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

Diane Alston
USU Extension

Utah Onion Association Meeting
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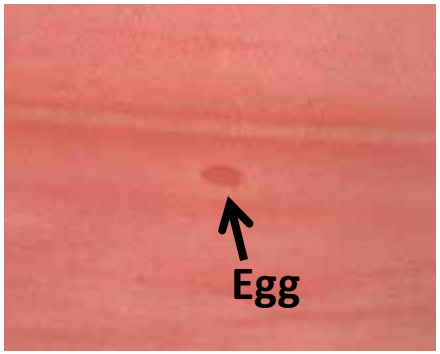
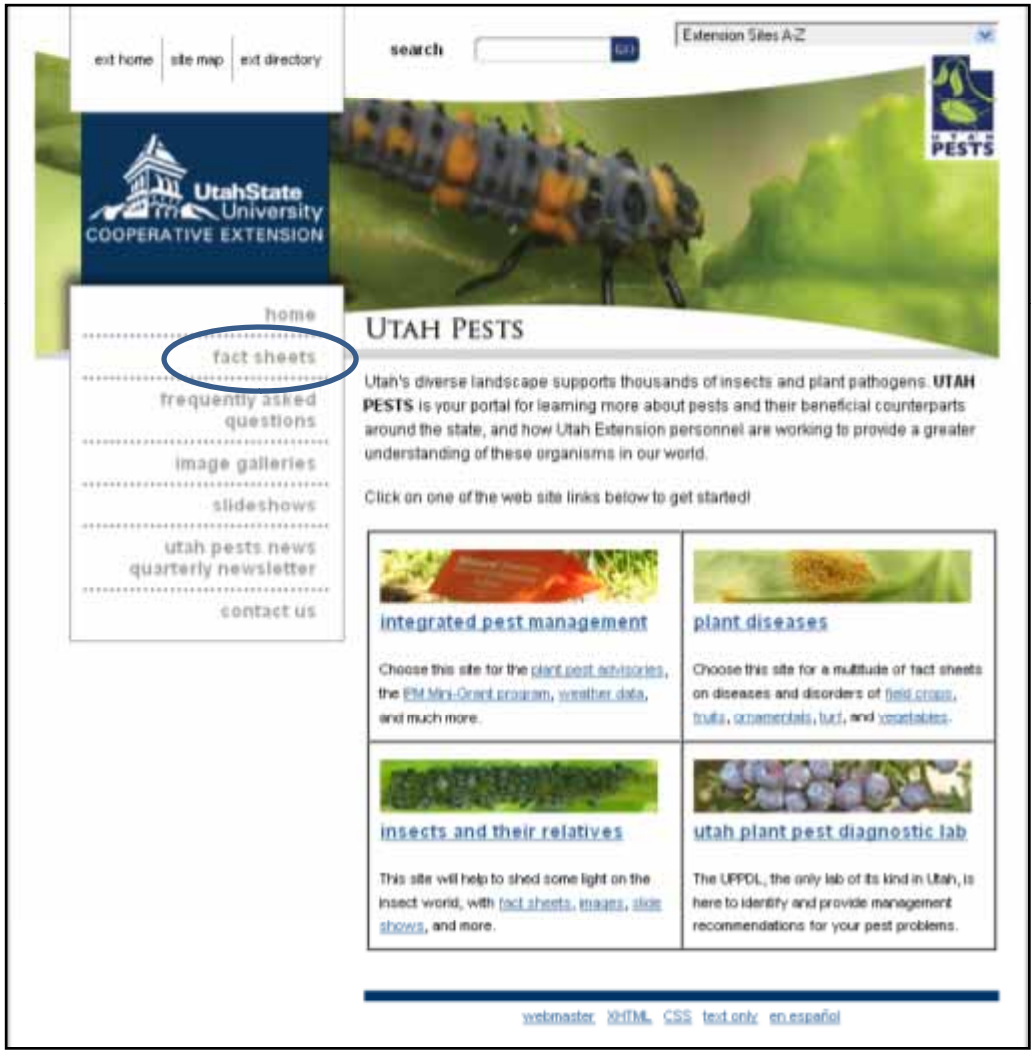



UtahState University

# Onion Thrips Fact Sheet


# www.utahpests.usu.edu



# Western Region SARE Grant:
## 2008: Survey of commercial onion fields

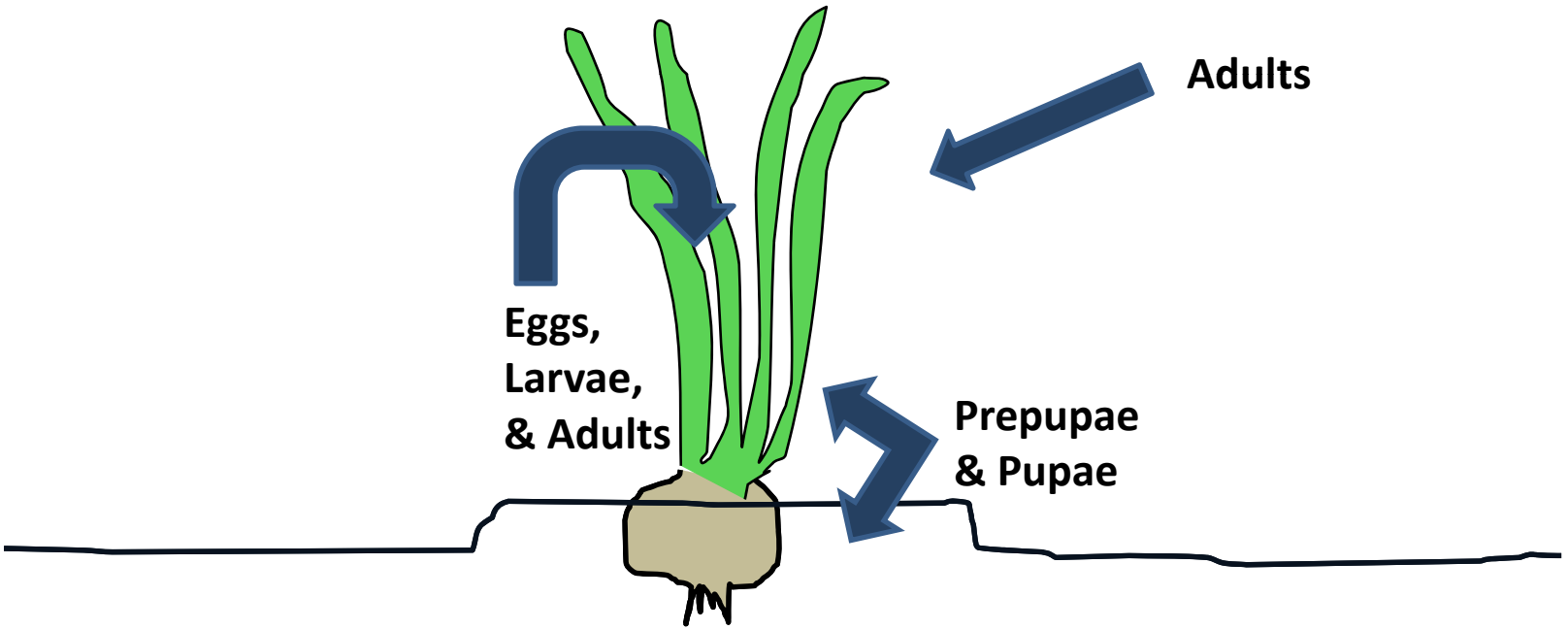
- Describe onion thrips population dynamics in commercial onion fields
  - 9 farms / 15 fields (2 transplanted, 13 seeded)
- Relationship of crop management practices to thrips densities (N, irrigation, insecticides)
- Relationship of thrips densities to Iris Yellow Spot Virus (ISYV) incidence

# Why are onion thrips such a pest?

- 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

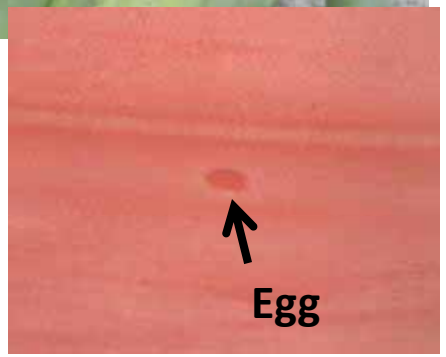


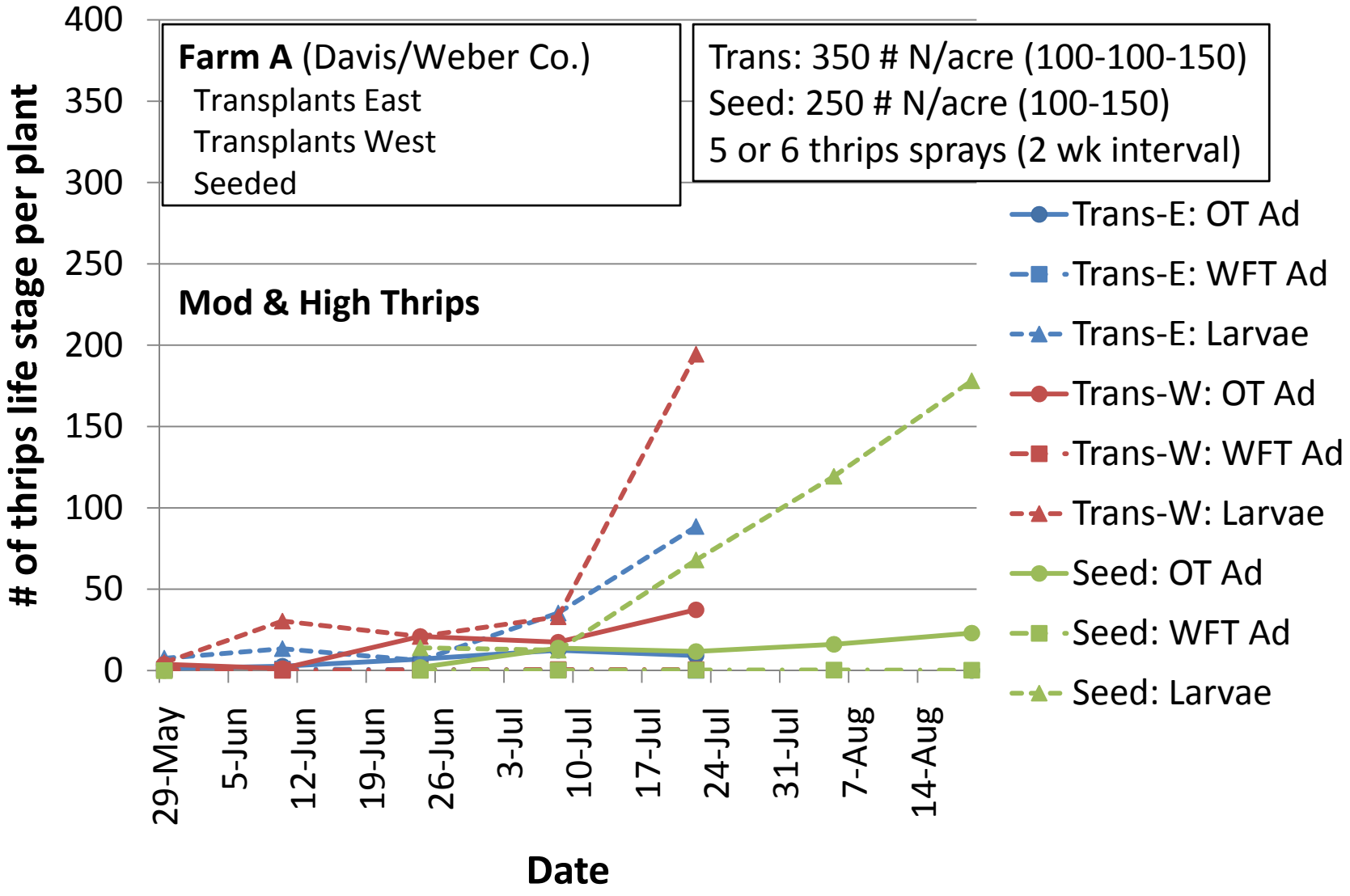
# Thrips sampling tools

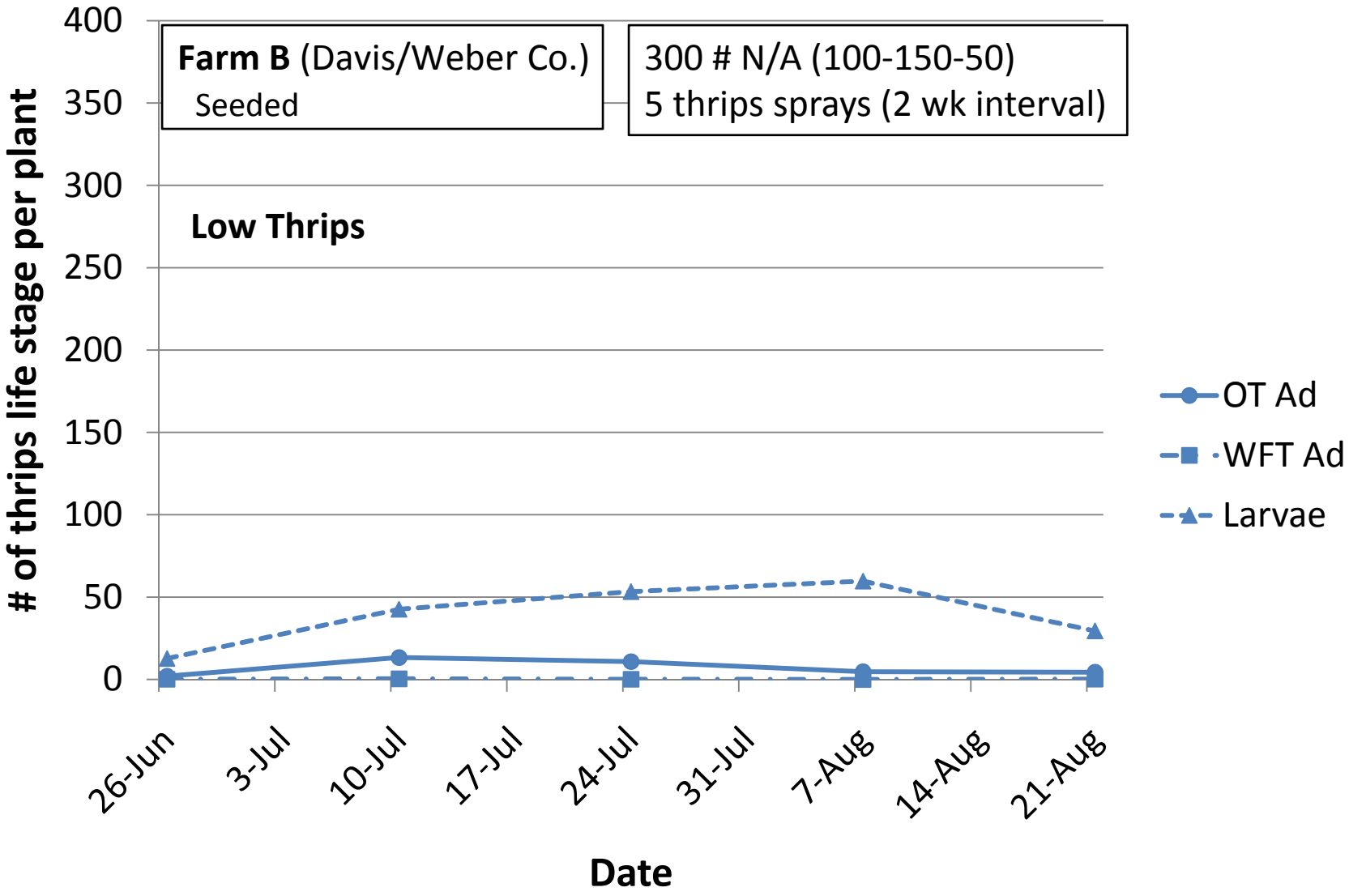
**1. Whole plant wash**

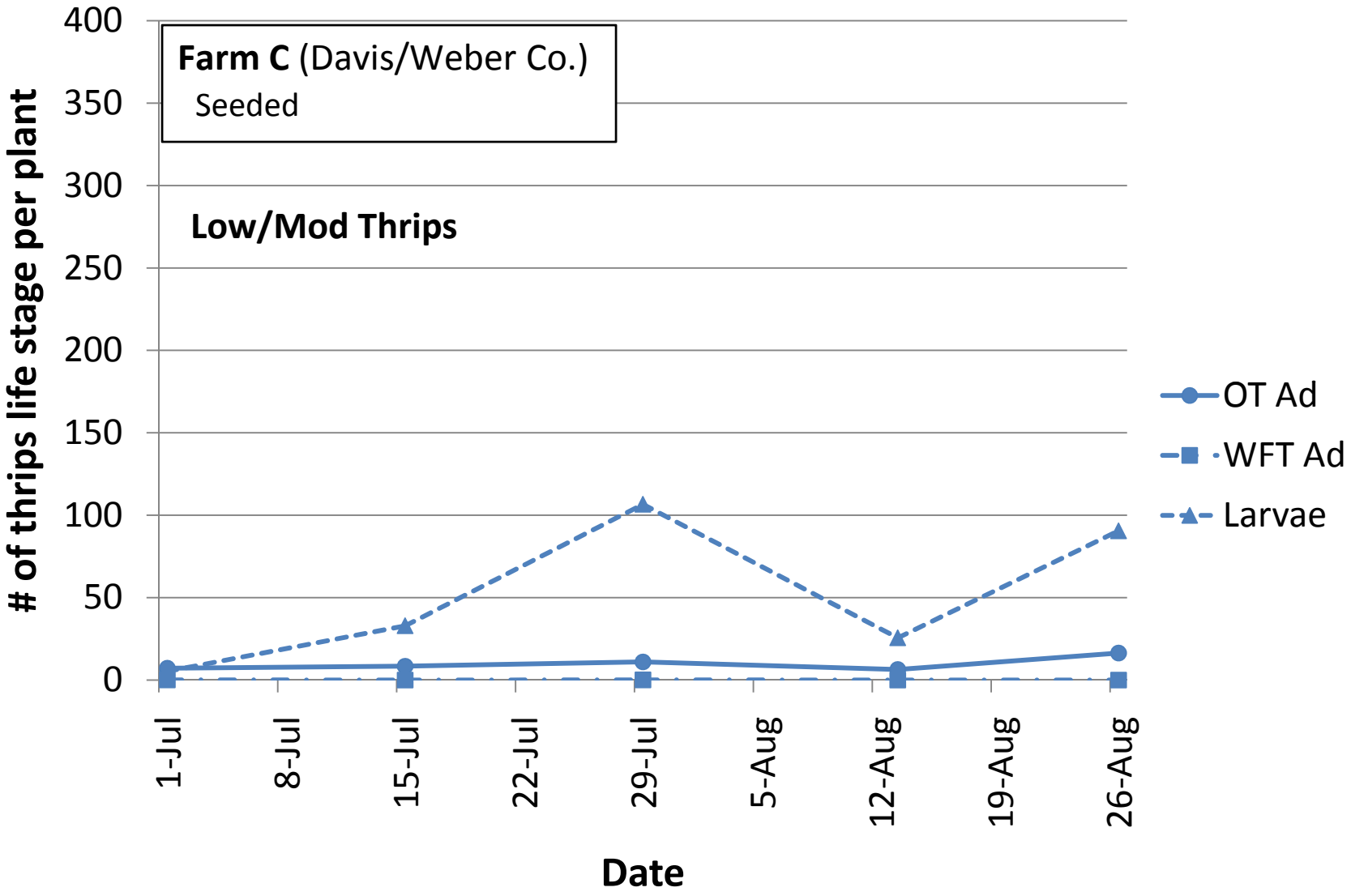


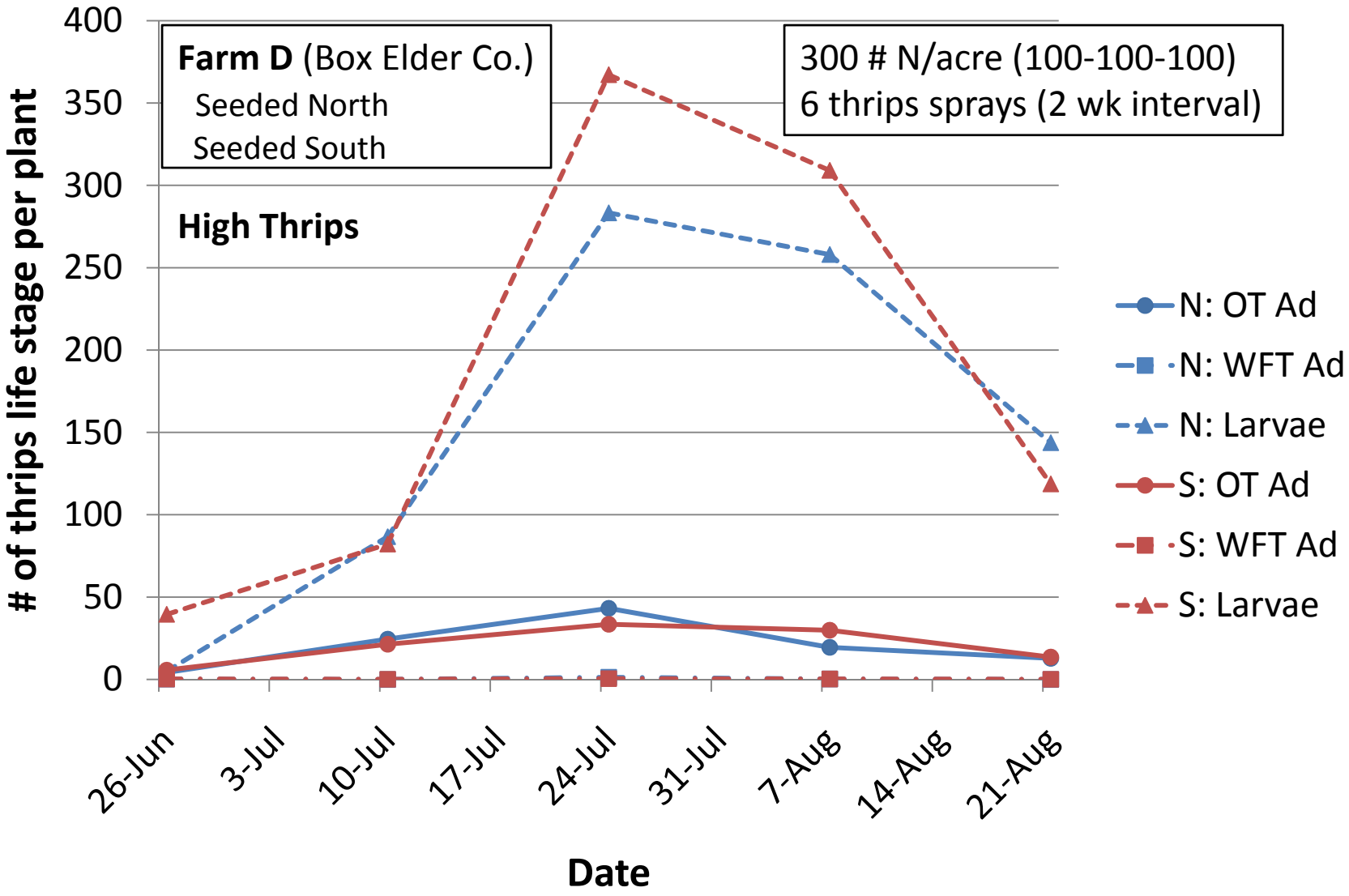
**2. Stain 3rd leaf**

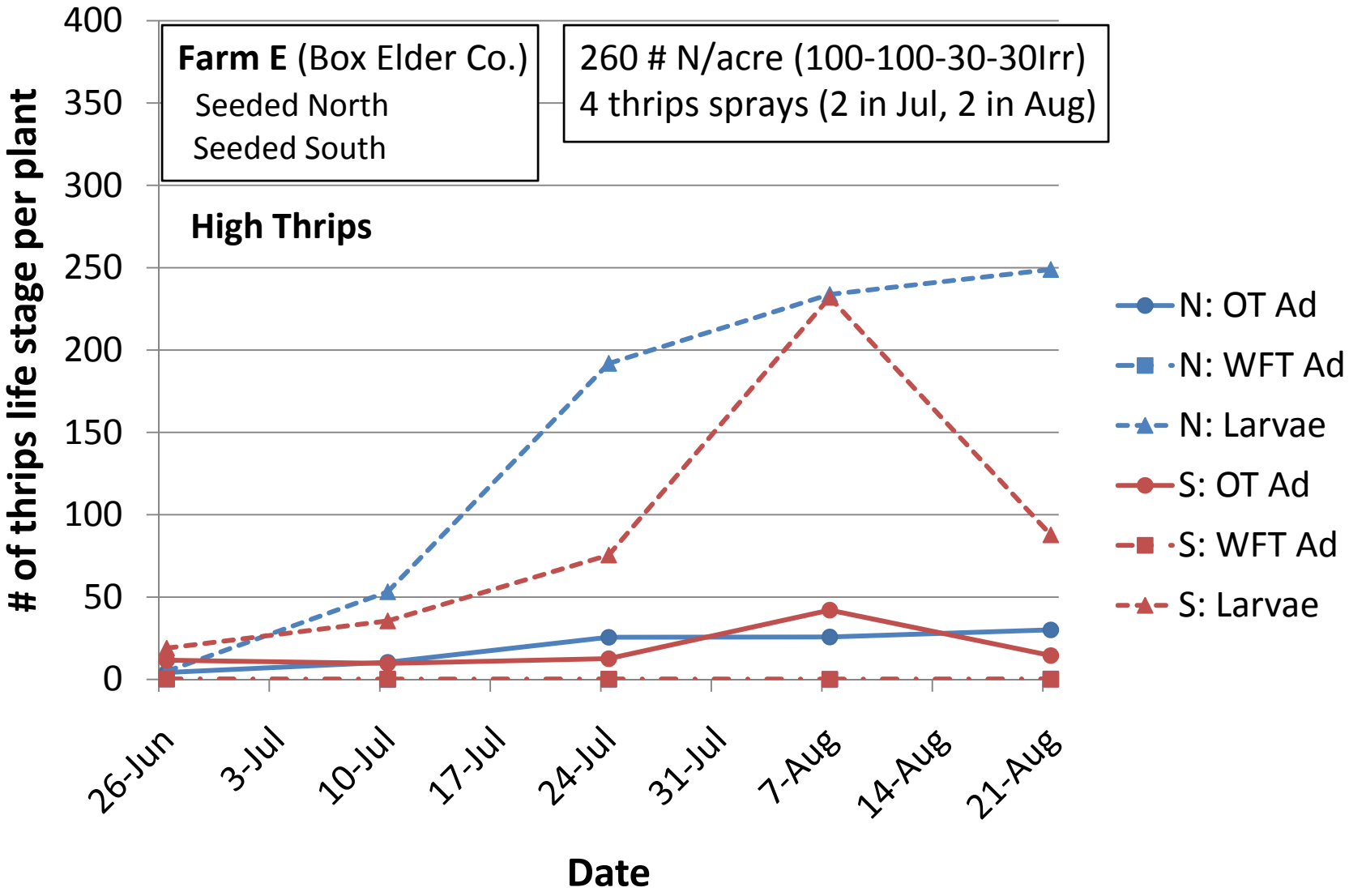


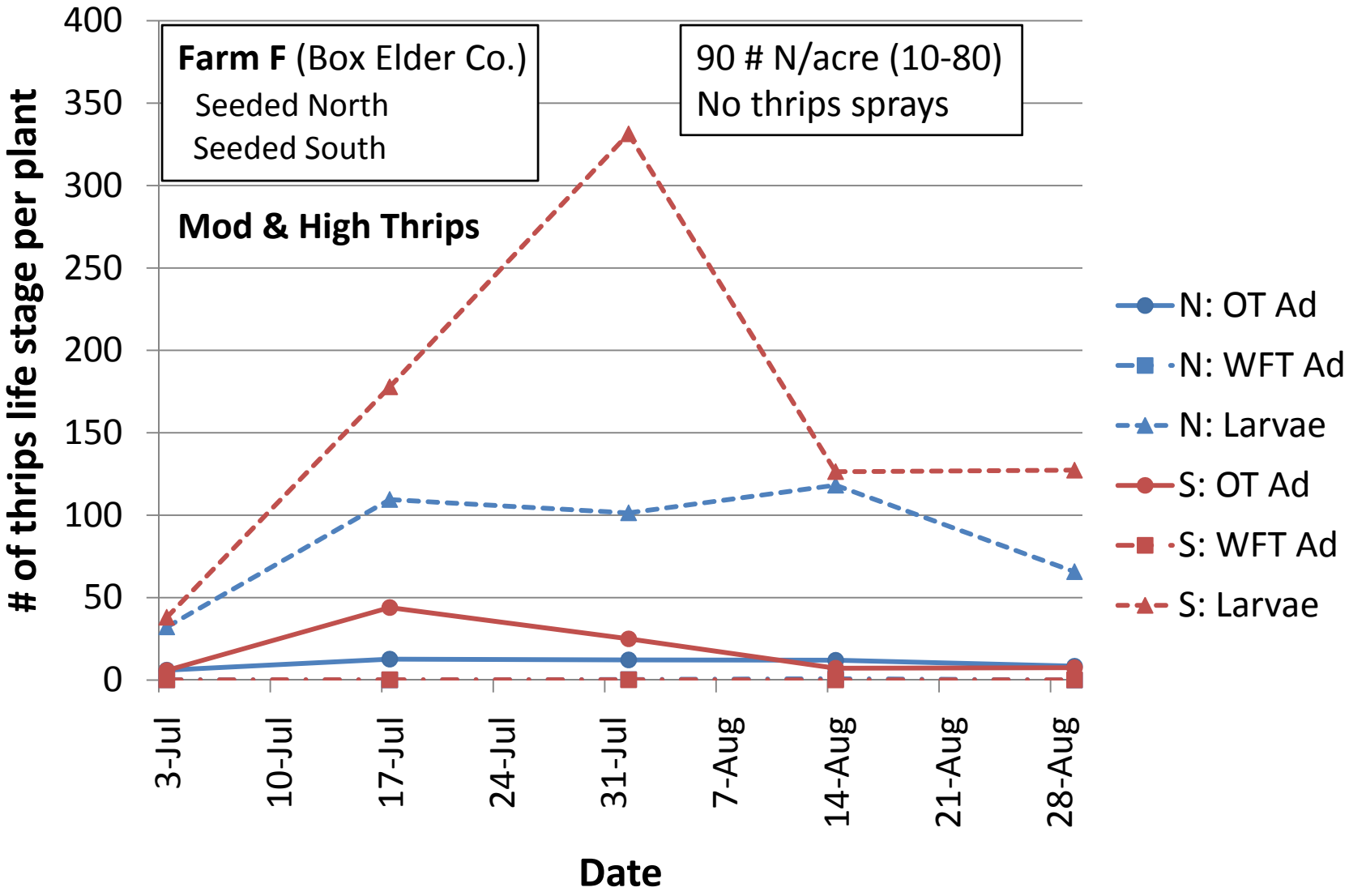

Farm A (Davis/Weber Co.)
Transplants East
Transplants West
Seeded
Trans: 350 # N/acre (100-100-150)
Seed: 250 # N/acre (100-150)
5 or 6 thrips sprays (2 wk interval)
Mod & High Thrips
# of thrips life stage per plant
400
350
300
250
200
150
100
50
0
29-May
5-Jun
12-Jun
19-Jun
26-Jun
3-Jul
10-Jul
17-Jul
24-Jul
31-Jul
7-Aug
14-Aug
Date
Trans-E: OT Ad
Trans-E: WFT Ad
Trans-E: Larvae
Trans-W: OT Ad
Trans-W: WFT Ad
Trans-W: Larvae
Seed: OT Ad
Seed: WFT Ad
Seed: Larvae

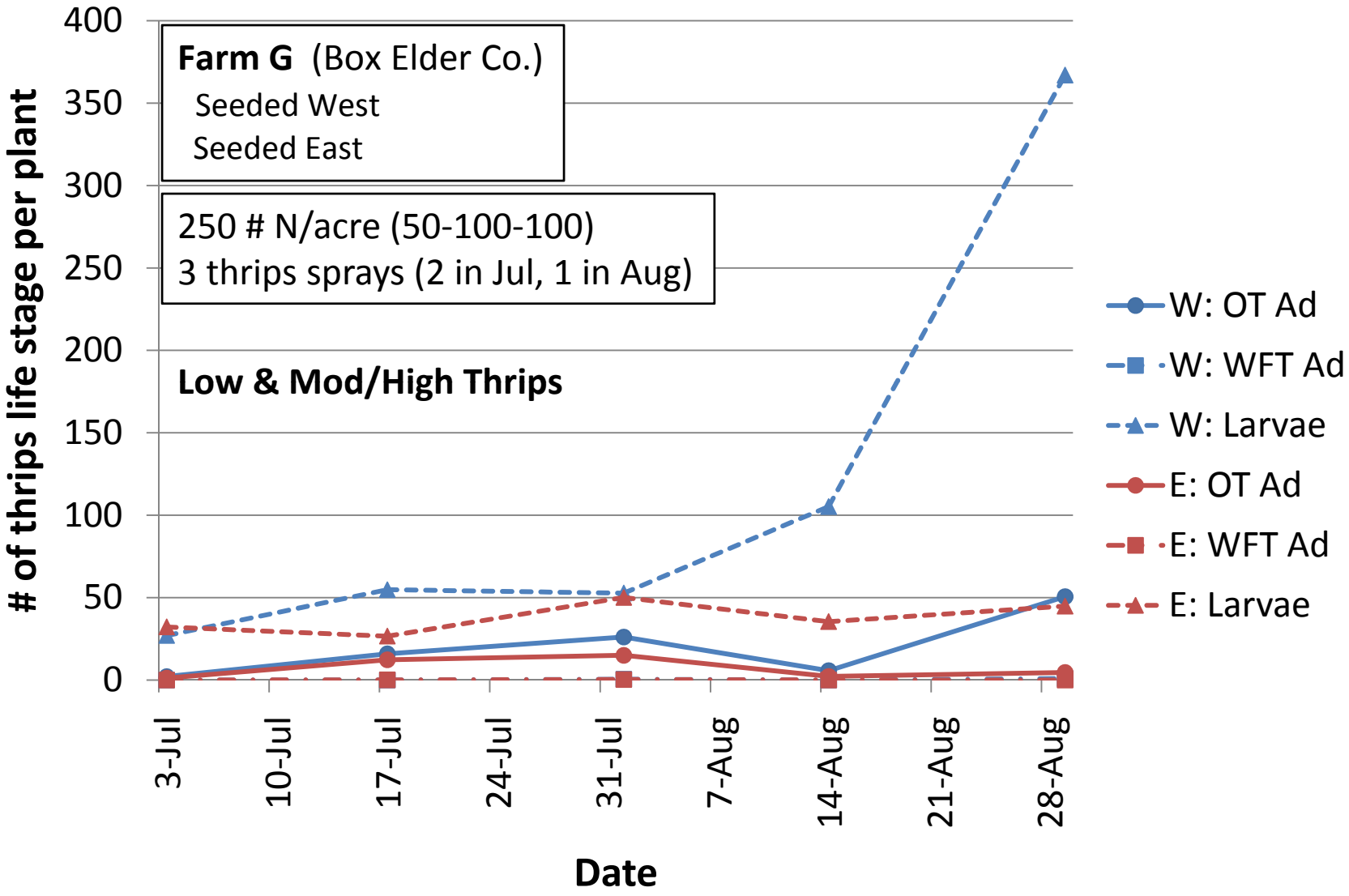

Farm B (Davis/Weber Co.)
Seeded
300 # N/A (100-150-50)
5 thrips sprays (2 wk interval)
Low Thrips
# of thrips life stage per plant
400
350
300
250
200
150
100
50
0
26-Jun
3-Jul
10-Jul
17-Jul
24-Jul
31-Jul
7-Aug
14-Aug
21-Aug
Date
OT Ad
WFT Ad
Larvae

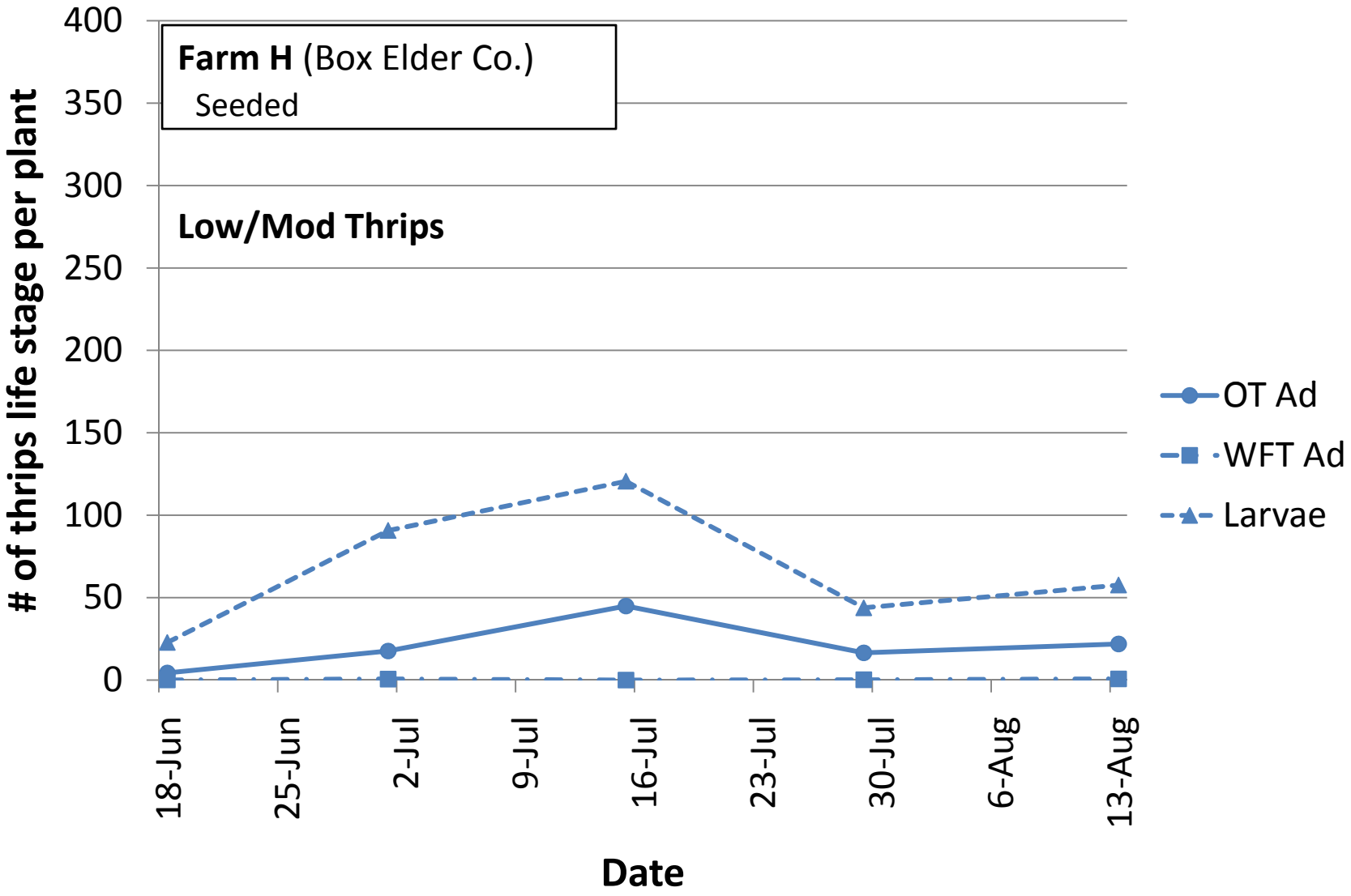

Farm C (Davis/Weber Co.)
Seeded
Low/Mod Thrips
# of thrips life stage per plant
400
350
300
250
200
150
100
50
0
1-Jul
8-Jul
15-Jul
22-Jul
29-Jul
5-Aug
12-Aug
19-Aug
26-Aug
Date
OT Ad
WFT Ad
Larvae

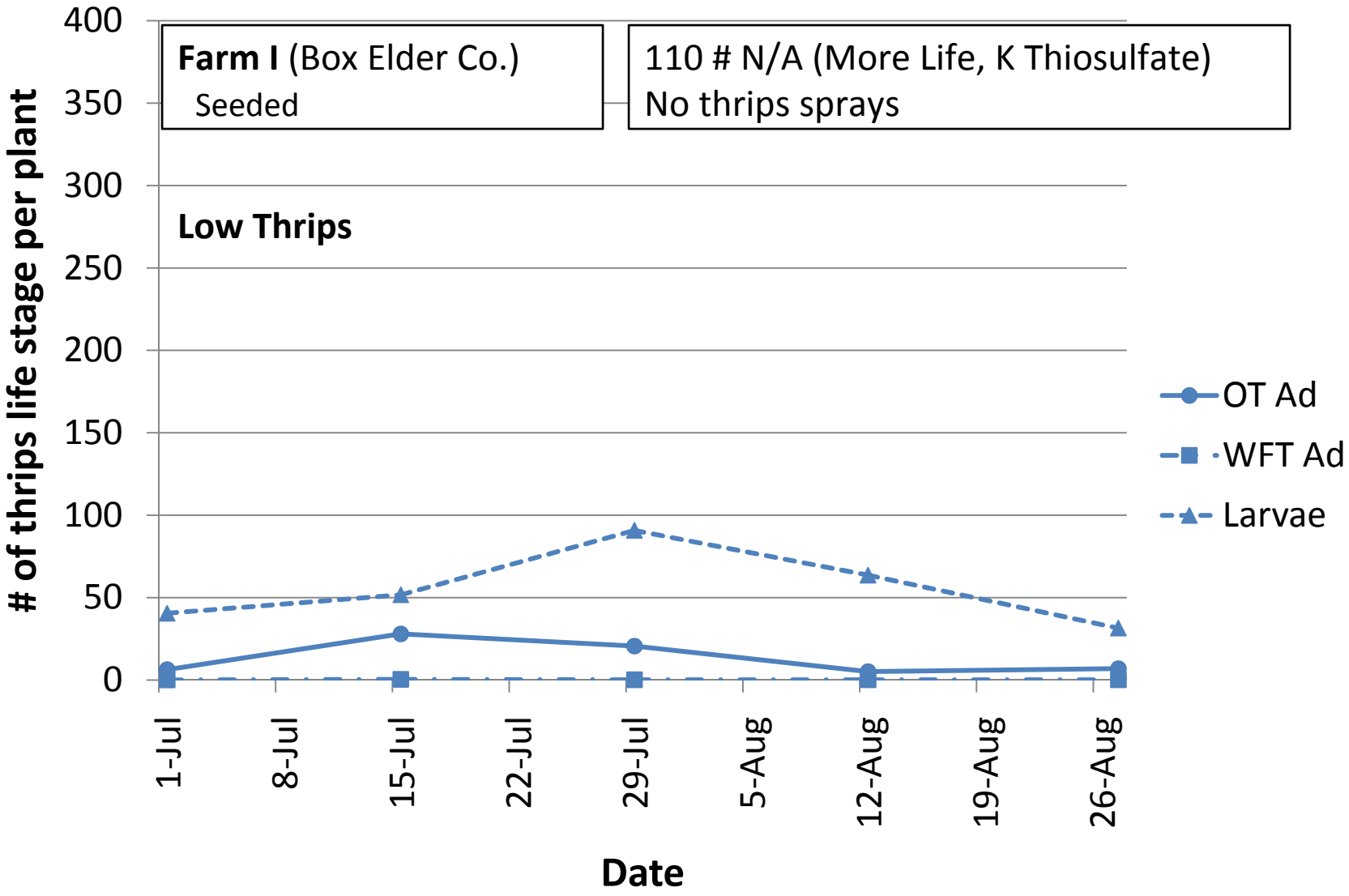

Farm D (Box Elder Co.)
Seeded North
Seeded South
High Thrips
300 # N/acre (100-100-100)
6 thrips sprays (2 wk interval)
# of thrips life stage per plant
400
350
300
250
200
150
100
50
0
26-Jun
3-Jul
10-Jul
17-Jul
24-Jul
31-Jul
7-Aug
14-Aug
21-Aug
Date
N: OT Ad
N: WFT Ad
N: Larvae
S: OT Ad
S: WFT Ad
S: Larvae


Farm E (Box Elder Co.)
Seeded North
Seeded South
260 # N/acre (100-100-30-30Irr)
4 thrips sprays (2 in Jul, 2 in Aug)
High Thrips
# of thrips life stage per plant
400
350
300
250
200
150
100
50
0
26-Jun
3-Jul
10-Jul
17-Jul
24-Jul
31-Jul
7-Aug
14-Aug
21-Aug
Date
N: OT Ad
N: WFT Ad
N: Larvae
S: OT Ad
S: WFT Ad
S: Larvae

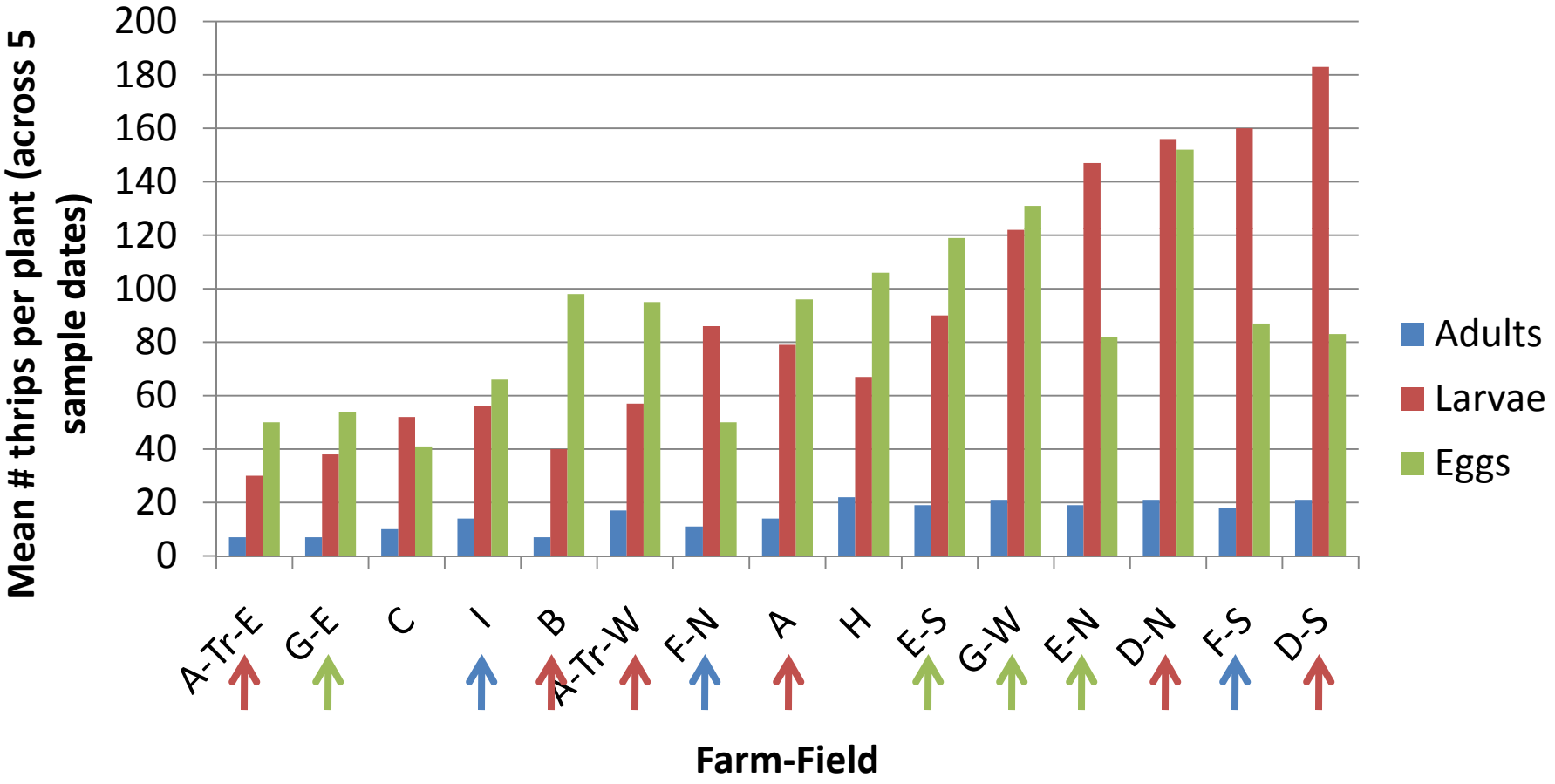

Farm F (Box Elder Co.)
Seeded North
Seeded South
90 # N/acre (10-80)
No thrips sprays
Mod & High Thrips
# of thrips life stage per plant
400
350
300
250
200
150
100
50
0
3-Jul
10-Jul
17-Jul
24-Jul
31-Jul
7-Aug
14-Aug
21-Aug
28-Aug
Date
N: OT Ad
N: WFT Ad
N: Larvae
S: OT Ad
S: WFT Ad
S: Larvae


Farm G (Box Elder Co.)
Seeded West
Seeded East
250 # N/acre (50-100-100)
3 thrips sprays (2 in Jul, 1 in Aug)
Low & Mod/High Thrips
# of thrips life stage per plant
400
350
300
250
200
150
100
50
0
3-Jul
10-Jul
17-Jul
24-Jul
31-Jul
7-Aug
14-Aug
21-Aug
28-Aug
Date
W: OT Ad
W: WFT Ad
W: Larvae
E: OT Ad
E: WFT Ad
E: Larvae


Farm H (Box Elder Co.)
Seeded
Low/Mod Thrips
# of thrips life stage per plant
400
350
300
250
200
150
100
50
0
18-Jun
25-Jun
2-Jul
9-Jul
16-Jul
23-Jul
30-Jul
6-Aug
13-Aug
Date
OT Ad
WFT Ad
Larvae

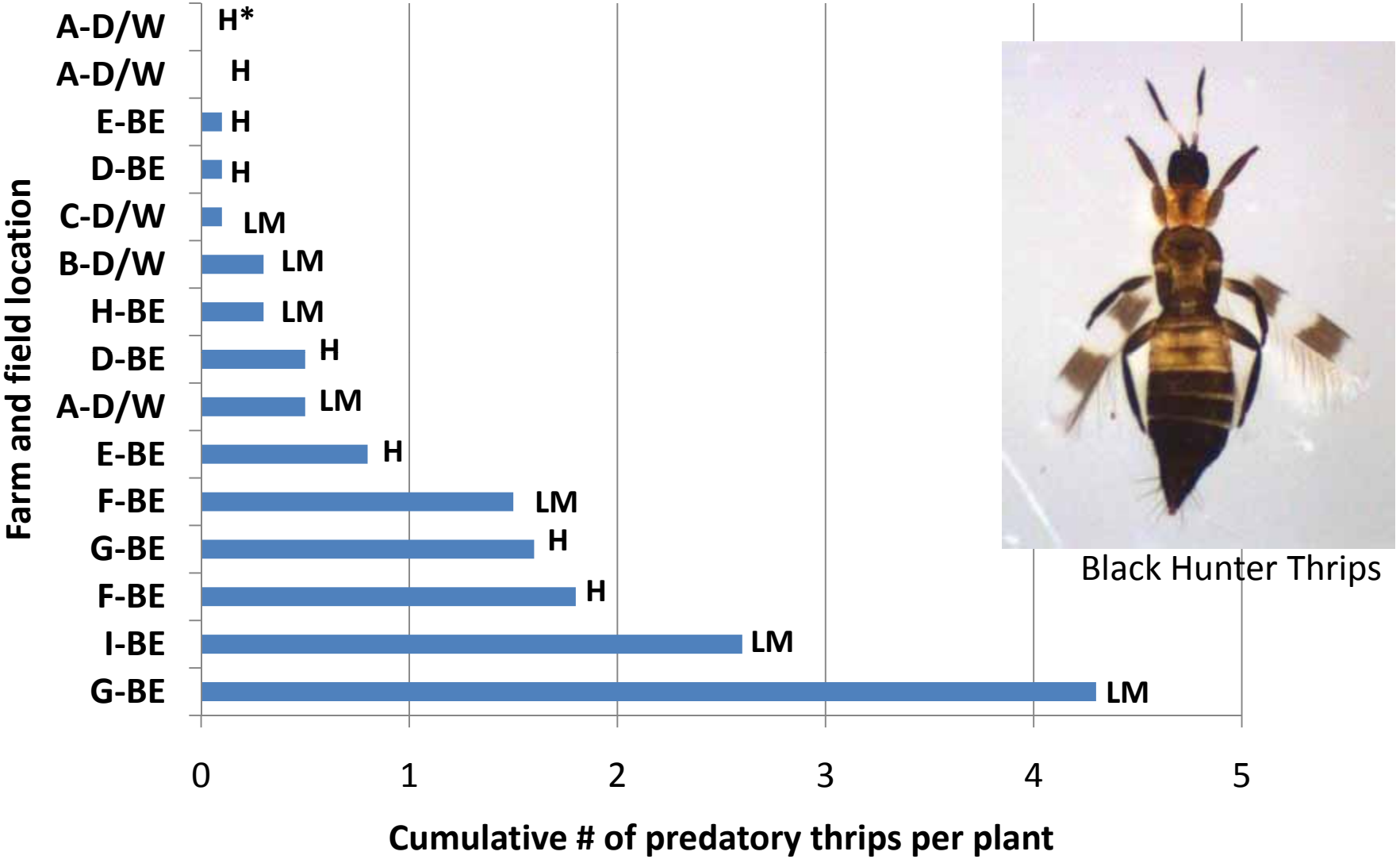

Farm I (Box Elder Co.)
Seeded
110 # N/A (More Life, K Thiosulfate)
No thrips sprays
Low Thrips
# of thrips life stage per plant
400
350
300
250
200
150
100
50
0
1-Jul
8-Jul
15-Jul
22-Jul
29-Jul
5-Aug
12-Aug
19-Aug
26-Aug
Date
OT Ad
WFT Ad
Larvae

# 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

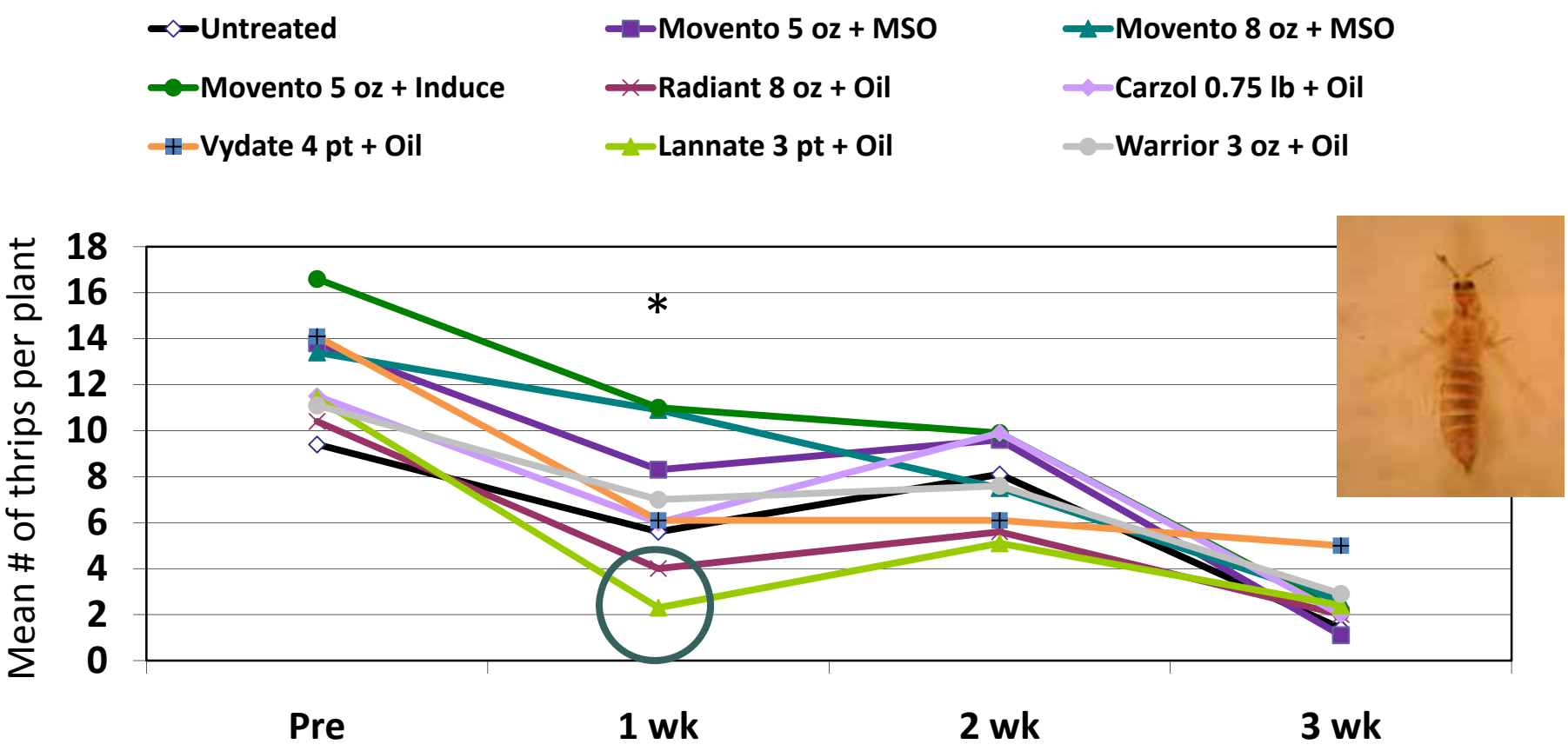
**Utah onion grower cooperators**

**Lincoln Andreasen,**
**USU undergraduate student**

**Jennifer Reeve**
**Dan Drost**
**C. Kent Evans**
**USU onion research/extension team**

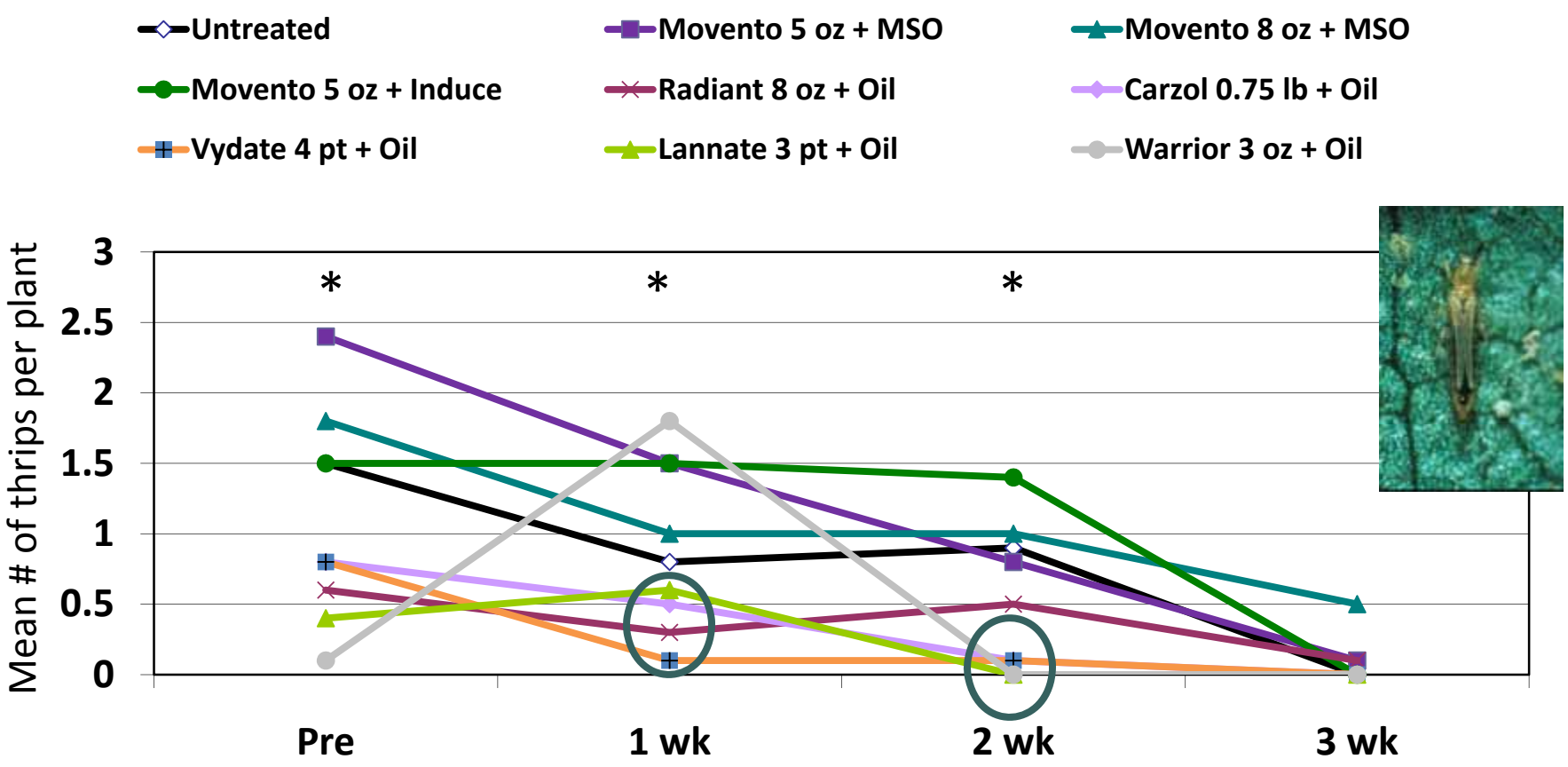
**Funding:**
**Western Region SARE**

# Insecticide efficacy
# Adult Onion Thrips (*Thrips tabaci*)
# July, 2007



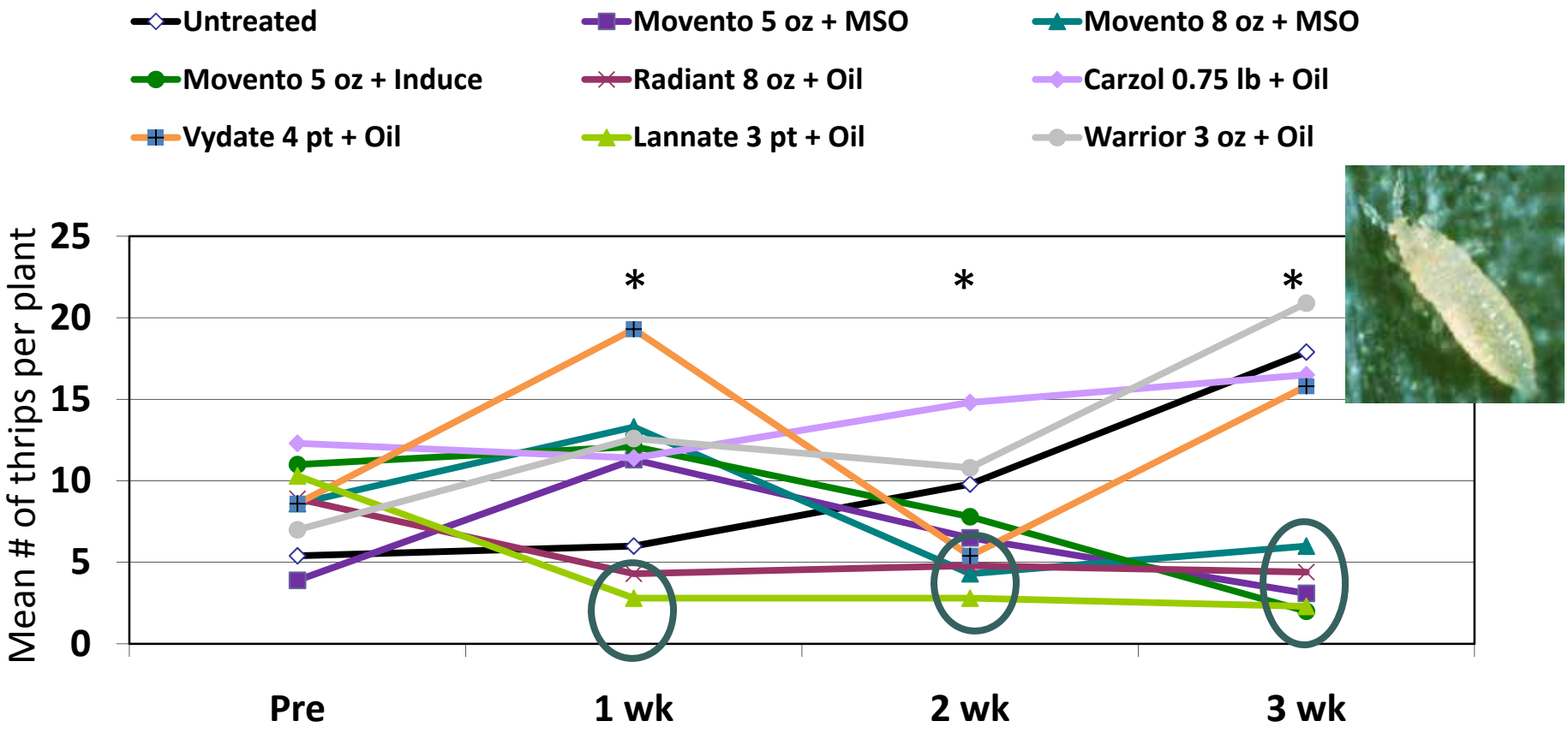

In an August trial, NS differences among treatments

# Insecticide efficacy
# Adult Western Flower Thrips (*Frankliniella occidentalis*)
# July, 2007




Similar results in an August trial

# Insecticide efficacy
# Thrips Larvae
# July, 2007





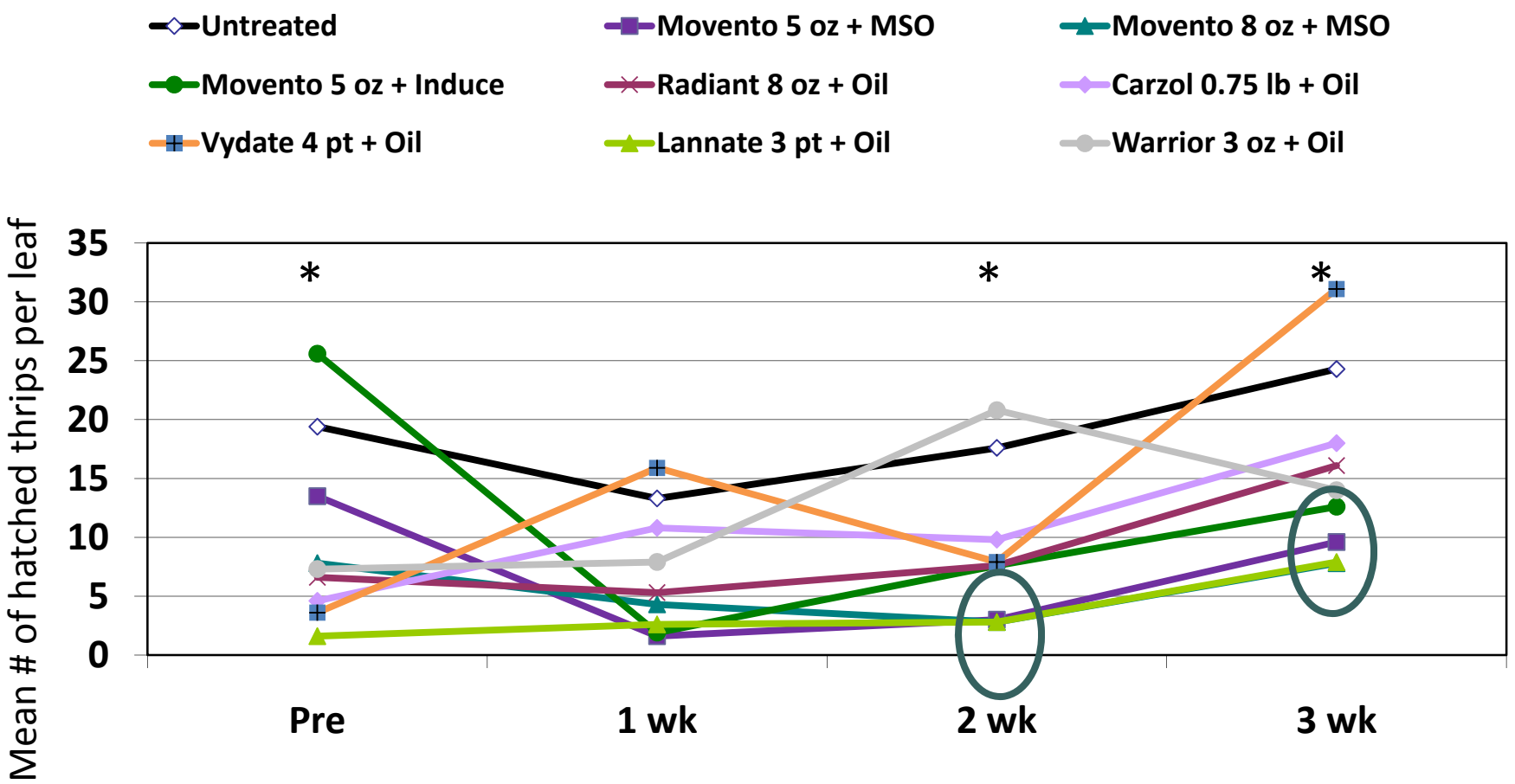

Similar results in an August trial

# Egg hatch from leaves

- Egg hatching chamber
  - Plastic bag
  - Collect 3rd 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

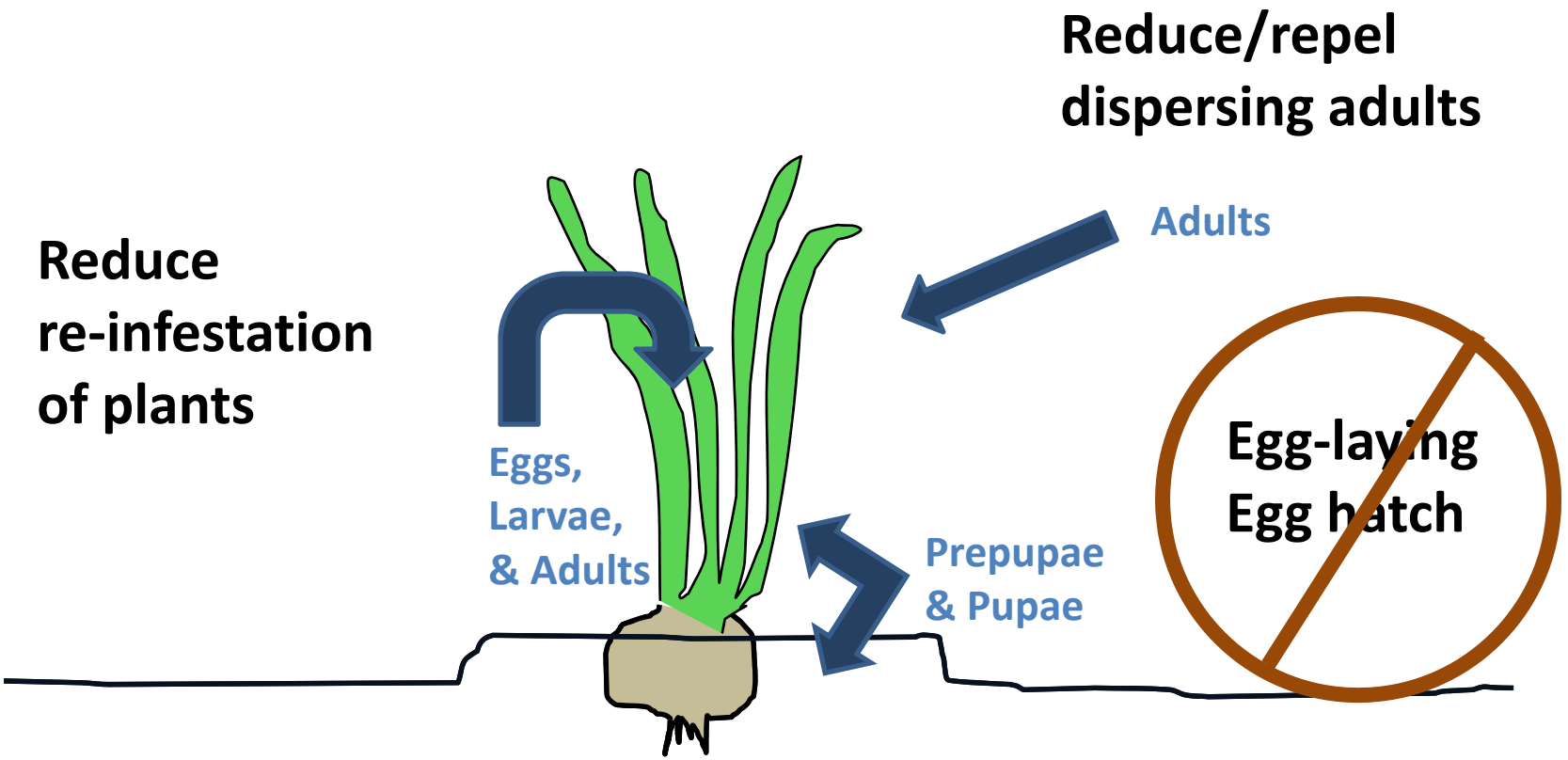

High-tech thrips hatching chamber

# Insecticide efficacy
# Thrips egg hatch (over 2 wk)
# July, 2007




Results from an August trial were similar

# Onion thrips life history



## 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

**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

- 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