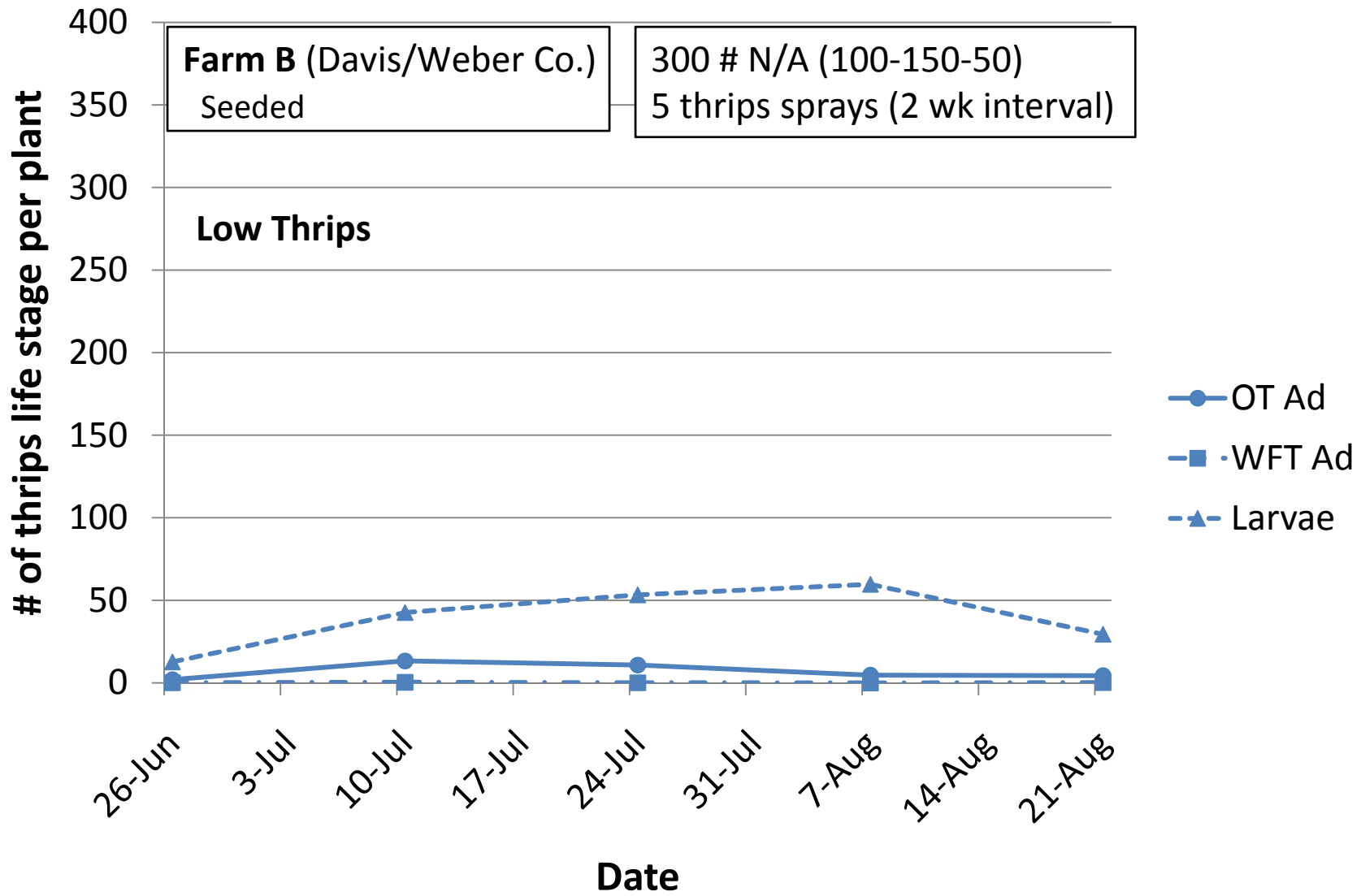


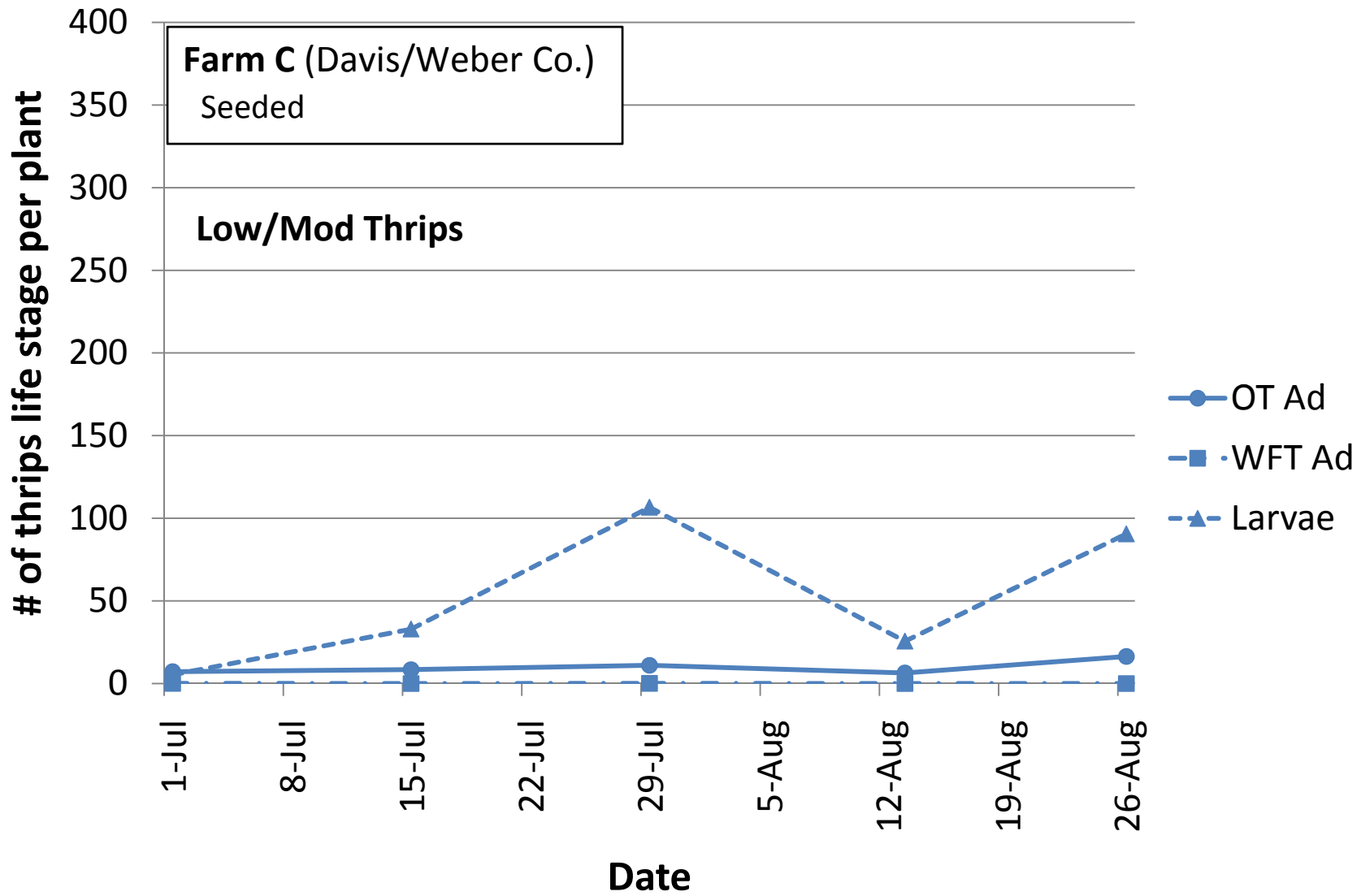
## 2. Stain 3<sup>rd</sup> leaf

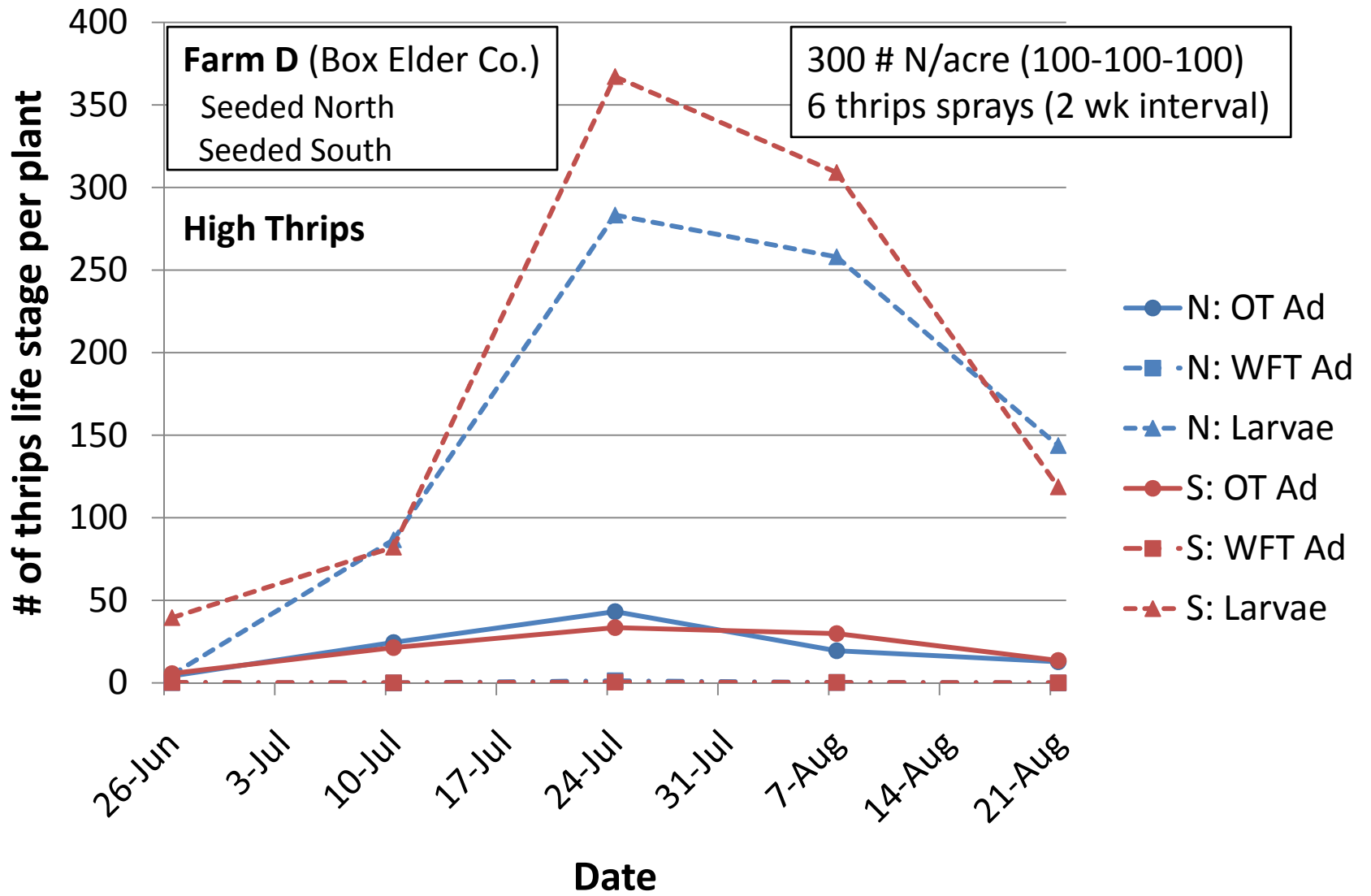


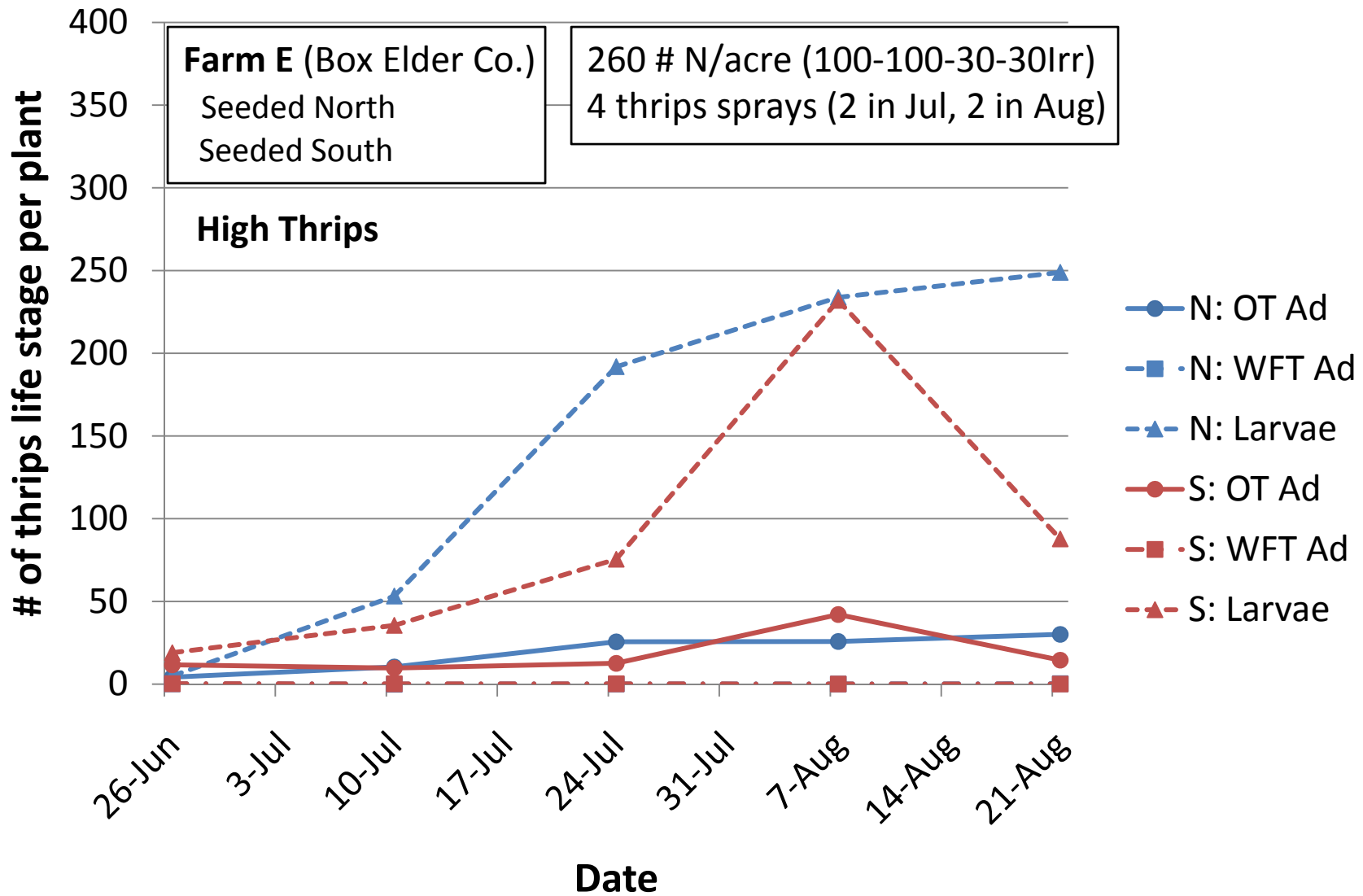


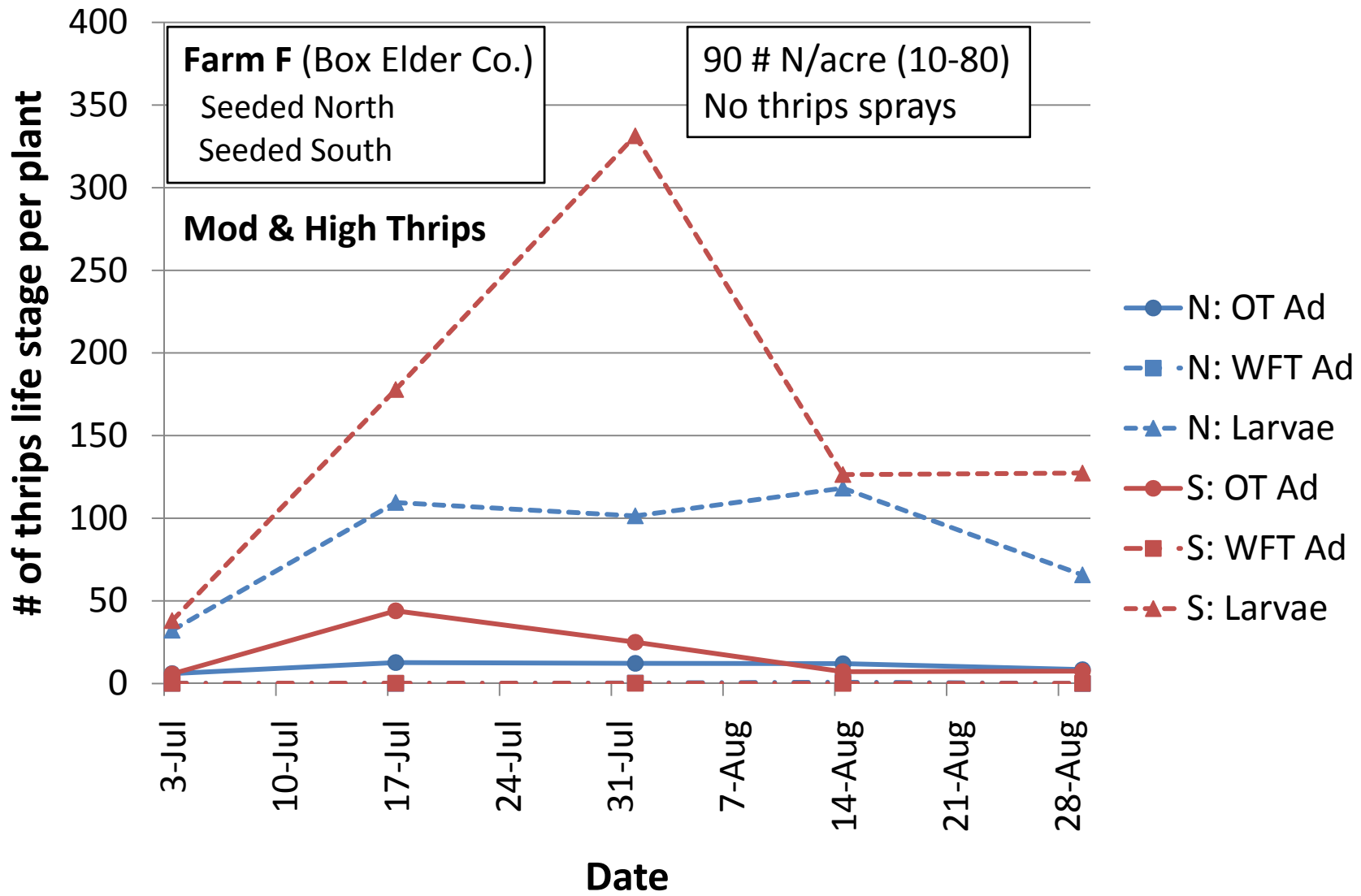


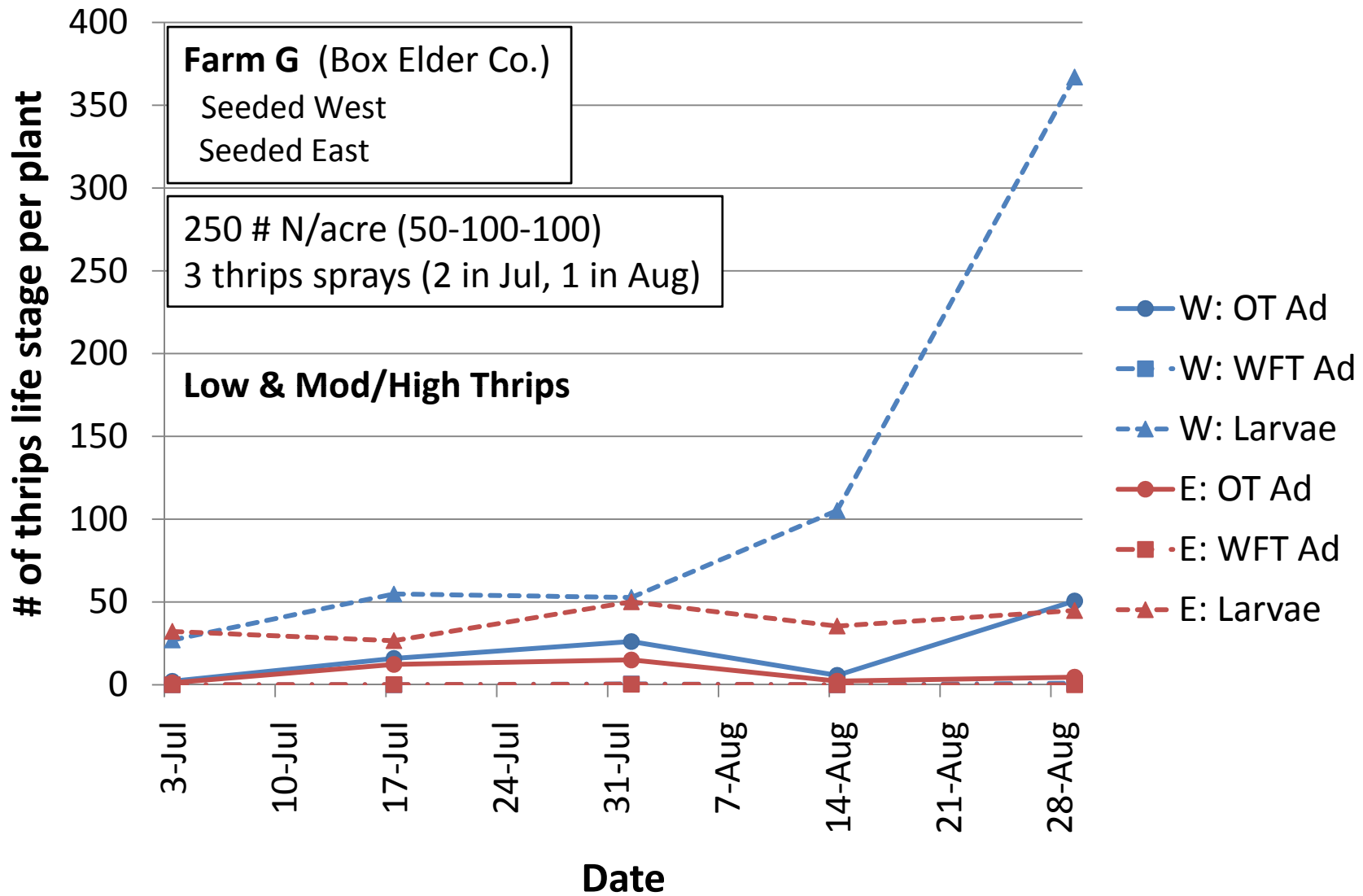


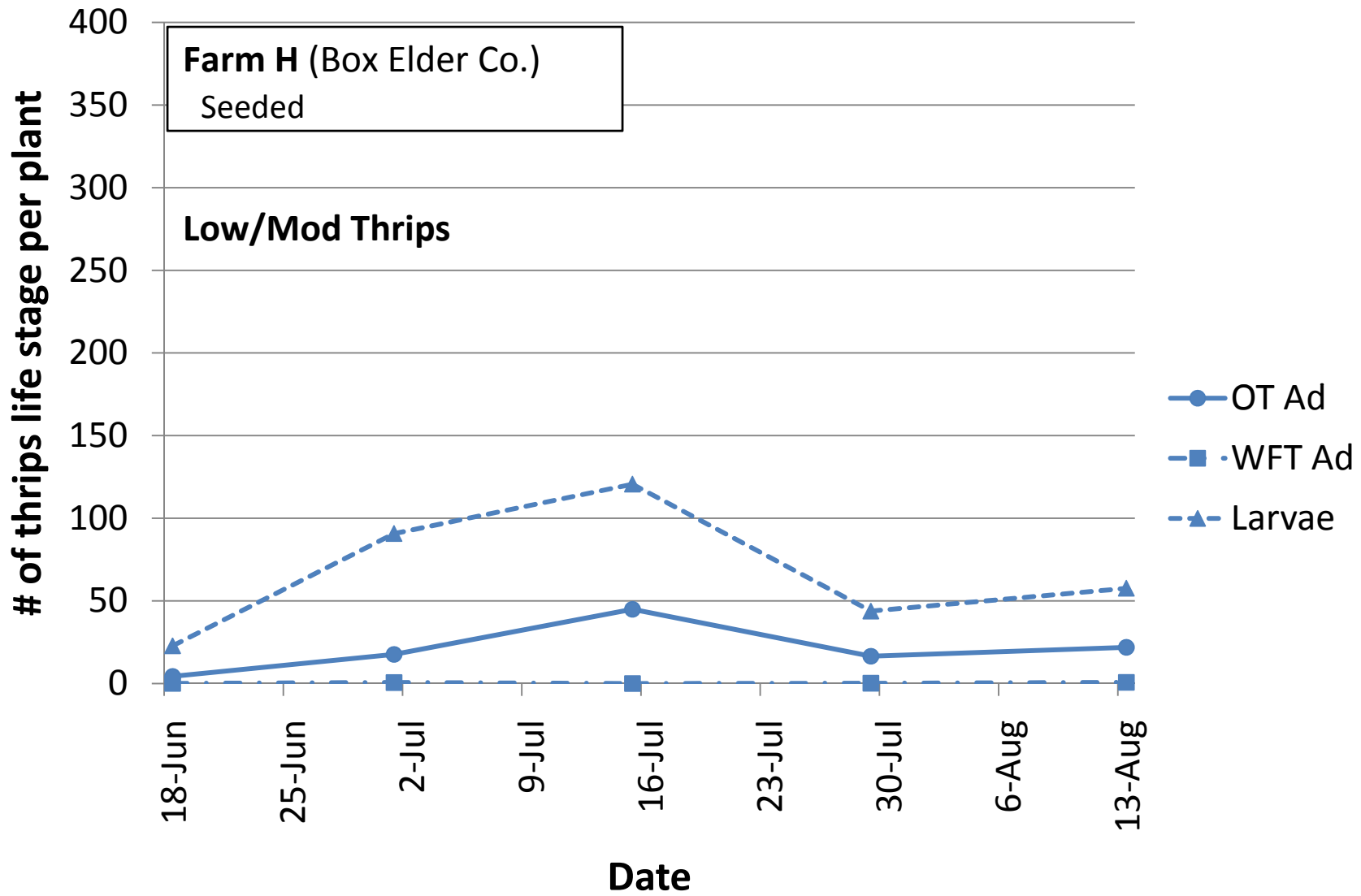


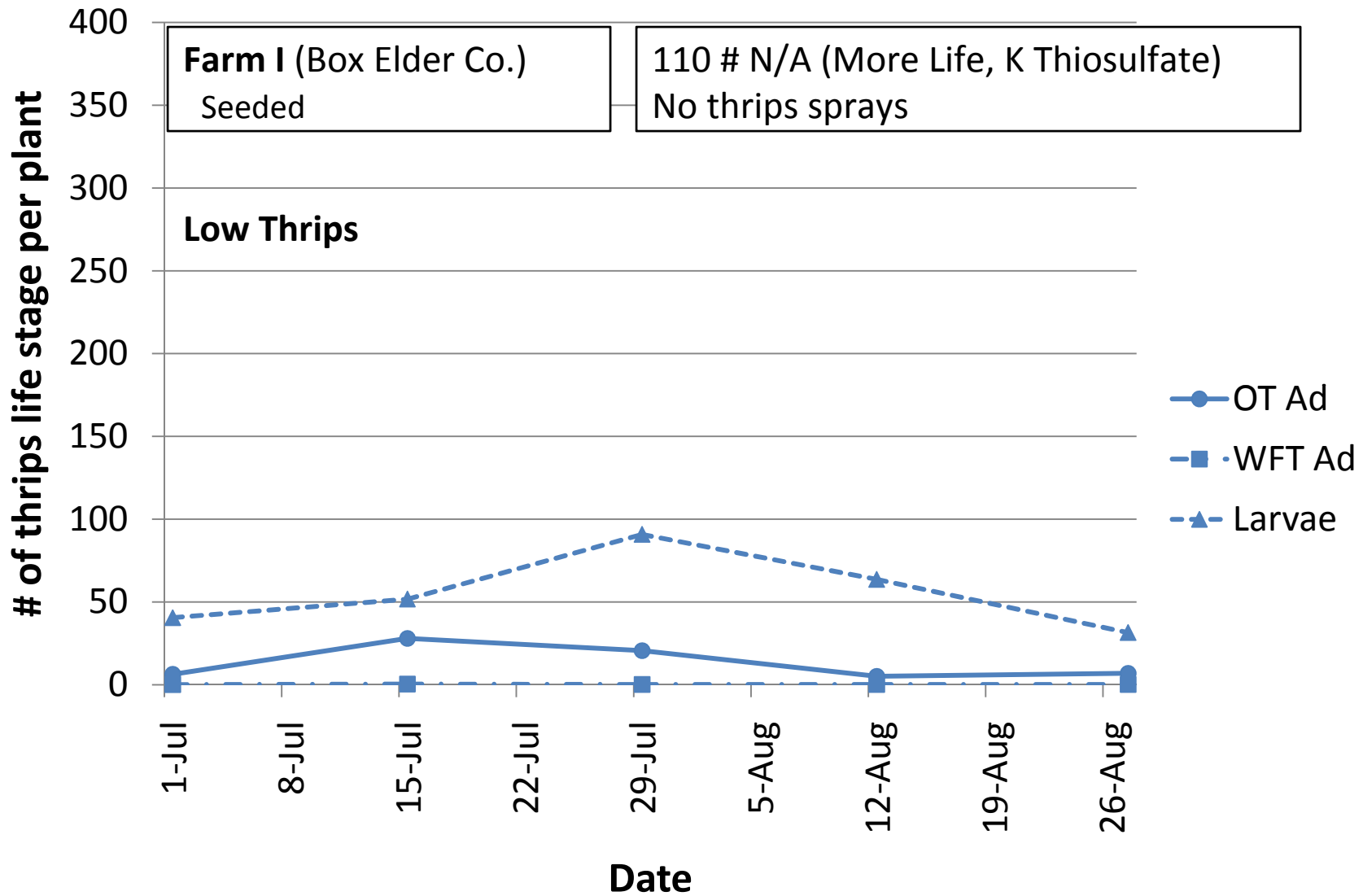






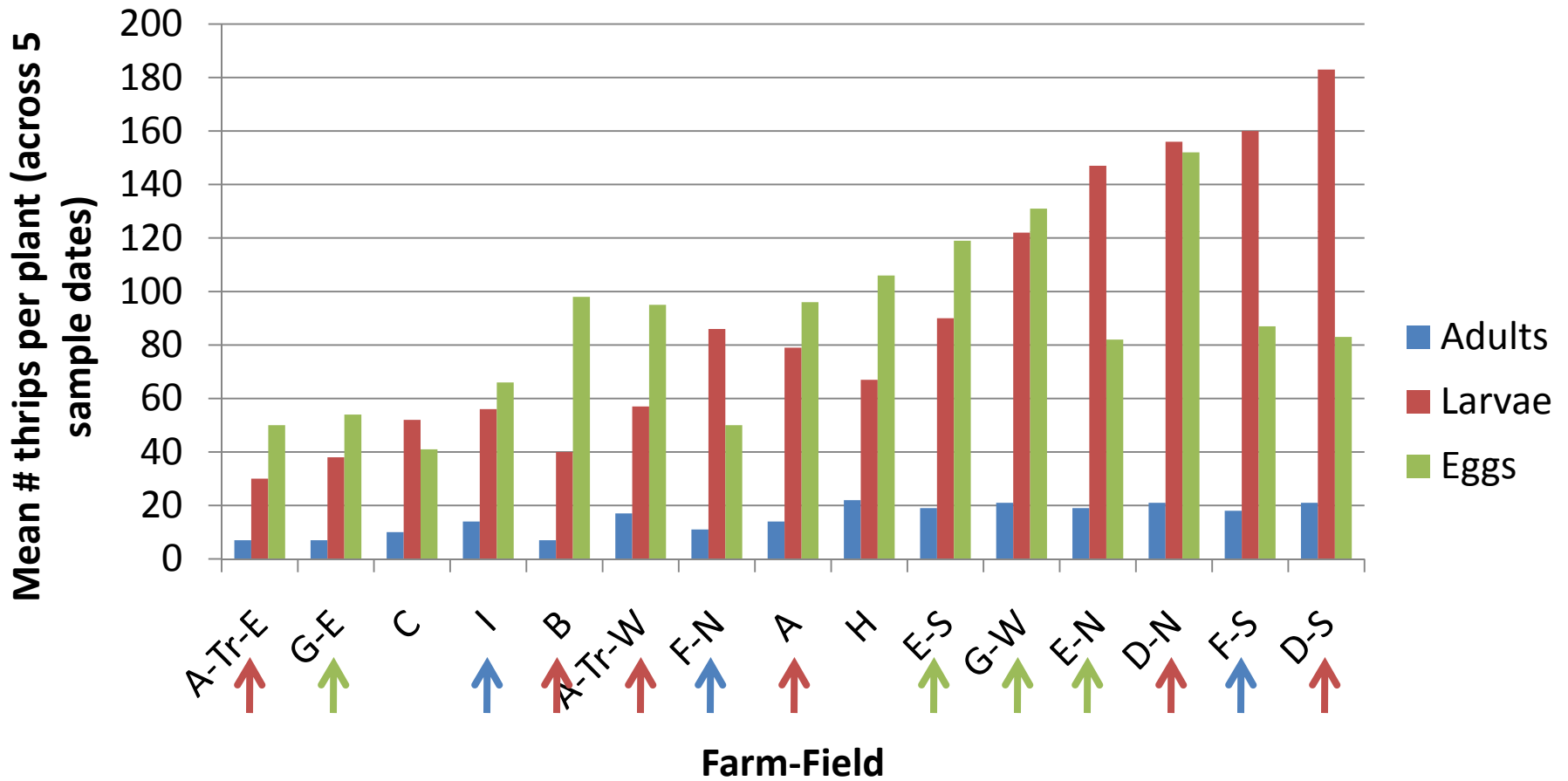






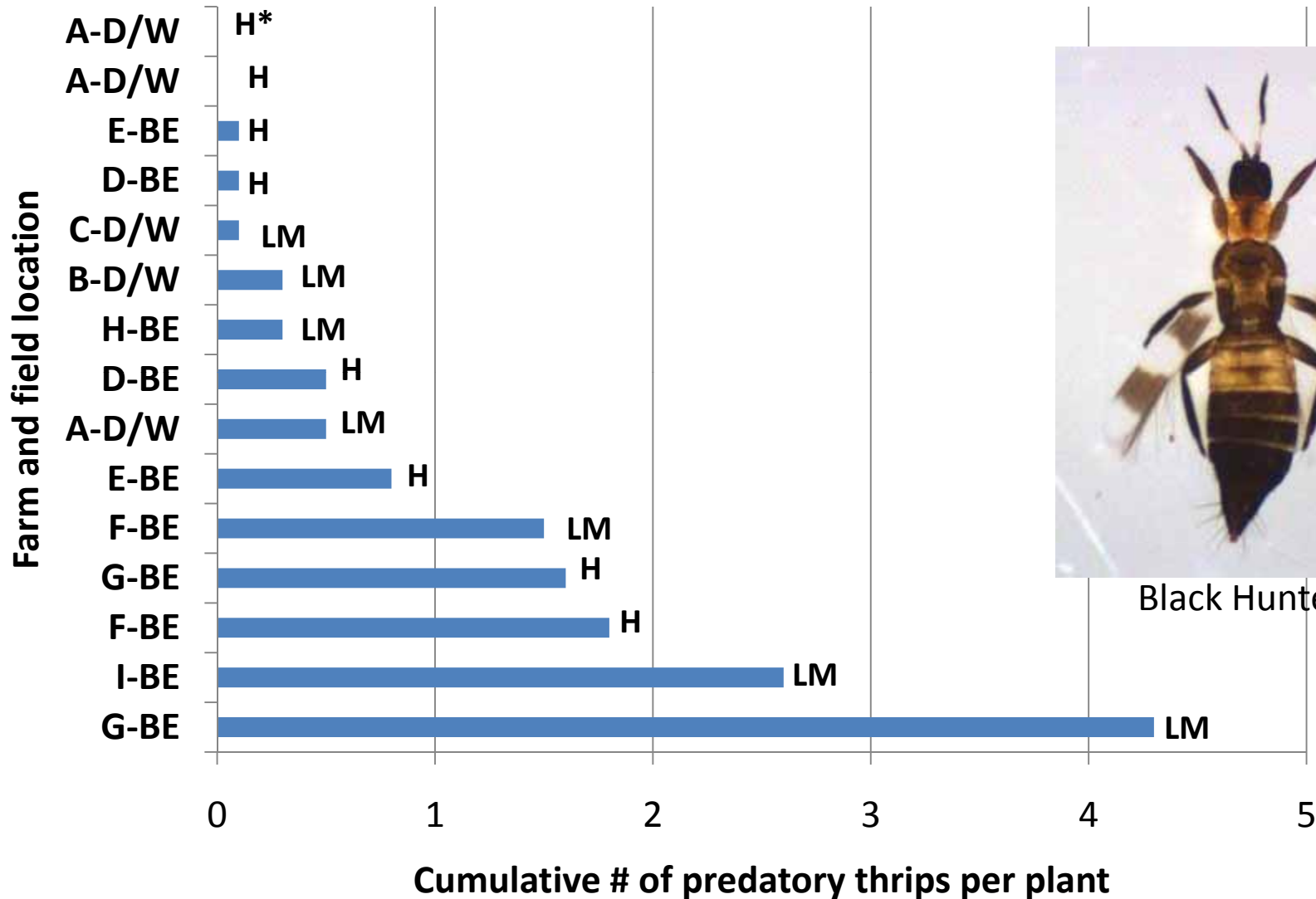


# Summary of Thrips Populations in Onion Fields



Farms F & I: Lo N, No sprays; Farms E & G: Mod N, Mod sprays;  
 Farms A, B & D: Hi N, Hi sprays; Farms C & H: no data

# Predatory Thrips Abundance



Black Hunter Thrips

\*H indicates fields with high onion thrips densities and LM indicates fields with low to moderate onion thrips densities.

# Acknowledgements

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**Utah onion grower cooperators**

**Lincoln Andreasen,  
USU undergraduate student**

**Jennifer Reeve**

**Dan Drost**

**C. Kent Evans**

**USU onion research/extension  
team**

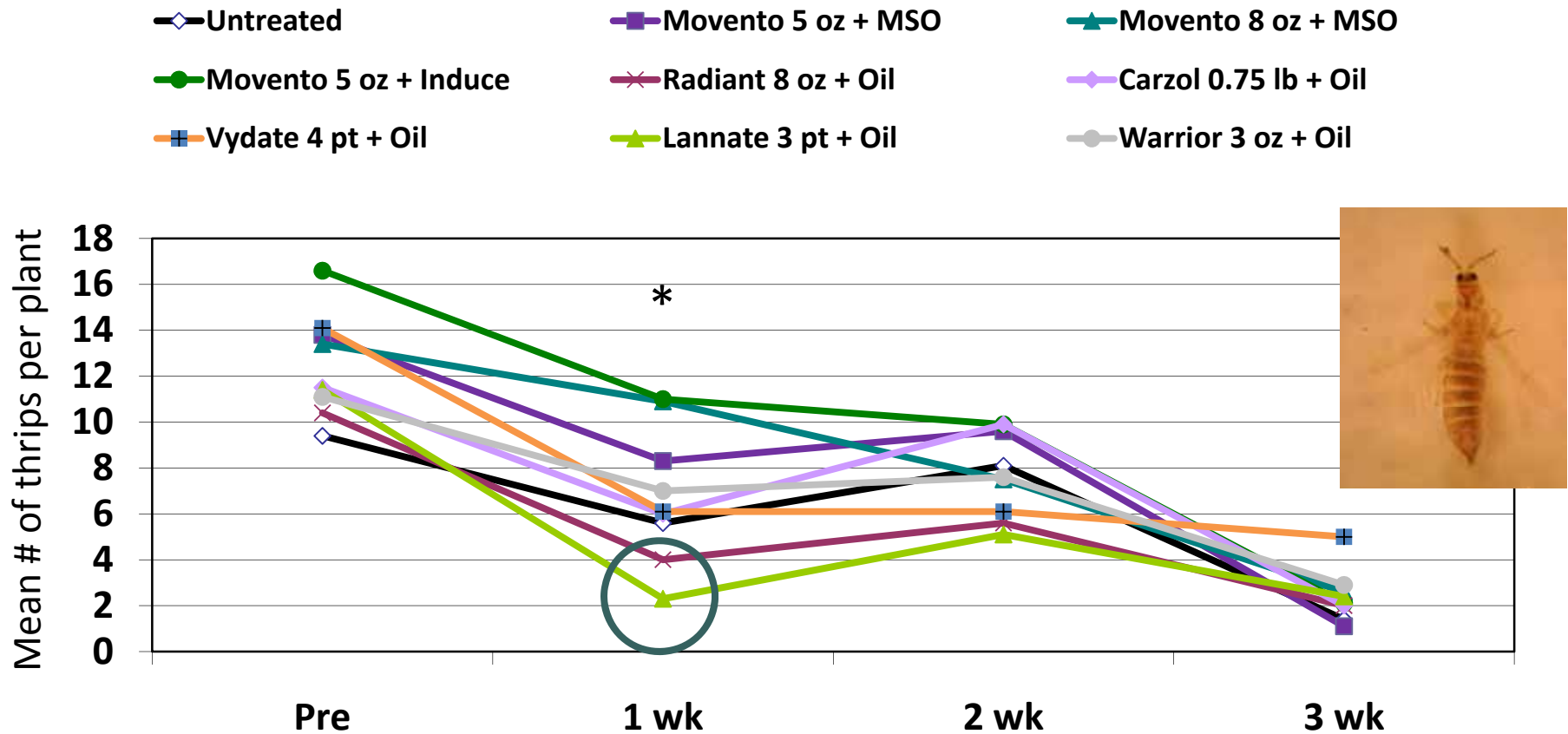
**Funding:**

**Western Region SARE**

# Insecticide efficacy

## Adult Onion Thrips (*Thrips tabaci*)

### July, 2007

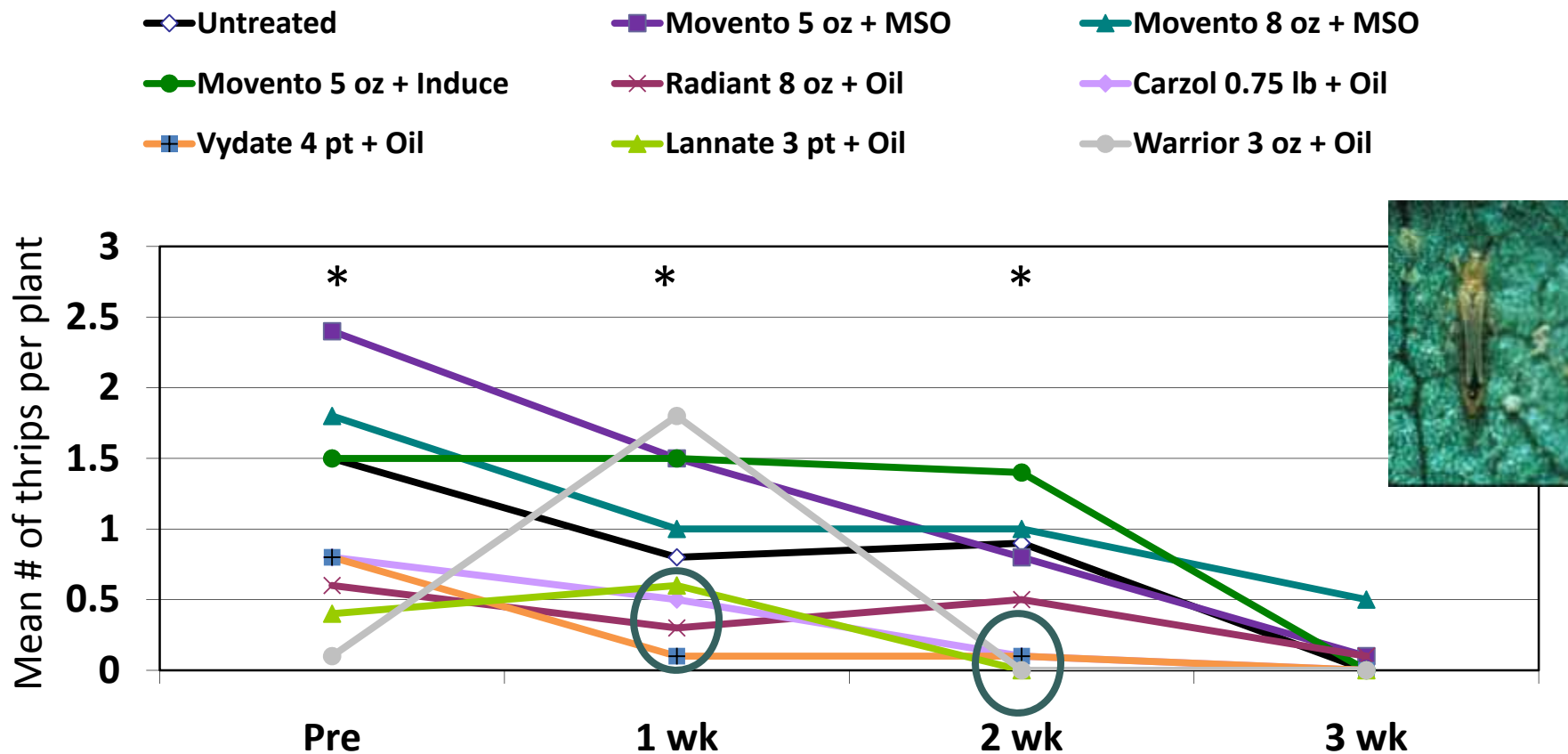


In an August trial, NS differences among treatments

# Insecticide efficacy

## Adult Western Flower Thrips (*Frankliniella occidentalis*)

### July, 2007

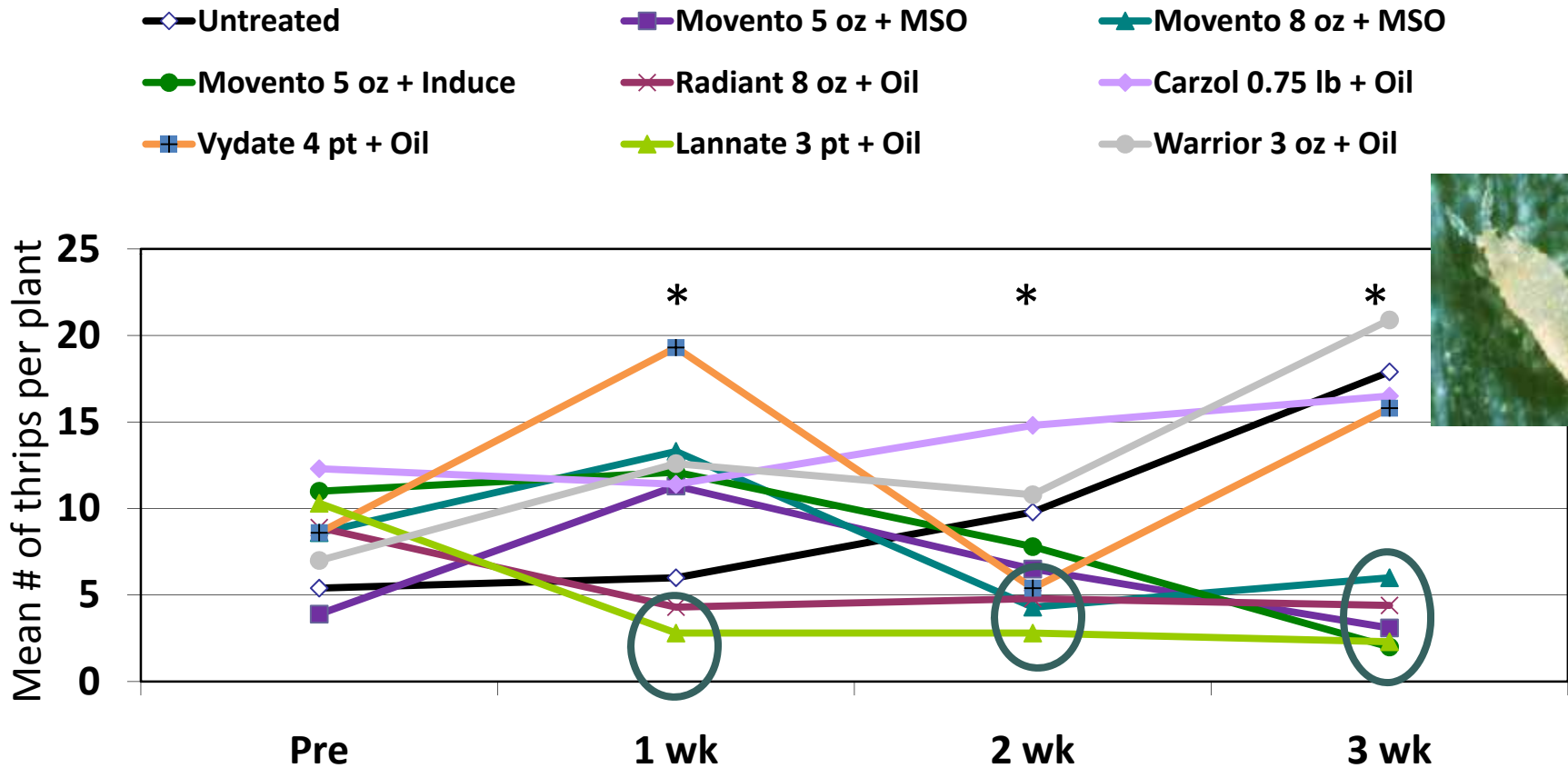


Similar results in an August trial

# Insecticide efficacy

## Thrips Larvae

### July, 2007



Similar results in an August trial

# Egg hatch from leaves

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## ⦿ Egg hatching chamber

- Plastic bag
- Collect 3<sup>rd</sup> onion leaf (8 reps per treatment)
- Wash leaves & place in hatching chamber with moist filter paper
- Place at 25°C for 2 wk
- Wash to collect thrips from leaf & inside of bag at 1 & 2 wk



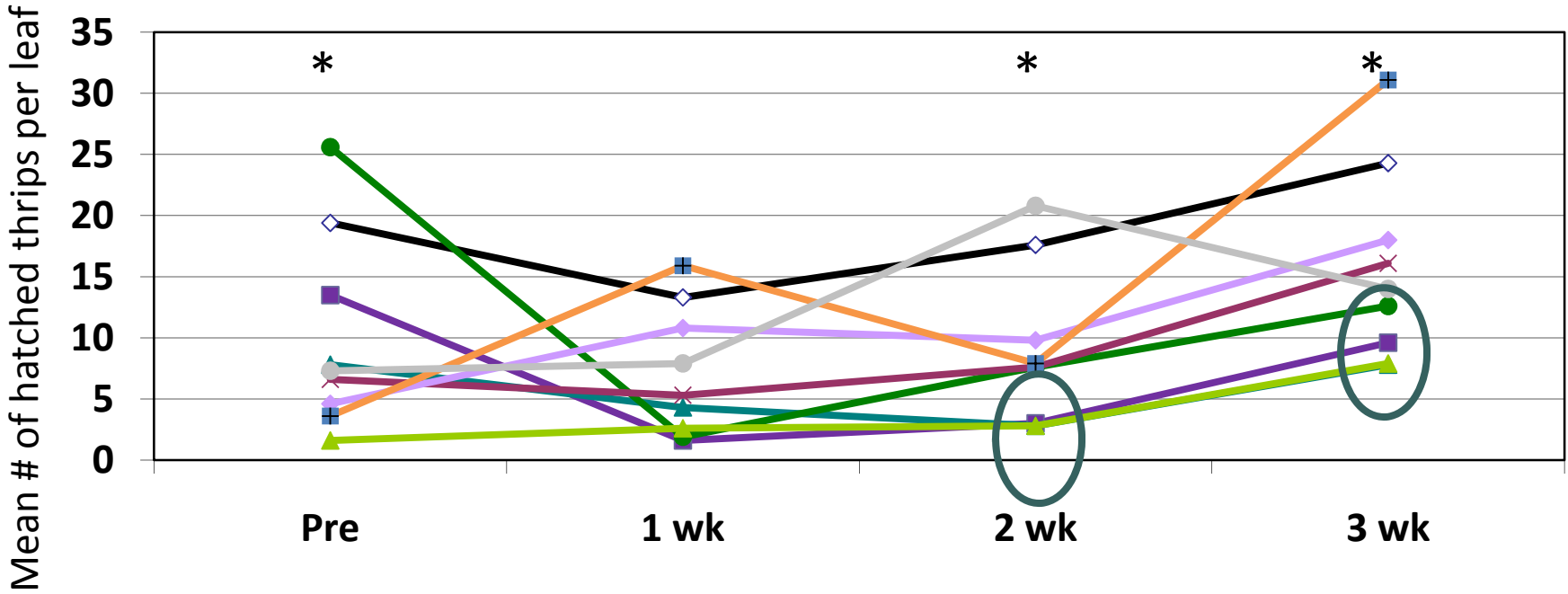
High-tech thrips hatching chamber

# Insecticide efficacy

## Thrips egg hatch (over 2 wk)

### July, 2007

- ◆ Untreated
- Movento 5 oz + MSO
- ▲ Movento 8 oz + MSO
- Movento 5 oz + Induce
- × Radiant 8 oz + Oil
- ◆ Carzol 0.75 lb + Oil
- Vydate 4 pt + Oil
- ▲ Lannate 3 pt + Oil
- Warrior 3 oz + Oil

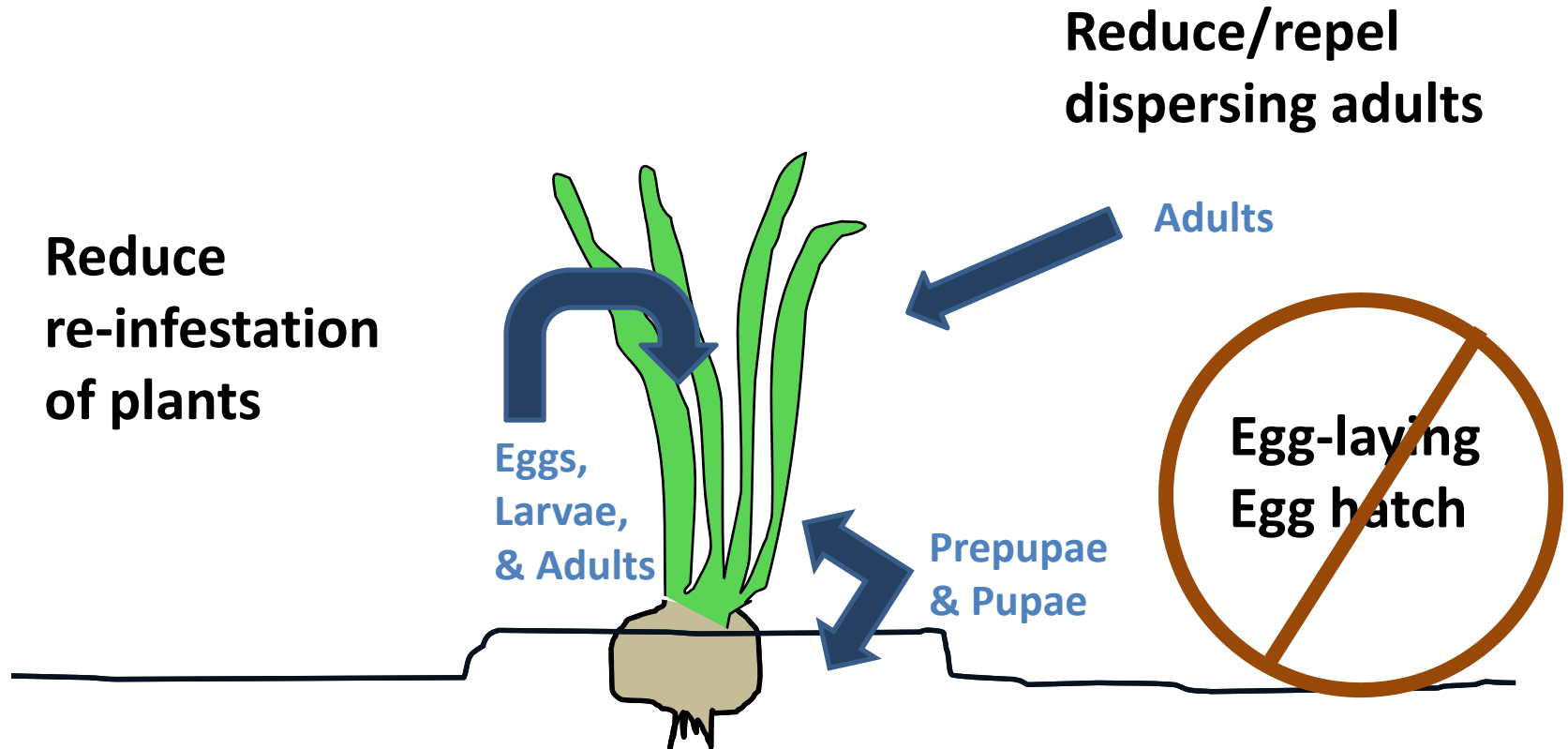


Results from an August trial were similar



# Onion thrips life history

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## Many ways to “skin a cat” - Multi-pronged approach will be the most sustainable

- Mortality factor (insecticide):
  - Short-term → quick knock-down of adults & larvae
  - Longer-term → egg reservoir in leaves (2 wk)
  - Longer-term → immigration of adults
  - Longer-term → survival of pre-pupae & pupae

# Multi-pronged approach will be the most sustainable

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**Sustained  
Mortality &  
Repellency  
of Thrips**

## **Cultural practices:**

- **Sprinkler irrigation**
- **Varietal tolerance**
- **Mulches**
- **Trap crops**
- **Nitrogen management**

## **Insecticides:**

- **Manage to prevent resistance**
- **Systemic activity**
- **Slow release (microencap)**
- **Ovicide, larvicide, adulticide**
- **Repellents**
- **Combinations**

# Thrips population suppression strategies

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- Make onions as tolerant / unattractive to thrips as possible
- Start suppression early in the season
- Use long-term suppressive controls
  - Target egg reservoir in leaves
  - Target multiple life stages



Morgan Reeder field on 2006  
Utah Onion Tour, Corinne, UT