Stink bug damage in processing tomatoes, biology, risk factors and management options.

Tom Turini
University of California
Vegetable Crops Advisor
Fresno County

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Presentation Overview

- Damage
- Stink bug species
- Life cycle
- Developmental Rates
- Phenology model
- Pheromone baited traps
- Treatment decisions
- Insecticide efficacy
- Management summary

Stink bug feeding

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Stink bug feeding symptoms with secondary rot

Advanced stages of rot in field with high stink bug population densities

Stink bug species in California

Say's stink bug complex: *Chlorochroa sayi* and *Chlorochroa uhleri*

Redshouldered stink bug: *Thyanta pallidovirens*

Consperse stink bug: *Euschistus conspersus*

Southern green stink bug: *Nezara viridula*

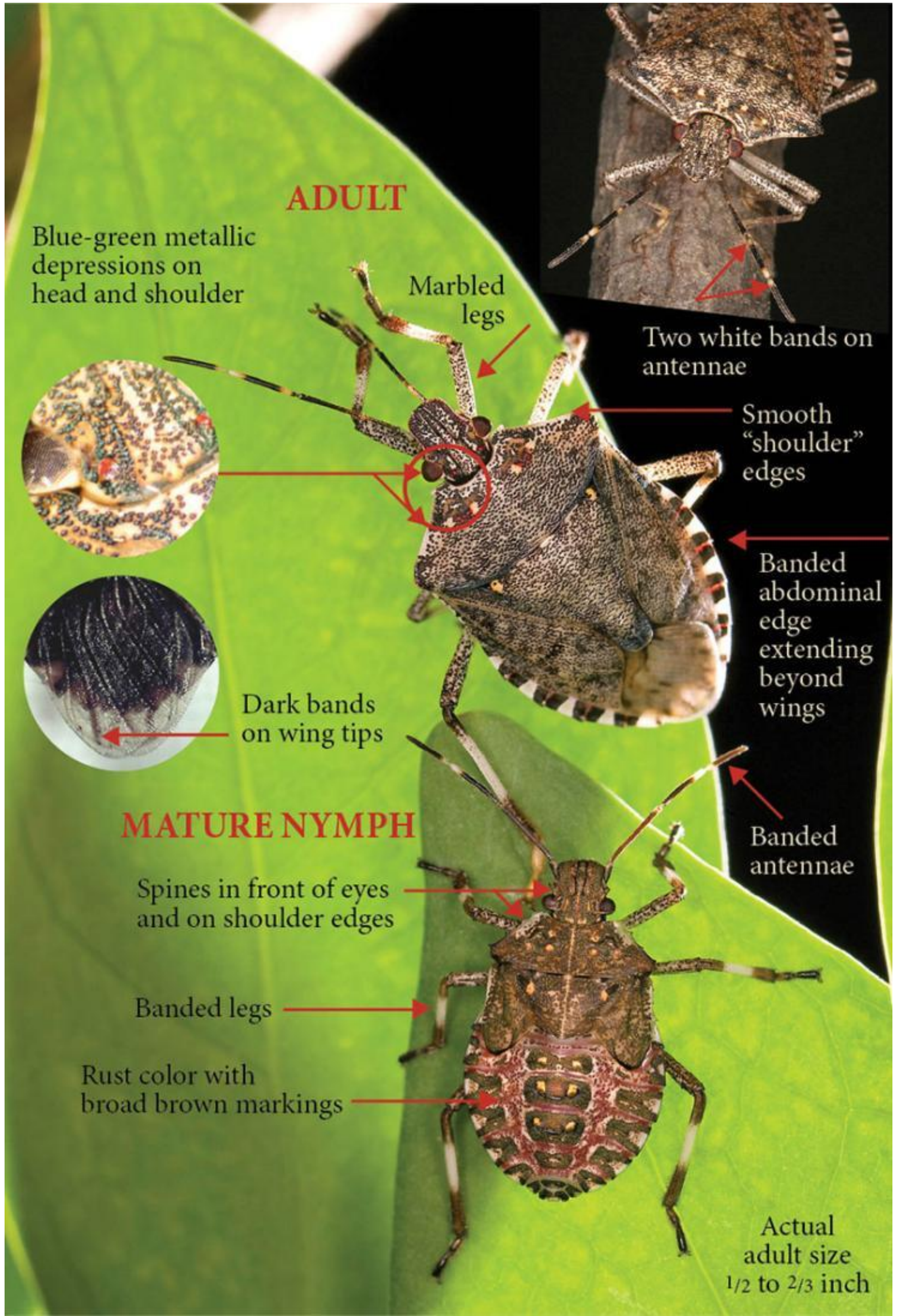
Stink Bugs More Recently Reported in California

Halyomorpha halys
Brown marmorated

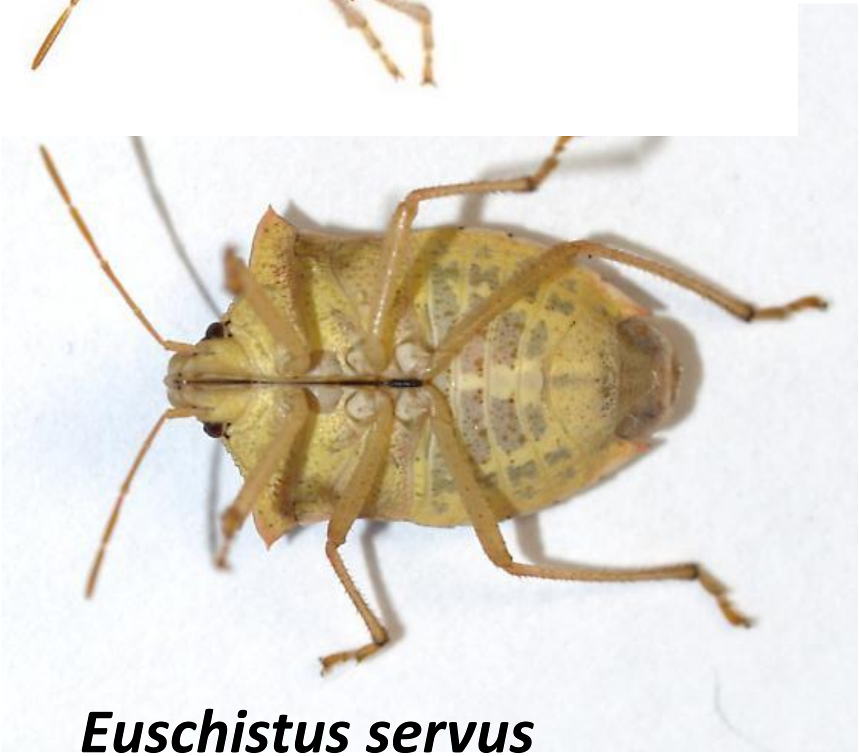
Euschistus servus
Brown stink bug

Slide adapted from Goodell 2014

Brown marmorated stink bug (BMSB), *Halyomorpha halys*



Brown stink bug *Compared to Consperse stink bug*



Euschistus servus
Brown stink bug

Consperse stink bug: Euschistus conspersus

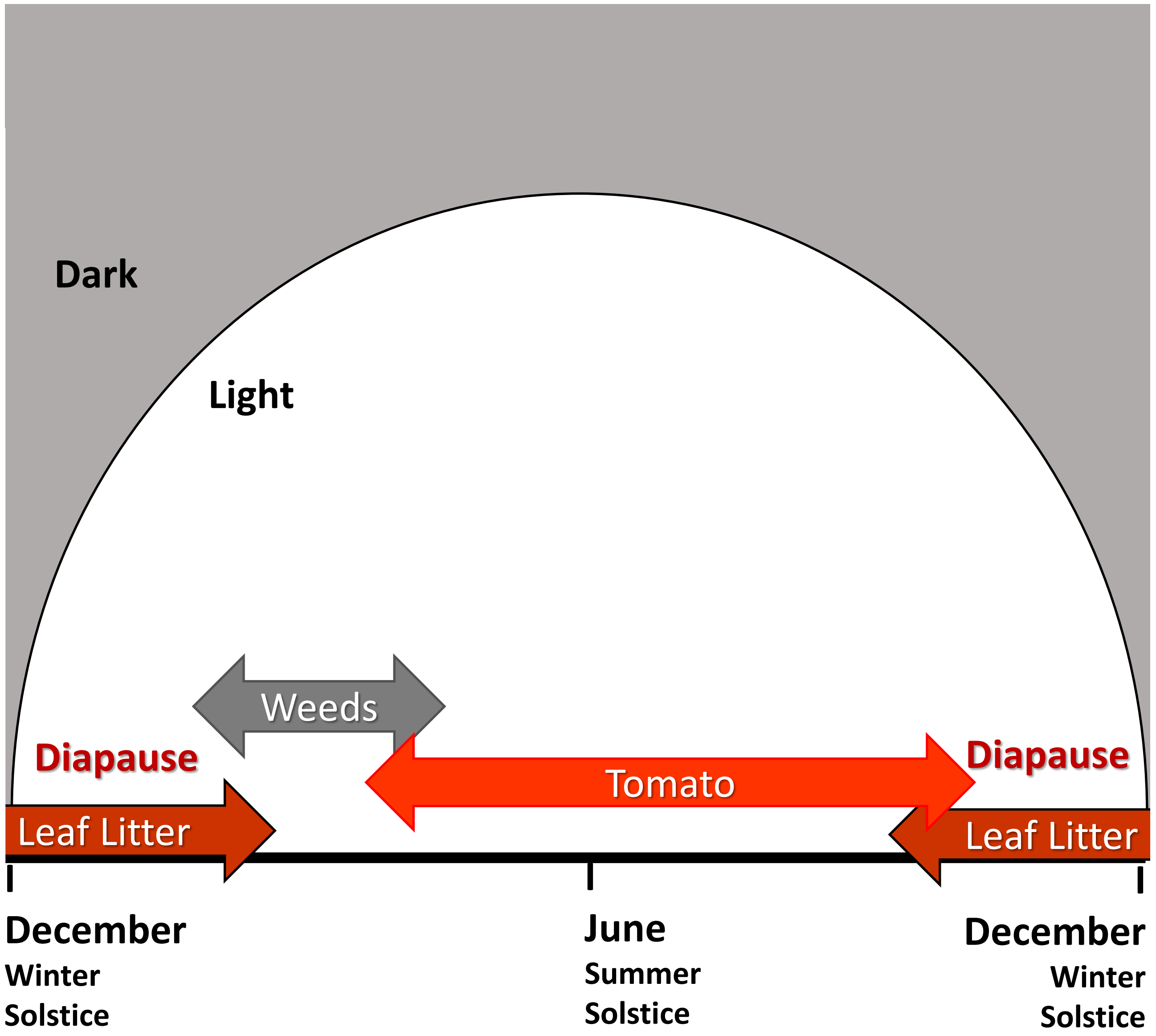
Predatory Stink Bug Common in California

Rough stink bug,
Brochymena sulcata

Consperse stink bug is consistently associated with damage in tomatoes in the Central San Joaquin Valley

Photos by E. Hannon, Fresno County Ag Commissioner's Entomologist

Consperse stink bug life cycle



Modified from Goodell, 2014

Consperse stink bug life cycle

Overwinter

Consperse stink bug overwinter under leaf litter or other cover

Consperse stink bug life cycle

Early season population development

Detected in mustards and wheat in

Stink bug eggs on leaf 24 Apr 2019

Photo by Daniel Delgado

Photo by Daniel Delgado 11 Apr 2019

Consperse stink bug life cycle

Mid- to Late-season

Population densities increases on tomatoes and move when their habitat is disrupted

Consperse stink bug life cycle

Reproduction stops with decreasing day length and they return to cover

Consperse stink bug overwinter under leaf litter or other cover

Developmental Rates of Consperse Stink Bug are Known

53.6° F Developmental Threshold	
Egg development	150 $DD_{>54°}$
1^{st}-3^{rd} instar (small nymph)	408 $DD_{>54°}$
4^{th} – 5^{th} instar (large nymph)	386 $DD_{>54°}$
Adult to Egg Laying*	275 $DD_{>54°}$
Total	1219 $DD_{>54°}$

http://www.ipm.ucdavis.edu/calludt.cgi/DDMODEL?MODEL=CSB&CROP=tomatoes

F. Zalom

Consperse stink bug Degree Day Reference Table

Lower Threshold: 53.6°F

	Minimum temperatures																												
Max temps	**34**	**36**	**38**	**40**	**42**	**44**	**46**	**48**	**50**	**52**	**54**	**56**	**58**	**60**	**62**	**64**	**66**	**68**	**70**	**72**	**74**	**76**	**78**	**80**	**82**	**84**	**86**	**88**	**90**
48	0	0	0	0	0	0	0	0																					
50	0	0	0	0	0	0	0	0	0																				
52	0	0	0	0	0	0	0	0	0	0																			
54	0	0	0	0	0	0	0	0	0	0	0																		
56	0	0	0	0	0	0	1	1	1	1	1	2																	
58	1	1	1	1	1	1	1	1	1	2	2	3	4																
60	1	1	2	2	2	2	2	2	2	3	3	4	5	6															
62	2	2	2	2	2	3	3	3	3	4	4	5	6	7	8														
64	3	3	3	3	3	3	4	4	4	5	5	6	7	8	9	10													
66	3	4	4	4	4	4	4	5	5	6	6	7	8	9	10	11	12												
68	4	4	4	5	5	5	5	6	6	7	7	8	9	10	11	12	13	14											
70	5	5	5	5	6	6	6	7	7	8	8	9	10	11	12	13	14	15	16										
72	6	6	6	6	7	7	7	8	8	9	9	10	11	12	13	14	15	16	17	18									
74	7	7	7	7	7	8	8	9	9	10	10	11	12	13	14	15	16	17	18	19	20								
76	7	8	8	8	8	9	9	9	10	11	11	12	13	14	15	16	17	18	19	20	21	22							
78	8	8	9	9	9	10	10	10	11	12	12	13	14	15	16	17	18	19	20	21	22	23	24						
80	9	9	10	10	10	11	11	11	12	13	13	14	15	16	17	18	19	20	21	22	23	24	25	26					
82	10	10	11	11	11	12	12	12	13	14	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28				
84	11	11	11	12	12	12	13	13	14	15	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30			
86	12	12	12	13	13	13	14	14	15	16	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32		
88	13	13	13	14	14	14	15	15	16	17	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	
90	14	14	14	15	15	15	16	16	17	18	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36
92	14	15	15	15	16	16	17	17	18	19	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37
94	15	16	16	16	17	17	18	18	19	20	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38
96	16	17	17	17	18	18	19	19	20	21	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39
98	17	18	18	18	19	19	20	20	21	22	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
100	18	18	19	19	20	20	21	21	22	23	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41
102	19	19	20	20	21	21	22	22	23	24	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42
104	20	20	21	21	22	22	23	23	24	25	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43
106	21	21	22	22	23	23	24	24	25	26	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44
108	22	22	23	23	24	24	25	25	26	27	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45
110	23	23	24	24	24	25	26	26	27	28	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46
112	24	24	25	25	25	26	27	27	28	29	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47
114	25	25	25	26	26	27	27	28	29	30	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48
116	26	26	26	27	27	28	28	29	30	31	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49
118	27	27	27	28	28	29	29	30	31	32	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	4950	

Pheromone-baited traps are effective in aiding with early detection

- Cone traps
- AlphaScents Consperse stink bug lure

Ambush™ stink bug trap

Live insect trap Sterling International Inc.

AlphaScents lures

Treatment decision support: Stink bug degree day accumulation tables can be generated and exported

- Go to UC IPM link https://ipm.ucanr.edu/weather/weather-models/?MODEL=CSB&CROP=tomatoes#gsc.tab=0
- Select County
- CIMIS station nearest your site
- Select start and end date

https://ipm.ucanr.edu/weather/weather-models/?MODEL=CSB&CROP=tomatoes#gsc.tab=0

Monthly DD>53.6° Accumulation

[FIVE_PTS.A (CIMIS #2, Five Points/WSFS USDA)]

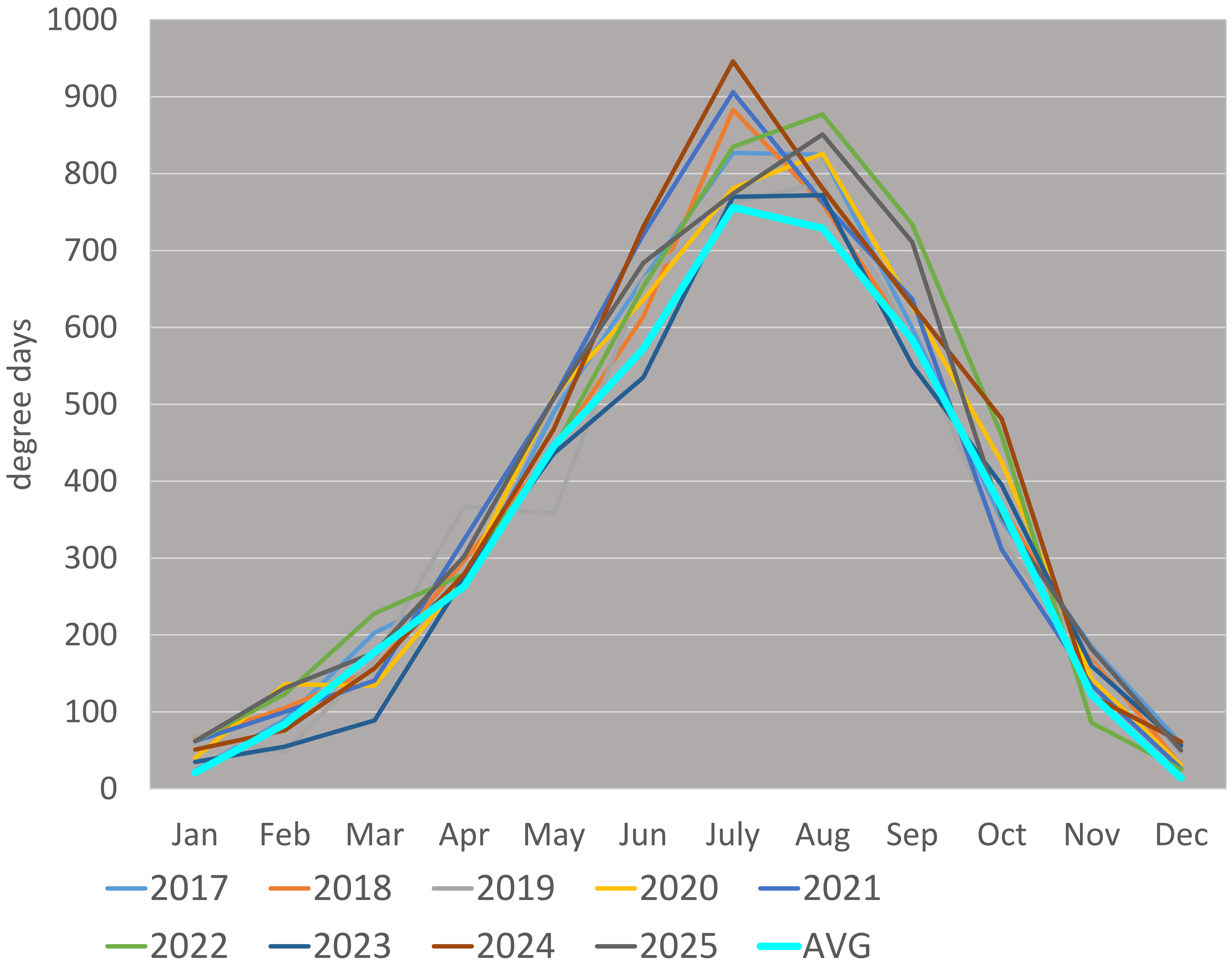
	2017	2018	2019	2020	2021	2022	2023	2024	2025	AVG
Jan	24	66	69	40	62	62	35	51	62	21
Feb	90	105	48	136	100	123	55	76	131	84
Mar	203	156	167	134	141	228	89	157	177	178
Apr	260	297	367	274	324	279	275	279	302	263
May	490	441	358	511	508	442	436	468	508	446
Jun	663	614	662	636	721	653	535	731	684	572
July	827	883	762	781	906	835	770	946	774	756
Aug	825	761	788	826	763	877	772	781	851	729
Sep	599	582	586	628	637	734	551	629	711	584
Oct	349	368	320	425	311	459	395	481	355	366
Nov	185	172	176	143	135	86	160	121	182	122
Dec	59	30	46	31	26	25	56	61	40	14

https://ipm.ucanr.edu/weather/weather-models/?MODEL=CSB&CROP=tomatoes#gsc.tab=0

Annual Accumulation

year	$DD_{.54}{}^{o}$
2017	4574
2018	4475
2019	4349
2020	4574
2021	4475
2022	4349
2023	4129
2024	4781
2025	4777
AVG	**4135**

Monthly stink bug degree day accumulation relative to historic average



Insecticides Evaluated (2014-2024)

Not all are currently registered for use as trialed

IRAC #*	Trade name	Common name
1A	Lannate	methomyl
1B	Dibrom 8E	naled
1B	Dimethoate	dimethoate
3A	Danitol	fenpopathrin
3A	Warrior II	lambda-cyhalothrin
3A	Danitol	fenpropathrin
3A + 4A	Brigadier	bifenthrin + imidicloprid
3A + 4A	Endigo ZCX	lambda-cyhalothrin + thiamethoxam
3A + 4A	Leverage	beta-cyfluthrin + imidicloprid
4A	Assail	acetamiprid
4A	Venom	dinotefuron
4A+ 15	Cormoran	acetamiprid + novaluron
4C	Sequoia	sulfoxaflor
4D	Sivanto	flupyradifurone
7C	Knack	pyriproxyfen Juvenile hormone rec. mod
9C	Beleaf	flonicamid Chordotonal organ nicotinamidase
15	Rimon	novaluron Benzoyl urea’s
21A	Torac	tolfenpyrad Mitochndrl Cmplx I, ETI
28	Exirel	cyantraniliprole Diamides

* IRAC# mode of action as assigned by the Insecticide Resistance Action Committee

Insecticides Evaluated (2014-2024)

Most insecticides that consistently showed efficacy are not longer available in CA

IRAC #*	Trade name	Common name	
1A	Lannate	methomyl	
1B	Dibrom 8E	naled	
1B	Dimethoate	dimethoate	
3A	Danitol	fenpopathrin	
3A	Warrior II	lambda-cyhalothrin	
3A	Danitol	fenpropathrin	
3A + 4A	Brigadier	bifenthrin + imidicloprid	
3A + 4A	Endigo ZCX	lambda-cyhalothrin + thiamethoxam	
3A + 4A	Leverage	beta-cyfluthrin + imidicloprid	
4A	Assail	acetamiprid	
4A	Venom	dinotefuron	
4A+ 15	Cormoran	acetamiprid + novaluron	
4C	Sequoia	sulfoxaflor	
4D	Sivanto	flupyradifurone	
7C	Knack	pyriproxyfen	Juvenile hormone rec. mod
9C	Beleaf	flonicamid	Chordotonal organ nicotinamidase
15	Rimon	novaluron	Benzoyl urea’s
21A	Torac	tolfenpyrad	Mitochndrl Cmplx I, ETI
28	Exirel	cyantraniliprole	Diamides

* IRAC# mode of action as assigned by the Insecticide Resistance Action Committee

Materials compared for efficacy against Consperse stink bug, 2025

Common name, rate per acre, application
Dimethoate 1 pt, Warrior II 1.92 fl oz, Danitol 10.67 fl oz and Assail 70WP 1.7 oz foliar
Celite 35 lbs dust
Plinazolin 200SC 4.1 fl oz foliar
Sivanto Prime 28 fl oz foliar
Venom 6.0 oz drip irrigation injected
Untreated control

Sivanto Prime was applied on 21 Aug, all other treatments were applied on 21 Aug and 9 Sep. All treatments applied to foliage were in the equivalent of 50 gal of water with 0.02% DyneAmic

Insecticide Trials 2025

Location : West Side Research and Extension Center – Fresno County
Plot size : single 60-inch bed x 75 ft
Untreated buffer between each treated row
Experimental design : 4 Replication Randomized Complete Block
Plant Date: June 2
Variety: HM8237

Application details:
CO_2-powered backpack sprayer
50 gallons per acre
30 psi
3 Teejet 8004 EVS 19-in spacing


AlphaScents lures

Insecticide Trial Evaluations

In-season: Three evaluations of fruit damage and stink bug counts of 4 feet under one side of canopy.

At harvest:
On 17 October, 7 row-feet were harvested and weighed
Hand sort of 22-28 lbs of fruit by quality (red, green, sunburn, rot & stink bug damage)

Adult Consperse stink bug counts, 2025

	Adult stink bugs		
Treatments	28 Aug	22 Sep	
Plinazolin 200SC 4.1 fl oz foliar	7.25	1.75	c
Venom 6.0 oz drip irrigation injected	16.25	6.75	bc
Celite 35 lbs dust	10.25	9.25	bc
Dimethoate 400 1 pt, Warrior II 1.92 fl oz, Danitol 10.67 fl oz and Assail 70WP 1.7 oz foliar	16.00	11.50	b
Sivanto Prime 28 fl oz foliar	12.25	12.50	b
Untreated control	15.25	21.25	a

Sivanto Prime was applied on 21 Aug, all other treatments were applied on 21 Aug and 9 Sep. All treatments applied to foliage were in the equivalent of 50 gal of water with 0.25% DyneAmic

Insecticide influence on fruit quality

Treatments[z]	Fruit quality based on hand-sort (%)[y]								
	Red		Green	Sun-burn	Rot total		Rot not specific	Rot stink bug	
Plinazolin 200SC 4.1 fl oz foliar[x]	69.2	a[w]	12.1	0.1	18.6	c	8.8	9.8	d
Dimethoate 400 1 pt, Warrior II 1.92 fl oz, Danitol 10.67 fl oz and Assail 70WP 1.7 oz foliar	63.4	ab	13.7	1.0	21.9	bc	6.5	15.4	cd
Sivanto Prime 28 fl oz foliar	44.2	bc	17.6	0.5	37.7	ab	10.5	27.1	bc
Celite 35 lbs dust[v]	37.3	c	14.3	0.6	47.7	a	15.6	32.2	ab
Venom 6.0 oz drip irrigation injected[u]	40.4	c	14.5	1.1	43.9	a	5.9	38.0	ab
Untreated control	27.1	c	17.3	0.5	55.1	a	9.7	45.4	a

Sivanto Prime was applied on 21 Aug, all other treatments were applied on 21 Aug and 9 Sep.
All treatments applied to foliage were in the equivalent of 50 gal of water with 0.02% DyneAmic

Insecticide influence on fruit quality

Treatments[z]	Fruit quality based on hand-sort (%)[y]								
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Sivanto Prime 28 fl oz foliar	44.2	bc	17.6	0.5	37.7	ab	10.5	27.1	bc
Celite 35 lbs dust[v]	37.3	c	14.3	0.6	47.7	a	15.6	32.2	ab
Venom 6.0 oz drip irrigation injected[u]	40.4	c	14.5	1.1	43.9	a	5.9	38.0	ab
Untreated control	27.1	c	17.3	0.5	55.1	a	9.7	45.4	a

Sivanto Prime was applied on 21 Aug, all other treatments were applied on 21 Aug and 9 Sep.
All treatments applied to foliage were in the equivalent of 50 gal of water with 0.02% DyneAmic

Insecticides Evaluated

Plinazolin and Celite have modes of action not previously evaluated

IRAC #*	Trade name	Common name	
1A	Lannate	methomyl	
1B	Dibrom 8E	naled	
1B	Dimethoate	dimethoate	
3A	Danitol	fenpopathrin	
3A	Warrior II	lambda-cyhalothrin	
3A	Danitol	fenpropathrin	
3A + 4A	Brigadier	bifenthrin + imidicloprid	
3A + 4A	Endigo ZCX	lambda-cyhalothrin + thiamethoxam	
3A + 4A	Leverage	beta-cyfluthrin + imidicloprid	
4A	Assail	acetamiprid	
4A	Venom	dinotefuron	
4A+ 15	Cormoran	acetamiprid + novaluron	
4C	Sequoia	sulfoxaflor	
4D	Sivanto	flupyradifurone	
7C	Knack	pyriproxyfen	Juvenile hormone rec. mod
9C	Beleaf	flonicamid	Chordotonal organ nicotinamidase
15	Rimon	novaluron	Benzoyl urea
21A	Torac	tolfenpyrad	Mitochndrl Cmplx I, ETI
28	Exirel	cyantraniliprole	Diamides
30	Plinazolin	isocycloseram	
UNM	Celite	diatomaceous earth	

* IRAC# mode of action as assigned by the Insecticide Resistance Action Committee 2025

Sprayer Comparison, 2025

EXPERIMENTAL SITE
Location: West Side Research and Extension Center
Plot size : four 60-inch beds x 50 ft
Experimental design : Six Replication Randomized Complete Block
Plant Date: 2 Jun
Variety: HM8237

Standard conventional sprayer
- 40 gallons per acre
- 30 psi
- Three Teejet 8003VS nozzles

Application:
Dates: 20 Aug, 11 Sep
Tank Mix: Dimethoate 1 pt + Warrior II 1.92 fl oz + Danitol 10.67 fl oz and Assail 70WP 1.7 oz + DyneAmic 0.25%

Electrostatic (OnTarget Spray Systems, Watsonville**)**
- 20 gallons per acre

Sprayer performance: stink bug Density/Fruit quality

Effect of spryer on stink bug densities

Treatments	29 Aug	23 Sep
Conventional	13.7	8.5
Electrostatic	12.2	11.5
Untreated	16.0	16.7

Consperse stink bug adults in the canopy and on soil in 4 ft length of 1 side of a bed

Effect of spryer on fruit quality

Treatments	Red	Green	Sunburn	Rot (advanced)	Rot (stink bug)	Rot (total)
Conventional	44.9	21.3	0.7	19.5	13.6 b	33.1 b
Electrostatic	40.1	22.8	1.6	12.6	23.0 a	35.6 ab
Untreated	30.9	27.6	0.5	19.5	21.5 ab	41.0 a

On 17 Oct even row feet of each plot were hand-harvested, a sub-sample of 22-28 lbs was collected and sorted into categories; red, green, sunburn, rot of unknown cause, and rot due to stink bug feeding was recorded. Percentages within in each category are presented

Management Considerations

- Minimize potential sites for over-wintering (heavy ground cover) in vicinity of tomato fields
- Weed management (particularly Feb-May)
- Avoid placement of early- or mid-season tomatoes near later-planted fields
- Treat with pyrethroid insecticides
- Maximize canopy and soil coverage

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- Les Ehler
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Agriculture and Natural Resources

Questions

Tom Turini
UC Cooperative Extension, Fresno County
taturini@ucanr.edu
559-375-3147

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