

# Spider Mite Management in Walnuts

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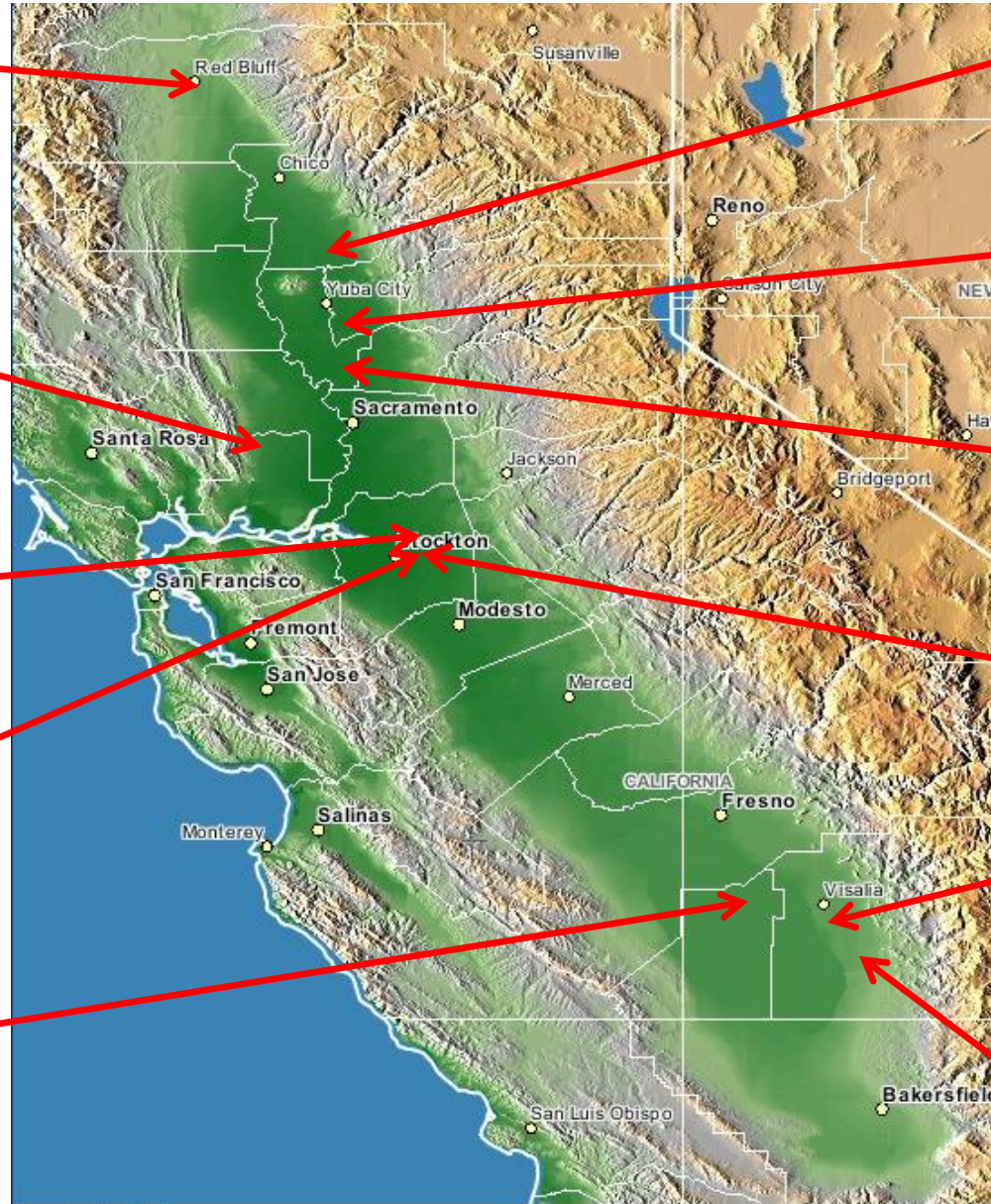


# Mite Sampling Protocols

- Paired orchards differing in cultivar at 5 locations in each of SV and SJV
- 4 lower and 4 mid canopy leaves from each of 10 trees in each orchard
- Samples taken every 2 weeks from Jun - Oct



# Sampling Locations 2013



Red Bluff  
Chandler /Hartley

Winters  
Tulare /Hartley

Linden - Hartley

Farmington 1  
Chandler /Vina

Hanford  
Chandler /Vina

Gridley  
Chandler /Hartley

Wheatland  
Chandler /Hartley

Nicolaus  
Chandler /Howard

Farmington 2  
Chandler /Tulare

Farmersville  
Chandler / Tulare

Porterville  
Chandler /Serr

# Walnut Spider Mites

**Web-spinning spider mites**

**Non web-spinning spider mites**

*Tetranychus urticae*  
(TSM)

*Panonychus ulmi*  
(ERM)

*Tetranychus pacificus*  
(PM)

*Tetranychus turkestanii*



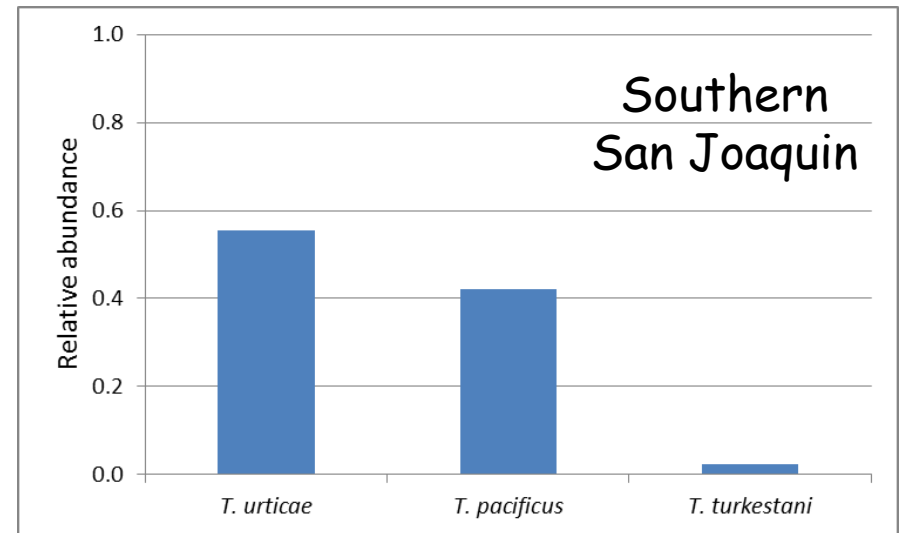
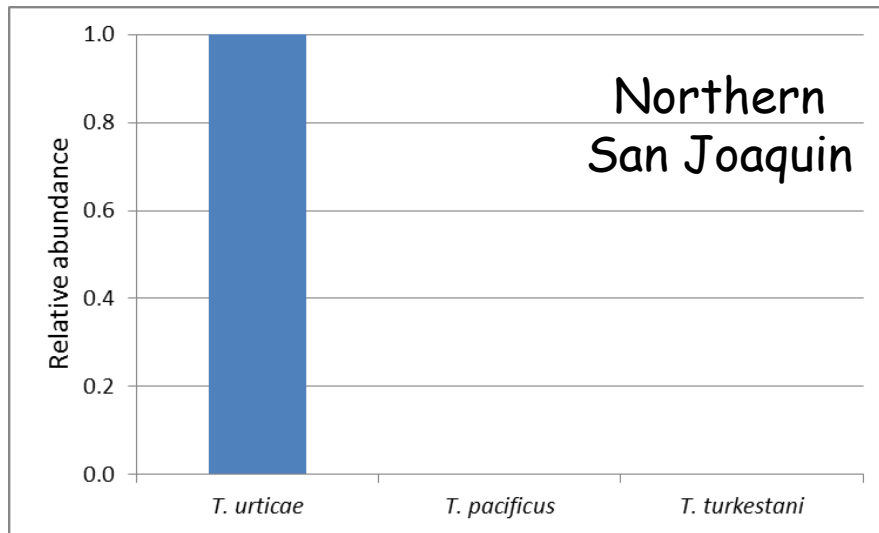
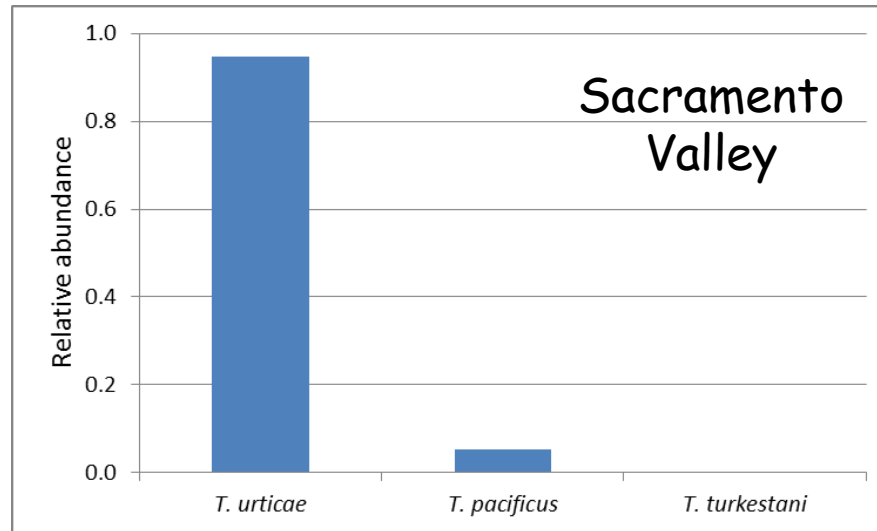
TSM  
*T. urticae*

PM  
*T. pacificus*

ERM  
*P. ulmi*



# Relative Abundance of Web-Spinning Spider Mites



# Predatory Mites and Their Food Types

Type 4



*Euseius stipulatus*

Type 3



*Metaseiulus citri*

Type 2



*Galendromus occidentalis*



*Euseius tularensis*



*Typhlodromus caudiglans*



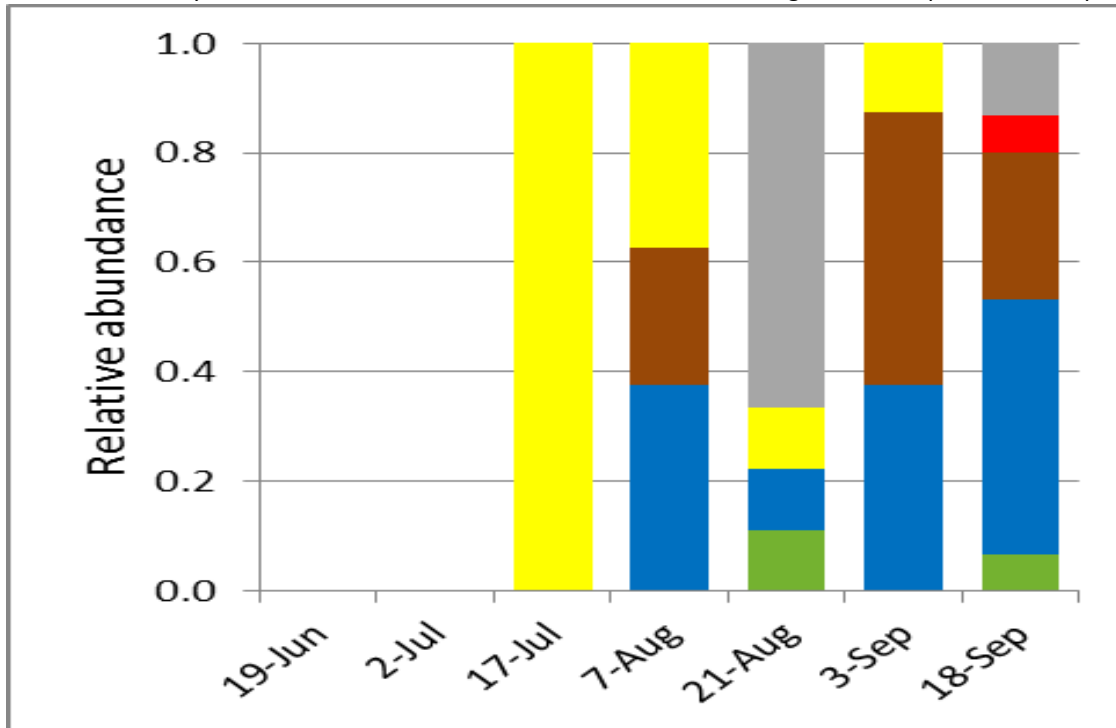
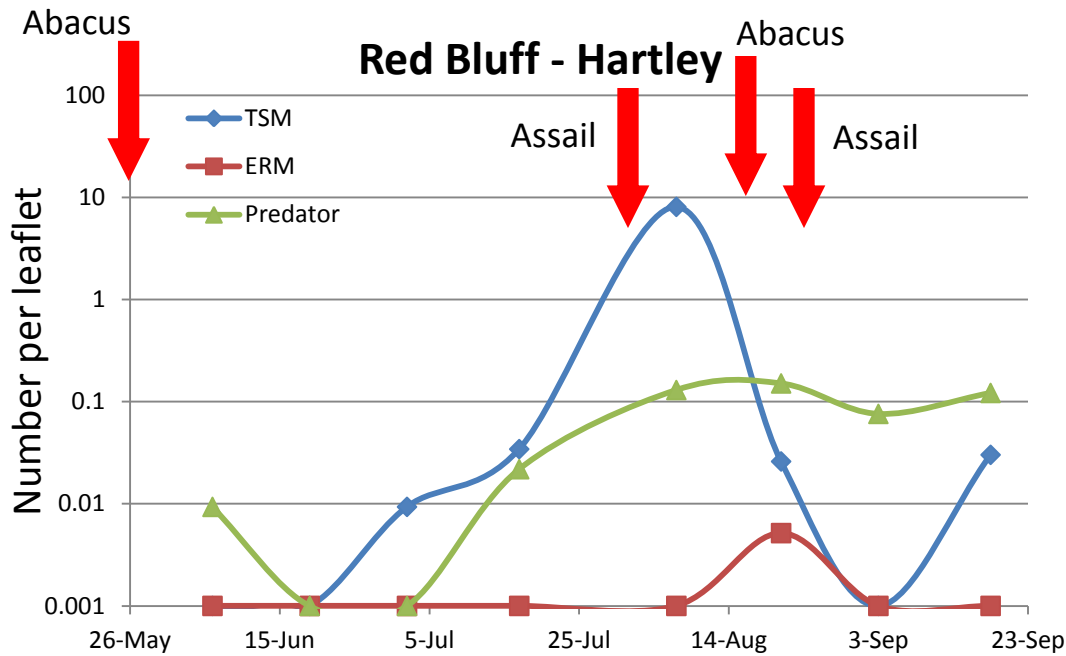
*Neoseiulus californicus*

# Predatory Mites and Their Food Types

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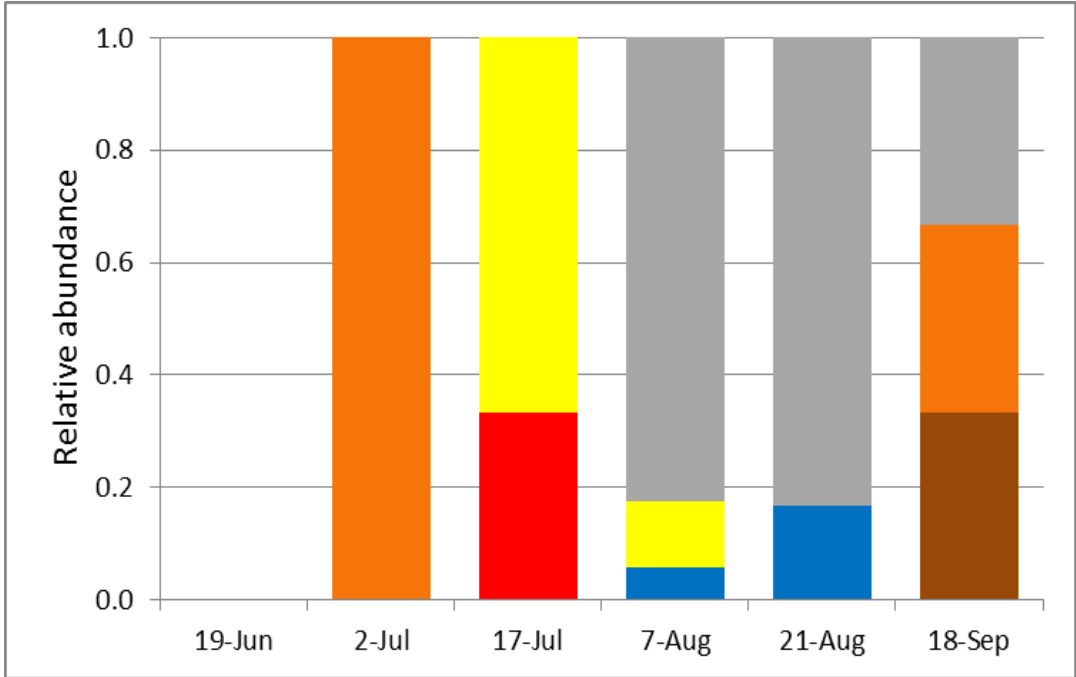
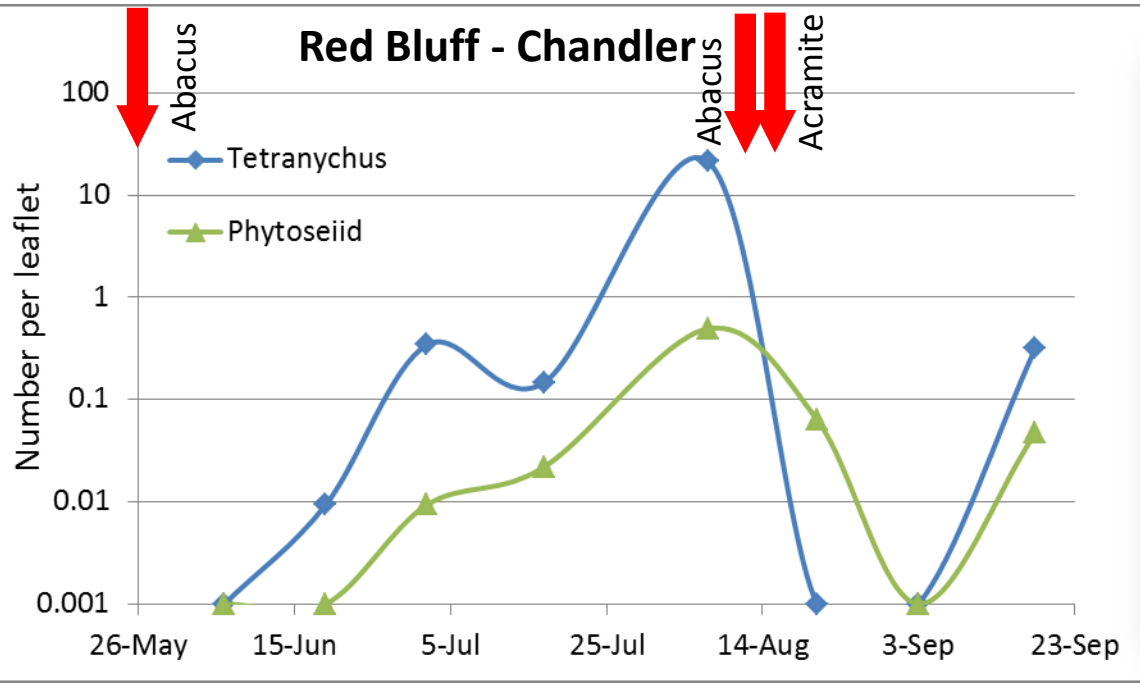
Type 4 Mites + insects + pollen + leaf sap	Type 3 Mites + insects + pollen	Type 2 Web-spinning spider mites
<i>Euseius quetzali</i>	<i>Amblyseius similoides</i>	<i>Galendromus occidentalis</i>
<i>Euseius stipulatus</i>	<i>Metaseiulus citri</i>	<i>Neoseiulus californicus</i>
<i>Euseius tularensis</i>	<i>Typhlodromus caudiglans</i>	

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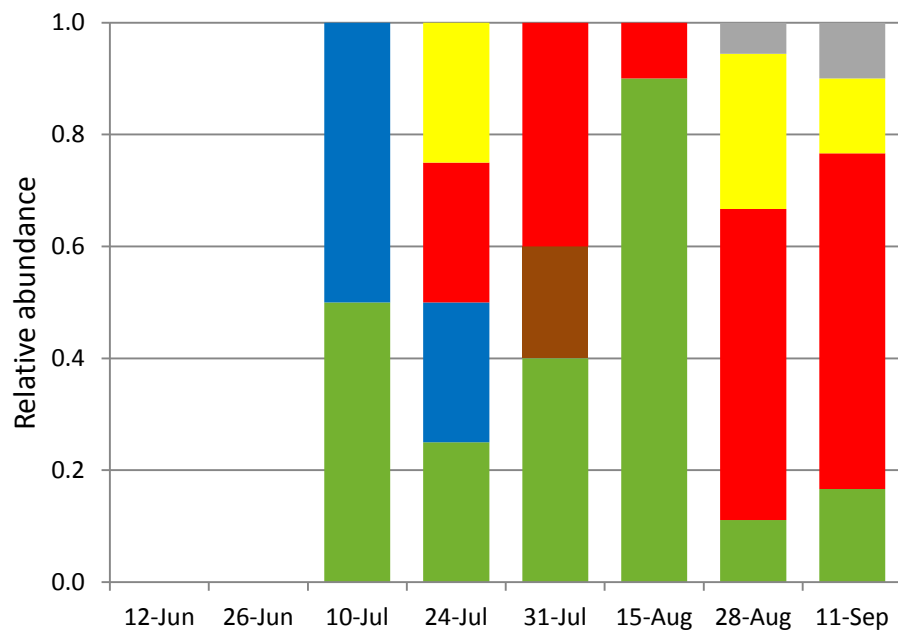
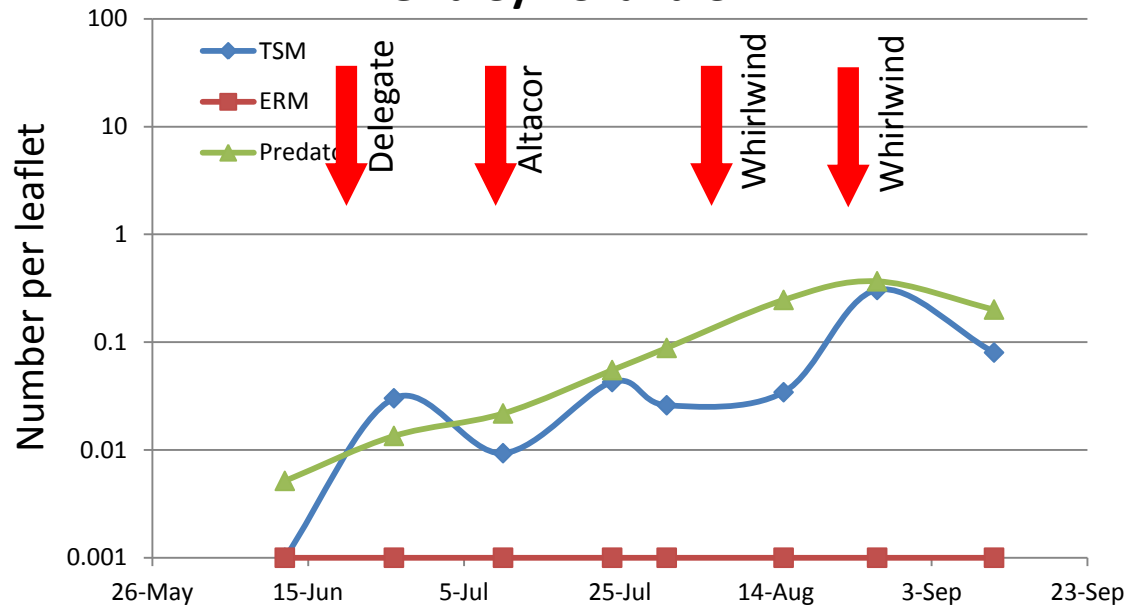


# Red Bluff - Chandler

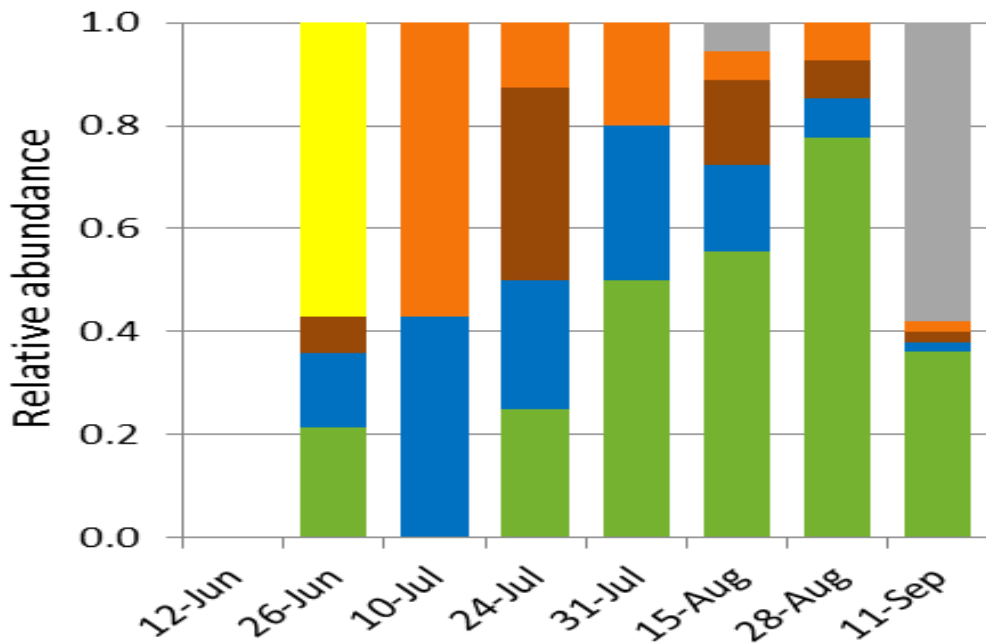
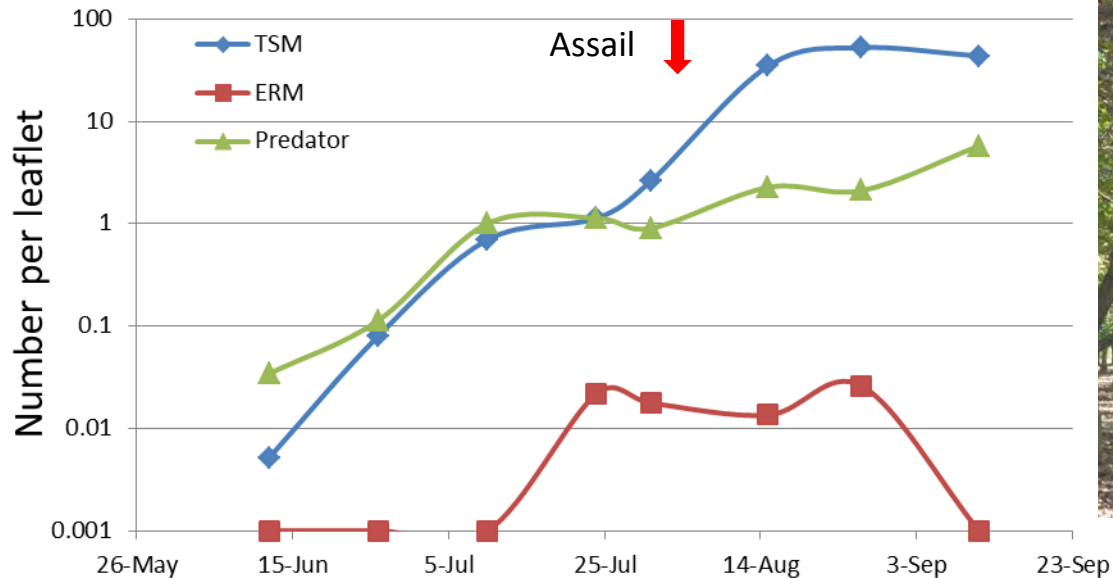


- Galendromus occidentalis*
- Typhlodromus caudiglans*
- Metaseiulus citri*
- Amblyseius similoides*
- Euseius quetzali*
- Euseius tularensis*
- Euseius stipulatus*

## Gridley - Chandler

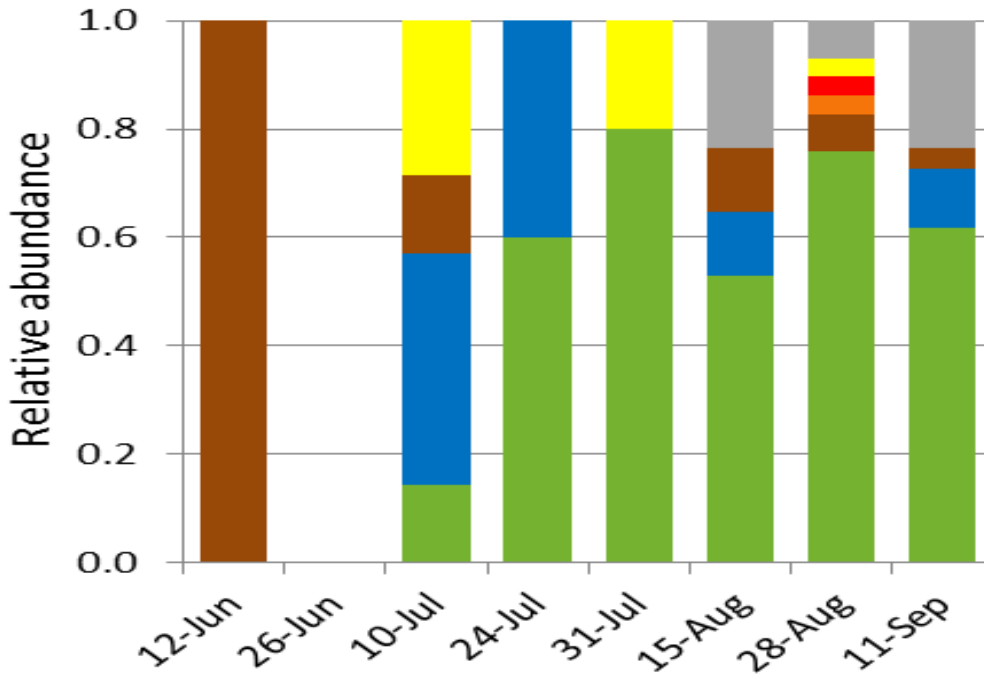
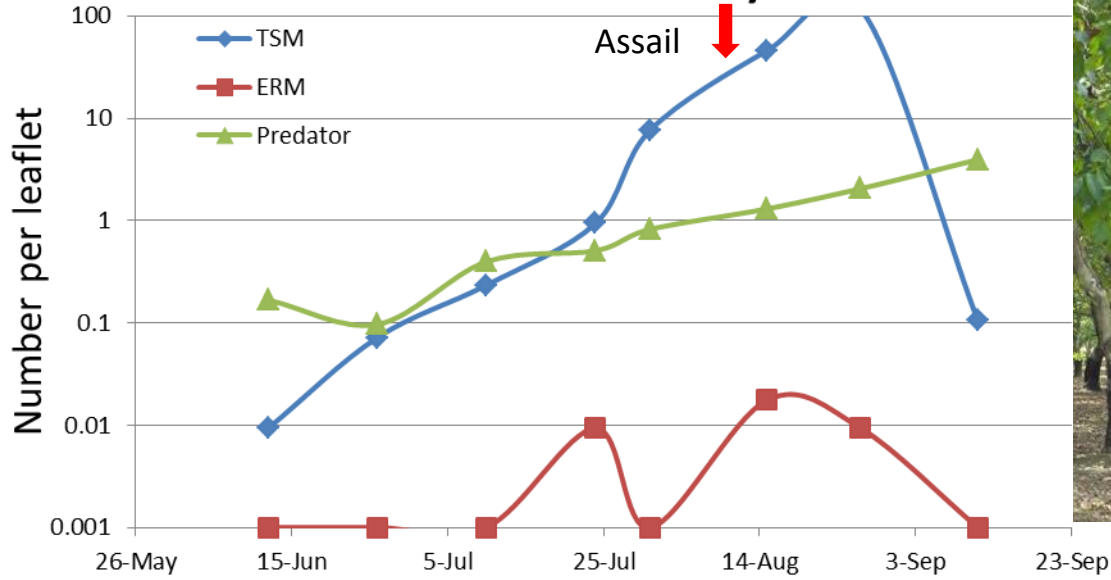


## Wheatland - Chandler



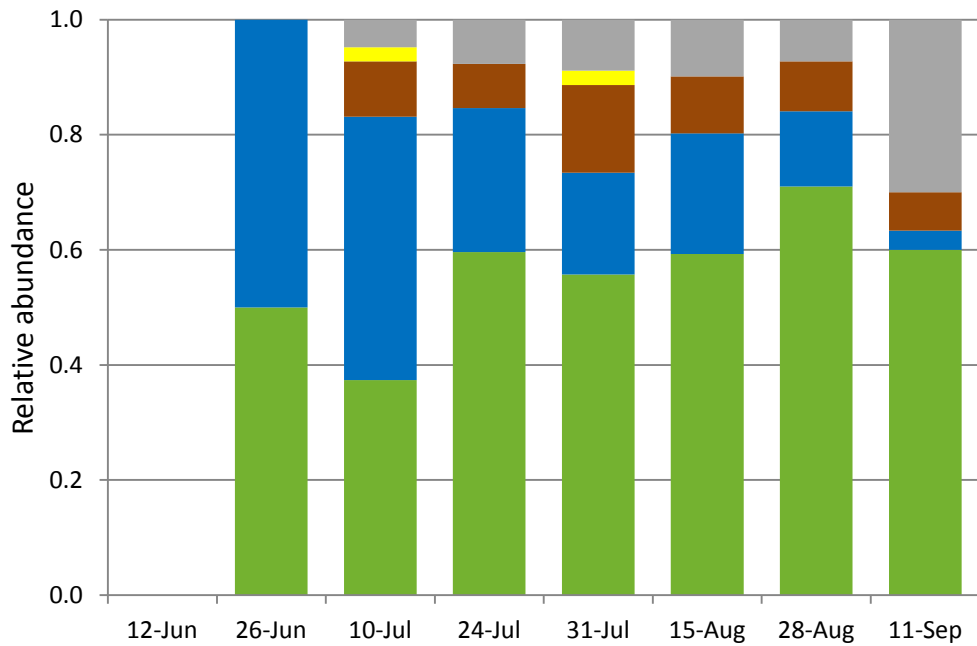
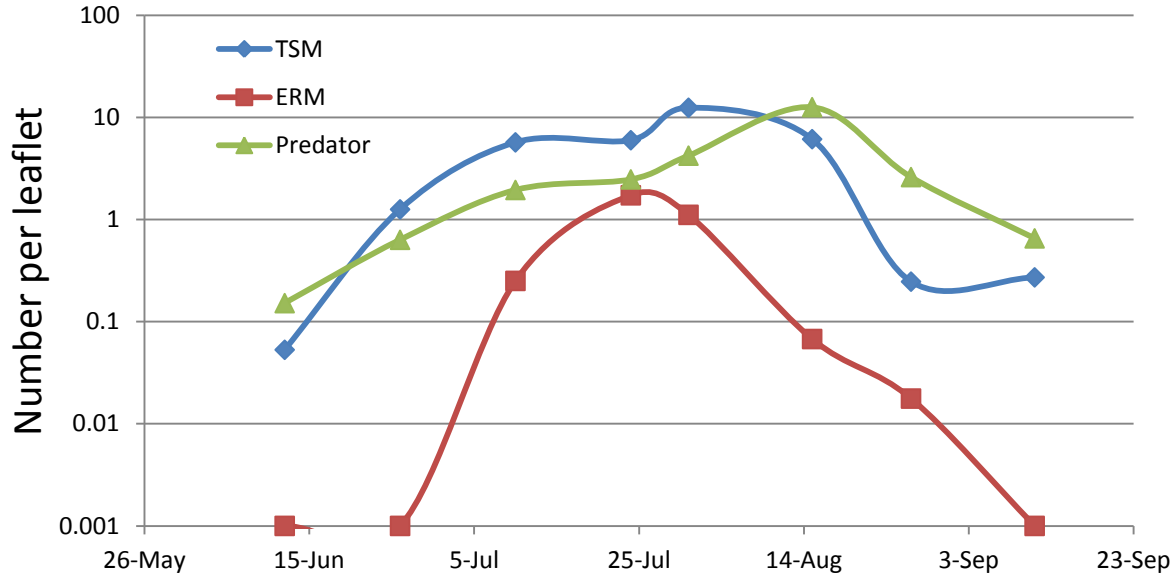
- *Galendromus occidentalis*
- *Typhlodromus caudiglans*
- *Metaseiulus citri*
- *Amblyseius similoides*
- *Euseius quetzali*
- *Euseius tularensis*
- *Euseius stipulatus*

## Wheatland - Hartley



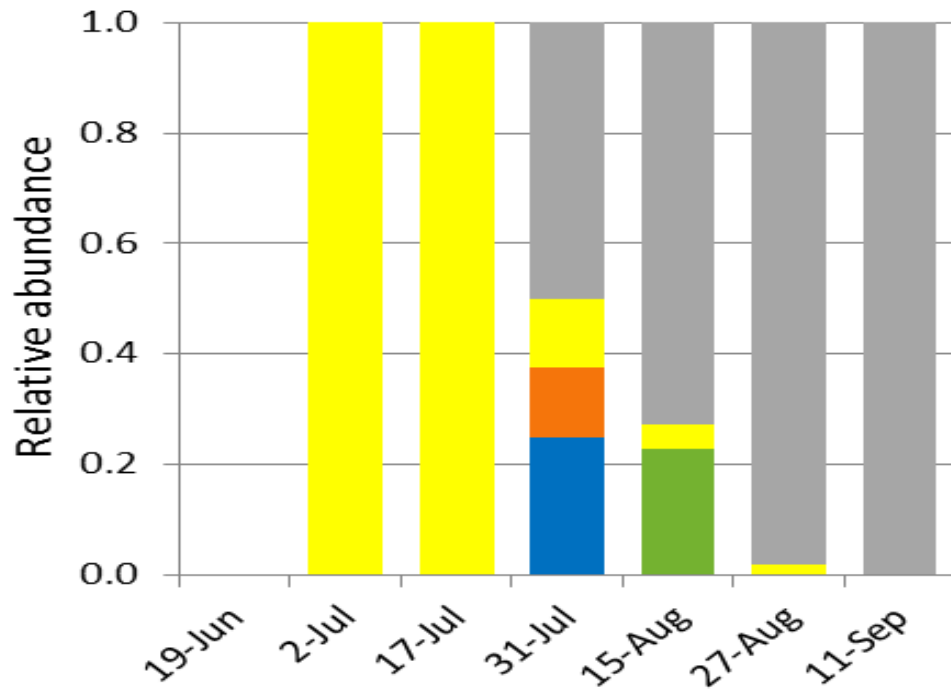
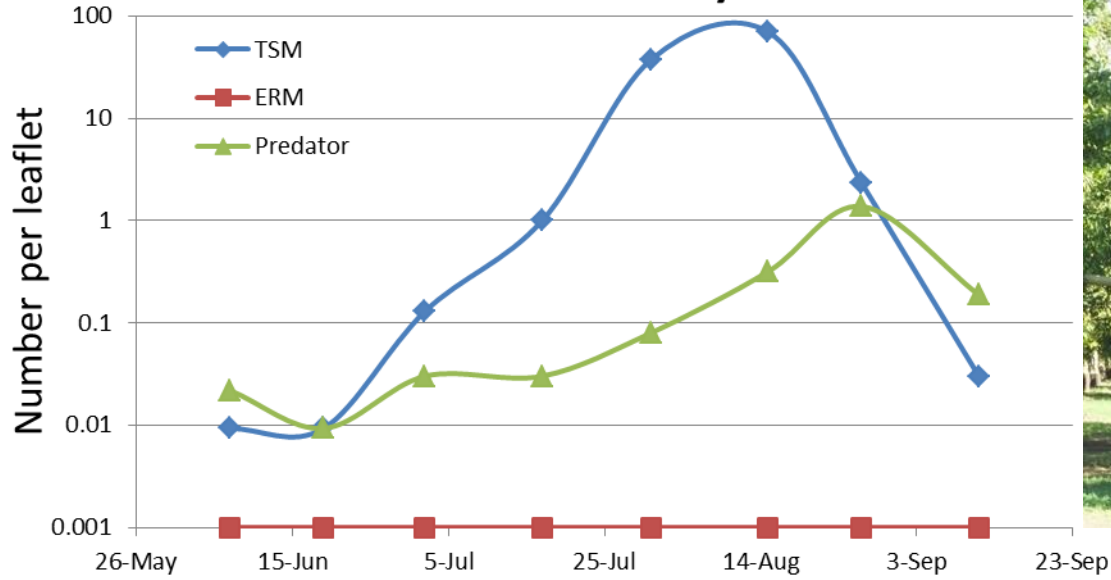
- Galendromus occidentalis*
- Typhlodromus caudiglans*
- Metaseiulus citri*
- Amblyseius similoides*
- Euseius quetzali*
- Euseius tularensis*
- Euseius stipulatus*

# Nicolaus - Chandler



- Galendromus occidentalis*
- Typhlodromus caudiglans*
- Metaseiulus citri*
- Amblyseius similoides*
- Euseius quetzali*
- Euseius tularensis*
- Euseius stipulatus*

## Winters - Hartley

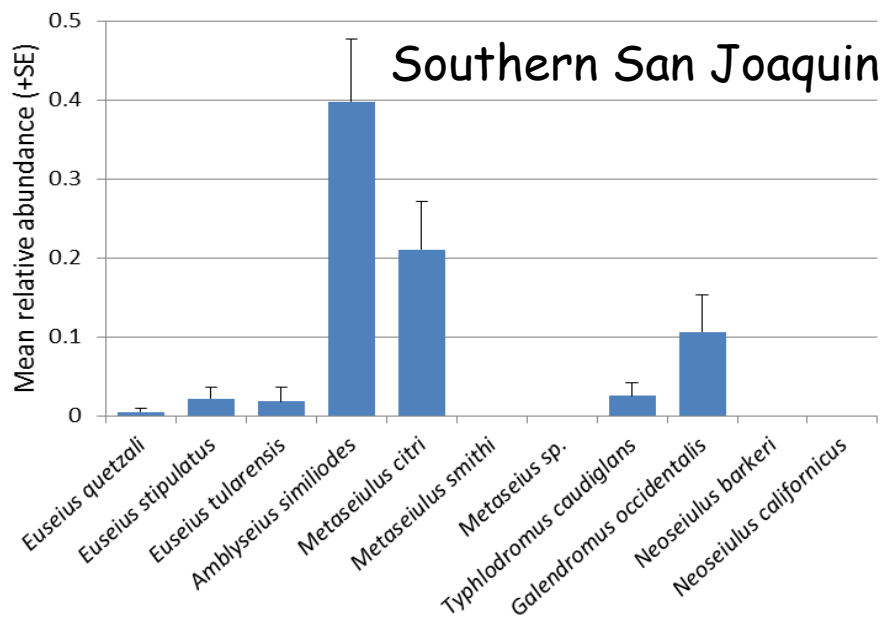
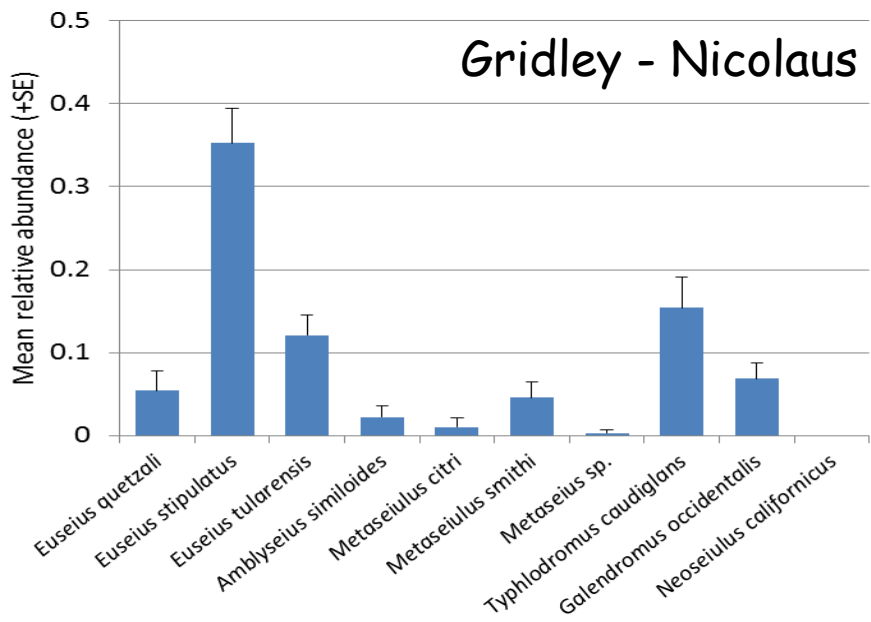
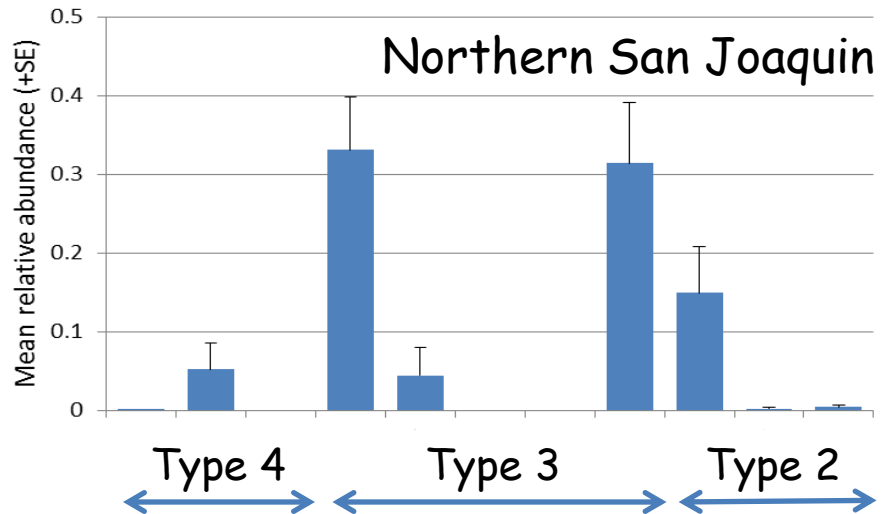
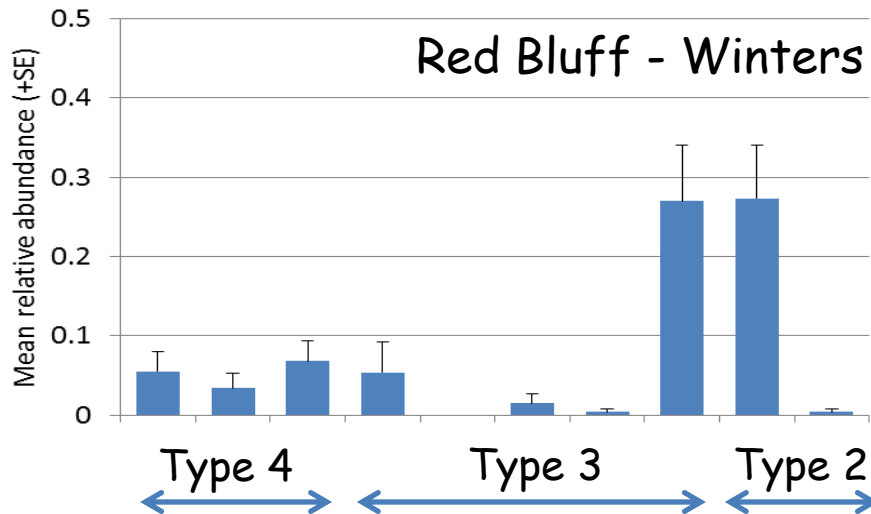


- Galendromus occidentalis*
- Typhlodromus caudiglans*
- Metaseiulus citri*
- Amblyseius similoides*
- Euseius quetzali*
- Euseius tularensis*
- Euseius stipulatus*

# Relative Abundance of Predatory Mite Species

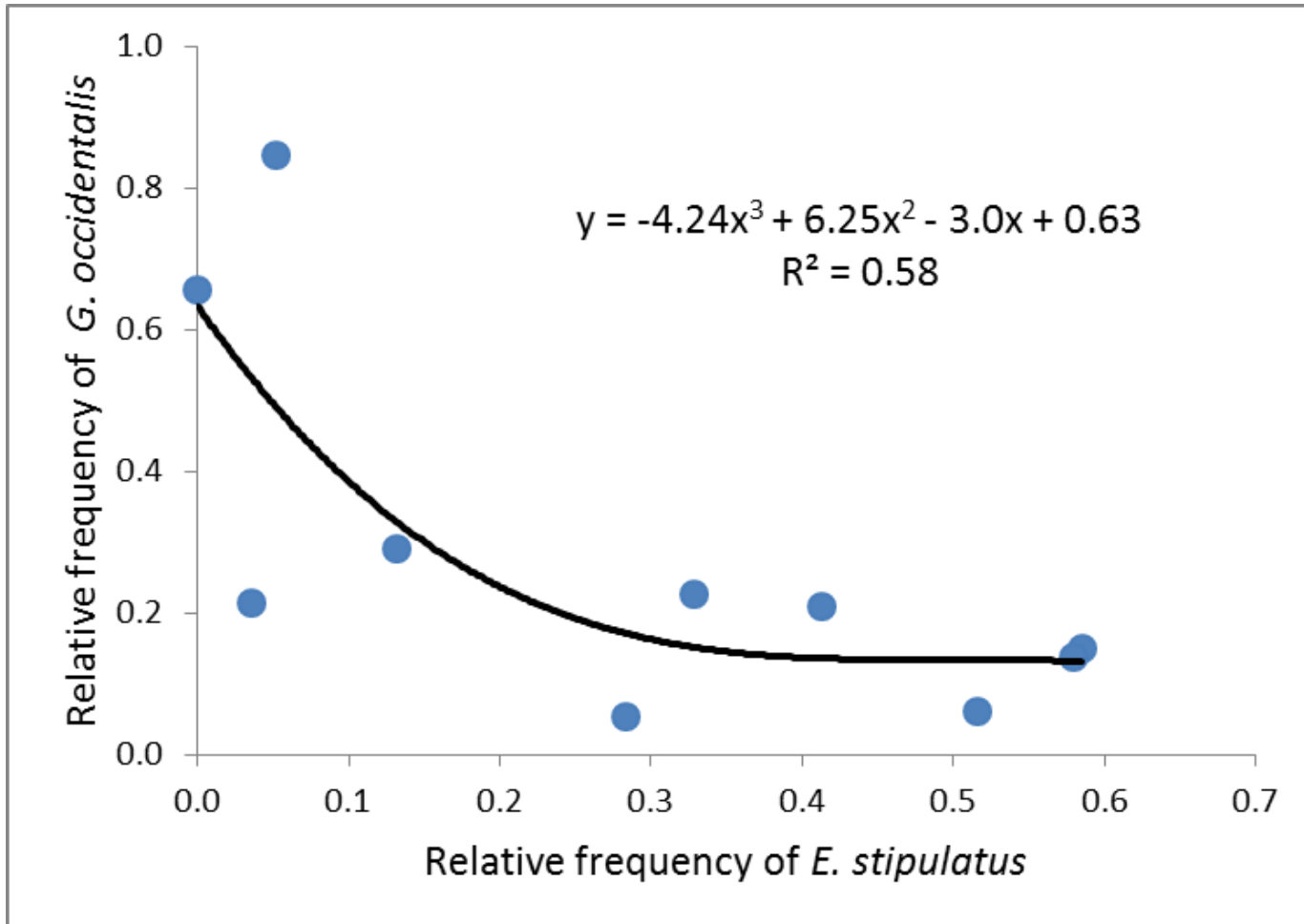
## Sacramento Valley

## San Joaquin Valley



# Predatory Mite Interactions in SV

## Can Type 4 species displace Type 2?



*G. occidentalis*  
Native - type 2



*E. stipulatus*  
Exotic - type 4



# Summary Observations - Spider Mites

- Most web-spinning mites are TSM (*T. urticae*)  
PM (*T. pacificus*) occurs in small numbers in SV and  
in equal numbers in southern SJV
- No strong cultivar effects - maybe Chandler less  
susceptible in southern SJV (PM = TSM)
- What is the economic threshold for TSM?  
Walnuts much more tolerant than almonds

# Summary Observations - Predators

- Dominance of *E. stipulatus* in eastern SV surprising - could interfere with *G. occidentalis*
- Pesticide impacts on predatory mites:  
Strong - Fujimite rest of season, Omite 3 months  
Weak - Abamectin (Athena, Epi-Mek), Zeal, Altacor, Lorsban, Assail
- WPM (*G. occidentalis*) appears too late in the season to be effective - why? Same for thrips/*Stethorus*
- Six-spotted thrips and spider mite destroyer either absent or at low abundance late in the season

