Control of mites: Biocontrol and miticides

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Damage

- Feed on the underside of leaves
  - Yellow mottling or dark spots on topside
  - Necrosis on underside

- Webbing
  - Spreads mites
  - Attracts dust on the underside
  - Can change transpiration

- Reduction in fruit size & yield
- Heavy infestations cause stunting & leaf drop
- Can kill a stressed plant

Control methods

- Cultural Practices
  - -Stressed plants = more mites

- Sprays (miticides, oils)

- Natural enemies
  - -Predatory mites
  - -Minute pirate bugs
  - -Lacewings, etc.

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Which mite works best?

2 year field study using 4 predatory mites

How will they behave in the field?

- Environmental variability
- Spatial variability

Methods

1 bed per treatment (AVG size: ~350ft x 4ft wide) per replicate (organic, var Ventana)

Released predators at a rate of 25,000 per acre

2 - 3 subplots per treatment bed

Collected 6 mid-tier leaves per subplot each sampling date

Treatments established in Randomized Complete Block Design with four blocks

Methods

Treatments

	2012/2013	2013/2014	Release Rate
A. andersoni	X	X	25,000/acre
N. californicus	X	X	25,000/acre
N. fallacis	X		25,000/acre
Grower Standard*	X	X	25,000/acre

* Grower released mainly *P. persimilis* & occasionally *N. californicus*

Methods

Data Collected:

No. spider mite mobiles (Lewis *&* Twospotted spider mite*)*
- Including a baseline count

No. spider mite eggs

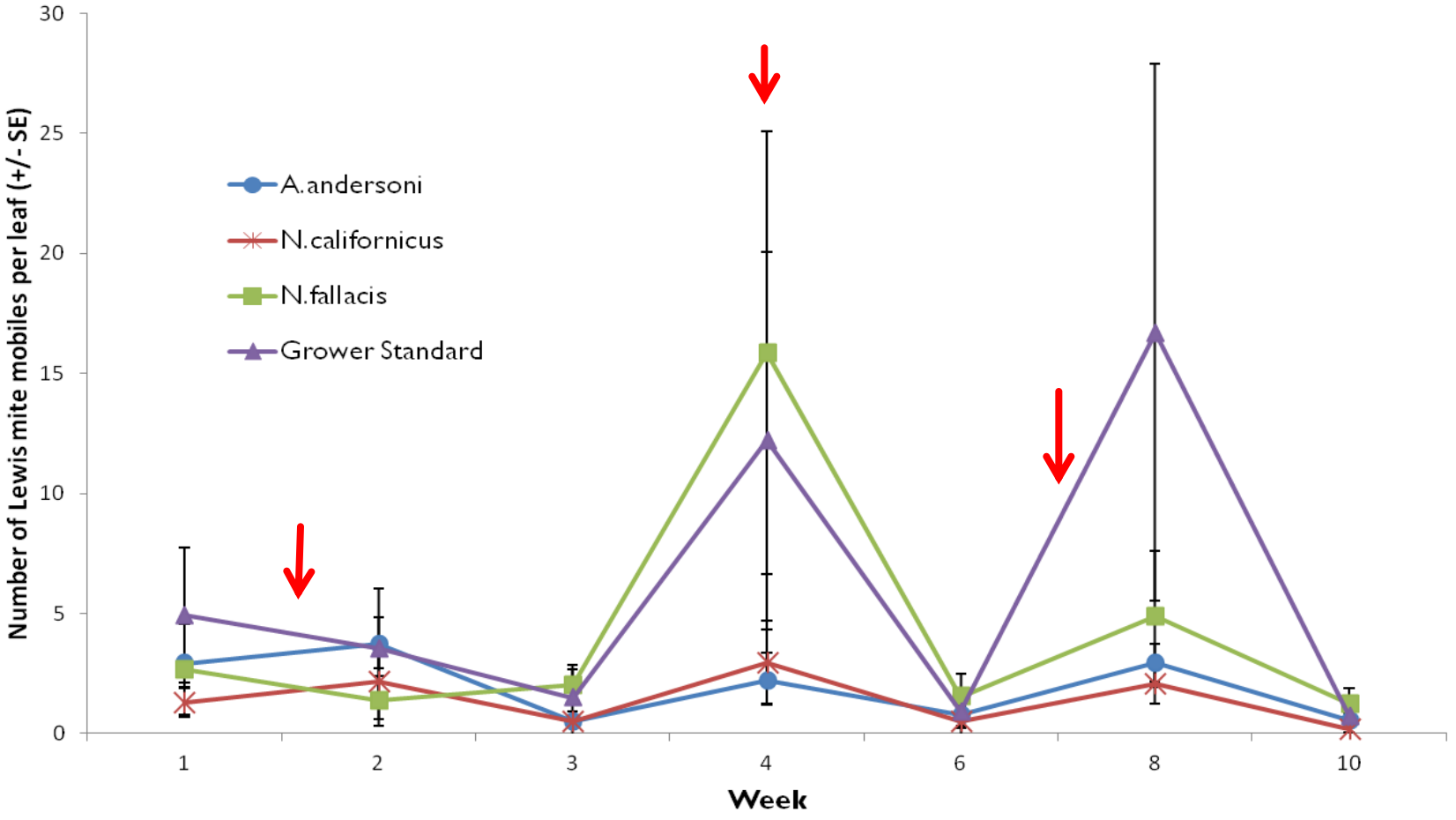
No. mobile predators (species)

No. predator eggs

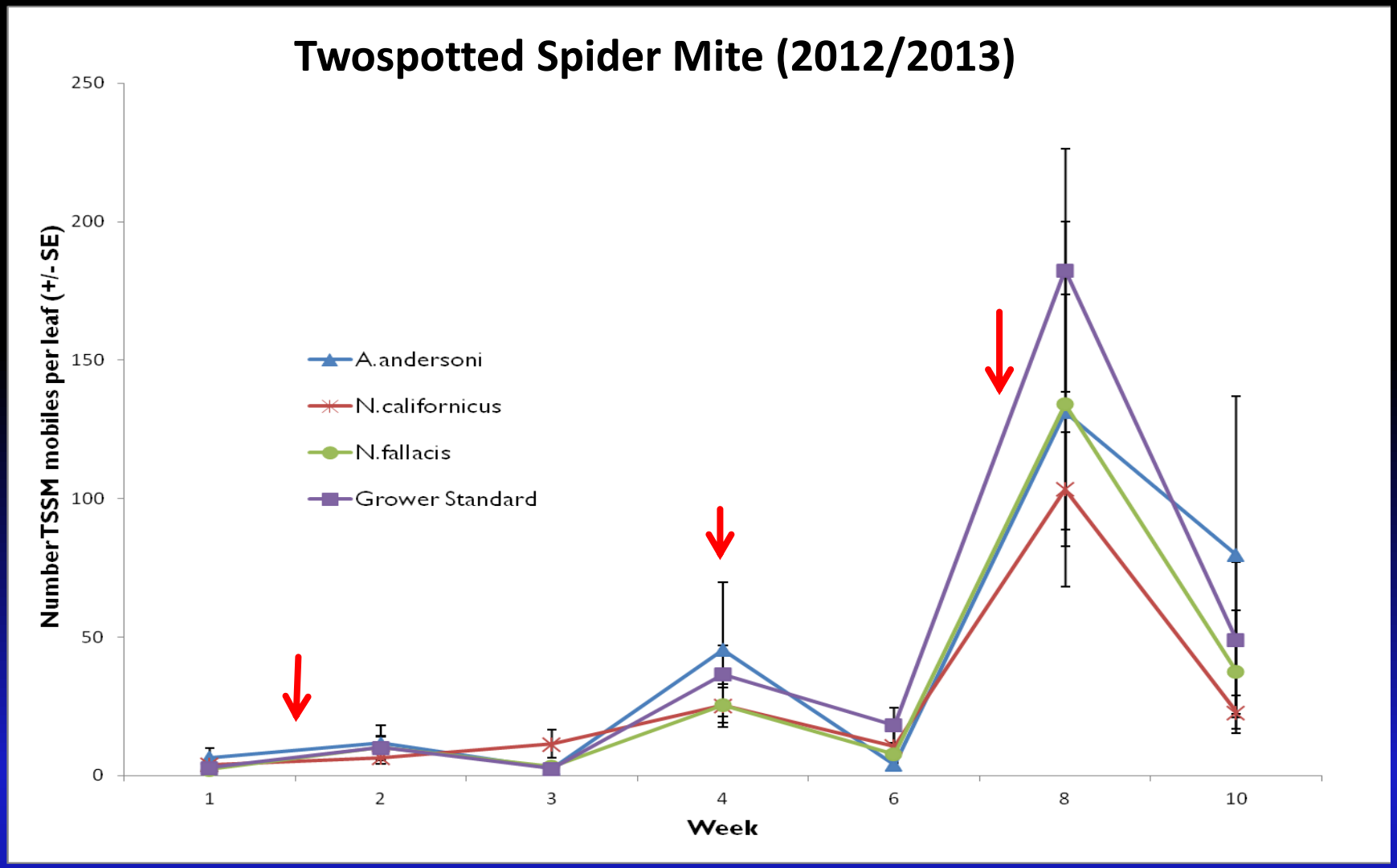
Lemons
Treeline
Lemons
Residential Area
Reservoir Area
GPS 34°16'21.44"N 119°00'48.51"W
2
1
3
4
Yard
N

Results

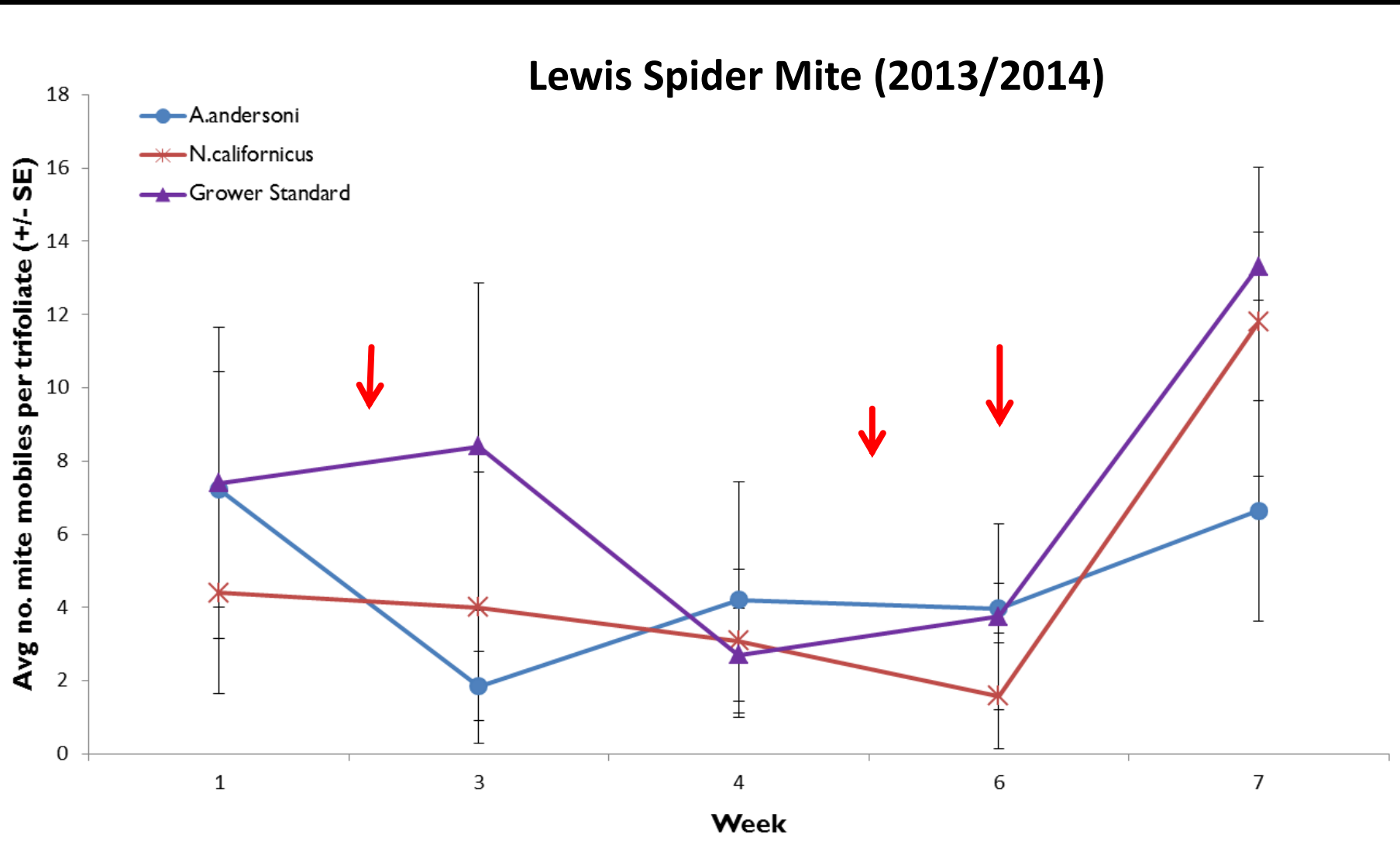
Lewis Spider Mite (2012/2013)



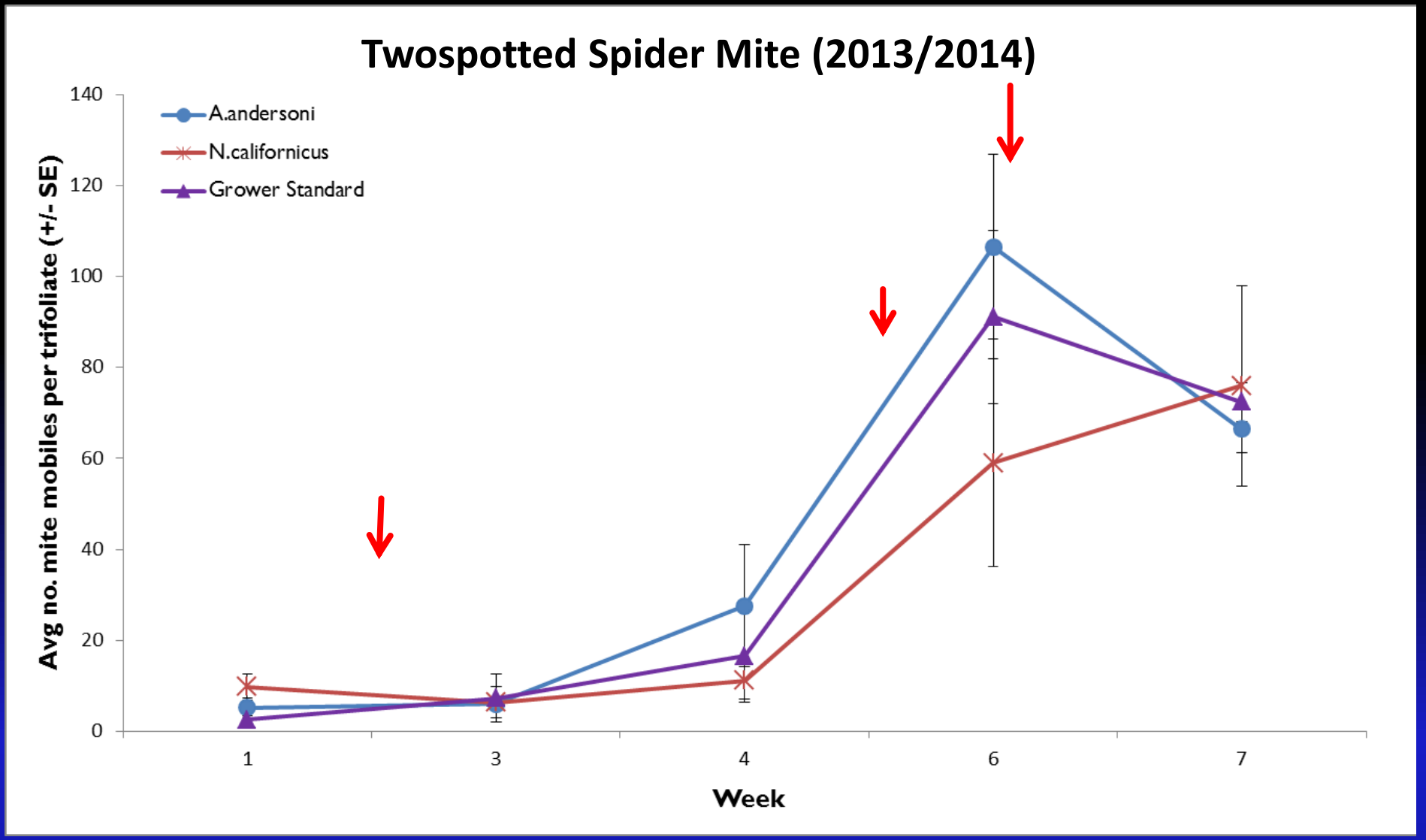
No sig. difference between treatments
Repeated measures ANOVA: $p = 0.391$



No sig. difference between treatments
Repeated measures ANOVA: $p = 0.416$



No sig. difference between treatments
Repeated measures ANOVA: $p = 0.337$



No sig. difference between treatments
Repeated measures ANOVA: $p = 0.339$

TSSM **ONLY**

P. persimilis

N. fallacis

A. andersoni

N. californicus

Lewis **ONLY**

P. persimilis

N. fallacis

A. andersoni

N. californicus

Lewis

+

TSSM

N. fallacis

A. andersoni

P. persimilis

+

N. californicus

New miticide by BASF to be registered soon

- BASF Experimental (Cyflumetofen)
- MOA:
  MET II electron transport inhibitor
- IRAC #25
- Bioassays to evaluate efficacy against Lewis spider mite

Methods

Treatments

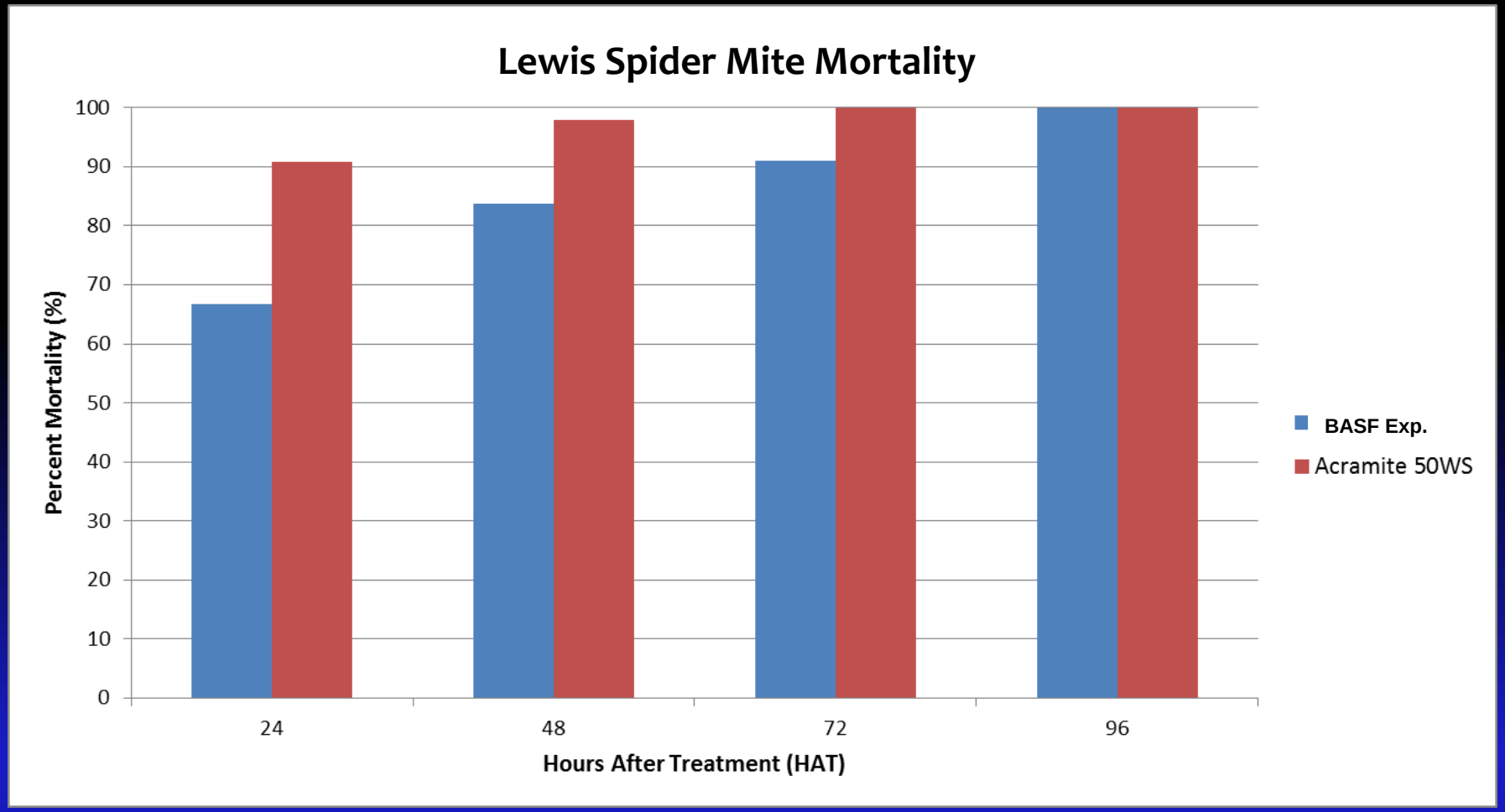
BASF experimental	13.7 fl. oz/acre
Acramite 50 WS	1 lb/ acre
DiWater	-

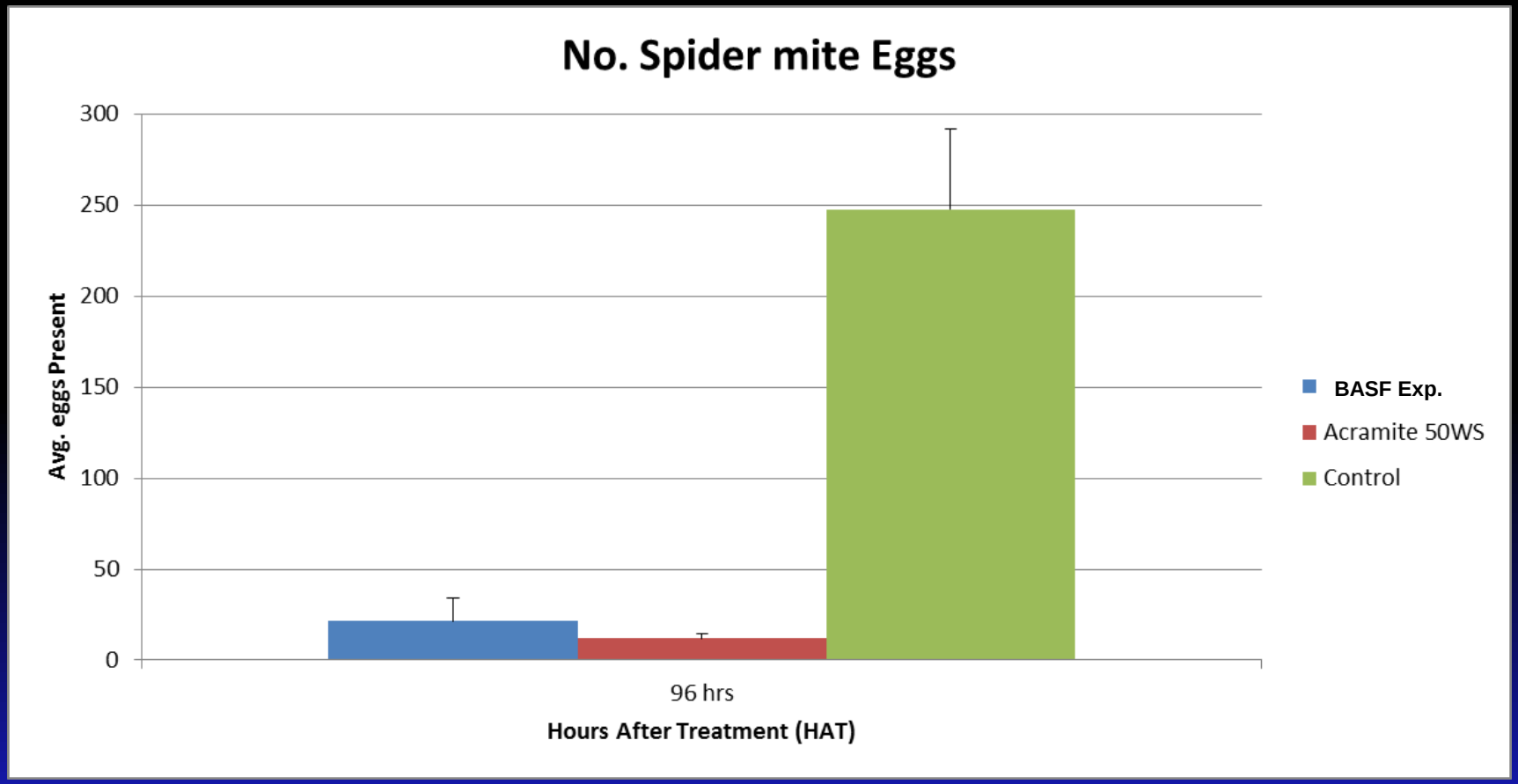
**DyneAmic was added to ALL treatments at a rate of 0.375% v/v

- Mid-Tier strawberry leaves were sprayed with each treatment & allowed to dry
- Leaves were placed in a petridish with wet filter paper to prevent mite escape

Methods

- 15 adult female Lewis mites added to each leaf
- Replicated 4x's (total of 60 mites per treatment)
- Lab Conditions: 16:8 (L/D); 77 ±1 ºF; 50-55% RH
- Mortality recorded at 24, 48, 72, & 96 hrs after treatment


Lewis Spider Mite Mortality
100
90
80
70
60
50
40
30
20
10
0
Percent Mortality (%)
24
48
72
96
Hours After Treatment (HAT)
BASF Exp.
Acramite 50WS



Sig. difference between treatments and the control
One-way ANOVA, $p < 0.0001$

Current Experiments

- Direct and sublethal effects of miticides on predatory mites
  - *P. persimilis*
  - *A. andersoni*
  - *N. californicus*
  - *N. fallacis*
  - *G. occidentalis*
- Currently evaluating mortality, fecundity (# eggs laid), & fertility (# young produced)
- Results can be used to make safe release times

What can you do to decrease mites

- Plant stress
  - High EC
  - water
  - Flower & fruiting stage
  - fertilization
- Edge/neighbor effects
- Decrease dust
- Don’t wait until populations are high to treat

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