



University of
California
Cooperative Extension

**Research Project Final Report
To the California Tomato Commission**

**Statewide Fresh Market Tomato Variety Trials:
Field and Postharvest Evaluations 2006**



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February 28, 2007

Statewide Fresh Market Tomato Variety Trials Field Evaluations for 2006

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University of California Cooperative Extension

Summary

As part of a long-term project with the California Tomato Commission, fresh market tomato variety trials were conducted in commercial tomato production fields in Fresno, Merced, and San Joaquin Counties in 2006 to evaluate field and postharvest performance. At each location, “round” lines were grown in both replicated and observation plots, while “roma” lines were limited to a replicated trial. New varieties were compared to the standards Shady Lady, Quali T-21, and Monica, and evaluated on marketable yield, size breakdown, color, and cull percentage. Varieties performed differently depending on location/time of planting. The early trial in Fresno had excellent yields, while the late trial in San Joaquin County suffered through the July heat wave, which significantly reduced yield and quality of the harvested fruit. Averaged across locations, significant differences were found for marketable yield, fruit size, and red fruit in the replicated round and roma trial; no significant differences were found between varieties in the round observation trial. Round lines with overall best marketable yield were PS2935 and PS2942, Quali T-21, and Wolverine. Roma varieties Monica, PX739, Mi Roma, and Mi Rey all yielded well. All three trials were shown at field days prior to harvest.

Introduction

UCCE conducts fresh market tomato variety trials in three areas in the San Joaquin Valley to evaluate the performance of new varieties and breeding lines from commercial plant breeders for the mature green market. These variety trials hopefully provide the opportunity to evaluate and compare fruit quality characteristics and yield in commercial production fields with different types of soil, management, and growing conditions.

The objective of this trial is to identify dependable, higher yielding and higher quality lines that can be grown in a wide geographic area and varying environmental conditions characteristic of central California. The main commercial market is for mature green tomatoes. Varieties are typically semi-determinant, bush-type grown without support and hand harvested. This market includes both round and “roma” type tomatoes.

The trials are broken into two components: replicated and observation. Seed companies are asked to submit lines that have been previously tested in grower fields in California for the replicated trial. The observation lines usually represent the plant breeder’s most promising lines for central California’s commercial growing conditions and markets.

Procedure

The trials are conducted by each Farm Advisor in a similar fashion so that local results can be compared with other locations. Plot size is 1 bed by 40 to 50 feet long, planted using commercial transplanters on 5 foot raised beds. Trials are laid out as randomized complete block designs with 4 replications (observation lines are not replicated but are planted adjacent to the replicated plots). Plots are managed concurrently as the commercial field in which they are located. Harvest is done by hand at the same time as the rest of the field, picking from a 10 – 13 foot section from the center of the plot. At harvest, fruit are sorted by culls, color, and size. Statistical analysis is performed using analysis of variance procedures with means separation at the 95% confidence level using Fisher’s protected LSD.

In 2006, round and roma variety trials were conducted at three locations. Trial locations, varieties, and field information are shown in Table 1. The Fresno trial was drip irrigated, the others, furrow. The Fresno, Merced, and San Joaquin trials were planted one month apart, to reflect early, mid, and late season production fields, respectively.

A field day was held at each location. Of the three field days, the field day held in Le Grand had the greatest participation and included information booths from UCCE Specialists, Farm Advisors, and industry representatives.

Postharvest samples from all the replicated varieties were collected by Marita Cantwell from all trials at the time of harvest and taken to the Mann Laboratory at UC Davis for color, firmness, and fruit composition analysis at the mature-green and table-ripe stage. A complete summary of the postharvest results follows this field report.

Results

Replicated Lines (round)

Results for marketable yield and fruit size for Fresno, Merced, and San Joaquin Counties are shown in Tables 2, 3, and 4. The combined analysis is shown in Table 5. Significant yield differences were found at each location, with Quali T-21 yielding the most in Fresno and San Joaquin, and PS 2942 in Merced County. When the data for all three locations were combined, significant differences occurred for yield, size, and amount of red fruit.

Extra large (XL) fruit were significant higher percentage of the market yield in Fresno as compared to the other locations (Fig. 1). In general, Shady Lady had consistently smaller fruit at each location. Other location comparisons are shown in Table 5. Shady Lady had the highest percentage of red fruit.

The significant variety by location LSD found for yield, M%, XL%, small, cull %, and red% indicates that varieties are performing differently at different locations. This makes sense, because some lines are better adapted for early or late season growing conditions. The implications are that it is better to use the individual location results for determining variety fit rather than the combined analysis.

Fruit and vine characteristics are shown in Tables 6 – 8.

Observed Lines

Fruit size and market yields for each county are shown in Tables 9, 10, and 11. The combined analysis is shown in Table 12. Because there is no replication in the observed lines, statistical analysis could be performed only on the combined data set. SXT 6783 and SXT6784 did particularly well in Fresno, while HMX 5790 yielded well in Merced. None of the Seeds of Change varieties performed well relative to the others at either the Merced or San Joaquin location. Combining locations, no significant differences among varieties were found for yield, size, or color, mainly because of the large amount of variability in the data.

As with the replicated trial, the Fresno location had more XL fruit than the other locations.

Fruit and vine characteristics for the observation lines are shown in Tables 13 – 15. Many of the lines suffered from misshapen fruit, zippers, and rough shoulders at all locations; 6260-D produced only small and medium size fruit.

Roma Trials

Roma trials were conducted in all three locations for the first time in 2006. There were not enough entries for both an observation and replicated trial, so only a replicated trial was conducted. Individual county

results are shown in Tables 16 – 18, and the combined analysis in Table 19. In general, yields were very good for all lines except BSS 526, which over produced small fruit. Neither the Merced nor San Joaquin location had any XL fruit. Monica yielded the best, followed closely by PX 739, Mi Rey, and Mi Roma.

Fruit and vine characteristics for the roma lines are shown in Tables 20 - 22.

Acknowledgements

Many thanks to the following seed company representative for their participation: Yair Askira, LSL Seed; Rod Jorgenson, Syngenta/Rogers Seed; Carl Hill and Susan Peters, Nunhems; Doug Heath, Seminis, Greg Styers, Bejo Seeds; Mark Beoshanz, Harris Moran; Erica Renaud, Seeds of Change; and Jeff Zischke, Sakata Seeds. Additional thanks to the cooperators who helped with these trials, and to the California Tomato Commission for financial support.

Table 1. 2006 UCCE Fresh Market Tomato Regional Variety Trial, varieties and locations.

Early Trial <i>Michelle LeStrange</i> 559-685-3309 x220 mlestrange@ucdavis.edu	Mid Season Trial <i>Scott Stoddard</i> 209-385-7403 csstoddard@ucdavis.edu	Late Season Trial Brenna Aegerter 209-468-9489 bjaegeter@ucdavis.edu
Replicated 1. PS 2942 (Seminis) 2. PS 2935 (Seminis) 3. Bobcat (Syngenta) 4. Q-21 (Syngenta) STD 5. Q-23 (Syngenta) 6. Scout (Syngenta) 7. Wolverine (Syngenta) 8. Shady Lady (Nunhems) STD 9. HMX 5790 (Harris Moran) 10. HMX 6812 (Harris Moran)	Replicated 1. PS 2942 (Seminis) 2. PS 2935 (Seminis) 3. Bobcat (Syngenta) 4. Q-21 (Syngenta) STD 5. Q-23 (Syngenta) 6. Scout (Syngenta) 7. Wolverine (Syngenta) 8. Shady Lady (Nunhems) STD	Replicated 1. PS 2942 (Seminis) 2. PS 2935 (Seminis) 3. Bobcat (Syngenta) 4. Q-21 (Syngenta) STD 5. Q-23 (Syngenta) 6. Scout (Syngenta) 7. Wolverine (Syngenta) STD 8. Shady Lady (Nunhems)
Observation 1. SXT 6764 (Nunhems) 2. SXT 6782 3. SXT 6783 4. SXT 6784	Observation 9. HMX 5790 (Harris Moran) 10. HMX 6812 (Harris Moran) 11. SXT 6764 (Nunhems) 12. SXT 6782 13. SXT 6783 14. SXT 6784 15. 10442 (Seeds of Change) 16. 11091 (Seeds of Change) 17. 5151 (Seeds of Change) 18. 6260-D (Seeds of Change)	Observation 9. HMX 5790 (Harris Moran) 10. HMX 6812 (Harris Moran) 11. SXT 6764 (Nunhems) 12. SXT 6782 13. SXT 6783 14. SXT 6784 15. 10442 (Seeds of Change) 16. 11091 (Seeds of Change) 17. 5151 (Seeds of Change) 18. 6260-D (Seeds of Change)
ROMA (Replicated) 1. Monica (Sakata) STD 2. BSS526 (Bejo Seeds) 3. SD257 (LSL) 4. MiRey (Syngenta) 5. MiRoma (Syngenta) 6. PX 739 (Seminis) Seeded: Feb 27, 2006 Transplant: April 21 Plot: 66" x 50 ft rep 4 times Drip irrigated Field Day: July 17, 15 people Harvest: July 19, 21 Notes: good growing conditions	ROMA (Replicated) R1. Monica (Sakata) STD R2. BSS526 (Bejo Seeds) R3. SD257 (LSL) R4. MiRey (Syngenta) R5. MiRoma (Syngenta) R6. PX 739 (Seminis) Seeded: March 14 2006 Transplant: May 11, 2006 Plot: 60" x 60 ft rep 4 times Furrow irrigated Field Day: July 27, 50 people Harvest: Aug 1-2 Notes: good trial	ROMA (Replicated) R1. Monica (Sakata) STD R2. BSS526 (Bejo Seeds) R3. SD257 (LSL) R4. MiRey (Syngenta) R5. MiRoma (Syngenta) R6. PX 739 (Seminis) Seeded: May 1 Transplant: June 9 Plot: 60" x 25 ft rep 4 times Furrow irrigated Field Day: Sept 21, 9 people Harvest: Sept 21 – 22 Notes: poor stand, July heat

STD = Standard

Table 2. Fresh market tomato (round) variety trial yield and grade results, Fresno County 2006. REPLICATED varieties.

Code Variety	Market Yield		M --- %	L Marketable	XL Yield ---	S Tons/A	Total Tons/A	Total Yield		culls Tons/A
	Tons/A	Boxes/A						Culls %	Red %	
1 PS 2942	42.9	3430	11.5	34.3	54.1	1.5	61.8	28.1	9.4	17.3
2 PS 2935	45.1	3608	10.0	36.6	53.4	2.1	58.1	18.9	9.2	10.9
3 Bobcat	42.9	3432	10.2	34.4	55.5	1.8	59.7	25.0	20.2	15.0
4 Quali T-21	46.8	3746	7.8	40.8	51.4	2.2	61.1	20.0	14.6	12.1
5 Quali T-23	32.2	2576	7.7	33.4	58.9	1.3	45.1	25.8	11.7	11.6
6 Scout	44.4	3552	16.9	34.4	48.7	3.2	59.0	19.1	19.4	11.4
7 Wolverine	47.8	3823	9.3	35.6	55.0	2.5	62.9	20.0	13.9	12.6
8 Shady Lady	38.5	3077	13.8	43.7	42.5	3.1	54.6	24.0	24.2	13.1
Average	42.6	3405.8	10.9	36.7	52.4	2.2	57.8	22.6	15.3	13.0
LSD 0.05	4.6	364	4.1	4.7	4.9	0.9	5.7	6.0	4.4	4.0
CV %	7.3	7.3	25.9	8.8	6.4	28.1	6.7	17.9	19.6	20.8

Table 3. Fresh market tomato (round) variety trial yield and grade results, MERCED COUNTY, 2006. REPLICATED varieties.

Code Variety	Market Yield		M --- %	L Marketable	XL Yield ---	S Tons/A	Total Tons/A	Total Yield		culls Tons/A
	Tons/A	Boxes/A						Culls %	Red %	
1 PS 2942	28.0	2241.7	17.3	36.1	46.6	2.9	48.3	36.0	12.5	17.4
2 PS 2935	27.9	2232.3	18.9	43.4	37.7	3.7	49.2	34.9	15.9	17.6
3 Bobcat	22.8	1826.8	22.5	40.0	37.5	4.4	46.0	40.5	11.4	18.8
4 Quali T-21	22.6	1808.7	22.9	40.9	36.2	4.5	44.5	38.8	8.4	17.3
5 Quali T-23	23.7	1899.2	20.0	42.3	37.7	3.1	41.3	35.3	18.7	14.4
6 Scout	19.3	1543.4	20.3	42.7	37.0	2.7	40.9	46.5	11.7	18.9
7 Wolverine	22.1	1766.5	16.2	48.3	35.5	2.5	43.7	43.6	15.8	19.1
8 Shady Lady	15.1	1206.3	35.3	45.1	19.6	5.0	40.9	51.0	16.0	20.9
Average	22.7	1816	21.7	42.4	36.0	3.6	44.3	40.8	13.8	18.0
LSD 0.05	5.0	401	8.5	NS	11.0	NS	NS	8.3	NS	NS
CV %	15.0	15	26.8	11.1	20.9	33.6	12.7	13.9	34.7	20.7

See notes next page.

Table 4. Fresh market tomato variety trial yield and grade results, SAN JOAQUIN COUNTY, 2006. REPLICATED varieties.

Code Variety	Market Yield		M --- % Marketable Yield ---	L	XL	S	Total Tons/A	Total Yield		culls Tons/A
	Tons/A	Boxes/A						Culls %	Red %	
1 PS 2942	11.5	921	29.7	41.5	28.8	5.6	25.9	34.4	5.0	8.8
2 PS 2935	10.2	813	28.6	44.3	27.1	7.3	24.4	29.4	3.8	7.0
3 Bobcat	8.0	639	35.0	37.4	27.6	5.8	19.9	30.5	5.0	6.1
4 Quali T-21	12.9	1034	28.2	43.8	28.0	8.3	30.3	29.8	1.2	9.0
5 Quali T-23	8.4	670	38.5	46.4	15.1	5.9	20.2	28.8	0.4	5.9
6 Scout	6.8	547	39.4	39.7	21.0	7.0	19.8	29.9	5.7	5.9
7 Wolverine	7.4	596	29.6	30.4	40.0	5.9	18.8	29.4	1.1	5.4
8 Shady Lady	6.2	493	48.1	44.8	7.2	5.7	17.1	30.7	2.0	5.2
Average	8.9	714	34.6	41.0	24.4	6.4	22.0	30.4	3.0	6.7
LSD 0.05	4.0	322	11.6	NS	12.5	NS	5.8	NS	NS	2.4
CV %	25.8	26	19.2	26.5	29.2	17.4	15.0	19.7	125.1	20.7

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 5. Fresh market tomato (round) variety trial yield and grade results, COMBINED ANALYSIS, 2006. REPLICATED varieties.

VARIETY	MKT t/a	MKT box	M %	L %	XL %	S t/a	TTL t/a	Culls %	Red %	Cull t/a
2 PS 2935	29.3 (01) A	2345.5 (01)	18.3 (07)	41.2 (03)	40.5 (04)	4.11 (03)	45.7 (03)	27.6 (08)	10.2 (06)	12.2 (07)
1 PS 2942	28.9 (02) A	2313.6 (02)	18.6 (06)	36.9 (08)	44.5 (01)	3.12 (08)	47.1 (01)	32.7 (02)	9.3 (07)	15.0 (01)
4 Quail T-21	28.8 (03) A	2302.0 (03)	18.9 (05)	41.6 (02)	39.5 (05)	4.71 (01)	46.7 (02)	29.5 (07)	8.7 (08)	13.2 (04)
7 Wolverine	27.4 (04) A	2195.2 (04)	17.4 (08)	38.8 (06)	43.8 (02)	3.44 (06)	43.9 (04)	31.1 (05)	11.1 (05)	13.0 (05)
3 Bobcat	26.1 (05) B	2086.7 (05)	21.4 (03)	37.2 (07)	41.3 (03)	3.82 (05)	43.9 (05)	32.1 (03)	12.9 (03)	14.0 (02)
6 Scout	25.0 (06) B	2002.0 (06)	24.3 (02)	38.9 (05)	36.9 (07)	4.07 (04)	41.7 (06)	32.0 (04)	12.9 (02)	12.6 (06)
5 Quail T-23	22.6 (07) C	1810.3 (07)	20.5 (04)	40.2 (04)	39.3 (06)	3.23 (07)	36.9 (08)	30.1 (06)	11.1 (04)	11.1 (08)
8 Shady Lady	21.1 (08) D	1692.0 (08)	31.0 (01)	44.5 (01)	24.5 (08)	4.47 (02)	39.4 (07)	35.6 (01)	15.2 (01)	13.8 (03)
Average	26.2	2093.4	21.3	39.9	38.8	3.87	43.2	31.3	11.4	13.1
LSD @ 0.05=	2.6	208.2	4.4	N.S.	5.3	0.9	3.8	N.S.	3.4	N.S.
C.V.=	11.6	11.6	24.3	16.2	15.9	25.9	10.4	16.6	34.5	22.1
VARIETY X										
LOCATION LSD @										
0.05 (Between										
Merced and Fresno										
Means) =										
	4.3	345.2	7.3	N.S.	8.7	1.4	6.4	7.4	5.6	N.S.
VARIETY X										
LOCATION LSD @										
0.05 (Between SJC										
means and Merced										
or Fresno Means) =										
	4.7	372.8	7.9	N.S.	9.4	1.5	6.9	8.0	6.0	N.S.

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.

Var x Location LSD = least significant difference between the same variety at different locations.

A significant var x location interaction indicates the varieties perform differently depending on location.

NS = not significant at the 95% probability level.

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

Table 6. Fresh market tomato fruit and vine characteristics. Fresno County, 2006.

REPLICATED varieties

Code	Variety	Vine size	Vine cover	Fruit shape	Roughness	Blossom end	Sunburn	Zip-pers	Over-all	Comments	
1	PS 2942	L-VL	G	FG-DG	R	2-3	SI	S	F-G	just a little too rough and variable in shape	
2	PS 2935	L	G	FG	R	2-3	SI	S	F-P	poor shape, many flat fruit	
3	Bobcat	ML	OK	G	M	2-3	SI	SI	F-G	slight leaf curl	
4	QualiT 21	VL	G	FG	M	2-3	SI	SI	F	rank growth, floppy	
5	QualiT 23	L	G	FG	M	2-4	S	SI	F-P	a lot of green striping, ugly, sunburn	
6	Scout	ML	G	F-G	M	2-3	SI	SI	F	a lot of blemish; slight leaf curl	
7	Wolverine	ML-L	F-G	FG	S	2-3	SI	N	G	more uniform than most, nice	
8	Shady Lady	ML	F-G	FG	S	2-3	SI	SI	F-G	pretty uniform, smooth, some blemish, green stripe	
		Vine size	VL=very large, L=large, M=med, S=small								
		Vine cover	C=compact, SC=semi-compact, F=floppy								
		Fruit shape	DG=deep globe, G=globe, FG= flat globe								
		Roughness	VS=very smooth, S=smooth, M=med, R=rough								
		Blossom end	1=very tight, 5=very open								
		Sunburn	N=none, SL=slight, S=Some, M=Much								
		Zippers	N=none, SL=slight, S=Some, M=Much								
		Overall	VG=very good, G=good, F=Fair, P=poor								

Table 7. Fresh market tomato fruit and vine characteristics. Merced County, 2006.

REPLICATED varieties.

Var #	Variety	Vine Size	Leaf cover	Leaf roll	Fruit shape	Roughness	Blossom end	Sunburn	Cat-facing	Zip-pers	Comments
1	PS 2942	VL	OK	N	G, FG	M	T	S	SL	SL	sunburn, rough shoulders
2	PS 2935	L	OK	N	G	S	T	S	SL	S	splits, sunburn, zippers
3	Bobcat	ML	G	N	G, FG	R	SL	SL	S	S	zippers, rough shoulders, catfacing, cracks
4	Quali T-21	VL	G	N	G	M	T	SL	SL	SL	sunburn, good greens
5	Quali T-23	L	OK	N	G, FG	MS	M	S	SL	S	stink bug, BER, blossom end
6	Scout	ML	OK	S	G	M	T	SL	N	S	
7	Wolverine	ML	OK	SL	G, FG	S	SL	SL	N	S	stink bug, lots of red
8	Shady Lady	L	G	S	G, FG	M	T	SL	N	SL	lots of red, shoulders

See notes next page.

Table 8. Fresh market tomato fruit and vine characteristics. San Joaquin County, 2006.

REPLICATED varieties.

Var #	Variety	Vine Size	Leaf cover	Leaf roll	Fruit shape	Roughness	Blossom end	Sunburn	Cat-facing	Zip-pers	Comments
1	PS 2942	L/XL	G	N	G - FG	S	M	N	SL	S	
2	PS 2935	L	OK	N	G - FG	S	T-M	N	SL	SL	
3	Bobcat	XL	G	N	G - FG	S	SL-S	N	SL	SL	
4	Quali T-21	XL	OK	SL	DG - G	S	T-SL	N	N	N	
5	Quali T-23	XL	OK	SL	DG - G	S	T-S	N	SL	SL	
6	Scout	L/XL	OK	SL	DG - G	S	T-S	N	N	N	
7	Wolverine	L	G	SL	G-FG	M	SL-S	N	S	SL	blackmold
8	Shady Lady	L	-	-	FG	M	T-SL	N	SL	N	lots of small, angular fruit (no seeds)

Vine Size: M = medium ML = medium large L = large VL = very large
 Leaf Cover: P = poor OK = adequate G = good VG = very 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: disease resistance provided by company
 V = verticillium wilt
 FF = Fusarium wilt race 1 and 2
 N = nematodes
 T = tobacco mosaic virus
 Asc = Alternaria stem canker, St = Stemphyllian, Sw = Spotted Wilt, Ty = tomato yellow leaf curl virus

Table 9. Fresh market tomato (round) variety trial yield and grade results, Fresno County 2006. OBSERVED varieties.

Code Variety	Market Yield		M --- % Marketable Yield ---	L	XL	S Tons/A	Total Tons/A	Total Yield		culls Tons/A
	Tons/A	Boxes/A						Culls %	Red %	
9 HMX 5790	35.9	2873	18.5	52.0	29.5	4.4	48.0	16.1	1.0	7.68
10 HMX 6812	31.1	2489	21.9	50.3	27.8	5.8	46.1	19.9	0.0	9.13
11 SXT 6764	38.0	3043	16.0	46.0	38.1	4.5	53.9	21.2	25.8	11.42
12 SXT 6782	40.7	3260	10.1	41.9	48.0	2.2	59.7	28.1	15.4	16.80
13 SXT 6783	51.8	4140	11.2	30.1	58.7	5.0	73.7	22.9	17.0	16.89
14 SXT 6784	47.5	3801	17.9	49.9	32.1	8.7	70.7	20.6	15.1	14.54
Average	40.8	3267.7	15.9	45.0	39.0	5.1	58.7	21.5	12.4	12.7
LSD 0.05										
CV %										

Table 10. Fresh market tomato (round) variety trial yield and grade results, MERCED COUNTY, 2006. OBSERVED varieties.

Code Variety	Market Yield		M --- % Marketable Yield ---	L	XL	S Tons/A	Total Tons/A	Total Yield		culls Tons/A
	Tons/A	Boxes/A						Culls %	Red %	
9 HMX 5790	30.9	2471.5	28.7	38.0	33.3	7.9	50.1	22.4	8.2	11.2
10 HMX 6812	27.8	2224.9	36.1	42.2	21.7	8.4	44.1	17.9	13.0	7.9
11 SXT 6764	12.5	999.9	40.2	42.1	17.7	5.4	33.3	46.3	9.7	15.4
12 SXT 6782	13.8	1107.1	40.9	44.6	14.5	8.0	31.9	31.5	6.6	10.1
13 SXT 6783	18.9	1514.5	22.3	55.4	22.3	3.1	51.6	57.3	5.8	29.6
14 SXT 6784	23.4	1868.4	22.0	54.9	23.1	3.1	54.2	51.3	16.1	27.8
15 10442	3.4	268.1	47.0	53.0	0.0	3.9	25.5	71.6	17.5	18.3
16 11091	11.6	924.8	47.8	40.6	11.6	7.9	34.2	42.9	18.1	14.7
17 5151	9.3	747.9	42.3	44.8	12.9	4.8	39.9	64.6	7.4	25.8
18 6260-D	5.1	407.5	67.1	32.9	0.0	10.1	27.4	44.6	4.9	12.2
Average	15.7	1253	39.4	44.8	15.7	6.3	39.2	45.0	10.7	17.3
LSD 0.05										
CV %										

See notes next page.

Table 11. Fresh market tomato variety trial yield and grade results, SAN JOAQUIN COUNTY, 2006. OBSERVED varieties.

Code	Variety	Market Yield		M	L	XL	S	Total	Total Yield		culls
		Tons/A	Boxes/A						Culls %	Red %	
9	HMX 5790	4.8	383.3	18.2	69.1	12.7	6.7	13.3	13.3	0.0	1.8
10	HMX 6812	8.2	656.9	37.1	43.0	19.9	5.6	19.4	29.2	2.2	5.7
11	SXT 6764	9.3	740.5	35.1	40.0	24.9	5.5	25.5	42.2	1.7	10.8
12	SXT 6782	7.4	592.4	29.7	37.9	32.4	6.1	16.0	15.7	2.0	2.5
13	SXT 6783	7.8	622.0	39.5	40.1	20.4	5.1	22.1	41.8	2.5	9.2
14	SXT 6784	5.2	414.7	42.0	27.3	30.7	5.7	18.9	42.4	3.0	8.0
15	10442	8.0	643.3	51.3	32.5	16.3	4.5	17.4	27.9	0.0	4.8
16	11091	16.7	1339.9	24.2	49.4	26.4	4.1	25.7	19.0	0.0	4.9
17	5151	9.6	768.4	29.9	37.6	32.4	1.5	21.3	47.6	0.0	10.1
18	6260-D	4.9	393.8	48.7	51.3	0.0	4.7	15.5	37.7	0.0	5.8
Average		8.2	656	35.6	42.8	21.6	4.9	19.5	31.7	1.1	6.4
LSD 0.05											
CV %											

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 could not be calculated because there was no replication.

CV = coefficient of variation, could not be calculated.

Table 12. Fresh market tomato (round) variety trial yield and grade results, COMBINED ANALYSIS, 2006.

VARIETY	MKT t/a	MKT box	M	L	XL	S	TTL	Culls	Red	Cull
			%	%	%	t/a	t/a	%	%	t/a
13 SXT 6783	26.2 (01)	2092.3 (01)	24.3 (09)	41.9 (08)	33.8 (01)	4.4 (08)	49.1 (01)	40.7 (03)	8.4 (05)	18.6 (01)
14 SXT 6784	25.4 (02)	2028.0 (02)	27.3 (07)	44.0 (04)	28.6 (03)	5.8 (04)	47.9 (02)	38.1 (04)	11.4 (02)	16.8 (03)
9 HMX 5790	24.5 (03)	1962.0 (03)	22.1 (10)	53.3 (01)	24.5 (06)	6.4 (03)	38.2 (05)	17.5 (10)	3.7 (10)	7.2 (10)
16 11091	23.2 (04)	1859.4 (04)	30.5 (05)	45.3 (03)	24.2 (07)	5.7 (05)	39.2 (04)	26.7 (07)	11.3 (03)	10.2 (06)
10 HMX 6812	22.9 (05)	1829.7 (05)	32.1 (03)	45.7 (02)	22.2 (08)	6.5 (02)	36.9 (07)	22.2 (09)	5.1 (08)	7.6 (09)
12 SXT 6782	20.6 (06)	1653.0 (06)	26.9 (08)	41.5 (10)	31.6 (02)	5.4 (06)	35.9 (08)	25.1 (08)	8.0 (06)	9.8 (07)
11 SXT 6764	19.9 (07)	1594.7 (07)	30.4 (06)	42.7 (06)	26.9 (05)	5.1 (07)	37.6 (06)	36.6 (06)	12.4 (01)	12.5 (04)
17 5151	18.5 (08)	1484.9 (08)	30.6 (04)	41.5 (09)	27.8 (04)	2.9 (10)	39.8 (03)	51.9 (01)	6.0 (07)	18.4 (02)
15 10442	14.8 (09)	1182.4 (09)	43.7 (02)	43.1 (05)	13.3 (09)	3.9 (09)	30.7 (09)	45.5 (02)	11.0 (04)	12.0 (05)
18 6260-D	14.1 (10)	1127.4 (10)	52.4 (01)	42.4 (07)	5.2 (10)	7.1 (01)	30.7 (09)	36.9 (05)	4.7 (09)	9.4 (08)
Average	18.7	1498.9	32.6	44.2	23.2	5.5	36.3	34.5	7.5	12.1
LSD @ 0.05=	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.
C.V.=	39.9	40.0	27.5	25.4	41.5	38.9	21.4	30.8	76.2	35.9

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.

NS = not significant at the 95% probability level.

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

Table 13. Fresh market tomato fruit and vine characteristics. Fresno County, 2006.

OBSERVED Varieties

Var #	Variety	Vine size	Vine cover	Fruit shape	Roughness	Blossom end	Sunburn	Zip-pers	Overall	Comments
9	HMX 5790	VL	VG	G-DG	S	1-2	N	N	G-VG	many immatures- lost crown set, late but fruit looks good
10	HMX 6812	VL	VG	G	R	1-3	N	N	F-G	shape flatter than #9, I like #9 better, just rougher
11	SXT 6764	M	F	FG-GL	MED	2-3	S		F	Big yield, smooth, blossom end a little rough, leaf curl
12	SXT 6782	L-VL	G	FG-G	VR	2-3		S	F-P	too rough, not smooth, zippers
13	SXT 6783	ML-L	F	FG-G	Rough-	2-3			F	huge yield, rough shape
14	SXT 6784	ML-L	F	FG-G	MED	2-3			F-G	huge yield, rough shape, a lot of leaf curl

Varieties are all very similar (visually); some pointed ends

- Vine size** VL=very large, L=large, M=med, S=small
- Vine cover** C=compact, SC=semi-compact, F=floppy
- Fruit shape** DG=deep globe, G=globe, FG= flat globe
- Roughness** VS=very smooth, S=smooth, M=med, R=rough
- Blossom end** 1=very tight, 5=very open
- Sunburn** N=none, SL=slight, S=Some, M=Much
- Zippers** N=none, SL=slight, S=Some, M=Much
- Overall** VG=very good, G=good, F=Fair, P=poor

Table 14. Fresh market tomato fruit and vine characteristics. Merced County, 2006.

OBSERVATIONAL varieties.

Var #	Variety	Vine Size	Leaf cover	Leaf roll	Fruit shape	Roughness	Blossom end	Sunburn	Cat-facing	Zip-pers	Comments
9	HMX 5790	VL	OK	N	G	M	T	S	N	SL	shoulders
10	HMX 6812	VL	G	N	FG	M	M	SL	SL	SL	blossom end, shoulders
11	SXT 6764	L	OK	S	DG	S	SL	SL	SL	S	lots red, some TSWV
12	SXT 6782	L	OK	S	DG	S	SL	SL	SL	S	
13	SXT 6783	VL	OK	N	G	R	SL	S	SL	SL	blotchy ripening, cracks
14	SXT 6784	L	OK	S	G	R	M	S	S	S	cracks, zippers, blotchy ripening
15	10442	L	OK	S	FG	R	M	SL	S	S	zippers, sm fruit, green shoulders
16	11091	L	OK	S	FG	R	M	S	SL	S	rough shoulders, green shoulders
17	5151	L	F	S	FG	R	M	S	S	S	rough shoulders, cat facing
18	6260-D	VL	G	S	G	R	SL	SL	S	S	small, zippers

See notes next page.

Table 15. Fresh market tomato fruit and vine characteristics. San Joaquin County, 2006. OBSERVED varieties.

Var #	Variety	Vine Size	Leaf cover	Leaf roll	Fruit shape	Roughness	Blossom end	Sunburn	Cat-facing	Zip-pers	Comments
9	HMX 5790	XL	G	SL	-	-	-	N	-	-	
10	HMX 6812	XL	G	SL	G	S	1/2	N	N	S	green flecking
11	SXT 6764	M/L	OK	S	G	S	1	N	SL	S+	lots of over-ripe reds
12	SXT 6782	XL	G	S	G	M	2/3	N	N	SL	
13	SXT 6783	L/XL	G	SL	FG - G	MR - R	1/2	N	SL	S	
14	SXT 6784	M	OK	S	G	S	2	N	N	SL	
15	10442	L	OK	N	FG	S	1/2/3	N	SL	S	
16	11091	XL	OK	S	G - FG	S	2/3	N	N	S	a bit green-stripey
17	5151	XL	G	-	FG	R	2/3	N	SL	S	a bit green-stripey
18	6260-D	XL	G	SL	FG	M	2/3	N	N	S	

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
 Cat Facing: N = none SL = slight S = some
 Maturity: - = earlier than T-21 0 = same as T-21 + = later than T-21
 Sunburn: N = none SL = slight S = some
 Zippers: N = none SL = slight S = some
 Disease: disease resistance provided by company
 V = verticillium wilt
 FF = Fusarium wilt race 1 and 2
 N = nematodes
 T = tobacco mosaic virus
 Asc = Alternaria stem canker, St = Stemphyllian, Sw = Spotted Wilt, Ty = tomato yellow leaf curl virus

Table 16. Fresh market tomato ROMA variety trial yield and grade results, FRESNO COUNTY, 2006. REPLICATED varieties.

Code	Variety	Market Yield		S	M	L	XL	S	Total	Total Yield		culls
		Tons/A	Boxes/A							---	% Marketable Yield	
R1	Monica	40.8	3264.5	11.2	21.4	39.6	27.8	4.6	42.3	3.5	13.1	1.5
R2	BSS 526	21.9	1750.2	42.9	53.9	3.2	0.0	9.2	22.3	2.0	64.3	0.4
R3	SD257	32.6	2607.6	8.6	26.7	44.5	20.1	2.8	35.1	7.2	29.7	2.5
R4	Mi Rey	38.9	3113.7	5.8	22.5	45.0	26.7	2.3	39.8	2.2	21.6	0.9
R5	Mi Roma	35.1	2809.5	6.2	23.0	51.0	19.7	2.1	35.9	2.3	36.2	0.8
R6	PX 739	37.2	2978.6	5.2	15.8	53.1	25.9	1.9	38.0	2.0	23.0	0.8
	Average	34.4	2754.0	13.3	27.2	39.4	20.0	3.8	35.6	3.2	31.3	1.2
	LSD 0.05	6.6	525.4	10.3	9.4	10.0	5.2	2.5	6.7	3.1	14.0	1.1
	CV %	12.7	12.7	51.2	22.9	16.8	17.3	44	12.5	64	29.6	62.1

See notes next page

Table 17. Fresh market tomato ROMA variety trial yield and grade results, MERCED COUNTY, 2006. REPLICATED varieties.

Code	Variety	Market Yield		S ---	M %	L Marketable	XL Yield	S ---	Total	Total Yield		culls Tons/A
		Tons/A	Boxes/A							Tons/A	Tons/A	
R1	Monica	25.9	2070.1	25.5	51.1	23.4	0.0	6.6	46.9	28.2	16.4	14.5
R2	BSS 526	13.7	1093.7	72.5	27.5	0.0	0.0	10.0	43.6	21.7	46.3	10.8
R3	SD257	19.7	1577.5	20.8	58.8	20.4	0.0	4.2	40.7	35.2	16.6	15.6
R4	Mi Rey	21.6	1731.0	29.4	54.7	15.8	0.0	6.4	50.7	35.9	21.4	20.4
R5	Mi Roma	24.1	1927.4	30.7	40.1	29.2	0.0	7.5	52.6	23.2	30.9	13.6
R6	PX 739	25.8	2062.1	22.2	59.8	18.0	0.0	5.7	50.4	37.4	11.1	20.9
	Average	21.8	1743.6	33.5	48.7	17.8	0.0	6.7	47.5	30.3	23.8	16.0
	LSD 0.05	4.2	336	8.2	12.1	11.4	NS	2.8	8	NS	13.9	NS
	CV %	12.8	12.8	16.2	16.5	42.4	---	27.2	11.2	26.8	38.7	34.1

Table 18. Fresh market tomato ROMA variety trial yield and grade results, SAN JOAQUIN COUNTY, 2006. REPLICATED varieties.

Code	Variety	Market Yield		S ---	M %	L Marketable	XL Yield	S ---	Total	Total Yield		culls Tons/A
		Tons/A	Boxes/A							Tons/A	Tons/A	
R1	Monica	19.9	1590.2	73.7	18.4	7.9	0.0	14.4	24.6	19.6	4.1	4.7
R2	BSS 526	8.0	640.0	84.2	14.3	1.5	0.0	6.8	11.1	27.0	7.2	3.1
R3	SD257	19.7	1578.6	55.6	25.5	18.9	0.0	11.1	27.1	27.5	6.4	7.3
R4	Mi Rey	17.4	1391.6	55.7	29.6	14.7	0.0	10.1	21.1	17.3	4.1	3.7
R5	Mi Roma	19.3	1543.8	60.6	21.7	17.7	0.0	11.7	24.4	20.8	3.9	5.1
R6	PX 739	20.3	1628.0	62.2	21.3	16.5	0.0	12.6	23.8	13.4	1.7	3.4
	Average	17.4	1395.4	65.3	21.8	12.9	0.0	11.1	22.0	20.9	4.6	4.6
	LSD 0.05	6.0	477.0	16.6	NS	11.0	NS	4.4	7.6	NS	NS	NS
	CV %	18.8	18.8	14	29.3	47	---	21.7	19	32.4	69.6	34.7

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

S, M, L, XL% = 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 = > 165 g

L = 130 - 165 g

M = 90 - 130 g

S = 50 - 90 g

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 19. Fresh market tomato ROMA variety trial yield and grade results, COMBINED ANALYSIS, 2006.

VARIETY	MKT t/a	MKT box	S %	M %	L %	XL %	S t/a	TTL tons	Culls %	Red %	Cull t/a
1 Monica	29.7 (01) A	2373.5 (01)	33.4 (02)	31.4 (04)	25.1 (04)	10.1 (01)	8.0 (02)	39.2 (01)	16.9 (05)	11.8 (05)	7.1 (05)
6 PX 739	28.5 (02) A	2277.0 (02)	26.9 (05)	33.3 (03)	30.3 (03)	9.4 (03)	6.2 (04)	38.6 (04)	18.0 (06)	12.9 (06)	8.8 (06)
5 Mi Roma	26.8 (03) A B	2143.5 (03)	29.9 (03)	28.9 (06)	34.0 (01)	7.2 (05)	6.6 (03)	38.9 (03)	15.0 (04)	25.5 (02)	6.7 (03)
4 Mi Rey	26.8 (04) A B	2141.2 (04)	28.0 (04)	36.2 (01)	26.2 (04)	9.7 (02)	5.9 (05)	38.7 (02)	18.6 (03)	16.8 (04)	8.8 (02)
3 SD257	24.4 (05) B	1952.4 (05)	25.9 (06)	38.0 (02)	28.8 (02)	7.3 (04)	5.5 (06)	35.0 (05)	23.0 (02)	18.6 (03)	8.6 (04)
2 BSS526	15.1 (06) C	1208.7 (06)	64.9 (01)	33.5 (05)	1.6 (06)	0.0 (06)	8.8 (01)	27.0 (06)	16.0 (01)	42.2 (01)	4.9 (01)
Average	25.2	2016.1	34.8	33.5	24.3	7.3	6.9	36.2	17.9	21.3	7.5
LSD @ 0.05=	3.1	243.3	6.0	N.S.	5.9	1.8	1.7	4.1	NS	7.0	N.S.
C.V.=	14.2	14.0	20.0	20.9	28.2	29.2	28.3	13.1	34.4	38.3	46.3
	N.S.	N.S.	10.8	10.8	10.6	3.3	3.0	7.3	9.5	12.6	NS
	N.S.	N.S.	10.0	10.0	9.8	3.0	2.8	6.8	8.8	11.7	NS

VARIETY X
LOCATION LSD @
0.05 (Between
Merced and Fresno
Means, 4 blocks
each) =

VARIETY X
LOCATION LSD @
0.05 (Between SJC
means, 3 blocks
each, and Merced
or Fresno Means) =

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

S, M, L, XL % = 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 = > 165 g

L = 130 - 165 g

M = 90 - 130 g

S = 50 - 90 g

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.

Var x Location LSD = least significant difference between the same variety at different locations.

A significant var x location interaction indicates the varieties perform differently depending on location.

NS = not significant at the 95% probability level.

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

Table 20. Fresh market tomato fruit and vine characteristics. FRESNO COUNTY, 2006.

ROMA Varieties										
Code	Variety	Vine size	Vine cover	Fruit shape	Roughness	Blossom End	Sun-burn	Zippers	Overall	Comments
R1	Monica	L	G	blocky round	S	1		N	G	Nice & smooth, big yield, large fruit
R2	BSS 526	VL	VG	long, slim pear	S	1		N	G	Sm, skinny fruit, smooth & uniform, early low yield
R3	SD 257	L-VL	VG	blocky square	MED	1		N	F-G	large fruit, variable shape
R4	Mi Rey	M-ML	F-G	blocky round	S	1		N	F-G	smooth fruit
R5	Mi Roma	L	G	blocky square	VS-MED	1		N	F-G	variable fruit
R6	PX 739	ML	G	blocky round	S	1		N	G	some fruit blemish

Table 21. Fresh market tomato fruit and vine characteristics. MERCED COUNTY, 2006.

ROMA Varieties											
Var #	Variety	Vine Size	Leaf cover	Leaf roll	Fruit shape	Roughness	Blossom end	Sun-burn	Cat-facing	Zip-pers	Comments
R1	Monica	L	G	N	roma	S	T	SL	N	SL	sl worms, zippers, sunburn
R2	BSS 526	ML	G	N	thin	S	T	SL	N	SL	worms, sunburn, small
R3	SD257	ML	OK	SL	blocky	S	T	SL	N	S	zippers, blotchy, sunburn
R4	Mi Rey	L	G	N	pointed	S	T	SL	N	SL	worms, sunburn
R5	Mi Roma	L	G	N	blocky	S	T	N	N	SL	lg red fruit, gold fleck
R6	PX 739	L	G	N	roma	S	T	N	N	S	blotchy, stinkbog, uneven ripen

Table 22. Fresh market tomato fruit and vine characteristics. SAN JOAQUIN COUNTY, 2006.

ROMA Varieties											
Var #	Variety	Vine Size	Leaf cover	Leaf roll	Fruit shape	Roughness	Blossom end	Sun-burn	Cat-facing	Zip-pers	Comments
R1	Monica	L/XL	G	SL	blocky	S	T	N	N	SL	stems easy, slightly soft
R2	BSS 526	L/XL	G	SL	pear	S	T	N	N	SL	small fruit, stems easy, firm
R3	SD257	L/XL	OK	SL	pointed	S	T	N	N	S	stems hard, med. Firm
R4	Mi Rey	L/XL	OK	SL	pointed	S	T	N	N	N	stems slightly hard, somewhat soft
R5	Mi Roma	L/XL	-	-	long	S	T	N	N	SL	lots v. small fruit, late maturing, firm
R6	PX 739	L/XL	-	-	pear	S	T	N	N	SL	late maturing, med. firm

See notes Table 15.

Fruit Size

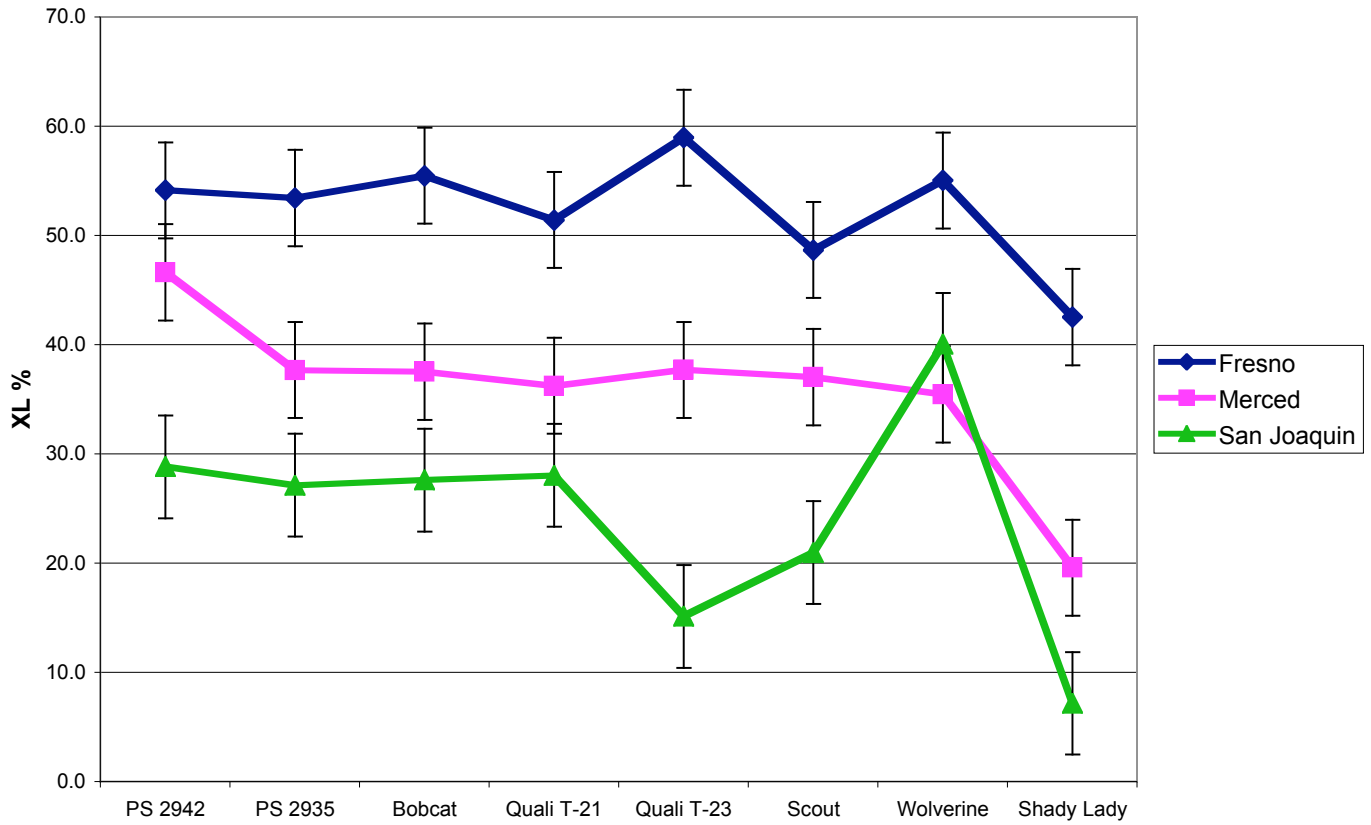


Figure 1. XL fruit size by county from the replicated round trials. Fresno had significantly more XL fruit than the other locations. Error bars show the location x variety LSD from Table 5.