Thrips, spider mite, and beetle update

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Outline

- Thrips
  - Species complex
  - Varietal effects and alternative hosts
  - Management
- Spider mites
  - Varietal effects
  - Management
- Beetles
  - Population dynamics

Flower thrips

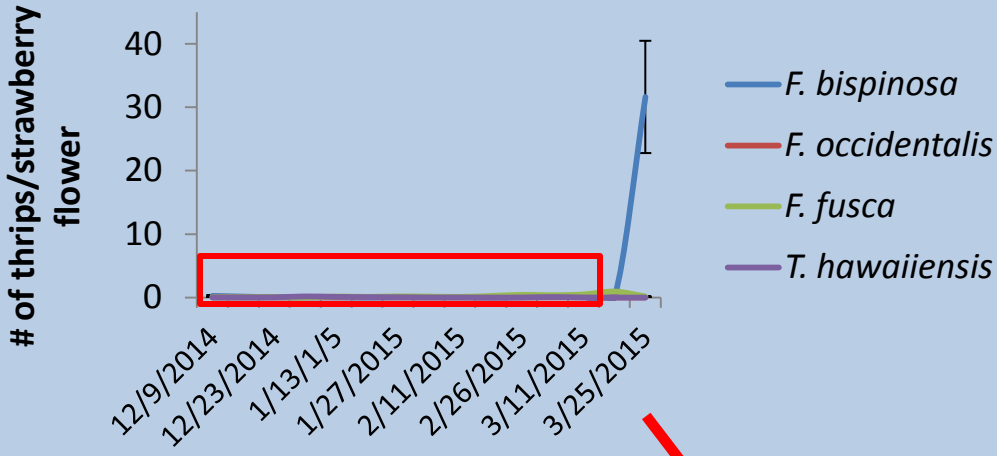
- *Frankliniella* and *Thrips* species

SPECIES COMPLEX

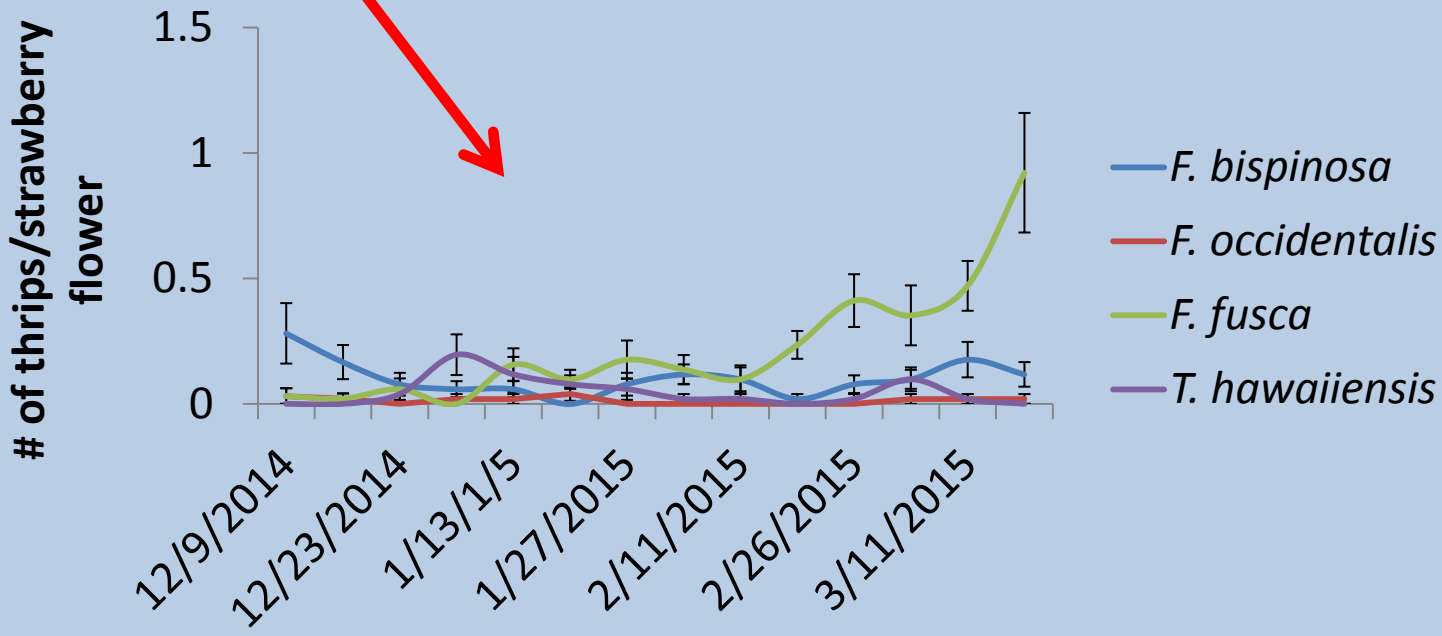
Species complex

- Weekly or bi-weekly flower samples
  - Citra research farm in Marion Co.
  - Two organic farms in Alachua Co.
  - Several farms in Hillsborough Co.

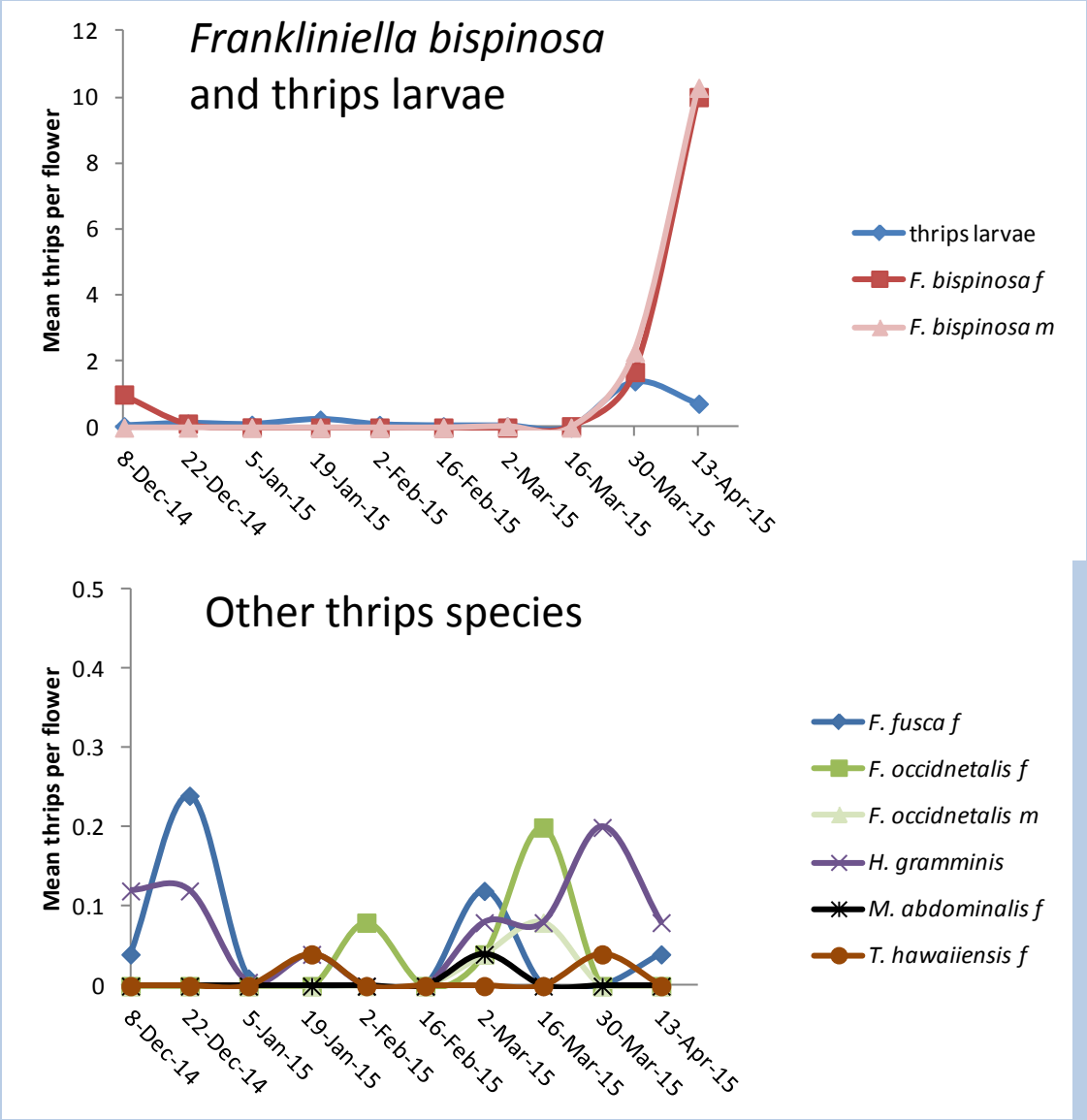
Citra (Marion Co.) 2014-15



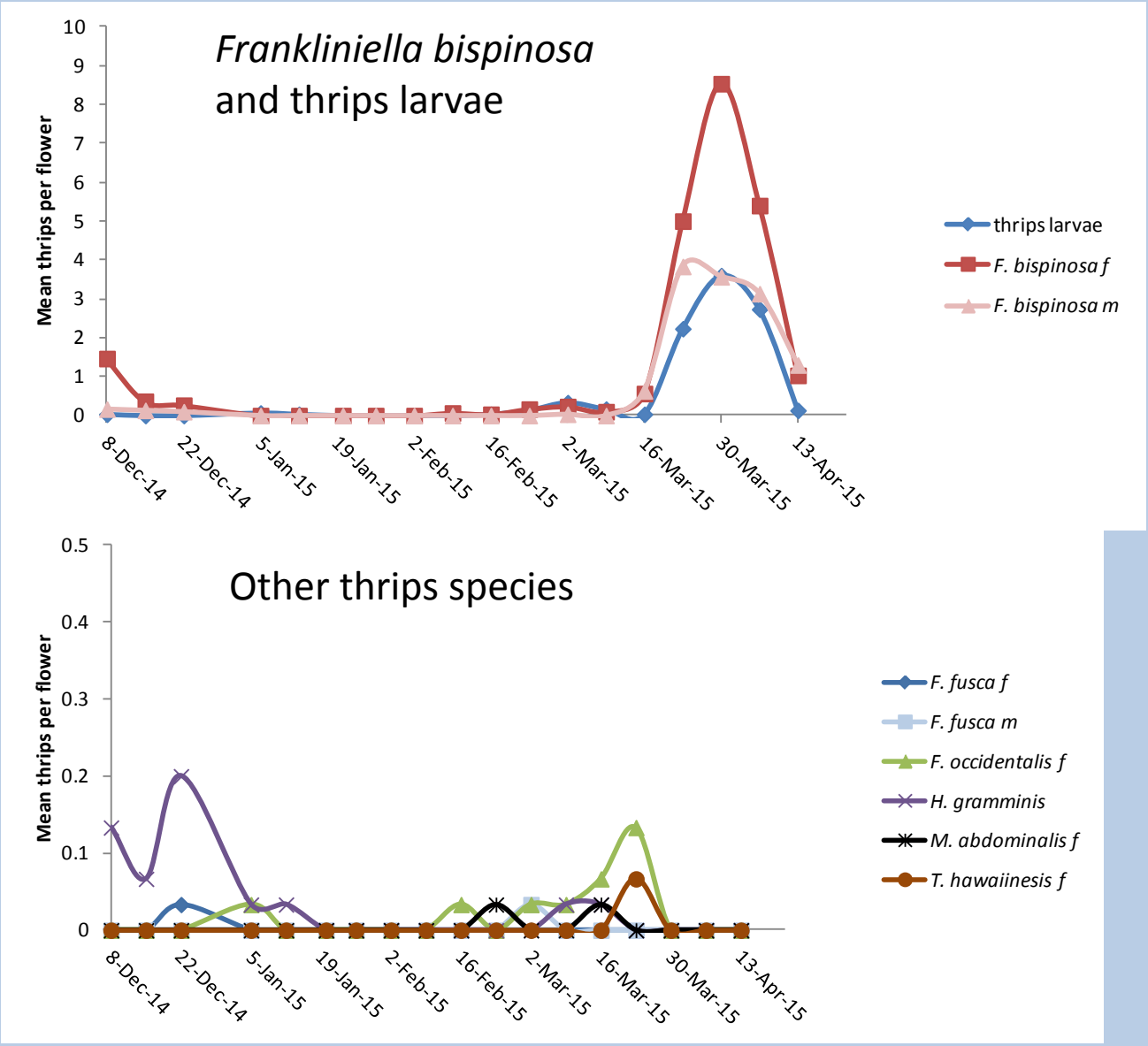
Predominately *F. bispinosa*, with populations drastically increasing by mid-March.



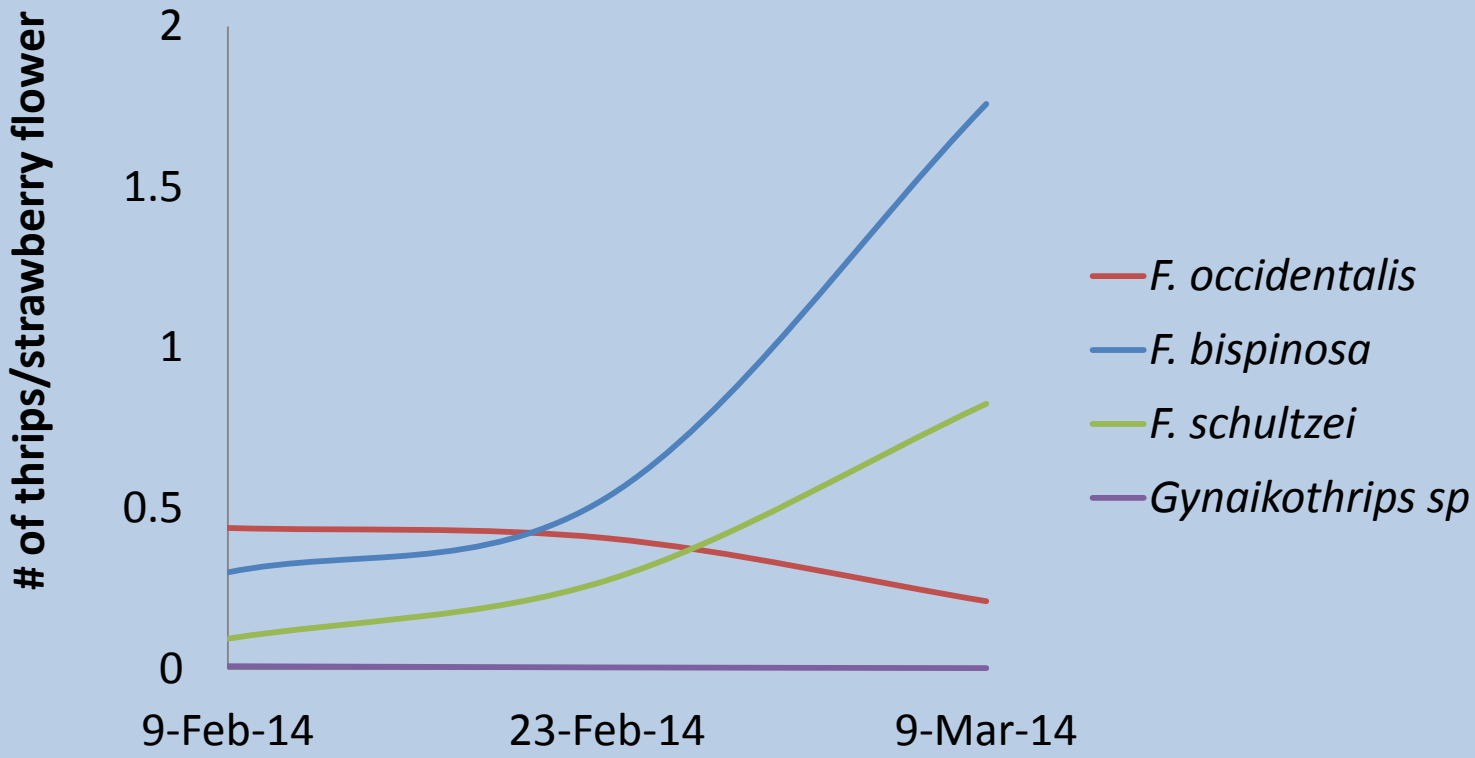
Gainesville (Alachua Co.) 2014-15



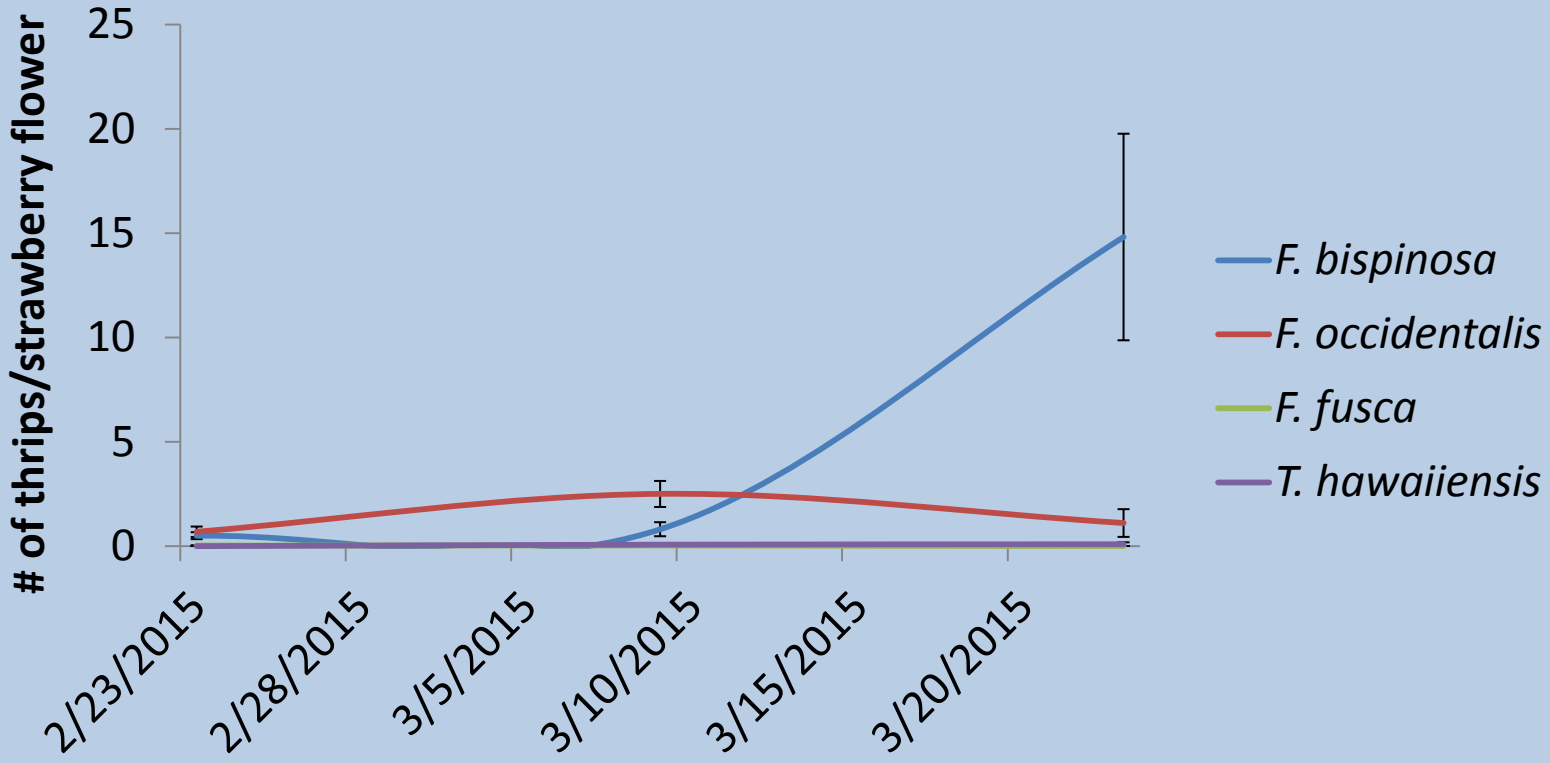
Hawthorne (Alachua Co.) 2014-15



Hillsborough Co. 2014



Hillsborough Co. 2015



VARIETAL EFFECTS AND ALTERNATIVE HOSTS

Investigating the effect of strawberry varieties and surrounding vegetation on thrips populations

- Plant Science and Research Unit (PSRU) in Citra, Florida
- Randomized complete block design with four replicates
- 4 strawberry varieties: Festival, Radiance, Sensation, and Winter Star
- Peppers planted on eastern border of the strawberry field

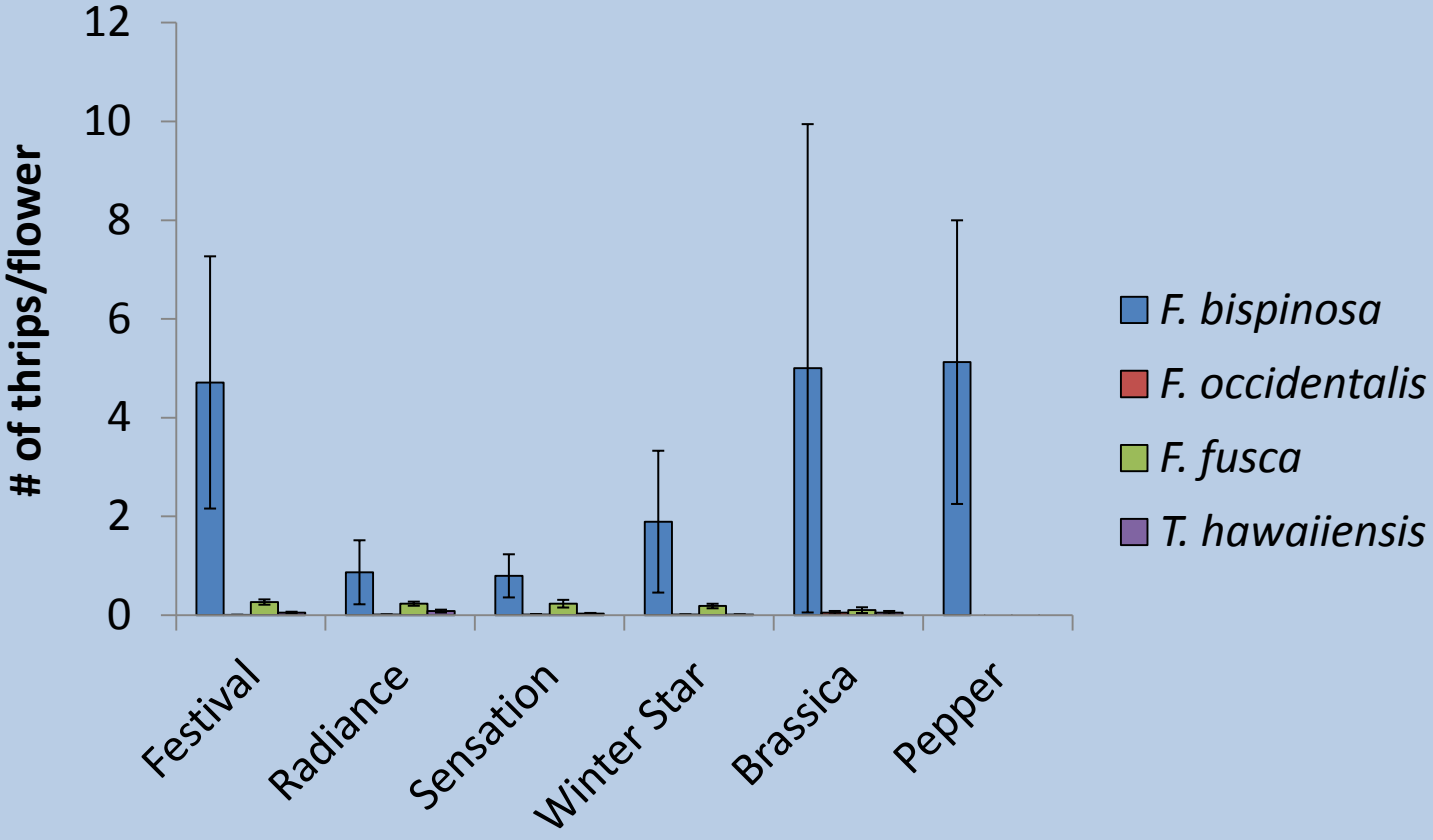
- Collect flower samples weekly

Brassica spp.

- Thrips identified to species

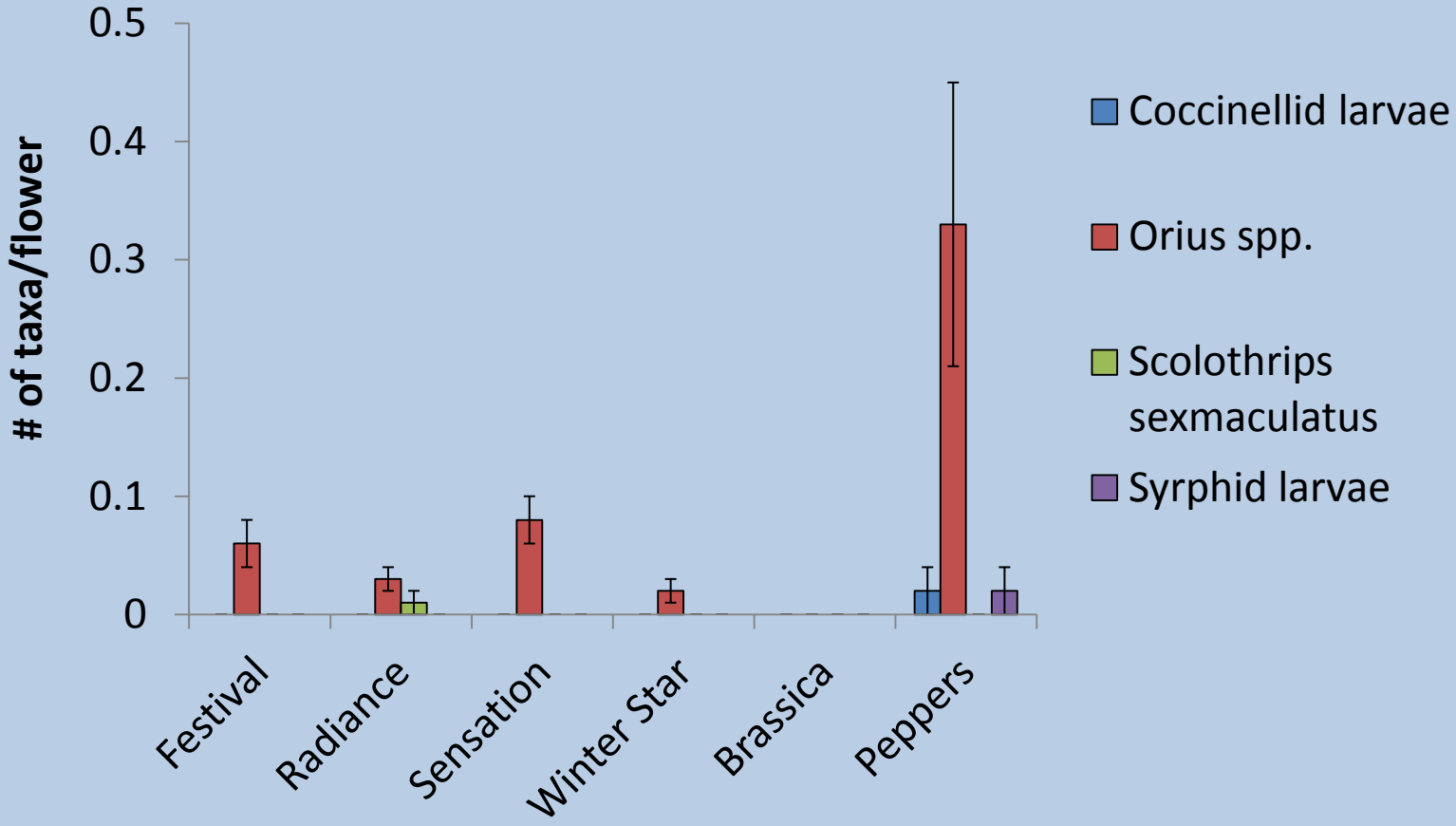
- Natural enemies also identified

Effect of strawberry variety and crop on thrips distribution in Citra, FL 2014-2015



High densities of *F. bispinosa* found in strawberry var. Festival, wild *Brassica*, and peppers.

Predators collected in strawberry and alternative host flowers in Citra, FL 2014-2015



Orius spp. key predator found in strawberries and peppers.

Conclusions

- *F. bispinosa* is the predominant species of thrips sampled from strawberry and pepper flowers in north-central Florida

- There was a higher density of thrips on the strawberry variety Festival
  - Festival strawberries were the healthiest throughout the season and produced the highest yields

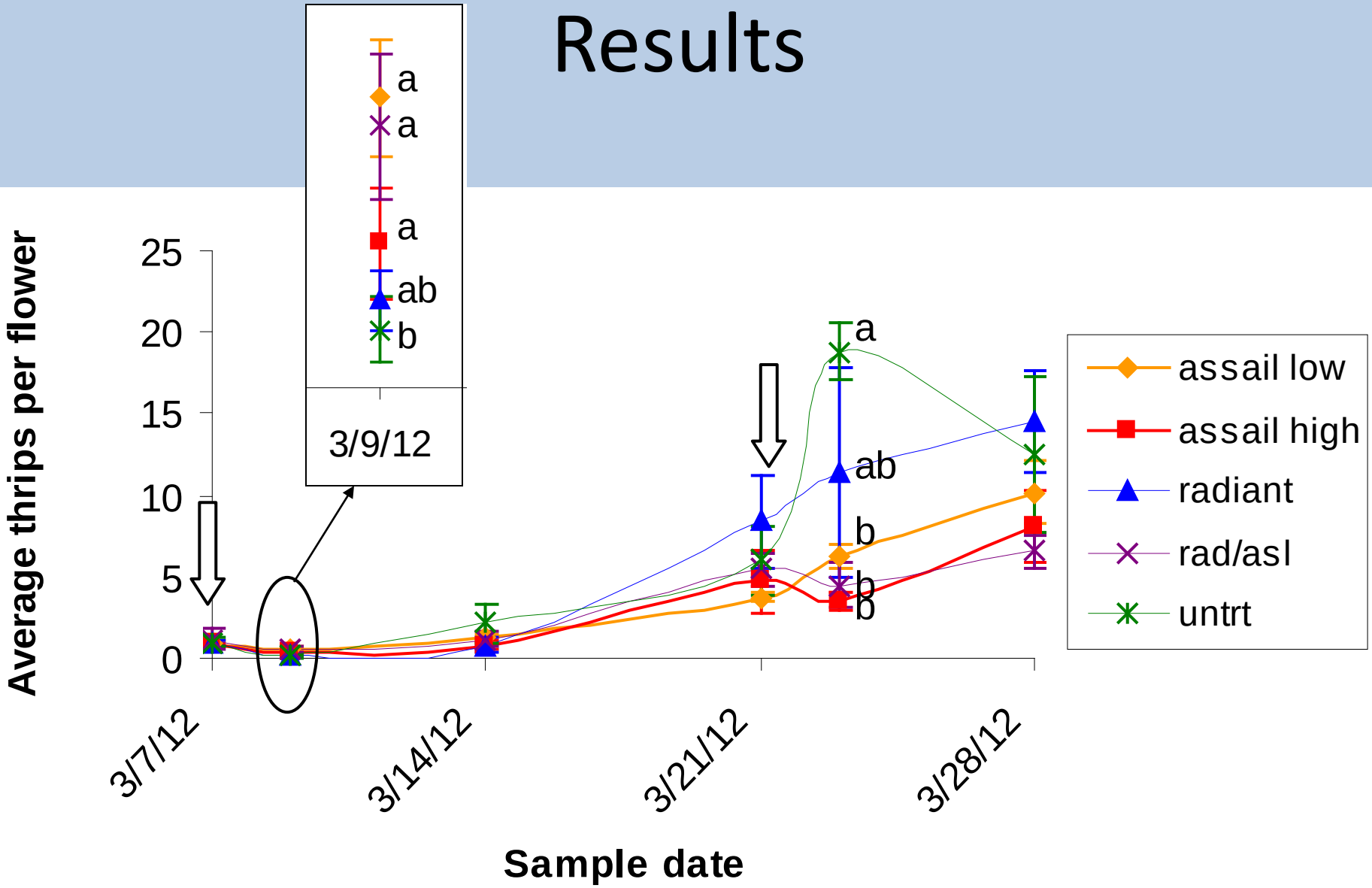
- Peppers were an attractive host for *F. bispinosa* thrips
  - Peppers could also serve as an important refuge for predators of thrips

EFFICACY TRIAL 2011/2012

Methods

- Plot = 2 rows of strawberry ‘Festival’ 6 ft long at Citra PSREU
- RCBD with 4 reps of 5 trts
  - Assail 30 SG high rate (6.9 oz / acre)
  - Assail 30 SG low rate (4.0 oz / acre)
  - Radiant SC (8 fl oz / acre)
  - Radiant/Assail low rate rotation
  - water treated control
- Trts applied every 14 days starting on 11 Jan. 2012

Results


Average thrips per flower
25
20
15
10
5
0
3/7/12
3/14/12
3/21/12
3/28/12
Sample date
a
a
a
ab
b
3/9/12
a
ab
b
b
b
assail low
assail high
radiant
rad/asl
untrt

Conclusion

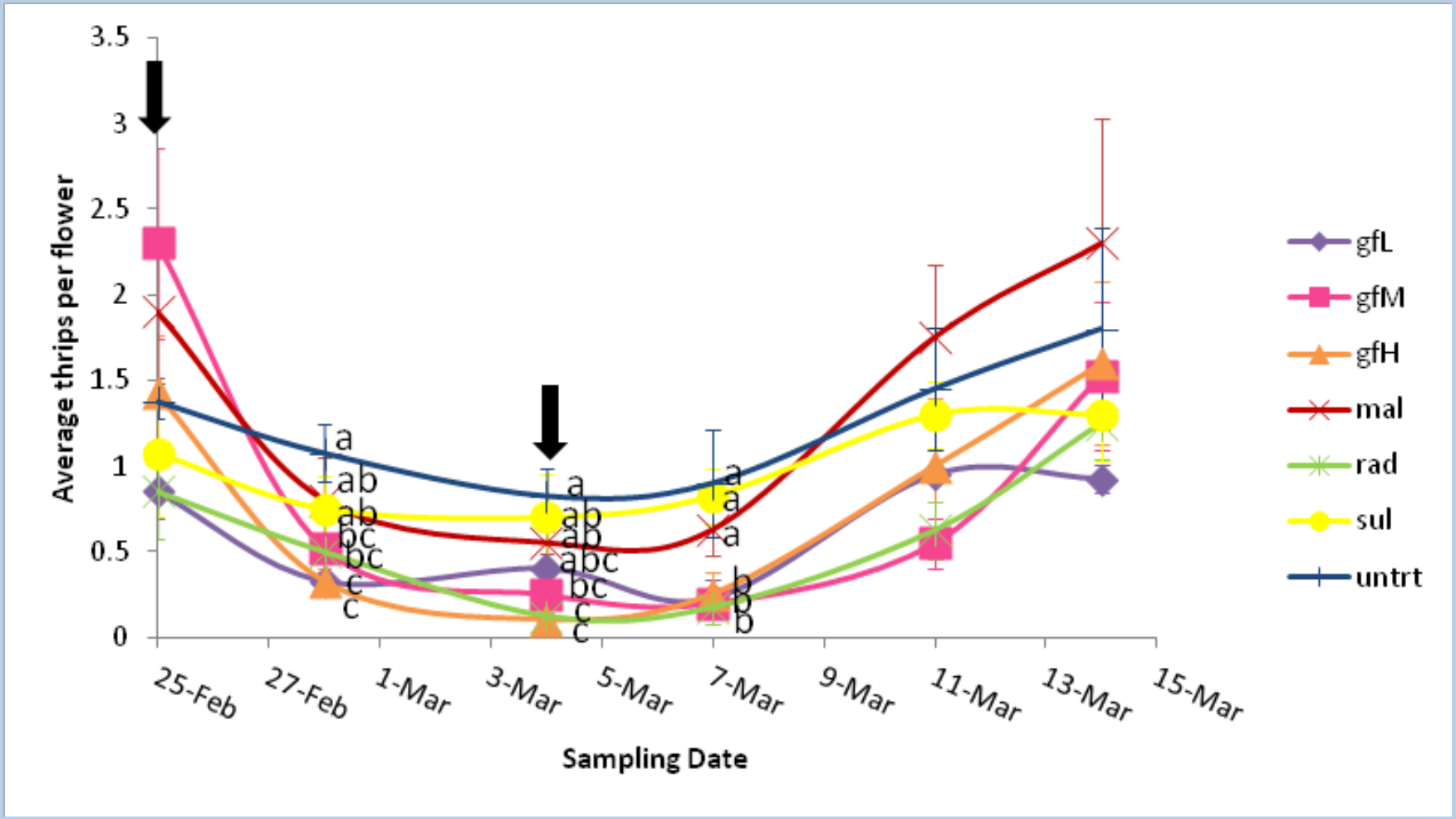
- All 4 trts appear to be viable options for thrips management in strawberries

EFFICACY TRIAL 2012/2013

Methods

- RCBD with 4 reps of 7 trts
  - GF-2860 (spinetoram + sulfoxaflur) low, medium, and high rates (100, 125, and 150 g a.i. / ha)
  - Sulfoxaflur at 5.7 floz / acre
  - Radiant at 61.4 g a.i. / ha
  - Malathion at 2.35 pt / acre
  - Water treated control

Results


Average thrips per flower
3.5
3
2.5
2
1.5
1
0.5
0
25-Feb
27-Feb
1-Mar
3-Mar
5-Mar
7-Mar
9-Mar
11-Mar
13-Mar
15-Mar
Sampling Date
gfL
gfM
gfH
mal
rad
sul
untrt

Conclusions

- Radiant (spinetoram) effectively reduced thrips numbers
- Sulfoxaflur did not reduce thrips numbers
- GF-2860 (a combination of spinetoram and sulfoxaflur) effectively reduced thrips numbers at all rates
- Malathion did not reduce thrips numbers possibly due to its broad spectrum effects on beneficials

Twospotted spider mites (TSM)

- *Tetranychus urticae* Koch
- Greenish-yellow and red forms
- Optimal conditions for development are high temperatures and low humidity

TSM Injury

Predatory mites

- *Neoseiulus californicus*
  - Prefers Tertanychid mites
  - Will persist on pollen and other small insects and mites
- Predator in first technique

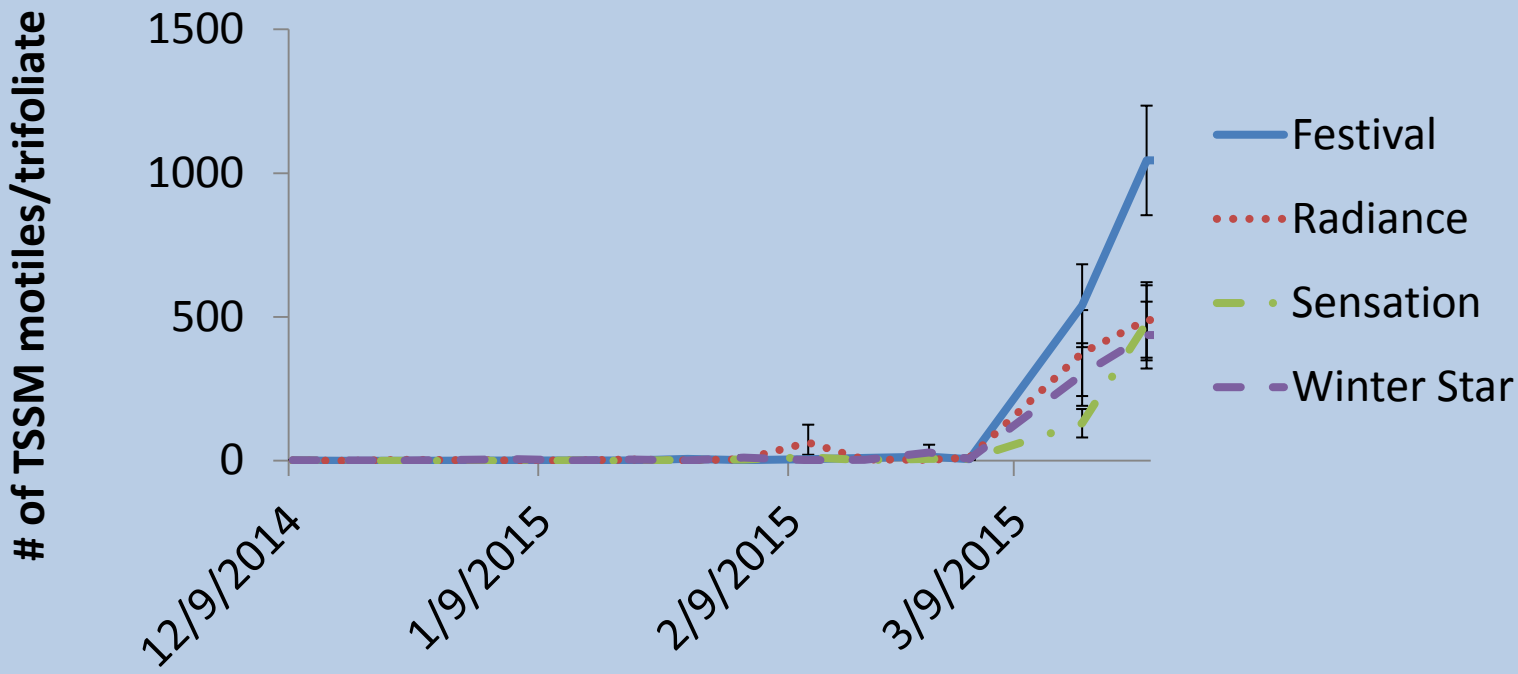
VARIETAL EFFECTS AND BIOLOGICAL CONTROL

Varietal effects: conventional

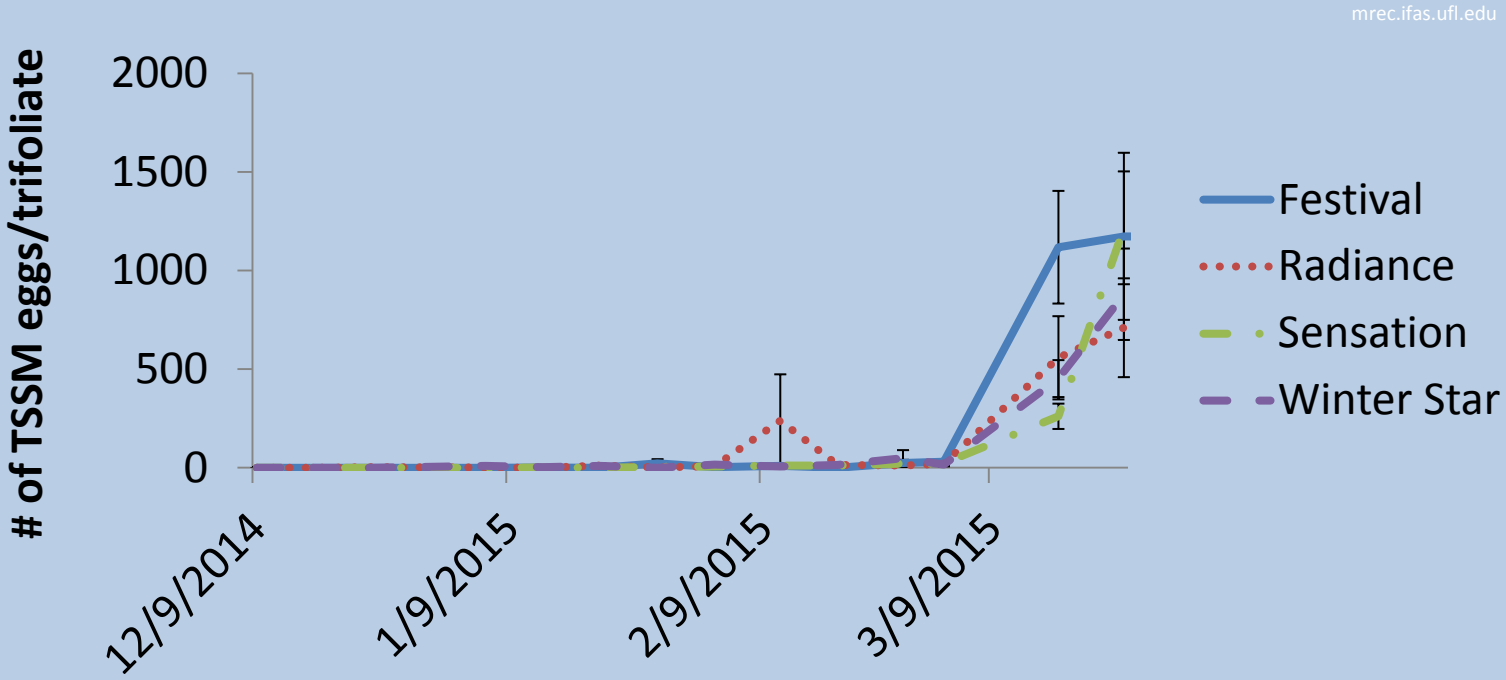
- Randomized complete block design with four replicates
- 4 Varieties:
  - Festival
  - Radiance
  - Sensation
  - Winter Star

- Recorded weekly the number of TSSM motiles and eggs, and yield
  - 4 trifoliates/plot

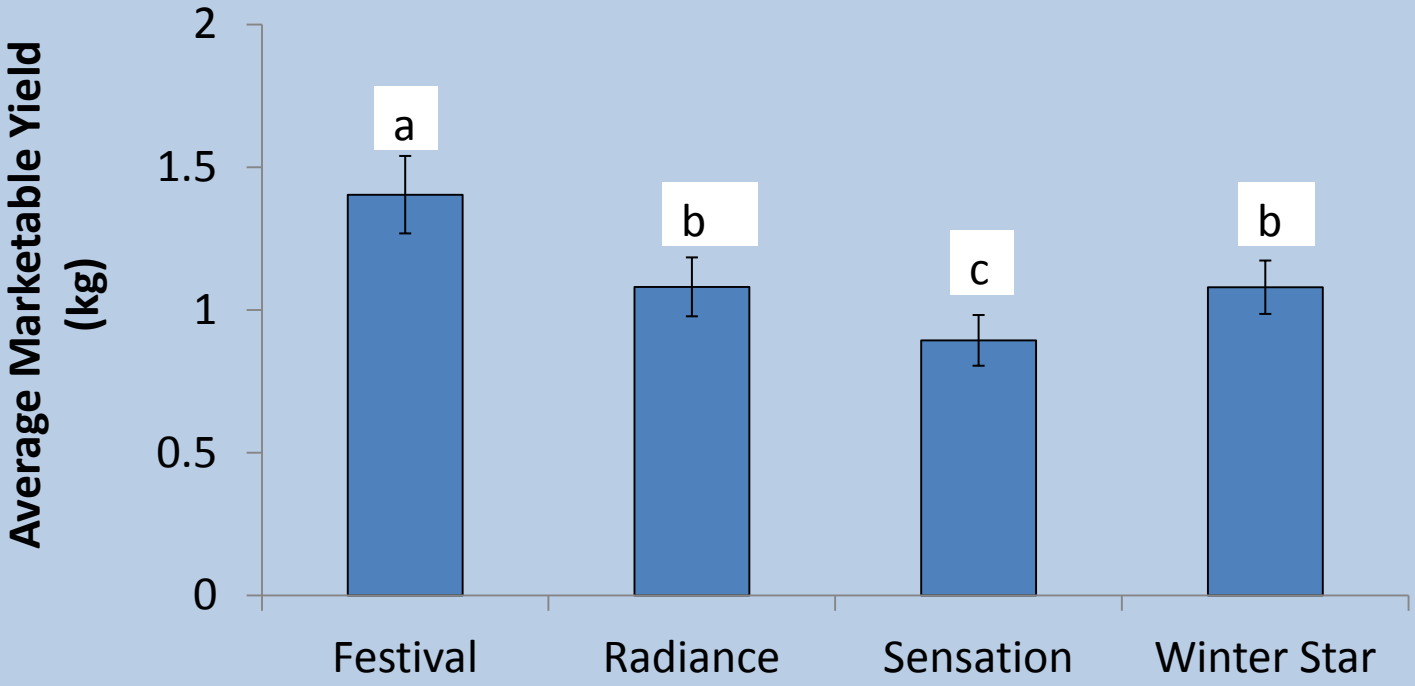
TSSM Populations: Motiles



TSSM Populations: Eggs



Marketable Yield



Conclusions

- TSSM populations and yield were both higher in Festival
  - Less disease incidence
  - TSSM populations were very low until late in the season

Varietal effects: organic

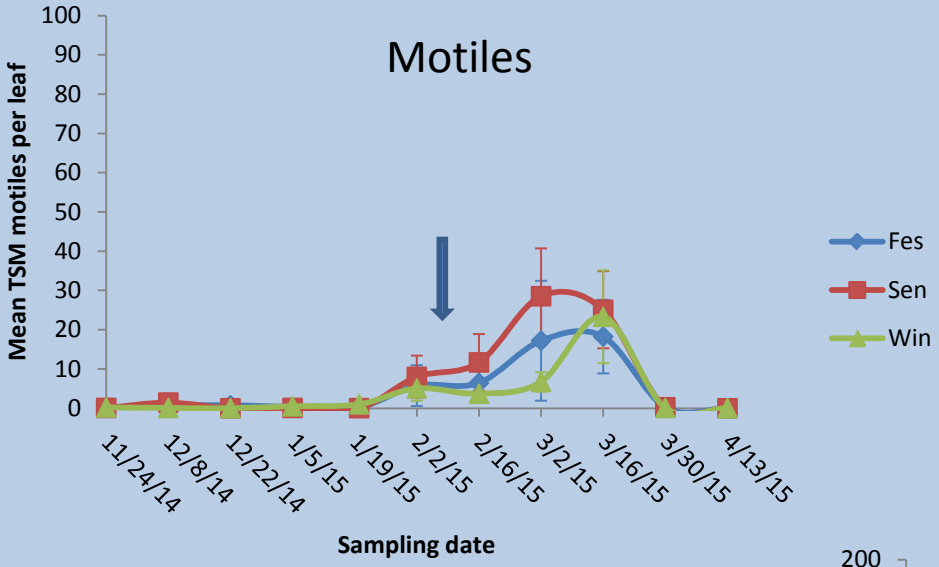
- Two organic farms in north-central Florida
- 3 replicates of 3 varieties
  - Festival, Sensation, Winterstar
- 4 trifoliate leaves were collected from each plot every other week at Gainesville farm and weekly at Hawthorne farm

Methods: predatory mite releases

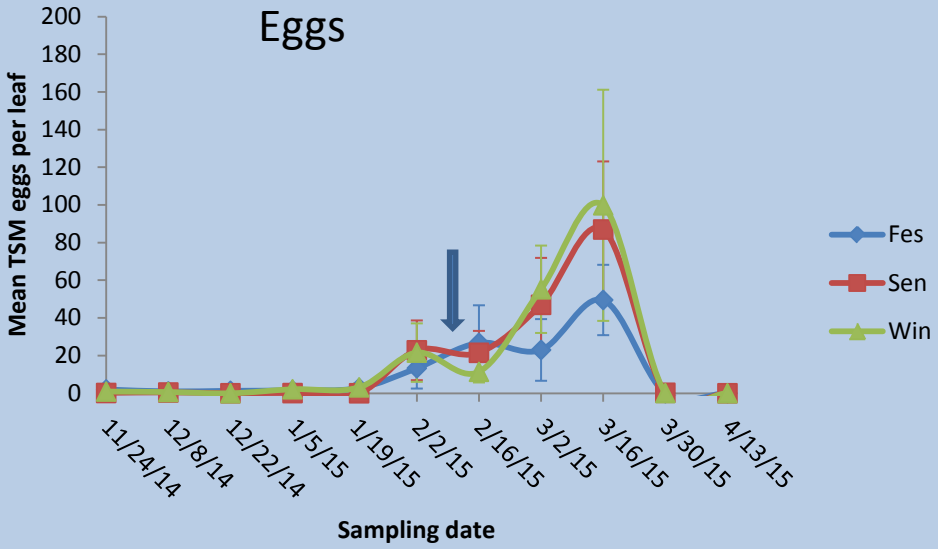
- *N. californicus* mites were released at the preventative rate (25 per m^2) on 11/12 and 11/13/15 on Gainesville and Hawthorne farms respectively

- A second release at the rate of 1 per 10 TSM occurred on 2/11/15 at Gainesville farm and 1/16/2015 at Hawthorne farm

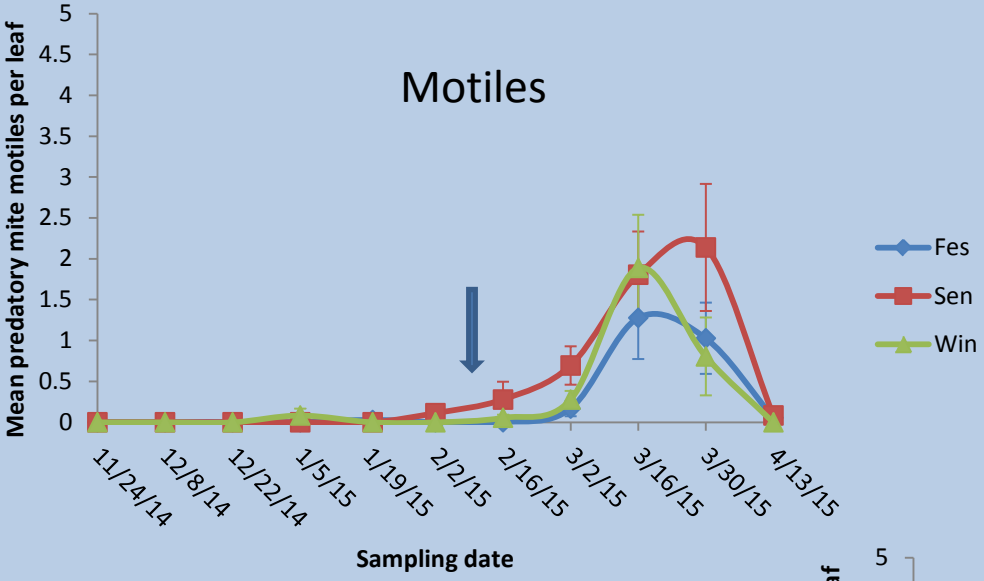
Results: Gainesville TSM



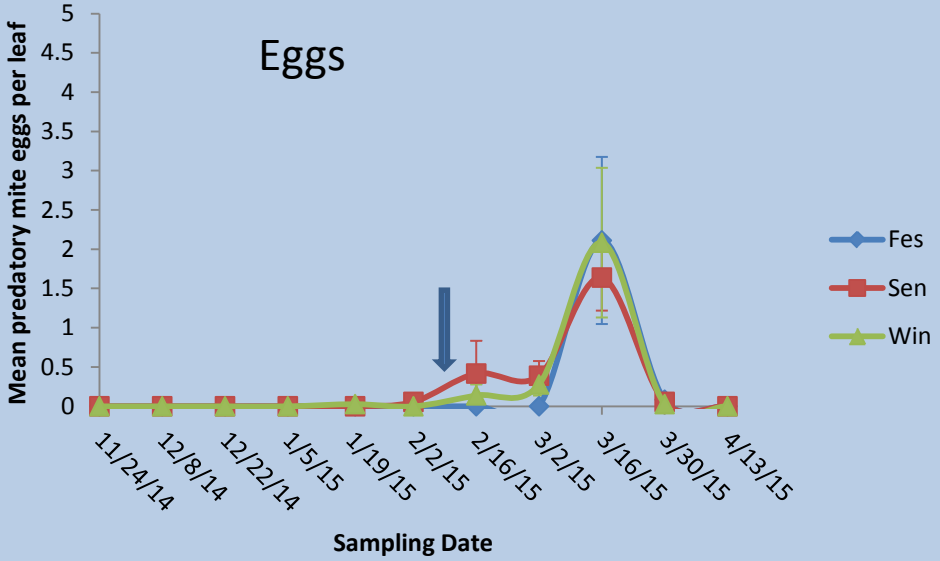
Fes = Festival
Sen = Sensation
Win = Winterstar



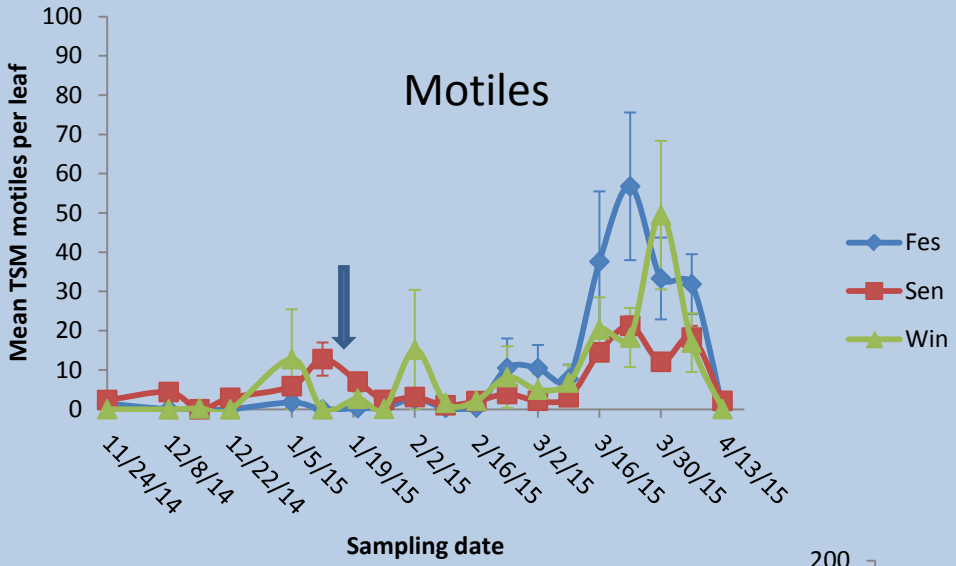
Results: Gainesville *N. californicus*



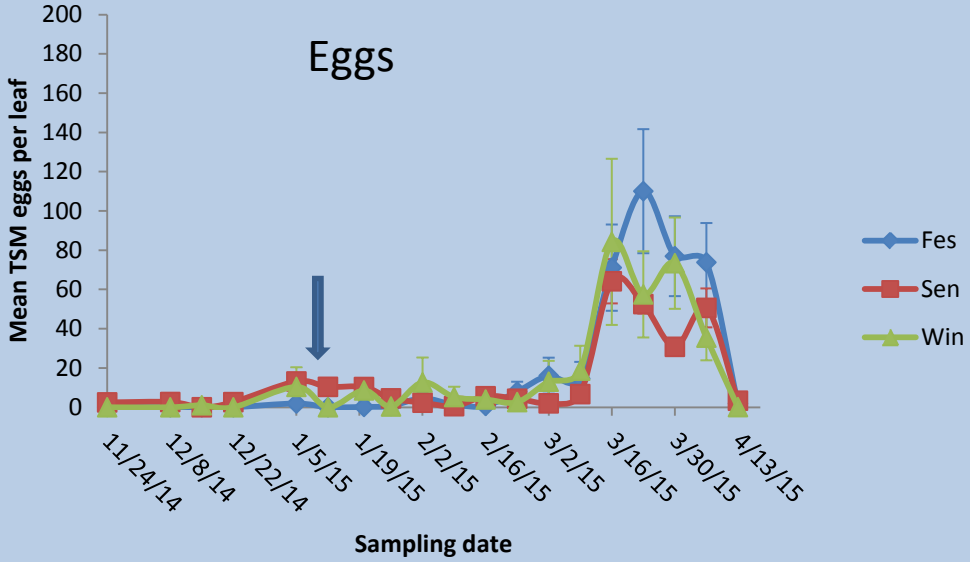
Fes = Festival
Sen = Sensation
Win = Winterstar



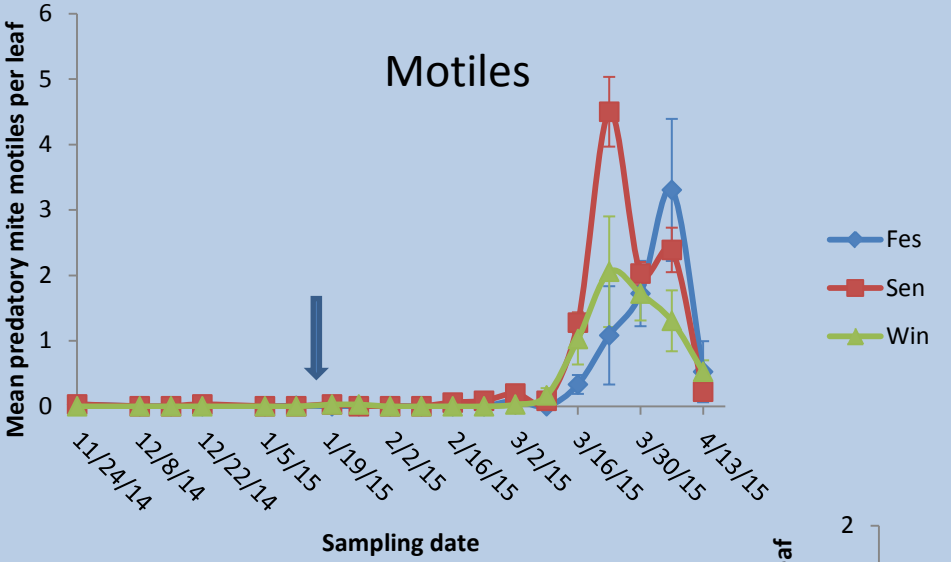
Results: Hawthorne TSM



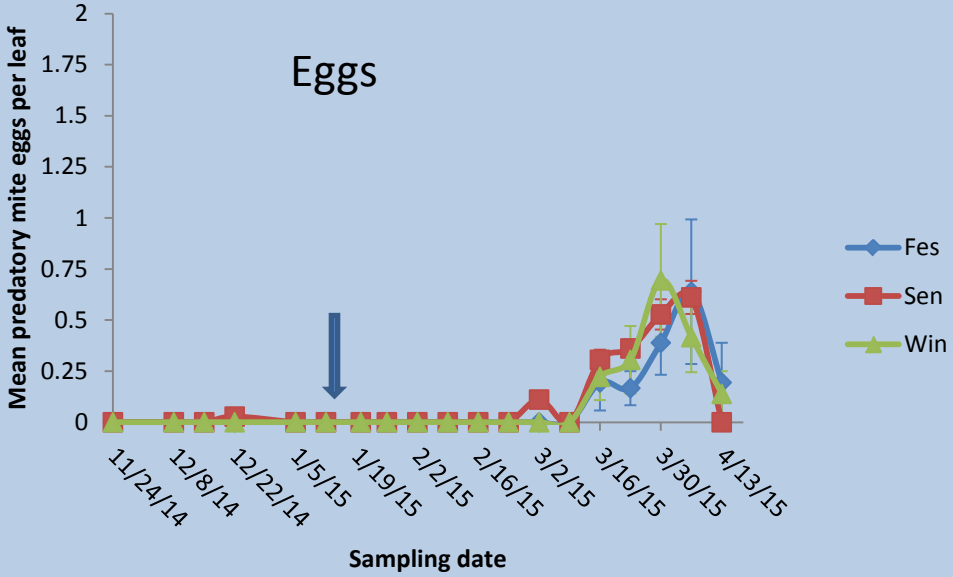
Fes = Festival
Sen = Sensation
Win = Winterstar



Results: Hawthorne *N. californicus*



Fes = Festival
Sen = Sensation
Win = Winterstar



Conclusions

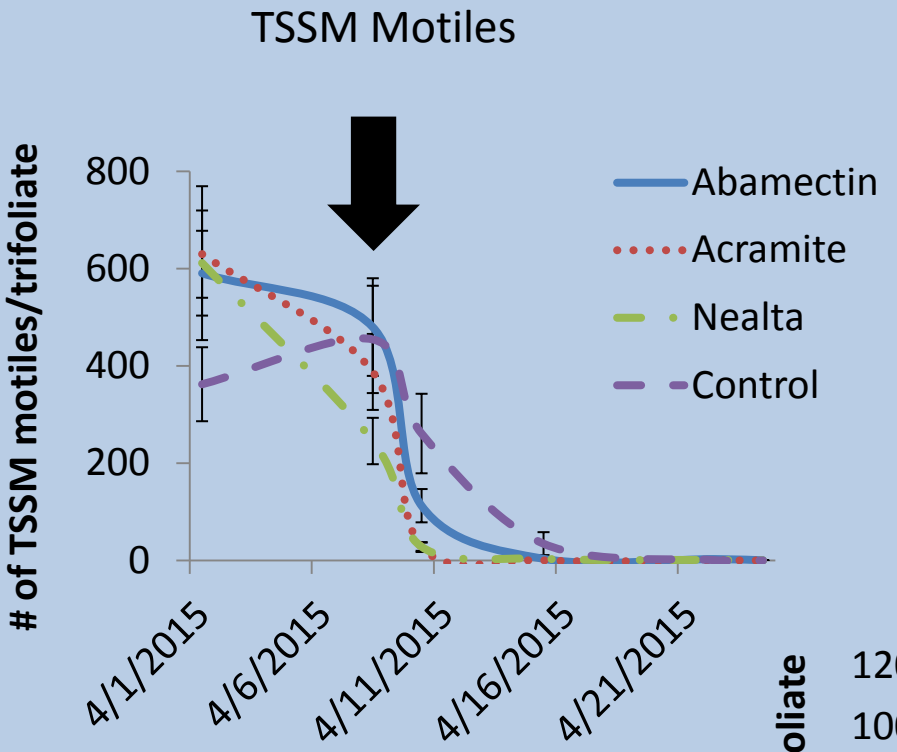
- No differences in TSM or *N. californicus* motiles and eggs among the 3 varieties
- *N. californicus* releases effectively managed TSM populations

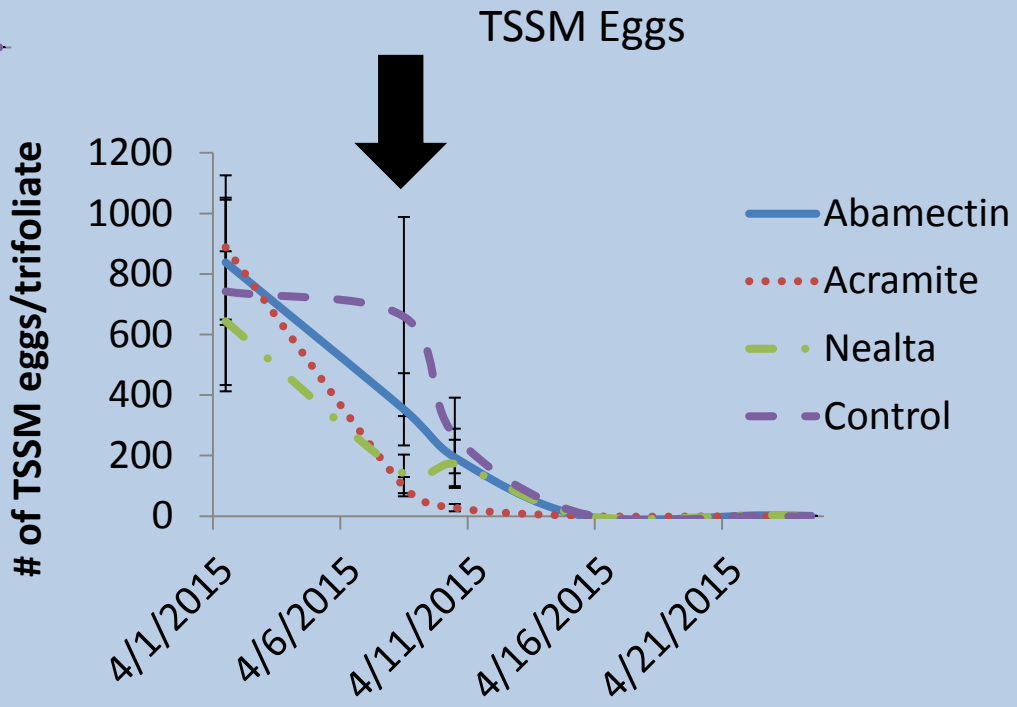
EFFICACY TRIAL

Effect of miticides on mite populations

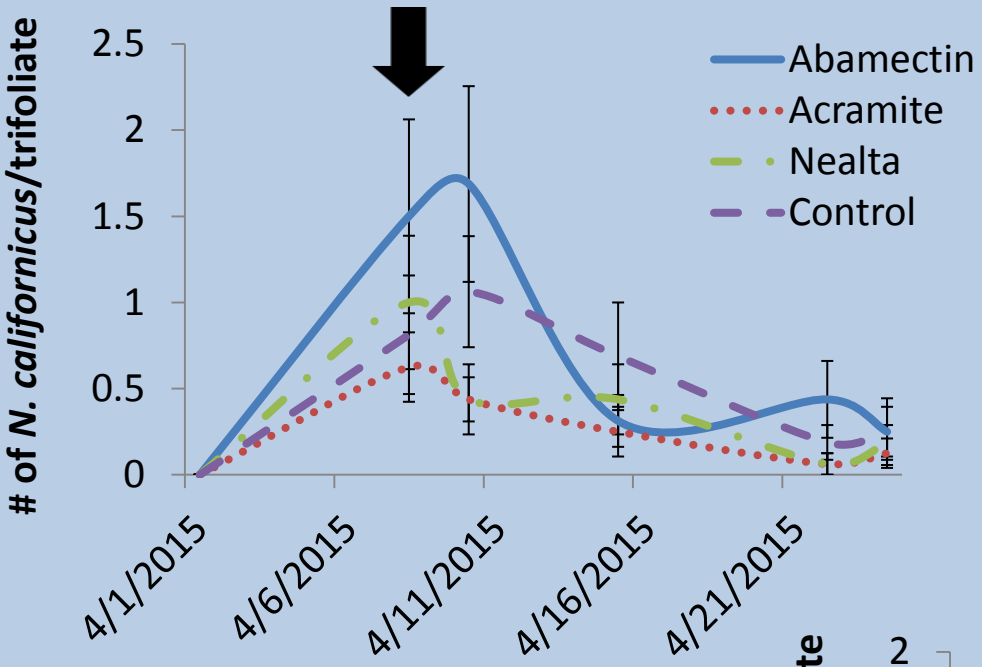
- Randomized complete block design with four replicates
- Released *Neoseiulus californicus* in all plots
- 4 Acaracide Treatments:
  - Acramite
  - Abamectin
  - Nealta
  - Untreated Control

- Recorded the number of TSSM motiles and eggs, *N. californicus*, and other beneficials
  - 2, 7, and 14 days after acaricide application

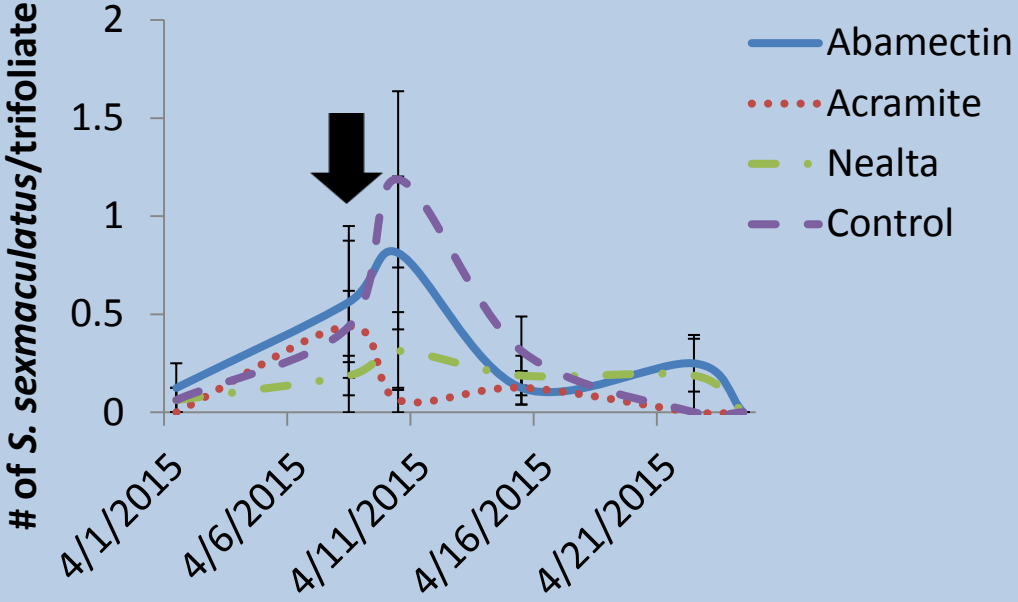

TSSM Motiles
# of TSSM motiles/trifoliate
800
600
400
200
0
4/1/2015
4/6/2015
4/11/2015
4/16/2015
4/21/2015
Abamectin
Acramite
Nealta
Control


TSSM Eggs
# of TSSM eggs/trifoliate
1200
1000
800
600
400
200
0
4/1/2015
4/6/2015
4/11/2015
4/16/2015
4/21/2015
Abamectin
Acramite
Nealta
Control

Neoseiulus californicus



Scolothrips sexmaculatus



Conclusions

- Nealta® and Acramite® applications resulted in lower TSSM populations.
- *N.californicus* densities were reduced with applications of Nealta® and Acramite®.
- *S. sexmaculatus* densities were not significantly reduced with applications of Nealta®, unlike Acramite®.

Sap beetles

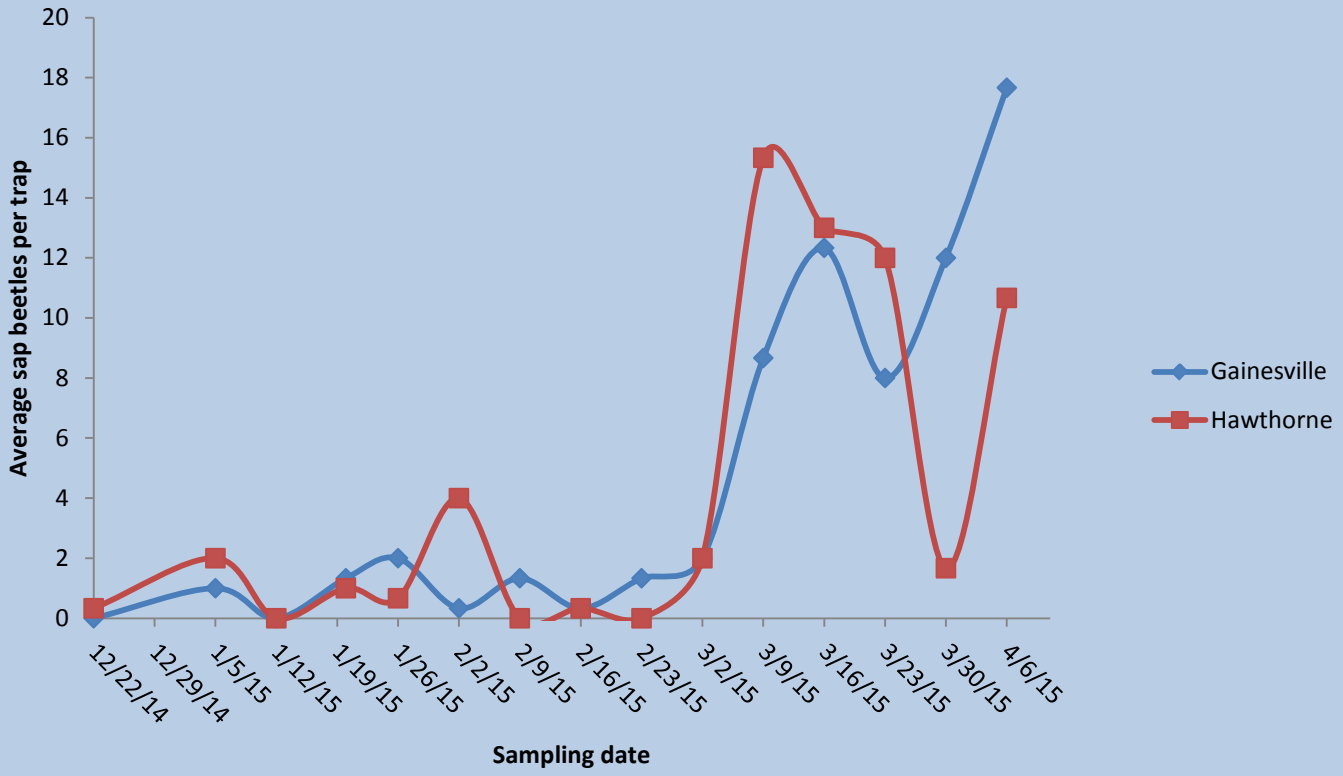
- Family Nitidulidae

http://ucanr.edu/blogs/blogcore/postdetail.cfm?postnum=7429

http://ucanr.edu/blogs/blogcore/postdetail.cfm?postnum=7429

- Prefer rotting fruit
  - Sanitation important
- Caught in SWD traps
  - yeast + sugar + water bait

Sap beetles in SWD traps



Summary

- Thrips
  - *F. bispinosa* is the dominant species
  - Festival variety had higher thrips numbers, but this did nor effect yield
  - Peppers may be a source of thrips and/or *Orius* sp.
  - Assail, Radiant, and a rotation fo the two effectvily reduced thrips numbers

Summary cont.

- Mites
  - Festival had higher TSM numbers and higher yield under conventional production
  - No varietal differences under organic production
  - *N. californicus* effectively managed TSM under organic production
  - Acramite and Nealta reduced TSM numbers

Summary cont.

- Beetles
  - Sap beetles are attracted to SWD traps with fermenting baits
  - Populations were high from early March through the end of the season

Acknowledgements

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- Dr. Janine Spies
- Dr. Tamika Garrick
- Staff and students of the Small Fruit and Vegetable IPM laboratory