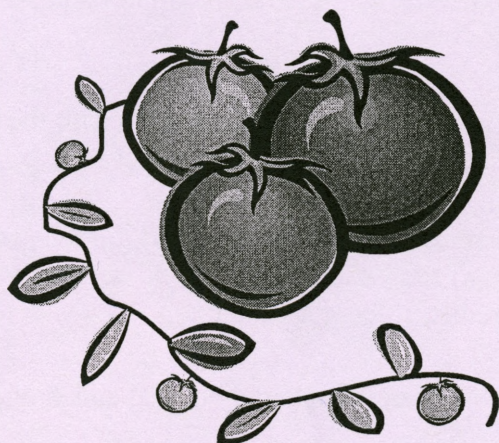
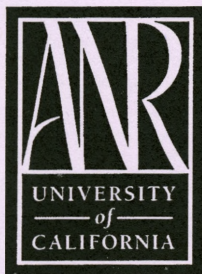


2002
Fresh Market Tomato
Statewide Uniform Variety Trial Report
Field and Postharvest Evaluations
South San Joaquin Valley

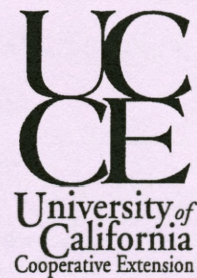


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2002 Fresh Market Tomato Variety Trial Research Report

South San Joaquin Valley

Michelle Le Strange, Farm Advisor, Tulare & Kings Counties

ACKNOWLEDGMENTS

I would like to express my gratitude to a few individuals for their assistance in conducting these field trials. Without their help, this information would not be available for use by the fresh market tomato industry

SPECIAL THANKS TO ...

- ★ The California Tomato Commission for their support and John LeBoeuf for his interest and help in the projects;
- ★ Richard Newton of Jones Farms for his cooperation with the management of the variety and thrips trials; Joe Fabry for his interest in the research at Jones Farms;
- ★ Marita Cantwell, postharvest specialist, UC Davis, for her lead and cooperation in the postharvest evaluations of the variety trial; Mann Laboratory Xunli Nie, research associate, and Paula Freitas, student assistant;
- ★ The commercial seed companies that supplied seed and support for the variety trial,
- ★ Michael Vietti of Edwards Nursery in Visalia for raising the transplants for the variety trial,
- ★ John Soares, Brad Binning, Francis Ferreira, Brandon Brown and Jan Bowen for their hard work as field research assistants.
- ★ Edna Blackhurst, secretary

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2002 Fresh Market Tomato Variety Trial Report - Kings County

Michelle Le Strange, Farm Advisor

Introduction

Fresh market tomato trials are conducted by UCCE in Kings/Tulare, Merced, and San Joaquin counties. These trials assist in evaluation of the performance of new varieties and breeding lines from commercial plant breeding programs. To assess performance under various climatic conditions, soil types, and cultural practices, the same varieties are planted at each location but with different transplant dates: early, mid, and late season for Kings, Merced, and San Joaquin, respectively

Two tests are conducted at the same time and location. A replicated test consists of varieties or lines which have previously been in trials and grown commercially. An observed test evaluates the plant breeder's most promising lines for California's commercial growing conditions and markets. This report summarizes both the replicated and observed variety test conducted in Kings County

Trial Procedure

The 2002 variety trial was established in a fresh market tomato field near Kettleman City in Kings County. Seeds were planted in the greenhouse on February 21 and set in the field with a commercial three-row planter on April 18 for a midsummer harvest. Specific information about the field and the research trial is presented in Table 1. Twelve varieties were replicated four times, and 17 varieties were observed in single plots. Variety names, code numbers, and sources of seed are listed in Table 2. The tomato variety trial was grown under subsurface drip irrigation and the grower's standard cultural practices.

The varieties were hand harvested on July 11, 84 days after transplanting. Ten consecutive feet of row were harvested from each plot, though plot size was larger. Red fruit were picked into

buckets and weighed separately before they were sorted by size and quality with the mature green fruit. Yields and market grades of the replicated and observed varieties are presented in Tables 3 (A&B) and 5, while Tables 4 and 6 are summaries of the fruit quality characteristics.

Reported yields may appear extraordinarily high compared to commercial averages. Under these experimental conditions, one goal is to ascertain "potential" yield of varieties and to make relative comparisons between varieties. We tend to pick and grade more fruit than commercial harvesters, who are more discriminating in what goes to market. Also, converting pounds per plot to tons per acre exaggerates yield because drive rows, roadways, etc., and other poor areas in the field are not considered.

Some key terms used in data analysis are defined and listed on the back page of this report.

Summary

Weather conditions were near optimal during the growing season. Days were warm to hot and nights were cool to warm with gradual changes in temperatures and no extreme temperature fluctuations. In general the plants had a good first (crown) and subsequent setting of fruit. So there was a good fruit load on most plants. Vine growth was adequate, yet not excessively vegetative. Three days prior to harvest the region did experience sudden hot temperatures, which lead to a rapid acceleration in fruit maturity and percentage of red fruit.

In general fruit quality was good and better than average. The amount of small fruit seemed lower than usual, while the amount of culls was typical.

Marketable yields were 7.6 and 2.8 tons higher on average in 2002 than in 2001 and 2000, respectively. Total yields were 13.7 and 9.1 tons

higher on average in 2002 than in 2001 and 2000, respectively. Percent red fruit at harvest were approximately the same as in 2001 and ten percent higher than in 2000.

Trial Averages By Year

	Yield Tons/A		%
	Market	Total	
2002	28.7	45.6	21.7
2001	21.1	31.9	21.1
2000	24.9	36.5	11.4

REPLICATED VARIETIES

Yields and Grades (Tables 3A & 3B)

Market Yield: Market yield ranged from a high of 32.1 to a low of 25.9 tons per acre (2569 to 2075 boxes per acre). Average yield was 28.7 tons (2297 boxes) per acre. This is only a 6.2 T/A range difference between high and low yields among the 12 varieties.

Bobcat was significantly higher in yield than QualiT 23 but that was the only statistically significant difference in market yield. All other varieties had yields equal to Bobcat, which happened to top the list.

Total Yield: The varietal ranking shifts somewhat when sorted by total yield. BHN 358 rises to the top but is not statistically different from B-807, Bobcat, QualiT 21, or BHN 503. QualiT 23 and Shady Lady remain near the bottom but are not statistically different from varieties closer to the top of the ranking.

Fruit Grades: The trial averaged 47.1, 37.7, and 14.3% medium sized fruit. This is a higher percentage of larger size fruit and a lower percentage of medium size fruit than is normally observed in this trial. Five varieties averaged greater than 55% extra large fruit sizes: Bobcat, QualiT 21, BHN 358, B-807, and BHN 503. Shady Lady averaged 34.6% extra large fruit.

Three varieties were lower than Shady Lady: SRT 6719 (32.7), SRT 6718 (32.2) and SRT 6722 (29.0).

Medium size fruit ranged from 5.6 to 25.6% of a variety's marketable yield. Shady Lady's market yield was composed of 22.0% medium sized fruit, while Bobcat was 10% medium sizes. Also high in medium fruit were SRT 6718, SXT 6624, and SRT 6719.

Nonmarket Yield: Nonmarket yield includes small sized fruit and culls. Small fruit ranged from 0.7 to 3.3 and averaged 1.5 tons per acre over all varieties. Culls ranged from 10.2 to 21.0 and averaged 15.4 tons per acre for the trial.

Percent Red Fruit at Harvest: The field maturity averaged 21.7% red fruit at harvest. Varieties ranged from 36.6% (PS 150440) to 11.1% (SRT 6718) red fruit. Shady Lady was 28.1% red and Bobcat was 15.3% red at picking.

Fruit and Vine Characteristics (Table 4)

Fruit shape ranged from flat globe to deep globe. Bobcat and SRT 6722 tended to have a deep globe shape, although some fruit of SRT 6722 were oblong and roma shaped. QualiT 21, SRT 6718, SXT 6624, and SRT 6719 had globe shape fruit. Shady Lady was flat globe to globe in shape along with BHN 358, BHN 503, and QualiT 23. PS 150440 had fruit with uniform flat globe shape, whereas B-807 was more variable.

Because of good weather during the growing season fruit shoulders were fairly smooth and evenly filled. Blossom end scars were also tight in general and not as variable as they can be when weather fluctuates during the growing season.

Sometimes the stem scar can be huge, distorted, or ugly when the calyx is removed at picking, but these varieties all looked okay this year.

Vine size ranged from medium to very large, but most varieties were medium large and because

the fruit set was fairly concentrated toward the crown of the plant they did not flop over into the furrows too much with the exception of B-807 and BHN 358.

All varieties had some sunburn due to fruit exposure, but Bobcat, QualiT 21, SXT 6624 and QualiT 23 had great leaf cover

Overall quality is based on visual appeal and represents a general conclusion based on all quality characteristics. Bobcat and QualiT 21 topped the list. Shady Lady was better than usual (which is typically good enough for the market). Most varieties were quite acceptable, however, BHN 358 and B-807 suffered because vine did not provide enough fruit cover and protection from sunburn.

OBSERVED VARIETIES

Single plot observations are useful to obtain an indication of a variety's potential. However, yield and other data are not an average of several plots, so there is more room for error. For this reason the absolute numbers are not as meaningful as in replicated trials.

Yields and Grades (Table 5)

Marketable yields ranged from 38.9 to 17.3 tons (3114 to 1381 boxes) per acre. Total yields ranged from 48.0 to 30.5 tons per acre.

Top yielding lines of marketable fruit include AT 48, BHN 499, 500, and 501, XP 150410, AT 89, BHN 464, and HMX 2807

When total yield is considered, there is a slight change in order. Some of the earliest varieties rise to the top like BHN 524, XP 150410, and EX 01981574. These varieties had 15 tons of cull fruit and many of those could have been red mature fruit.

EX 01981574 was the earliest maturing variety followed by BHN 464, HA 3640, AT 89, and BHN 524.

Fruit and Vine Characteristics (Table 6)

At a field day on July 9th one plant from each plot was shaken and the fruit was placed at the front of the plot so that it could be viewed off the vine. Representative fruit were sliced in half and visual assessments of wall thickness were observed and reported under fruit qualities. BHN 499 and BHN 464 had very thick walls. Most lines fell in the thick category. A few lines were categorized as medium thick: XP 150410, BHN 524, and EX 01981574.

As in the replicated trial there was variability in fruit shape, shoulder smoothness, blossom end, and vine qualities, however there was a wider range of response to most of these characteristics.

Some of the lines looked very good, such as XP 150410, BHN 501, EX 01981574, and BHN 500.

A few of the lines were not well adapted to this growing area or are too rough, misshapen, or low in yield.

2002 Fresh Market Tomato Variety Trial
South San Joaquin Valley – Kings County

Table 1

Trial Specifics

Cooperators	Jones Farms – Richard Newton, grower; Joe Fabry, ag consultant
Trial Location	Highway 41 and Quail Avenue, Kettleman City
Soil Type	Panoche fine sandy loam
Previous Crop	Cotton
Transplant Date	April 18, 2002 Greenhouse Seeded: Feb. 21, 2002
Plot Size	Replicated. One 60-inch bed x 37-foot row; 20 plants per plot Observed: One 60-inch bed x 55-foot row; 30 plants per plot
Plant Spacing	22 inches between plants; single row per bed
Field Variety	Shady Lady
Pesticides	Admire® and Ridomil® at planting; Asana®
Fertilization	~140 lbs N, 75 lbs P ₂ O ₅ and 85 lbs K ₂ O
Irrigation	Subsurface drip irrigation
Harvest Date	July 11, 2002 - 84 days after transplant
Harvest Plot Size	One 60-inch bed x 10-foot row
Experimental Design	Randomized Complete Block (4 replications)

2002 Fresh Market Tomato Variety Trial
South San Joaquin Valley – Kings County

Table 2

Seed Sources and Varieties

Source	Replicated		Observed	
American Takii			21	AT 48
			22	AT 89
BHN	1	BHN 358	23	BHN 464
	2	BHN 503	24	BHN 499
			25	BHN 500
			26	BHN 501
			27	BHN 524
Harris Moran			28	Mtn Fresh
			29	HMX 2807
Hazera			30	HA 3603
			31	HA 3638
			32	HA 3640
LSL Plant Science	3	B-807	33	B-812
Seminis	4	PS 150440	34	XP 150410
			35	EX 01981574
Sunseeds	5	SRT 6718	36	SRT 6728
	6	SRT 6719	37	Classy Lady
	7	SRT 6722		
	8	SXT 6624		
	9	Shady Lady		
Syngenta	10	QualiT 21		
	11	QualiT 23		
	12	Bobcat		

Table 3-A

2002 YIELDS AND GRADES OF FRESH MARKET TOMATO VARIETIES
South San Joaquin Valley - Kettleman City, Kings County
Replicated Varieties
Sorted by Marketable Yield

Code	Variety	Market			% Market Yield ²			Nonmarket		TOTAL Yield ⁵ T/A	% Reds ⁶
		 Yield/Acre ^{1*}			X-L	Large	Med	Small ³ T/A	Culls ⁴ T/A		
12	Bobcat	32.1	2569	a	59.8	30.2	10.0	0.9	15.5	48.5	15.3
10	QualiT 21	31.6	2524	ab	59.2	31.7	9.1	0.7	15.1	47.4	11.4
5	SRT 6718	29.8	2380	ab	32.2	42.3	25.6	3.3	10.2	43.2	11.1
1	BHN 358	29.7	2378	ab	63.5	28.0	8.5	0.9	21.0	51.6	27.6
3	B-807	28.9	2313	ab	64.5	29.9	5.6	0.8	18.9	48.7	22.1
8	SXT 6624	28.8	2303	ab	35.9	44.2	19.9	1.8	12.9	43.4	25.8
6	SRT 6719	28.7	2294	ab	32.7	47.8	19.6	2.0	14.4	45.1	17.1
4	PS 150440	27.8	2220	ab	42.9	40.8	16.3	1.9	14.7	44.3	36.6
7	SRT 6722	27.6	2205	ab	29.0	45.8	15.2	1.6	15.5	44.6	22.4
9	Shady Lady	27.1	2170	ab	34.6	43.4	22.0	2.4	12.0	41.6	28.1
2	BHN 503	26.7	2138	ab	57.7	33.3	9.0	0.9	18.6	46.2	22.6
11	QualiT 23	25.9	2075	b	54.0	35.5	10.6	1.2	15.9	43.0	20.6
	Average	28.7	2297.4		47.1	37.7	14.3	1.5	15.4	45.6	21.7
	LSD 05	5.6	446.4		12.3	8.7	8.2	1.1	5.3	6.1	7.8
	CV %	11.5	11.5		15.1	13.6	34.1	43.6	20.4	7.9	21.2

- 1 - Market Yield = average weight in pounds of four replications converted to tons and boxes per acre of all marketable extra large, large, and medium sized fruit.
2 - Percent Market Yield = the percentage of each fruit size of the market yield.
3 - Small fruit were considered unmarketable this year
4 - Culls = all unsalable fruit (catfaced, diseased, misshapen, wormy, sunburned, etc.) and extra small fruit in tons per acre (This year there were NO extra small fruit at harvest.)
5 - Total Yield = Marketable Yield plus small fruit and culls.
6 - Percent Red = percent reds by weight of the TOTAL yield including culls to indicate maturity relative to all of the tested varieties.
* - Varieties followed by the same letter are not statistically different from each other

Fruit Sizes:

XL = 2 7/8 to 3 15/16 inches in diameter
L = 2 17/32 to 2 7/8 inches in diameter
M = 2 9/32 to 2 17/32 inches in diameter
S = 2 1/8 to 2 9/32 inches in diameter

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 3-B

2002 YIELDS AND GRADES OF FRESH MARKET TOMATO VARIETIES
South San Joaquin Valley - Kettleman City, Kings County
Replicated Varieties
Sorted by TOTAL YIELD

		Market			Nonmarket			... Yield ...		TOTAL	
		 Yield/Acre ^{1*}			% Market Yield ²			Small ³	Culls ⁴	Yield ^{5*}	%
#	Variety	Tons	Boxes		X-L	Large	Med	T/A	T/A	T/A	Reds ⁶
1	BHN 358	29.7	2378	ab	63.5	28.0	8.5	0.9	21.0	51.6	a
3	B-807	28.9	2313	ab	64.5	29.9	5.6	0.8	18.9	48.7	ab
12	Bobcat	32.1	2569	a	59.8	30.2	10.0	0.9	15.5	48.5	ab
10	QualiT 21	31.6	2524	ab	59.2	31.7	9.1	0.7	15.1	47.4	abc
2	BHN 503	26.7	2138	ab	57.7	33.3	9.0	0.9	18.6	46.2	abc
6	SRT 6719	28.7	2294	ab	32.7	47.8	19.6	2.0	14.4	45.1	bc
7	SRT 6722	27.6	2205	ab	29.0	45.8	15.2	1.6	15.5	44.6	bc
4	PS 150440	27.8	2220	ab	42.9	40.8	16.3	1.9	14.7	44.3	bc
8	SXT 6624	28.8	2303	ab	35.9	44.2	19.9	1.8	12.9	43.4	bc
5	SRT 6718	29.8	2380	ab	32.2	42.3	25.6	3.3	10.2	43.2	bc
11	QualiT 23	25.9	2075	b	54.0	35.5	10.6	1.2	15.9	43.0	bc
9	Shady Lady	27.1	2170	ab	34.6	43.4	22.0	2.4	12.0	41.6	c
Average		28.7	2297.4		47.1	37.7	14.3	1.5	15.4	45.6	21.7
LSD .05		5.6	446.4		12.3	8.7	8.2	1.1	5.3	6.1	7.8
CV %		11.5	11.5		15.1	13.6	34.1	43.6	20.4	7.9	21.2

- 1 - Market Yield = average weight in pounds of four replications converted to tons and boxes per acre of all marketable extra large, large, and medium sized fruit.
2 - Percent Market Yield = the percentage of each fruit size of the market yield.
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4 - Culls = all unsalable fruit (catfaced, diseased, misshapen, wormy, sunburned, etc.) and extra small fruit in tons per acre (This year there were NO extra small fruit at harvest.)
5 - Total Yield = Marketable Yield plus small fruit and culls.
6 - Percent Red = percent reds by weight of the TOTAL yield including culls to indicate maturity relative to all of the tested varieties.
* - Varieties followed by the same letter are not statistically different from each other

Fruit Sizes:

XL = 2 7/8 to 3 15/16 inches in diameter
L = 2 17/32 to 2 7/8 inches in diameter
M = 2 9/32 to 2 17/32 inches in diameter
S = 2 1/8 to 2 9/32 inches in diameter

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 4

TOMATO FRUIT & VINE CHARACTERISTICS - 2002 Replicated Varieties
South San Joaquin Valley - Kettleman City, KINGS County

Code	Variety	Fruit shape	Shoulder Smooth	Blos End	Stem Scar	Vine Size	Leaf cover	Overall	Comments
12	Bobcat	G-DG	sm	1-2	ok	L	XLNT	G-VG	Kind of hard to stem, uniform & consistent fruit
10	QualiT 21	G	sm-med	1-3	ok	L	G-VG	G-VG	Nice unif fruit, smooth, upright vine, nice green color, zippers
5	SRT 6718	G	med	2-3	ok	ML	F-G	F-G	Pretty smooth fruit, zippers
1	BHN 358	FG-G	sm	1-2	ok	L	F-P	F-P	Floppy vine, too sunburn, some pointed ends, huge reds, rough
3	B-807	FG, var	med	1-2	ok	M	F-P	F-P	Floppy vine, too much sunburn, fruit is rough, variable
8	SXT 6624	G	med	2-3	ok	VL	G-VG	G	Some sunburn, nice shape, pretty uniform
6	SRT 6719	G	sm	2-3	ok	ML	F	F	Sunburn, incipient blos end, zippers, scarred fruit
4	PS 150440	FG	med-sm	2-3	ok	ML	G	F	Some sunburn, incipient blos end rot, kind of hard to stem
7	SRT 6722	G-DG, var	sm	2-3	ok	ML	F-G	F	Big fruit = Gl, small fruit = roma?
9	Shady Lady	FG-G	sm-med	1-3	ok	M	F-G	G	Looks better than usual, tighter blos end & better shape, bigger fruit
2	BHN 503	G-FG	Vsm	1-2	G	ML-L	F-G	F-G	Easy to pick, nice shape, v. nice blos end, too much sunburn, some pointed ends
11	QualiT 23	FG-G	sm	1-3	ok	ML-L	XLNT	G	Slit set, not as unif or as consistent as T21 or Bobcat

1 - Fruit Shape:

2 - Shoulder Smoothness:

3 - Blossom End:

4 - Stem Scar

5 - Vine Size:

6 - Leaf Cover

7 - Overall appearance:

FG = flat globe

Vsm = very smooth

1 = tight

good = great, hardly noticeable

VL = very large

XLNT - excellent cover of fruit

F = fair

VG = very good

G = globe

sm = smooth

2 = slight scar

L = large

G = good

DG = deep globe

med = medium

3 = medium scar

ok = ok

M = medium

VG = very good

P = poor, much exposed fruit

F = fair

var = variable

r = rough

4 = big scar

poor = hugely noticeable

s = small, relative to others

G = good

P = poor

Table 5
2002 YIELDS AND GRADES OF FRESH MARKET TOMATO VARIETIES - Observed Varieties
 South San Joaquin Valley - Kettleman City, KINGS County

Code	Variety	Market .. Yield/Acre ¹ ..		% Market Yield ²			NonmarketYield		TOTAL Yield ⁵ T/A	% Red ⁶
		Tons	Boxes	X-Large	Large	Medium	Small ³ T/A	Culls ⁴ T/A		
21	At 48	38.9	3114	26.1	51.1	22.8	2.3	6.7	48.0	15.8
24	BHN 499	38.3	3063	40.3	46.2	13.5	0.7	10.7	49.8	25.2
26	BHN 501	37.6	3008	45.3	40.6	14.2	1.6	9.5	48.6	25.7
25	BHN 500	35.9	2873	51.7	37.2	11.1	2.1	11.2	49.2	27.9
34	XP 150410	34.9	2792	55.9	30.1	14.0	1.6	16.5	52.9	25.0
22	AT 89	34.6	2767	26.6	47.6	25.7	2.3	13.7	50.5	36.2
23	BHN 464	34.4	2753	35.5	44.0	20.6	3.0	11.8	49.3	41.2
29	HMX 2807	34.0	2718	39.1	44.3	16.6	1.4	12.5	48.0	15.5
27	BHN 524	31.8	2542	66.1	26.9	7.0	1.7	20.0	53.4	34.0
35	EX 01981574	31.5	2517	48.9	42.5	8.6	1.7	18.5	51.6	42.2
33	B-812	29.2	2338	69.5	22.7	7.8	0.5	15.0	44.7	26.7
28	Mtn Fresh	28.4	2276	32.9	49.7	17.4	2.2	8.7	39.4	13.8
36	SRT 6728	28.2	2257	15.7	50.0	34.2	4.4	14.2	46.8	16.5
37	Classy Lady	25.0	2000	62.6	34.5	2.9	0.4	12.5	37.9	30.0
32	HA 3640	23.6	1889	44.0	39.6	16.4	2.9	15.2	41.7	36.4
31	HA 3638	19.3	1547	22.7	53.3	24.0	3.5	12.3	35.2	16.6
30	HA 3603	17.3	1381	44.0	45.1	10.9	0.7	12.6	30.5	16.4
Average		31.3	2460.8	42.8	41.5	15.8	1.9	13.0	45.7	26.2

1 - Market Yield = average weight in pounds of four replications converted to tons & boxes per acre of all marketable extra large, large, and medium sized fruit.

2 - Percent Market Yield = the percentage of each fruit size of the market fruit.

3 - Small fruit were considered unmarketable this year

4 - Culls = all unsalable fruit (catfaced, diseased, misshapen, wormy, sunburned, etc.) and extra small fruit in tons per acre. (This year there were NO extra small fruit at harvest.)

5 - Total Yield = Marketable Yield + Nonmarketable Yield

6 - Percent Red = percent reds by weight of the TOTAL yield including culls to indicate maturity relative to all tested varieties.

FRUIT SIZES:

XL = 2 7/8 to 3 15/16 inches diameter

L = 2 17/32 to 2 7/8 "

M = 2 9/32 to 2 17/32 "

S = 2 1/8 to 2 9/32 "

Table 6
TOMATO FRUIT & VINE CHARACTERISTICS - 2002 Observed Varieties
South San Joaquin Valley - Kettleman City, KINGS County

Code	Variety	Wall	Fruit shape	Shoulder Smooth	Blos End	Vine Size	Leaf cover	Overall	Comments
21	At 48	TH	GI	med	2-3	ML	XLNT	F-G	nice compact vine, fair blos end
24	BHN 499	VTH	F-GI var	med	2-3	ML	G	F	upright vine, some split, ok blos end
26	BHN 501	TH	GI	vsm	1-3	ML	F	G	vine split open, some rough fruit, fair to good blossom end
25	BHN 500	TH	GI	sm	2-4	ML	G	G-F	compact vine, ok blos end
34	XP 150410	MTH	GI	sm	1-3	L	G	G-VG	good blos end, consistent shape & size, uniform, good stem end
22	AT 89	TH	FGI	sm	1-3	L	G	F	some split in vine, fruit a little rough
23	BHN 464	VTH	GI	sm	2-3	ML	G-F	F-G	some split in vine, nice fruit shape, pretty consistent
29	HMX 2807	TH	FG-GI	med-sm	1-3	VL	G	F-G	nice blos end, later mat, nice unif med fruit, stem scar a little big, big vine, but not split
27	BHN 524	MTH	var FG-GI	rough	3-4	M	F	F	Vine split, poor blos end, var shape, rough
35	EX 01981574	MTH	FGI-GI	sm	2-4	L	Split-F	G	ok blos end, pretty uniform, good scar, earlier mat
33	B-812	TH	GI	sm	1-2	ML	Split-F	F	nice blos end, a little rough, nonuniform, some pointed ends
28	Mtn Fresh	TH	GI	vsm	1-3	ML	G	F	later mat, nice blos end, nice shoulders, okay
36	SRT 6728	TH	FG-GI	sm	2-4	ML	G	G-F	ok blos end, not real big fruit, unif & consistent, nice med size fruit
37	Classy Lady	TH	FG-GI	med	3-4	S-M	F-G	F	blos end is a little big, fruit a little rough, small vine
32	HA 3640	TH	FG	med	3-6	M	Split-F	F-P	very rough blos ends, not uniform fruit
31	HA 3638	TH	var	rough	5-6	ML	Split-F	P	no size, golf ball fruit, rough, BE rot
30	HA 3603	TH	G-FG	sm	3-5	ML	F-G	F	rough blos ends, some zipper

Wall Thickness:	VTH = very thick	TH = Thick	MTH = medium thick	
Fruit Shape:	FG = flat globe	G = globe	DG = deep globe	var = variable
Shoulder Smoothness:	Vsm = very smooth	sm = smooth	med = medium	r = rough
Blossom End:	1 = tight	2 = slight scar	3 = medium scar	4 = big scar
Stem Scar:	good = great, hardly noticeable		ok = ok	poor = very noticeable
Vine Size:	VL = very large	L = large	M = medium	s = small
Leaf Cover:	XLNT - excellent cover of fruit		VG = very good	G = good
	F = fair	Split = split open vines	P = poor, much exposed fruit	
Overall appearance:	VG = very good	G = good	F = fair	P = poor

***Statewide
Fresh Market Tomato
Variety Trials
FIELD and POSTHARVEST
Evaluations***

Statewide Variety Trials FIELD EVALUATIONS

*Michelle Le Strange, Scott Stoddard, and Bob Mullen
Farm Advisors, Tulare & Kings, Merced & Madera, and San Joaquin Counties*

Introduction

Fresh market tomato variety trials are conducted in major tomato-growing regions in California to evaluate the performance of new varieties and breeding lines from commercial plant breeder programs and universities. Variety trials provide the opportunity to evaluate and compare fruit quality characteristics and yield under the same field conditions.

It is important to test the varieties in several areas to assess performance under different climatic conditions and soils. The objective is to identify dependable, higher yielding and higher quality variety releases that can be grown over a wide geographic area under varying environmental conditions.

To determine which varieties/lines are tested, growers/packers/shippers and seed company representatives are surveyed throughout the state. Replicated varieties have been previously tested in grower fields in California. Observed lines usually represent the plant breeder's most promising lines for California's commercial growing conditions and markets.

Trial Locations

County farm advisors conduct the statewide variety trials in a uniform fashion so that local results can be compared with other locations. Three round variety trials and one roma variety trial were grown and harvested in commercial fields in 2002.

- **Kings County: April 18 - July 11** with Jones Farms (O.P. Murphy & Sons) near Kettleman City (Michelle Le Strange).

- **Merced County: May 15 - August 8** with Live Oak Farms in LeGrand (Scott Stoddard).
- **San Joaquin County: June 4 - Sept. 4** with Lagorio Farms (Ace Tomato Co.) near Collegeville; round and roma tomato variety trials (Bob Mullen).

Approximately 12 varieties were replicated and 20 lines/varieties were grown under single plot observation at each site, representing eight commercial seed companies.

The three round tomato variety trials had 11 replicated and 14 observed (non-replicated) varieties in common. These are listed on the next page. The production results are presented in a series of tables which are described in the next section.

Postharvest samples from all replicated varieties were collected from all trials at the time of harvest and transported to the Mann Laboratory at UC Davis for color, firmness, and composition evaluations at the table-ripe stage. Fruit were harvested as mature greens, but some cultivars were also harvested as vine ripe. A complete summary of the postharvest results is included in this research report.

Each farm advisor prepares a research progress report that lists the production and postharvest performance of the varieties in their county location. These reports are mailed to the tomato industry and interested persons. They are available upon request and should be obtained and consulted with regard to variety performance in market yield, fruit sizing data, and fruit quality observations for that particular trial location.

Varieties in Common at Kings, Merced, and San Joaquin Counties 2002 Fresh Market Tomato Uniform Trials

Seed Company	Replicated	Observed
American Takii		AT 48 AT 49
BHN	BHN 503 (VFFT)	BHN 464 BHN 499 BHN 500 (VFFN) BHN 524
Hazera		HA 3603 (VFFT) HA 3638 (VFFN) HA 3640 (VFFT)
LSL Plant Science	B-807(VFFT)	B-812
Seminis	PS 150440 (VFFT)	XP 150410 EX 01981574
Sunseeds	Shady Lady (VFF) SRT 6718 (VFFN) SRT 6719 (VFFN) SRT 6722 (VFFN) SXT 6624 (VFF)	Classy Lady (VFN) SRT 6728 (VFFN)
Syngenta	Bobcat (VFF Stem.) QualiT 21 (VFFN TMV Stem.) QualiT 23 (VFF TMV Stem.)	

Verticillium, Fusarium race 1, Fusarium race 2, Nematode, T or TMV Tobacco Mosaic Virus, Stemphyllium leafspot.

Results

Combined Summary Tables

Tables 1 and 2 summarize the data. Tables A-B-C include equivalent information and rank the varieties from highest to lowest. Tables 1-D and 2-D reflect the size grade percentages of marketable yield.

Replicated Varieties (3 locations)

Table 1	Yield and Maturity Summary
Table 1-A.	Market Yield Tons/Acre and Boxes/Acre
Table 1-B.	Total Yield Tons/Acre and Boxes/Acre
Table 1-C:	Percent Reds
Table 1-D.	Size Grades - % Market Yield

Observed Varieties (3 locations)

Table 2.	Yield and Maturity Summary
Table 2-A.	Market Yield Tons/Acre and Boxes/Acre
Table 2-B.	Total Yield Tons/Acre and Boxes/Acre
Table 2-C:	Percent Reds
Table 2-D.	Size Grades - % Market Yield

Discussion

The summary tables are included as an aid to assess and compare performances among varieties at the different locations.

REPLICATED VARIETIES

Market Yield: Market yield ranged from 31.5 to 27.3 tons per acre, a difference of 4.2 tons. The calculated Least Significant Difference was 2.8 tons so in general varieties yielded similarly in marketable fruit. There was no significant difference between the top six varieties listed in Table 1 Bobcat and QualiT 21 were higher in market yields than the last five varieties listed in Table 1

Total Yield: When total yield is evaluated the range widened from 47.1 to 39.4 tons per acre, a difference of 8.7 tons and there was more separation of means (a-f) as shown in Table 1-B.

Bobcat was at the top of both lists and Shady Lady was in the middle. B-807 went from the penultimate to second place when ranked for marketable and total yield indicating a high amount of nonmarketable fruit

Bobcat and QualiT 21 topped the list in Kings & Merced counties, whereas SXT 6624 and QualiT 23 topped the Merced County list. There was quite a bit of variability in varietal performance at each county

Percent Reds: PS 150440, Shady Lady, and BHN 503 were the earliest varieties followed by SXT 6624 and QualiT 23. SRT 6718 was the latest variety followed by QualiT 21 and Bobcat.

Percent Size Grades: The eleven replicated lines averaged close to 40% - 40% - 20% for extra large, large, and medium sized fruits. Of the top six varieties in market yield QualiT 21 averaged 55.8% extra large fruits, which was 8% more than its sister varieties QualiT 23 (47.7%) and Bobcat (47.2%). Extra large fruit size of the other top three varieties were closer to 1/3 of marketable yield. With respect to medium sizes the Syngenta lines were close to 15%, while the other three were 20-25% medium sized fruit.

OBSERVED VARIETIES

The single plot observation varieties from each location were combined and analyzed as a replicated field study. There was a lot of variability within varieties between locations, which makes summarizing performance difficult. The data should be viewed with less confidence than replicated tests. Assuming that Kings is early, Merced is midseason, and San Joaquin is late, then in general.

Some perform better EARLY than LATE:

Market yield. BHN 499, AT 48, BHN 500
Total yield. BHN 499, BHN 524, AT 89
Percent red: BHN 464, BHN 524, AT 89,
B-812, HA 3640

Some perform better LATE than EARLY:

Market yield. EX 01981574, SRT 6728,
B-812, HA 3638
Total yield. SRT 6728, B-812, HA 3603
Percent red. XP 150410, HA 3638

Some perform BETTER in MIDSEASON

Market yield. BHN464, BHN524, Classy Lady
Total yield. Classy Lady, HA 3603
Percent red: AT 48

Some perform WORSE in MIDSEASON:

Total yield. EX 01981574, BHN 500,
SRT 6728
Percent red. BHN 500, HA 3638

Some perform CONSISTENTLY at all sites:

Market yield. XP 150410, HA 3640
Total yield. XP150410, BHN 464, BHN 500,
HA 3640
Percent red. BHN499, EX01981574,
HA 3603

Final Remarks

Determining what variety to plant for a complex fresh market industry is outside the scope of this evaluation. The purpose of this research is to assist growers, packers, shippers, and the seed industry with variety selections and evaluations.

The strength of the farm advisors' variety trial is in side-by-side comparisons of yields and quality characteristics in a commercial setting across a range of conditions. The ultimate test of variety performance is commercial scale success on individual farms over a number of seasons.

Table 1

YIELD & MATURITY* of Fresh Market Tomatoes - REPLICATED Varieties
Results Summary of Three Fresh Market Tomato Trials - 2002

Variety	Company	Combined Results			Kings Co. (early season)			Merced Co. (midseason)			San Joaquin Co. (late season)		
		Yield T/A		%	Yield T/A		%	Yield T/A		%	Yield T/A		%
		Market	Total	Reds	Market	Total	Reds	Market	Total	Reds	Market	Total	Reds
Bobcat	Syngenta	31.5	47.1	11.5	32.1	48.5	15.3	27.4	50.5	14.9	35.0	42.3	4.2
QualiT 21	Syngenta	30.9	43.7	10.8	31.6	47.4	11.4	27.2	40.1	16.6	33.8	43.6	4.5
SXT 6624	Sunseeds	29.7	42.0	17.2	28.8	43.4	25.8	21.7	38.1	17.8	38.6	44.4	8.0
SRT 6718	Sunseeds	29.5	40.8	6.9	29.8	43.2	11.1	24.1	39.5	5.7	34.5	39.8	4.0
Shady Lady	Sunseeds	29.2	42.4	23.1	27.1	41.6	28.1	24.1	42.4	29.1	36.3	43.2	12.1
QualiT 23	Syngenta	29.2	44.4	16.2	25.9	43.0	20.6	23.6	42.3	20.1	38.0	47.8	7.9
PS 150440	Seminis	28.0	45.6	23.4	27.8	44.3	36.6	24.9	51.1	23.2	31.3	41.3	10.5
BHN 503	BHN	27.8	45.4	20.3	26.7	46.2	22.6	23.1	44.6	27.6	33.5	45.4	10.7
SRT 6722	Sunseeds	27.6	40.9	13.8	27.6	44.6	22.4	23.6	40.6	13.3	31.5	37.4	5.6
B-807	LSL Plant Sci.	27.4	45.7	14.9	28.9	48.7	22.1	19.9	44.1	13.0	33.3	44.2	9.7
SRT 6719	Sunseeds	27.3	39.4	12.2	28.7	45.1	17.1	19.7	35.0	15.1	33.6	38.1	4.4
Average		28.9	43.4	15.5	28.6	45.1	21.2	23.6	42.6	17.9	34.5	42.5	7.4
LSD .05		2.8	3.2	---	NS	4.5	5.6	4.8	6.9	5.4	NS	5.3	5.5
CV %		12.0	9.0	24.7	11.5	7.9	21.2	46.8	14.7	79.8	12.2	8.6	51.6
Variety x Location Interaction		NS	NS	S									

Variety by Location Interaction - When this statistic is significant, it means that the varieties did not behave consistently at each location.

* Market Yield = average weight in pounds of four replications converted to tons and boxes per acre of all marketable extra large, large, and medium sized fruit. Small fruit were considered unmarketable this year

TOTAL Yield = Marketable Yield plus small sized and cull fruit.

Percent Red = % reds by weight of TOTAL yield including culls to indicate maturity relative to all tested varieties.

Table 1-A
Marketable Yield (TONS/Boxes per Acre)* - REPLICATED Varieties
Summary of Three Fresh Market Tomato Trials - 2002

Variety	Company	Combined Market Yield/Acre		Kings Co. (early season)		Merced Co. (midseason)		San Joaquin Co. (late season)	
		Tons	Boxes	Tons	Boxes	Tons	Boxes	Tons	Boxes
Bobcat	Syngenta	31.5 a	2521	32.1	2569	27.4	2194	35.0	2800
QualiT 21	Syngenta	30.9 a	2468	31.6	2524	27.2	2177	33.8	2704
SXT 6624	Sunseeds	29.7 ab	2376	28.8	2303	21.7	1737	38.6	3088
SRT 6718	Sunseeds	29.5 ab	2355	29.8	2380	24.1	1924	34.5	2760
Shady Lady	Sunseeds	29.2 ab	2334	27.1	2170	24.1	1929	36.3	2904
QualiT 23	Syngenta	29.2 ab	2334	25.9	2075	23.6	1886	38.0	3040
PS 150440	Seminis	28.0 b	2239	27.8	2220	24.9	1992	31.3	2504
BHN 503	BHN	27.8 b	2222	26.7	2138	23.1	1847	33.5	2680
SRT 6722	Sunseeds	27.6 b	2204	27.6	2205	23.6	1886	31.5	2520
B-807	LSL Plant Sci.	27.4 b	2190	28.9	2313	19.9	1593	33.3	2664
SRT 6719	Sunseeds	27.3 b	2185	28.7	2294	19.7	1572	33.6	2688
Average		28.9	2312	28.6	2290	23.6	1885	34.5	2759
LSD .05		2.8	225	4.0	320	4.8	384	NS	NS
CV %		12.0	12.0	9.6	9.6	14.1	14.1	12.2	12.2
Variety x Location Interaction		NS							

Variety x Location Interaction - When this statistic is significant then the varieties behaved differently at each location.

* Market Yield = average weight in pounds of four replications converted to tons and boxes per acre of all marketable extra-large, large, and medium sized fruit. Small fruit were considered unmarketable this year

Table 1-B
TOTAL Yield (TONS/Boxes per Acre)* - REPLICATED Varieties
Summary of Three Fresh Market Tomato Trials - 2002

Variety	Company	Combined TOTAL Yield/Acre		Kings Co. (early season)		Merced Co. (midseason)		San Joaquin Co. (late season)	
		Tons	Boxes	Tons	Boxes	Tons	Boxes	Tons	Boxes
Bobcat	Syngenta	47.1 a	3768	48.5	3880	50.5	4040	42.3	3384
B-807	LSL Plant Sci.	45.7 ab	3653	48.7	3896	44.1	3528	44.2	3536
PS 150440	Seminis	45.6 abc	3645	44.3	3544	51.1	4088	41.3	3304
BHN 503	BHN	45.4 abc	3632	46.2	3696	44.6	3568	45.4	3632
QualiT 23	Syngenta	44.4 abcd	3549	43.0	3440	42.3	3384	47.8	3824
QualiT 21	Syngenta	43.7 bcde	3496	47.4	3792	40.1	3208	43.6	3488
Shady Lady	Sunseeds	42.4 cdef	3392	41.6	3328	42.4	3392	43.2	3456
SXT 6624	Sunseeds	42.0 def	3357	43.4	3472	38.1	3048	44.4	3552
SRT 6722	Sunseeds	40.9 ef	3269	44.6	3568	40.6	3248	37.4	2992
SRT 6718	Sunseeds	40.8 ef	3267	43.2	3456	39.5	3160	39.8	3184
SRT 6719	Sunseeds	39.4 f	3152	45.1	3608	35.0	2800	38.1	3048
Average		43.4	3471	45.1	3607	42.6	3406	42.5	3400
LSD .05		3.2	256	4.5	360	6.9	552	5.3	424
CV %		9.0	9.0	6.9	6.9	11.2	11.2	8.6	8.6
Variety x Location Interaction		NS	NS						

Variety x Location Interaction - When this statistic is significant then the varieties behaved differently at each location.

* TOTAL Yield = Marketable Yield plus small sized and cull fruit.

Table 1-C

Percent (%) Red Fruit at Harvest* - REPLICATED Varieties
Summary of Three Fresh Market Tomato Trials - 2002

Variety	Company	Combined	Kings	Merced	San Joaquin
PS 150440	Seminis	23.4	36.6	23.2	10.5
Shady Lady	Sunseeds	23.1	28.1	29.1	12.1
BHN 503	BHN	20.3	22.6	27.6	10.7
SXT 6624	Sunseeds	17.2	25.8	17.8	8.0
QualiT 23	Syngenta	16.2	20.6	20.1	7.9
B-807	LSL Plant Sci.	14.9	22.1	13.0	9.7
SRT 6722	Sunseeds	13.8	22.4	13.3	5.6
SRT 6719	Sunseeds	12.2	17.1	15.1	4.4
Bobcat	Syngenta	11.5	15.3	14.9	4.2
QualiT 21	Syngenta	10.8	11.4	16.6	4.5
SRT 6718	Sunseeds	6.9	11.1	5.7	4.0
Average		15.5	21.2	17.9	7.4
LSD .05		---	5.6	5.4	NS
CV %		24.7	18.2	21.1	51.6
Variety x Location		S			

Variety x Location Interaction - When this statistic is significant then the varieties behaved differently at each location.

- * Percent Red = % reds by weight of TOTAL yield including culls to indicate maturity relative to all tested varieties.

Table 1-D

Size Grades of Fresh Market Tomatoes - REPLICATED Varieties
Results Summary of Three Fresh Market Tomato Trials - 2002
Sorted by Market Yield

Variety	Company	COMBINED RESULTS			Kings Co. (early season)			Merced Co. (midseason)			San Joaquin Co. (late season)		
		% Market Yield			% Market Yield			% Market Yield			% Market Yield		
		XL	L	Med	XL	L	Med	XL	L	Med	XL	L	Med
Bobcat	Syngenta	47.2	35.2	17.6	59.8	30.2	10.0	41.5	43.1	15.4	40.2	32.4	27.4
QualiT 21	Syngenta	55.8	29.8	14.4	59.2	31.7	9.1	57.3	30.4	12.3	50.8	27.3	21.9
SXT 6624	Sunseeds	32.8	41.7	25.5	35.9	44.2	19.9	31.5	43.7	24.8	30.9	37.2	31.9
SRT 6718	Sunseeds	31.9	42.9	25.2	32.2	42.3	25.6	33.5	45.4	21.1	30.0	41.0	29.0
Shady Lady	Sunseeds	34.0	44.5	21.5	34.6	43.4	22.0	30.4	47.5	22.2	37.0	42.7	20.3
QualiT 23	Syngenta	47.7	38.1	14.3	54.0	35.5	10.6	47.4	41.4	11.2	41.6	37.4	21.0
PS 150440	Seminis	37.1	43.4	19.5	42.9	40.8	16.3	33.4	47.3	19.3	34.9	42.2	22.9
BHN 503	BHN	46.7	38.1	15.2	57.7	33.3	9.0	37.2	46.5	16.3	45.1	34.5	20.4
SRT 6722	Sunseeds	29.1	46.8	20.7	29.0	45.8	15.2	26.3	49.5	24.3	32.1	45.2	22.7
B-807	LSL Plant Sci.	57.1	31.5	11.4	64.5	29.9	5.6	56.7	33.4	9.8	50.2	31.1	18.7
SRT 6719	Sunseeds	29.5	45.7	24.8	32.7	47.8	19.6	29.8	47.4	22.9	26.1	41.9	32.0
Average		40.8	39.8	19.1	45.7	38.6	21	38.6	43.2	18.1	38.1	37.5	24.4
LSD .05		5.8	4.5	4.2	8.8	6.3	6	9.1	7.4	6.8	12.6	9.9	9.3
CV %		17.4	14	27.2	13.1	11.3	27.9	16.3	11.9	25.9	23.0	18.3	26.5
Variety x Location Interaction		NS	NS	NS									

Variety by Location Interaction - When this statistic is significant, it means that the varieties did not behave consistently at each location.

* Market Yield = average weight in pounds of four replications converted to tons and boxes per acre of all marketable extra large, large, and medium sized fruit. Small fruit were considered unmarketable this year

FRUIT SIZES:

XL = 2 7/8 to 3 15/16 inches diameter

L = 2 17/32 to 2 7/8 "

M = 2 9/32 to 2 17/32 "

S = 2 1/8 to 2 9/32 "

Table 2
YIELD & MATURITY* of Fresh Market Tomatoes - OBSERVED Varieties
Combined Results of Three Fresh Market Tomato Trials - 2002
Sorted by Market Yield

Variety	Company	Combined Results			Kings Co. (early season)			Merced Co. (midseason)			San Joaquin Co. (late season)		
		Yield T/A		%	Yield T/A		%	Yield T/A		%	Yield T/A		%
		Market	Total	Reds	Market	Total	Reds	Market	Total	Reds	Market	Total	Reds
XP 150410	Seminis	35.1	50.0	22.1	34.9	52.9	25.0	25.0	40.0	23.2	45.3	57.1	18.3
BHN 464	BHN	34.4	46.1	21.0	34.4	49.3	41.2	27.6	38.3	16.2	41.1	50.7	5.5
BHN 499	BHN	32.9	42.0	14.3	38.3	49.8	25.2	29.0	37.4	9.7	31.4	38.8	7.9
AT 48	Am Takii	32.6	40.4	12.0	38.9	48.0	15.8	24.9	36.7	15.4	34.0	36.6	4.8
EX 01981574	Seminis	31.3	49.6	25.5	31.5	51.6	42.2	18.9	37.2	21.3	43.6	60.1	13.0
AT 89	Am Takii	30.0	43.8	19.7	34.6	50.5	36.2	23.1	39.4	16.7	32.2	41.4	6.3
BHN 500	BHN	29.9	43.3	15.4	35.9	49.2	27.9	20.2	35.9	7.5	33.5	44.9	10.7
BHN 524	BHN	29.8	48.2	16.4	31.8	53.4	34.0	25.4	46.7	9.3	32.2	44.4	5.9
SRT 6728	Sunseeds	29.2	40.8	13.6	28.2	46.8	16.5	18.1	29.0	15.9	41.4	46.7	8.4
B-812	LSL Plant Sci	28.9	47.6	14.5	29.2	44.7	26.7	18.8	44.6	11.9	38.8	53.6	4.9
Classy Lady	Sunseeds	28.2	42.1	21.6	25.0	37.9	30.0	24.8	47.6	16.6	34.9	40.9	18.1
HA 3603	Hazera	25.8	41.5	14.9	17.3	30.5	16.4	22.1	48.4	13.0	37.9	45.7	15.2
HA 3640	Hazera	23.2	37.8	16.7	23.6	41.7	36.4	15.4	34.8	7.8	30.5	37.0	5.9
HA 3638	Hazera	22.5	36.3	11.7	19.3	35.2	16.6	11.3	31.0	3.1	37.0	42.7	15.3
Average		29.6	43.5	17.1	30.2	45.8	27.9	21.8	39.1	13.4	36.7	45.8	10.0
LSD .05		8.4	10.8	13.3									
CV %		17.0	14.8	44.9									

* Market Yield = average weight in pounds of four replications converted to tons and boxes per acre of all marketable extra large, large, and medium sized fruit. Small fruit were considered unmarketable this year

TOTAL Yield = Marketable Yield plus small sized and cull fruit.

Percent Red = % reds by weight of TOTAL yield including culls to indicate maturity relative to all tested varieties.

Table 2-A

Marketable Yield (TONS/Boxes per Acre)* - OBSERVED Varieties
Summary of Three Fresh Market Tomato Trials - 2002

Variety	Company	Combined Market Yield/Acre		Kings Co. (early season)		Merced Co. (midseason)		San Joaquin Co. (late season)	
		Tons	Boxes	Tons	Boxes	Tons	Boxes	Tons	Boxes
XP 150410	Seminis	35.1 a	2805.6	34.9	2792	25.0	2000	45.3	3624
BHN 464	BHN	34.4 a	2749.6	34.4	2752	27.6	2208	41.1	3288
BHN 499	BHN	32.9 a	2632.0	38.3	3064	29.0	2320	31.4	2512
AT 48	Am Takii	32.6 abc	2608.0	38.9	3112	24.9	1992	34.0	2720
EX 01981574	Seminis	31.3 abcd	2506.4	31.5	2520	18.9	1512	43.6	3488
AT 89	Am Takii	30.0 abcd	2397.6	34.6	2768	23.1	1848	32.2	2576
BHN 500	BHN	29.9 abcd	2389.6	35.9	2872	20.2	1616	33.5	2680
BHN 524	BHN	29.8 abcd	2384.0	31.8	2544	25.4	2032	32.2	2576
SRT 6728	Sunseeds	29.2 abcd	2338.4	28.2	2256	18.1	1448	41.4	3312
B-812	LSL Plant Sci	28.9 abcd	2314.4	29.2	2336	18.8	1504	38.8	3104
Classy Lady	Sunseeds	28.2 abcd	2258.4	25.0	2000	24.8	1984	34.9	2792
HA 3603	Hazera	25.8 bcd	2061.6	17.3	1384	22.1	1768	37.9	3032
HA 3640	Hazera	23.2 cd	1853.6	23.6	1888	15.4	1232	30.5	2440
HA 3638	Hazera	22.5 d	1802.4	19.3	1544	11.3	904	37.0	2960
Average		29.6	2364.4	30.2	2416.6	21.8	1740.6	36.7	2936.0
LSD .05		8.4							
CV %		17.0							

* Market Yield = average weight in pounds of four replications converted to tons and boxes per acre of all marketable extra-large, large, and medium sized fruit. Small fruit were considered unmarketable this year

Table 2-B

TOTAL Yield (TONS/Boxes per Acre)* - OBSERVED Varieties
Summary of Three Fresh Market Tomato Trials - 2002

Variety	Company	Combined TOTAL Yield/Acre		Kings Co. (early season)		Merced Co. (midseason)		San Joaquin Co. (late season)	
		Tons	Boxes	Tons	Boxes	Tons	Boxes	Tons	Boxes
XP 150410	Seminis	50.0 a	4000	52.9	4232	40.0	3200	57.1	4568
EX 01981574	Seminis	49.6 a	3970	51.6	4128	37.2	2976	60.1	4808
BHN 524	BHN	48.2 ab	3854	53.4	4272	46.7	3736	44.4	3552
B-812	LSL Plant Sci	47.6 ab	3810	44.7	3576	44.6	3568	53.6	4288
BHN 464	BHN	46.1 abc	3688	49.3	3944	38.3	3064	50.7	4056
AT 89	Am Takii	43.8 abc	3502	50.5	4040	39.4	3152	41.4	3312
BHN 500	BHN	43.3 abc	3466	49.2	3936	35.9	2872	44.9	3592
Classy Lady	Sunseeds	42.1 abc	3370	37.9	3032	47.6	3808	40.9	3272
BHN 499	BHN	42.0 abc	3360	49.8	3984	37.4	2992	38.8	3104
HA 3603	Hazera	41.5 abc	3322	30.5	2440	48.4	3872	45.7	3656
SRT 6728	Sunseeds	40.8 abc	3266	46.8	3744	29.0	2320	46.7	3736
AT 48	Am Takii	40.4 abc	3232	48.0	3840	36.7	2936	36.6	2928
HA 3640	Hazera	37.8 bc	3026	41.7	3336	34.8	2784	37.0	2960
HA 3638	Hazera	36.3 c	2904	35.2	2816	31.0	2480	42.7	3416
Average		43.5	3484	45.8	3666	39.1	3126	45.8	3661
LSD .05		10.8							
CV %		14.8							

* TOTAL Yield = Marketable Yield plus small sized and cull fruit.

Table 2-C

Percent (%) Red Fruit at Harvest* - OBSERVED Varieties
Summary of Three Fresh Market Tomato Trials - 2002

Variety	Company	Combined	Kings	Merced	San Joaquin
EX 01981574	Seminis	25.5	42.2	21.3	13.0
XP 150410	Seminis	22.1	25.0	23.2	18.3
Classy Lady	Sunseeds	21.6	30.0	16.6	18.1
BHN 464	BHN	21.0	41.2	16.2	5.5
AT 89	Am Takii	19.7	36.2	16.7	6.3
HA 3640	Hazera	16.7	36.4	7.8	5.9
BHN 524	BHN	16.4	34.0	9.3	5.9
BHN 500	BHN	15.4	27.9	7.5	10.7
HA 3603	Hazera	14.9	16.4	13.0	15.2
B-812	LSL Plant Sci	14.5	26.7	11.9	4.9
BHN 499	BHN	14.3	25.2	9.7	7.9
SRT 6728	Sunseeds	13.6	16.5	15.9	8.4
AT 48	Am Takii	12.0	15.8	15.4	4.8
HA 3638	Hazera	11.7	16.6	3.1	15.3
Average		17.1	27.9	13.4	10.0
LSD .05		13.3			
CV %		44.9			

* Percent Red = % reds by weight of TOTAL yield including culls to indicate maturity relative to all tested varieties.

Table 2-D

Size Grades of Fresh Market Tomatoes - OBSERVED Varieties
Summary of Three Fresh Market Tomato Trials - 2002
Sorted by Market Yield

Variety	Company	COMBINED RESULTS			Kings Co. (early season)			Merced Co. (midseason)			San Joaquin Co. (late season)		
		% Market Yield			% Market Yield			% Market Yield			% Market Yield		
		XL	L	Med	XL	L	Med	XL	L	Med	XL	L	Med
XP 150410	Seminis	53.3	31.7	15.0	55.9	30.1	14.0	41.4	46.9	11.8	62.7	18.2	19.1
BHN 464	BHN	36.5	43.0	20.6	35.5	44.0	20.6	45.3	34.6	20.1	28.7	50.3	21.0
BHN 499	BHN	38.7	43.6	17.7	40.3	46.2	13.5	32.1	49.8	18.1	43.6	34.9	21.5
AT 48	Am Takii	30.7	43.7	25.6	26.1	51.1	22.8	34.0	46.8	19.2	31.9	33.3	34.8
EX 01981574	Seminis	43.4	38.4	18.2	48.9	42.5	8.6	37.8	39.1	23.1	43.6	33.5	22.9
AT 89	Am Takii	37.3	41.3	21.3	26.6	47.6	25.7	39.7	40.1	20.2	45.7	36.2	18.1
BHN 500	BHN	56.6	34.5	9.0	51.7	37.2	11.1	50.8	37.4	11.9	67.3	28.8	3.9
BHN 524	BHN	51.4	33.8	14.8	66.1	26.9	7.0	46.5	41.4	12.1	41.7	33.1	25.2
SRT 6728	Sunseeds	22.3	44.9	32.7	15.7	50.0	34.2	19.6	53.1	27.3	31.7	31.7	36.6
B-812	LSL Plant Sci	47.5	35.2	17.3	69.5	22.7	7.8	36.7	37.4	26.0	36.3	45.6	18.1
Classy Lady	Sunseeds	47.8	35.0	17.2	62.6	34.5	2.9	38.2	43.7	18.1	42.7	26.7	30.6
HA 3603	Hazera	43.3	47.0	9.7	44.0	45.1	10.9	49.2	42.4	8.4	36.8	53.5	9.7
HA 3640	Hazera	50.4	31.7	17.9	44.0	39.6	16.4	48.5	33.0	18.5	58.6	22.6	18.8
HA 3638	Hazera	30.1	47.4	22.5	22.7	53.3	24.0	25.5	49.3	25.1	42.2	39.5	18.3
Average		42.1	39.4	18.5	43.5	40.8	15.7	39.0	42.5	18.6	43.8	34.9	21.3
LSD .05		16.9	13.3	10.3									
CV %		24.0	20.2	33.3									

* Market Yield = average weight in pounds of four replications converted to tons and boxes per acre of all marketable extra large, large, and medium sized fruit. Small fruit were considered unmarketable this year

TOTAL Yield = Marketable Yield plus small sized and cull fruit.

Percent Red = % reds by weight of TOTAL yield including culls to indicate maturity relative to all tested varieties.

FRUIT SIZES:

XL = 2 7/8 to 3 15/16 inches diameter

L = 2 17/32 to 2 7/8 "

M = 2 9/32 to 2 17/32 "

S = 2 1/8 to 2 9/32 "

Statewide Tomato Variety Trials POSTHARVEST EVALUATIONS for 2002

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Objective of Research

To evaluate the most important quality characteristics of ripened fresh market tomatoes from known varieties and new experimental lines.

Executive Summary

We evaluated 12 round tomato varieties from 3 fresh market tomato trials (Kings, Merced and San Joaquin Counties) for color, firmness and composition at the table-ripe stage. We also evaluated 6 Roma varieties from the San Joaquin County Trial. Fruit were harvested as mature-greens and vine-ripes (at 30-40% color).

The quality measurements conducted are described in Tables 1-3. Data for the individual trials are presented in Tables 4 -7. Summaries comparing cultivars in the 3 trials are in Tables 8-11. Table 11 provides an overall ranking of the varieties based on color, firmness and composition values for 2002 evaluations.

Trial Locations

County farm advisors conduct the statewide variety trials in a uniform fashion so that local results can be compared with other locations. Three round variety trials and one roma variety trial were grown and harvested in commercial fields in 2002.

Kings County: April 18 - July 11 with Jones Farms (O.P. Murphy & Sons) near Kettleman City (Michelle Le Strange).

Merced County: May 15 - August 8 with Live Oak Farms, LeGrand (Scott Stoddard).

San Joaquin County: June 4 - Sept. 4 with Lagorio Farms (Ace Tomato Co.) near Collegeville; round and roma tomato variety trials (Bob Mullen).

Experimental Procedures

Fruit Sampling:

We harvested mature-green (MG) fruit from the 3 variety trials for 11 or 12 replicated varieties. For 2 of the 3 trials, vine-ripe (VR) fruit were harvested with 30-50% color. Typically 80 MG fruit or more were harvested in buckets, placed in plastic trays for transport to the lab, and well-formed large (5x5 or 5x6) fruit were selected for ripening and evaluation.

A minimum of 45 fruit (3 reps of 15 each) were ripened under standard conditions: 3-4 days 100 ppm ethylene at 20°C (68°F) and high relative humidity followed by placement on plastic-wrapped trays to complete ripening at 20°C. Fruit that did not show color change within 3-4 days of ethylene treatment were discarded.

Fruit were evaluated when they reached the **table-ripe stage** or color stage 6 on the USDA scale + 1-2 days. This 1-2 day interval does not affect results.

Quality Measurements Tables 1-3:

The minimum quality evaluation of different tomato varieties should include data on firmness, color and composition at the table-ripe stage (Table 1). Flavor can be estimated measuring soluble solids (sugars) and acid contents. Table 1 describes the measurements useful to assess the postharvest

potential of different fresh market tomato varieties. For firmness, it would also be useful to evaluate fruits about 1 week after reaching table-ripe to determine which varieties

maintain firmness during a simulated marketing period. Typical values for color and firmness measurements are described in Tables 2 and 3

Table 1 Ripe tomato quality measurements for 2002 variety trials.

Attribute	Measurement	Additional Information
1. Color	Objective color values using a Minolta Color meter	Data reported as "Hue"; this is a calculated color value and the most useful single value to compare tomato color; see Table 2 for typical values for a range of tomato stages. Hue values from 35-40 usually indicate good red color
2. Texture	2a. Compression test: compression of the fruit with a given load.	A compression test simulates hand/finger compression when consumers test tomatoes; the higher the mm of compression, the softer the fruit. Table 3 describes typical values.
	2b. Compression test: the force to compress the fruit a distance of 5 mm is measured	Computerized texture analyzer equipped with a 25 mm flat cylinder moving at 0.5 mm/sec ; value is inversely related to values in 2a. Data expressed in Newtons (1 N =9.81 kg-force or 4.45 lb.-force) , typical range 15-25 N (Table 3).
3. Composition	3a. Soluble solids (SS) are measured on a refractometer	Fruit are quartered, blended. The juice is filtered and used. 5 min per fruit for sample preparation and measurements of SS and TA. Values can range from 3.5-7.0%.
	3b. Titratable acidity (TA); 10 mL juice are titrated with NaOH	pH of the juice is taken as a part of these measurements. Generally there is an inverse relationship between pH and T.A. Values can range from 0.2-0.6%.

Table 2. Example of color changes during the ripening of fresh market tomato fruits.

Stage of Development/Color	USDA Color Chart Stage	L*	a*	b*	chroma	hue
Mature-Green	1	62.7	-16.0	34.4	37.9	115.0
Breaker	2	55.8	-3.5	33.0	33.2	83.9
Pink-Orange	4	49.6	16.6	30.9	35.0	61.8
Orange-Red	5	46.2	24.3	27.0	36.3	48.0
Bright Red; Table-ripe	6	41.8	26.4	23.1	35.1	41.3
Dark Red	6+	39.6	27.5	20.7	34.4	37.0

L* indicates lightness (high value) to darkness (low value); a* changes from green (negative value) to red, b* changes from blue to yellow (high value). Chroma and hue are calculated $[(a^{*2} + b^{*2})^{1/2}]$ and $\tan^{-1}(b^{*}/a^{*})$ and indicate intensity and color, respectively. The lower the hue value, the redder the tomato. Hue is the single most useful color value.

Table 3. Textural characteristics of tomatoes based on subjective and objective tests.

Firmness Class	Description based on hand and finger pressure	Manual Firmness (mm compression)¹	Texture Analyzer Newtons Force²
Very Firm	Fruit yields only slight to considerable pressure	0.5-1.0	>25
Firm	Fruit yields slightly to moderate pressure	1.0-1.5	18-25
Moderately Firm	--	1.5-2.0	15-18
Moderately Soft	--	2.0-2.5	12-15
Soft	Fruit yields readily to slight pressure	2.5-3.0	8-12
Very Soft	Fruits yields very readily to slight pressure	>3.0	<8

¹ Measured by placing a 500 g weight for 10 seconds on the equator of the fruit; see 2a in Table 1

² Measured by compressing fruit at the equator with a 25 mm flat cylindrical probe to a distance of 5 mm on a computerized texture analyzer. 1 Newton force = 9.81 kg-force or 4.45 pound-force.

Kings Co. Trial Summary - Table 4.

Only mature-green (MG) fruit were harvested in this trial. Fruit all had acceptable red color as indicated by Hue color values in the mid 30s. However fruit of B-807 and BHN 503 had less red color at the table-ripe stage.

QualiT 21 had significantly firmer fruit than other cultivars; Bobcat, QualiT 23, BHN358, and PS 150440 all had similar firmness values. The remaining 7 cultivars had fruit with similar firmness values.

The % soluble solids were highest in BHN 503 (4.8%), but was not significantly different from that of SRT 6718 (4.7%), SRT 6719 (4.6%) or SRT 6722 (4.6%). The cultivars B-807, BHN 358, Bobcat, PS 150440, and SXT 6624 had the lowest %SS, varying from 4.2 to 4.3%. Titratable acidity was highest in Shady Lady but similar to values in fruit of BHN 358 and SRT 6722. B-807, SRT 6718 and SRT 6719 had the lowest % titratable acidity (0.25-0.26%).

Using Bobcat as a reference cultivar, 2 cultivars had significantly better red color, 1 cultivar was firmer, 4 cultivars had higher % soluble solids and 1 cultivar had significantly more acidity

Merced Co. Trial Summary - Table 5.

Eleven cultivars of round tomatoes were harvested at both the MG and VR stages and ripened to the table-ripe stage. In this trial, the average quality characteristics of MG-harvested fruit and VR-harvested fruit were similar (no significant differences in color, firmness or composition). Overall average red color (hue values) were similar for 9 cultivars, but fruit of B-807 and BHN 503 were less red at the table-ripe stage.

The firmest fruit were from B-807, followed by PS 150440, and Bobcat. The least firm fruit were from cultivars BHN 503, Shady Lady and SXT 6624.

Average soluble solids values (5.0%) were highest in this trial. Cultivars QualiT 21 (5.6%), SRT 6718 (5.45%), and SRT 6719 (5.35%) had the highest soluble solids, while cultivars PS 150440 (4.4%) and B-807 (4.55%) had the lowest.

PS 150440 and B-807 also had low average acidity levels (0.25% for B-807 fruit and 0.23% titratable acidity for PS 150440 fruit). Cultivars SRT 6718, SXT 6624 and QualiT 21 had the highest average acidity values at table-ripe stage.

Using Bobcat as a reference cultivar, 2 cultivars were significantly firmer, 1 cultivar was significantly redder, 7 cultivars had higher soluble solids, and 6 cultivars had higher titratable acidity.

San Joaquin Co. Summary - Table 6.

Average quality characteristics in the 11 cultivars evaluated in this trial were not different between the MG- and VR-harvested fruit. Composition of BHN 503 fruit harvested VR was significantly different from composition of the MG-harvested fruit although color and firmness were similar

Fruit from cultivar Bobcat in the trial were compared with the grower's Bobcat fruit and were not different in any quality characteristic.

Using Bobcat as a reference cultivar, 6 cultivars had similar red color and 4 cultivars had significantly less red color development (B-807, BHN 503, QualiT 21 and QualiT 23).

Bobcat was one of the firmer cultivars with only PS 150440 having higher average firmness. B-807, BHN 503, Shady Lady, SRT 6718, SRT 6722 and SXT 6624 had significantly softer fruit.

Bobcat had 4.2% soluble solids and 8 cultivars had higher soluble solids contents. The highest soluble solids were found in SRT 6718 (4.9%) and SXT 6624 (4.55%). Acidity was generally similar among the 11 cultivars and was generally higher for VR-harvested fruit than MG-harvested fruit.

Summary 2002 San Joaquin County Roma Tomato Trial - Table 7

Six cultivars of Roma tomatoes were harvested at the MG and VR stages. There were no significant differences in average final quality characteristics for MG-harvested and VR-harvested fruit except for titratable acidity (higher for VR-harvested fruit).

Four cultivars had similar final red color, but red color development was significantly less for Mariana and HA 35133. The latter two cultivars were also, on average, significantly firmer than the other 4 cultivars.

Soluble solids were highest in Monica (4.65%) and significantly higher than the average content in the

other 5 cultivars. Average titratable acidity was highest in CTRI 1605, but similar among the other 5 cultivars.

Three Trial Summary - Tables 8 - 11.

As noted in evaluations from previous years, differences between varieties often were of the same magnitude as differences for a given variety between trials, regardless of whether they were harvested MG or VR (Summary Tables 8 and 9).

Excluding B-807 and BHN 503 because of poorer color development, the final red color of MG-harvested fruit (Table 8) with hue values 33.3-35.3, and VR-harvested fruit (Table 9) with hue values of 32.2-36.0, varied little among cultivars. All cultivars except the two mentioned achieved good red color at the table-ripe stage.

Cultivars varied significantly in firmness and differences were greater in the MG-harvested fruit than the VR-harvested fruit. The soluble solids contents varied considerably (range 4.3-5.0% for MG-harvested; 4.2-5.2% for VR-harvested). Acidity also varied significantly among cultivars (range 0.27-0.30 % titratable acidity for MG-harvested fruit and 0.26-0.32% for VR-harvested fruit).

Red color development was, on average, very good in all three trials for both MG-harvested and VR-harvested fruits (Table 10).

Average firmness values were lower in fruit from the Merced trial and were similar between fruits from Kings and San Joaquin Counties' trial. Soluble solids contents were highest in the Merced Trial and similar between the other 2 trials. Titratable acidity was similar, but was slightly higher in fruit from the San Joaquin Trial.

Table 11 provides an overall ranking of the varieties based on color, firmness and composition values for 2002 evaluations. Bobcat ranked the highest in overall quality, and B-807 and BHN 503 ranked the lowest.

Results in Tables

Kings County Trial – Harvested July 11, 2002

Table 4. Quality characteristics of fresh market tomatoes harvested **MG** from the 2002 Kings Co. Trial and ripened at 20°C (68°F). Fruit were treated with ethylene for 3-4 days and were evaluated at the table-ripe stage. See Tables 1-3 for explanation of measurements; lower color values indicate redder fruits, lower firmness values indicate softer fruits. Varieties are listed in alphabetical order

Cultivar & Company		Stage at Harvest	Red Color, Hue	Firmness, Newtons	% Soluble solids	pH	% Titratable acidity
B-807	(LSL)	MG	38.1	16.0	4.2	4.48	0.25
BHN 358	(BHN)	MG	37.3	18.6	4.3	4.45	0.31
BHN 503	(BHN)	MG	38.2	15.3	4.8	4.35	0.30
Bobcat	(Syngenta)	MG	35.9	19.4	4.3	4.27	0.30
PS 150440	(Seminis)	MG	35.3	18.9	4.3	4.38	0.28
QualiT 21	(Syngenta)	MG	36.5	20.8	4.5	4.47	0.29
QualiT 23	(Syngenta)	MG	35.2	18.8	4.4	4.40	0.30
Shady Lady	(Sunseeds)	MG	33.9	16.2	4.4	4.43	0.34
SRT 6718	(Sunseeds)	MG	35.0	16.1	4.7	4.42	0.26
SRT 6719	(Sunseeds)	MG	35.2	16.0	4.6	4.47	0.25
SRT 6722	(Sunseeds)	MG	34.5	15.8	4.6	4.46	0.31
SXT 6624	(Sunseeds)	MG	36.1	15.1	4.3	4.48	0.29
Average		MG	35.9	17.3	4.5	4.42	0.29
LSD.05			1.5	1.4	0.5	0.07	0.04

Color & firmness data are from 3 reps of 15 fruit; composition data are from 3 reps of composite samples of 15 fruit.

Merced County Trial – Harvested August 8, 2002

Table 5. Quality characteristics of fresh market tomatoes harvested **MG** and **VR** from the 2002 Merced Co. Trial and ripened at 20°C (68°F). MG-harvested fruit were treated with ethylene for 3-4 days. Fruit were evaluated at the table-ripe stage. See Tables 1-3 for explanation of measurements; lower color values indicate redder fruits, lower firmness values indicate softer fruits. Varieties are listed in alphabetical order.

Cultivar & Company	Stage at Harvest	Red Color, Hue	Firmness, Newtons	% Soluble solids	pH	% Titratable acidity
B-807 (LSL)	MG	42.2	20.5	4.7	4.41	0.26
	VR	39.6	17.0	4.4	4.56	0.25
BHN 503 (BHN)	MG	41.9	13.7	5.0	4.26	0.27
	VR	37.0	15.4	4.9	4.42	0.29
Bobcat (Syngenta)	MG	34.0	17.3	4.7	4.53	0.26
	VR	34.5	15.6	4.7	4.52	0.25
PS 150440 (Seminis)	MG	35.6	18.8	4.4	4.41	0.23
	VR	34.8	17.3	4.4	4.54	0.23
QualiT 21 (Syngenta)	MG	33.8	16.8	5.5	4.48	0.28
	VR	34.3	16.6	5.7	4.46	0.31
QualiT 23 (Syngenta)	MG	35.1	16.4	4.7	4.42	0.27
	VR	34.9	16.7	4.9	4.41	0.27
Shady Lady (Sunseeds)	MG	33.2	14.8	4.7	4.50	0.29
	VR	33.8	14.4	4.6	4.45	0.27
SRT 6718 (Sunseeds)	MG	34.4	14.1	5.3	4.43	0.30
	VR	33.0	16.5	5.6	4.49	0.31
SRT 6719 (Sunseeds)	MG	32.8	15.4	5.2	4.49	0.28
	VR	30.7	16.0	5.5	4.39	0.29
SRT 6722 (Sunseeds)	MG	33.8	15.9	5.0	4.46	0.28
	VR	33.0	16.0	5.0	4.53	0.27
SXT 6624 (Sunseeds)	MG	34.2	14.2	5.0	4.43	0.30
	VR	34.0	14.4	5.1	4.48	0.28
Average	MG	35.5	16.0	4.9	4.44	0.28
Average	VR	34.5	16.2	5.0	4.48	0.28
LSD.05		2.6	1.2	0.4	0.07	0.02

Color and firmness data are from 3 reps of 15 fruits for MG and 3 reps of 8-15 fruits for VR.

Composition data are from 3 reps of composite samples of 15 fruit for MG and 8-15 fruits for VR.

San Joaquin County Trial – Harvested September 4, 2002

Table 6. Quality characteristics of fresh market tomatoes harvested **MG** and **VR** from the 2002 San Joaquin Co. Trial and ripened at 20°C (68°F). MG-harvested fruit were treated with ethylene for 3-4 days. Fruit were evaluated at the table-ripe stage. See Tables 1-3 for explanation of measurements; lower color values indicate redder fruits, lower firmness values indicate softer fruits. The Bobcat** samples were taken from the grower's field outside the trial. Varieties are listed in alphabetical order

Cultivar & Company	Stage at Harvest	Red Color, Hue	Firmness, Newtons	% Soluble solids	pH	% Titratable acidity
B-807 (LSL)	MG	38.2	17.6	4.1	4.38	0.30
	VR	37.1	14.3	4.4	4.38	0.32
BHN 503 (BHN)	MG	36.4	14.3	4.0	4.35	0.29
	VR	36.7	14.5	4.6	4.29	0.35
Bobcat (Syngenta)	MG	33.6	20.2	4.1	4.34	0.29
	VR	34.5	18.5	4.1	4.44	0.31
Bobcat**	MG	33.6	19.8	4.2	4.42	0.29
	VR	34.5	18.7	4.3	4.37	0.32
PS 150440 (Seminis)	MG	34.6	21.8	4.1	4.35	0.27
	VR	35.5	20.6	4.2	4.25	0.34
QualiT 21 (Syngenta)	MG	35.6	17.9	4.2	4.42	0.26
	VR	37.8	16.8	4.3	4.34	0.28
QualiT 23 (Syngenta)	MG	35.4	20.0	4.4	4.39	0.28
	VR	36.0	16.0	4.3	4.31	0.31
Shady Lady (Sunseeds)	MG	32.7	15.5	4.3	4.42	0.31
	VR	34.7	17.0	4.3	4.41	0.32
SRT 6718 (Sunseeds)	MG	33.6	16.0	4.9	4.37	0.32
	VR	34.4	16.1	4.9	4.38	0.33
SRT 6719 (Sunseeds)	MG	34.3	18.5	4.4	4.41	0.31
	VR	33.6	16.3	4.5	4.42	0.32
SRT 6722 (Sunseeds)	MG	33.2	15.5	4.4	4.38	0.29
	VR	33.5	16.7	4.5	4.43	0.32
SXT 6624 (Sunseeds)	MG	33.2	14.7	4.6	4.29	0.30
	VR	35.0	16.1	4.5	4.33	0.34
Average	MG	34.5	17.9	4.3	4.38	0.29
Average	VR	35.1	17.1	4.4	4.36	0.32
LSD.05		1.6	2.1	0.4	0.08	0.04

Color and firmness data are from 3 reps of 15 fruits for MG and 3 reps of 8-15 fruits for VR.

Composition data are from 3 reps of composite samples of 15 fruit for MG and 8-15 fruits for VR.

San Joaquin County Trial – Harvested September 4, 2002 – ROMA Lines

Table 7. Quality characteristics of fresh market **Roma** tomatoes harvested **MG** and **VR** from the 2002 San Joaquin Co. Trial. MG fruit were treated with ethylene and ripened at 20°C (68°F), and fruit were evaluated at the table-ripe stage. See Tables 1-3 for explanation of measurements; lower color values indicate redder fruits, lower firmness values indicate softer fruits.

Cultivar	Stage at Harvest	Red Color, Hue	Firmness, Newtons	% Soluble solids	pH	% Titratable acidity
Monica	MG	31.9	21.4	4.7	4.25	0.29
	VR	34.3	17.4	4.6	4.39	0.33
Mariana	MG	35.7	26.6	4.4	4.20	0.30
	VR	34.6	20.9	4.3	4.31	0.32
CTRI 1605	MG	31.4	19.0	4.3	4.25	0.32
	VR	34.4	19.2	4.4	4.22	0.39
BHN 523	MG	33.3	19.6	4.2	4.28	0.28
	VR	34.2	20.5	4.2	4.30	0.32
BHN 621	MG	35.0	19.9	4.3	4.32	0.28
	VR	34.1	19.3	4.2	4.34	0.31
HA 35133	MG	39.3	22.7	4.1	4.39	0.28
	VR	34.9	25.9	4.5	4.41	0.32
Average	MG	34.5	21.5	4.3	4.28	0.29
Average	VR	34.4	20.5	4.4	4.33	0.33
LSD.05		1.9	2.6	0.3	0.09	0.04

Color and firmness data are from 3 reps of 15 fruits for MG and 8-10 fruits for VR.

Composition data are from 3 reps of composite samples of 15 fruit each for MG and 8-10 fruit for VR.

Summary Table 8. Quality characteristics of fresh market tomatoes harvested **MG** from three uniform variety trials in 2002. See Tables 1-3 for explanation of measurements.

Cultivar	Trial	Red Color, Hue	Firmness, Newtons	% Soluble solids	pH	% Titratable acidity
B-807 (LSL)	Kings	38.1	16.0	4.2	4.48	0.25
	Merced	42.2	20.5	4.7	4.41	0.26
	San Joaq.	38.2	17.6	4.1	4.38	0.30
	Ave.	39.5±2.3	18.0±2.3	4.3±0.3	4.42±.05	0.27±.03
BHN 503 (BHN)	Kings	38.2	15.3	4.8	4.35	0.30
	Merced	41.9	13.7	5.0	4.26	0.27
	San Joaq.	36.4	14.3	4.0	4.35	0.29
	Ave.	38.8±2.8	14.4±0.8	4.6±0.5	4.32±.05	0.29±.02
Bobcat (Syngenta)	Kings	35.9	19.4	4.3	4.27	0.30
	Merced	34.0	17.3	4.7	4.53	0.26
	San Joaq.	33.6	20.2	4.1	4.34	0.29
	Ave.	34.5±1.2	19.0±1.5	4.4±0.3	4.38±.13	0.28±.02
PS 150440 (Seminis)	Kings	35.3	18.9	4.3	4.38	0.28
	Merced	35.6	18.8	4.4	4.41	0.23
	San Joaq.	34.6	21.8	4.1	4.35	0.27
	Ave.	35.2±0.5	19.8±1.7	4.3±0.2	4.38±.03	0.26±.03
QualiT 21 (Syngenta)	Kings	36.5	20.8	4.5	4.47	0.29
	Merced	33.8	16.8	5.5	4.48	0.28
	San Joaq.	35.6	17.9	4.2	4.42	0.26
	Ave.	35.3±1.4	18.5±2.1	4.7±0.7	4.46±.03	0.28±.02
QualiT 23 (Syngenta)	Kings	35.2	18.8	4.4	4.40	0.30
	Merced	35.1	16.4	4.7	4.42	0.27
	San Joaq.	35.4	20.0	4.4	4.39	0.28
	Ave.	35.2±1.5	18.4±1.8	4.5±0.2	4.40±.02	0.28±.02
Shady Lady (Sunseeds)	Kings	33.9	16.2	4.4	4.43	0.34
	Merced	33.2	14.8	4.7	4.50	0.29
	San Joaq.	32.7	15.5	4.3	4.42	0.31
	Ave.	33.3±0.5	15.5±0.7	4.5±0.2	4.45±.04	0.31±.02
SRT 6718 (Sunseeds)	Kings	35.0	16.1	4.7	4.42	0.26
	Merced	34.4	14.1	5.3	4.43	0.30
	San Joaq.	33.6	16.0	4.9	4.37	0.32
	Ave.	34.3±0.7	15.4±1.1	5.0±0.3	4.41±.03	0.29±.03
SRT 6719 (Sunseeds)	Kings	35.2	16.0	4.6	4.47	0.25
	Merced	32.8	15.4	5.2	4.49	0.28
	San Joaq.	34.3	18.5	4.4	4.41	0.31
	Ave.	34.1±1.2	16.6±1.6	4.7±0.4	4.46±.04	0.28±.03
SRT 6722 (Sunseeds)	Kings	34.5	15.8	4.6	4.46	0.31
	Merced	33.8	15.9	5.0	4.46	0.28
	San Joaq.	33.2	15.5	4.4	4.38	0.29
	Ave.	33.8±0.6	15.7±0.2	4.7±0.3	4.43±.05	0.29±.02
SXT 6624 (Sunseeds)	Kings	36.1	15.1	4.3	4.48	0.29
	Merced	34.2	14.2	5.0	4.43	0.30
	San Joaq.	33.2	14.7	4.6	4.29	0.30
	Ave.	34.2±1.5	14.7±0.4	4.6±0.4	4.40±.10	0.30±.05

Color and firmness data are from 3 reps of 15 fruits; composition data are from 3 reps of composite samples of 15 fruit each

Summary Table 9. Quality characteristics of fresh market tomatoes harvested VR from two of the three 2002 variety trials. See Tables 1-3 for explanation of measurements.

Cultivar	Trial	Red Color, Hue	Firmness, Newtons	% Soluble solids	pH	% Titratable acidity
B-807 (LSL)	Merced	39.6	17.0	4.4	4.56	0.25
	San Joaq.	37.1	14.3	4.4	4.38	0.32
	Ave.	38.4	15.6	4.4	4.47	0.28
BHN 503 (BHN)	Merced	37.0	15.4	4.9	4.42	0.29
	San Joaq.	36.7	14.5	4.6	4.29	0.35
	Ave.	36.8	15.0	4.8	4.36	0.32
Bobcat (Syngenta)	Merced	34.5	15.6	4.7	4.52	0.25
	San Joaq.	34.9	16.7	4.9	4.41	0.27
	Ave.	34.7	16.2	4.8	4.46	0.26
PS 150440 (Seminis)	Merced	35.5	20.6	4.2	4.25	0.34
	San Joaq.	34.5	18.5	4.1	4.44	0.31
	Ave.	35.0	19.6	4.2	4.34	0.32
QualiT 21 (Syngenta)	Merced	34.3	16.6	5.7	4.46	0.31
	San Joaq.	37.8	16.8	4.3	4.34	0.28
	Ave.	36.0	16.7	5.0	4.40	0.30
QualiT 23 (Syngenta)	Merced	33.8	14.4	4.6	4.45	0.27
	San Joaq.	36.0	16.0	4.3	4.31	0.31
	Ave.	34.9	15.2	4.4	4.38	0.29
Shady Lady (Sunseeds)	Merced	33.8	14.4	4.6	4.45	0.27
	San Joaq.	34.7	17.0	4.3	4.41	0.32
	Ave.	34.2	15.7	4.4	4.43	0.30
SRT 6718 (Sunseeds)	Merced	33.0	16.5	5.6	4.49	0.31
	San Joaq.	34.4	16.1	4.9	4.38	0.33
	Ave.	33.7	16.3	5.2	4.44	0.32
SRT 6719 (Sunseeds)	Merced	30.7	16.0	5.5	4.39	0.29
	San Joaq.	33.6	16.3	4.5	4.42	0.32
	Ave.	32.2	16.2	5.0	4.40	0.30
SRT 6722 (Sunseeds)	Merced	33.0	16.0	5.0	4.53	0.27
	San Joaq.	33.5	16.7	4.5	4.43	0.32
	Ave.	33.2	16.4	4.8	4.49	0.30
SXT 6624 (Sunseeds)	Merced	34.0	14.4	5.1	4.48	0.28
	San Joaq.	35.0	16.1	4.5	4.33	0.34
	Ave.	34.5	15.2	4.8	4.40	0.33

Color and firmness data are from 3 reps of 8-15 fruits; composition data are from 3 reps of composite samples of 8-15 fruit each.

Summary Table 10. Average quality characteristics of fresh market tomatoes harvested **MG** or **VR** from three trials in 2002. MG fruit were treated with ethylene, completed ripening at 20°C (68°F), and were evaluated at the table-ripe stage (USDA Color Chart stage 6). See Tables 1-3 for explanation of measurements.

Trial	# cultivars	Red Color, Hue	Firmness, Newtons	% Soluble solids	pH	% Titratable acidity
Harvested MG						
Kings Co.	12	35.9	17.3	4.5	4.42	0.29
Merced Co.	11	35.5	16.0	4.9	4.44	0.28
San Joa. Co.	11	34.5	17.9	4.3	4.38	0.29
Average		35.3±0.7	17.1±1.0	4.6±0.3	4.41±.03	0.29±.01
Harvested VR						
Kings Co.	0	--	--	--	--	--
Merced Co.	11	34.5	16.2	5.0	4.48	0.28
San Joa. Co.	11	35.1	17.1	4.4	4.36	0.32
Average		34.8±0.4	16.6±0.6	4.7±0.4	4.42±.08	0.30±.03

Summary Table 11. Overall scores of ripe round tomato varieties (includes **MG** and **VR** harvested fruits) evaluated in 2002

Variety	Number of Evaluations	% SS Score	% TA Score	Flavor Score (Max = 3)	Red Color Score (Max = 3)	Firmness Score (Max = 3)	Total Quality Score (Max =9)
Bobcat	7	2.0	1.9	2.0	2.9	2.7	7.6
SRT 6718	5	3.0	2.0	2.5	2.8	2.0	7.3
SRT 6719	5	2.4	1.8	2.1	2.8	2.2	7.1
SRT 6722	5	2.4	1.8	2.1	3.0	2.0	7.1
PS 150440	5	1.8	1.6	1.7	2.4	2.8	6.9
Shady Lady	5	2.2	2.0	2.1	2.8	1.8	6.7
QualiT 21	5	2.4	1.8	2.1	2.4	2.2	6.7
QualiT 23	5	2.4	1.6	2.0	2.2	2.4	6.6
SXT 6624	5	2.4	2.2	2.3	2.6	1.4	6.3
B-807	5	1.8	1.4	1.6	1.8	2.0	5.4
BHN 503	5	2.4	2.0	2.2	1.8	1.4	5.4

Varieties are scored for each characteristic on a 3 point scale, where 1=low, 2=intermediate, and 3=high.

Red color:	score 1 = poor, with hue >40	score 2 = hue 35-40	score 3 = high with hue <35
Firmness:	score 1 = <15N force	score 2 = 15-18	score 3 = >18
Soluble solids:	score 1 = < 4.2 %SS	score 2 = 4.2-4.6 %SS	score 3 = >4.6 %SS
Acidity:	score 1 = < 0.28 %T.A.	score 2 = .28-.30 %TA	score 3 = >0.30 %T.A.

Flavor Score is the average of the soluble solids and titratable acidity scores.

Total score is based on the sum of the flavor, red color and firmness scores, and the higher the total score, the better the overall quality. Varieties are ordered based on total quality score (right column).

DATA ANALYSIS TERMS

All data, such as total marketable yield, size grades, and vine and fruit characteristics, are statistically analyzed to determine significant differences between varieties. A significant difference is one that is too large to be the result of chance and that has a reasonably high probability of being a real difference.

A **Least Significant Difference (LSD)**, calculated from each set of data, indicates the smallest difference between treatment numbers that can be considered real. When two items differ by more than the LSD .05, we are 95 percent confident that the difference is real. If an LSD .01 is indicated then we are 99 percent confident that the difference is real and not just due to chance.

Not Significant (NS) indicates there is no significant difference between treatment numbers. OR There is no significance in the interaction between location and varieties, i.e. varieties followed similar trends in all locations. When the interaction is not significant then an LSD can be calculated and used to separate the varieties.

Significant (S) indicates there is a significant difference between varieties and a LSD is calculated. S also indicates there is significance in the interaction between variety and location, i.e. varieties did not follow similar trends in all locations. In this situation it is illogical to separate the varieties with an LSD

The **Coefficient of Variation (CV)** is a measure of the variation among the data. The greater the variation in the data, the larger the differences must be to be considered significant. A coefficient of variation less than or equal to 10 is considered good.