



The effect of cultivar and cover crop on twospotted spider mite, *Tetranychus urticae* Koch, on two organic strawberry farms in north-central Florida

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Strawberries in Florida



- 2nd largest producer in the U.S.
 - 9,900 acres valued at ~282 million USD in 2018
- Primary producer of winter strawberries
- Annual crop on raised beds with black plastic mulch and drip irrigation
- Multiple cultivars grown on a single farm
- Growing market for organic strawberries
 - Summer cover cropping common

Twospotted spider mites (TSSM)

- *Tetranychus urticae*



Spider mite predators

- Predatory mites
 - *Neoseiulus californicus*
 - *Phytoseiulus persimilis*
- Six-spotted thrips,
Scolothrips
sexmaculatus



Research station trial summary

- No effect of cover crop on TSSM or its predators
- Florida Beauty harbored extremely high TSSM populations
- Florida Brilliance, Florida Radiance, Sensation, Strawberry Festival, and Winterstar performed similarly
- *N. californicus* predatory mite numbers were higher where TSSM numbers were higher

Objectives

- Assess the effect of strawberry cultivar and cover crop on TSSM and its predators on-farm

Hypothesis: Results will be similar to those seen in the research station trials

Methods: farms

- East Gainesville
 - Standard Florida growing practices
 - Plugs planted both years
 - Frost blankets used as early as November if needed
- Hawthorne
 - Raised beds with straw mulch and overhead irrigation
 - Plugs in 2017-18, bare-root transplants in 2018-19
 - Frost blankets not used until February no matter the temperature

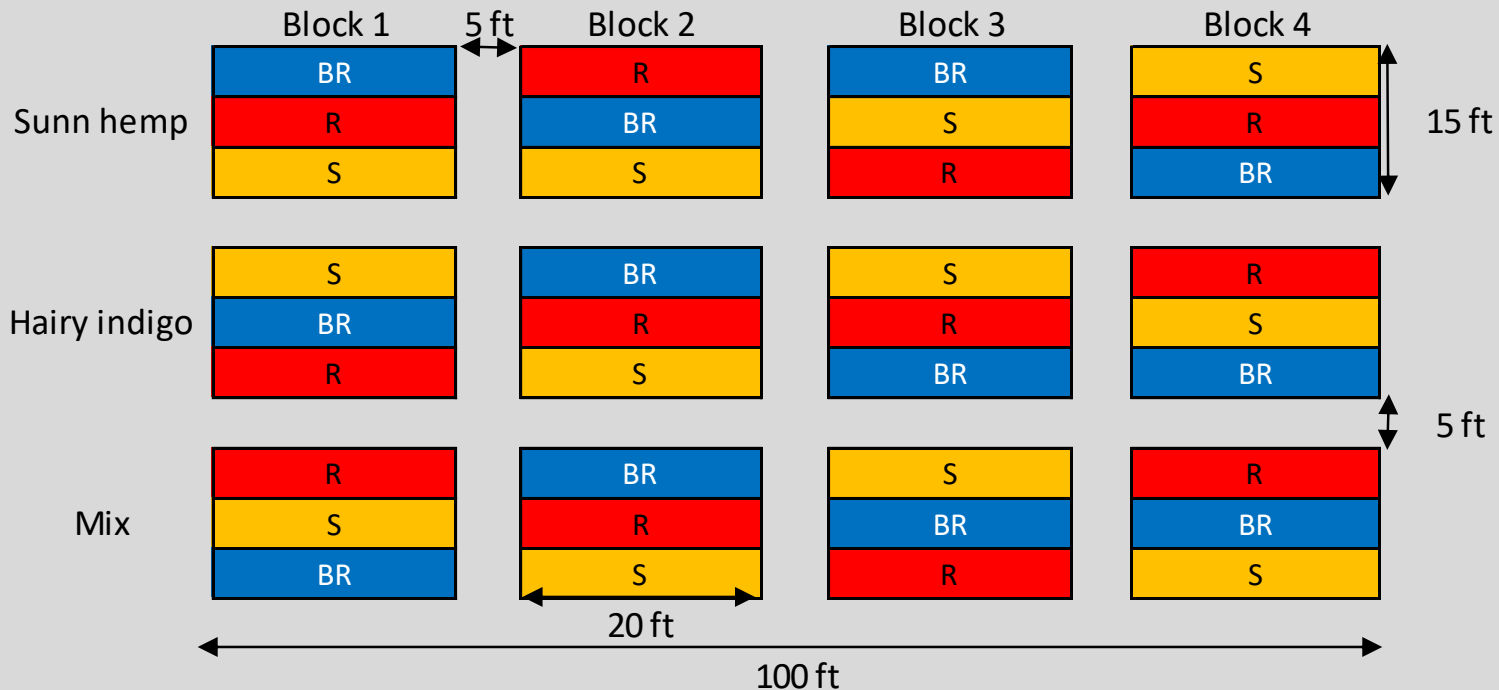
Methods: sampling

- Split plot
 - main plots = cover crops
 - subplots = cultivars
- Leaf samples every other week: 2 per subplot
- TSSM motiles and eggs, predatory mite motiles and eggs, and Six-spotted thrips per leaf counted and recorded



Treatments

- Cover crops
 - Sunn hemp
 - Hairy indigo
 - 4-way mix of sunn hemp, hairy indigo, slenderleaf rattlebox, and American jointvetch
- Cultivars
 - Florida Beauty (2017-18)
 - Florida Brilliance (2018-19)
 - Florida Radiance
 - Sensation



Mix is a 4-way mixture of sunn hemp, hairy indigo, slenderleaf rattlebox, American jointvetch

FL-127	S
Radiance	R
Brilliance	BR

RESULTS

TSSM Predators



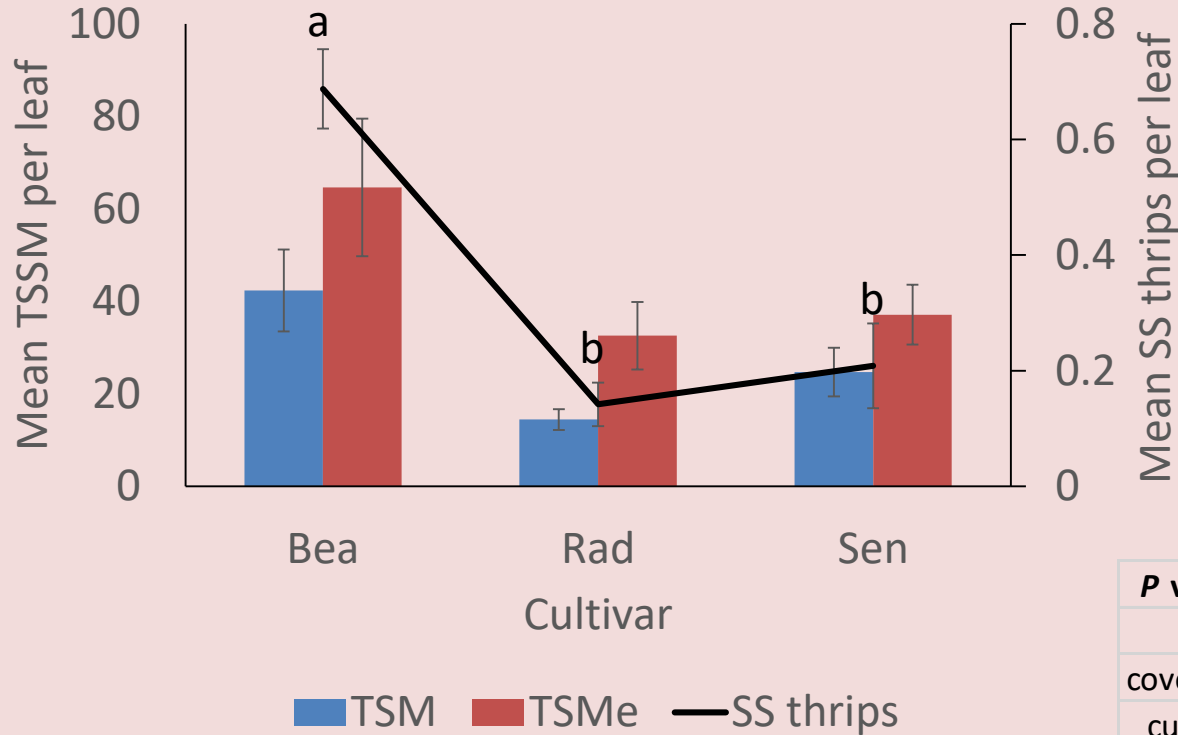
- East Gainesville

- Six-spotted thrips
- *P. macropilis* (Banks)
- Other *Amblyseius* and/or *Neoseiulus* spp.
- *N. californicus*

- Hawthorne

- Six-spotted thrips
- *N. californicus*
- Other *Amblyseius* and/or *Neoseiulus* spp.
- *P. macropilis*

East Gainesville 2017-18

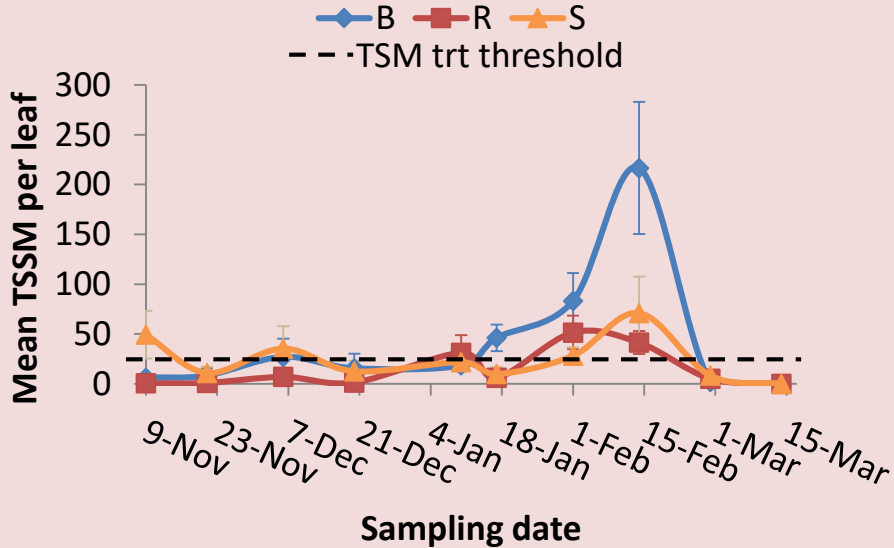


	SS thrips	
HI	0.33 ± 0.11	ab
SH	0.45 ± 0.13	a
mix	0.26 ± 0.11	b

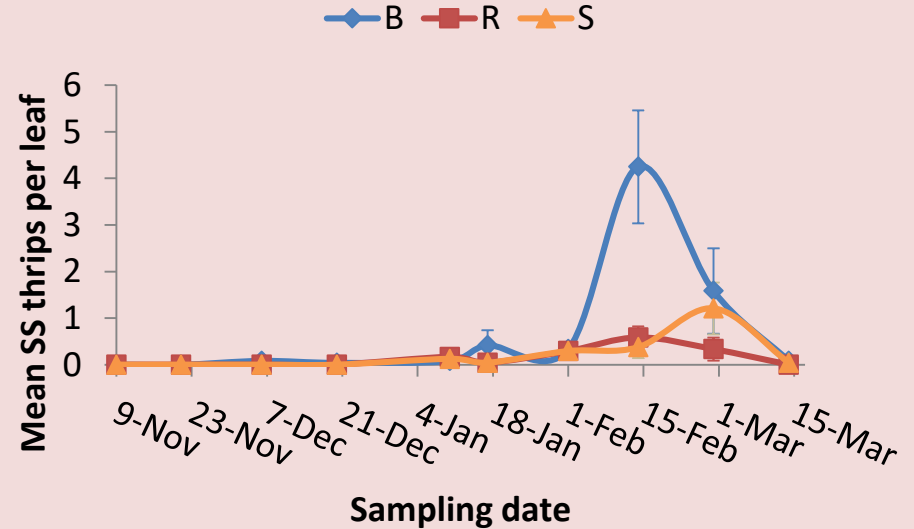
P values			
	TSSM	TSSM eggs	SS thrips
cover crop	0.79	0.59	0.03
cultivar	0.059	0.21	0.0025
CC*cul	0.95	0.97	0.97

East Gainesville 2017-18

TSSM motiles

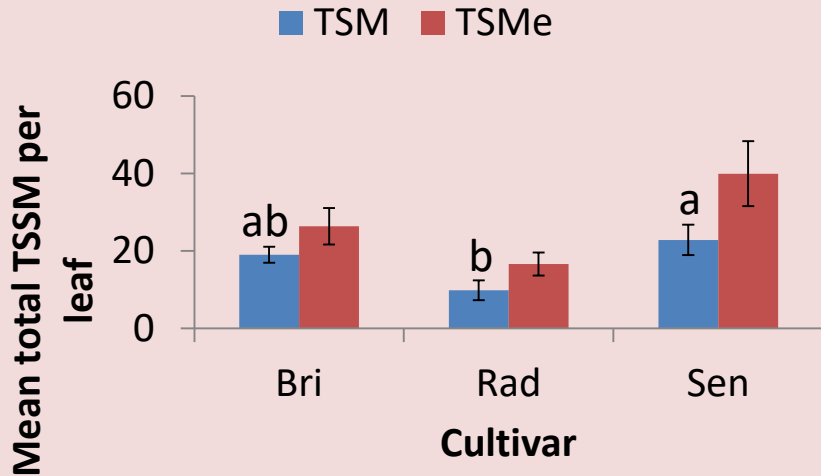


Six-spotted thrips



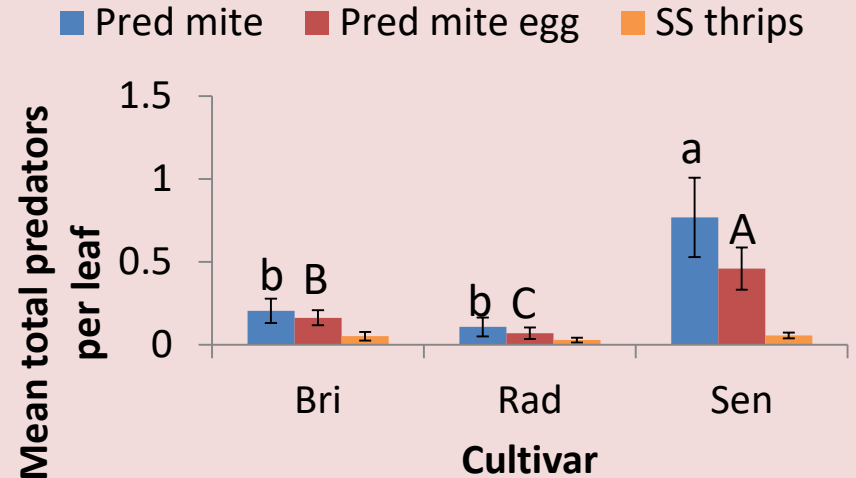
East Gainesville 2018-19

TSSM



<i>P</i> values	TSSM	TSSM eggs
cover crop	0.92	0.25
cultivar	0.048	0.1
CC*cul	0.4	0.54

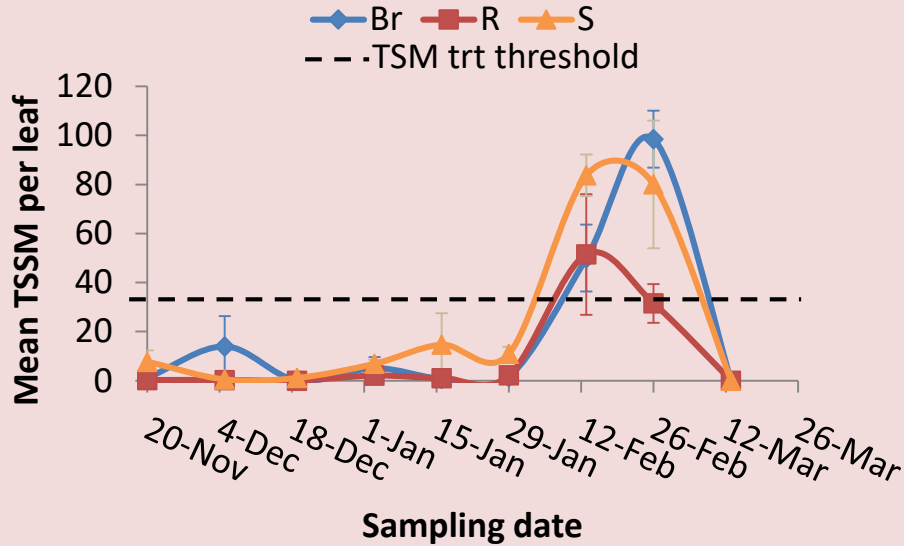
Predators



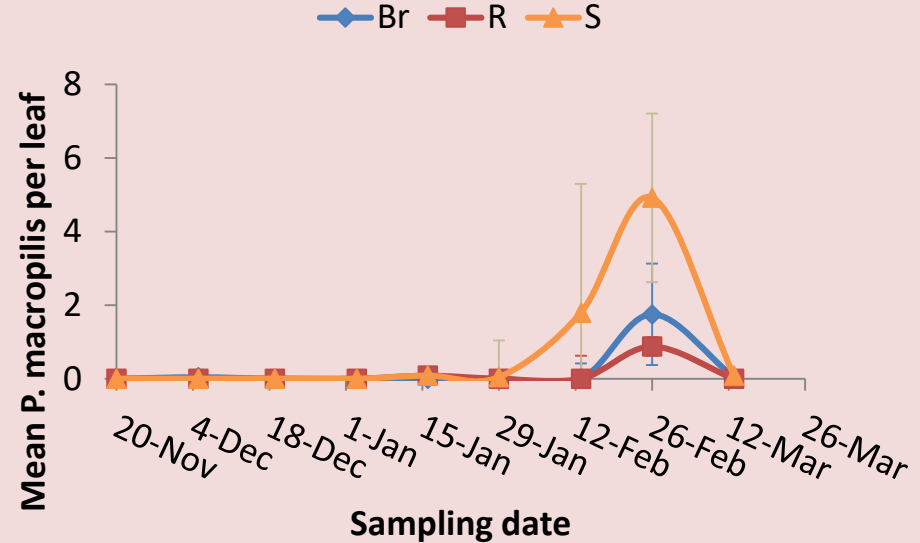
<i>P</i> values	Pred mite	Pred mite eggs
cover crop	0.2	0.15
cultivar	0.03	0.003
CC*cul	0.82	0.18

East Gainesville 2018-19

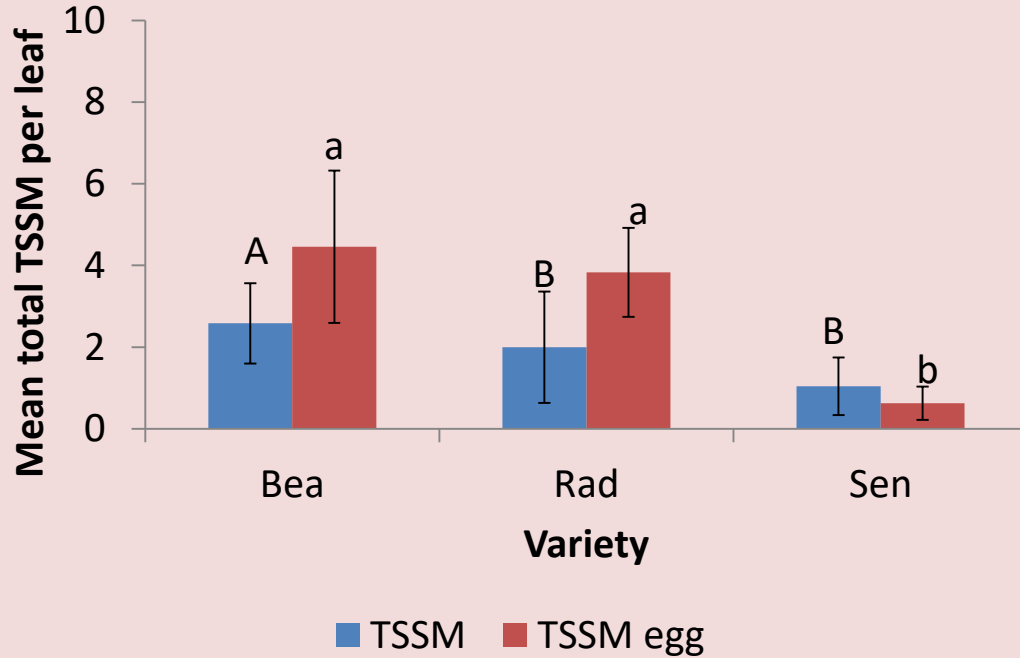
TSSM motiles



P. macropilis motiles

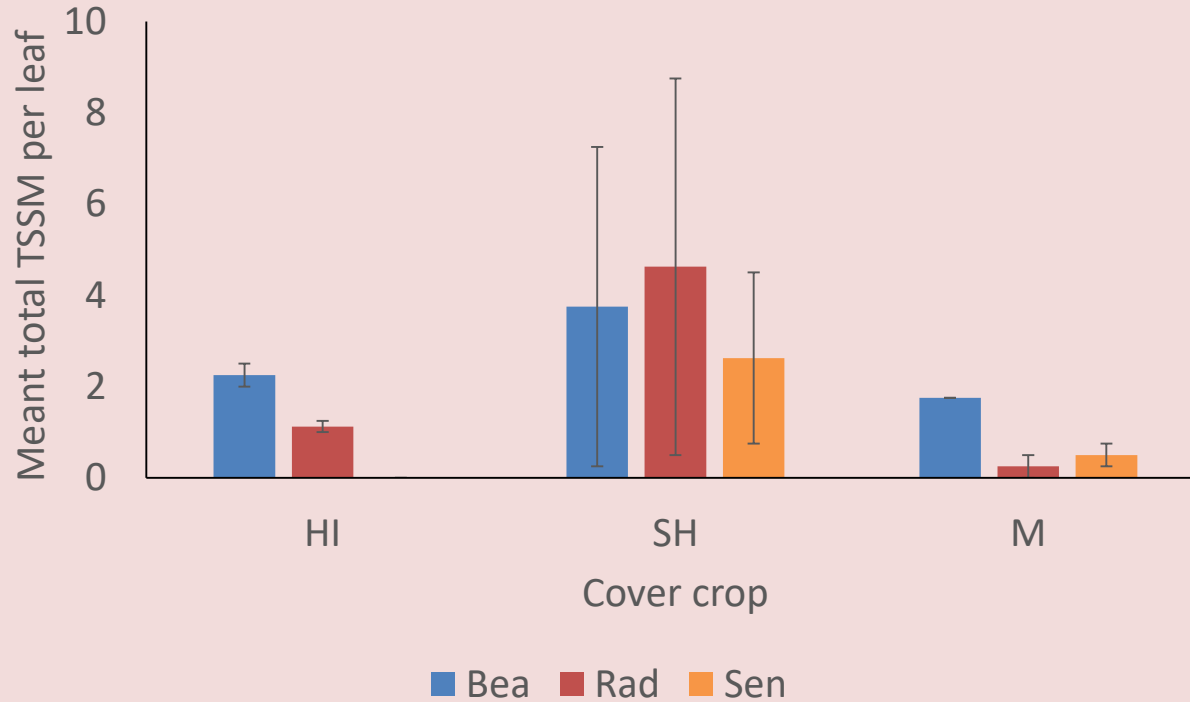


Hawthorne 2017-18

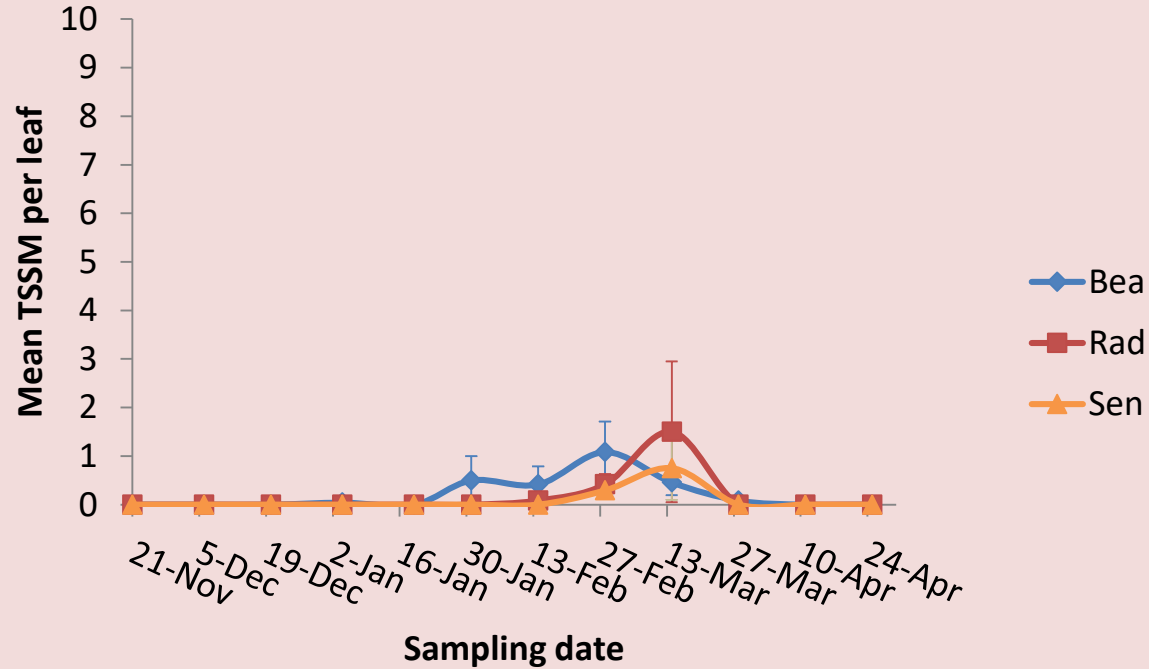


<i>P</i> values	TSSM	TSSM eggs
	cover crop	0.64
cultivar	0.011	0.047
CC*cul	0.043	0.12

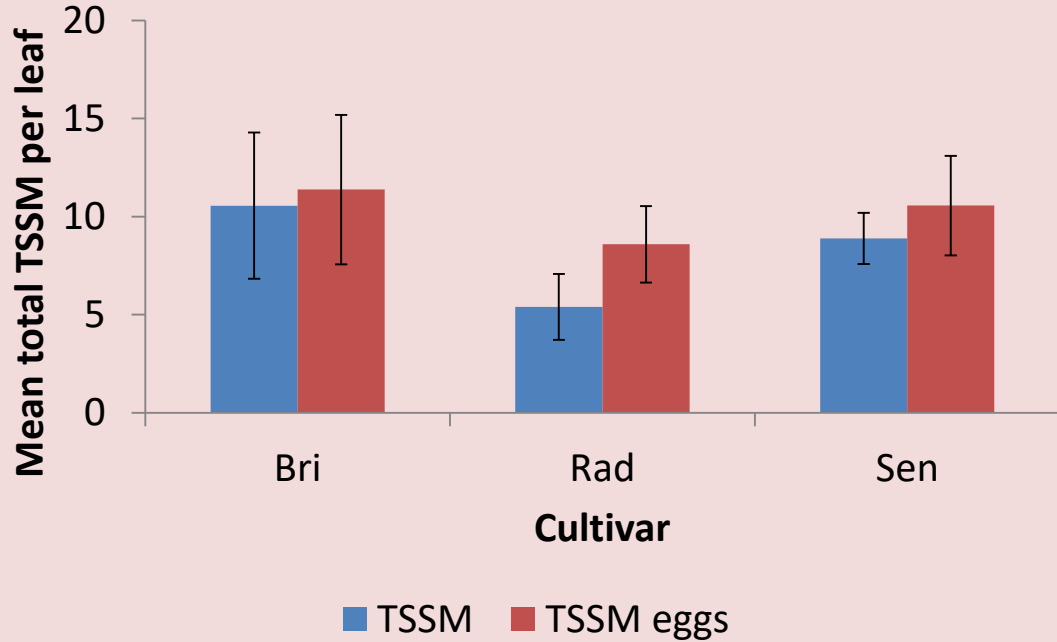
Hawthorne 2017-18



Hawthorne 2017-18



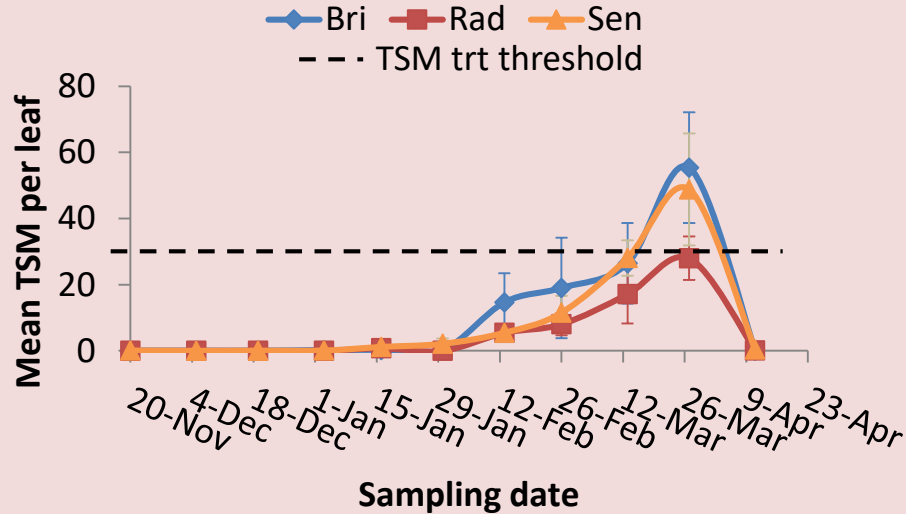
Hawthorne 2018-19



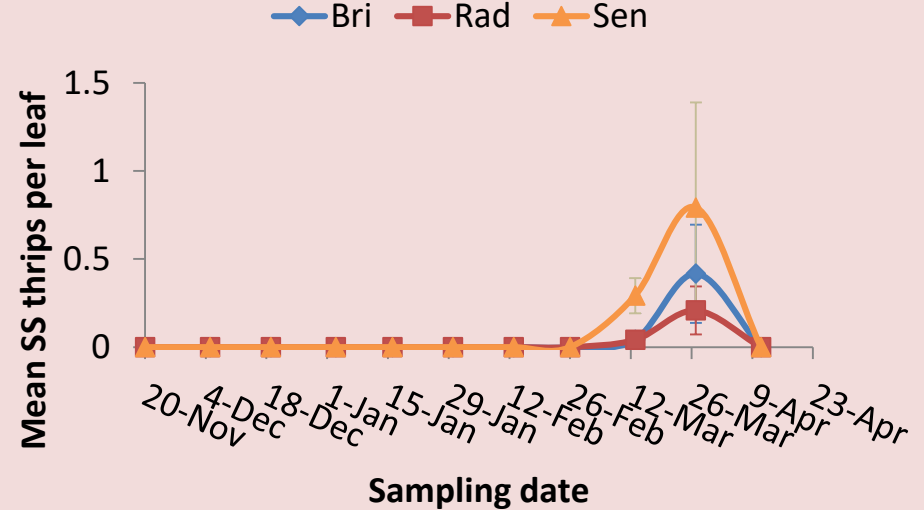
<i>P</i> values		
	TSSM	TSSM eggs
cover crop	0.35	0.23
cultivar	0.39	0.83
CC*cul	0.95	0.82

Hawthorne 2018-19

TSSM motiles



Six-spotted thrips

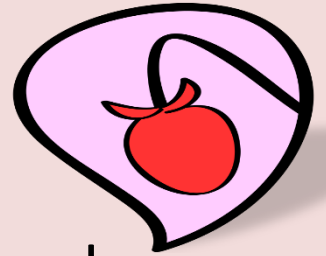


Summary



- Higher TSSM and predator populations in ‘Beauty’
- Naturally occurring predators were able to manage the TSSM population
 - Six-spotted thrips
 - *Phytoseiulus macropilis*
 - *Amblyseius* and/or *Neoseiulus* spp.
- Minimal effects of cover crop on TSSM or predators

Acknowledgements



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