Stink Bug Management and Insecticide Efficacy

Thomas Turini
University of California Cooperative Extension
Vegetable Crops Advisor
Fresno County

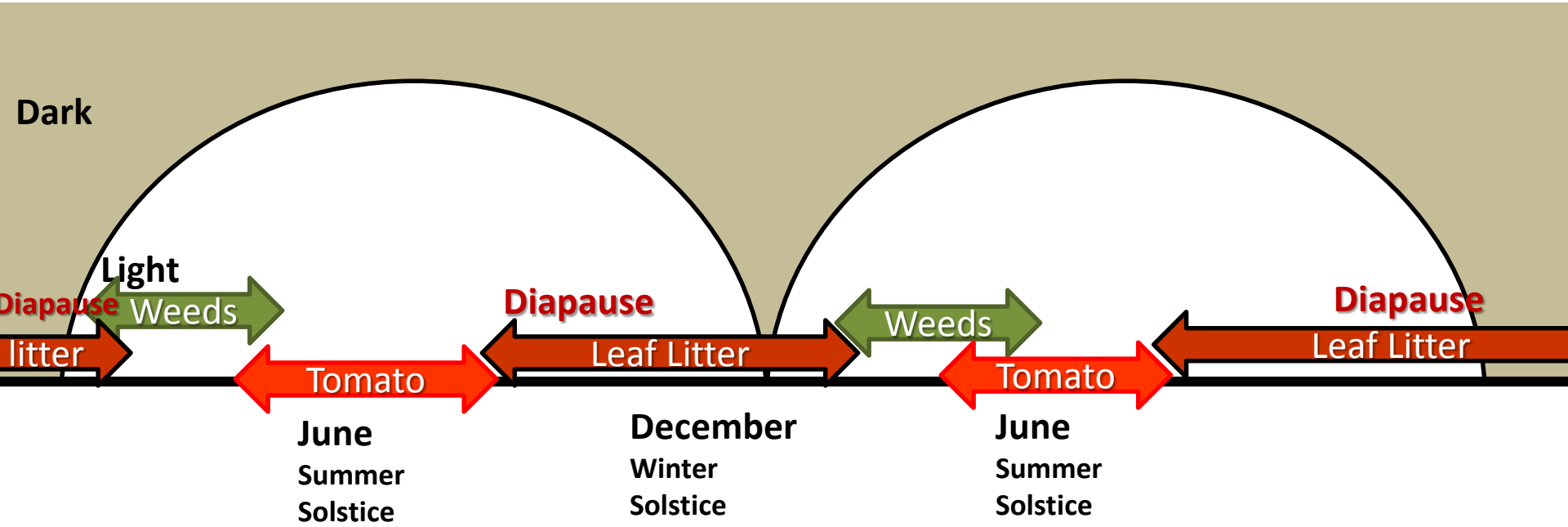
Stink Bug Damge in Fresno County

Stink Bugs Associated with Fresno Co. Tomatoes from 2013-2017 were Consperse

Photos by E. Hannon, Fresno County Ag Commissioner's Entomologist, 2014

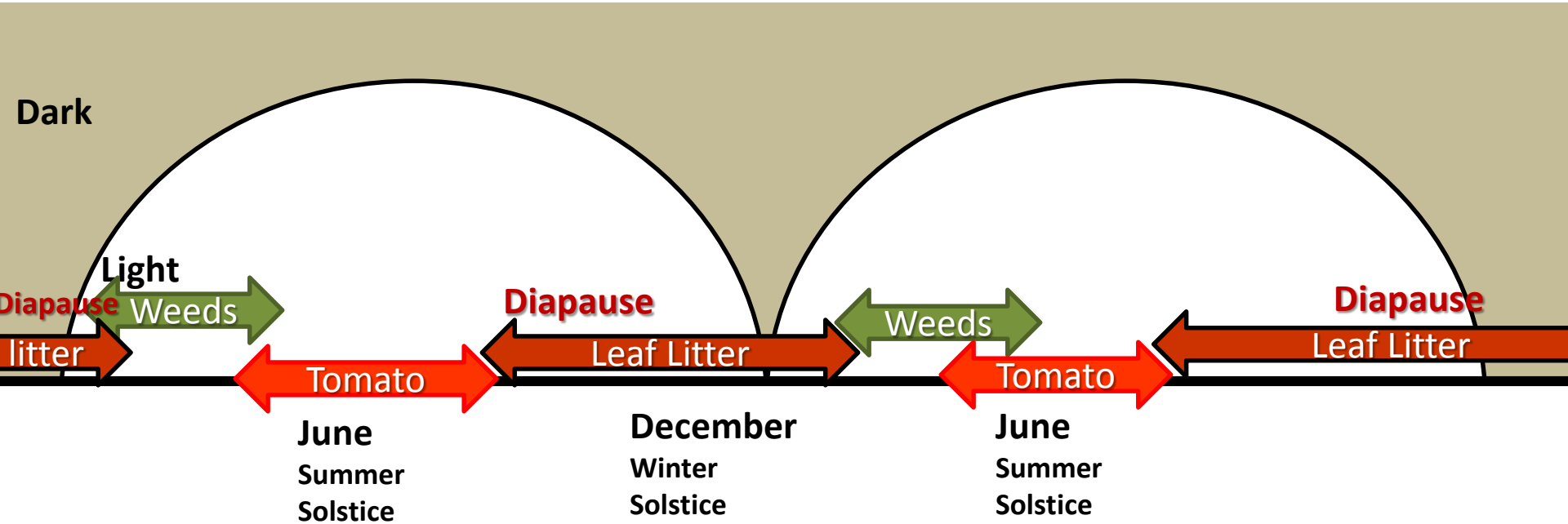
Damage

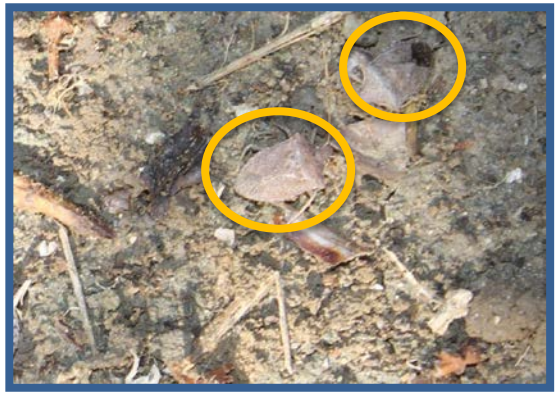
Consperse Stink Bug Schematic Life Cycle



Goodell, 2014

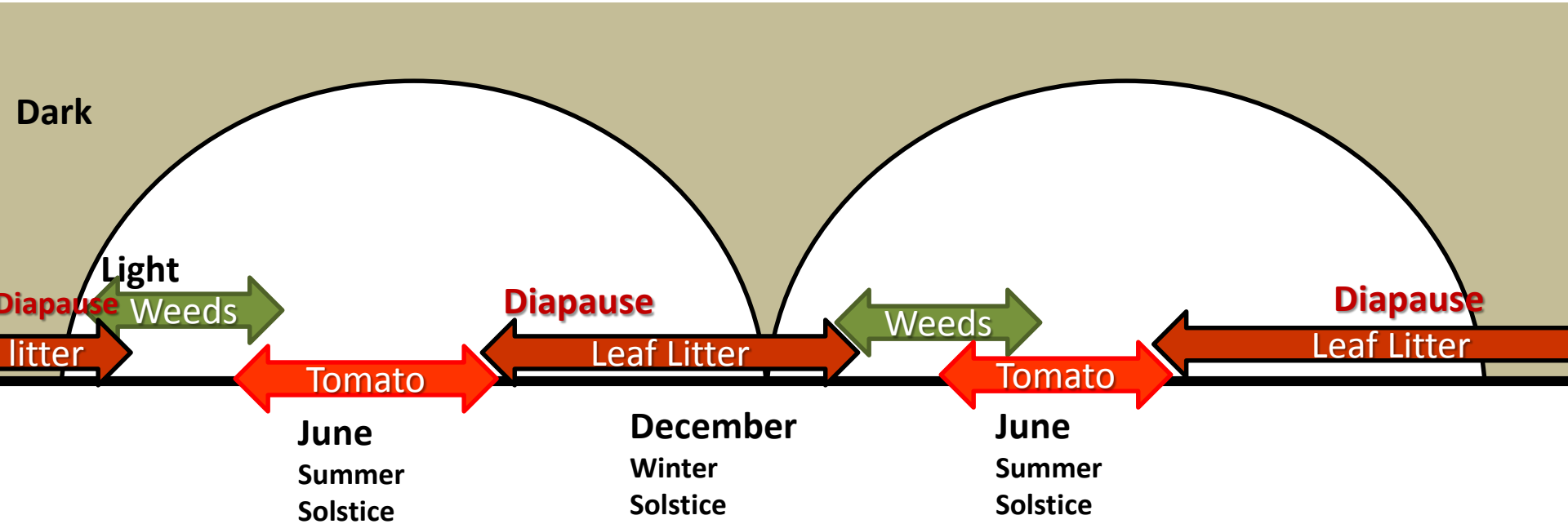
Consperse Stink Bug Schematic Life Cycle





Goodell, 2014

Consperse Stink Bug Schematic Life Cycle



Weed Hosts

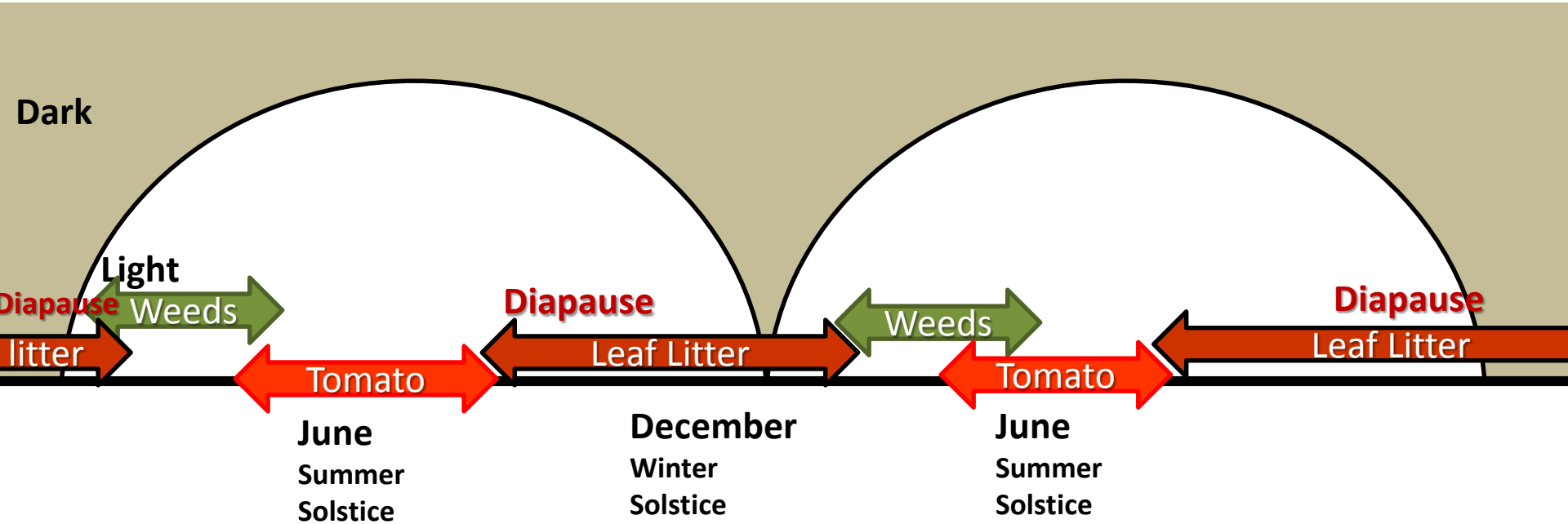
- Mustard
- Mullein
- Dock

Crop Hosts

- Small grains
- Alfalfa
- Broccoli

Goodell, 2014

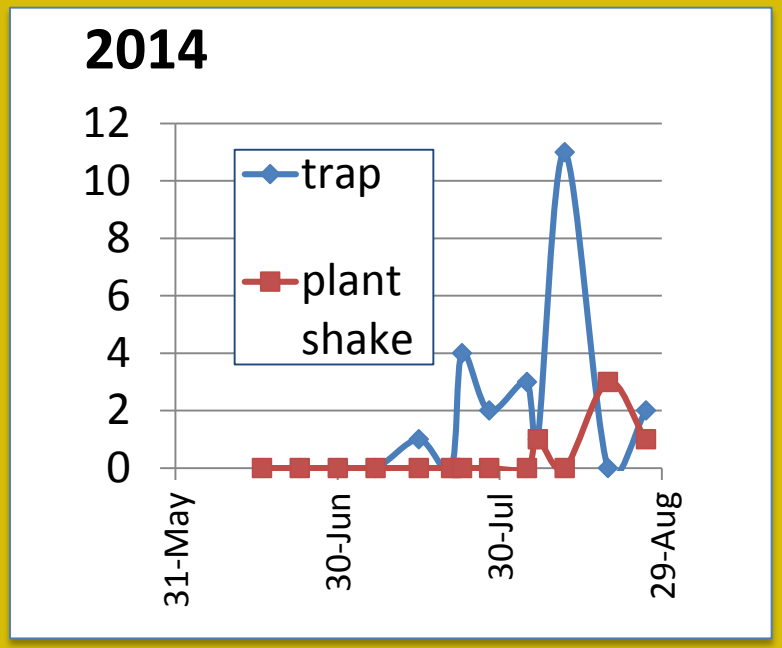
Consperse Stink Bug Schematic Life Cycle

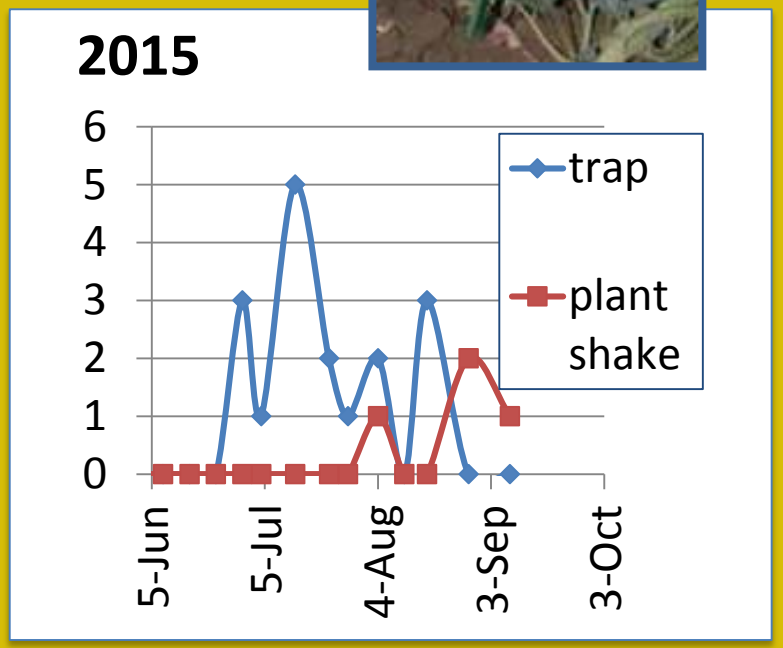


Goodell, 2014

Early Detection in Tomatoes

- Live insect trap Sterling International, Inc. with AlphaScents Consperse stink bug lure
- Plant Shake method with 18 x 12 in (45 x 30 cm) tray





2016: Detection of stinkbugs in tomatoes prior to capture in trap

Developmental Rates of Consperse Stink Bug are Know and Degree Day Models are Available

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 $DD_{>54°}$

Target nymphs with applications

Calculate nymph presence based on:

- detection of adults
- developmental rates
- degree day accumulation

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

Insecticide Trials 2014-17

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, 5/23/2017
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
14 and 25 Aug 2017

Insecticides Evaluated

IRAC #*	Trade name	Common name
1A	Lannate	methomyl
1B	Dibrom 8E	naled
1B	Dimethoate	dimethoate
1B	Thionex	endosulfan
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	Belay	clothianidin
4A + 15	Cormoran	acetamiprid + novaluron
4C	Sequoia	sulfoxaflor
4D	Silvanto	flupyradifurone
7C	Knack	pyriproxyfen
9C	Beleaf	flonicamid
15	Rimon	novaluron
21A	Torac	tolfenpyrad
28	Exirel	chlorantraniliprole

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

Insecticide Trial Evaluations 2014-17

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

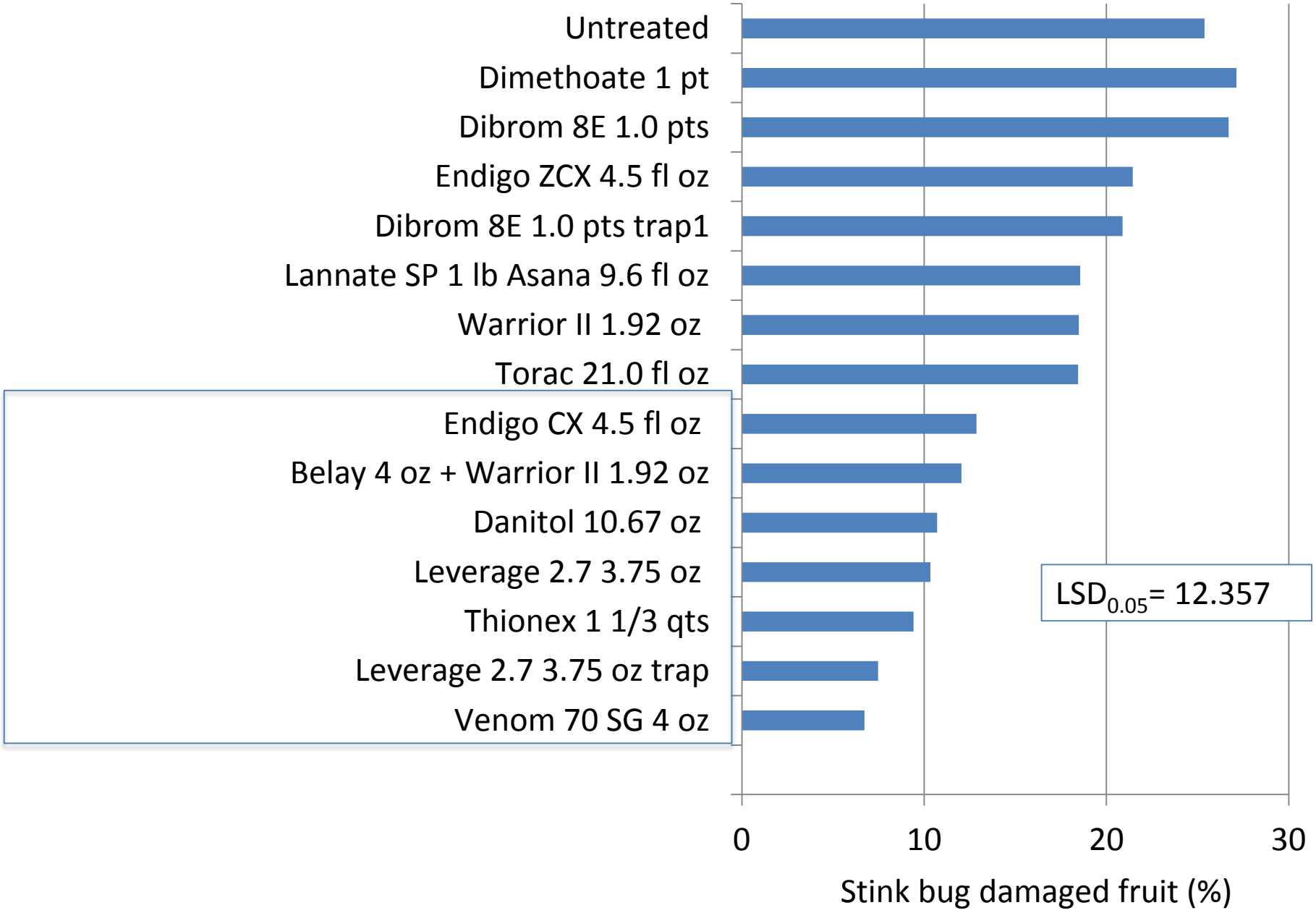
At harvest:

Harvest: 20 ft (6 m) weigh all fruit

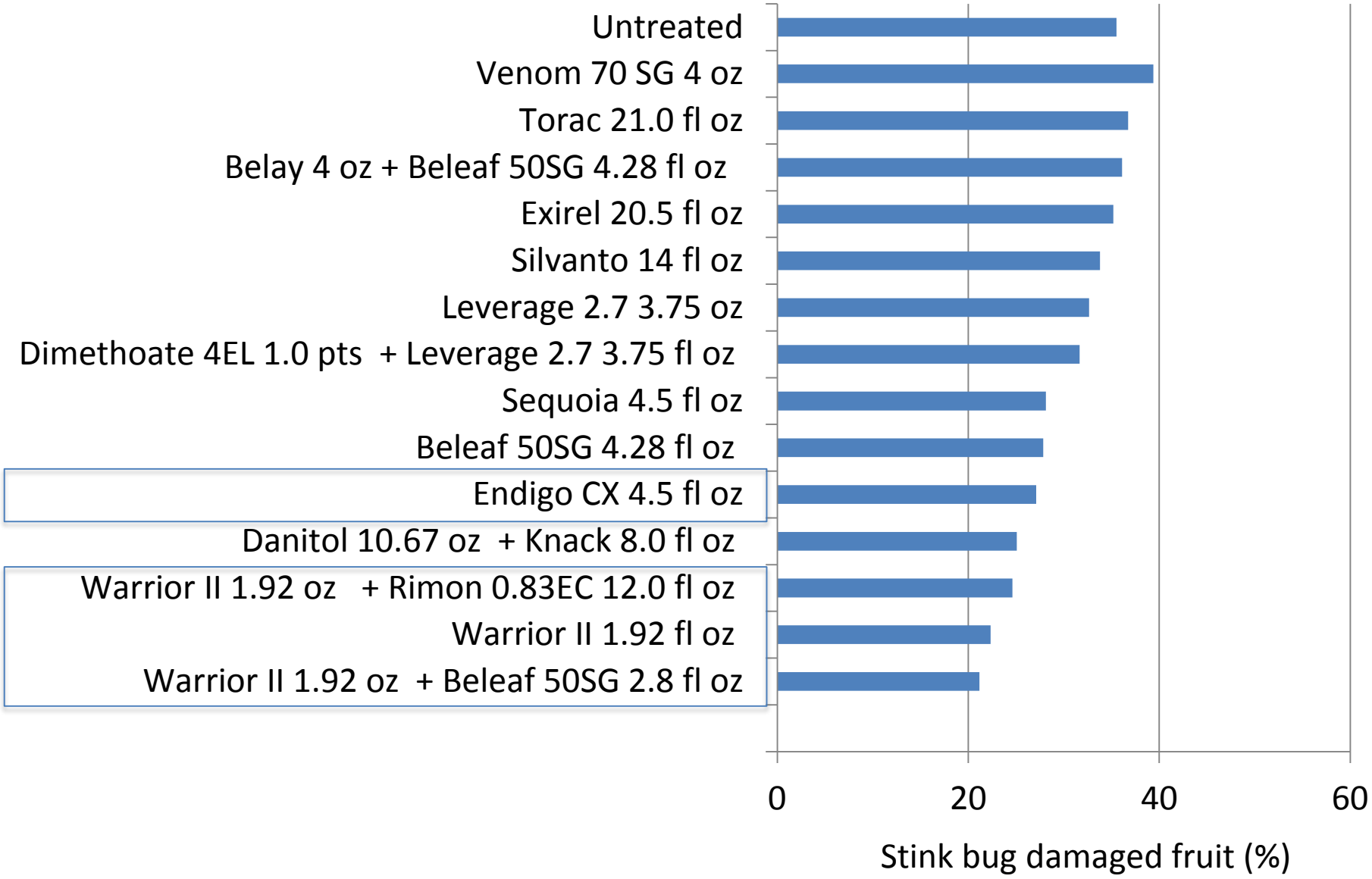
Hand sort of 25 to 35 lbs (13.6 to 18.9 kg) of fruit by quality (red, green, sunburn, rot & stink bug damage)

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

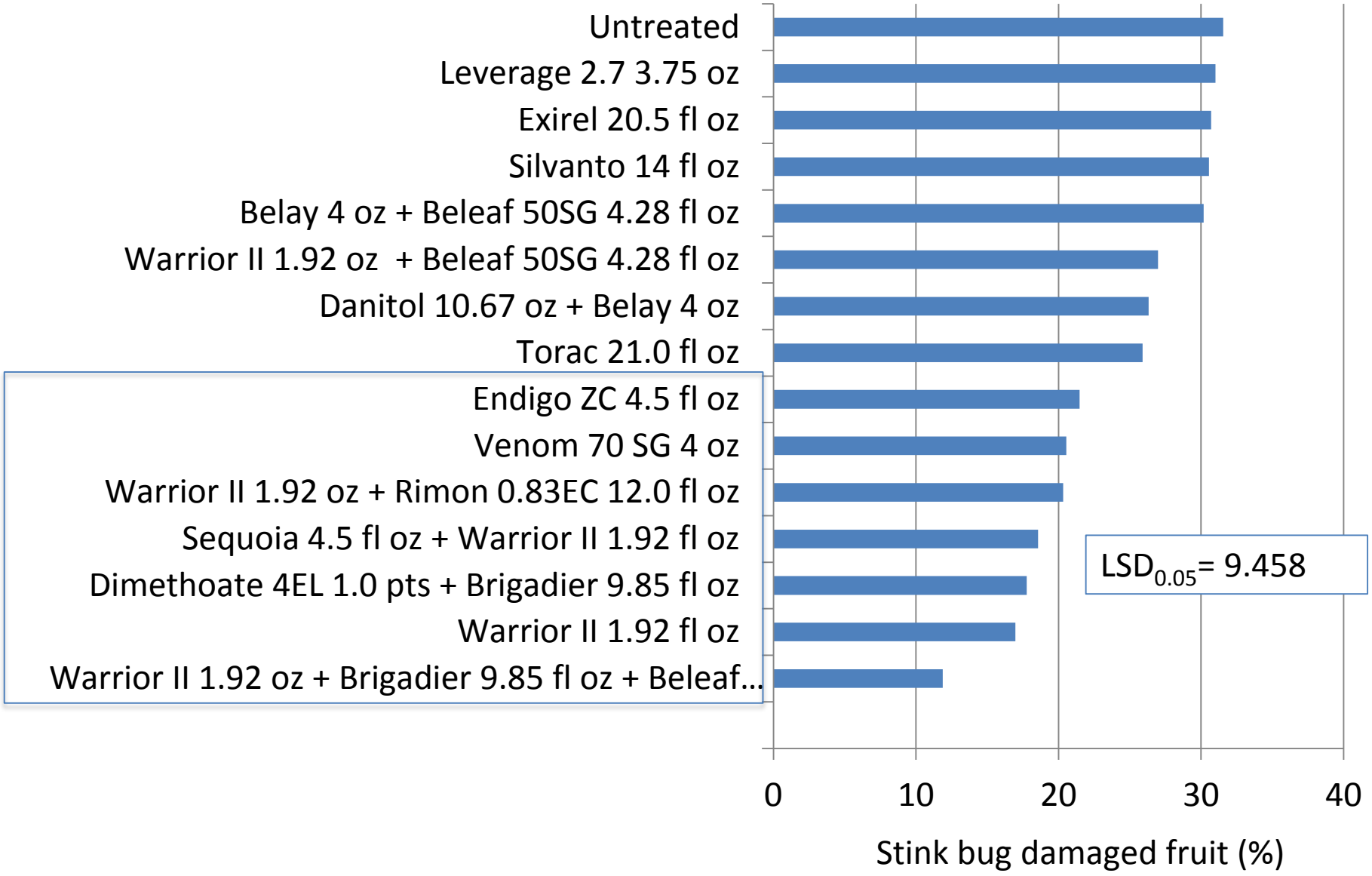
Influence of Insecticide Treatments on Stink Bug Damage, 2014



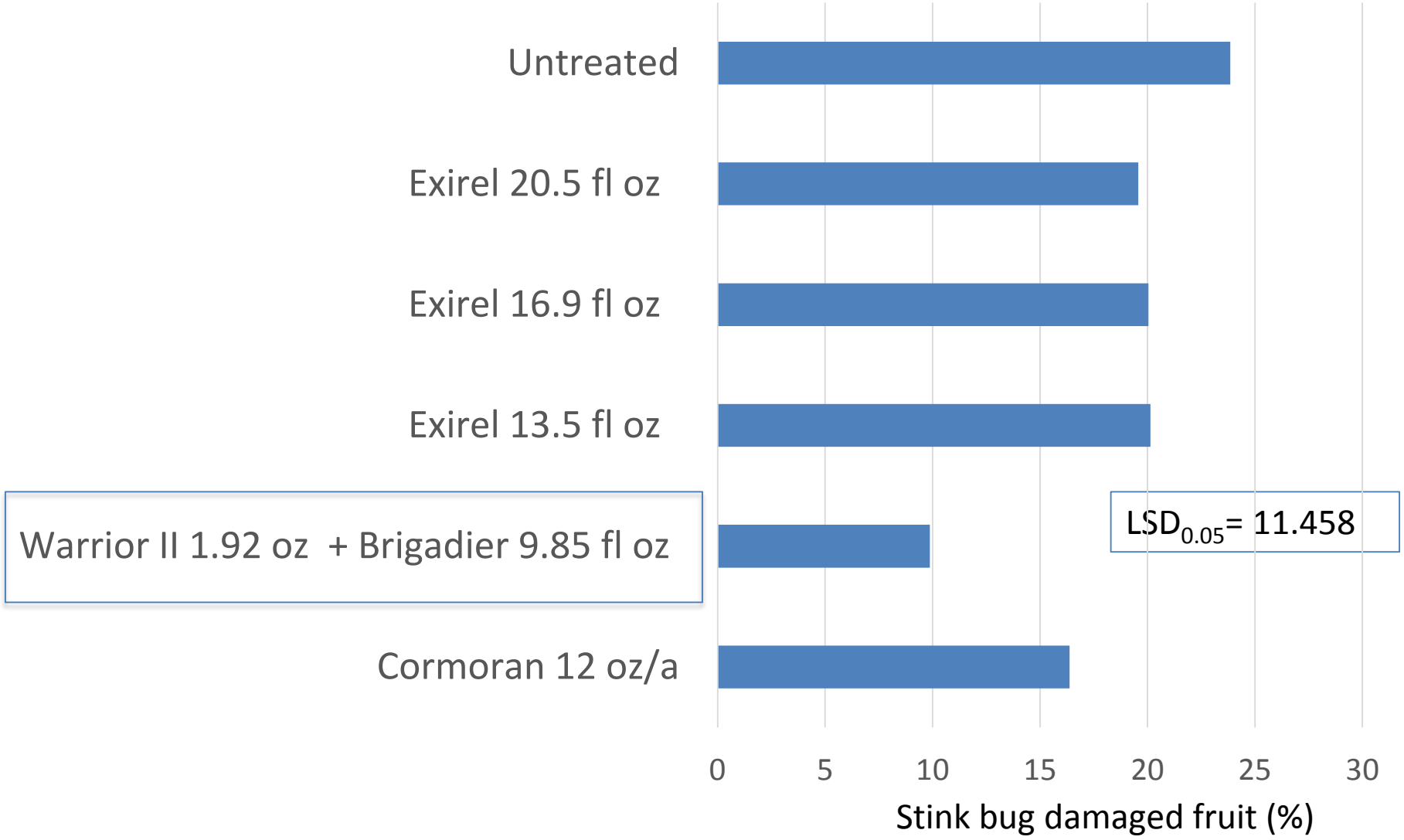
Influence of Insecticide Treatments on Stink Bug Damage, 2015



Influence of Insecticide Treatments on Stink Bug Damage, 2016



Influence of Insecticide Treatments on Stink Bug Damage, 2017



Comparison of Three Sprayers, 2016

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

Bed drench sprayer
200 gpa

Berm blower sprayer:
40 gallons per acre

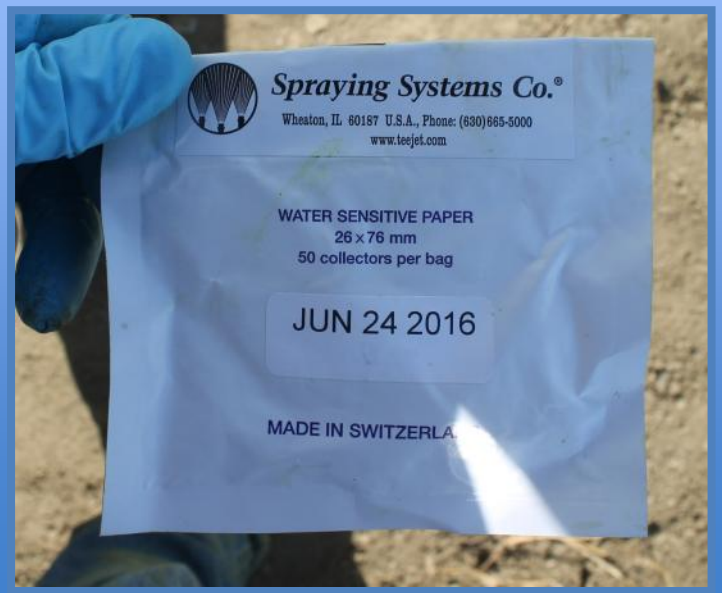
Untreated Control

Application:
Date: 31 Aug
Tank Mix: Warrior II 1.92 fl oz + Brigadier 9.85 fl oz + Beleaf 50SG 4.28 oz

CONDITIONS AT EXPERIMENTAL SITE
Location: West Side Research and Extension Center
Plot size : three 60 inch bed x 130 ft
Experimental design : Five Replication Randomized Complete Block
Plant Date: 24 May 2016
Variety: H5608

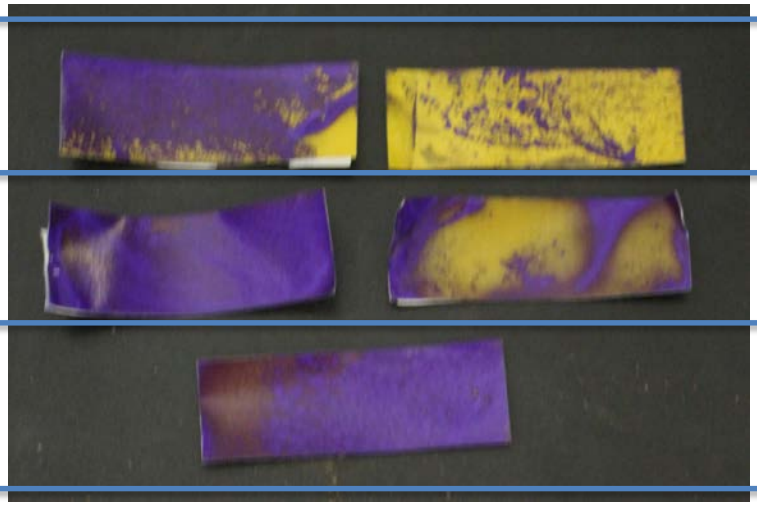
Sprayer Comparison Evaluations 2016

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

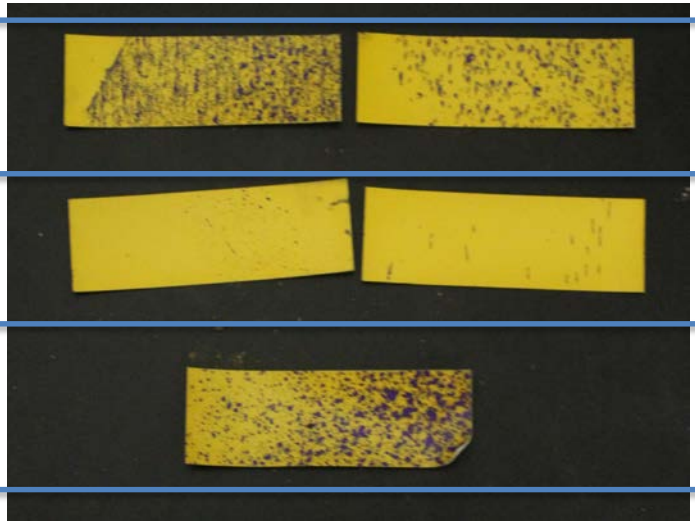
Water Sensitive Cards



10-12”

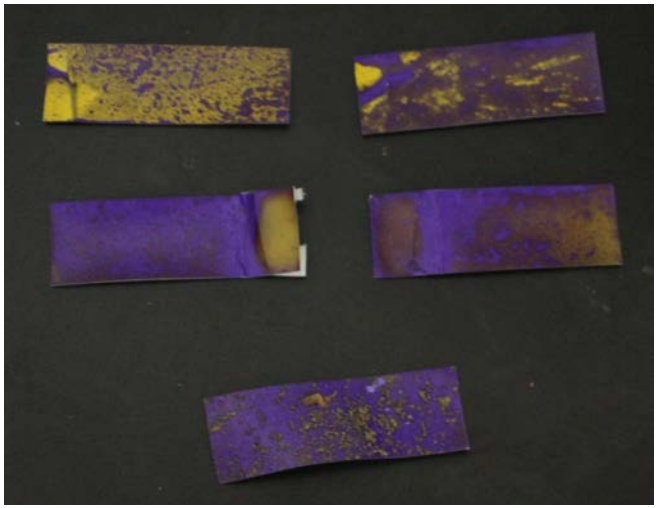
3-4”

Ground, under canopy



Berm Blower Sprayer @ 40 gpa

Conventional sprayer @ 40 gpa



Berm Blower Sprayer @ 200 gpa
not replicated

Coverage Comparison (3 replications)

Treatment	Gross yield (tons/ acre)	Red (%)	Green (%)	Sun burn (%)	Rot (%)	Stink bug (%)
Standard	52.867	38.26	9.95	3.16	17.80	30.86
Berm blower	50.501	51.24	7.73	4.04	15.01	21.97
Untreated	52.029	31.22	8.61	2.68	19.26	38.24
$LSD_{0.05}$	NS	8.07	NS	NS	NS	10.92
CV (%)	12.19	14.84	43.92	59.14	23.53	24.66

Fruit quality is based on hand sort of 25-35 lbs fruit and percentage is calculated based on weight per category.

Management Overview

- Limit presence of overwintering sites in production area
- Reduce weed population densities
- Use a combination of traps and canopy monitoring for early detection
- Treat with pyrethroid + neonicotinoid insecticides
- Maximize canopy and soil coverage

Acknowledgements

- California Tomato Research Institute
- Daniel Delgado
- Joe Nunez
- Fresno Consultants and Growers
- Ron Avila (CPS)
- Jose Mandajano (CPS)
- Pete Goodell
- Frank Zalom
- Les Ehler
- UC WSREC staff

Questions

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