

Thrips Control and Seasonal Population Fluxes in Central SJV

Tom Turini

University of California

Agriculture and Natural Resources

Vegetable Crops Advisor, Fresno

Thrips in onions in SJV

- Population densities typically increase slowly from mid-Feb to mid-Jun.
- *Iris yellow spot virus* is present, but typically at low levels.



Objectives

- Efficacy comparison for thrips control in onions
- Evaluate impact of insecticide programs on yield
- Determine species fluctuations by season and by chemical treatment



Methods

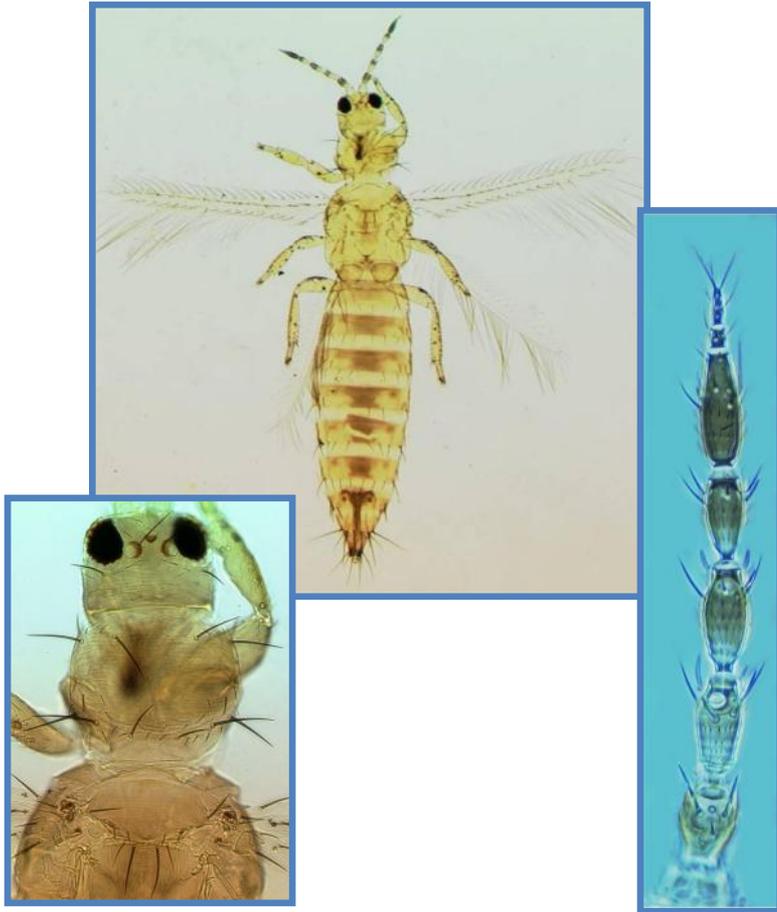
- University of California West Side Research and Extension Center, Fresno Co., CA
- First irrigation: 4 Feb 2011, 12 Jan 2012 and 24 Jan 2013
- Olam late-season processing onion variety
- Sprinkle to furrow irrigation
- Insecticide applications began when 5-10 thrips/plant
- Efficacy applications were applied with CO²-pressurized sprayer at 40 psi, 50 gpa
- Programs treatments were applied with a tractor mounted rig at 30 psi and 30 gpa
- Activator, non-ionic surfactant, 0.25% v/v was included with all treatments
- Data collection: Yield and plant damage evaluations



Thrips Data Collection

- Thrips counts
 - Three plants/plot cut and put into 1 to 2 gallon zip lock bag.
 - Samples were washed within the bag and poured into a 150 mesh screen. (repeated 3x)
 - From the top of the screen, ca. 5 mls were poured into a vial and 15 ml 70% EtOH was added.
 - A dissecting-scope (17x) was used to count thrips.
- Thrips identification
 - Adult thrips (5-15/plot) are identified to species.
 - Compound microscope (100x)
 - Lucid Key: Hoddle MS, Mound LA, Paris DL. 2012. Thrips of California.
http://keys.lucidcentral.org/keys/v3/thrips_of_california

Thrips Identification



Frankliniella occidentalis
(Western flower thrips)



Thrips tabaci (Onion thrips)

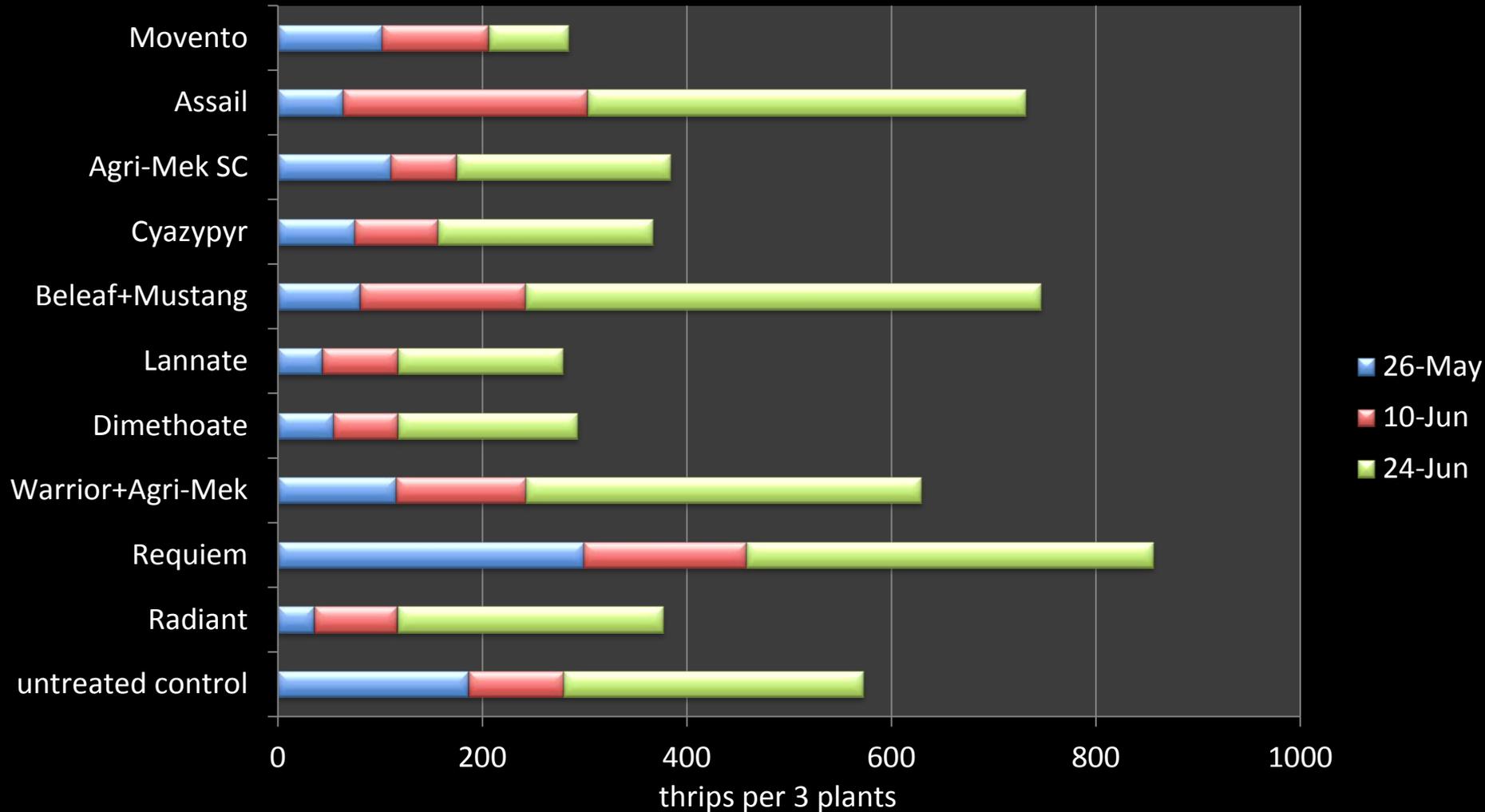
Insecticide Efficacy Comparisons

Some of the materials discussed are not currently registered and there may be other limitations associated with some materials, so carefully read all label instructions before writing a recommendation.

Group #	Chemical sub-group	Primary target site of action	Trade name	Active ingredient
1A	Carbamate	Acetylcholine esterase inhibitors	Lannate LV	methomyl
3A	Pyrethroids	Sodium channel modulators	Mustang, Warrior with Zeon	Zeta-cypermethrin, Lambda-cyhalothrin
4A	Neonicotinoids	Nicotinic acetylcholine receptor agonists	Admire, Assail, Platinum, Venom	Imidacloprid, acetamiprid, thiamethoxam, dinotefuron
5	Spinosyns	Nicotinic acetylcholine receptor allosteric activators	Radiant Entrust	spinetoram spinosad
6	Avermectins,	Chloride channel activators	Agri-Mek SC	abamectin
9C	Flonicamid	Selective homopteran feeding blockers	Beleaf	flonicamid
21	Pyrazole		Torac	tolfenpyrad
23	Tetronic acid derivatives	Inhibitors of acetyl CoA carboxylase.	Movento	spirotetramat
28	Diamide	Ryanodine receptor modulators Nerve and muscle action	Cyazypyr, IKI-3106	Cyantraniliprole, Cyclaniliprole

From IRAC, 2012

2011 Efficacy Comparison

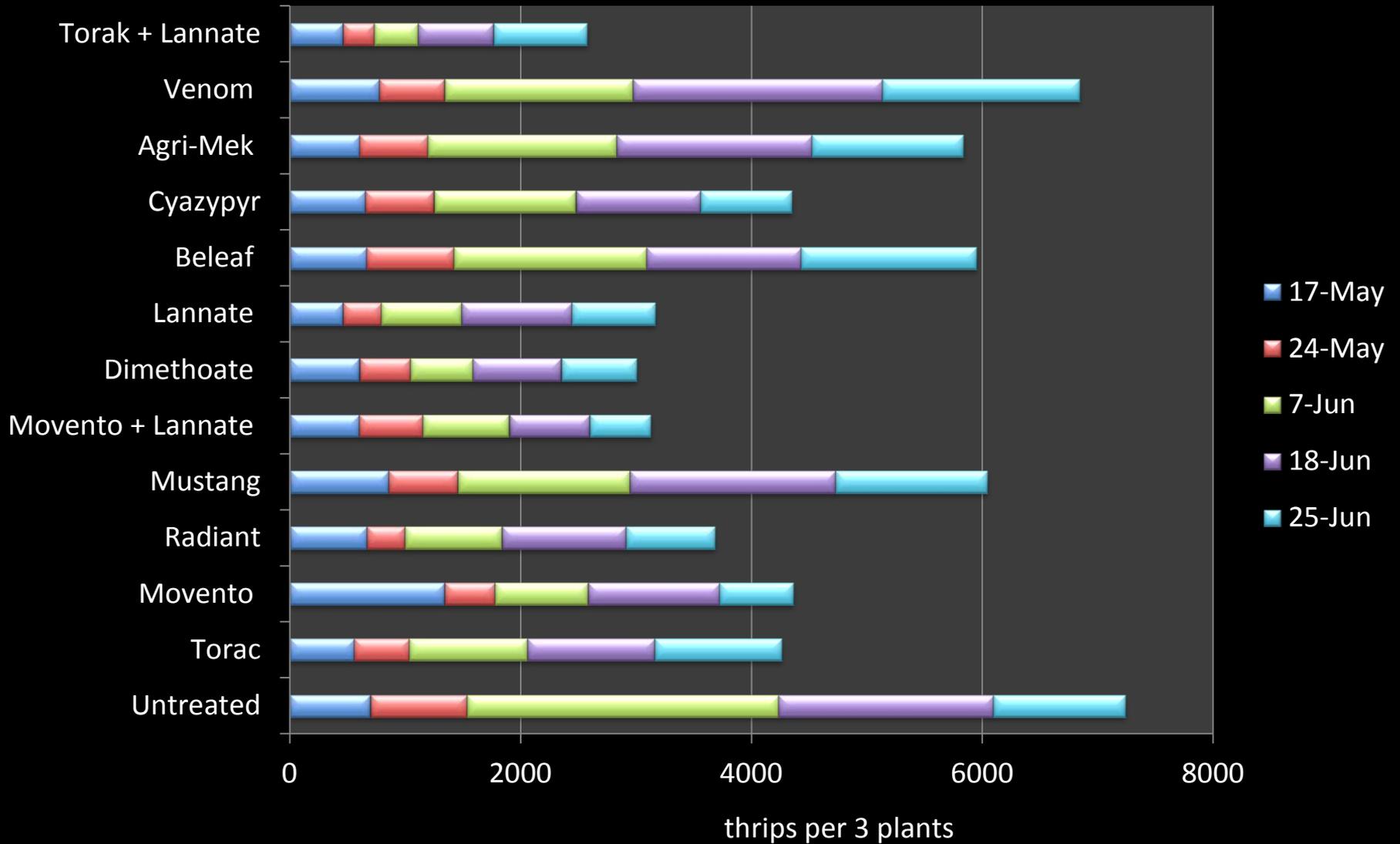


All materials applied on 13, 23 May, 7 and 17 Jun

Species Differentiation, 2011

Treatments	26-May					24-Jun				
	Adults		Nymphs		<i>T. tabaci</i> (%)	Adults		Nymphs		<i>T. tabaci</i> (%)
Radiant 8 fl oz	13.8	g	21.8	f	30.7bcd	42.5	bc	218.0	bcd	80.5
Dimethoate 4EL 4 pt	14.5	fg	39.3	def	17.6d	38.5	bc	137.3	cd	67.9
Lannate LV 3 pt	17.8	efg	25.8	ef	54.5ab	44.5	bc	117.3	de	72.2
Warrior with Zeon 1.92 fl oz + Agri-Mek SC 3.0 fl oz	22.5	defg	93.0	bc	35.7bcd	84.5	a	302.5	ab	72.4
Assail SG 8 oz	23.8	cdefg	39.8	def	53.8ab	65.5	ab	236.5	bcd	80.8
Beleaf 50SG 2.8 oz + Mustang 4.3 oz	30.5	cdefg	49.8	cde	76.4a	89.3	a	415.5	a	85.6
Cyazypyr 10SE 13.5 fl oz	32.5	cde	42.8	def	34.5bcd	44.8	bc	165.8	cd	85.3
Agri-Mek SC 3.0 fl oz	43.0	bcd	67.5	cd	26.7cd	31.8	c	178.0	bcd	75.8
Movento 240 SC 5 fl oz	44.8	abc	57.5	cd	44.4bc	36.0	bc	42.5	e	83.3
Requiem 4 pt	71.5	a	227.8	a	15.5d	88.5	a	310.0	abc	68.6
Control	59.3	ab	127.0	b	43.3bc	87.3	a	341.8	ab	72.7

2012 Efficacy Comparison



All materials were applied on 4,14,30 May and 12 Jun

Species Differentiation, 2012

	24-May			7-Jun			25-Jun		
Treatments	Adults	Nymphs	<i>T. Tabaci</i> (%)	Adults	Nymphs	<i>T. Tabaci</i> (%)	Adults	Nymphs	<i>T. Tabaci</i> (%)
Torac 24.0 fl oz + Lannate LV 3 pt	32	238	76	42	335	80	74	582	84
Dimethoate 4 pt	49	393	82	58	485	73	65	699	87
Lannate LV 3 pt	37	295	84	70	622	83	66	892	77
Movento 240 SC 5 oz + Lannate LV 3 pt	71	479	93	64	686	73	95	606	77
Movento 240 SC 5 oz	178	256	93	114	696	80	116	1025	77
Radiant 8 oz	54	275	87	101	743	93	91	981	80
Torac 24.0 fl oz	72	404	91	67	956	86	61	1039	84
Cyazypyr 100D 13.5 fl oz	119	475	77	99	1134	80	89	987	73
Mustang 4.3 fl oz	170	433	90	167	1318	100	165	1616	80
Venom 70SG 3.0 oz	159	409	83	146	1488	85	168	1992	87
Agri-Mek SC 3.0 fl oz	102	487	90	99	1534	83	94	1602	77
Beleaf 50SG 2.8 oz	209	548	90	125	1549	100	79	1258	67
Untreated	228	607	83	191	2511	80	133	1731	73
LSD P=0.05	62.4	162.5	NS	57.6	518.6	NS	62.6	473.4	15.6
CV (%)	38.2	27.8	12.5	38.9	33.5	14.2	43.9	28.6	11.8

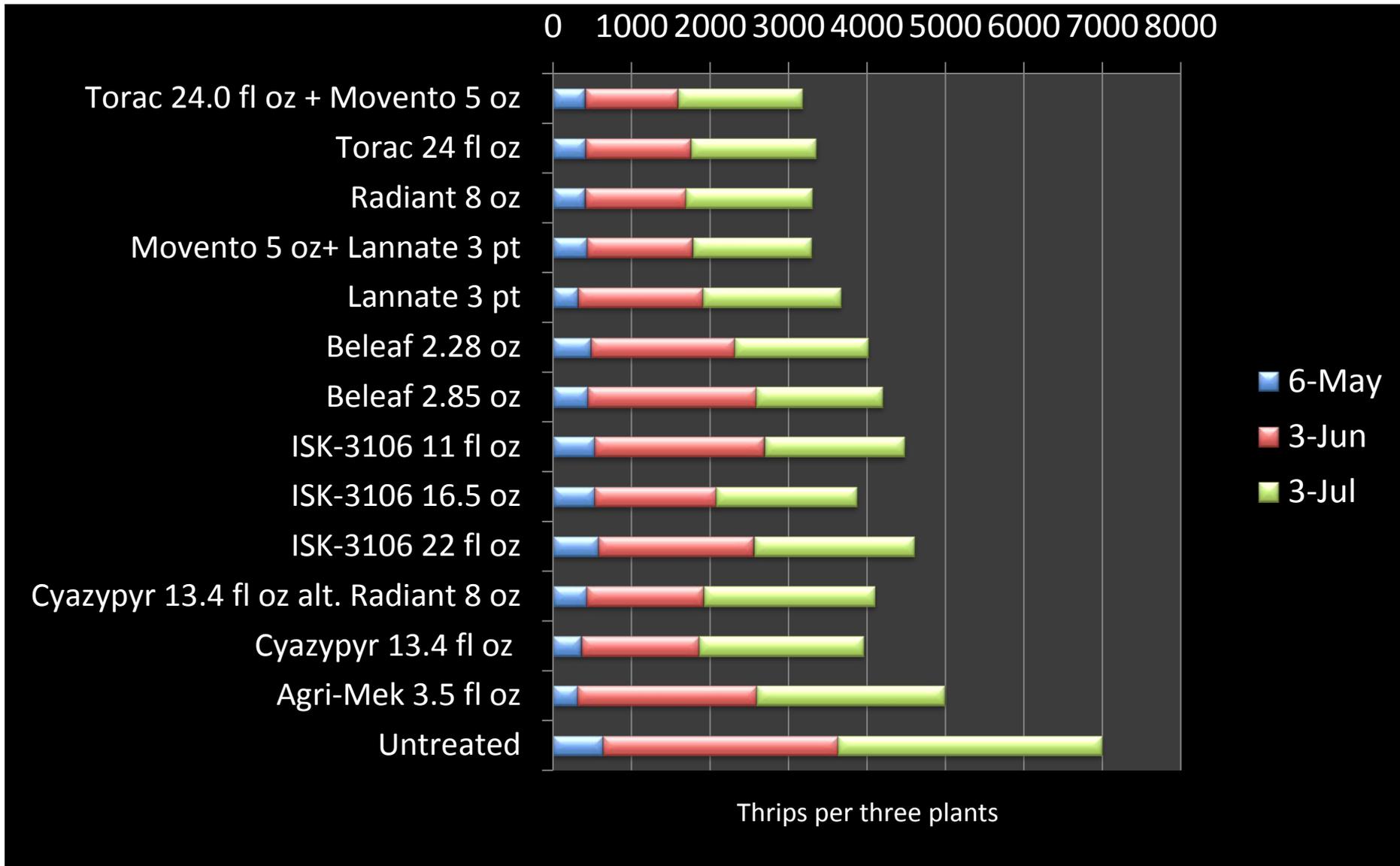


2012 Efficacy Comparison

Treatments	plant height	thrips damage (0-10)		Yield
	(in) 14 Jun	14-Jun	28-Jun	(T/A)
Torak 24.0 fl oz + Lannate LV 3 pt	28.4	0.4	1.4	
Movento 240 SC 5 oz + Lannate LV 3 pt	25.0	1.1	1.0	18.0
Dimethoate 4 pt	25.8	1.0	1.5	20.2
Lannate LV 3 pt	27.7	0.4	1.4	20.3
Radiant 8 oz	27.1	0.8	1.4	21.5
Cyazypyr 100D 13.5 fl oz	25.0	1.9	2.5	20.4
Movento 240 SC 5 oz	23.8	2.5	4.3	
Torak 24.0 fl oz	25.8	1.0	2.4	
Beleaf 50SG 2.8 oz	23.1	5.8	6.5	
Agri-Mek SC 3.0 fl oz	25.3	1.0	2.3	
Mustang 4.3 fl oz	23.7	5.3	6.0	
Venom 70SG 3.0 oz	23.2	4.0	6.5	
untreated control	21.5	8.5	8.3	14.6
LSD P=0.05	1.9	1.6	1.4	2.0
CV (%)	5.2	43.0	28.3	71.2

Thrips caused a 32% decrease in yield based on difference between the treatment with highest yield

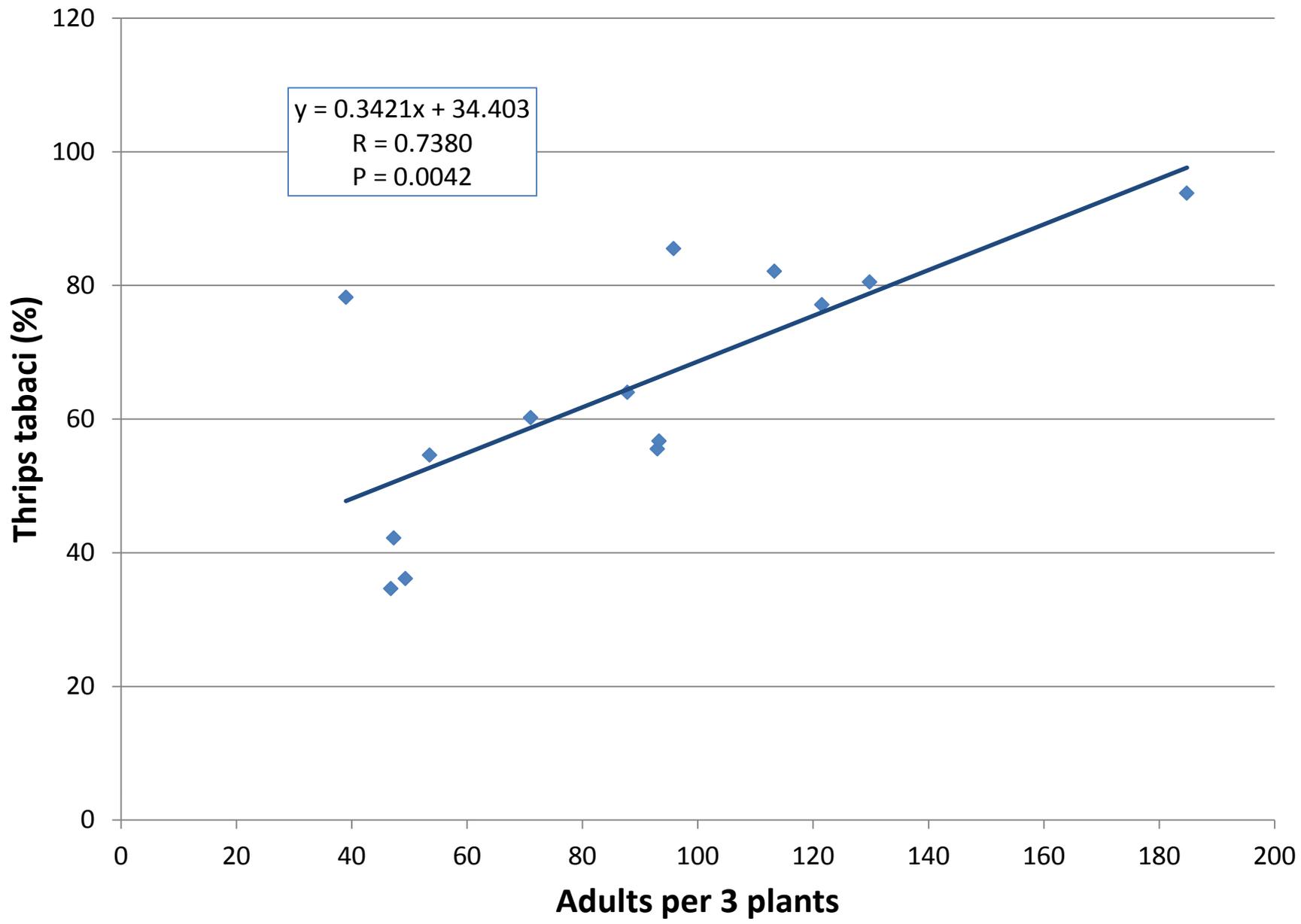
2013 Efficacy Comparison



Application dates: 2, 14, 29 May, 11, 28 Jun

2013 Efficacy: Species Differentiation

	5-May			7-Jul		
Treatments	Adults	Nymphs	<i>T. tabaci</i> (%)	Adults	Nymphs	<i>T. tabaci</i> (%)
Torac 24.0 fl oz + Movento 5 oz	39.0	402.8	78.2	165.0	1583.7	100.0
Torac 24 fl oz	53.5	412.0	54.6	162.3	1601.3	96.7
Radiant 8 oz	46.8	403.0	34.6	160.8	1608.8	100.0
Movento 5 oz+ Lannate 3 pt	49.3	428.0	36.1	139.0	1521.8	100.0
Lannate 3 pt	47.3	316.3	42.2	149.0	1765.5	100.0
Beleaf 2.28 oz	95.8	484.5	85.5	129.0	1705.3	100.0
Beleaf 2.85 oz	113.3	440.5	82.1	161.3	1612.5	100.0
ISK-3106 11 fl oz	93.0	526.0	55.5	160.8	1787.8	91.7
ISK-3106 16.5 oz	87.8	523.8	64.0	134.8	1797.5	100.0
ISK-3106 22 fl oz	71.0	577.5	60.2	152.5	2050.5	90.5
Cyazypyr 13.4 fl oz alt. Radiant 8 oz	93.3	426.8	56.7	177.8	2181.5	100.0
Cyazypyr 13.4 fl oz	129.8	356.0	80.5	161.5	2109.8	93.6
Agri-Mek 3.5 fl oz	121.5	309.5	77.1	159.5	2396.5	99.8
Untreated	184.8	629.5	93.8	188.8	3368.0	100.0
LSD P=0.05	26.0	59.25	29.0	42.8	423.7	NS
CV (%)	20.8	9.30	31.08	17.5	33.5	6.92



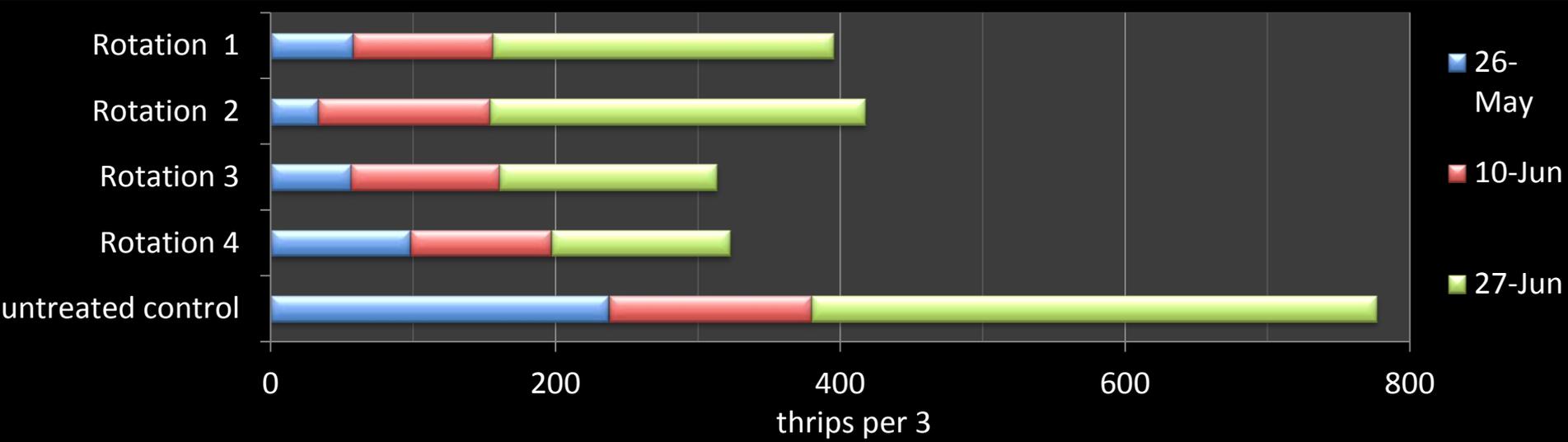


2013 Efficacy Comparison: Foliar Damage and Yield

	Thrips damage (0-10)				Yield
Treatments	26 Jun		8 Jul		T/A
Torac 24.0 fl oz + Movento 5 oz	2.5	b	2.3	c	12.0ab
Lannate 3 pt	2.5	b	2.3	c	12.8a
Radiant 8 oz	2.8	b	2.8	c	10.4 bc
Cyazypyr 13.4 fl oz	2.5	b	3.0	c	10.8ab
Movento 5 oz+ Lannate 3 pt	2.5	b	3.3	bc	10.7ab
Torac 24 fl oz	3.8	b	3.8	bc	12.3ab
ISK-3106 16.5 oz	4.0	b	3.8	bc	
Agri-Mek 3.5 fl oz	3.0	b	3.8	bc	
ISK-3106 22 fl oz	4.0	b	4.3	bc	12.0ab
Cyazypyr 13.4 fl oz alt. Radiant 8 oz	3.5	b	4.3	bc	11.4ab
Beleaf 2.85 oz	5.3	a	5.3	ab	8.3 cd
ISK-3106 11 fl oz	3.3	b	5.3	ab	
Beleaf 2.28 oz	6.0	a	6.8	a	
Untreated	6.8	a	6.8	a	7.1 d

Insecticide Program Comparisons

2011 Insecticide Programs Evaluations



application dates, materials and rates

	13-May	23-May	30-May	8-Jun	21-Jun
Rotation 1	Radiant 8.0 fl oz	Movento 5.0 fl oz	Assail 30SG 8.0 oz	Lanate LV 3 pt	
Rotation 2	Lanate LV 3 pt	Radiant 8.0 fl oz	Warrior 3.84 oz	Lanate LV 3 pt	
Rotation 3	Movento 5.0 fl oz	Radiant 8.0 fl oz	Lanate LV 3 pt		
Rotation 4	Cyazypur 13.5 fl oz	Movento 5.0 fl oz	Assail 30SG 8.0 oz	Lanate LV 3 pt	Radiant 8.0 fl oz

Untreated

2011 Insecticide Program Bulb Yields

					Yield (tons/acre)	
11-May	23-May	30-May	8-Jun	21-Jun	16-Sep	
HGW86 13.5 fl oz	Movento 5.0 fl oz	Assail 30 SG 8.0 fl oz	Lanate LV 3 pt	Radiant 8.0 fl oz	20.79	a
Untreated					19.73	ab
Movento 5.0 fl oz	Radiant 8.0 fl oz	Lanate LV 3 pt			19.13	ab
Lanate LV 3 pt	Radiant 8.0 fl oz	Warrior 3.84 oz	Lanate LV 3 pt		17.84	b
Radiant 8.0 fl oz	Movento 5.0 fl oz	Assail 30 SG 8.0 fl oz	Lanate LV 3 pt		17.42	b

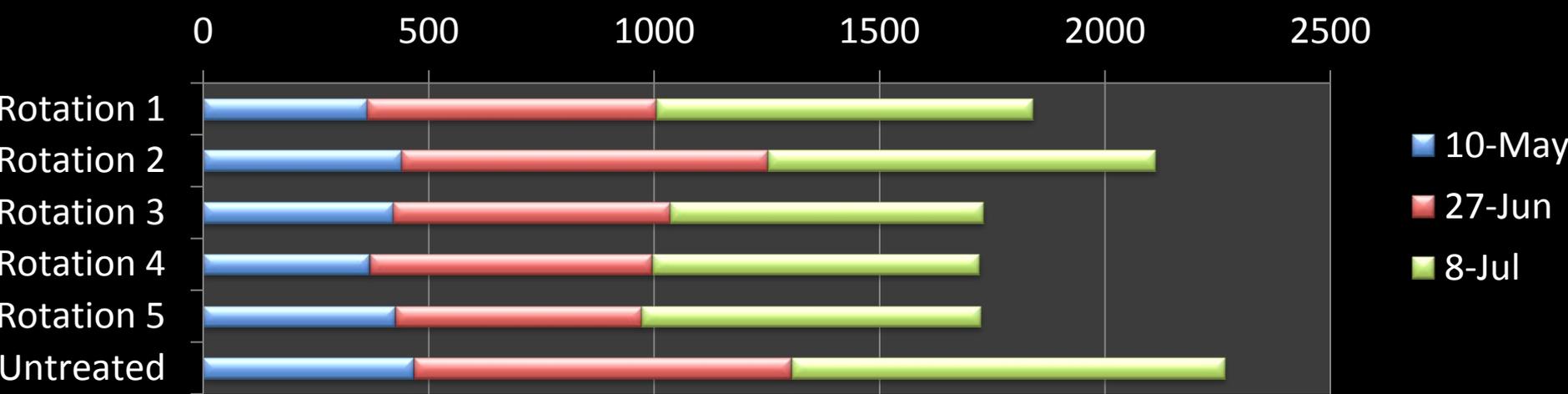
Insecticide Programs Evaluation

11 Jul 2012



IYSV was present in the trial at a low level

2013 Insecticide Programs Evaluations



application dates, materials and rates

	7 May	22 May	5 Jun	14 Jun	24 Jun	3 Jul
Rotation 1	Lannte LV 3 pt	Movento oz	Movento 5 oz	Radiant 8.0 fl oz	Radiant 8.0 fl oz	Agrimek 3.5 fl oz
Rotation 2	Agrimek 3.5 fl oz Movento 5 oz	skip	Lannte LV 3 pt	skip	Radiant 8.0 fl oz	skip
Rotation 3	Agrimek 3.5 fl oz + Movento 5 oz	skip	skip	skip	Radiant 8.0 fl oz	skip
Rotation 4	Movento 5 oz	Movento 5 oz	Radiant 8.0 fl oz	Radiant 8.0 fl oz	Skip	skip
Rotation 5	Lannate LV 3 pt Movento 5 oz	skip		skip	Radiant 8.0 fl oz	skip
Untreated						

2013 Insecticide Program Bulb Yields

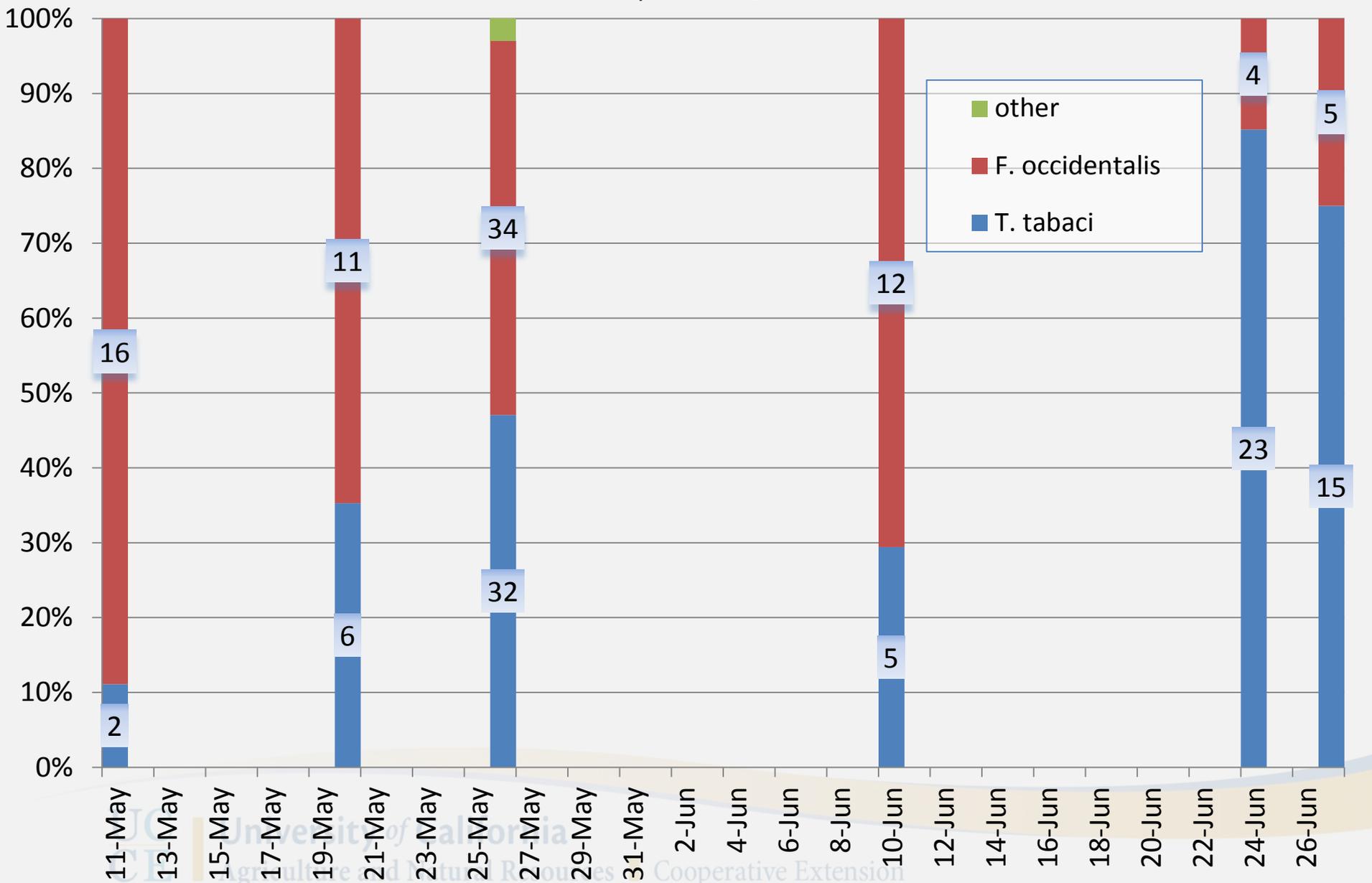
treatment (date applied/material/rate)									Thrips damage rating (0-10) ^y			yield (tons/acre)	
3-May	11-May	18-May	25-May	1-Jun	8-Jun	15-Jun	22-Jun	29-Jun	26-Jun		8-Jul		
Lannte LV 3 pt	Movento oz	Movento 5 oz	Radiant 8.0 fl oz	Radian t 8.0 fl oz	Agrime k 3.5 fl oz	Agrime k 3.5 fl oz	Lannat e	skip		4 b	4.5 b	9.4a	
Agrime k 3.5 fl oz	skip	Lannte LV 3 pt	skip	Radian t 8.0 fl oz	skip	Lannte LV 3 pt	skip	Radian t 8.0 fl oz		5.3ab	5.3 b	8.6a	
Agrime k 3.5 fl oz	skip	skip	skip	Radian t 8.0 fl oz	Skip	Skip	skip	Lannat e LV 3 pt		3.8 b	6.8 b	8.9a	
Moven to 5 oz	Movento 5 oz	Radiant 8.0 fl oz	Radiant 8.0 fl oz	Skip	Skip	skip	Skip	Skip		5.3ab	6.8 b	9.7a	
Lannat e LV 3 pt	skip	skip	skip	Radian t 8.0 fl oz	skip	skip	Skip	Agrime k 3 fl oz		6.3a	7 b	8.4a	
Untreated										5.3ab	7.3 b	8.1a	

Seasonal Fluctuations in Thrips Species

Seasonal Thrips Species Relative Abundance, WSREC, 2011

(from untreated areas)

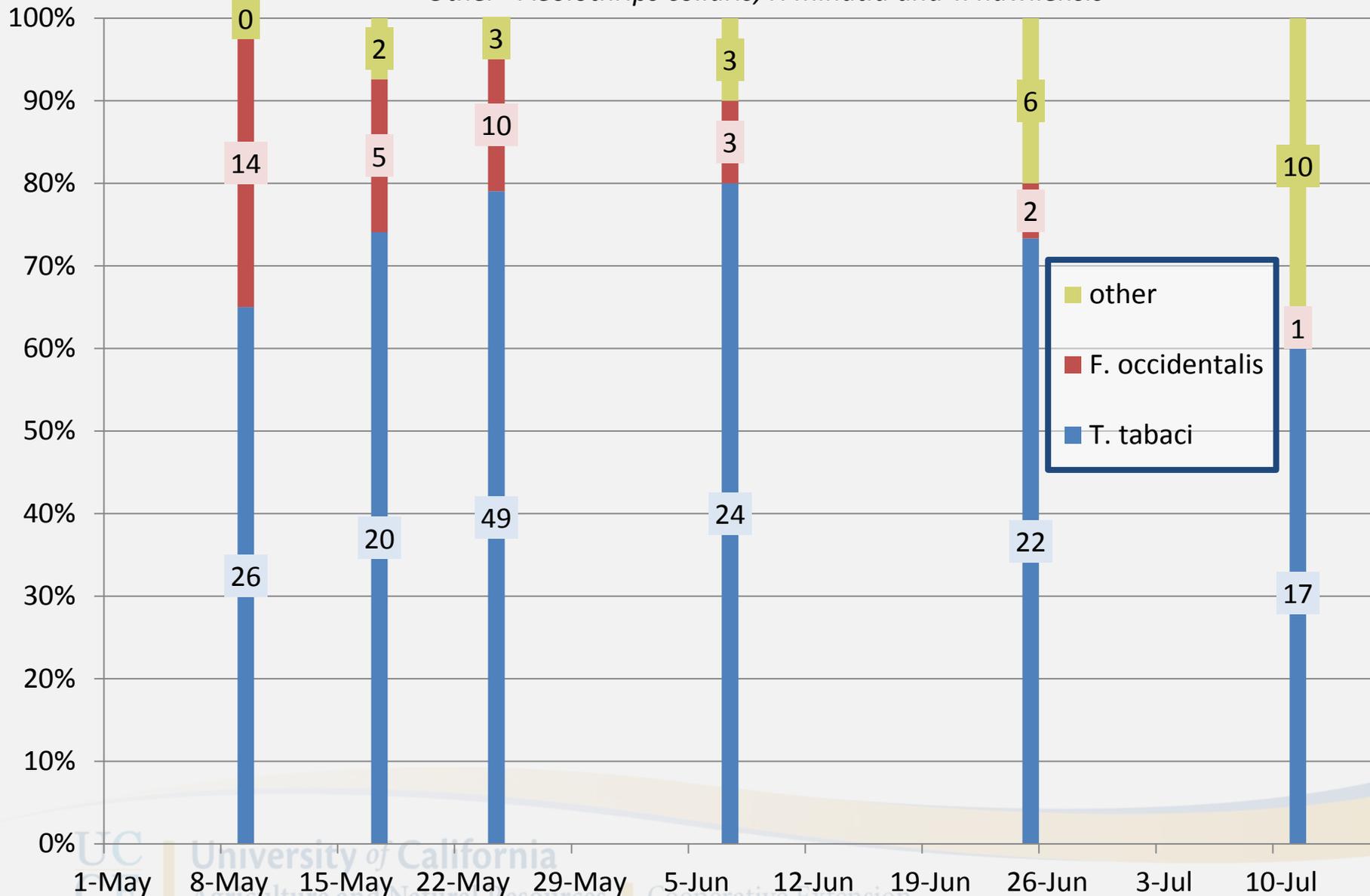
Other = Aeolothrips collaris, F. minutia and T. hawaiiensis



Seasonal Thrips Species Relative Abundance, WSREC, 2012

(from untreated areas)

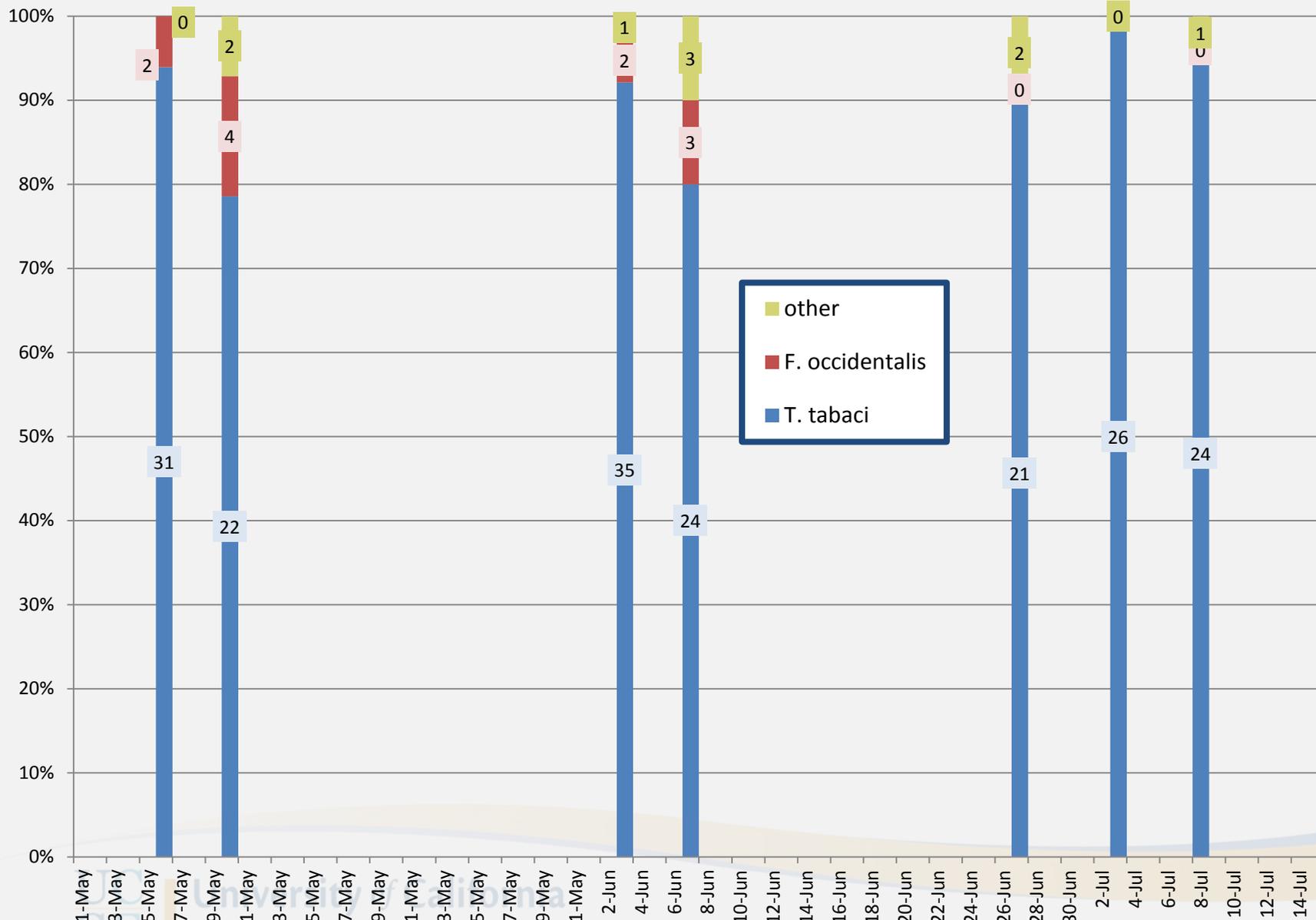
Other = Aeolothrips collaris, F. minutia and T. hawiiensis



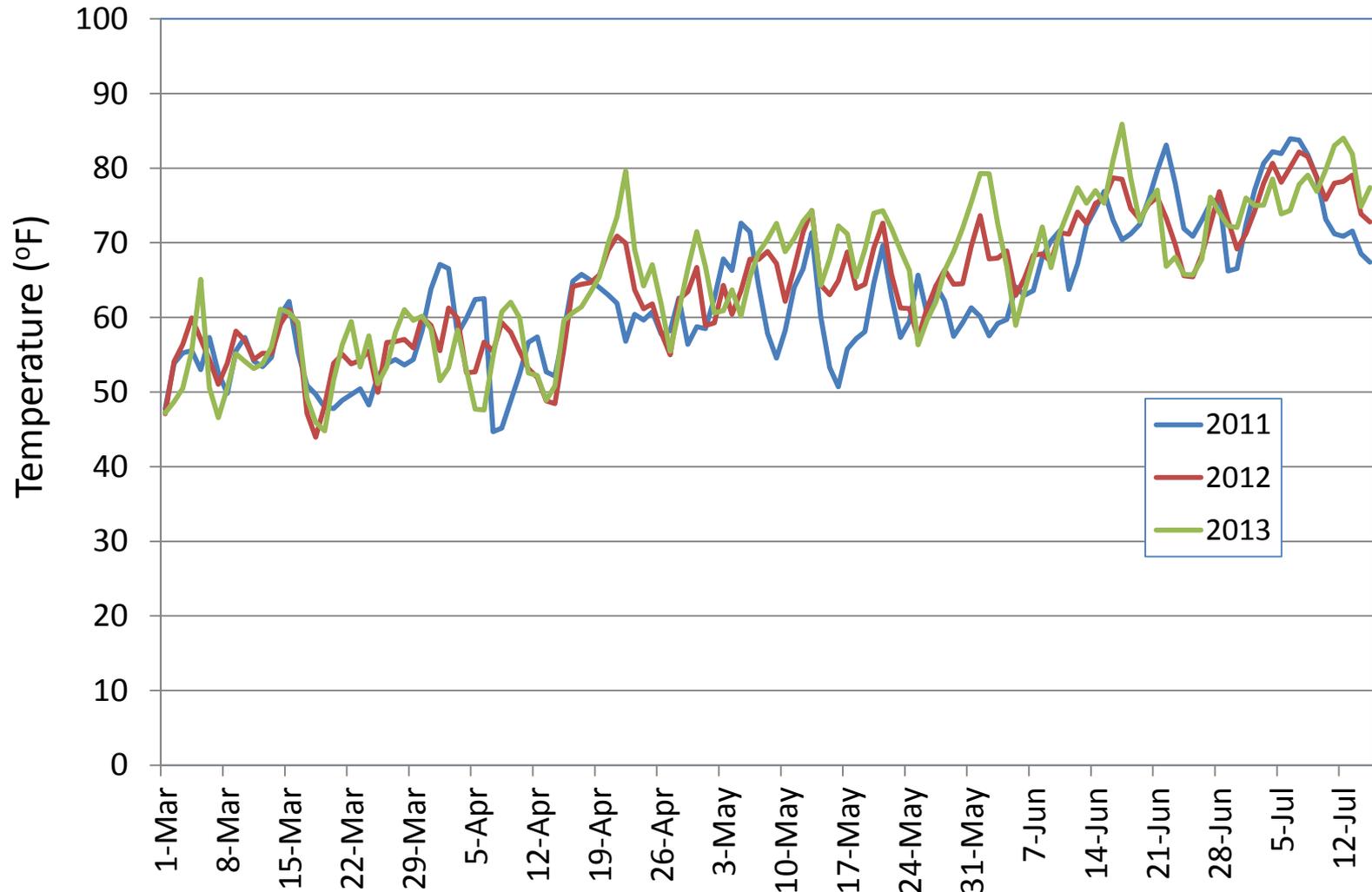
Seasonal Thrips Species Relative Abundance, WSREC, 2013

(from untreated areas)

Others = *Neohydatothrips spp.*, *Merothrips floridensis* and *T. hawaiiensis*



Average Temperatures 2011-13



Aeolothrips collaris



Summary

- **Radiant, Cyazypur, Movento, Torac and Lannate consistently reduced thrips levels**
- **Yield reduction due to thrips feeding was documented in efficacy trials and in the most aggressive programs treatment.**
- **Onion thrips to Western flower thrips ratio increased or was stable depending upon balance in May .**
- **The specific other thrips species present varied among years.**

Acknowledgements

- California Garlic and Onion Research Advisory Board
- OLAM
- UC West Side Research and Extension Center
- Devon Rodriguez: UCCE, Fresno
- Jon Wroble: UCCE, Fresno

