

## Fresh Market Tomato TSWV Variety Trial 2009

Scott Stoddard, UCCE Merced County  
Brenna Aegerter, UCCE San Joaquin County

Objective: a field trial with commercial growers to evaluate the performance and horticultural qualities of fresh market tomato varieties (bush type, green pick for California round market) that have been bred for resistance to tomato spotted wilt. Disease resistance ratings will also be made if disease pressure is present.

As part of larger thrips monitoring project, yellow sticky cards can be placed around project area.

Sow date: May 1, 2009

Transplant date – Merced: June 23, 2009. Location: Live Oak Farms. Field south of LeGrand and Burchell Rds, near Le Grand.

Transplant date – San Joaquin: July 2, 2009. Location: Lagorial Farms. Kingsley Rd., S99 Frontage Rd., Baker Ranch.

Varieties:

1. BHN 856.
2. BHN 933
3. BHN 934
4. BHN 935
5. Harris Moran Trinity
6. Rogers Bobcat (STD)
7. Rogers Quali T-21 (STD)
8. Rogers Quali T-27
9. Rogers Quali T-47
10. Seminis PS 2935
11. Seminis PS 2942
12. Takii AT98a (only 35 plants per plot)
13. Takii AT98b (only 35 plants per plot)

Field plot layout: randomized complete block with 4 replications. Plots are about 50 plants each. Center 6 – 10 feet destructive harvest to estimate yield.

Results.

Yield results for Merced County are shown in Table 1, and fruit and vine characteristics are shown in Table 2. This field location had about 4 – 6% TSWV in the field and standard varieties. Rogers Quali T-47, Takii AT98b, Quali T-27, and BHN 934 all had statistically highest yields over 2500 boxes per acre. Fruit quality was superior with T-27 and T-47. Harris Moran's Trinity did not fare well at this location, probably because of the late plant date for this trial (Trinity does better as an early season variety).

Results for San Joaquin County are shown in Table 3. There was almost no TSWV at this location. The trial yielded less than Merced, and the varieties performed differently, though T-27 and Seminis PS 2942 yielded well at both locations. A comparison of the two locations is shown in Figure 1.

A fruit sample from each plot was gassed with ethylene and evaluated after one week for fruit ripening characteristics (Figure 2). Results were similar across all varieties at both locations.

Based on the results of these trials, some new TSWV varieties bred for the California fresh market tomato industry are agronomically equivalent or superior to current standards and should be considered when growing in areas where there is a potential for TSWV to occur.

**Table 1. Fresh market tomato (round) TSWV variety trial yield and grade results. Merced County (Le Grand), 2009**

Code Variety	Market Yield		M --- % Marketable Yield ---	L	XL	Total Yield		
	Tons/A	Boxes/A				Red %	culls %	small %
9 Rogers Quali T-47	35.8	2865	24.7%	46.0%	29.4%	0.0%	25.4%	21.5%
13 Takii AT98b	34.4	2751	18.6%	45.4%	36.1%	4.1%	39.1%	14.7%
8 Rogers Quali T-27	34.3	2743	28.1%	43.8%	28.2%	6.6%	34.2%	15.8%
3 BHN 934	32.6	2610	30.8%	42.5%	26.7%	0.7%	25.4%	22.9%
12 Takii AT98a	30.2	2416	27.9%	52.1%	20.0%	3.7%	16.2%	24.9%
11 Seminis PS 2942	29.8	2383	29.0%	47.9%	23.1%	0.0%	32.5%	27.8%
7 Rogers Quali T-2 (STD)	28.2	2257	35.9%	45.0%	19.1%	3.6%	13.9%	27.4%
4 BHN 935	27.4	2193	33.9%	42.1%	24.0%	12.2%	35.6%	30.0%
2 BHN 933	26.6	2130	36.9%	45.9%	17.3%	13.8%	20.1%	30.5%
6 Rogers Bobcat (STD)	25.6	2044	34.2%	44.3%	21.5%	4.1%	38.4%	27.4%
1 BHN 856	23.6	1891	29.5%	42.0%	28.5%	0.1%	42.9%	29.7%
10 Seminis PS 2935	21.7	1735	45.1%	44.4%	10.5%	1.0%	17.0%	43.5%
5 Harris Moran Trinity	18.3	1462	53.2%	33.9%	12.9%	0.3%	13.5%	49.9%
Average	28.3	2267.8	32.9%	44.2%	22.9%	3.9%	27.3%	28.2%
p-value		0.001	0.001	0.23	0.01	0.01	0.01	0.001
LSD 0.05		385	12.4	ns	10.8	7.7	16.9	8.2
CV, %		10.1	22.4	13.6	28	118	36.8	17.2

Market yield = XL + L + M size fruit, average of four replications. One box = 25 lbs.

XL, L, M% = weight of respective fruit sizes divided by marketable yield.

Red% = weight of all red fruit divided by total yield. Indicates relative maturity among tested varieties.

Culls, %: Any fruit so disfigured (due to rot, cat facing, insect damage, etc.) as to be unmarketable.

XL = 3 inches and larger in diameter

L = 2.5 to 3"

M = 2.25 to 2.5"

S = 2 to 2.25"

LSD 0.05 = least significant difference at the 95% probability level.

Means within the same column that differ by less than this amount are not significantly different.

NS = not significant at the 95% probability level.

CV = coefficient of variation, a measure of the variability in the experiment.

**Table 2. Fresh market tomato fruit and vine characteristics. Merced County, 2009. TSWV resistant round varieties.**

Var #	Variety	Vine Size	Leaf cover	Fruit shape	Roughness	Blossom end	Sunburn	Cat-facing	Zip-pers	disease rating	Comments
1	BHN 856	L	G	FG	S	SL	N	SL	N	4	deep red on mature fruit
2	BHN 933	L	G	G	S	T	N	N	N	7	powdery mildew severe
3	BHN 934	L	G	G	MR	T	N	S	N	2	deep shoulders
4	BHN 935	L	G	G	M	SL	N	N	N	3	shoulders
5	Harris Moran Trinity	VL	G	G	S	SL	N	N	N	1	large vine, small fruit
6	Rogers Bobcat (STD)	L	G	FG	M	SL	N	N	N	3	lg fruit, TSWV present
7	Rogers Quali T-21 (STD)	VL	VG	G	S	SL	N	N	N	3	TSWV present
8	Rogers Quali T-27	L	G	G-FG	S	SL	N	N	N	2	lg fruit
9	Rogers Quali T-47	L	G	G-FG	S	SL	N	SL	SL	2	lg fruit
10	Seminis PS 2935	L	G	G	S	T	N	N	N	2	medium fruit
11	Seminis PS 2942	L	G	G	S	SL	N	N	N	3	TSWV symptoms on some
12	Takii AT98a	L	G	G-DG	S	SL	N	N	SL	7	fruit cracking
13	Takii AT98b	L	G	DG	S	T	N	N	S	6	fruit cracks

Vine Size: M = medium ML = medium large L = large VL = very large  
 Leaf Cover: P = poor OK = adequate G = good  
 Leaf Roll: N = none SL = slight S = some  
 Fruit Shape: DG = deep globe G = globe FG = flat globe  
 Shoulder roughness: S = smooth M = medium MR = medium rough R = rough  
 Blossom End: T = tight SL = slight scar M = medium size scar  
 Sunburn: N = none SL = slight S = some  
 Cat Facing: N = none SL = slight S = some  
 Zippers: N = none SL = slight S = some

disease rating: Powdery mildew rating on vine, 0 - 10 score (0 = nothing)

**Table 3. Fresh market tomato (round) TSWV variety trial yield and grade results. UCCE San Joaquin County (Stockton).**

Variety	Total yield (tons/A)		Marketable (%)		Market yield (tons/a)		Fruit size			Notes
							% XL	% L	% M	
PS 2942 (Seminis)	54.3	a	35.5	abc	19.3	a	9.9	37.3	27.2	very good fruit size, fair leaf coverage, some rough shoulders
<b>Bobcat (Syngenta)</b>	46.9	ab	37.0	a	17.4	a	7.4	33.1	28.9	leaf coverage good, many stems sticking, smooth shoulders
Quali T-27 (Syngenta)	47.6	ab	36.7	a	17.4	a	14.9	40.0	22.0	good leaf coverage, some rough shoulders, zippers and growth cracks, fruit set spread out
BHN 935 (BHNSeed)	47.5	ab	36.1	ab	17.1	a	13.2	34.8	20.4	poor leaf coverage, foliage not holding up well, some rough shoulders, early maturing, fruit set spread out
<b>Quali T-21 (Syngenta)</b>	47.0	ab	34.3	abc	16.1	ab	10.2	34.7	26.7	good fruit size, some rough shoulders and stems sticking, later maturing
Trinity (Harris Moran)	45.1	abc	34.5	abc	15.8	abc	5.0	33.4	27.1	large vines, good leaf coverage, later maturing, some stems sticking
BHN 934 (BHNSeed)	46.0	ab	33.1	abcd	15.1	abc	13.1	36.8	16.0	poor leaf coverage, foliage not holding up well, fruit set spread out
Quali T-47 (Syngenta)	41.8	bcd	36.7	a	15.1	abc	14.1	38.3	21.3	good leaf coverage, some rough shoulders, very good fruit size
AT98b (American Takii)	36.5	bcde	32.1	abcd	12.2	bcd	11.0	27.9	26.2	good leaf coverage, good fruit size, many stems sticking
PS 2935 (Seminis)	37.7	bcde	30.8	bcd	11.6	bcd	3.5	29.0	27.6	large vines, good leaf coverage, smooth shoulders, stems sticking
AT98a (American Takii)	32.5	de	35.0	abc	11.3	cd	8.4	34.1	26.1	good leaf coverage, small fruit size
BHN 856 (BHNSeed)	34.0	cde	30.2	cd	10.2	d	6.6	33.4	20.1	poor leaf coverage, some rough shoulders, small fruit size
BHN 933 (BHNSeed)	28.3	e	28.7	d	8.1	d	3.0	30.2	22.0	poor leaf coverage, early maturing, small fruit size, fruit set not concentrated, stems sticking
Mean	41.9		33.9		14.4		9.3	34.1	24.0	
LSD 5%	11.8		5.5		4.8		NS	NS	NS	
P value	0.0045		0.057		0.0015		NS	NS	NS	
CV %	16.6		9.5		19.8		60.1	14.4	27.3	

Notes: Numbers represent the mean of 4 observations, means in the same column followed by the same letter are not statistically different.

Bold lettering indicates standard commercial varieties included for comparison, all varieties except standards are resistant to tomato spotted wilt virus (TSWV).

Some Verticillium wilt and powdery mildew uniformly throughout trial, TSWV pressure light, only seen in non-resistant varieties.

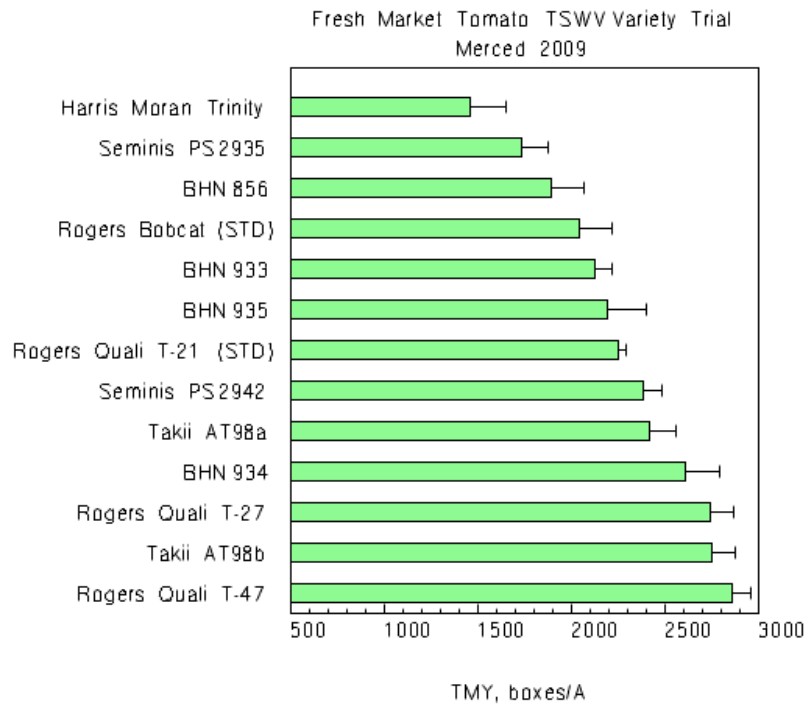
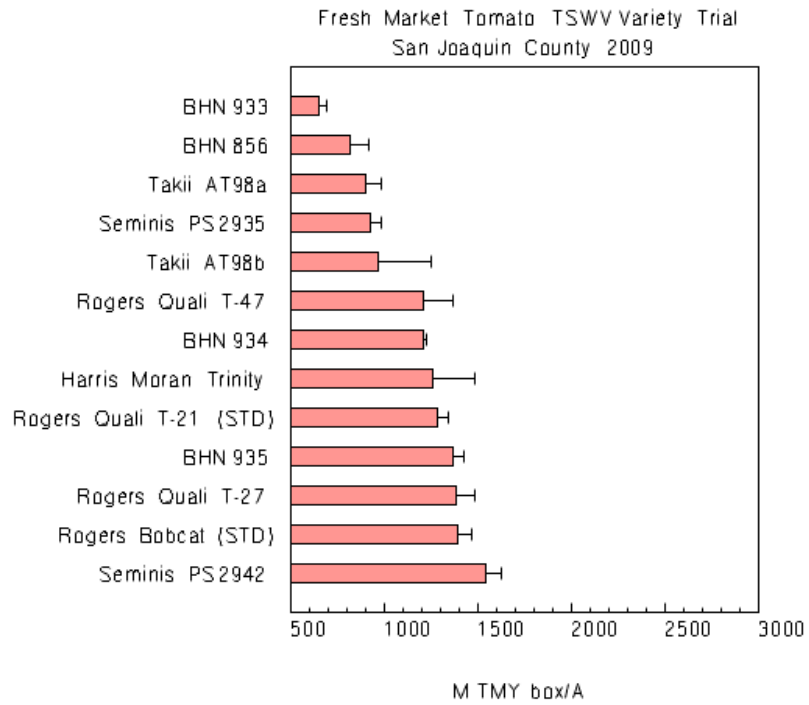


Figure 1. Total marketable yields for the 2009 TSWV resistant fresh market tomato variety trial for Stockton (above) and Merced (below).

### Fruit Ripening 1 Week Post-Harvest

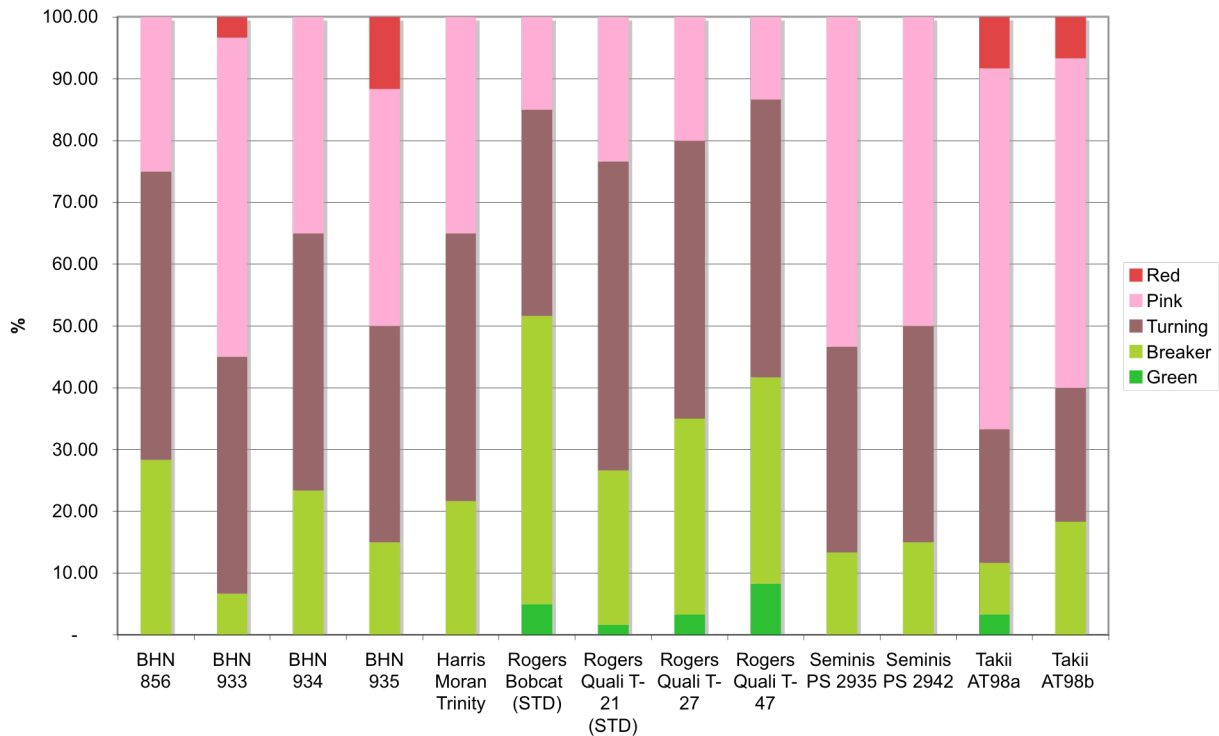


Figure 2. One box of fruit from each plot was gassed with ethylene (200 ppm) and then evaluated after one week to observe fruit ripening characteristics for each variety (Merced location).