Stink bug damage, biology and management options

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Consperse stink bug
Euschistus conspersus

Photos by E. Hannon

Redshouldered stink bug:
Thyanta pallidovirens

Southern green stink bug:
Nezara viridula

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

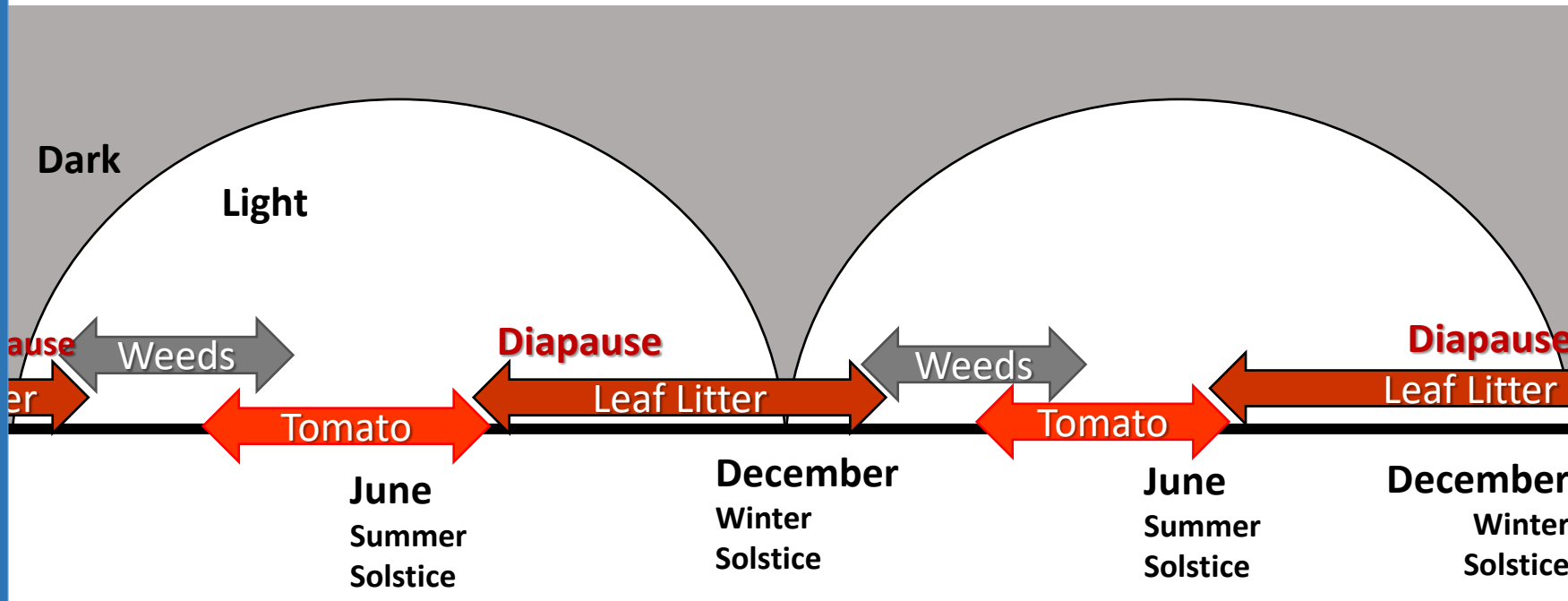
Halyomorpha halys
Brown marmorated stink bug

Stink Bug Topics Covered

- Stink bugs associated with damage
- Population Development
  - Seasonal
  - Landscape
  - Climate
- Management Strategies Detection
  - Treatment
- Recent local studies
- Considerations regarding control

Damage

Consperse Stink Bug Schematic Life Cycle



Goodell, 2014

Consperse stink bug life cycle

Overwintering

Consperse stink bug overwinter in heavy leaf litter or under 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

Nymphs are more susceptible to insecticides

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

Rate of development of Consperse stink bug is known

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

F. Zalom

Degree day accumulation since 2017

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

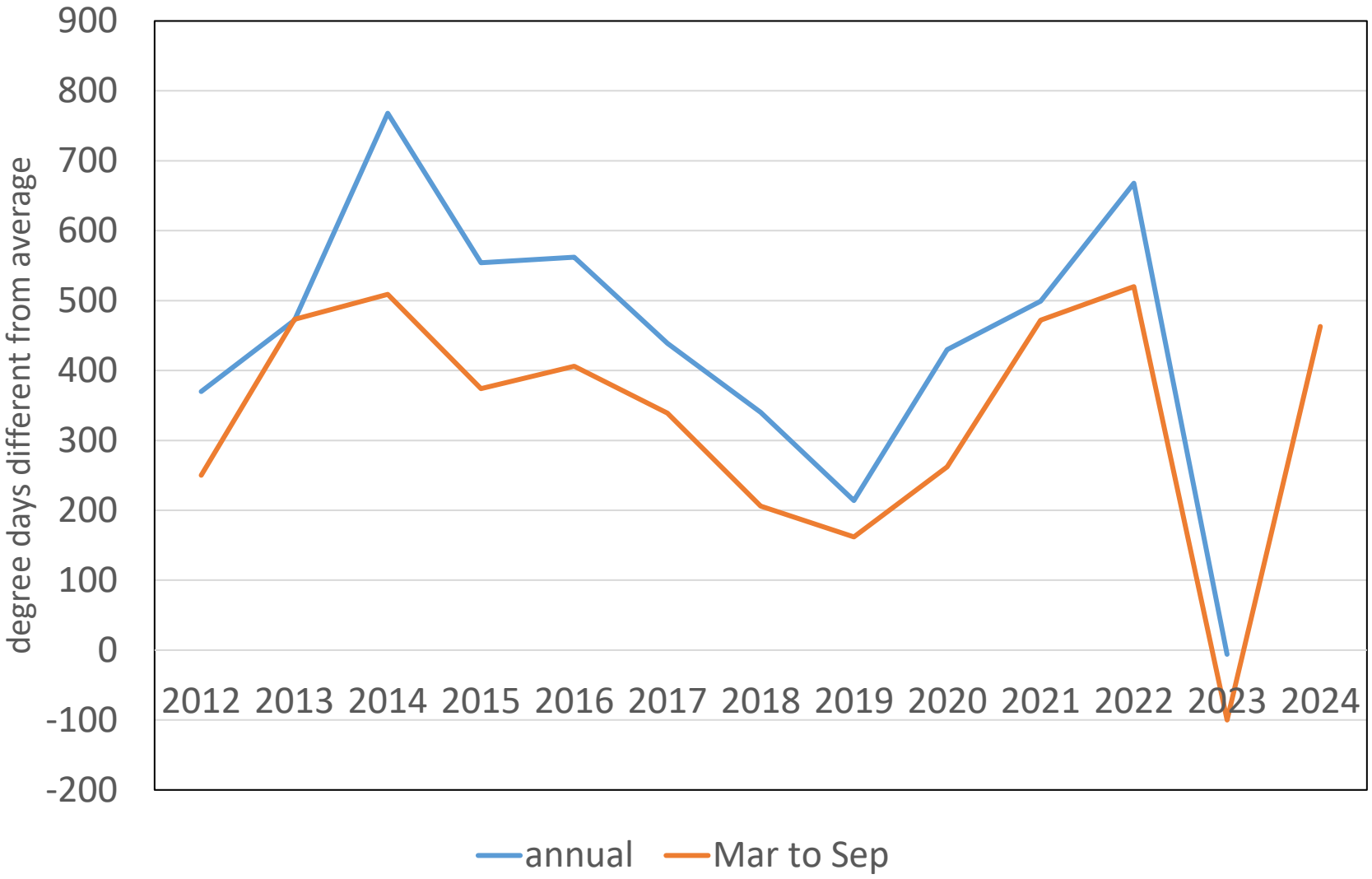
	2017	2018	2019	2020	2021	2022	2023	2024	AVG
Jan	24	66	69	40	62	62	35	51	21
Feb	90	105	48	136	100	123	55	76	84
Mar	203	156	167	134	141	228	89	157	178
Apr	260	297	367	274	324	279	275	279	263
May	490	441	358	511	508	442	436	468	446
June	663	614	662	636	721	653	535	731	572
July	827	883	762	781	906	835	770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

Annual Accumulation

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

Monthly $DD_{>53.6^{\circ}}$ Accumulation

Degree day accumulation relative to historic average



Insecticides Evaluated

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	Belay	clothianidin
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

Neonicotinoid limitations on rates and timing in fruiting vegetables

"'Bloom" means the period from the onset of flowering until petal fall is complete.'

(a) Application of a neonicotinoid is prohibited during bloom.

(b) If both soil and foliar application methods are used on the same crop, or if multiple neonicotinoid active ingredients are applied to the same crop, a total maximum combined rate of 0.172 lbs. ai/A/season may be applied.

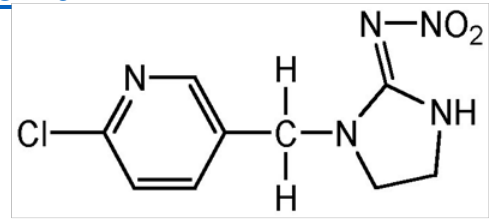
(c) If managed pollinators will be used within the growing season, additional limitations apply.

From: California Dept. of Pesticide Regulation, 22-001, Final
https://www.cdpr.ca.gov/docs/enforce/neonicotinoid/neonicotinoid_regulations.htm

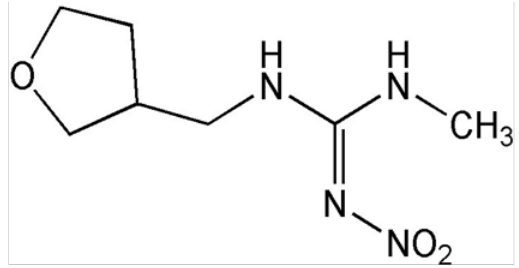
Neonicotinoid CA DPR definition for purposes of this regulatory action

‘”Neonicotinoid” means a pesticide containing any of the following active ingredients in the **nitroguanidine insecticide** Class of neonicotinoids: clothianidin, dinotefuran, imidacloprid, and thiamethoxam.’

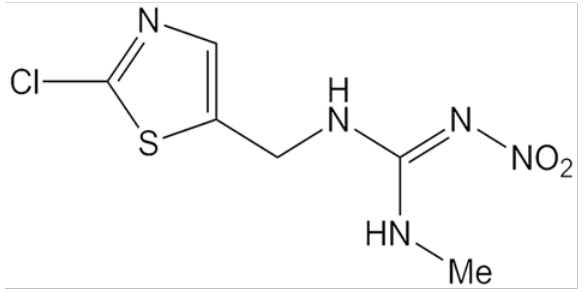
From: California Dept. of Pesticide Regulation, 22-001, Final https://www.cdpr.ca.gov/docs/enforce/neonicotinoid/neonicotinoid_regulations.htm



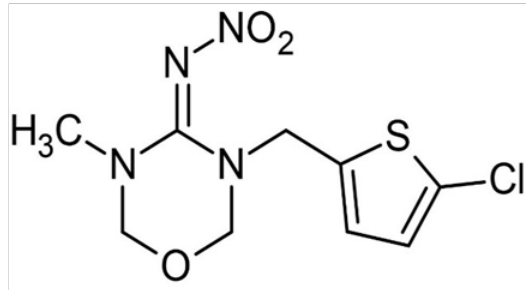
Imidacloprid



Dinotefuran



Clothianidin



Thiamethoxam

Insecticide Trials 2014-16

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 Dates: 5/21/2014, 5/15/2015, 5/24/2016
Variety: H5608

Application details:
CO_2-powered backpack sprayer
50 gallons per acre
35 psi
3 Teejet 8004 EVS 19-in spacing
8 and 29 Aug 2014
18, 28 Jul, and 18 Aug 2015
25 Aug and 8 Sep 2016

Insecticide Trial Evaluations 2014-17

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

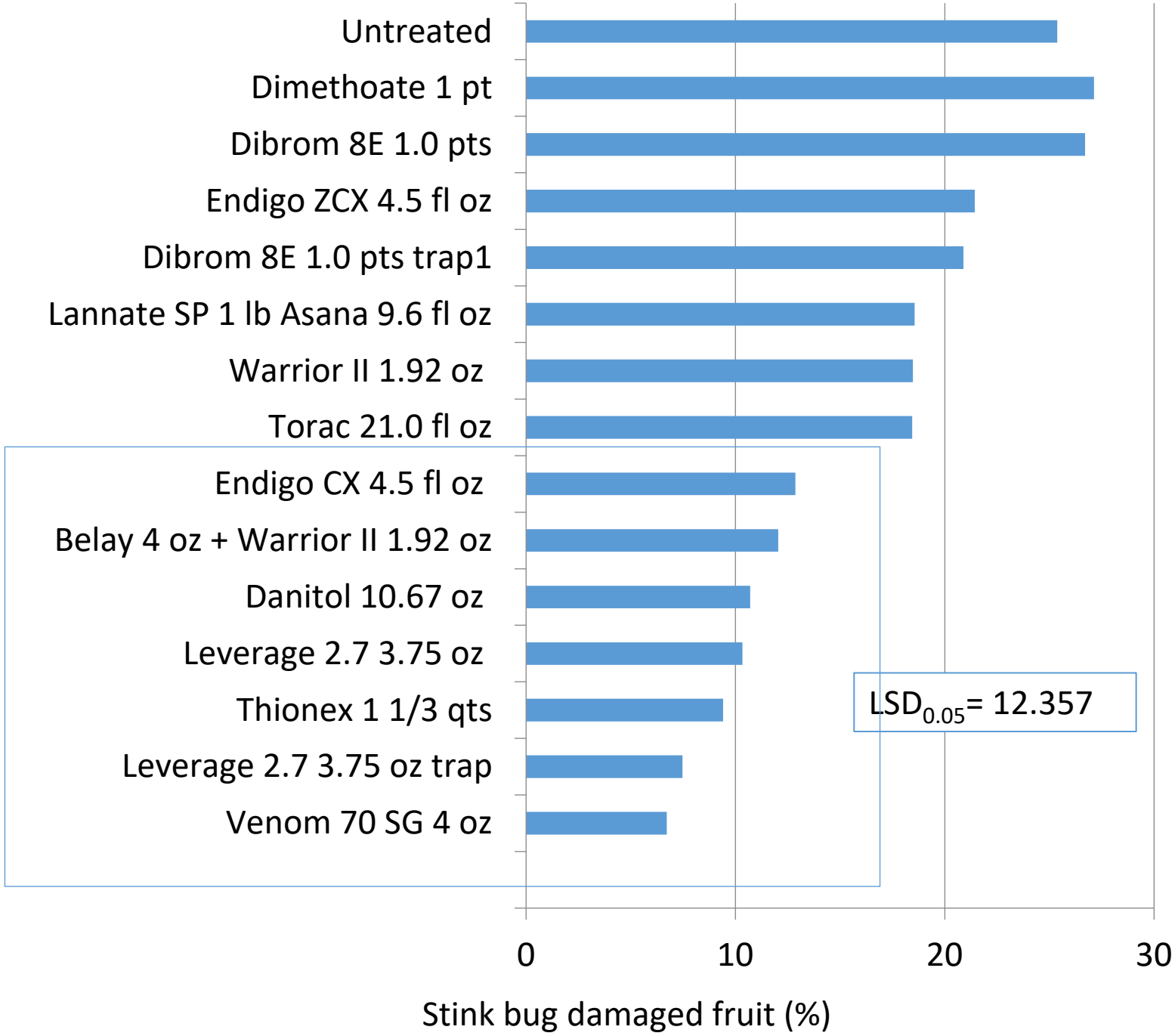
At harvest:

Harvest: 20 ft (6 m) weigh all fruit

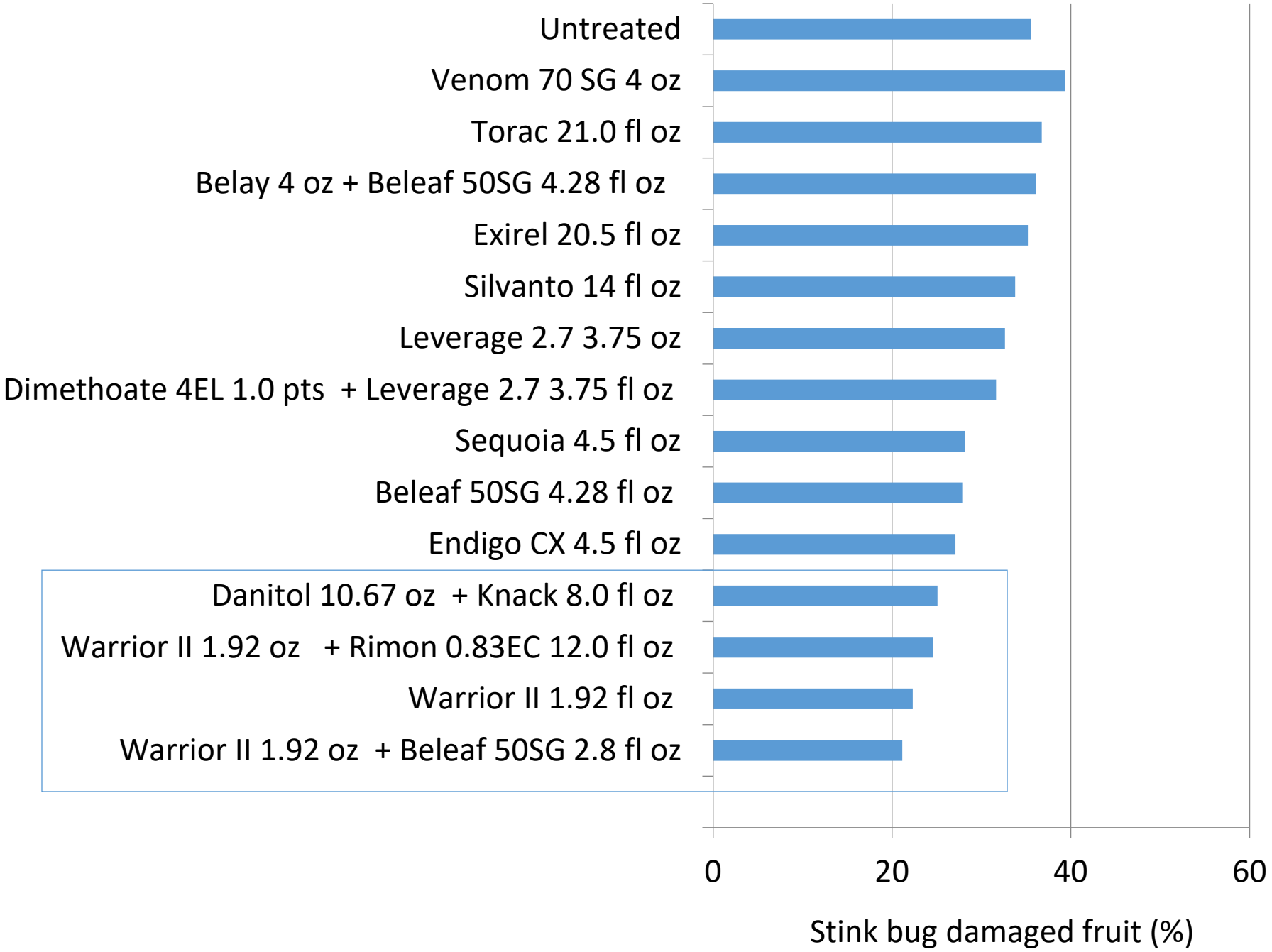
Hand sort of 25 to 35 lbs (13.6 to 18.9 kg) of fruit by quality (red, green, sunburn, rot & stink bug damage)

Lab analysis of 50 red fruit at Processing Tomato Advisory Board (PTAB)

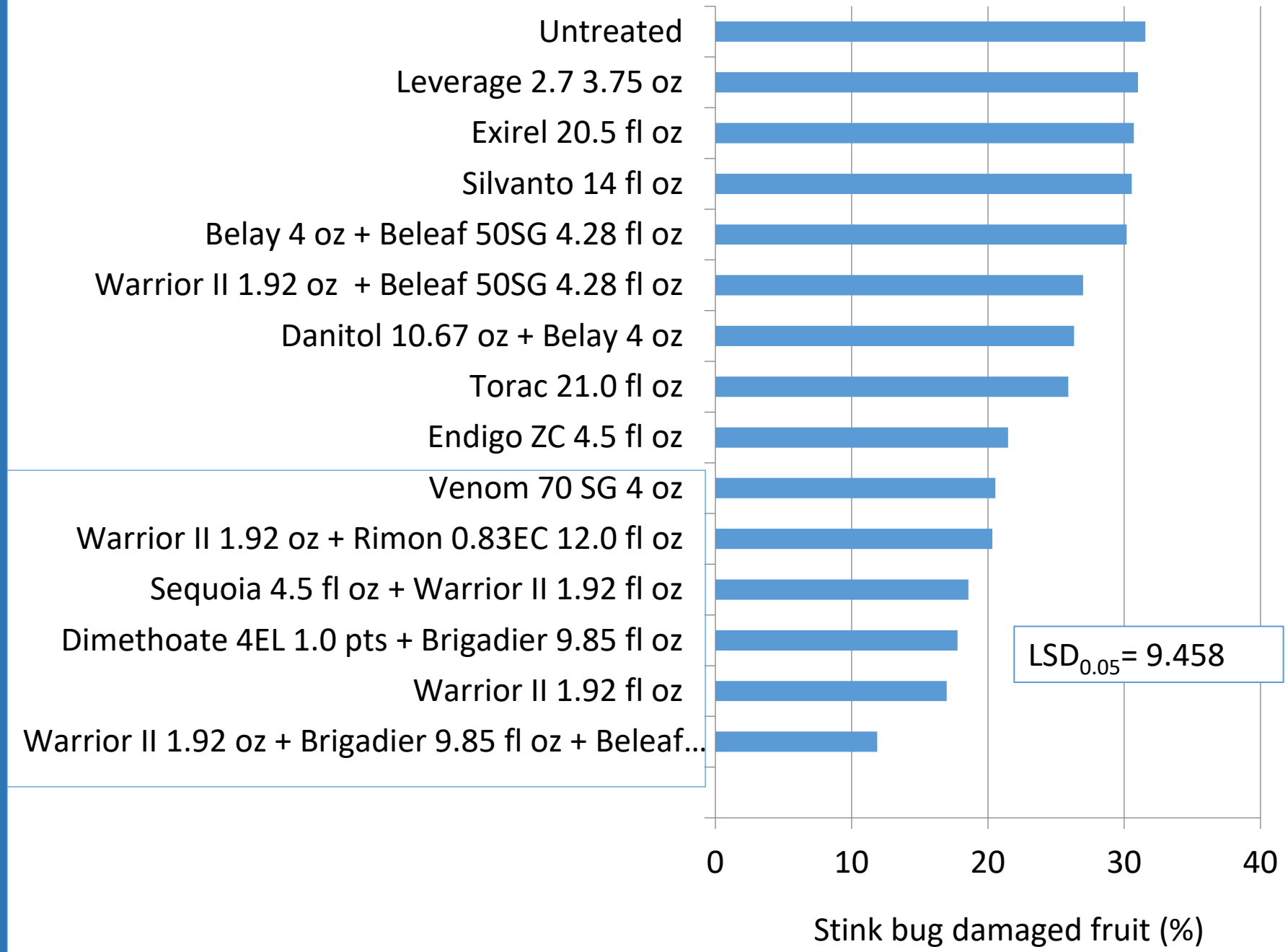
Influence of Insecticide Treatments on Stink Bug Damage, 2014



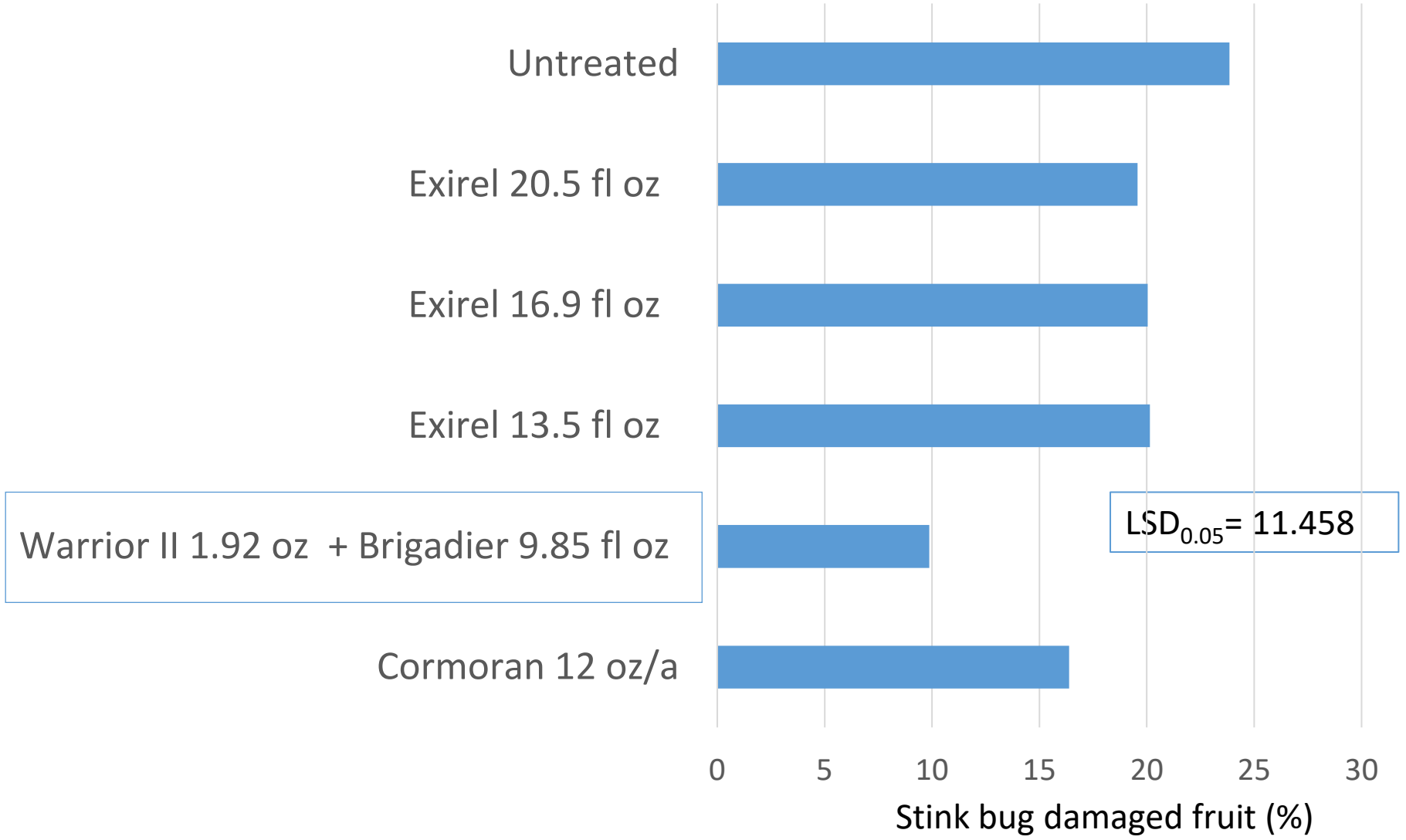
Influence of Insecticide Treatments on Stink Bug Damage, 201



Influence of Insecticide Treatments on Stink Bug Damage, 2016



Influence of Insecticide Treatments on Stink Bug Damage, 2017



Efficacy of insecticide treatments against stink bug, 2024

Location : West Side Research and Extension Center – Fresno County
Plot size : Three 60 inch bed x 75 ft
Untreated buffer between each treated row
Experimental design : 4 Replication
Randomized Complete Block
Plant Dates: 5/24/2024
Variety: H5608

Application details:
tractor mounted sprayer
40 gallons per acre
40 psi
2 October 2024

Evaluation Stink Bug Counts, 2024

In-season: 39-inches of canopy on one side of the bed was shaken and lifted. The soil was inspected and number of stink bug were recorded.

Consperse stink bug counts, 2024

	9-Oct	24-Oct
Untreated Control	3.25	0.75
Dimethoate 1 pt Acephate 90WDG 1.1 lb Lannate1 lb	1.75	0
Acephate 90WDG 1.1 lb Sniper 6.4 fl oz Danitol 10.67 fl oz	1.25	0.25
Dimethoate 1 pt Danitol 10.67 fl oz Anarchy 70WP 1.7 oz Lannate 1 lb/a	0.5	0.5
Acephate 90WDG 1.1 lb Dimethoate 1 pt/a Danitol 10.67 fl oz/a	1.75	0.75
$P_{0.05}$	NS	NS

Insecticides Tested

IRAC #*	Trade name	Common name
1A	Lannate	methomyl
1B	Acephate 90WDG	acephate
1B	Dimethoate	dimethoate
3A	Danitol	fenpropathrin
3A	Sniper	bifenthrin
4A	Anarchy 70WP	acetamiprid

Sprayer comparisons in 2016 and 2019

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

Berm blower sprayer:
40 gallons per acre

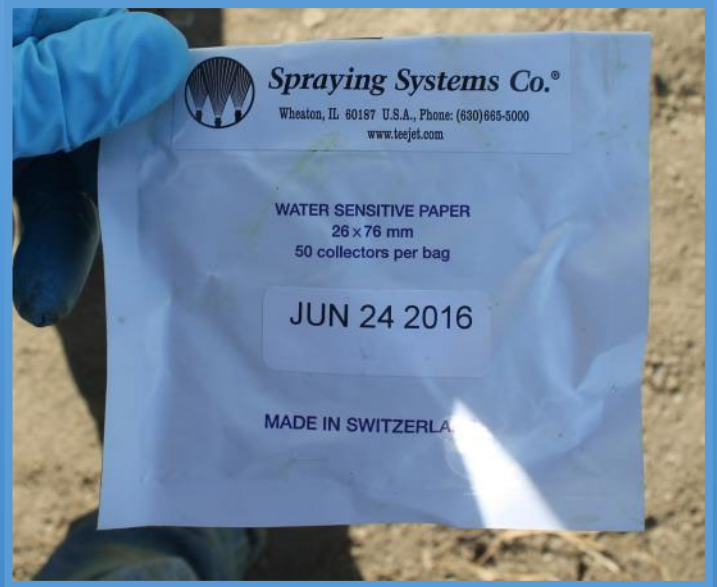
Untreated Control

Application:
Date: 27 Aug
Tank Mix: Warrior II 1.92 fl oz + Brigadier 9.85 fl oz

CONDITIONS AT EXPERIMENTAL SITE
Location: West Side Research and Extension Center
Plot size : three 60 inch bed x 130 ft
Experimental design : Four Replication Randomized Complete Block
Plant Date: 22 May 2019
Variety: H5608

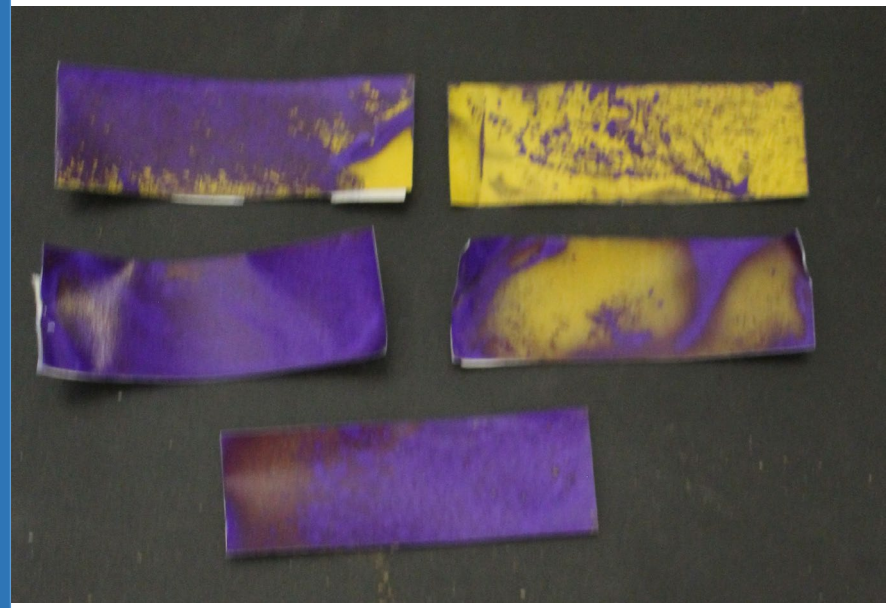
Sprayer Comparisons

Water sensitive paper was used for determination of canopy penetration and coverage

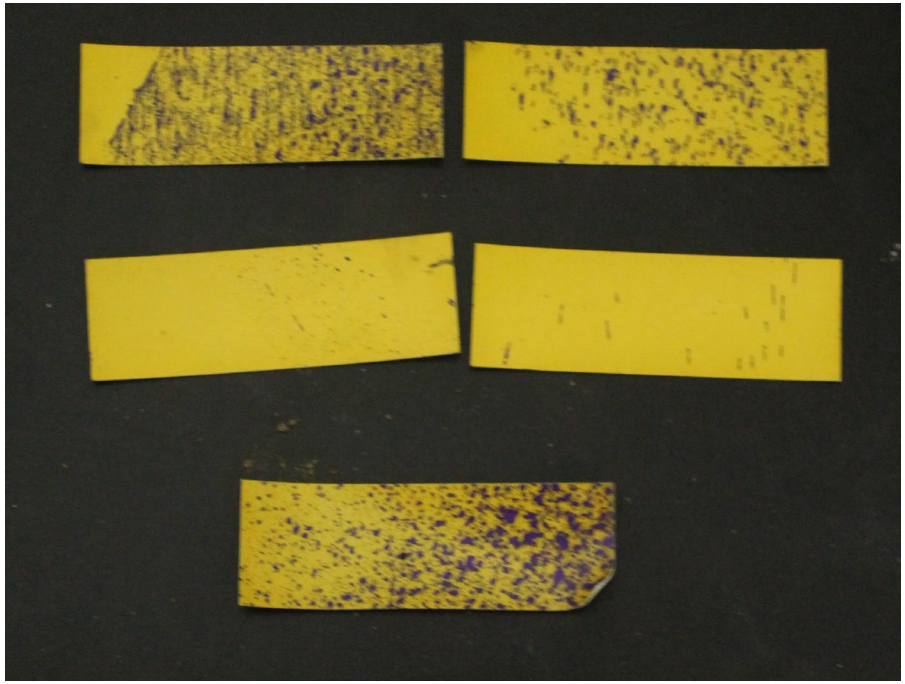


Placed into sprayed area immediately before treating on the soil surface at 3 to 4 inches above the soil surface and at 10 to 12 inches above the soil surface

Water sensitive cards 2019



Berm Blower Sprayer @ 40 gpa



Conventional standard @ 40 gpa

Berm Blower Sprayer (Nutrien)

Management Considerations

- Seasonal movement:
  - Over-wintering sites are under heavy ground cover
  - Feb and Mar adults move and reproduce on weeds and crops
  - Apr to Jun reproduction occurs in tomatoes
  - As early- and mid-season tomatoes are harvested, SB moves.
- Treat with pyrethroid insecticides
- Maximize canopy and soil coverage

Acknowledgements

- California Tomato Research Institute
- Daniel Delgado
- Joe Nunez
- Fresno Consultants and Growers
- Scott Schmidt
- Jared Overmyer
- Jose Mandajano
- Ron Avila
- Pete Goodell
- Frank Zalom
- Les Ehler
- UC WSREC staff