

Project Title: UCCE Statewide Processing Tomato Variety Evaluation Trials, 2008

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Joe Nunez, Farm Advisor, Kern County
Tom Turini, Farm Advisor, Fresno County

Summary:

UCCE farm advisors conducted three early-maturity variety tests and seven mid-maturity tests in 2008. This year, Contra Costa County did not conduct a trial, and this was replaced with one in Colusa County. Spring weather was warm and dry across all locations, and most trials had good stand establishment. The one exception was the mid-maturity trial in San Joaquin County, where high winds shortly after transplanting resulted in a poor stand that could not be harvested, though fruit sampling for PTAB data was performed. Insect pest pressure was generally low this season, but some of the mid-maturity locations were impacted by high powdery mildew pressure again in 2008, similar to what occurred last year. The Stanislaus County Trial was accidentally harvested early and no yield data were measured. The trials continue to increase in transplants relative to direct seed (only 2 of the 10 locations were direct seeded) and drip irrigation (4 of the 10 were drip irrigated), which mirrors changes taking place in the industry.

The early maturity trials escaped most insect or disease problems and yielded very well in all three locations, averaging almost 46 tons/acre. In the early trial, Sun 6366, BOS66509, and HED 1058 had significantly better yields than the other entries in this test; SUN 6366 and AB 4606 had the highest °Brix. The results for Sun 6366 were similar in 2007, showing this variety to have good yield and soluble solids potential across a wide range of weather and field conditions. Significant differences were observed for fruit pH between the varieties, though values were high for all, averaging 4.42. Excellent yields were recorded in the mid-season observation trial, averaging nearly 50 tons per acre. However, there were no significant differences in yield between the varieties when test locations were combined. NUN 6385 had the highest yield at 55.2 tons/A, but also the lowest Brix at only 4.4. In the replicated mid-maturity trial, best yields occurred with SUN 6368, H9780, AB8058, and H2005, and H2005 also had significantly higher Brix than the other varieties at 5.4. H2005 has performed well in these trials in both 2007 and 2008. Significant differences were also seen for color and pH. Similar to the early maturity trial, pH was elevated, averaging 4.50.

Objectives:

The major objective is to conduct processing tomato variety field tests that evaluate fruit yield, Brix, color, and pH in replicated plots in various statewide locations of early commercial release lines. The data are combined from all test locations to analyze variety adaptability under a wide range of growing conditions. These tests are designed and conducted with input from seed companies, processors, and other allied industry and are intended to generate unbiased, third-party information to assist in making variety choice decisions.

Procedures:

Three(3) early-maturity variety tests and seven (7) mid-maturity tests were conducted in 2008. Participating counties and Farm Advisors are shown in Tables 1 and 2. Variety entries and their disease resistances are listed in Table 3. As in 2005, 2006, and 2007, there were no observational lines in the early trial. Variety selections were made in the fall of 2007 based on input from tomato processors. Changes and/or additions were made by the seed companies based on seed availability.

Early maturity tests were planted in March and mid-maturity lines were planted from March to May. New varieties were usually screened one or more years in non-replicated observational trials before being selected for testing in the replicated trials. Tests were primarily conducted in commercial production fields with grower cooperators (the Fresno trials were located at the UC West Side Research and Extension Center (WSREC) near Five Points).

Each variety was planted in a one-bed by 100-foot long plot. Plot design was randomized complete block with four replications for the replicated trial. The observational trial consisted of one non-replicated plot directly adjacent to the replicated trial. The Farm Advisor organized seeding or transplanting at the same time that the rest of the field was planted. All cultural operations, with the exception of planting and harvest, were done by the grower cooperator using the same equipment and techniques as the rest of the field. Most test locations used transplants, and four locations this year were drip irrigated (Merced, Fresno 1 & 2, and Kern). A field day or arrangements for interested persons to visit the plots occurred at most locations.

Shortly before or during harvest, fruit samples were collected from all plots and submitted to an area PTAB station for soluble solids (reported as °Brix, an estimate of the soluble solids percentage using a refractometer), color (LED color), and pH determinations. These samples were hand picked ripe fruit directly off the plants or the harvester. The tomatoes in each plot were harvested with commercial harvest equipment, conveyed to a GT wagon equipped with weigh cells, and weighed before going to the trailers for processing.

Data were analyzed using analysis of variance procedures with SAS, both for each individual location and combining locations. In the combined analysis, the block effect was nested within each county. Significant difference tests were performed using Fisher's protected LSD at the 5% level. Because the San Joaquin County mid-maturity trial had such a poor stand, yield data were not included in the over-location analysis, however, PTAB data were. Stanislaus yield results were not available. Occasional missing plots occurred in the other trial locations, resulting in an unbalanced design and variable LSD values depending on what was being compared.

Results:

Results are presented in the following order and include combined county, yield, °Brix, color, and pH for each trial: early maturity replicated (Table 3 a - e), mid-maturity observational (Table 4 a - f), and mid-maturity replicated (Table 5 a - e).

Early maturity replicated. Early maturity replicated results are presented in Tables 3 a – e. Significant differences were found among varieties for yield, Brix, LED color, and pH. Overall yields with the early varieties were excellent, especially in Colusa County where all varieties yielded more than 50 tons/acre. Best yields occurred Sun 6366 and BOS 66509. SUN 6366 and AB 4606 had significantly better °Brix than the other varieties. Average pH was elevated (though better than 2007) at 4.42 with a 0.10 difference between varieties (Table 4e).

Like 2007, significant variety by location interactions occurred only for yield and color. This indicates that some varieties performed better at different locations. Where significant, the variety by location LSD can be used to compare the performance of varieties across locations (Table 3b, d).

Mid observational. Mid-maturity observational results combining all locations are shown in Table 4a, and individual counties in Tables 4 b – e. San Joaquin and Stanislaus Counties PTAB data are shown, but not yields. Because of missing plots at some locations, multiple LSD values were calculated to compare varieties and are shown in Table 4f. When all counties were combined, significant differences were found among varieties only for Brix and pH (Table 4a). High variability (CV 13.3%) in this test resulted in many varieties to yield statistically similar. Overall yields were excellent at 50 tons per acre for almost all lines except CXD 269, which averaged much lower at 40.7. °Brix was slightly less than the early trial at 5.0. Fruit pH was again elevated, and ranged from 4.39 to 4.61 (Table 4e). Because there was no replication in this test, variety by location interactions could not be performed. In general, Merced and Yolo Counties had better yields than the other locations.

Mid replicated. Mid-maturity replicated variety results combining all locations are shown in Table 5 a, and individual counties in Tables 5 b – e. San Joaquin County and Stanislaus PTAB data are shown, but not yields.

Significant differences were found for all parameters measured, though San Joaquin County did not have significant differences for color. Averaged across all locations, significantly best yields occurred with SUN 6368, H9780, AB8058, H2005, H4007 at > 48 tons/A. As with the observational trial, yields were better in Yolo and Merced compared to the other locations.

Brix was significantly better in H2005 at 5.4% compared to the other varieties. The other varieties ranged between 5.2 to 4.7%. Fresno Mid#1 posted the best average °Brix at 5.8. H4007, NDM5578, and NUN 672 had the best fruit color with an LED ratings < 23 (Table 5d). Fruit pH ranged from 4.42 to 4.58 (Table 5e), with H9780, AB2 and HM 6898 having significantly lowest pH.

Significant variety by location interactions occurred for yield, °Brix, color, and pH. This indicates that certain varieties performed differently at different locations. AB2, for example, yielded relatively poorly in Merced compared to the other locations.

Acknowledgements:

Many thanks to CTRI and participating processors and seed companies for their continued support for this project. The cooperation from PTAB and support of the processors is also greatly appreciated. Many thanks to Gail Nishimoto for her help with the statistical analyses. And lastly, this project would not be possible without the many excellent grower cooperators who were involved with this project.

Table 1. 2008 UCCE early maturity Processing Tomato Variety Trial locations.

Advisor	Seeded	Transplant	Harvested	Location	Comments:
Michelle Le Strange & Tom Turini	Direct Seed, 2/15/2008		14-Jul-08	UC WSREC, Fresno County	double-row, furrow irrigated. Field day July 10.
Gene Miyao		March 18 (double row)	18-Jul-08	Joe Rominger of D.A. Rominger and Sons, Winters, Yolo County	Furrow irrigation. Good stand, slow early growth, moderate vine size, low level powdery mildew, Fusarium wilt. Good fruit size and yield. Multiple year, consecutive tomatoes. Field day July 14.
Mike Murray	Direct seed Feb 15, 2008		20-Jul-08	Maxwell area, northern Colusa County. Allen Etchepare, Emerald Farms	Self directed, "open" field day. No serious problems.
Janet Caprile & Brenna Aegerter					No trial held in Contra Costa county this year

Table 2. 2008 UCCE mid-maturity Processing Tomato Variety Trial locations.

Advisor	Seeded	Transplant	Harvested	Location	Comments:
Michelle Le Strange & Tom Turini		Mid #1, 4/16/2008	21-Aug	UC WSREC, Fresno County	Field day for the Mid-Season #1 on 10 July, but it was not well attended. Drip irrigation. Curly top virus (CTV)-symptoms present on approximately 5% of the plants, TSWV is present at higher levels (4 to 22 plants per 70 ft plot). Differences in TSW-symptom incidence among entries.
Michelle Le Strange & Tom Turini		Mid #2, May 13, 2008	9/18/08	UC WSREC, Fresno County	Good stand, strong plant growth through fruit sizing. Vert wilt moderately severe, light incidence of spotted wilt, light pressure from powdery mildew, corky root moderately severe- very high yields with big fruit size. Field day Aug 14.
Gene Miyao		April 7 (double row)	20-Aug-08	Steve Meek of J.H. Meek and Sons, North Dixon area, Yolo County	Field day Aug 14.
Joe Nunez		4/23/08	28-Aug-08	Kern County	drip irrigation
Scott Stoddard	3/14/08	5/6/08	10/3/08	A-Bar Ranch, Aric Barcellos. South of Los Banos. Merced County	Drip irrigation very large plants, trimmed 2x. Field "open house" Sept 22.
Jan Mickler		5/23/2008 (double row)	not harvested	Westley area, Leroy Del Don, Stanslaus County	Furrow irrigation. Double row plots, plot length short. Powdery mildew high. PTAB samples taken. Commercial harvest before weighed
Brenna Aegerter		13-May-08	not harvested	Hal Robertson, Linne Rd, near Tracy. San Joaquin County	Very poor stand due to high winds & heat following transplanting, no harvest, no field day. PTAB samples.

Table 3. 2008 UCCE Processing Tomato Regional Variety Trial
Processor & seed company entries .

TRIAL	COMPANY	VAR	my CODE	Disease Resistance	days to maturity	processed use	Brix	std compared	vine size	fruit shape	trial years
Early	AB Seeds	AB 4606		VFFNBsp	115	MultiUse	high	410	med	blocky	08
Replicated	Seminis	APT 410		VFFNBsp	114	MultiUse	med - high	STD	--	blocky	06, 07, 08
	Orsetti Seeds	BOS 66509		VFFNBsp	108	peel/dice	5	--	--	block rnd	06, 07
	Campbell's Seeds	CXD 274		VFFNBsp	114	--	5.25	410	med	sq round	08
	Gem Veg Seeds	GEM 89		VFF	110	peel/dice	5.4	410	Med	sq round	08
	Heinz Seed	H2206		VF	105	product	5.2	9280		sm round	07, 08
	Heinz Seed	H9280		VFFNBsp	108	MultiUse	4.8	STD	sm	blocky	06, 07, 08
	HED Seed	HED 1058		FN	115	peel, solids	high	--	compact	sq round	'07, 08
	Nunhems USA	SUN 6366		VFFNBsp	118	MultiUse	V. high	410	med/lg	blocky	07, 08
Mid	AB Seeds	AB 2	1	VFFP	120	Multiuse	high	3155	med	sq	06, 07, 08
Replicated	AB Seeds	AB 8058	2	VFFN TSWV	125	paste	med	AB2	med	blocky	06, 07, 08
	Heinz Seed	H 2005	3	VFFNP	128	MultiUse	5.5	H9780	lg	oval	06, 07, 08
	Heinz Seed	H 2601	4	VFFNP	122	pear	5	STD	lg	pear	06, 07, 08
	Heinz Seed	H4007	5	VFFNP	120	MultiUse	5.1	H9780	med/lg	blocky	08
	Heinz Seed	H8004	6	VFFNP	125	MultiUse	5.5	H9780	lg	long, blkcy	08
	Heinz Seed	H 9780	7	VFFNP	138	MultiUse	5.5	STD	lg	blocky	06, 07, 08
	Harris Moran	HM 6898	8	VFFNP	122	MultiUse	high	AB2	lg	round	08
	Nippon Del Monte	NDM 5578	9	VFFB	122	multi	5.3	3155	med	sq round	07, 08
	Nunhems USA	NUN 672	10	VFFN	125	viscosity	--	H 9665	Med	blocky	08
	Seminis	PX 1723	11	VFFNBsp	125	Peel/dice	high	9557	lg	blocky	07, 08
	Nunhems USA	SUN 6368	12	VFFN Bsp	125	peel, solids	high	AB2	med/lg	blocky	06, 07, 08
	United Genetics	UG 4305	13	VFFN	122	MultiUse	high	--	--	sq round	07, 08
Mid	Orsetti Seed	BOS 1411	21	VFFNP	118	multiuse	5.7	--	--	blocky	08
OBSERVED	Campbell's Seed	CXD 255	22	VFFNBsp	125	multiuse	5.5	AB2	med	elongate	08
	Campbell's Seed	CXD 269	23	VFFNBsp	124	multiuse	5.4	AB2	med	blocky	08
	AB Seeds	DRI 0303	24	VFFNBsp	122	multiuse	high	AB2	med	blocky	08
	Heinz Seed	H 8504	25	VFFNBsp	130	multiuse	5.4	9780	lg	long blkcy	08
	Harris Moran	HMX 7885	26	VFFNBsp	122	Pear	med/high	2601	lg	pear	08
	Nunhems	NUN 6385	27	VFFNBsp SW	125	Viscosity	--	H9665	med/lg	sq round	08
	Nunhems	NUN 6390	28	VFFNBsp	130	solids, peel	--	AB2	med/lg	sq round	08

V = Verticillium Wilt race 1
 FF = Fusarium Wilt races 1 & 2
 N = Root knot nematode
 Bsp, P = Bacterial speck race 0
 SW = Spotted Wilt

Check with seed company to confirm disease resistance.

**TABLE 3a. PROCESSING TOMATO EARLY MATURITY VARIETY TRIALS 2008
STATEWIDE 3 LOCATIONS**

VARIETY	Yield tons/acre		Brix %	Color	pH
937 SUN 6366	50.8 (01)	A	5.6 (01)	28.1 (09)	4.42 (04)
938 BOS 66509	50.3 (02)	A	5.0 (05)	25.8 (02)	4.43 (06)
953 HED 1058	47.8 (03)	A B	4.6 (09)	26.1 (04)	4.38 (02)
962 AB 4606	46.3 (04)	B C	5.5 (02)	26.8 (08)	4.37 (01)
732 APT 410	45.3 (05)	B C	5.0 (07)	25.5 (01)	4.44 (08)
963 CXD 274	44.9 (06)	B C	5.2 (04)	26.3 (06)	4.43 (05)
964 GEM 89	44.5 (07)	C D	5.0 (06)	25.8 (02)	4.44 (07)
951 H2206	41.8 (08)	D E	5.3 (03)	26.3 (06)	4.47 (09)
637 H9280	40.6 (09)	E	4.6 (08)	26.1 (04)	4.41 (03)
MEAN	45.8		5.1	26.3	4.42
LSD @ 0.05=	3.08		0.22	0.98	0.048
C.V.=	8.3		5.2	4.6	1.3
VARIETY X LOCATION					
LSD @ 0.05=	5.34		N.S.	1.70	N.S.

Numbers in parentheses (x) represent relative ranking within a column.

LSD = Least significant difference at the 95% confidence level. Means followed by the same letter are not significantly different.

NS = not significant.

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

Variety x location LSD = LSD when comparing varieties across locations.

**TABLE 3b. 2008 PROCESSING TOMATO EARLY MATURITY VARIETY TRIALS
COMBINED REPLICATED TRIALS, YIELD (TONS/ACRE)**

VARIETY	Yield tons/acre	Statewide			
		3 LOCATIONS	Yolo	Fresno	Colusa
937 SUN 6366	50.8	A	47.1	44.2	61.0
938 BOS 66509	50.3	A	50.3	39.6	60.9
953 HED 1058	47.8	A B	40.0	41.9	61.4
962 AB 4606	46.3	B C	43.8	39.8	55.2
732 APT 410	45.3	B C	47.0	35.0	53.9
963 CXD 274	44.9	B C	40.5	40.4	53.9
964 GEM 89	44.5	C D	43.0	37.4	53.1
951 H2206	41.8	D E	35.5	37.5	52.4
637 H9280	40.6	E	34.7	32.7	54.4
MEAN	45.8		42.4	38.7	56.2
LSD @ 0.05=	3.08		6.40	4.44	5.56
C.V.=	8.3		10.3	7.8	6.8
VARIETY X LOCATION LSD @ 0.05=	5.34				

**TABLE 3c. 2008 PROCESSING TOMATO EARLY MATURITY VARIETY TRIALS
STATEWIDE AND BY COUNTY REPLICATED TRIALS, %BRIX**

VARIETY	Brix %	Statewide			
		3 LOCATIONS	Yolo	Fresno	Colusa
937 SUN 6366	5.6	A	5.2	5.9	5.6
962 AB 4606	5.5	A B	5.4	5.7	5.3
951 H2206	5.3	B C	5.5	5.4	5.2
963 CXD 274	5.2	C D	5.2	5.4	5.2
938 BOS 66509	5.0	D E	4.9	5.3	4.9
964 GEM 89	5.0	E	5.0	4.9	5.1
732 APT 410	5.0	E	4.8	5.3	4.8
637 H9280	4.6	F	4.5	5.0	4.4
953 HED 1058	4.6	F	4.4	4.8	4.5
MEAN	5.1		5.0	5.3	5.0
LSD @ 0.05=	0.22		0.33	0.47	0.35
C.V.=	5.2		4.5	6.1	4.8
VARIETY X LOCATION LSD @ 0.05=	N.S.				

TABLE 3d. 2008 PROCESSING TOMATO EARLY MATURITY VARIETY TRIALS STATEWIDE AND BY COUNTY REPLICATED TRIALS, COLOR

VARIETY	Color	Statewide 3 LOCATIONS	Yolo	Fresno	Colusa
732 APT 410	25.5	A	25.5	24.0	27.0
938 BOS 66509	25.8	A	25.5	23.8	28.0
964 GEM 89	25.8	A	23.8	26.0	27.5
637 H9280	26.1	A B	25.3	25.5	27.5
953 HED 1058	26.1	A B	25.5	26.3	26.5
951 H2206	26.3	A B	25.3	25.8	27.8
963 CXD 274	26.3	A B	25.3	25.5	28.0
962 AB 4606	26.8	B	26.8	24.0	29.8
937 SUN 6366	28.1	C	27.0	25.3	32.0
MEAN	26.3		25.5	25.1	28.2
LSD @ 0.05=	0.98		1.35	N.S.	1.68
C.V.=	4.6		3.6	5.9	4.1
VARIETY X LOCATION LSD @ 0.05=	1.70				

TABLE 3e. 2008 PROCESSING TOMATO EARLY MATURITY VARIETY TRIALS STATEWIDE AND BY COUNTY REPLICATED TRIALS, pH

VARIETY	pH	Statewide 3 LOCATIONS	Yolo	Fresno	Colusa
962 AB 4606	4.37	A	4.41	4.28	4.41
953 HED 1058	4.38	A B	4.45	4.33	4.37
637 H9280	4.41	A B C	4.50	4.35	4.38
937 SUN 6366	4.42	B C	4.46	4.34	4.45
963 CXD 274	4.43	B C D	4.49	4.37	4.42
938 BOS 66509	4.43	B C D	4.49	4.37	4.43
964 GEM 89	4.44	C D	4.51	4.35	4.45
732 APT 410	4.44	C D	4.49	4.42	4.43
951 H2206	4.47	D	4.51	4.45	4.46
MEAN	4.42		4.48	4.36	4.42
LSD @ 0.05=	0.048		0.055	N.S.	N.S.
C.V.=	1.3		0.8	1.9	1.0
VARIETY X LOCATION LSD @ 0.05=	N.S.				

**TABLE 4a. PROCESSING TOMATO MID-MATURITY VARIETY TRIALS 2008
OBSERVATIONAL ENTRIES (NO REPLICATION)**

VARIETY	Yield tons/acre	Brix %	Color	pH
974 NUN 6385*	55.2 (01)	4.4 (08)	24.5 (06)	4.51 (05)
969 CXD 255	52.8 (02)	5.1 (03)	23.4 (01)	4.45 (02)
973 HMX 7885	52.6 (03)	4.7 (07)	24.6 (07)	4.61 (08)
972 H 8504	50.6 (04)	4.7 (06)	24.1 (03)	4.39 (01)
950 BOS 1411	50.0 (05)	5.0 (04)	24.3 (04)	4.51 (04)
975 NUN 6390*	48.3 (06)	5.2 (02)	24.7 (08)	4.55 (07)
971 DRI 0303	47.9 (07)	4.9 (05)	24.4 (05)	4.48 (03)
970 CXD 269	40.7 (08)	5.3 (01)	23.7 (02)	4.52 (06)

*** Brix, Color, pH means adjusted for 1 missing plot**

MEAN	49.8	5.0	24.2	4.51
C.V.=	13.3	8.2	5.9	1.3

*To compare all means except NUN 6385 and NUN 6390 with each other
(means composed of 7 plots)*

LSD @ 0.05=	N.S.	0.44	N.S.	0.065
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To Compare NUN 6385 or NUN 6390 (6 plots) vs others (7 plots)

LSD @ 0.05=	N.S.	0.46	N.S.	0.067
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To Compare NUN 6385 with NUN 6390 (6 plots vs 6 plots)

LSD @ 0.05=	N.S.	0.48	N.S.	0.070
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Note: Yield means include data from 5 locations (Fresno 1, Fresno 2, Kern, Merced, Yolo)

Brix, Color, pH means include data from 7 locations.

Numbers in parentheses represent relative ranking within a column.

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

NS = not significant.

C.V.= coefficient of variation.

**TABLE 4b. 2008 PROCESSING TOMATO MID-MATURITY VARIETY TRIAL
COMBINED AND COUNTY OBSERVATION YIELD (TONS/ACRE)**

VARIETY	Yield						SAN JOAQUIN	STAN- ISLAUS	YOLO
	tons/acre	FRESNO #1	FRESNO #2	KERN	MERCED				
974 NUN 6385	55.19	50.41	37.68	48.79	74.71			64.36	
969 CXD 255	52.79	52.62	43.04	39.20	61.55			67.51	
973 HMX 7885	52.56	63.13	39.04	39.12	68.91			52.61	
972 H 8504	50.60	49.82	54.13	34.54	52.27			62.24	
950 BOS 1411	49.99	51.71	37.53	37.42	59.98			63.33	
975 NUN 6390	48.35	37.91	40.93	48.13	52.01			62.74	
971 DRI 0303	47.94	48.22	43.09	30.36	57.11			60.92	
970 CXD 269	40.73	37.95	37.92	32.37	49.31			46.12	
MEAN	49.768								
LSD @ 0.05=	N.S.								
C.V.=	13.3								

Note: No harvest was performed at San Joaquin and Stanislaus Counties.

Observation varieties were not replicated so the statistical analysis could be performed on the combined data only.

**TABLE 4c. 2008 PROCESSING TOMATO MID-MATURITY VARIETY TRIAL
COMBINED AND COUNTY OBSERVATION BRIX**

VARIETY	% Brix		Fresno			San			Yolo
			Fresno #1	#2	Kern	Merced	Joaquin	Stanislaus	
970 CXD 269	5.329	A	5.8	4.8	5.4	5.6	5.3	5.5	4.9
975 NUN 6390	5.231	A	6.2	4.8	4.0	6.1		5.5	5.2
969 CXD 255	5.143	A B	5.1	5.1	5.6	5.0	4.5	5.9	4.8
950 BOS 1411	5.043	A B	5.1	4.9	5.1	5.1	4.7	5.3	5.1
971 DRI 0303	4.915	A B	5.5	4.8	4.1	5.2	4.2	5.3	5.3
972 H 8504	4.743	B C	5.4	4.2	4.5	5.4	4.5	4.5	4.7
973 HMX 7885	4.743	B C	5.1	5.4	4.0	5.1	4.2	4.6	4.8
974 NUN 6385	4.447	C	4.9	4.6	4.1	4.1		4.9	4.5
MEAN	4.969								
C.V.=	8.2								
<i>To compare all means except NUN 6385 and NUN 6390 with each other</i>									
LSD @ 0.05=	0.44								
<i>To Compare NUN 6385 or NUN 6390 (6 plots) vs others (7 plots)</i>									
LSD @ 0.05=	0.46								
<i>To Compare NUN 6385 with NUN 6390 (6 plots vs 6 plots)</i>									
LSD @ 0.05=	0.48								

Observation varieties were not replicated so the statistical analysis could be performed on the combined data only.

**TABLE 4d. 2008 PROCESSING TOMATO MID-MATURITY VARIETY TRIAL
COMBINED AND COUNTY OBSERVATION COLOR**

VARIETY	Color	FRESNO #1	FRESNO #2	KERN	MERCED	SAN JOAQUIN	STAN-ISLAUS	YOLO
969 CXD 255	23.4	26	25	22	22	23	22	24
970 CXD 269	23.7	27	26	23	22	22	21	25
972 H 8504	24.1	26	25	26	21	23	22	26
950 BOS 1411	24.3	25	24	23	25	23	21	29
971 DRI 0303	24.4	27	25	26	22	25	22	24
974 NUN 6385	24.5	24	25	24	25	---	21	29
973 HMX 7885	24.6	27	26	24	25	24	22	24
975 NUN 6390	24.7	25	25	26	23	---	22	28
MEAN	24.2							
LSD @ 0.05=	N.S.							
C.V.=	5.9							

Observation varieties were not replicated so the statistical analysis could be performed on the combined data only.

**TABLE 4e. 2008 PROCESSING TOMATO MID-MATURITY VARIETY TRIAL
COMBINED AND COUNTY OBSERVATION pH**

VARIETY	pH		FRESNO #1	FRESNO #2	KERN	MERCED	SAN JOAQUIN	STAN-ISLAUS	YOLO
972 H 8504	4.39	A	4.34	4.52	4.42	4.54	4.25	4.30	4.37
969 CXD 255	4.45	A B	4.47	4.43	4.47	4.57	4.42	4.35	4.44
971 DRI 0303	4.48	B C	4.49	4.48	4.52	4.59	4.53	4.35	4.42
950 BOS 1411	4.51	B C D	4.53	4.57	4.50	4.65	4.45	4.36	4.52
974 NUN 6385	4.51	B C D	4.49	4.44	4.50	4.70	---	4.41	4.60
970 CXD 269	4.52	C D	4.52	4.50	4.54	4.62	4.44	4.39	4.62
975 NUN 6390	4.55	D E	4.41	4.64	4.52	4.68	---	4.52	4.58
973 HMX 7885	4.61	E	4.55	4.50	4.76	4.76	4.54	4.50	4.66
MEAN	4.51								
C.V.=	1.30								
To compare all means except NUN 6385 and NUN 6390									
LSD @ 0.05=	0.07								
To Compare NUN 6385 or NUN 6390 (6 plots) vs others (7 plots)									
LSD @ 0.05=	0.07								
To Compare NUN 6385 with NUN 6390 (6 plots vs 6 plots)									
LSD @ 0.05=	0.07								

Observation varieties were not replicated so the statistical analysis could be performed on the combined data only.

Table 4f. LSD values for combined mid-maturity observation trial, 2008.

Variable	Error Mean Square	Degrees of Freedom for Error	t value	count mean 1	count mean 2	LSD	comment
Brix	0.165967	40	2.02108	7	7	0.440	Compare all means except NUN 6385 and NUN 6390 with each other (means composed of 7 plots)
Brix	0.165967	40	2.02108	7	6	0.458	Compare NUN 6385 or NUN 6390 (6 plots) mean vs others (7 plots)
Brix	0.165967	40	2.02108	6	6	0.475	Compare NUN 6385 with NUN 6390 (6 plots vs 6 plots)
pH	0.003596	40	2.02108	7	7	0.065	Compare all means except NUN 6385 and NUN 6390 with each other (means composed of 7 plots)
pH	0.003596	40	2.02108	7	6	0.067	Compare NUN 6385 or NUN 6390 (6 plots) mean vs others (7 plots)
pH	0.003596	40	2.02108	6	6	0.070	Compare NUN 6385 with NUN 6390 (6 plots vs 6 plots)

**TABLE 5a. PROCESSING TOMATO MID-MATURITY VARIETY TRIALS 2008
STATEWIDE 7 LOCATIONS**

VARIETY	Yield tons/acre		Brix %	Color	pH
923 SUN 6368	50.9 (01)	A	4.98 (07)	24.3 (11)	4.46 (04)
866 H 9780	50.0 (02)	A B	5.10 (04)	24.4 (13)	4.43 (03)
942 AB 8058	48.8 (03)	A B C	4.74 (11)	23.4 (04)	4.51 (07)
944 H 2005	48.6 (04)	A B C	5.39 (01)	23.9 (06)	4.54 (11)
966 H4007	48.4 (05)	A B C	4.70 (12)	22.8 (01)	4.58 (13)
967 HM 6898	47.1 (06)	B C D	5.05 (06)	24.3 (12)	4.43 (02)
968 NUN 672	46.6 (07)	C D E	4.66 (13)	23.0 (03)	4.53 (09)
545 H8004	46.3 (08)	C D E	5.21 (02)	23.9 (07)	4.47 (05)
865 H 2601	46.1 (09)	C D E	4.87 (10)	24.0 (08)	4.54 (10)
955 NDM 5578	45.1 (10)	D E	4.89 (09)	22.9 (02)	4.49 (06)
960 UG 4305	44.6 (11)	D E	4.91 (08)	24.2 (10)	4.56 (12)
868 AB 2	43.7 (12)	E	5.07 (05)	24.1 (09)	4.42 (01)
958 PX 1723	39.5 (13)	F	5.21 (03)	23.8 (05)	4.52 (08)
MEAN	46.7		4.98	23.8	4.50
LSD @ 0.05=	3.02		0.17	0.50	0.027
C.V.=	10.4		6.3	4.0	1.2
VARIETY X LOCATION					
LSD @ 0.05=	6.8		0.44	1.33	0.072

Note: San Joaquin and Stanislaus did not have yield data

LSD = Least significant difference at the 95% confidence level. Means followed by the same letter are not significantly different.

NS = not significant.

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

Variety x location LSD = LSD when comparing varieties across locations.

**TABLE 5b. 2008 PROCESSING TOMATO MID-MATURITY VARIETY TRIAL
COMBINED AND COUNTY REPLICATED YIELD (TONS/ACRE)**

VARIETY	Yield tons/acre	Statewide 5 LOCATIONS	Fresno #1	Fresno #2	Kern	Merced	San Joaquin	Stan- islaus	Yolo
923 SUN 6368	50.9	(01) A	48.4	45.4	38.7	57.5			64.6
866 H 9780	50.0	(02) A B	44.4	44.4	34.1	63.0			64.2
942 AB 8058	48.8	(03) A B C	51.1	49.0	29.9	48.4			65.5
944 H 2005	48.6	(04) A B C	46.5	43.7	31.5	59.3			61.8
966 H4007	48.4	(05) A B C	51.1	49.0	27.9	55.7			58.5
967 HM 6898	47.1	(06) B C D	42.5	46.1	28.8	60.9			57.4
968 NUN 672	46.6	(07) C D E	44.4	40.9	25.4	62.8			59.7
545 H8004	46.3	(08) C D E	39.4	44.8	26.1	62.2			58.7
865 H 2601	46.1	(09) C D E	44.5	44.2	24.2	65.5			52.2
955 NDM 5578	45.1	(10) D E	42.7	46.1	32.3	51.2			53.4
960 UG 4305	44.6	(11) D E	45.6	39.6	26.5	47.4			64.0
868 AB 2	43.7	(12) E	47.2	38.1	28.5	41.4			63.6
958 PX 1723	39.5	(13) F	36.5	37.1	26.5	41.9			55.5
MEAN	46.7		45.0	43.7	29.2	55.6			59.9
LSD @ 0.05=	3.02		6.74	6.41	6.02	10.03			4.40
C.V.=	10.4		10.4	10.2	14.3	12.6			5.1
VARIETY X LOCATION LSD @ 0.05=	6.75								

Note: San Joaquin and Stanislaus did not have yield data

**TABLE 5c. 2008 PROCESSING TOMATO MID-MATURITY VARIETY TRIAL
COMBINED AND COUNTY REPLICATED BRIX**

VARIETY	Brix %	Statewide 7 LOCATIONS	Fresno #1	Fresno #2	Kern	Merced	San Joaquin	Stan- islaus	Yolo
944 H 2005	5.39	A	6.0	5.2	5.3	5.7	5.0	5.5	5.2
545 H8004	5.21	B	6.0	4.9	5.0	5.3	4.9	5.3	5.2
958 PX 1723	5.21	B	5.8	4.9	4.8	5.4	4.9	5.4	5.3
866 H 9780	5.10	B C	5.7	4.6	5.0	5.4	4.8	5.3	5.0
868 AB 2	5.07	B C D	5.9	4.7	4.0	5.6	4.5	5.4	5.5
967 HM 6898	5.05	B C D	6.0	4.7	4.4	5.2	5.2	4.6	5.3
923 SUN 6368	4.98	C D E	6.0	4.5	4.7	5.2	4.5	5.0	5.0
960 UG 4305	4.91	D E	6.0	4.7	3.7	5.5	4.6	missing	5.0
955 NDM 5578	4.89	E F	5.6	4.5	4.3	5.1	4.6	5.1	5.1
865 H 2601	4.87	E F	5.5	4.4	4.6	4.7	4.6	5.2	5.2
942 AB 8058	4.74	F G	5.6	4.5	3.8	5.5	4.1	5.1	4.7
966 H4007	4.70	G	5.6	4.5	4.4	4.7	4.2	4.9	4.8
968 NUN 672	4.66	G	5.2	4.4	3.9	4.9	4.3	5.1	4.8
MEAN	4.98		5.76	4.64	4.45	5.22	4.60	5.14	5.08
LSD @ 0.05 =	0.17		0.38	0.37	0.70	0.49	0.46	0.38	0.27
C.V. =	6.3		4.6	5.6	10.9	6.5	7.0	5.1	3.8
VARIETY X LOCATION LSD @ 0.05=	0.44								

**TABLE 5d. 2008 PROCESSING TOMATO MID-MATURITY VARIETY TRIAL
COMBINED AND COUNTY REPLICATED COLOR**

VARIETY	Color	STATEWIDE 7 LOCATIONS					San	Stan-	Yolo
		Fresno #1	Fresno #2	Kern	Merced	Joaquin	islaus		
966 H4007	22.8	A	23.5	23.8	22.5	22.8	22.8	20.8	23.8
955 NDM 5578	22.9	A	23.3	23.8	24.3	22.8	22.5	20.5	23.3
968 NUN 672	23.0	A B	23.3	24.3	24.3	22.0	23.0	20.5	23.8
942 AB 8058	23.4	B C	23.3	24.8	25.3	21.8	23.0	21.5	24.5
958 PX 1723	23.8	C D	23.8	24.8	24.5	23.5	23.5	22.0	24.8
944 H 2005	23.9	C D E	24.8	25.0	23.8	23.5	22.8	22.0	25.5
545 H8004	23.9	C D E	24.0	25.5	25.0	23.5	22.5	21.0	26.0
865 H 2601	24.0	D E	25.0	25.0	25.0	23.8	23.0	21.8	24.8
868 AB 2	24.1	D E	24.3	25.3	25.8	22.2	23.0	21.5	26.8
960 UG 4305	24.2	D E	24.3	24.5	25.3	23.0	23.0	<i>missing</i>	24.8
923 SUN 6368	24.3	D E	24.0	25.8	25.5	23.5	23.8	21.8	25.8
967 HM 6898	24.3	D E	24.8	25.8	25.5	23.0	22.8	22.3	26.3
866 H 9780	24.4	E	25.0	26.8	24.5	22.8	22.5	22.0	26.5
MEAN	23.8		24.1	25.0	24.7	23.0	22.9	21.5	25.1
LSD @ 0.05 =	0.5		1.3	1.3	1.7	1.1	N.S.	1.1	1.6
C.V. =	4.0		3.8	3.6	4.9	3.3	4.2	3.5	4.4
VARIETY X LOCATION LSD @ 0.05=	1.3								

**TABLE 5e. 2008 PROCESSING TOMATO MID-MATURITY VARIETY TRIAL
COMBINED AND COUNTY REPLICATED pH**

VARIETY	pH	Statewide					San	Stan-	Yolo
		7 LOCATIONS	Fresno #1	Fresno #2	Kern	Merced	Joaquin	islaus	
868 AB 2	4.42	A	4.39	4.42	4.45	4.57	4.39	4.29	4.46
967 HM 6898	4.43	A B	4.42	4.40	4.51	4.53	4.34	4.39	4.44
866 H 9780	4.43	A B	4.44	4.42	4.48	4.50	4.37	4.39	4.45
923 SUN 6368	4.46	B C	4.40	4.49	4.50	4.58	4.43	4.37	4.45
545 H8004	4.47	C D	4.51	4.42	4.51	4.52	4.41	4.38	4.55
955 NDM 5578	4.49	D E	4.45	4.46	4.57	4.57	4.41	4.43	4.53
942 AB 8058	4.51	E F	4.49	4.47	4.60	4.56	4.51	4.40	4.51
958 PX 1723	4.52	F G	4.49	4.50	4.59	4.69	4.47	4.39	4.53
968 NUN 672	4.53	F G H	4.55	4.52	4.62	4.65	4.48	4.35	4.56
865 H 2601	4.54	G H	4.50	4.56	4.64	4.58	4.48	4.42	4.59
944 H 2005	4.54	G H	4.49	4.57	4.60	4.63	4.50	4.47	4.51
960 UG 4305	4.56	H I	4.49	4.53	4.64	4.63	4.51	<i>missing</i>	4.52
966 H4007	4.58	I	4.54	4.59	4.65	4.64	4.55	4.43	4.64
MEAN	4.50		4.47	4.49	4.56	4.59	4.45	4.39	4.52
LSD @ 0.05=	0.027		0.075	0.093	0.071	0.07	0.065	0.074	0.070
C.V.=	1.2		1.2	1.5	1.1	1.1	1.0	1.2	1.1
VARIETY X LOCATION LSD @ 0.05=	0.07								