



Insecticide Impacts on Thrips Numbers and Species

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Spring 2013 – Hillsborough & Manatee Cos

Heavy thrips damage across commodities

- Eggplant
- Cabbage
- Strawberries
- Ornamentals



No evidence of routine or widespread overuse of Radiant in 2012-2013 season.

Specimen Label

Dow AgroSciences



Insecticide

*Trademark of Dow AgroSciences LLC

For control or suppression of lepidopterous larvae (worms, caterpillars), dipterous leafminers, thrips, and certain psyllids in asparagus, Brassica (cole) crops, bulb vegetables, cereal grains (except rice, millet and sorghum), corn (field, sweet, popcorn, and seed corn), cotton, cucurbits, fruiting vegetables (tomato, peppers, and eggplant), globe artichoke, grain amaranth, herbs, leafy vegetables, leaves of legume vegetables, leaves of root and tuber vegetables, legume vegetables (succulent and dried beans and peas), okra, peanut, peppermint, pineapple, root and tuber vegetables, soybean, spearmint, spices (except black pepper), strawberry, teosinte, turnip greens, and watercress.

Active Ingredient:	
spinetoram (a mixture of spinetoram-J and spinetoram-L)	11.7%
Other Ingredients	88.3%
Total	100.0%
Contains 1 lb of active ingredient per gallon (120 g ai/liter)	

Precautionary Statements

Hazards to Humans and Domestic Animals

EPA Reg. No. 62719-545

CAUTION

Causes Moderate Eye Irritation

Avoid contact with eyes or clothing. Wash thoroughly with soap and water after handling and before eating, drinking, chewing gum, or using tobacco.

Personal Protective Equipment (PPE)

Applicators and other handlers must wear:

- Long-sleeved shirt and long pants
- Shoes plus socks

Follow manufacturer's instructions for cleaning/maintaining PPE. If no such instructions for washables, use detergent and hot water. Keep and wash PPE separately from other laundry.

User Safety Recommendations

Users should:

- Wash hands before eating, drinking, chewing gum, using tobacco or using the toilet.

First Aid

If in eyes: Hold eye open and rinse slowly and gently with water for 15-20 minutes. Remove contact lenses, if present, after the first 5 minutes, then continue rinsing eye. Call a poison control center or doctor for treatment advice.

Have the product container or label with you when calling a poison control center or doctor, or going for treatment. You may also contact 1-800-992-5994 for emergency medical treatment information.

Environmental Hazards

This product is toxic to bees exposed to treatment during the 3 hours following treatment. Do not apply this pesticide to blooming, pollen-

shedding or nectar-producing parts of plants if bees may forage on the plants during this time period. This product is toxic to aquatic invertebrates. Do not apply directly to water, to areas where surface water is present or to intertidal areas below the mean high water mark. Do not contaminate water when disposing of equipment washwaters. Do not apply where runoff is likely to occur. Do not apply when weather conditions favor drift from treated areas. Drift and runoff from treated areas may be hazardous to aquatic organisms in neighboring areas. Apply this product only as specified on the label.

Directions for Use

It is a violation of Federal law to use this product in a manner inconsistent with its labeling.

Read all Directions for Use carefully before applying.

Do not apply this product in a way that will contact workers or other persons, either directly or through drift. Only protected handlers may be in the area during application. For any requirements specific to your state or tribe, consult the state or tribal agency responsible for pesticide regulation.

Agricultural Use Requirements

Use this product only in accordance with its labeling and with the Worker Protection Standard, 40 CFR Part 170. This Standard contains requirements for the protection of agricultural workers on farms, forests, nurseries, and greenhouses, and handlers of agricultural pesticides. It contains requirements for training, decontamination, notification, and emergency assistance. It also contains specific instructions and exceptions pertaining to the statements on this label about personal protective equipment, restricted entry interval, and notification to workers (as applicable). The requirements in this box only apply to uses of this product that are covered by the Worker Protection Standard.

Do not enter or allow worker entry into treated areas during the restricted entry interval (REI) of 4 hours.

PPE required for early entry to treated areas that is permitted under the Worker Protection Standard and that involves contact with anything that has been treated, such as plants, soil, or water, is:

- Coveralls
- Chemical-resistant gloves made of any waterproof material
- Shoes plus socks

Storage and Disposal

Do not contaminate water, food or feed by storage or disposal.

Pesticide Storage: Store in original container only. In case of leak or spill, contain material with absorbent materials and dispose as waste.

Pesticide Disposal: Wastes resulting from the use of this product must be disposed of on site or at an approved waste disposal facility.

Nonrefillable rigid containers 5 gallons or less:

Container Handling: Nonrefillable container. Do not reuse or refill this container.

Triple rinse or pressure rinse container (or equivalent) promptly after emptying. **Triple rinse** as follows: Empty the remaining contents into application equipment or a mix tank and drain for 10 seconds after the flow begins to drip. Fill the container 1/4 full with water and recap. Shake for 10 seconds. Four rinsate into application equipment or a mix tank or store rinsate for later use or disposal. Drain for 10 seconds after the flow begins to drip. Repeat this procedure two more times. **Pressure rinse** as follows: Empty the remaining contents into application equipment or a mix tank and continue to drain for 10 seconds after the flow begins to drip. Hold container upside down over application equipment or mix tank and continue to drain for 10 seconds after the flow begins to drip. Hold container upside down over application equipment or mix tank or collect rinsate for later use or disposal. Insert pressure rinsing nozzle in the side of the container, and rinse at about 40 psi for at least 30 seconds. Drain for 10 seconds after the flow begins to drip. Then offer for recycling if available or puncture and dispose of in a sanitary landfill, or by incineration, or by other procedures allowed by state and local authorities.

Refillable rigid containers larger than 5 gal: **Container Handling:** Refillable container. Refill this container with pesticide only. Do not reuse this container for any other purpose. Cleaning the container before final disposal is the responsibility of the person disposing of the container. Cleaning before refilling is the responsibility of the refiller. To clean the container before final disposal, empty the remaining contents from this container into application equipment or a mix tank. Fill the container about 10% full with water and, if possible, spray all sides while adding water. If practical, agitate vigorously or recirculate water with the pump for two minutes. Pour or pump rinsate into application equipment or rinsate collector system. Repeat this rinsing procedure two more times. Then offer for recycling if available or puncture and dispose of in a sanitary landfill, or by incineration, or by other procedures allowed by state and local authorities.

Field Trials 2014 and 2015

1. Identify thrips species
2. Evaluate alternatives to Radiant

Materials evaluated 2014 -15 - GCREC

Trade name	Active Ingredient	Rate/acre	IRAC MoA Code
Brigade WSB	bifenthrin	20 oz.	3A
Assail 30SG	acetamiprid	6.9 oz.	4A
Closer SC	sulfoxaflor	4.5 fl. oz.	4C
Radiant SC	spinetoram	10 fl. oz.	5
Rimon 0.83 EC	novaluron	12 fl. oz.	15
Apta 1.3 SC*	tolfenpyrad	21 fl. oz.	21A
Exirel 100 SE*	cyazypyr	20.5 fl. oz.	28

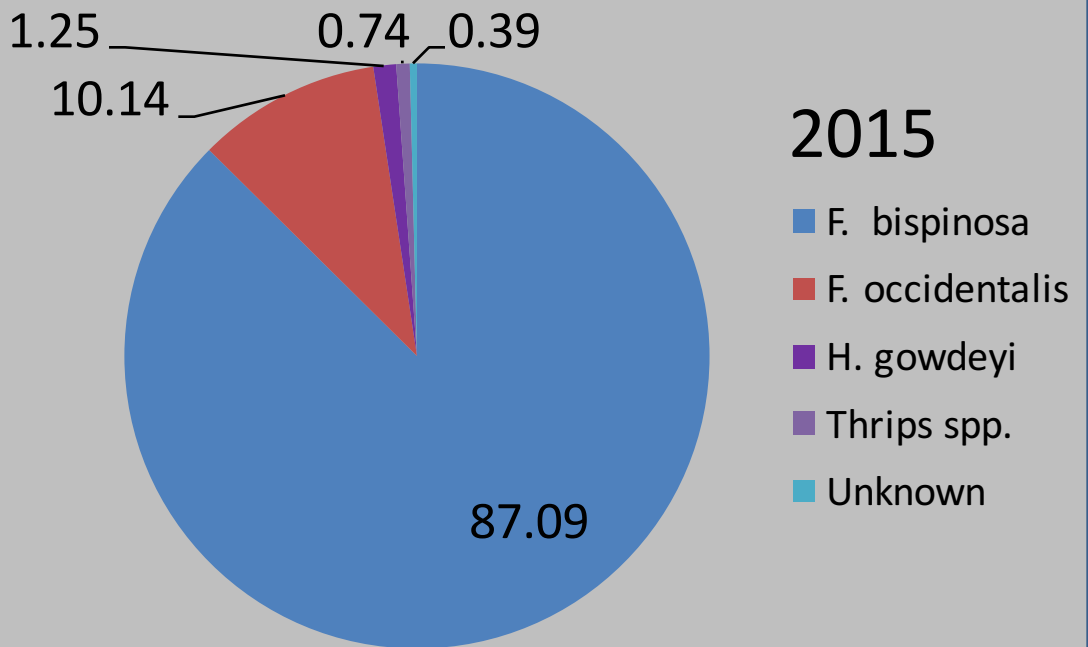
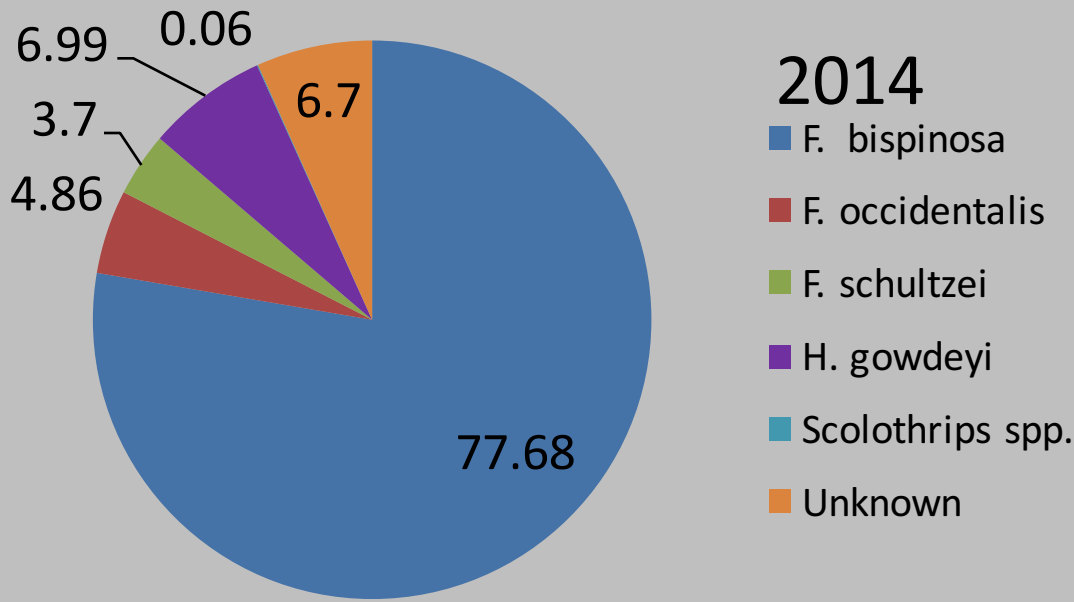
*Not yet labeled for strawberry

Rotations evaluated 2014-15 - GCREC

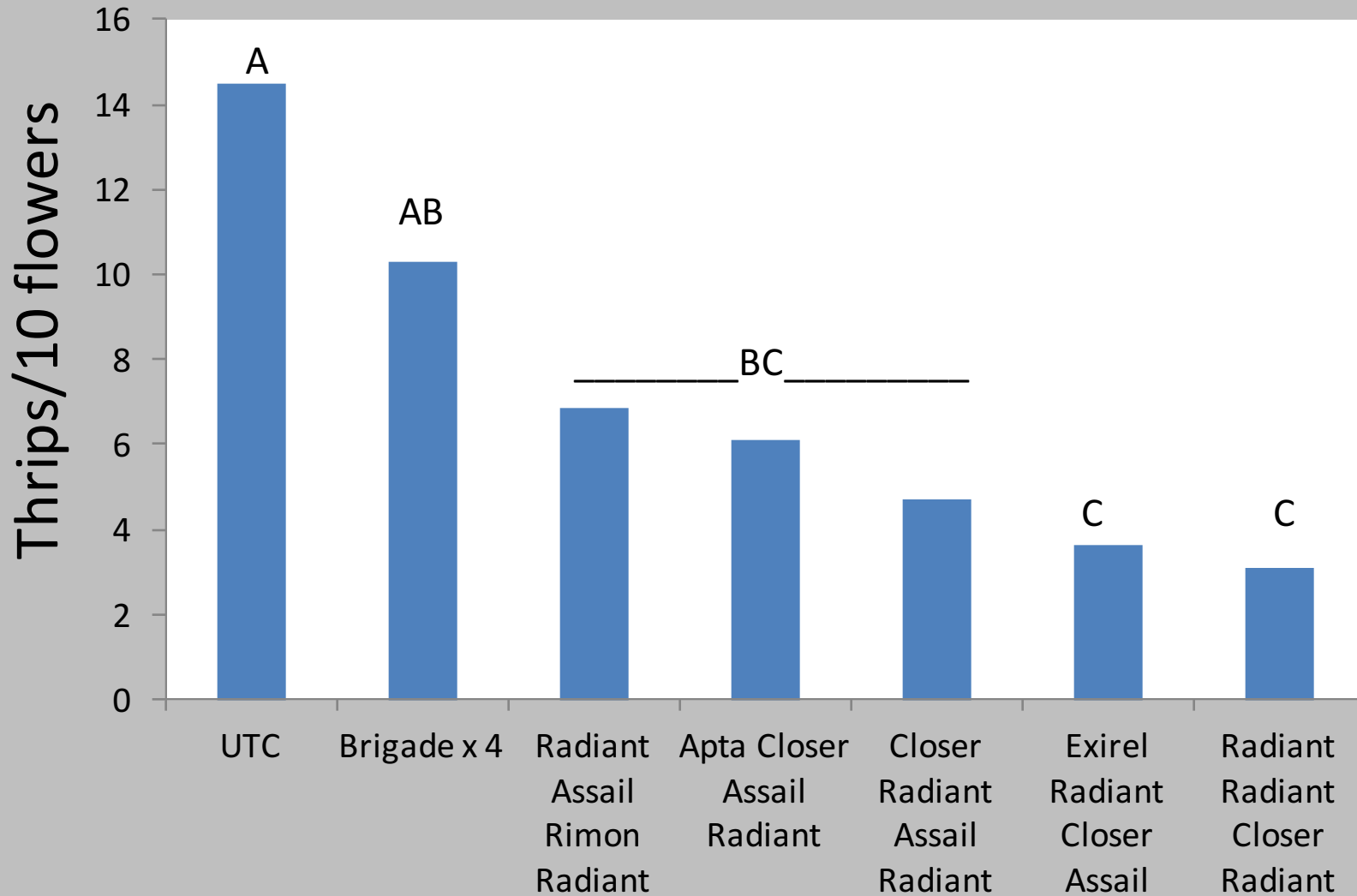
	Week 1	Week 2	Week 3	Week 4
1	None	None	None	None
2	Radiant	Radiant	Closer	Radiant
3	Radiant	Assail	Rimon	Radiant
4	Closer	Radiant	Assail	Radiant
5	Exirel*	Radiant	Closer	Assail
6	Apta*	Closer	Assail	Radiant
7	Brigade	Brigade	Brigade	Brigade

*Not labelled for strawberry

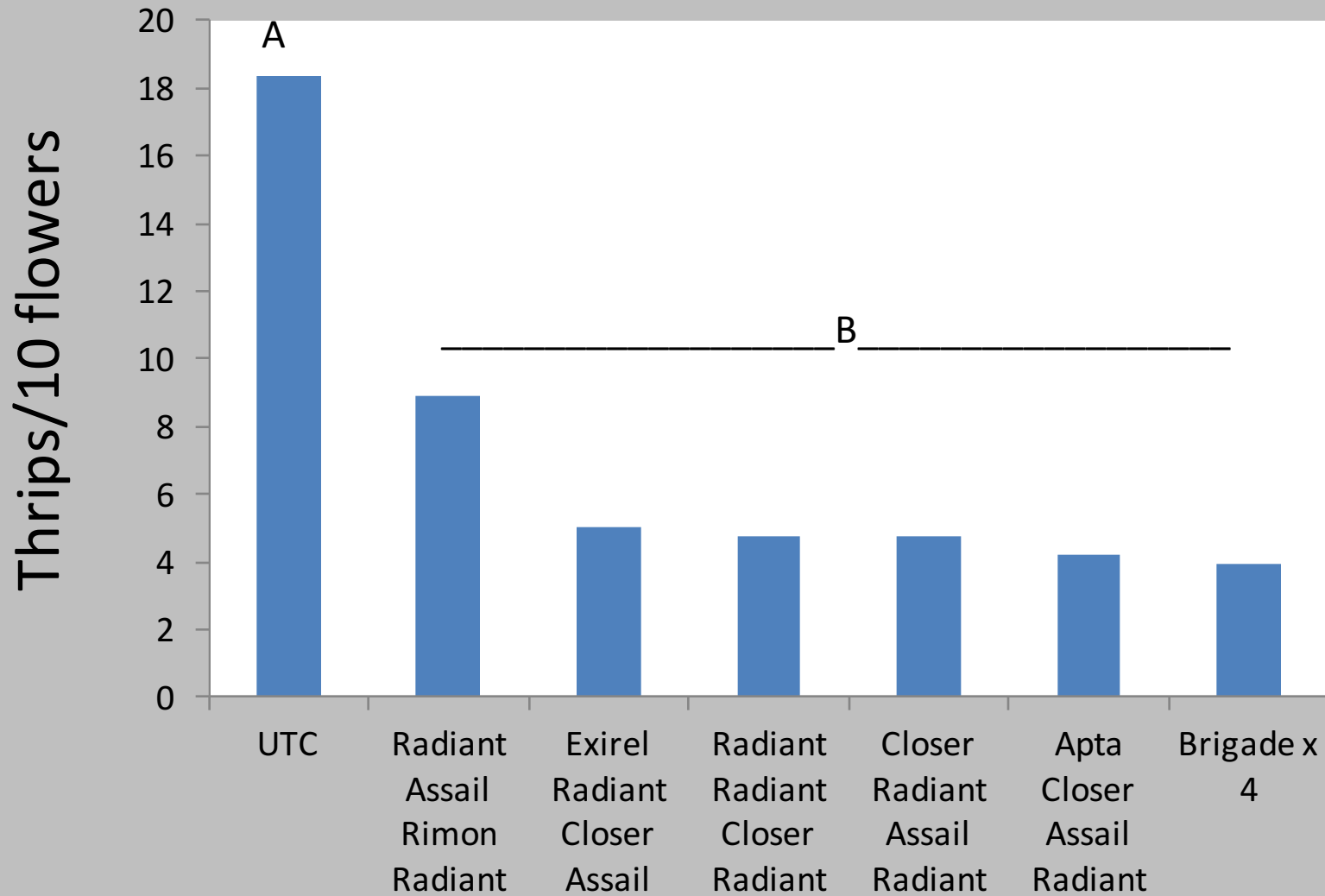
Thrips Species: Strawberry Flowers – UTC



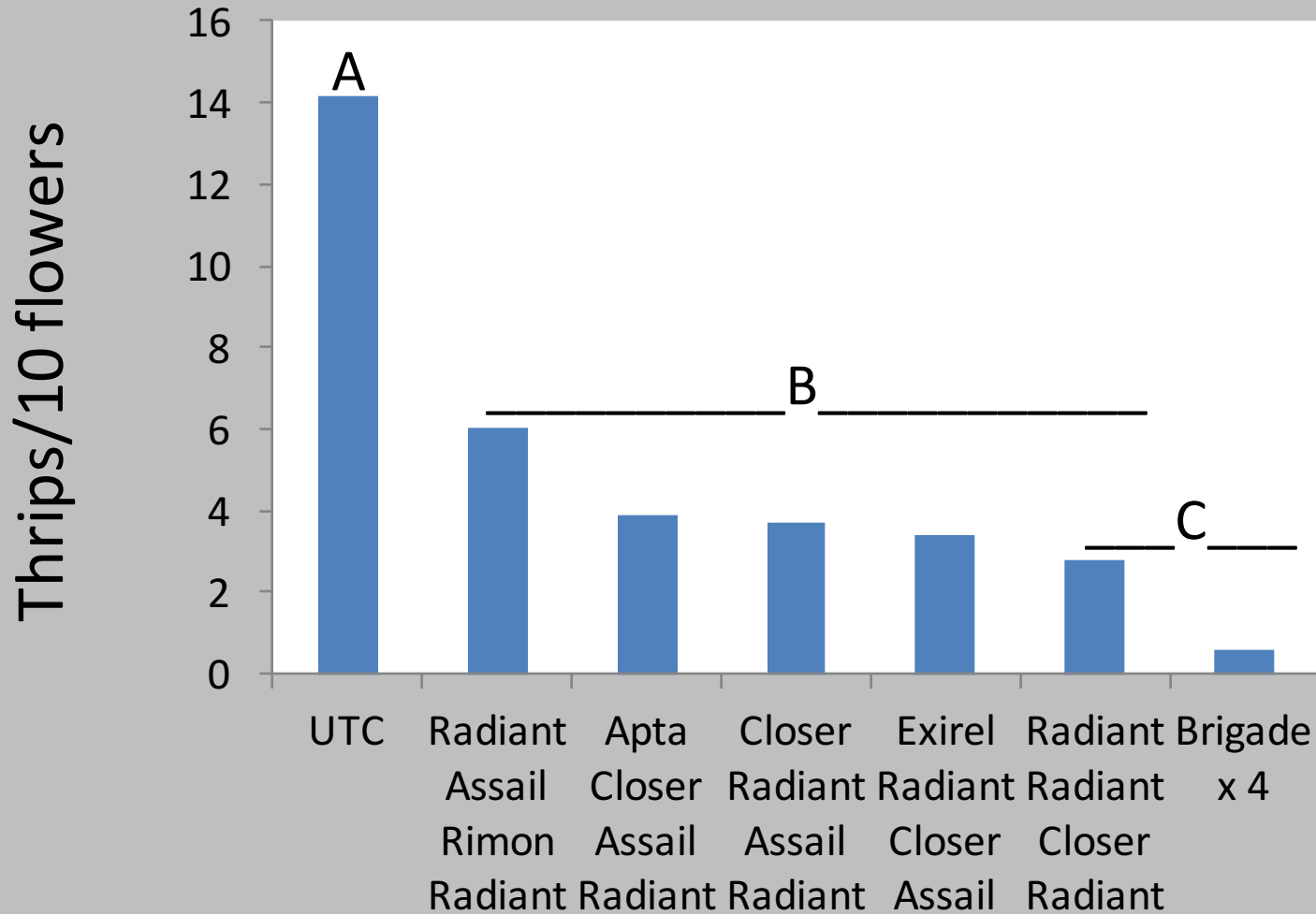
2014 Season Adult Thrips (Four Samples Pooled)



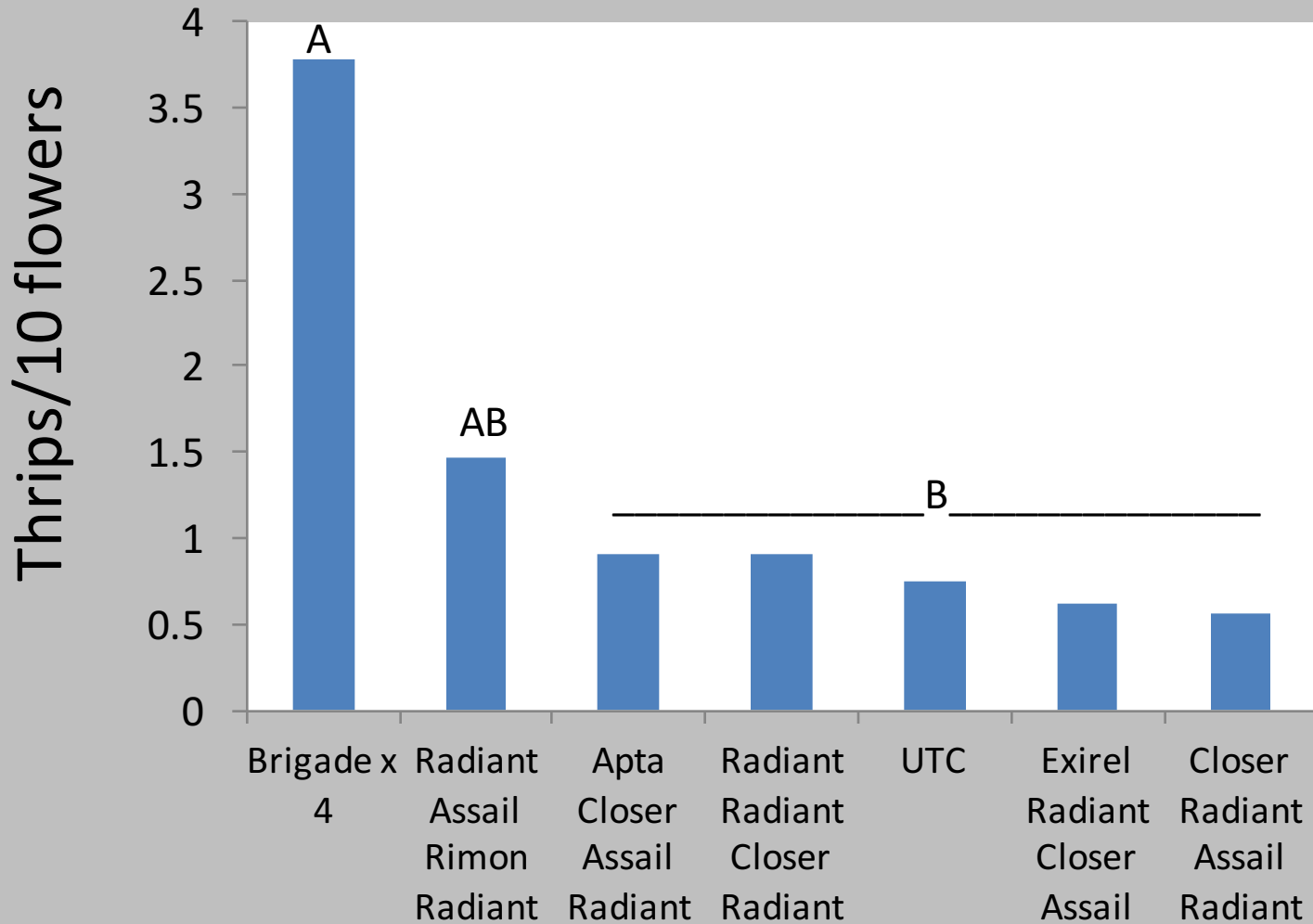
2015 Season Adult Thrips (Four Samples Pooled)



2014-2015 Florida Flower Thrips Pooled (Four Sample Dates Each Year)



2014-2015 Western Flower Thrips Pooled (Four Sample Dates Each Year)



2015 – Thrips were identified from green and pink fruit as well as flowers.

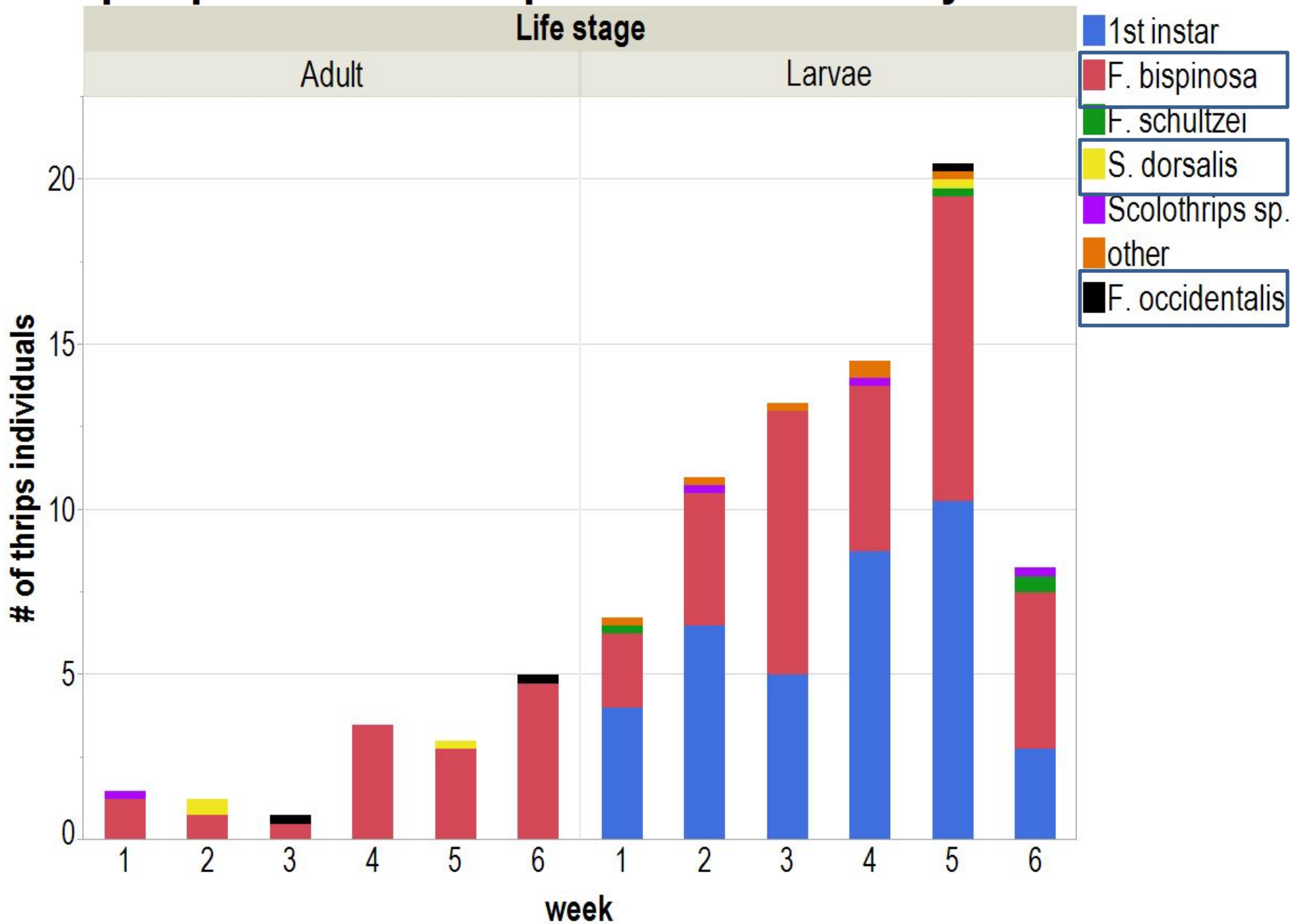
Green Fruit



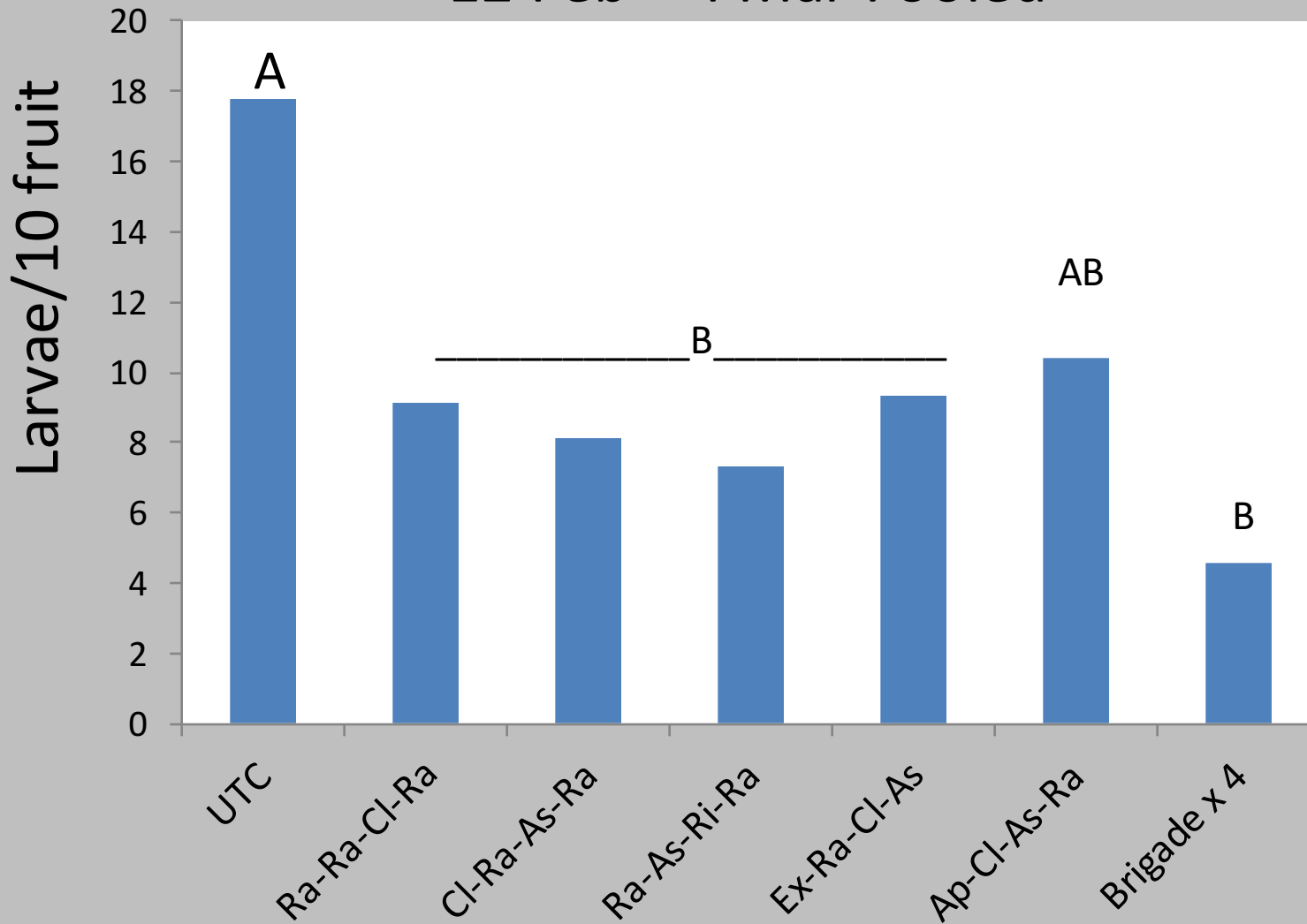
Pink Fruit



Thrips species in a sample of ten strawberry fruit



2015 Season: Treatment Effects on Thrips Larvae on Fruit 12 Feb – 4 Mar Pooled



Results

2014 and 2015

- Florida flower thrips was the predominant species in strawberry flowers.
- Florida flower thrips was susceptible to all insecticide rotations tested.
- Rotations with 3, 2 or 1 application of Radiant were equally effective in suppressing Florida flower thrips .
- No insecticide rotation reduced numbers of western flower thrips compared to UTC.

Results

2015

- *F. bispinosa* was the predominant species on strawberry fruit.
- Most rotations were comparable in suppression of larvae on fruit.

2015-16 Trials Funded by FDACS

- Silver vs Black Mulch
- 9 insecticides

1/week x 4 weeks (no rotations)



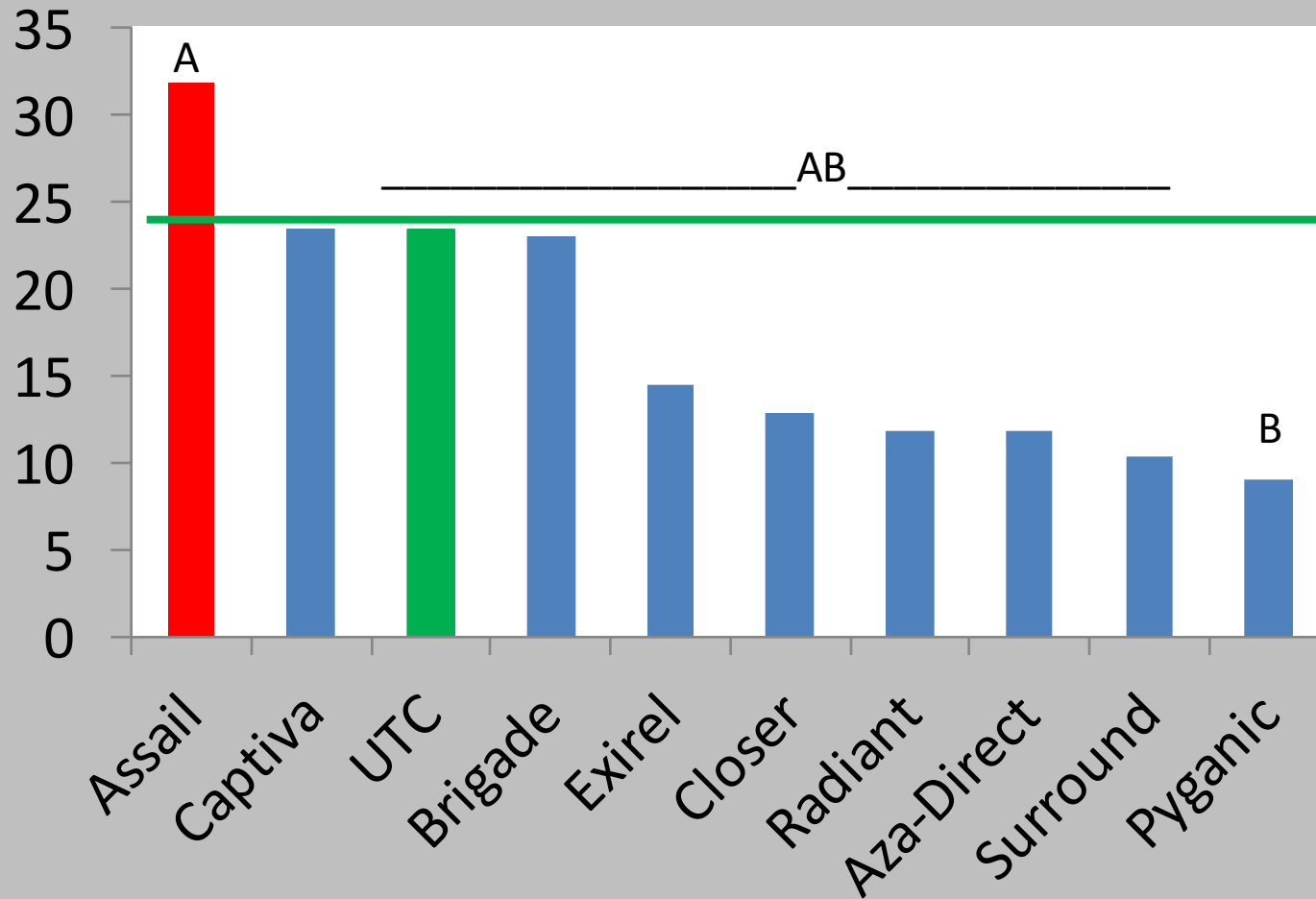
Insecticide treatments –

- Applied weekly 4 times
- Surround: applied twice weekly

Feb 18 – Mar 17 2015

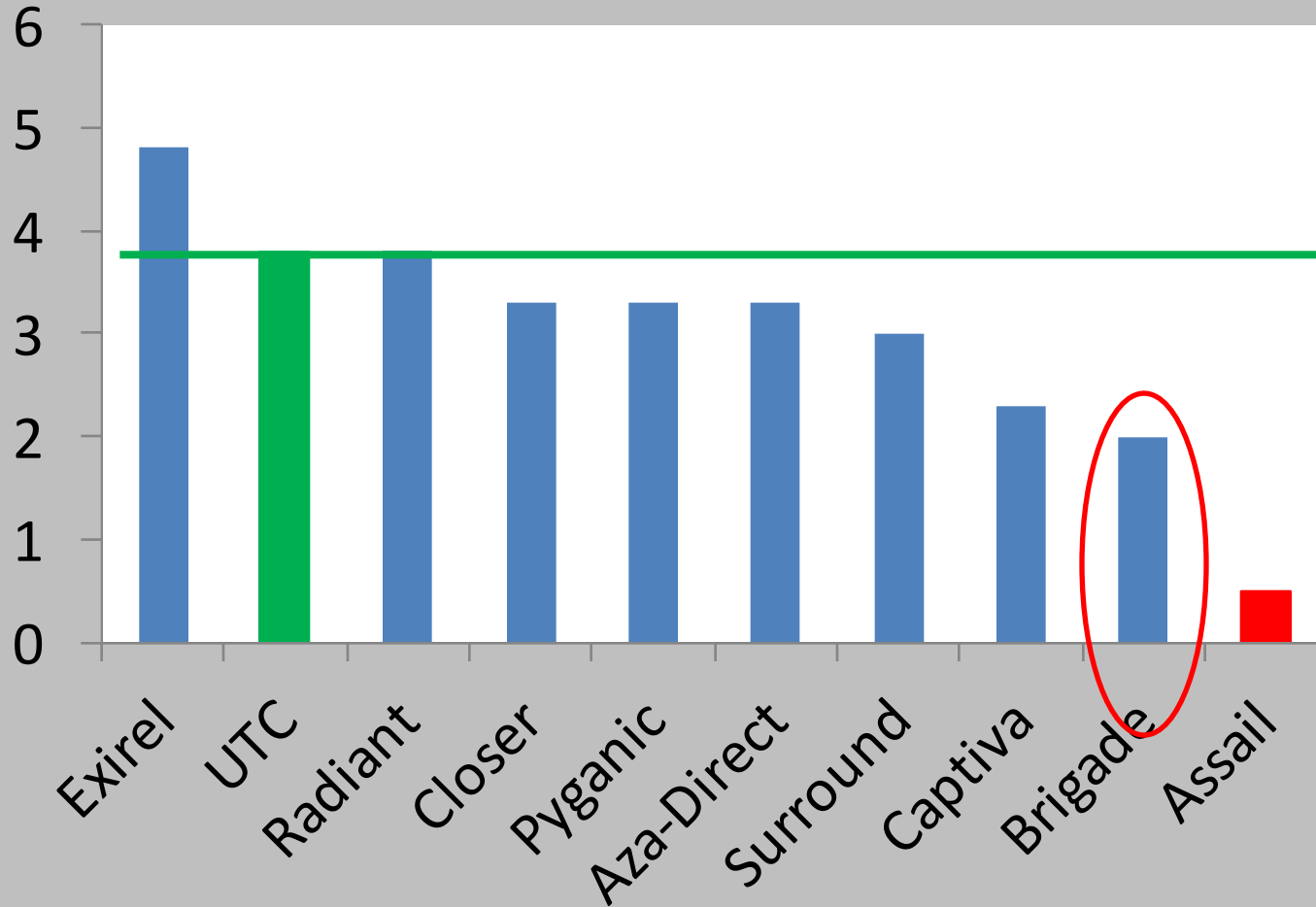
Insecticide	Active	Rate/Acre	MoA Code
Assail 30 SG	acetamiprid	6.9 oz.	4A
Aza-Direct	azadirachtins	32 fl. oz.	---
Brigade WSB	bifenthrin	2 lbs	3A
Captiva	capsicum	32 fl. oz.	---
Closer SC	sulfoxaflor	4.5 fl. oz.	4C
Exirel 100 SE (+ Induce)	cyazypyr	20.5	28
Pyganic 1.4 EC	pyrethrins	32 fl. oz.	3
Radiant	spinetoram	6 fl. oz.	5
Surround	kaolin clay	12.5 lb	---

2015 - Western Flower Thrips/40 Flowers Silver Mulch



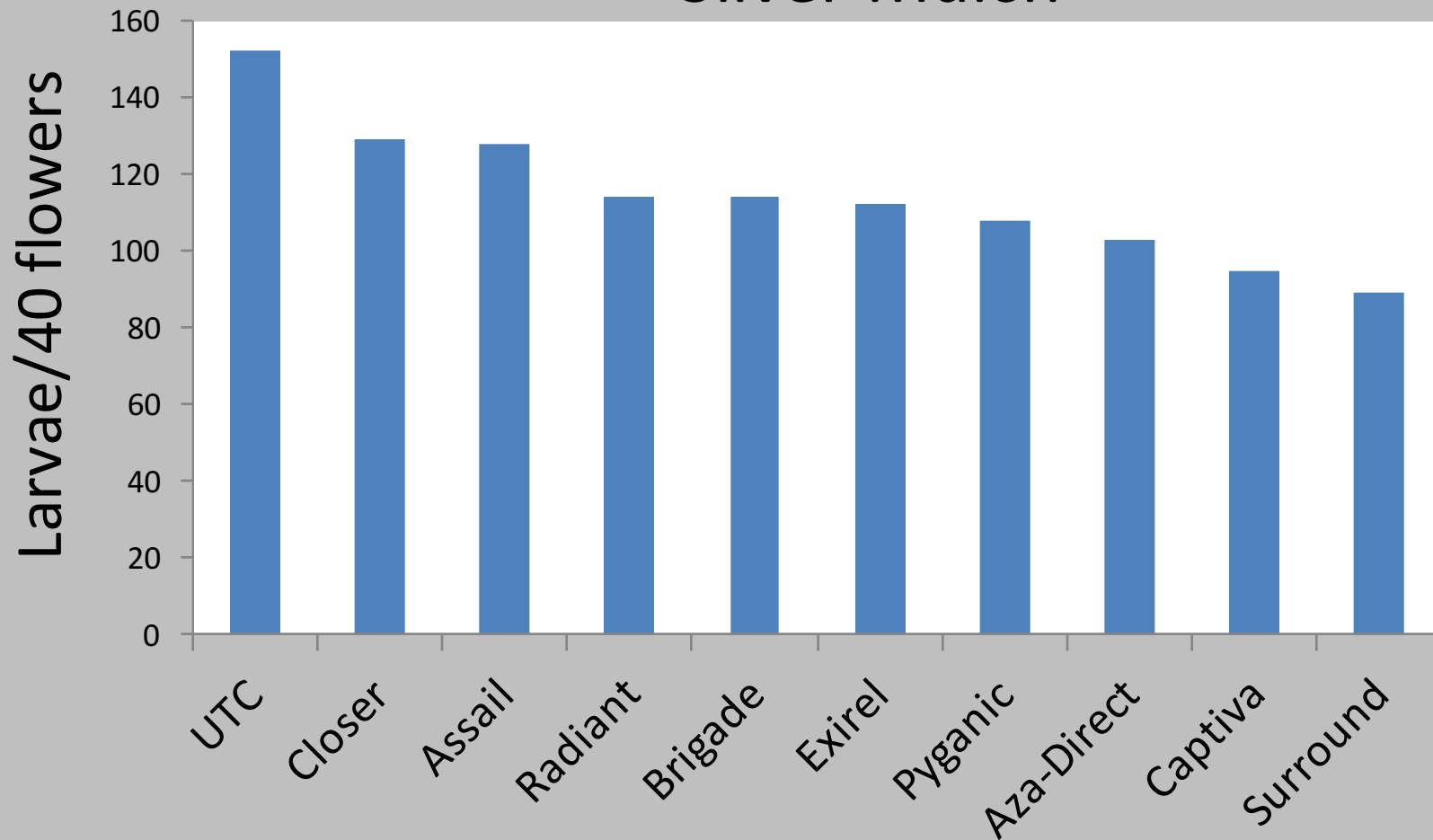
$F_{19,57} = 2.36; P = 0.006$

2015-Orius (Minute Pirate Bugs)/40 Flowers Silver Mulch – Season Long



2015 - Season Effects on Thrips Larvae

Silver Mulch



Flower thrips thrive on floral resources.

High thrips numbers don't always mean insecticide failures.



Wild Radish



Citrus blooms



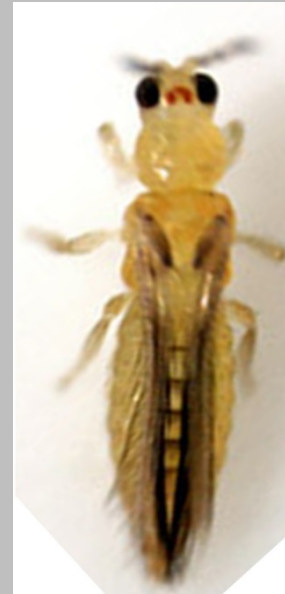
Thrips in central Florida strawberry



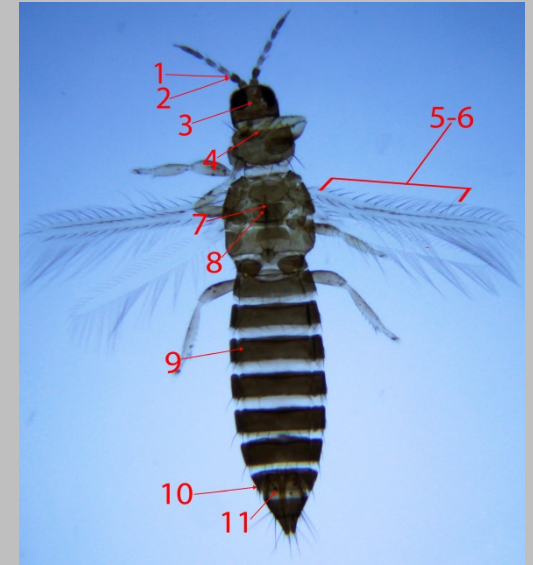
Florida
Flower
Thrips



Western
Flower
Thrips



Chilli
Thrips



Common
Blossom
Thrips

Thrips identification materials developed with support from FSGA

Quick Guides

Chilli thrips UF IFAS Extension UNIVERSITY OF FLORIDA
Jeffery D. Cluever

Florida flower thrips UF IFAS Extension UNIVERSITY OF FLORIDA
Frankliniella

Melon Thrips, *Thrips nalmi* Karny UF IFAS Extension UNIVERSITY OF FLORIDA

Western flower thrips UF IFAS Extension UNIVERSITY OF FLORIDA
Jeffery D. Cluever and Hugh A. Smith¹
Frankliniella occidentalis (Pergande)

Morphology

1. Smooth pedicel at base of antennal segment III
2. No stout spines on antennal segment II
3. 4 major setae on anterior margin of pronotum (blue); 2 minor setae (red)
4. Ocellar III setae not arising between posterior ocelli
5. Metanotal campaniform sensilla present
6. Comb on tergite VIII not interrupted in center
7. Ctenidium on tergite VIII anterior to spiracle
8. Unbroken line of setae on wing

1. Jeff D. Cluever, M.S. student, Photo Credit: Center-L. Buss, University of Florida; 1-4: J.D. Cluever, University of Florida

Posters

Thrips species in central Florida strawberry

UF UNIVERSITY OF FLORIDA

Major Species

- Frankliniella bispinosa* Florida flower thrips
- Frankliniella occidentalis* western flower thrips
- Frankliniella schultzei* common blossom thrips

Characteristics

- Spirines**
- Pedicel**
- Ocellar III setae**
- Setae on anterior margin of pronotum**
- Metanotal campaniform sensilla**
- Tergite VIII macroretrochalear comb**

Minor Species

Frankliniella

Thrips

*1A and 1B is the only morphological difference between *F. bispinosa* and *F. schultzei*

Thrips

- Increasing in importance across Florida.
- Need to improve diagnostic capabilities across state.



Thrips ID workshop, LaBelle Florida

Acknowledgements

This research was carried out with support from The Florida Strawberry Growers Association. Thanks to Tom Skarlinsky, USDA APHIS for assistance with larval ID.

