Chemical control evaluations for stink bug: Leafhopper surveys for Beet curly top virus

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

Consperse Stink Bug in Fresno County

Consperse stink bug: ***Euschistus conspersus***

Stink Bug Species Reported in CA

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*

Most Stink Bugs Associated with Fresno Co. Tomatoes from 2013-2015 were Consperse

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

Research Initiated in 2014

- Assess seasonal population development near high population density areas.
- Evaluate pheromone bated traps as potential tools for detection
- Compare insecticides/insecticide programs in processing tomatoes

Pheromone baited traps were deployed in tomatoes and in high risk sites

Consperse Stink bug Phenology Model

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	944 $DD_{>54°}$
Egg Laying*	275 $DD_{>54°}$
Total	1219 $DD_{>54°}$

***Estimated**

Cullen & Zalom, 2000

Monthly $DD_{>54^\circ}$ Accumulation

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

	30 yr	2015	2014	2013	2012
Jan	18.69	45.93	105.74	30.23	63.98
Feb	77.43	159.06	115.93	61.66	83.25
Mar	168.3	309.19	226.56	230.12	144.3
Apr	248.14	301.15	333.14	337.5	259.62
May	427.48	407.29	544.03	462.62	473.45
June	590	702.50	642.8	654.1	584.95
July	803.9	773.40	839.4	824.4	785.4
Aug	767.4	770.40	786.9	732.93	838.4
Sept	595.5	640.01	664.1	560.27	692.56
Oct	352.57	452.16	440.78	309.75	385.24
Nov	112.99	92.85	149.28	154.88	153.93
Dec	14.24	35.79	55.07	48.83	41.12

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

Modified from Goodell, 2014

Insecticide Trials 2014-15

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 and 5/15/2015
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

Insecticide Trial Evaluations 2014-15

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

At harvest:
Harvest: 20 ft weigh all fruit
Hand sort of 30 to 35 lbs of fruit
Lab analysis of 50 red fruit PTAB

Not all pesticides mentioned in this presentation are currently registered in tomatoes.

Carefully read all current labels before writing a pesticide recommendation

Insecticides with Activity against Stink Bug

> 80% control (adults and nymphs)	
Beta cyfluthrin	Baythroid
Permethrin	Ambush, Pounce and others
Lambda-cyhalothrin + thiamethoxam	Warrior II + Actara
Bifenthrin	Brigade, Bifenture, Capture, and others
Dimethoate	Dimethoate
Dinotefuron	Venom
> 60% control (adults and nymphs)	
Beta-cyfluthrin + imidacloprid	Leverage
Lambda-cyhalothrin	Warrior II
Thiamethoxam	Actara
Clothianidin	Belay
Methomyl	Lannate
< 50% control of adults and > 80% control of nymphs	
S-cypermethrin	Hero, Mustang Max

Modified from Zalom

Insecticides Selected for 2014 Trials

IRAC #*	Trade name	Common name
1A	Lannate	methomyl
1B	Dibrom 8E	naled
1B	dimethoate	dimethoate
2B	Thionex	endosulfan
3A	Danitol	fenpopathrin
3A	Warrior II	lambda-cyhalothrin
3A + 4A	Endigo ZCX	lambda-cyhalothrin + thiamethoxam
3A + 4A	Leverage	imidicloprid + cyfluthrin
3A + 28	Voliam Xpress	lambda-cyhalothrin + chlorantraniliprole
4A	Venom	dinotefuran
21A	Torac	tolfenpyrad
28	Coragen	chlorantraniliprole

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

Stink bug efficacy, yield and quality 2014

		Fruit quality (%)				
Treatment	yield (t/a)	reds	greens	sunburn	rot	stink bug
Venom 70 SG 4 oz	39.24	60.83	12.44	10.01	9.99	6.72
Leverage 2.7 3.75 oz trap	40.82	73.46	5.31	4.25	9.52	7.47
Thionex 1 1/3 qts	45.80	74.35	6.54	4.34	5.33	9.41
Leverage 2.7 3.75 oz	40.84	55.88	10.09	9.83	13.86	10.34
Danitol 10.67 oz	37.40	66.04	9.84	4.92	8.49	10.71
Belay 4 oz + Warrior II 1.92 oz	41.80	69.46	5.76	5.36	7.36	12.05
Endigo CX 4.5 fl oz	37.22	59.62	15.77	4.45	7.29	12.87
Torac 21.0 fl oz	41.09	50.05	7.78	13.06	10.66	18.44
Warrior II 1.92 oz	37.00	60.67	8.72	5.73	6.41	18.48
Lannate SP 1 lb Asana 9.6 fl oz	47.52	58.43	14.55	2.46	6.00	18.56
Dibrom 8E 1.0 pts trap1	45.75	46.33	10.55	11.54	10.69	20.89
Endigo ZCX 4.5 fl oz	41.79	57.33	7.84	4.94	8.47	21.44
Dibrom 8E 1.0 pts	37.70	53.13	8.12	2.79	9.26	26.70
Dimethoate 1 pt	40.84	47.82	6.60	11.83	6.62	27.13
Untreated	38.91	52.84	7.02	7.46	7.30	25.38
LSD (P=0.05)^{s}	8.440	15.935	7.305	8.425	6.346	12.357
CV (%)	14.33	18.89	56.04	85.95	52.37	52.64

Unless otherwise specified all applications were made on 8 and 29 Aug. Treatments followed by 'trap' were applied on 18 Jul after 1st capture. Asana was applied on 15 Aug in addition to the Lannate applications on 8 and 29 Aug, H5608 planted 21 May and harvested 15-17 Sep

Stink bug efficacy, yield and quality 2014

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Dibrom 8E 1.0 pts	37.70	53.13	8.12	2.79	9.26	26.70
Dimethoate 1 pt	40.84	47.82	6.60	11.83	6.62	27.13
Untreated	38.91	52.84	7.02	7.46	7.30	25.38
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Danitol 10.67 oz	37.40	66.04	9.84	4.92	8.49	10.71
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Dimethoate 1 pt	40.84	47.82	6.60	11.83	6.62	27.13
Untreated	38.91	52.84	7.02	7.46	7.30	25.38
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Leverage 2.7 3.75 oz	40.84	55.88	10.09	9.83	13.86	10.34
Danitol 10.67 oz	37.40	66.04	9.84	4.92	8.49	10.71
Belay 4 oz + Warrior II 1.92 oz	41.80	69.46	5.76	5.36	7.36	12.05
Endigo CX 4.5 fl oz	37.22	59.62	15.77	4.45	7.29	12.87
Torac 21.0 fl oz	41.09	50.05	7.78	13.06	10.66	18.44
Warrior II 1.92 oz	37.00	60.67	8.72	5.73	6.41	18.48
Lannate SP 1 lb Asana 9.6 fl oz	47.52	58.43	14.55	2.46	6.00	18.56
Dibrom 8E 1.0 pts trap1	45.75	46.33	10.55	11.54	10.69	20.89
Endigo ZCX 4.5 fl oz	41.79	57.33	7.84	4.94	8.47	21.44
Dibrom 8E 1.0 pts	37.70	53.13	8.12	2.79	9.26	26.70
Dimethoate 1 pt	40.84	47.82	6.60	11.83	6.62	27.13
Untreated	38.91	52.84	7.02	7.46	7.30	25.38
LSD (P=0.05)^{s}	8.440	15.935	7.305	8.425	6.346	12.357
CV (%)	14.33	18.89	56.04	85.95	52.37	52.64

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Stink bug efficacy, field evaluations, 2014

	Stink bug counts (per 4 ft)			Stink bug damage (0-10)		
Treatment	21-Aug	28-Aug	5-Sep	21-Aug	28-Aug	5-Sep
Venom 70 SG 4 oz	0.0	2.0	0.8	1.0	3.3	2.0
Leverage 2.7 3.75 oz trap	0.0	0.0	1.0	1.0	0.5	1.0
Thionex 1 1/3 qts	1.3	0.3	0.5	0.8	1.0	1.0
Leverage 2.7 3.75 oz	0.8	3.8	0.8	1.3	2.0	1.0
Danitol 10.67 oz	0.4	3.2	1.6	0.6	4.0	1.0
Belay 4 oz + Warrior II 1.92 oz[v]	1.5	0.5	1.3	1.5	1.5	1.0
Endigo CX 4.5 fl oz	0.5	3.0	3.3	1.0	2.0	2.0
Torac 21.0 fl oz	1.0	1.3	1.8	2.3	2.3	2.3
Warrior II 1.92 oz	0.8	1.3	1.0	1.5	1.5	1.0
Lannate SP 1 lb/Asana 9.6 fl oz	0.5	1.0	2.3	1.3	1.0	2.0
Dibrom 8E 1.0 pts trap	0.3	2.3	2.5	1.5	4.0	2.3
Endigo ZCX 4.5 fl oz	1.3	1.3	0.3	2.8	1.8	0.7
Dibrom 8E 1.0 pts	0.0	0.5	4.3	1.5	1.8	1.7
Dimethoate 1 pt	1.0	3.3	3.0	2.8	3.5	3.7
Untreated	1.3	0.5	4.0	4.5	2.8	3.3
LSD (P=0.05)[t]	NS[s]	3.05	3.23	1.93	2.24	1.39
CV (%)	149.46	133.74	120.69	80.74	71.74	55.45

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H5608 planted 21 May and harvested 15-17 Sep

Materials Tested, 2015

Trade name of material tested (common name-IRAC mode of action number)
Dimethoate 4EL 1.0 pts (dimethoate – 1B) + Leverage 2.7 3.75 fl oz (cyfluthrin + imidicloprid – 3A + 4A)
Warrior II 1.92 fl oz (Lambda cyhalothrin – 3A)
Endigo CX 4.5 fl oz (lambda-cyhalothrin + thiamethoxam – 3A + 4A)
Leverage 2.7 3.75 oz (cyfluthrin + imidicloprid – 3A + 4A)
Warrior II 1.92 oz (lambda-cyhalothrin – 3A) + Beleaf 50SG 2.8 fl oz (flonicamid – 9C)
Danitol 10.67 oz (fenpropathrin -3A) + Knack 8.0 fl oz (pyriproxyfen – 7C)
Warrior II 1.92 oz (lambda-cyhalothrin – 3A) + Rimon 0.83EC 12.0 fl oz (novaluron - 15)
Belay 4 oz (clothanidin – 4A) + Beleaf 50SG 4.28 fl oz (flonicamid – 9C)
Venom 70 SG 4 oz (dinotefuran – 4A)
Sequoia 4.5 fl oz (sulfoxaflor – 4C)
Silvanto 14 fl oz (flupyradifurone – 4D)
Beleaf 50SG 4.28 fl oz (flonicamid – 9C)
Torac 21.0 fl oz (tolfenpyrad – 21A)
Exirel 20.5 fl oz (cyantranilaprole – 28)
Untreated

Influence of Insecticide Treatments on Yield and Quality, 2015

		Fruit quality (%)[z]				
Treatment[x]	yield (t/a)[w]	reds	greens	Sun burn	rot	stink bug
Warrior II 1.92 oz + Beleaf 50SG 2.8 fl oz	56.51	67.41	8.43	2.01	2.95	21.16
Warrior II 1.92 fl oz	51.11	64.59	6.23	3.41	3.45	22.33
Warrior II 1.92 oz + Rimon 0.83EC 12.0 fl oz	60.75	69.71	6.86	0.62	2.14	24.62
Danitol 10.67 oz + Knack 8.0 fl oz	54.01	66.15	5.67	1.85	1.25	25.08
Endigo CX 4.5 fl oz	53.91	60.57	6.94	1.54	3.85	27.10
Beleaf 50SG 4.28 fl oz	53.37	61.48	7.93	1.85	0.88	27.86
Sequoia 4.5 fl oz	59.68	61.94	5.00	1.53	3.40	28.13
Dimethoate 4EL 1.0 pts + Leverage 2.7 3.75 fl oz	53.80	62.96	5.69	1.67	1.82	31.65
Leverage 2.7 3.75 oz	53.22	57.88	4.83	2.33	2.31	32.64
Silvanto 14 fl oz	48.80	53.47	3.86	2.93	5.96	33.78
Exirel 20.5 fl oz	60.67	51.58	7.37	3.19	2.66	35.20
Belay 4 oz + Beleaf 50SG 4.28 fl oz	54.24	50.59	7.17	2.65	3.48	36.11
Torac 21.0 fl oz	54.42	55.85	5.51	2.40	1.34	36.74
Venom 70 SG 4 oz	53.62	49.44	6.10	2.10	2.99	39.38
Untreated	53.62	49.87	6.32	2.70	5.59	35.52
LSD (P=0.05)[u]	9.967	15.935	3.265	1.950	3.412	19.197
CV (%)	12.61	18.89	36.55	62.50	87.01	44.13

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Silvanto 14 fl oz	48.80	53.47	3.86	2.93	5.96	33.78
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Untreated	53.62	49.87	6.32	2.70	5.59	35.52
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CV (%)	12.61	18.89	36.55	62.50	87.01	44.13

Paired comparisons lambda cyhalothrin containing treatments vs. those without: P=0.025

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Torac 21.0 fl oz	54.42	55.85	5.51	2.40	1.34	36.74
Venom 70 SG 4 oz	53.62	49.44	6.10	2.10	2.99	39.38
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CV (%)	12.61	18.89	36.55	62.50	87.01	44.13

Insecticide efficacy against stink bug , yield and quality, 2015

Treatment	yield (t/a)	stink bug dmgd fruit (%)
Warrior II 1.92 fl oz	58.73	20.87
Warrior II 1.92 oz + Beleaf 50SG 2.8 fl oz	63.62	23.19
Warrior II 1.92 oz + Rimon 0.83EC 12.0 fl oz	64.40	27.04
Endigo CX 4.5 fl oz	61.31	27.92
Danitol 10.67 oz + Knack 8.0 fl oz	59.22	28.38
Beleaf 50SG 4.28 fl oz	59.86	28.63
Sequoia 4.5 fl oz	66.51	32.86
Leverage 2.7 3.75 oz	58.72	33.59
Exirel 20.5 fl oz	70.10	33.61
Dimethoate 4EL 1.0 pts + Leverage 2.7 3.75 fl oz	56.64	37.42
Torac 21.0 fl oz	58.91	37.53
Belay 4 oz + Beleaf 50SG 4.28 fl oz	62.62	39.94
Silvanto 14 fl oz	55.54	42.79
Venom 70 SG 4 oz	60.39	42.98
LSD (P=0.05)[s]	6.154	20.81
CV (%)	12.81	43.93

All applications were made on 18, 28 Jul, 18 Aug. H5608 planted 15 May and harvested 17-21 Sep. ANCOVA adjusted means

In-Season Stink Bug Densities and Damage Assessment, 2015

	Stink bug counts (per 4 ft)[z]			Stink bug damage (0-10)[y]		
Treatment[x]	14 Aug	28-Aug	11-Sep	14 Aug	28-Aug	11-Sep
Warrior II 1.92 oz + Beleaf 50SG 2.8 fl oz	0.0	1.0	5.3	0.3	0.8	3.5
Warrior II 1.92 fl oz	0.5	0.8	1.0	1.0	1.5	1.8
Warrior II 1.92 oz + Rimon 0.83EC 12.0 fl oz	0.0	1.0	3.3	0.8	2.0	3.3
Danitol 10.67 oz + Knack 8.0 fl oz	0.5	1.0	4.0	0.5	1.0	4.3
Endigo CX 4.5 fl oz	0.0	0.3	2.5	0.0	0.3	2.5
Beleaf 50SG 4.28 fl oz	0.0	2.3	4.8	0.0	1.3	3.3
Sequoia 4.5 fl oz	0.0	0.0	6.0	0.0	0.3	5.5
Dimethoate 4EL 1.0 pts + Leverage 2.7 3.75 fl oz	0.8	0.0	4.5	0.8	0.3	3.8
Leverage 2.7 3.75 oz	0.0	1.5	0.8	0.3	2.0	1.5
Silvanto 14 fl oz	2.5	1.8	2.0	0.8	2.0	2.0
Exirel 20.5 fl oz	0.0	0.0	2.3	0.0	0.5	2.3
Untreated	1.8	1.3	1.3	1.0	1.3	2.0
Belay 4 oz + Beleaf 50SG 4.28 fl oz	0.0	0.5	10.8	0.3	0.5	5.8
Torac 21.0 fl oz	0.5	2.0	4.5	0.5	1.3	4.3
Venom 70 SG 4 oz	0.5	0.5	5.8	1.0	0.8	4.8
LSD (P=0.05)[t]	NS[s]	NS	NS	NS	NS	3.38
CV (%)	216.05	98.36	129.74	98.36	73.27	91.33

Z The experimental area was transplanted on 15 May with cv. H5608 processing tomato plants at UC West Side Research and Extension Center. Foliar applications were made with a backpack sprayer at 50 gpa. All applications were made on 18, 28 Jul, and 18 Aug.

w Yields per acre were calculated based on a hand harvest of 20 row feet from 17-21 Sep.

Summary

- Stink bugs can be at very high levels prior to detection in tomato canopy – pheromone baited traps aid in early detection
- Lambda cyhalothrin-containing treatments (such as Warrrior II) and provided reduction of damage both seasons tested.
- Venom and Leverage provided a reduction in damage in 2014, but not in 2015.

Beet curly top virus

Beet curly top virus: Central SJV

- 2013 – Regionally severe BCTV, up to 80%
- 2014 – Low levels of BCTV 0-5%.
- 2015 – Variable levels of BCTV, 0 – 45%

Beet leafhopper

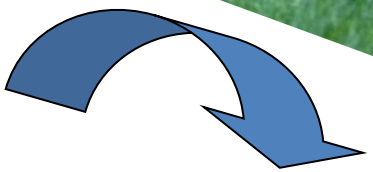
Circulifer tenellus

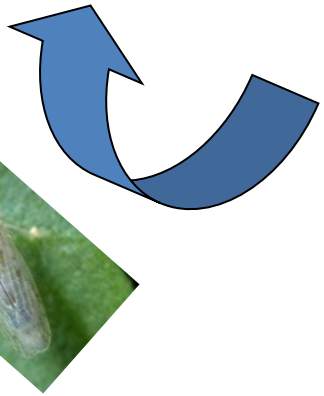
- The only vector of the curly top viruses.
- Four to 5 generations in California
- Strong flier
- Favored by warm dry conditions
- Introduced from the Middle East ~100 years ago.
- Tomatoes and melons are not preferred hosts

Photo by Lori Dunning

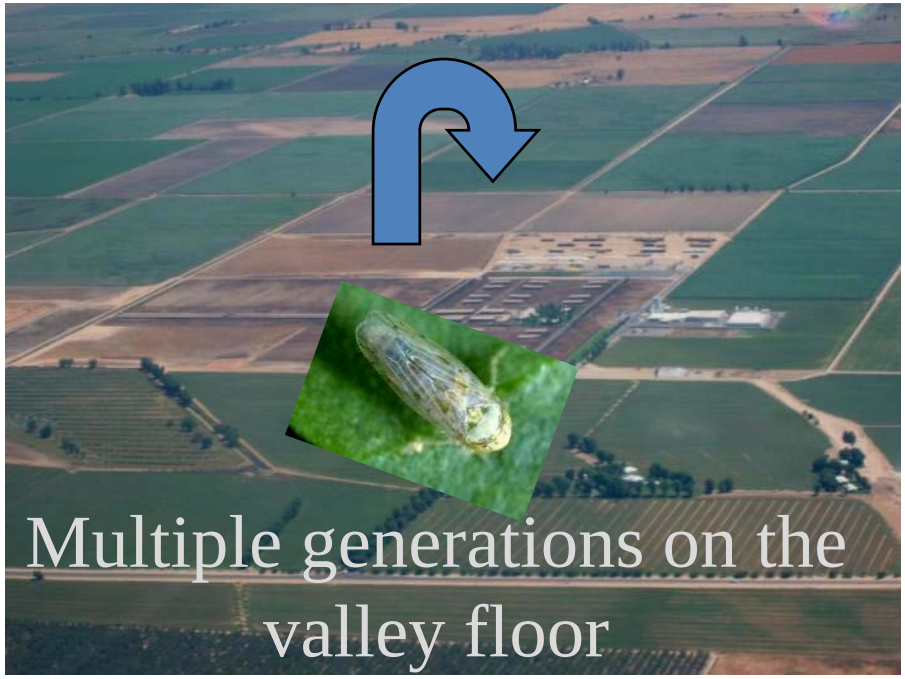
Curly Top Disease Cycle

Spring: adult leafhoppers migration





Fall: adult leafhoppers migrate for overwintering in the foothills



Modified from Gilbertson Presentation Dec 2015.

Host Range: > 300 species

- Crops: beets, beans, tomatoes, peppers, cucumbers, squash, muskmelon, watermelon, spinach.
- Weeds: filaree, perennial pepperweed, Buckhorn plantain, Russian thistle and mustard species

Bassia spp.

Russian thistle

Goosefoot

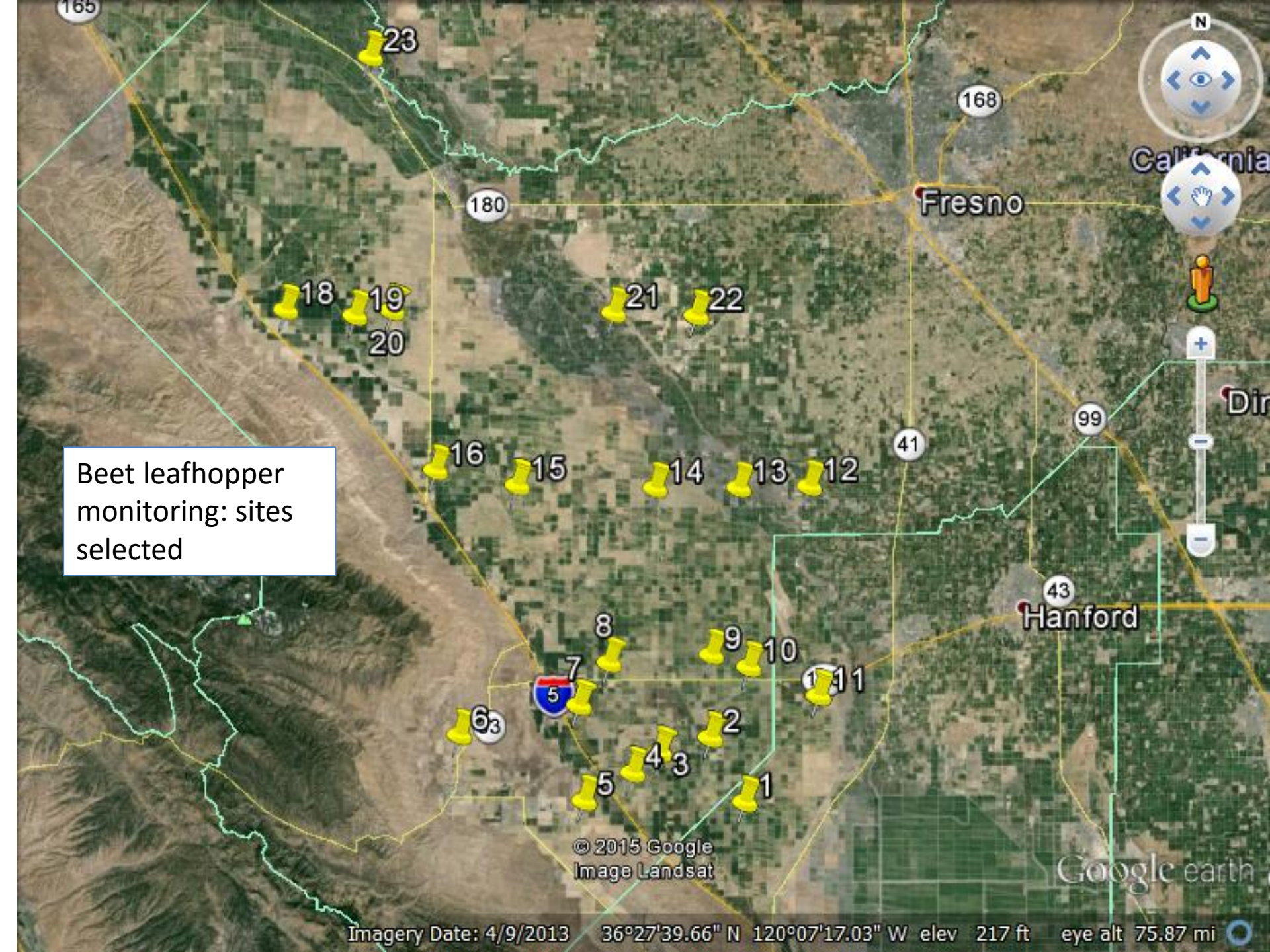
Filaree

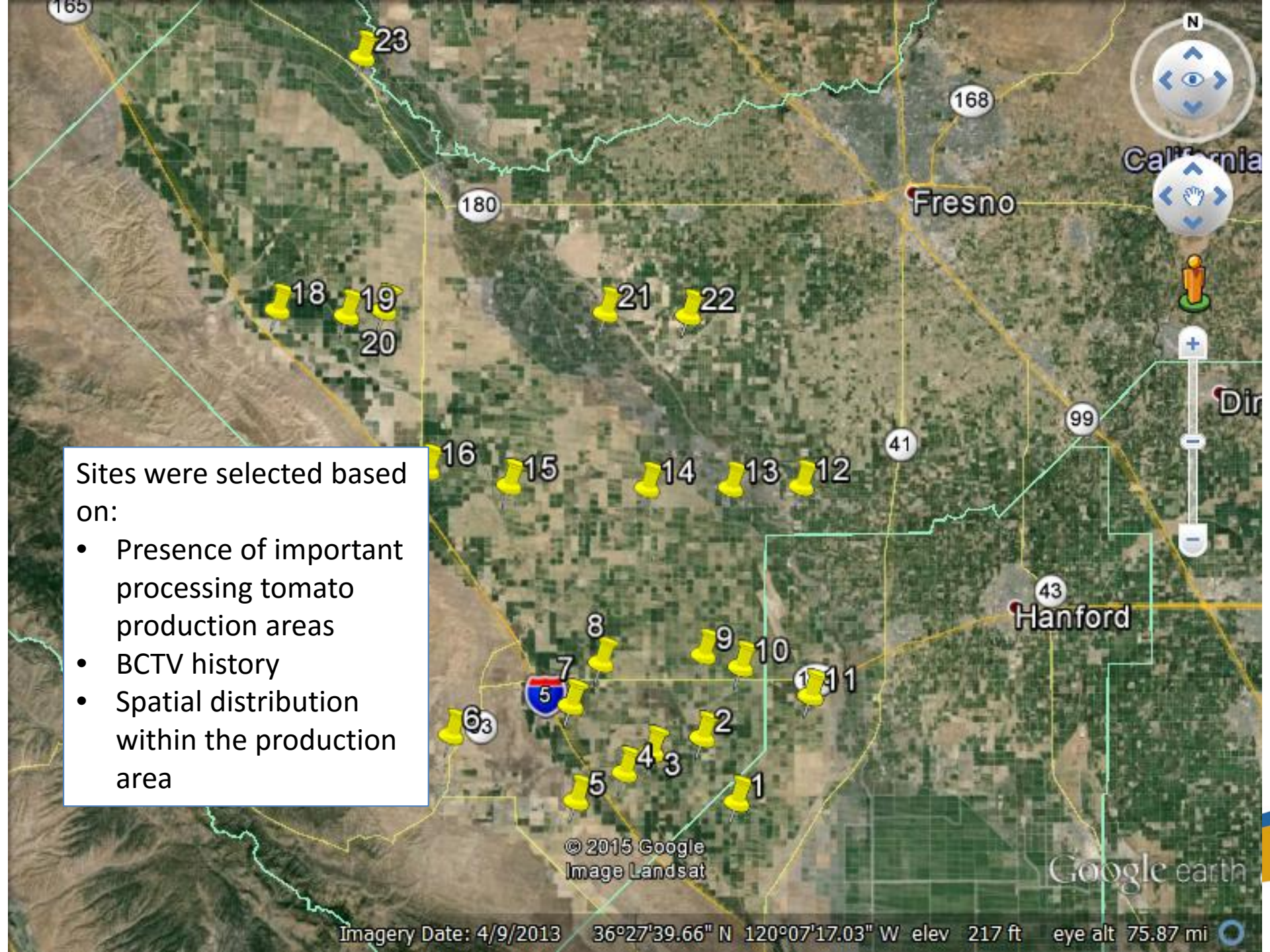
Peppergrass

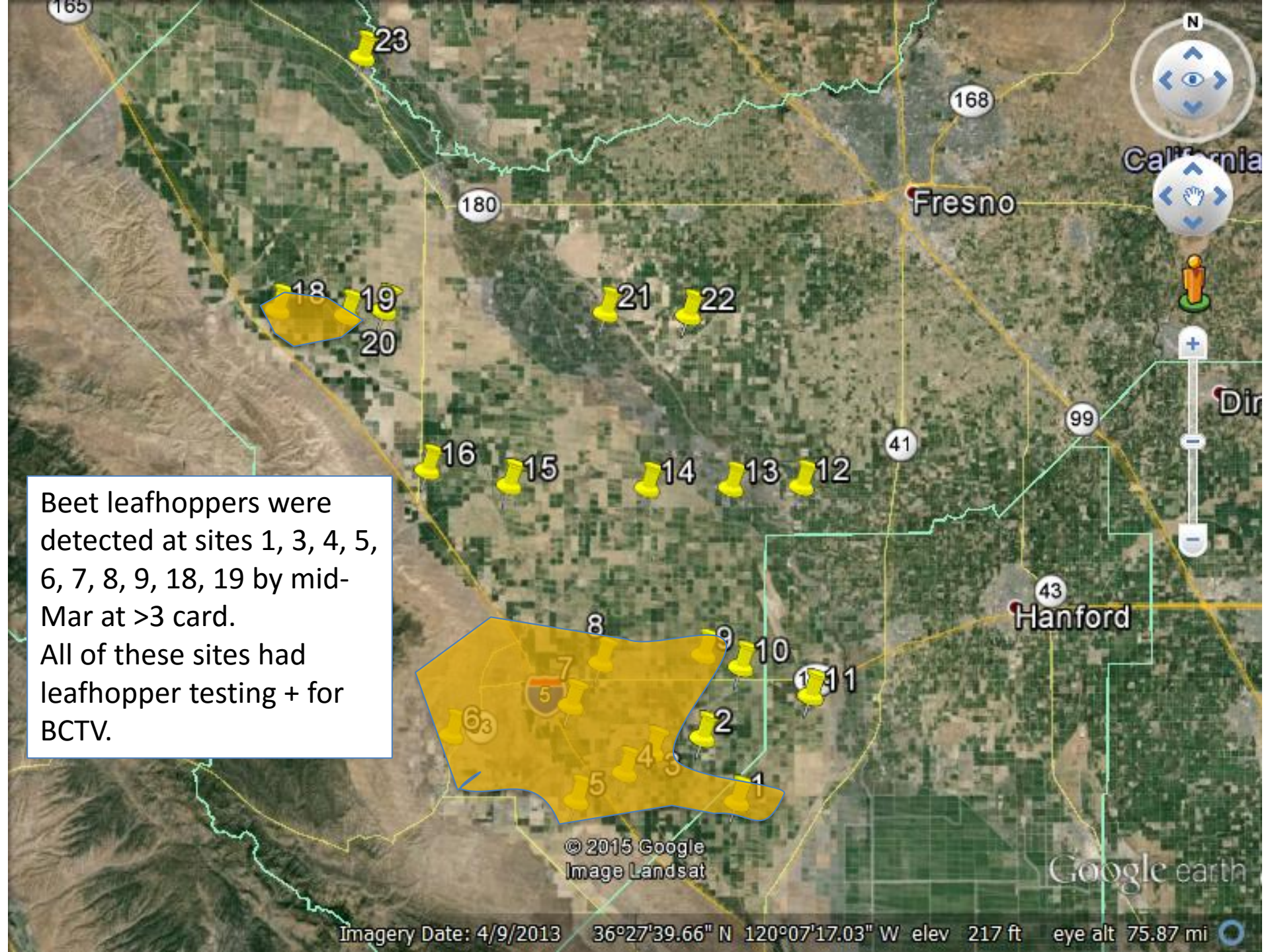
Buckhorn plantain

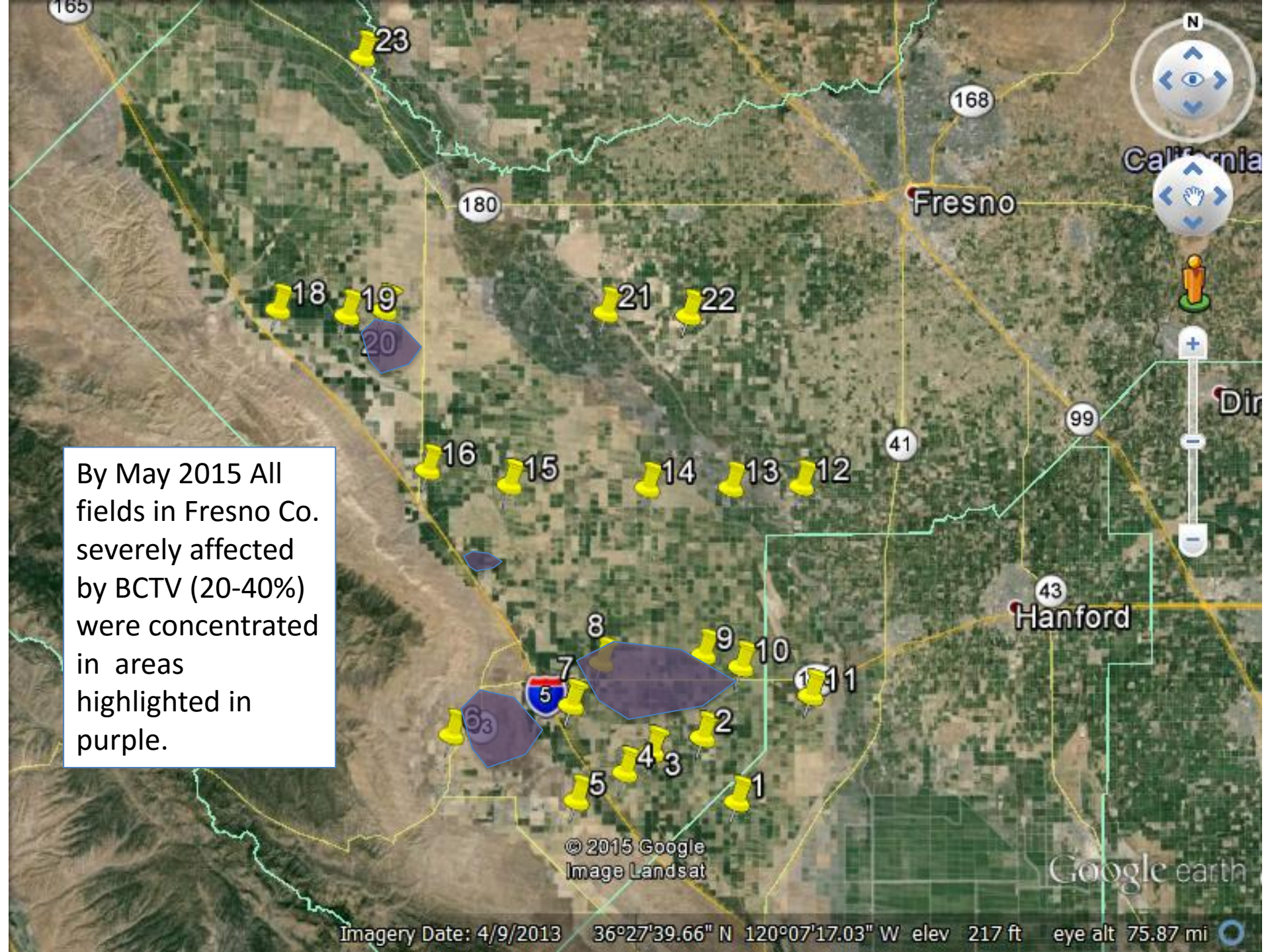
Research Objectives

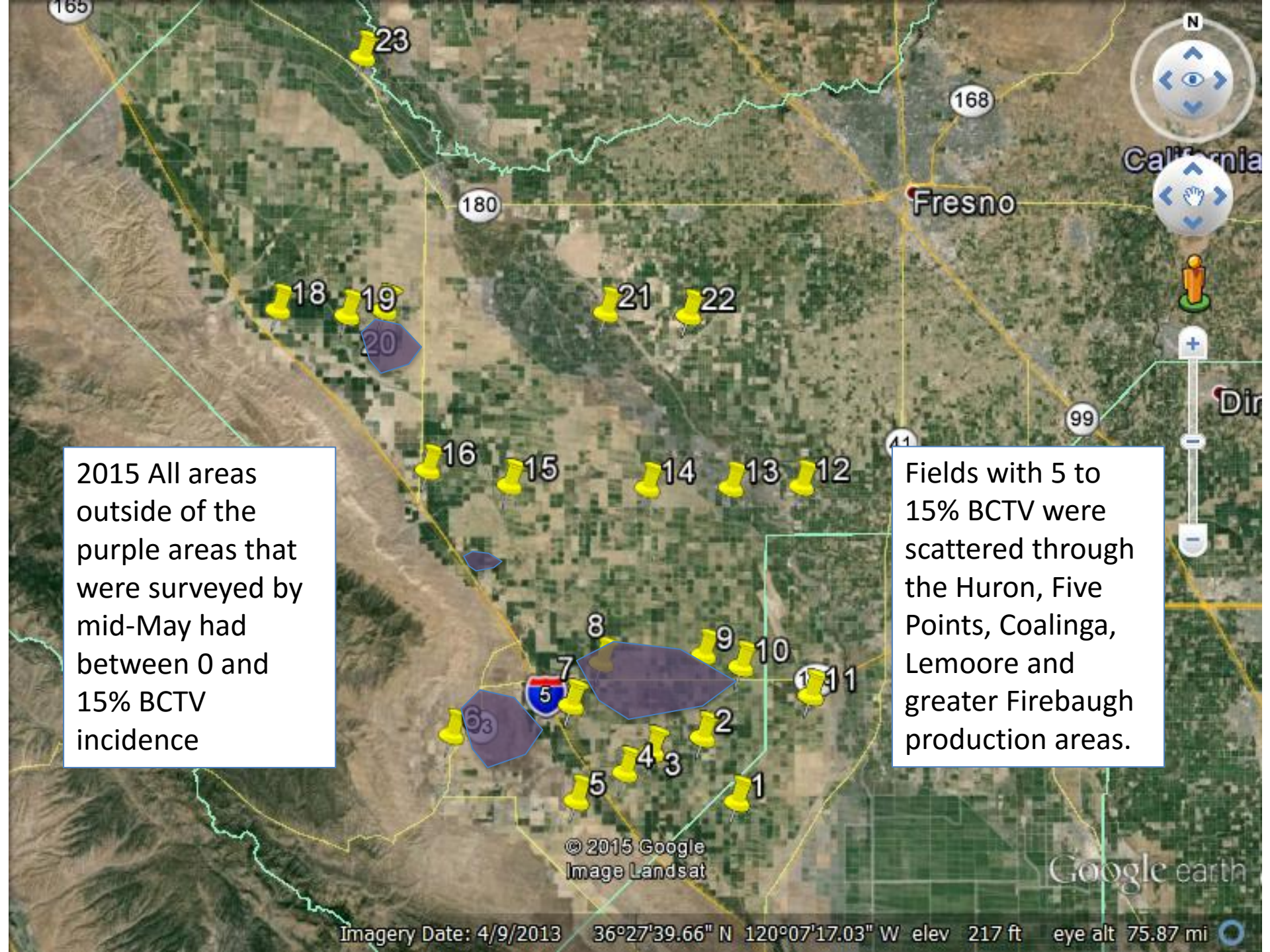
- Survey leafhopper and BCTV levels in and around the production
- Evaluate percentages of leafhopper carrying the virus
- Virus genetic evaluations
- Search for BCTV resistance in tomato
- Development of improved IPM strategy for BCTV


Beet leafhopper monitoring: sites selected
Fresno
Hanford
168
180
99
41
43
5
23
18
19
20
21
22
16
15
14
13
12
8
9
10
11
7
6
3
2
4
5
1
© 2015 Google
Image Landsat
Google earth
Imagery Date: 4/9/2013 36°27'39.66" N 120°07'17.03" W elev 217 ft eye alt 75.87 mi


Sites were selected based on:
• Presence of important processing tomato production areas
• BCTV history
• Spatial distribution within the production area
Fresno
Hanford
168
180
99
41
43
5
© 2015 Google
Image Landsat
Google earth
Imagery Date: 4/9/2013 36°27'39.66" N 120°07'17.03" W elev 217 ft eye alt 75.87 mi


Beet leafhoppers were detected at sites 1, 3, 4, 5, 6, 7, 8, 9, 18, 19 by mid-Mar at >3 card.
All of these sites had leafhopper testing + for BCTV.
Fresno
Hanford
168
180
99
41
43
© 2015 Google
Image Landsat
Google earth
Imagery Date: 4/9/2013 36°27'39.66" N 120°07'17.03" W elev 217 ft eye alt 75.87 mi


By May 2015 All fields in Fresno Co. severely affected by BCTV (20-40%) were concentrated in areas highlighted in purple.
Fresno
Hanford
23
18
19
20
21
22
16
15
14
13
12
8
9
10
11
7
6
3
2
4
5
1
© 2015 Google
Image Landsat
Google earth
Imagery Date: 4/9/2013 36°27'39.66" N 120°07'17.03" W elev 217 ft eye alt 75.87 mi


2015 All areas outside of the purple areas that were surveyed by mid-May had between 0 and 15% BCTV incidence
Fields with 5 to 15% BCTV were scattered through the Huron, Five Points, Coalinga, Lemoore and greater Firebaugh production areas.
Fresno
23
18
19
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22
16
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14
13
12
8
9
10
11
7
6
3
2
4
5
1
© 2015 Google
Image Landsat
Google earth
Imagery Date: 4/9/2013 36°27'39.66" N 120°07'17.03" W elev 217 ft eye alt 75.87 mi

Observations regarding fields with high BCTV incidence:

- Most were March planted fields.
- Most were treated with neonicotinoid insecticides.
- Variety contribution to incidence/expression?
- Distribution within fields were variable.

Late Season BCTV Spread

By mid-June 2015, several tomato fields Firebaugh had field averages of 13 to 34% BCTV symptomatic plants.

Insecticide Treatment of Crop

- Use with other management tactics
- Under conditions of very high pressure, may not provide commercially acceptable levels of control
- The objective is to reduce the number of times that a leafhopper transmits the virus

Insecticide Program Comparison, 2015

- University of California West Side Research and Extension Center – Five Points
- Sun 6366 processing tomato plants were transplanted on 22 May
- 6 treatments were compared in 4 rep RCB design
- Total plants per plot recorded on 17 Jun, BCTV symptomatic plants were recorded 22 Jun and at 14 day intervals

Influence of Insecticide Applications on BCTV incidence, Five Points, 2015

Untreated Control
Verimark 13.5 oz/A tray drench (5/21/15)
Admire Pro 4 oz/A transplant water (5/22/15) Silvanto 2 fl oz directed foliar (5/22/15) Admire Pro 6.5 Drip (6/22/15)
Admire Pro 10.5 oz/A transplant water (5/22/15)
Silvanto 2 fl oz directed foliar Admire Pro 6.5 Drip (6/22/15)
Admire Pro 6.5 Drip (6/22/15)

Influence of Insecticide Applications on BCTV incidence, Five Points, 2015

	BCTV (%)				
	22 Jun	1 Jul	14 Jul	28-Jul	12-Aug
Verimark 13.5 oz/A tray drench (5/21/15)	2.8	3.7	5.7	4.3	4.8
Admire Pro 6.5 Drip (6/22/15)	10.4	11.8	9.7	8.6	6.7
Admire Pro 10.5 oz/A transplant water (5/22/15)	5.3	6.8	8.0	8.4	6.9
Admire Pro 4 oz/A transplant water (5/22/15) Silvanto 2 fl oz directed foliar (5/22/15) Admire Pro 6.5 Drip (6/22/15)	7.8	8.1	10.3	7.5	8.1
Silvanto 2 fl oz directed foliar Admire Pro 6.5 Drip (6/22/15)	11.7	12.8	11.5	9.9	9.6
Untreated Control	9.9	12.1	13.9	11.5	12.3
$LSD_{0.05}$	4.29	3.18	3.87	4.66	3.58
CV (%)	35.95	22.88	26.06	36.95	29.5

At UC West Side Research and Extension Center, 6366 transplants were planted on 22 May

7 July 2015 WSREC

Admire Pro 6.5 oz/A drip applied 22 Jun

Verimark 13.5 oz/A transplant drench

Admire Pro 10 oz/A tranplant water

Untreated

Influence of Insecticide Applications on yield and quality, Five Points, 2015

	Yield	% based on hand sort				PTAB		
	(t/a)	Red	Grn	Sun	Rot	Col	Sld	pH
Verimark 13.5 oz/A tray drench (5/21/15)	45.6	80.2	7.8	0.2	11.8	28.0	4.725	4.530
Admire Pro 6.5 Drip (6/22/15)	40.0	77.3	11.1	2.1	9.5	28.3	4.850	4.480
Admire Pro 10.5 oz/A transplant water (5/22/15)	42.1	77.6	12.8	1.4	8.2	27.5	4.675	4.545
Untreated Control	36.2	79.4	9.8	0.8	9.9	28.3	4.925	4.510
$LSD_{0.05}$	7.7	NS	NS	NS	NS	NS	NS	NS
CV (%)	11.7	9.8	35.2	93.1	31.5	6.7	5.250	1.700

At UC West Side Research and Extension Center, 6366 transplants were planted on 22 May. Harvested on 11 Sep.

BCTV Observations 2015

- Most tomato fields with high BCTV incidence were at early stages of development in early to mid April.
- >20% incidence was present in fields treated with neonicotinoid insecticides.
- In one study conducted at UC WSREC, insecticide treated plants had significantly lower BCTV incidence than in the control.

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- Ozgur Batuman
- Neil McRoberts
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- California Department of Food and Agriculture
- Growers and Ag consultants in Fresno and Kings Counties

Questions

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