

# Spider Mites in Silage Corn: Damage & Management



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# Believe It or Not!

Spider Mites are more closely related to ticks and spiders than to insects!!



A-Z Animals



# Mites of the world!

Spider mites are one kind of mite.

Other kinds of mites include (but not limited to):

Predatory mites

Bulb mites

Cyclamen mites

Eriophyid mites

# Life Cycle of Spider Mite



egg



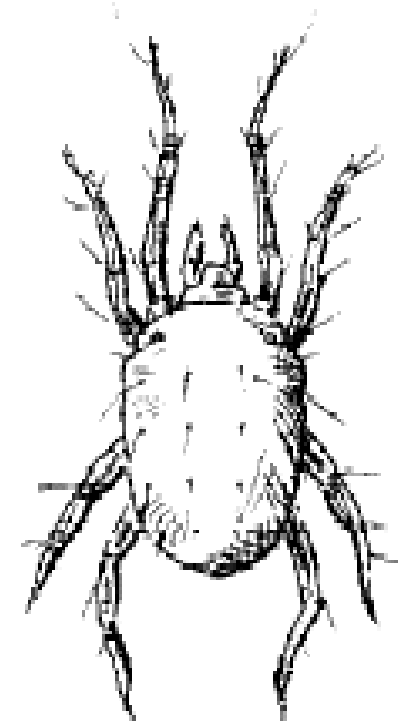
larva



protonymph



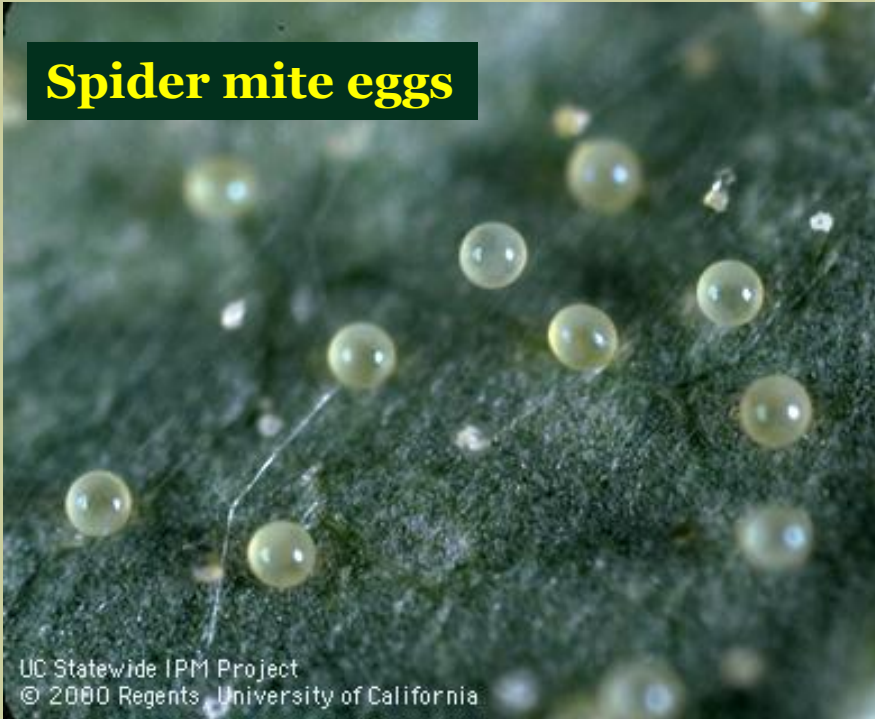
deutonymph



adult

Head and abdomen  
No antennae  
4 pair of legs usually  
No Wings

**Spider mite eggs**



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**Spider mite nymphs**



**Spider mite adults**

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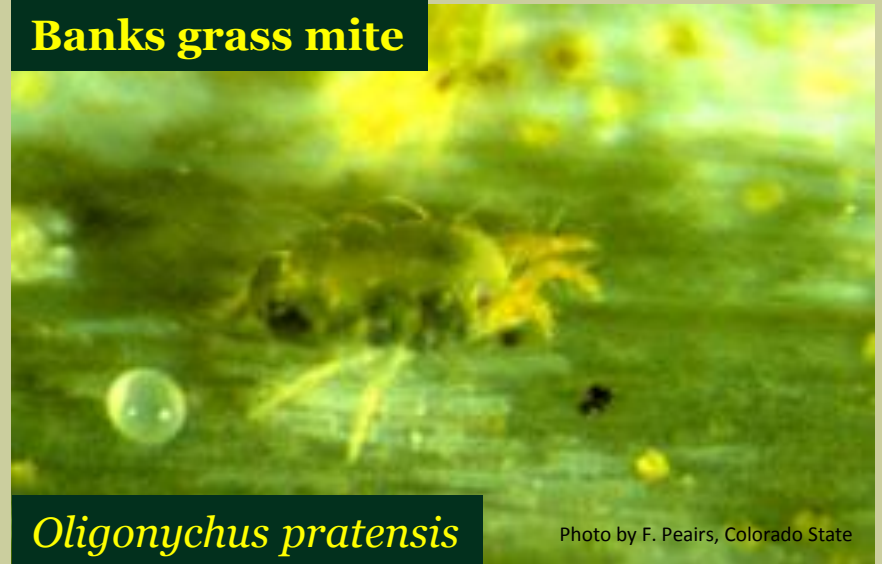
# Problem Spider Mites on Corn

Two spotted spider mite



*Tetranychus urticae*

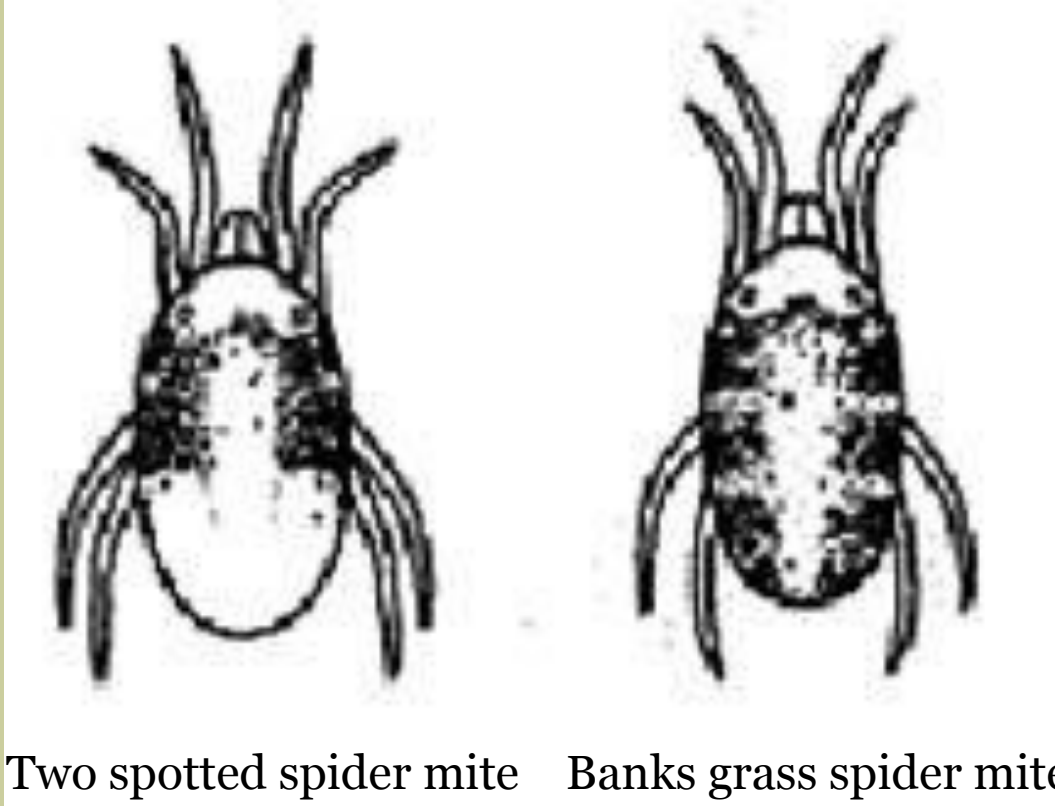
Banks grass mite



*Oligonychus pratensis*

Photo by F. Peairs, Colorado State

Two spotted spider mite predominant on corn in CA  
Banks grass mite is often the dominant one in CO, UT, TX, NM, etc.



Two spotted spider mite

Banks grass spider mite

**Two spotted spider mite**



*Tetranychus urticae*

**Banks grass mite**



*Oligonychus pratensis*

Photo by F. Peairs, Colorado State

**Strawberry spider mite**



*Tetranychus turkestanii*

**Pacific spider mite**



*Tetranychus pacificus*

# Damage



Ada Szczepaniec SDSU Extension

# Damage



Ada Szczepanec. SDSU Extension



## Summer

- Populations increase in June/July (hot & dry)
- Generation in as little as 7 days

- Colonies develop on undersides of leaves
- Heavy populations go to tops of leaves



## Spider mite damage



L. Godfrey



untreated



treated

Godfrey 2002 Trial Tulare County

**So what!**

**What do they do to silage corn  
yield & quality?**

## Impact on Yield in 3 Large Scale Trials – Tulare Co, CA

	Tons/acre adj. to 70% Moisture		
	2010	2012	2013
Untreated	30.7	32.4	39.4
Average of all Miticide Treatments	36.5	37.4	39.4
<b>Difference</b>	<b>+5.8</b>	<b>+5.0</b>	<b>0</b>

Large scale trials, commercially applied; 4 replications  
2010, 2012 no difference in moisture; 2013 there were differences in moisture

Frate



## Impact on % ADF in 3 Large Scale Trials – Tulare Co, CA

	Percent Acid Detergent Fiber		
	2010	2012	2013
Untreated	30.1	32.3	26.1
Average of all Miticide Treatments	28.2	27.9	26.2
<b>Difference</b>	<b>-1.9</b>	<b>-4.4</b>	<b>NS</b>

Large scale trials, commercially applied; 4 replications  
2010, 2012 no difference in moisture; 2013 there were differences in moisture

Frate

## Impact on % NDF in 3 Large Scale Trials – Tulare Co, CA

	% Neutral Detergent Fiber		
	2010	2012	2013
Untreated	47.6	50.7	39.1
Average of all Miticide Treatments	45.4	43.7	39.6
<b>Difference</b>	<b>NS</b>	<b>-7.0</b>	<b>NS</b>

Large scale trials, commercially applied; 4 replications

2010, 2012 no difference in moisture; 2013 there were differences in moisture

# Mite-promoting conditions

- Dust
- Water-stressed plants
  - Insufficient irrigation
  - Excessively hot weather
- Use of broad-spectrum insecticides
  - Lack of beneficial organisms
- BMR variety (seems to be more susceptible)

# Beneficial Organisms



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**Six spotted thrips**



**lacewings**



**Predatory mites**



**Minute pirate bug**



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**Big-eyed bug**

# Insect Predators of Mites

- Disadvantages
  - Most with slow developmental time
  - Most with relatively low reproductive rate
  - Not pest specific (may only eat mites if no other food)



Lacewing larva (good bug) eating a predatory beetle (another good bug)

# Thresholds for Treatment Decisions

Recommendations differ for different states:

In some of the western states if:

lower 1/3 leaves show damage  
& middle 1/3 leaves have spider mites  
& corn has not reached hard dough  
& evaluate economics



Treat

In San Joaquin Valley of CA, if

spider mites are present before lay-by



Treat

## Currently Registered Miticides on Corn in CA

	Rate/A/App	Apps/Season	Total/Season	PHI (days)	REI
<b>Comite</b>	2 -3 pts	1	3 pts	30	13 days
<b>Oberon</b>	5.7 - 16 fl oz	2	17 fl oz	5	12 hr
<b>Onager</b>	10 – 24 fl oz	1	24 fl oz	30	12 hr
<b>Zeal</b>	1-3 oz	2	6 oz	21	12 hr

# Registration Expected 2014 on Corn in CA

  
Miteus\* 5 SC

\*Registered on corn as Portal in some states and as Fujimite on some other commodities.  
Kills all stages by contact so coverage is important

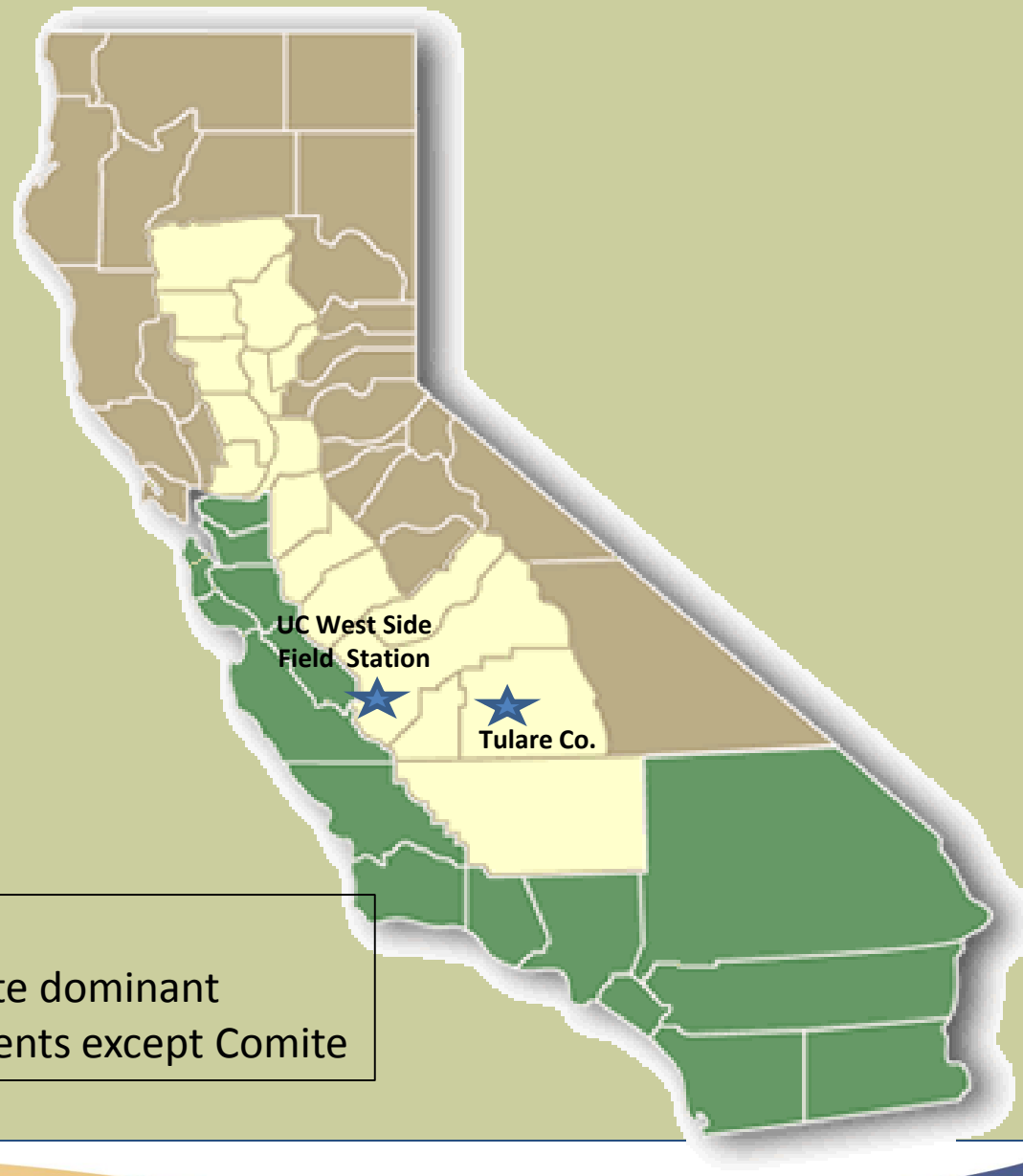
## Miticide Trials in California

### UC West Side Field Station

Small replicated plots  
No yield taken

### Tulare County

Large replicated plots  
(12-24 rows wide, ¼ mi long) in  
grower field  
Yields taken on 5 rows



About 60 miles apart  
Two spotted spider mite dominant  
NIS used w/ all treatments except Comite

# Miticide Trials in California

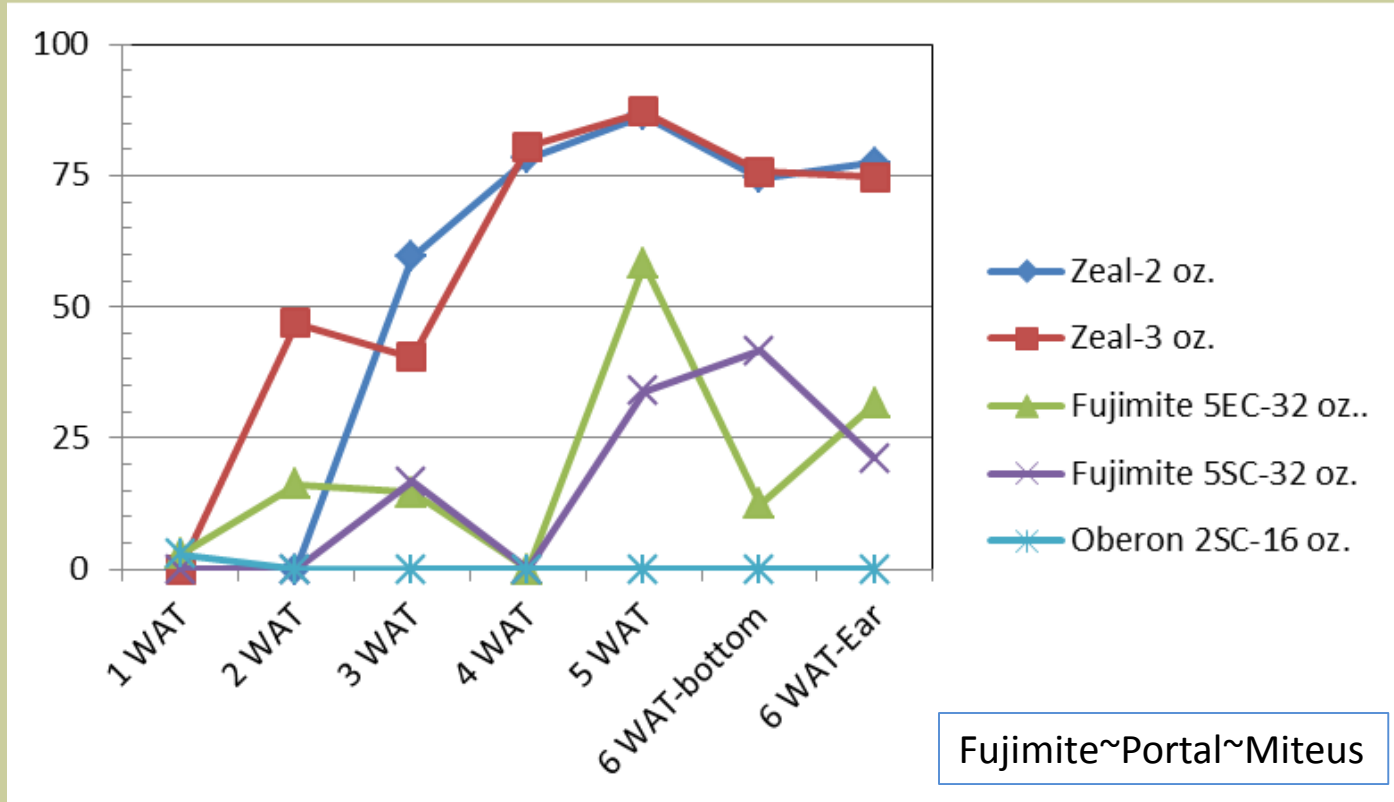
Small replicated plots at UC West Side Field Station  
Large replicated plots (12-24 rows wide, 1/4 mi long) in grower field



# 2012 UC West Side Trial

L. Godfrey

## Percent Spider Mite Control

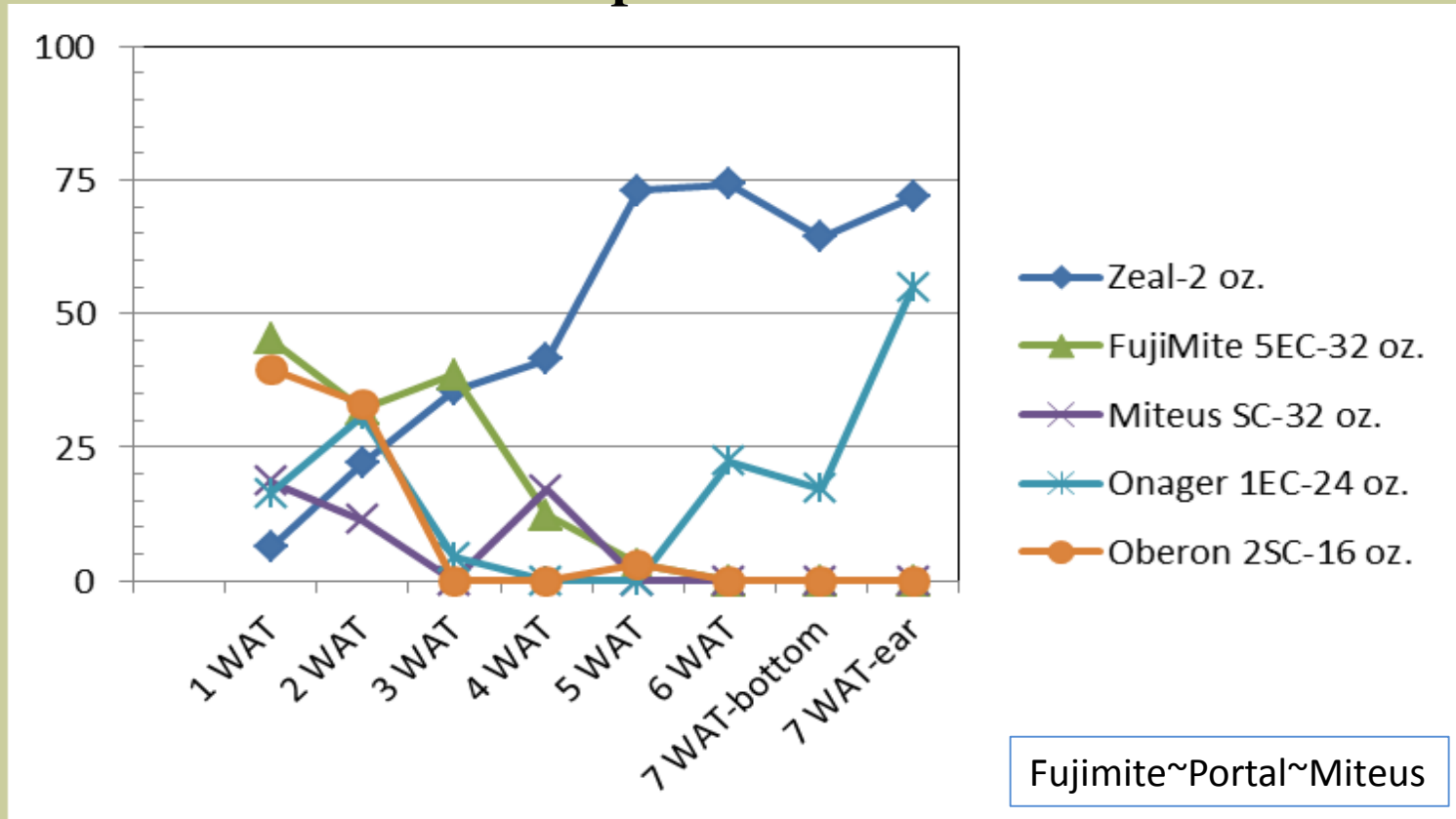


On ear leaf, average of 2000 spider mites per leaf on the UTC

# 2013 UC West Side Trial

L. Godfrey

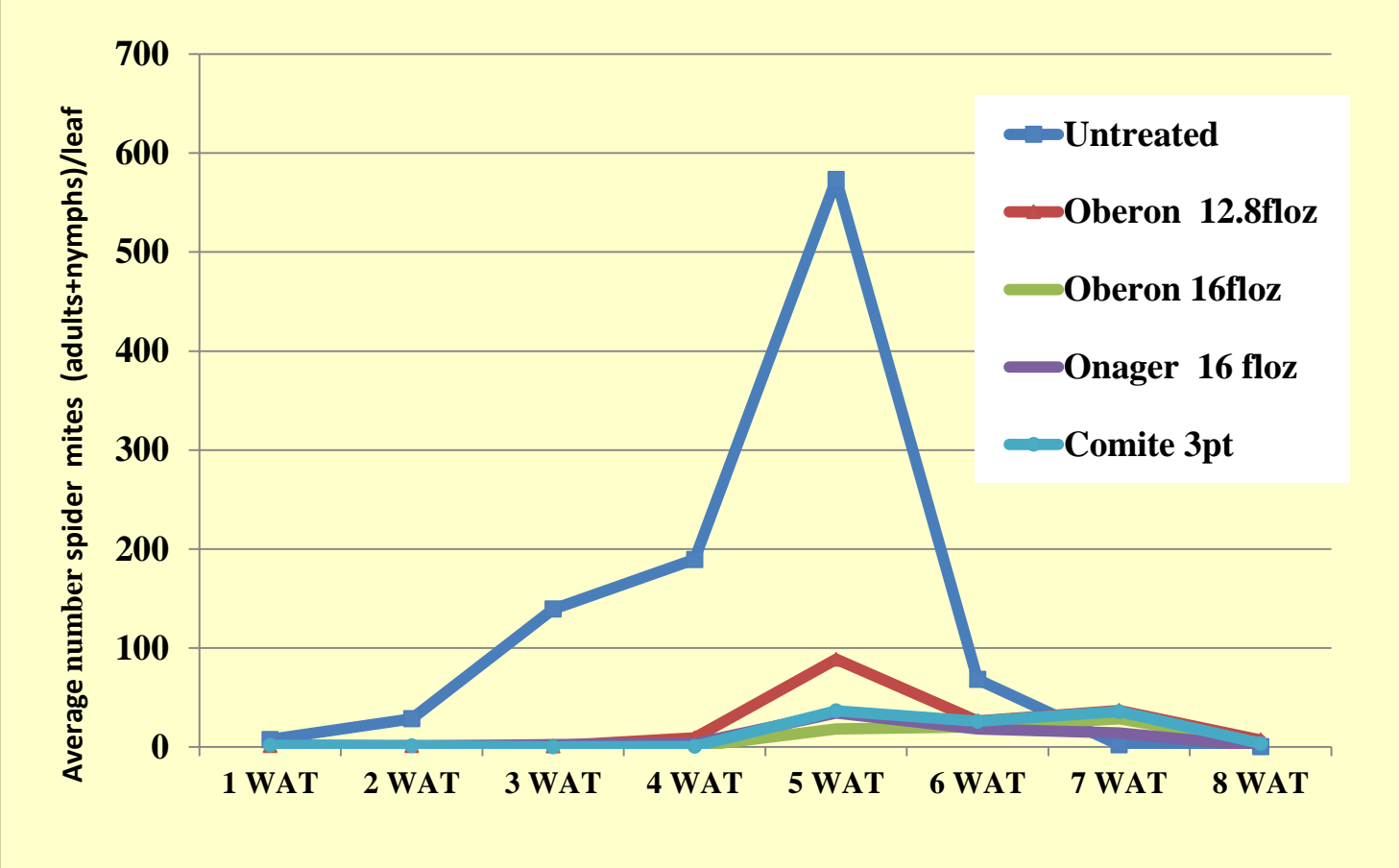
## Percent Spider Mite Control



On ear leaf, average of 1900 spider mites per leaf on the UTC

# 2010 Large Scale Trial – Tulare County

## Number of Spider Mites/Leaf

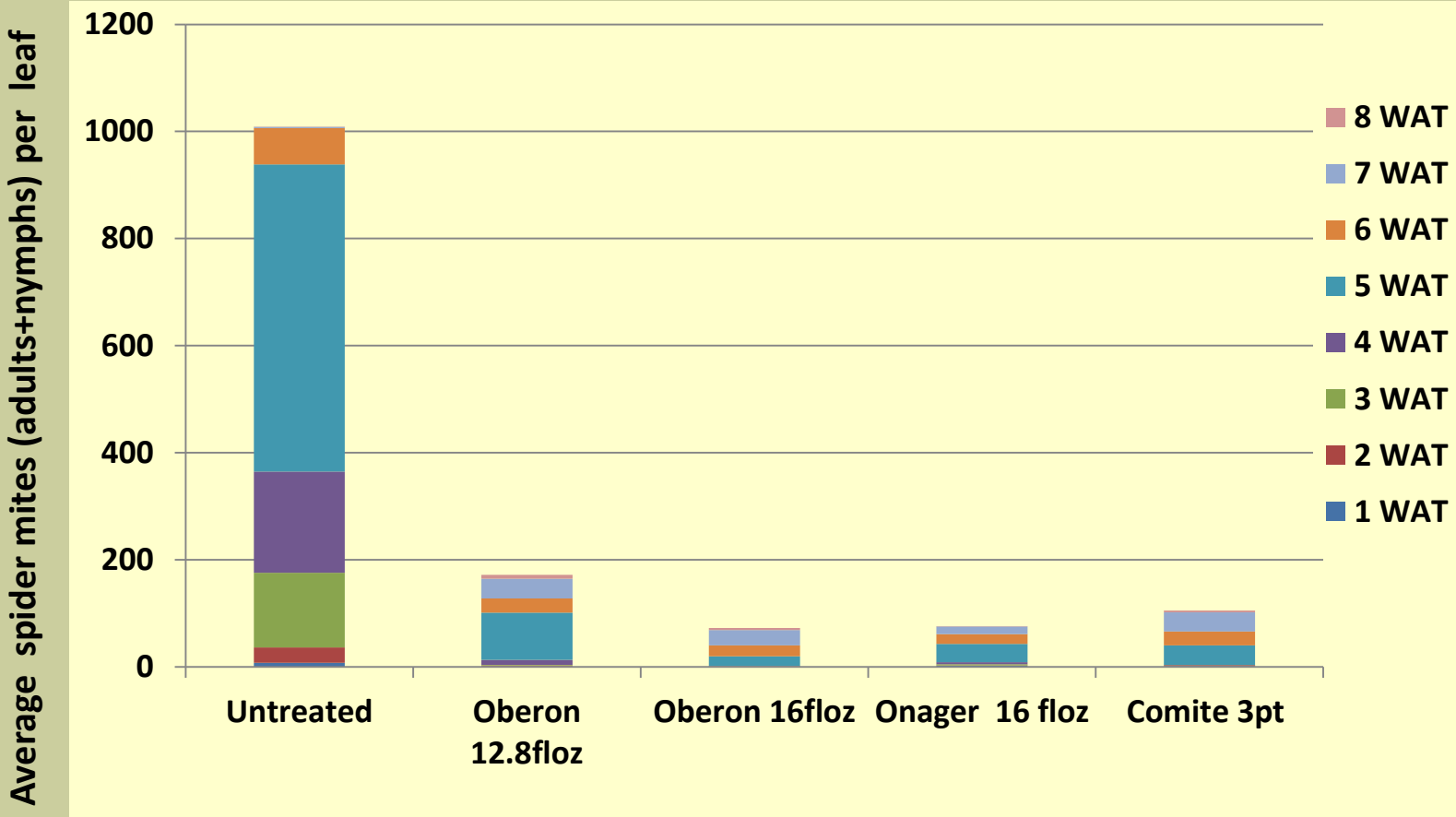


Frate



# 2010 Large Scale Trial – Tulare County

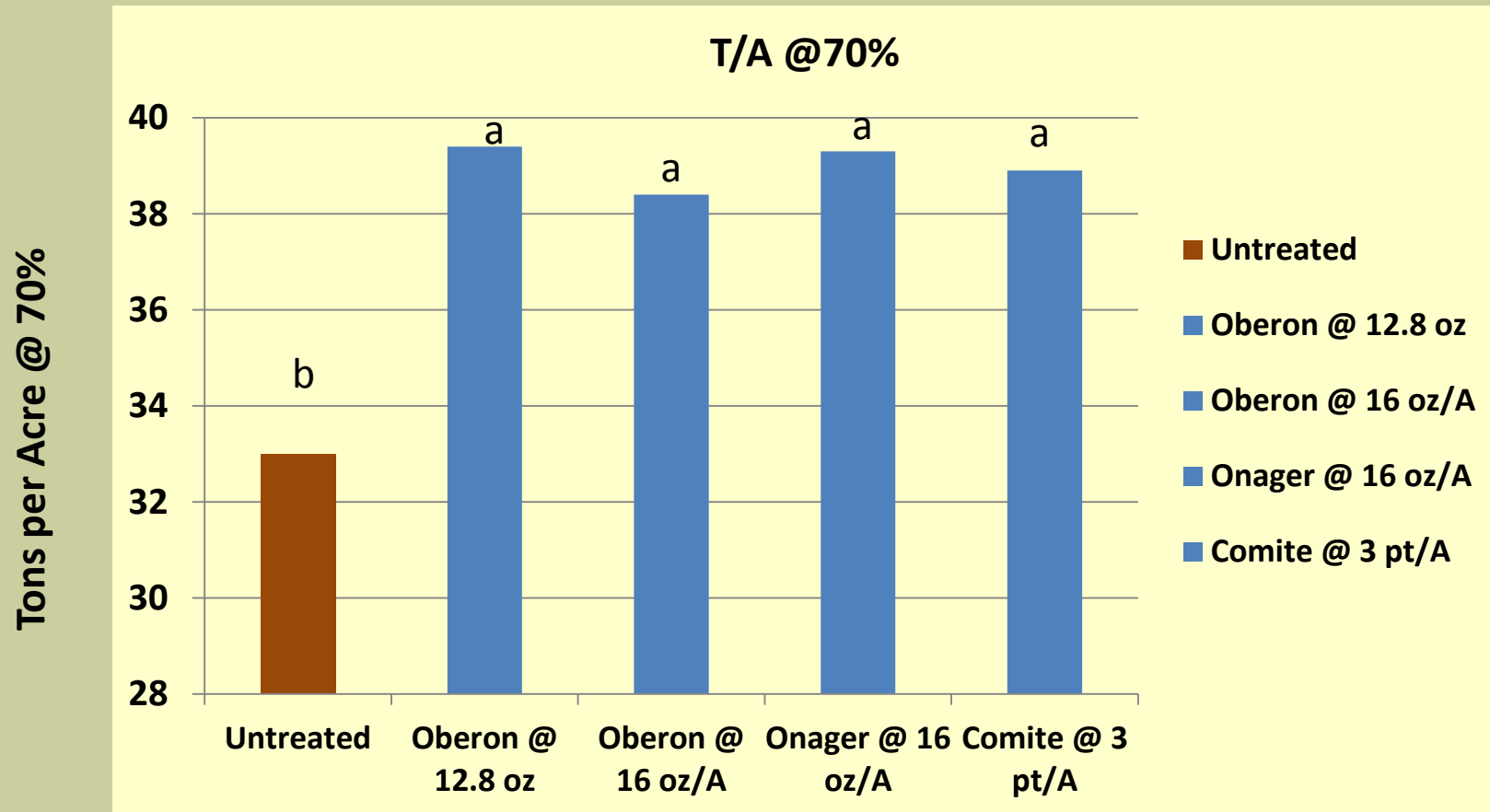
## Number of Spider Mites/Leaf



Frate



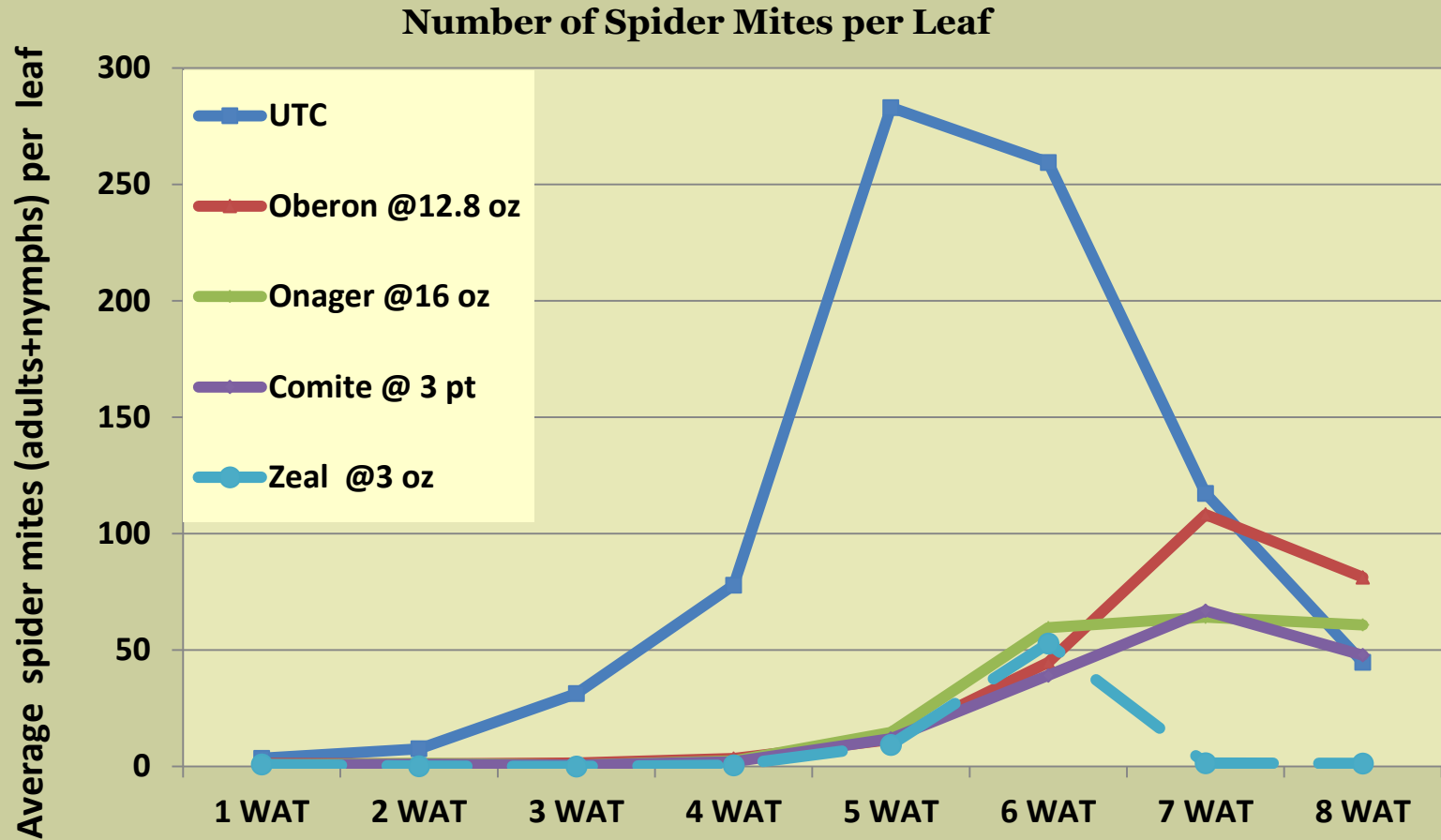
# 2010 Large Scale Trial – Tulare County



Frate



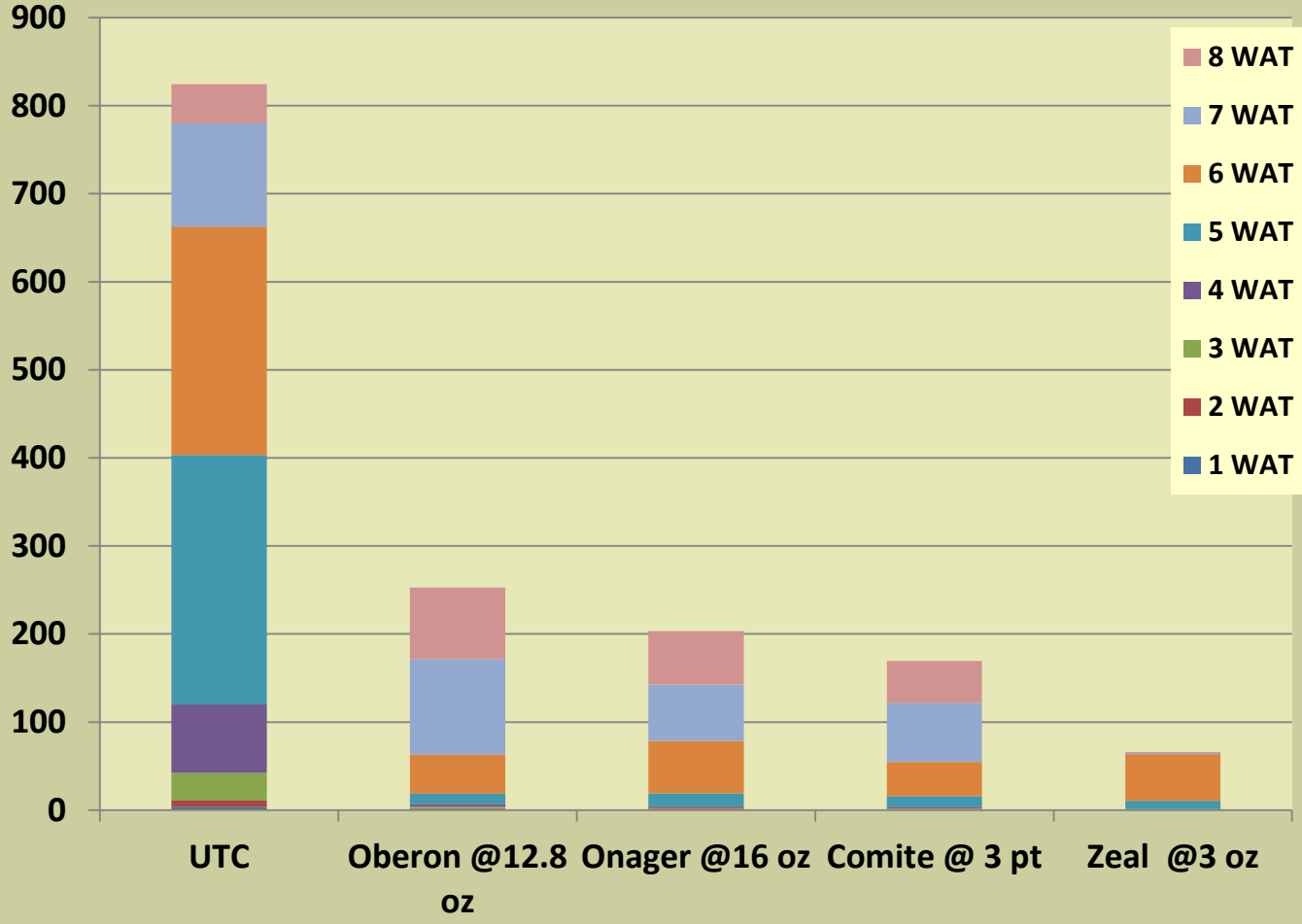
# 2012 Large Scale Trial – Tulare County



Frate



# 2012 Large Scale Trial – Tulare County

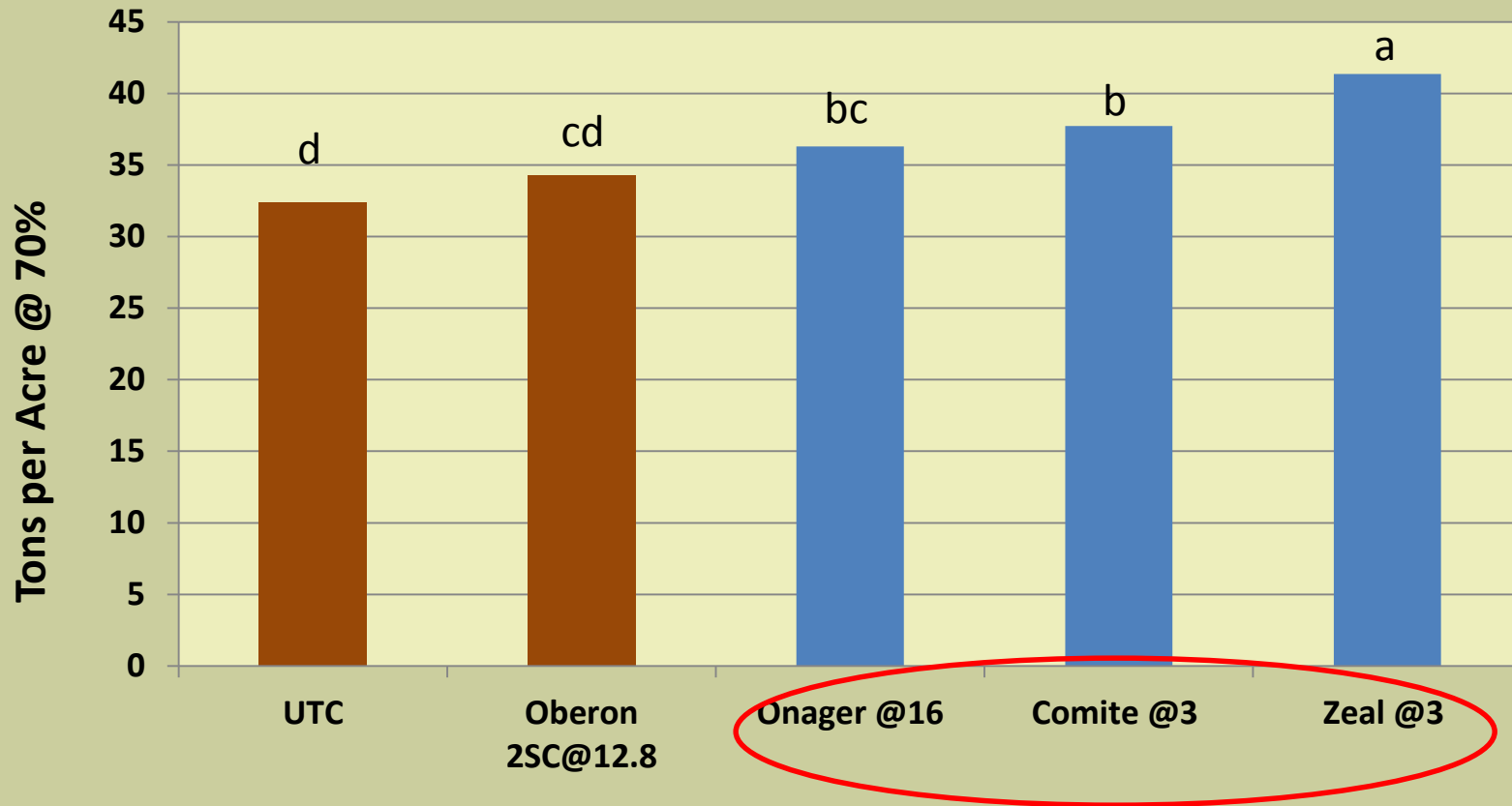


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# 2012 Large Scale Trial – Tulare County

Adjusted Yield (70% Moisture )  
Tons/Acre

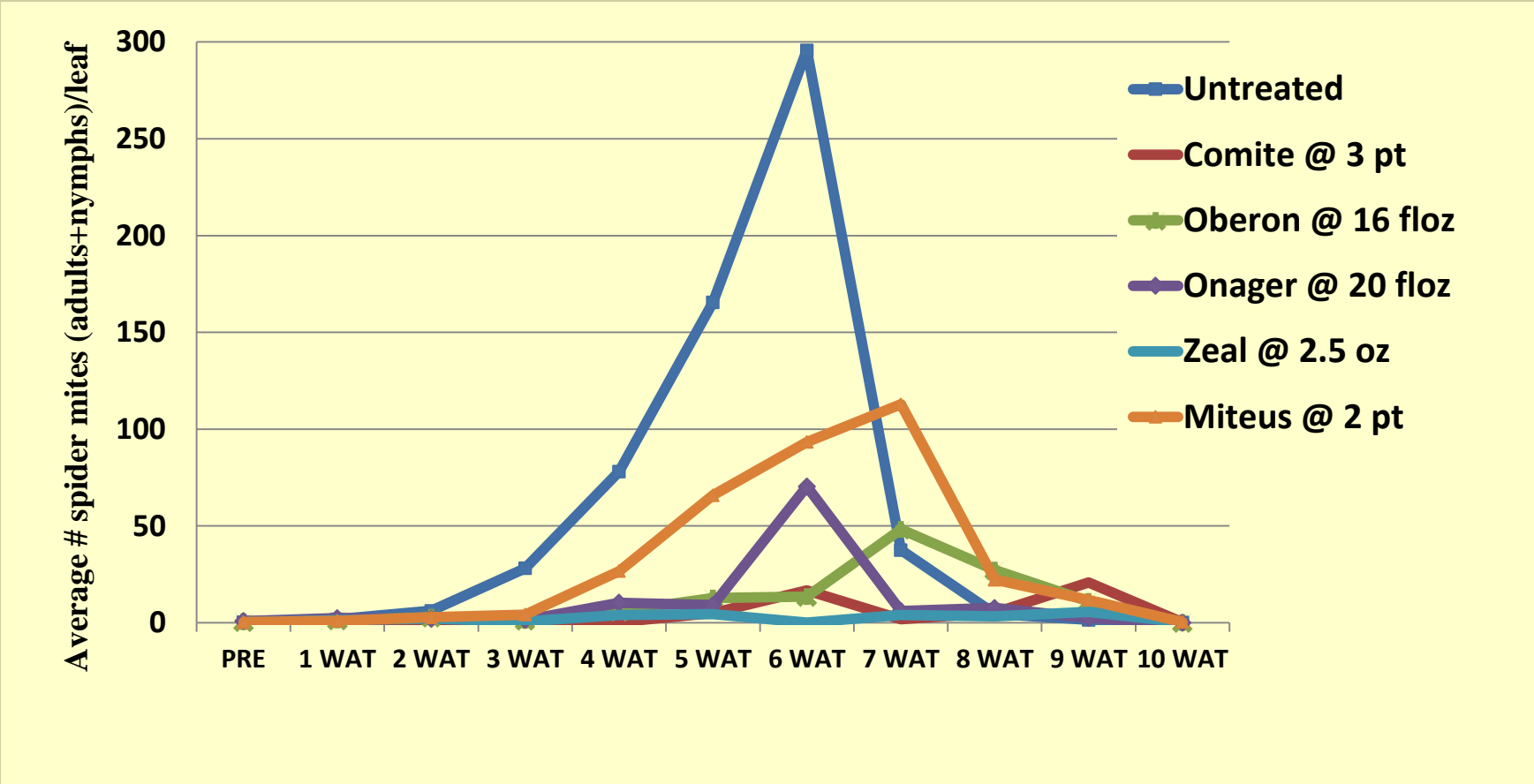


Frate



# 2013 Large Scale Trial – Tulare County

## Number of Spider Mites per Leaf

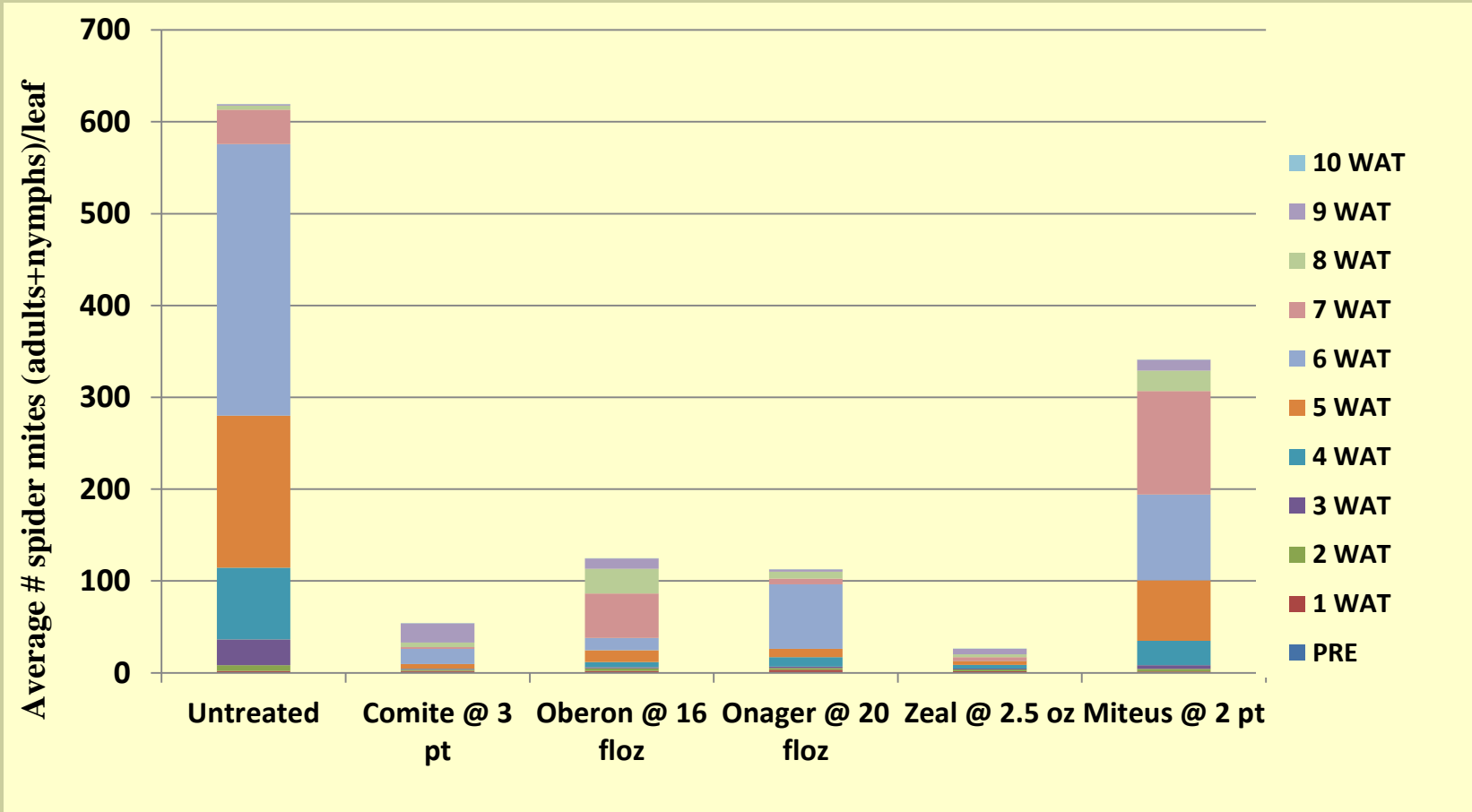


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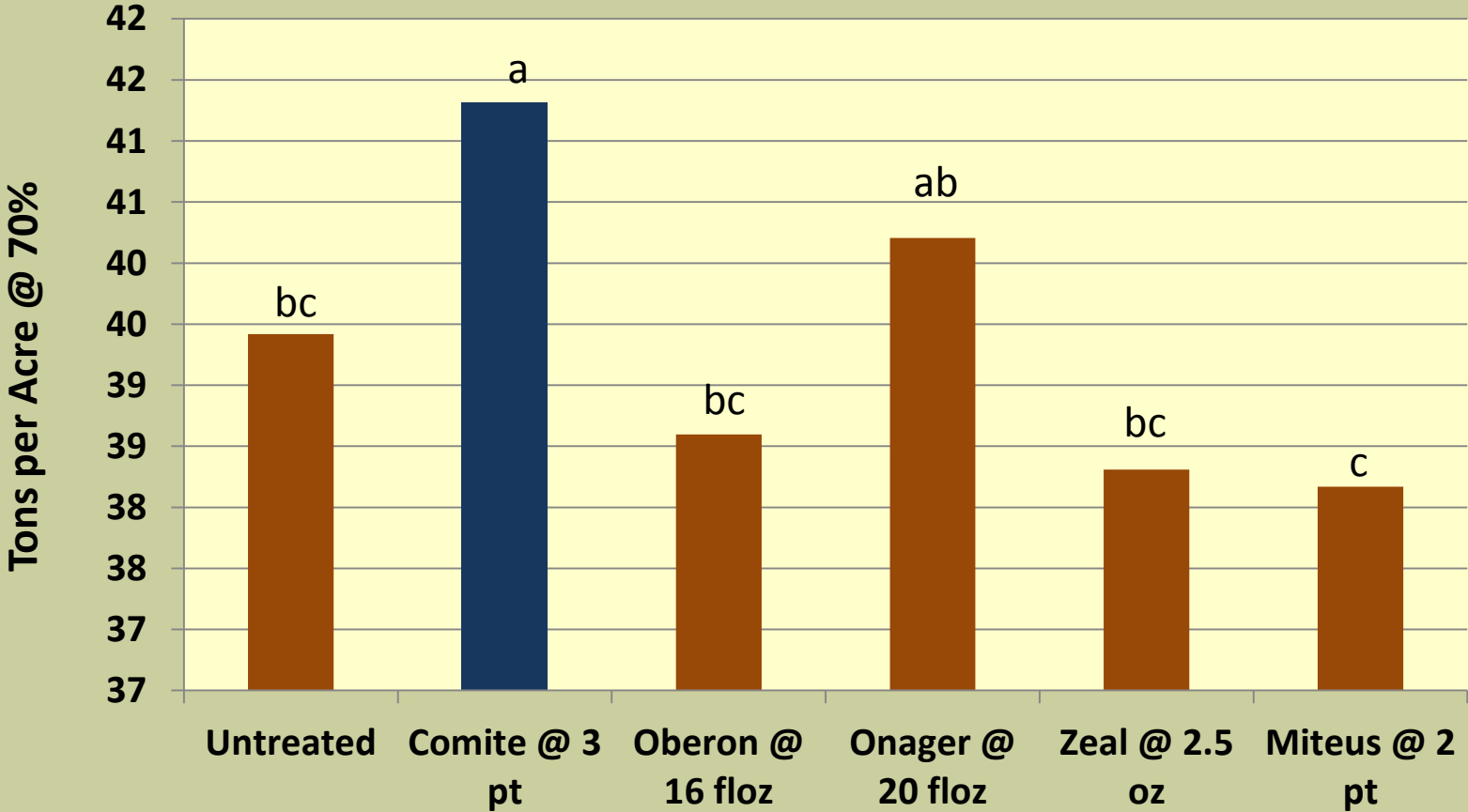
# 2013 Large Scale Trial – Tulare County

## Number of Spider Mites per Leaf



# 2013 Large Scale Trial – Tulare County

## Tons per Acre @ 70%

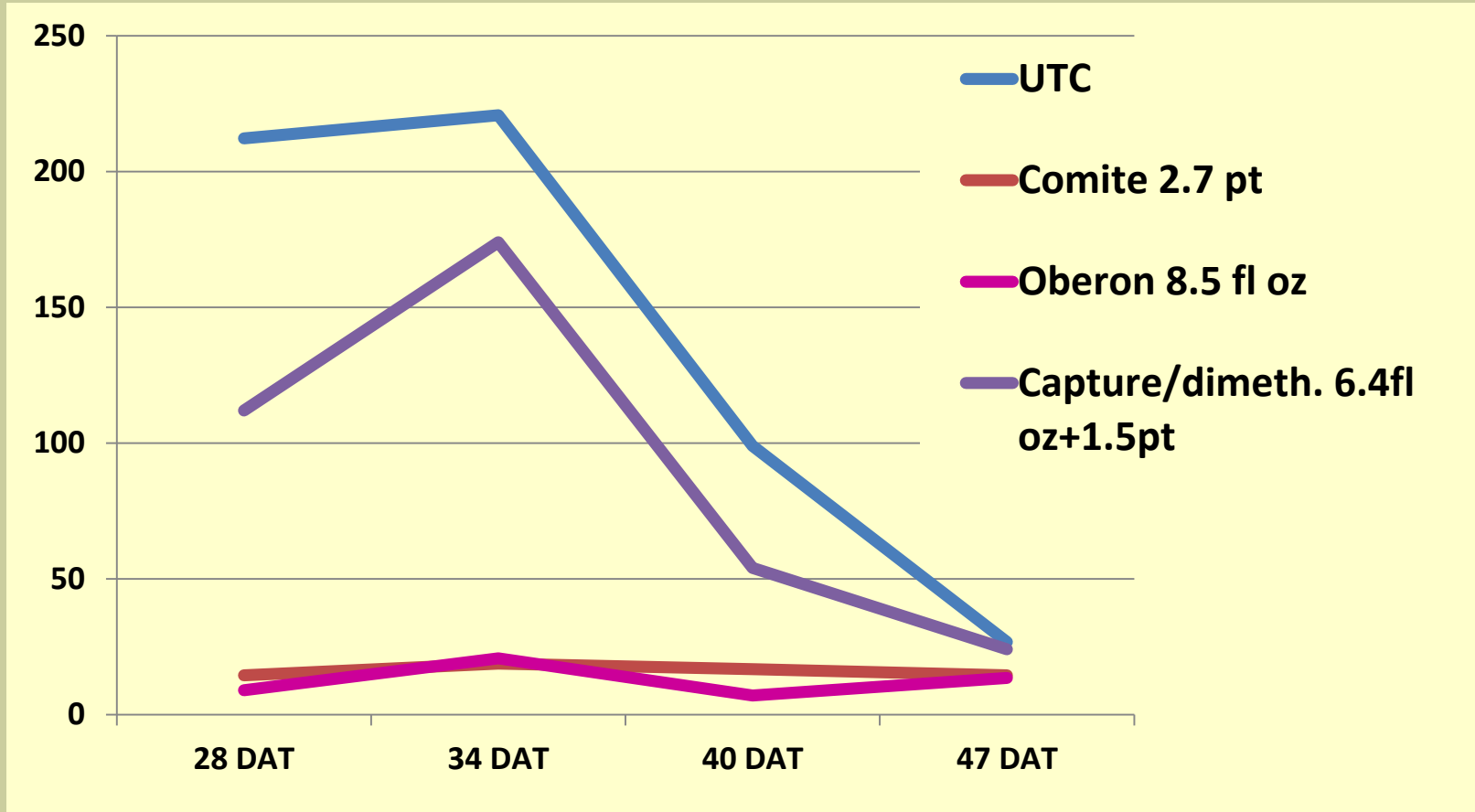


Frate



# 2005 Large Scale Trial – Tulare County

## Number of Spider Mites/10 Leaves



Frate



# Corn Miticides – Mode of Action

	<b>Chemical Name</b>	<b>Mode of Action</b>	<b>Resistance Class</b>
<b>Comite</b>	73.6 propargite	Inhibit mitochondria/energy	<b>12 C</b>
<b>Oberon</b>	23.1 spiromesifen	Interferes w/lipid synthesis	<b>23</b>
<b>Onager</b>	11.8 hexythiazox	Growth inhibitor	<b>10 A</b>
<b>Zeal</b>	etoxazol	Ovicide & inhibits molting; translaminar	<b>10 B</b>
<b>Miteus</b>	fenpyroximate	Contact on eggs & juveniles	<b>21</b>

# Summary

Spider mites can significantly reduce yield and quality of silage corn


Avoid stressing corn – especially water stress

Minimize dust and avoid broad spectrum insecticide applications

Follow treatment threshold recommendations for your area

Be aware of spider mite species and reports of resistance in your area when choosing a miticide

Rotate miticides to avoid developing resistant spider mites



Thank you for your attention!

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