Project Title: **UCCE Statewide Processing Tomato Variety Evaluation Trials, 2010**

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Summary:

UCCE farm advisors conducted six mid-maturity tests in 2010, however only 5 locations produced PTAB fruit quality data, and only 4 were harvested for yield. As in 2009, there were no early maturity varieties submitted, because of a lack of sufficient new entries. Seed companies submitted 16 replicated and 13 observation entries for the mid maturity trial. Spring weather was cool and wet across most locations, but no significant stand establishment problems because of weather or pests were reported. Both Fresno trials were impacted by TSWV, CTV, and irrigation problems, more so for Fresno #1 and therefore this dataset was not used. The trial in Kern County was sampled for PTAB analysis, but a malfunctioning weigh bar on the GT cart prevented yield determination. Drip irrigation was used at all locations but Yolo County. At the Merced location, plots were 2-rows on an 80" bed, the first time for this configuration with this trial, with excellent results. Unlike the previous two seasons, powdery mildew was not an issue, but there was some vine decline due to *Fusarium* crown and root rot (F.o.r.l.) in patches at the San Joaquin location.

The mid maturity observational trial yielded well in all locations except Fresno #1, for the reasons noted above. When test locations were combined, some significant differences in yield were found between varieties, but 11 of the 13 entries yielded similarly, between 48 – 59 tons per acre. HMX9905 (Harris Moran) did very well in Merced, producing an estimated 85 tons at 4.5 Brix. The best °Brix performance this year was from BQ187 (Woodbridge Seeds) and BOS7210246 (Orsetti), at 5.9 and 5.6 respectively. All fruit were very red and no color differences were detected between entries. Fruit pH, which in general appears to be increasing over time across all varieties, ranged from 4.36 for UG19306 (United Genetics) to 4.51 for BQ198.

In the replicated mid-maturity trial, best yields occurred with N6385 (Nunhems), H5608, and H5508 (Heinz Seeds). Best Brix% occurred with BQ205, BQ163, UG19406 (United Genetics), N6394 (Nunhems), SUN6366 (Nunhems), and AB3 (AB Seeds). Significant differences were also seen for color and pH. UG19406 (United Genetics), H8504, and H5508 had the lowest average pH across all locations.

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:
Six (6) mid-maturity tests were conducted in 2010. Participating counties and Farm Advisors are shown in Table 1. Variety entries and their disease resistances are listed in Table 2. No early-maturity trial was conducted this year because of a lack of entries. Variety selections were made in the fall of 2009 with input from tomato processors. Changes and/or additions were made by the seed companies based on seed availability.

Test locations were transplanted from late March (Kern Co) through May 20 (Fresno). New varieties were usually screened one of 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 a 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 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. All test locations used transplants, and all locations but Yolo used drip irrigation. A field day or arrangements for interested persons to visit the plots occurred at most locations. Farm Advisors were also responsible for taking soil samples and documenting growth and development.

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. Kern County had no yield data for the over-location analysis, however, PTAB data were included. A trial in Stanislaus County was planned but not conducted. The Fresno #1 location was transplanted, but compromised from the start by having too little water to get good early growth, and virus pressure in the trial (mainly TSWV and CTV) was very high. As a result, yield and PTAB results were not included in the analysis. This year was unique in that there were no missing plot data from the other locations.

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

Mid observational. Mid-maturity observational results combining all locations are shown in Table 3a, and individual counties in Tables 3 b – e. Kern County PTAB data are shown, but not yields. When all counties were combined, significant differences were found among varieties for yield, Brix, and pH (Table 3a). Because of relatively high yield variability (CV 16.0%), 11 of the 13 entries had statistically similar yields, ranging from 59 to 48 tons per acre (Table 3b). Highest yields occurred with HMX9905 (Harris Moran). Average °Brix and color were slightly better this year than 2009, at 5.3 and 23.8. BQ187 and BOS7210246 had significantly higher Brix than the other entries; there were no significant differences between varieties for color when location data were combined. Fruit pH ranged from 4.36 to 4.51 (Table 3e). Because there was no replication in this test, variety by location interactions could not be performed.

A significant negative relationship was observed again this year between Brix and yield for the observation varieties (Figure 1): soluble solids decreased as yield increased, as would be expected.

Mid replicated. Mid-maturity replicated variety results combining all locations are shown in Table 4a, and individual counties in Tables 4 b – e. Kern County PTAB data were collected, but not yields.

Using combined data, significant differences were found for all parameters measured, though Kern did not have significant differences for color. Averaged across all locations, significantly best yields occurred with N6385, H5608, and H5508, all ~ 60 tons per acre. AB2, AB3, and CXD282 were in the lowest yielding group this year. Yields were much better in the Merced trial than the other locations, averaging 72 tons/A. H5508 did especially well at this location, producing almost 84 tons/A (Table 4b).

Significant differences were observed for Brix in the combined data and individual location data. BQ205 had the best overall Brix at 5.7%, which was 21% greater than the lowest Brix entry, H5508. In general, lines that yielded well had low Brix and vice-versa, but SUN6366, UG19406, and N6394 had relative high Brix combined with high yield (Table 4a). Unlike the observation trial, there was less relationship between average yield and fruit soluble solids (Figure 2).

The difficulty in interpreting overall yield and Brix results between varieties is that one variety may perform well in one location and not in another. Therefore, an analysis was made of the relationship between Brix and yield at each location, where first the data were normalized by dividing the value for a variety by the overall plot mean. To aid interpretation and graphing, 1 was subtracted from each quotient, which resulted in values between -1 to +1:

[Brix(x)/Brix(avg)]-1

[Yield(x)/Yield)avg)]-1

The resulting coordinates were then plotted on an x-y axis, shown in Figure 3. Varieties that appear in the upper right quadrant have better Brix and yield than average. Conversely, entries in the bottom left quadrant perform less than average for both yield and Brix relative to the others in the trial. N6394, SUN6366, UG19406, and BQ163 consistently appear in the upper right quadrant, indicating superior performance across locations.

H5608, CXD282, and H4007 had the best fruit color with LED ratings of 22.4 – 23.1. (Table 4 d). Fruit pH ranged from 4.32 to 4.56 (Table 4e), with UG19406, H8504, and H5508 having significantly lowest pH. Overall, fruit pH values were slightly better (lower values) than 2008 and 2009.

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 much worse in

Fresno compared to the other locations (Table 4b). Many of the varieties at Merced had significantly higher pH than the other locations, which may have been a result of a delayed harvest (145 days after transplanting).

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. 2010 UCCE mid-maturity processing tomato variety trial locations.

Advisor	Trial
Gene Miyao, Yolo Co.	Transplant April 26, double-row on 60" beds. Furrow irrigation. Wet soil conditions at planting, but good establishment and growth. Low level of TSWV and powdery mildew; high level of *Verticillium* wilt. Cooperator: JH Meek and Sons. Harvest Sept 2 (129 days)
Brenna Aegerter, San Joaquin County	Transplant April 26, drip irrigation. Single row on a 60" bed. No stand problems this year. Some Fusarium crown and root rot. Cooperator: Hal Robertson, K & H Farms. Harvest Sept 10 (137 days).
Scott Stoddard, Merced County	Transplant April 30, drip irrigation. Double-row on 80" beds. Good stand, good vine growth. Cooperator: Aric Barcellos, A-Bar Ranch. Harvest Sept 26 (145 days). Excellent yields, Brix okay.
Michelle LeStrange, Tom Turini, Fresno County 1	Transplant April 16, sprinkler irrigation, then drip. Single row, 66" beds. TSWV and CTV came in early. Not enough drip irrigation at season start: a lot of blossom end rot. WSREC. Harvest August 26 (132 days). Yield data too variable to use.
Michelle LeStrange, Tom Turini, Fresno County 2	Transplant May 20, sprinkler irrigation, then drip. Some TSWV and CTV. Small plot size: greenhouse error on number of transplants (switched reps with observed). Single row 66" beds. WSREC. Harvest Sept 16 (119 days).
Joe Nunez, Kern County	Transplant March 31, drip irrigation. Good coverage, good fruit quality. PTAB samples taken, but malfunctioning weigh bar on GT Cart resulted in no yield measurements obtained. Cooperator: Toroganni Farms. Harvest Aug 10 (124 days).

Table 2. 2010 UCCE Processing Tomato Statewide Variety Trial

TRIAL	COMPANY	VAR	UC code	Disease Resistance	days to maturity	processed use	Brix	std compared	vine size	fruit shape	trial years
Mid	AB Seeds	**AB 2 (STD)**	**868**	VFFP	120	Multiuse	high	3155	med	sq	06, 07, 08,09,10
Replicated	AB Seeds	AB3 (DRI0303)	**971**	VFFNP	121	Multiuse	high	--	med	--	09,10
	Woodbridge Seeds	BQ163	**982**	VFFNP	118	Paste/peel	5.7-5.9	AB2	med	blocky	2010
	Woodbridge Seeds	BQ205	**984**	VFFNP	120	paste/peel	5.7-6.2	6366	lg	blocky	2010
	Campbell's Seeds	CXD 255	**969**	VFFNP	125	Multiuse	medium	849	med	sq	09, 10
	Campbell's Seeds	CXD 282	**976**	VFFFNP	125	Multiuse	medium	2401	med	sq	09,10
	Heinz Seed	H4007	**966**	VFFNP	118	MultiUse	4.9	H9780/N6366	med/lg	blocky	08, 09,10
	Heinz Seed	H5508	**986**	VFFN SW	128	paste	4.8	H9780	lg	blocky	09,10
	Heinz Seed	H5608	**987**	VFFNP SW	128	MultiUse	5	H9780	V. lg	blocky	2010
	Heinz Seed	H8504	**972**	VFFNP	130	paste	5.2	H9780	V. lg	oval	08, 09,10
	Heinz Seed	**H9780 (STD)**	**866**	VFFNP	139	Multiuse	5.4	H9780	V. lg	blocky	09,10
	Harris Moran	HM 7885	**973**	VFN	122	Pear	med/high	H2601	lg	pear	08, 09, 10
	Nunhems USA	N6385	**974**	VFFNP TSWV	125	Multiuse/Visc	med/low	AB8058	med	ElSqBlky	09,10
	Nunhems	N6394	**990**	VFFNP TSWV	126	Multiuse	high	AB8058/HZ2401	lg	sq/blocky	09,10
	Nunhems USA	**SUN6366 (STD)**	**919**	VFFNP	118	Multiuse	high	AB2/As410	med	sq/blocky	early trial
	United Genetics	UG19406	**991**	VFFNP	128	multiuse	high	H9780	strong plant	sq round	09, 10
Mid	Orsetti Seed	BOS 7210246	992	VFFNP							10
OBSERVED	Woodbridge SeedS	BQ 187	993	VFFFNP	120	paste/peel	5.5-5.9	6366	lg	blocky	10
	Woodbridge Seeds	BQ 198	994	VFFNP	120	Paste/peel	5.8-6.0	AB2	lg	Elongated	10
	Campbell's Seeds	CXD 280	995	VFFNP SW	125	paste	high		medium	square/round	10
	Heinz Seed	H6809	996	VFFN	125	multiuse	5.3	H9780	large	blocky	10
	Heinz Seed	H7709	997	VFFNP	122	peeling	5.5	AB2	large	oval	10
	Harris Moran	**HMX 9903**	998	VFFN	118	Multiuse/Visc	high	H8892	med	sq	10
	Harris Moran	HMX 9905	999	VFFN	125	Multiuse/Visc/efh	med	H8504	lg	sq	10
	Harris Moran	**HMX 9906**	**1000**	VFFNP	122	pear	med/high	**H2601**	lg	sq	**10**
	Nunhems	N6398	1001	VFFNP TSWV	125	multiuse/visc	med	H9780	med	blocky	10
	Nunhems	N6400	1002	VFFNP	125	multiuse/visc	med	H9780	lg	oval	10
	United Genetics	UG 19006	1003	VFFNP	125	dicing paste peel	med	H8504/H9780	very strong	sq blocky	10
	United Genetics	UG 19306	1004	VFFNP	130	dicing paste peel	med	H9557/H9780	vigorous	sq round	10

V = Verticillium Wilt race 1
FFF = Fusarium Wilt races 1 & 2 & 3
N = Root knot nematode
Bsp, P = Bacterial speck race 0
TSWV, SW = Spotted Wilt

All descriptions were provided by participating seed companies.
Check with seed company to confirm disease resistance.

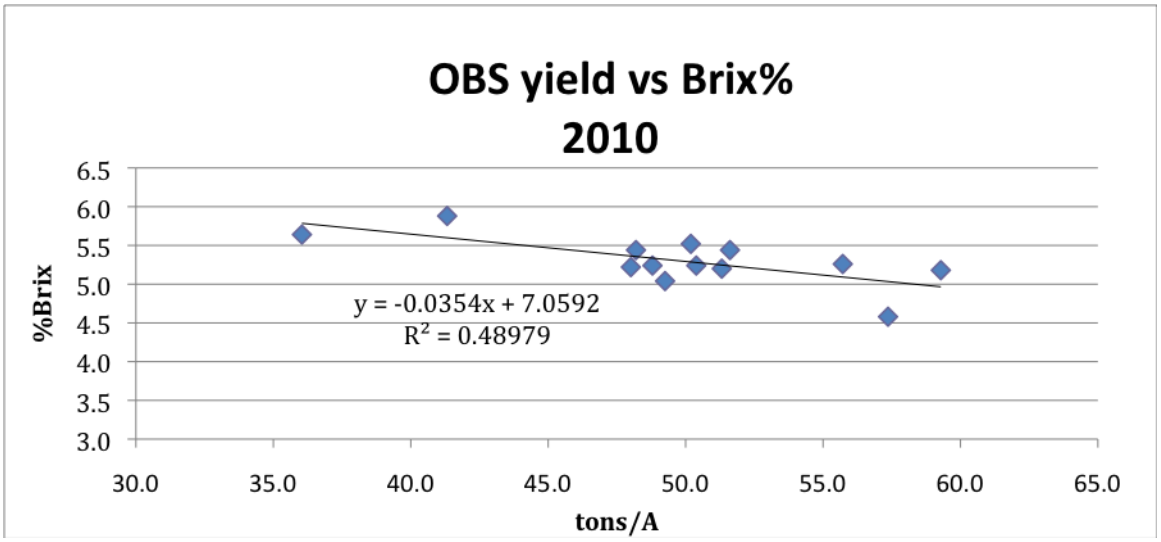

Figure 1. Relationship between tomato fruit yield and soluble solids for the varieties in the observation trial. Each point is the mean of 5 locations.

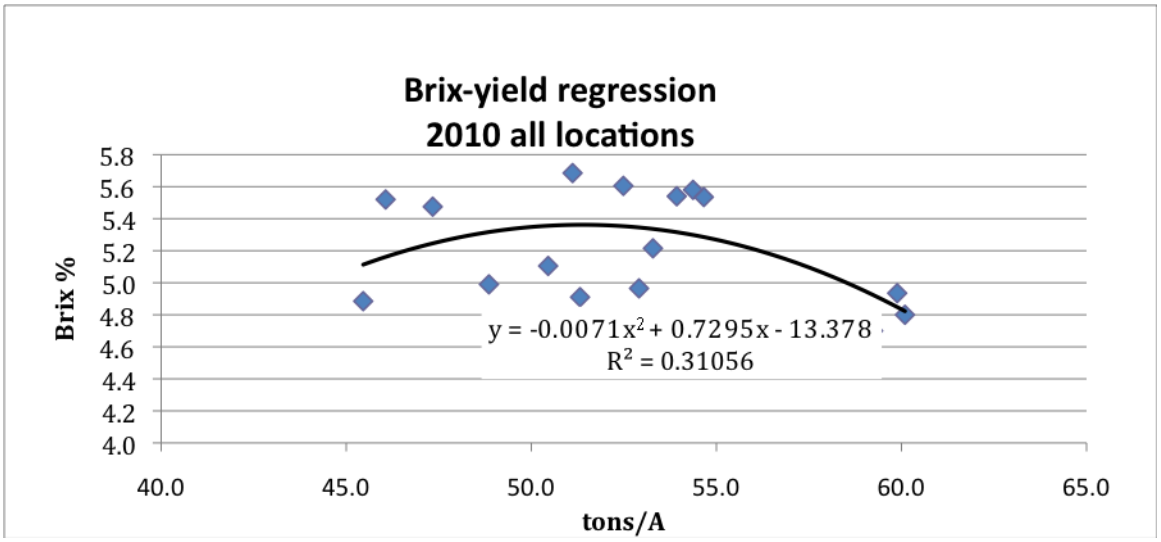

Figure 2. Relationship between tomato fruit yield and soluble solids for the varieties in the replicated trial. Each point is the mean of 20 data points.

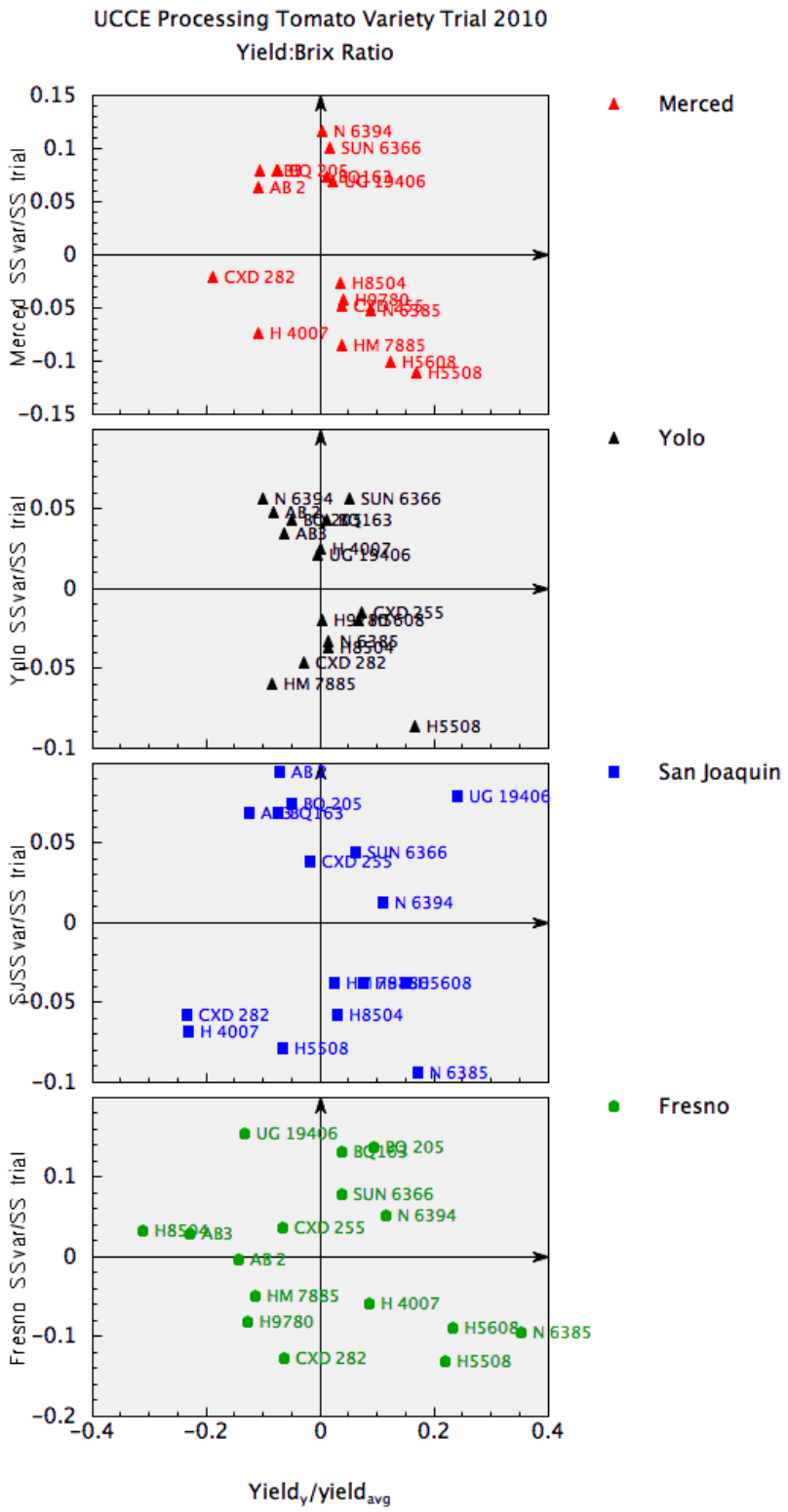

Figure 3. Normalized Brix:Yield ratio for all replicated entries at each trial location. Varieties that appear in the upper right quadrant are superior to the others for both yield and Brix.

TABLE 3a. 2010 PROCESSING TOMATO VARIETY TRIAL
MID SEASON OBSERVATIONAL COMBINED ANALYSIS

Variety	Yield tons/acre					Brix %		Color		pH	
999 HMX 9905	59.3	(01)	A			5.2	(11)	24.4	(10)	4.49	(12)
1001 N 6398	57.4	(02)	A			4.6	(13)	24.0	(06)	4.39	(02)
997 H 7709	55.7	(03)	A			5.3	(06)	24.8	(12)	4.44	(08)
1003 UG 19006	51.6	(04)	A	B		5.4	(04)	23.4	(04)	4.44	(06)
995 CXD 280	51.3	(05)	A	B		5.2	(10)	23.2	(02)	4.41	(03)
1000 HMX 9906	50.4	(06)	A	B		5.2	(07)	24.0	(06)	4.44	(06)
998 HMX 9903	50.2	(07)	A	B		5.5	(03)	21.8	(01)	4.47	(10)
1002 N 6400	49.3	(08)	A	B		5.0	(12)	24.2	(09)	4.46	(09)
996 H 6809	48.8	(09)	A	B		5.2	(07)	23.2	(02)	4.43	(05)
1004 UG 19306	48.2	(10)	A	B		5.4	(04)	24.8	(12)	4.36	(01)
994 BQ 198	48.0	(11)	A	B		5.2	(09)	24.0	(06)	4.51	(13)
993 BQ 187	41.3	(12)		B	C	5.9	(01)	24.4	(10)	4.48	(11)
992 BOS 7210246	36.0	(13)			C	5.6	(02)	23.8	(05)	4.41	(03)
Mean	**49.8**					**5.3**		**23.8**		**4.44**	
CV	**16.0**					**4.3**		**5.7**		**1.2**	
LSD @ 0.05	**11.41**					**0.29**		**NS**		**0.069**	

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.

TABLE 3b. 2010 MID MATURITY OBSERVATION COMBINED ANALYSIS: YIELD

Variety	Yield tons/acre				Yolo	San Joaquin	Fresno	Kern	Merced
999 HMX 9905	59.3	A			48.2	49.8	53.2		85.9
1001 N 6398	57.4	A			47.2	45.3	61.1		75.9
997 H 7709	55.7	A			49.4	51.1	43.2		79.2
1003 UG 19006	51.6	A	B		48.1	39.4	41.3		77.6
995 CXD 280	51.3	A	B		49.1	33.1	54.6		68.6
1000 HMX 9906	50.4	A	B		46.1	34.1	48.4		73.0
998 HMX 9903	50.2	A	B		40.9	39.0	54.0		66.9
1002 N 6400	49.3	A	B		44.8	50.3	27.0		74.9
996 H 6809	48.8	A	B		44.1	41.1	41.7		68.4
1004 UG 19306	48.2	A	B		47.5	46.6	38.5		60.2
994 BQ 198	48.0	A	B		47.0	28.7	54.9		61.4
993 BQ 187	41.3		B	C	41.4	31.6	43.7		48.7
992 BOS 7210246	36.0			C	44.2	34.8	21.7		43.4
Mean	**49.8**								
CV	**16.0**								
LSD @ 0.05	**11.41**								

Observation varieties were not replicated so the statistical analysis could be performed on the combined data only.
Malfunctioning weigh bar at the Kern County location, no yield measurements made.

TABLE 3c. 2010 MID MATURITY OBSERVATIONAL COMBINED ANALYSIS: BRIX

Variety	Brix %							Yolo	San Joaquin	Fresno	Kern	Merced
993 BQ 187	5.9	A						5.9	5.9	5.8	6.5	5.3
992 BOS 7210246	5.6	A	B					5.9	5.1	5.5	6.3	5.4
998 HMX 9903	5.5		B	C				5.5	5.2	6.2	6.0	4.7
1004 UG 19306	5.4		B	C	D			5.2	5.3	5.6	5.8	5.3
1003 UG 19006	5.4		B	C	D			6.0	5.3	5.6	5.3	5.0
997 H 7709	5.3			C	D	E		5.5	5.1	5.4	5.5	4.8
996 H 6809	5.2			C	D	E		5.2	5.1	5.5	5.6	4.8
1000 HMX 9906	5.2			C	D	E		5.4	5.4	5.2	5.3	4.9
994 BQ 198	5.2				D	E		5.5	5.1	5.3	5.5	4.7
995 CXD 280	5.2				D	E		5.5	5.1	5.5	5.3	4.6
999 HMX 9905	5.2				D	E		5.2	5.1	5.7	5.4	4.5
1002 N 6400	5.0					E		5.3	5.0	5.2	5.1	4.6
1001 N 6398	4.6						F	4.9	4.4	4.8	4.8	4.0
Mean	**5.3**											
CV	**4.3**											
LSD @ 0.05	**0.29**											

TABLE 3d. 2010 MID MATURITY OBSERVATIONAL COMBINED ANALYSIS: COLOR

Variety	Color				Yolo	San Joaquin	Fresno	Kern	Merced
998 HMX 9903	21.8				22.0	22.0	21.0	21.0	23.0
996 H 6809	23.2				23.0	22.0	23.0	24.0	24.0
995 CXD 280	23.2				22.0	23.0	24.0	23.0	24.0
1003 UG 19006	23.4				25.0	22.0	24.0	22.0	24.0
992 BOS 7210246	23.8				22.0	25.0	28.0	22.0	22.0
994 BQ 198	24.0				23.0	23.0	23.0	25.0	26.0
1001 N 6398	24.0				23.0	23.0	25.0	24.0	25.0
1000 HMX 9906	24.0				23.0	23.0	23.0	25.0	26.0
1002 N 6400	24.2				22.0	23.0	26.0	26.0	24.0
999 HMX 9905	24.4				25.0	24.0	26.0	23.0	24.0
993 BQ 187	24.4				24.0	22.0	26.0	24.0	26.0
997 H 7709	24.8				24.0	24.0	25.0	25.0	26.0
1004 UG 19306	24.8				22.0	25.0	25.0	28.0	24.0
Mean	**23.8**								
CV	**5.7**								
LSD @ 0.05	**NS**								

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

TABLE 3e. 2010 MID MATURITY OBSERVATIONAL COMBINED ANALYSIS: pH

Variety	pH						Yolo	San Joaquin	Fresno	Kern	Merced
1004 UG 19306	4.36	A					4.40	4.26	4.47	4.23	4.45
1001 N 6398	4.39	A	B				4.36	4.36	4.45	4.28	4.52
995 CXD 280	4.41	A	B	C			4.39	4.37	4.46	4.37	4.48
992 BOS 7210246	4.41	A	B	C			4.47	4.26	4.47	4.37	4.50
996 H 6809	4.43	A	B	C	D		4.36	4.40	4.51	4.33	4.53
1003 UG 19006	4.44		B	C	D	E	4.38	4.37	4.44	4.47	4.55
1000 HMX 9906	4.44		B	C	D	E	4.45	4.42	4.52	4.27	4.55
997 H 7709	4.44		B	C	D	E	4.49	4.40	4.44	4.33	4.56
1002 N 6400	4.46		B	C	D	E	4.60	4.36	4.45	4.32	4.55
998 HMX 9903	4.47			C	D	E	4.48	4.41	4.50	4.32	4.63
993 BQ 187	4.48			C	D	E	4.51	4.40	4.53	4.38	4.59
999 HMX 9905	4.49				D	E	4.52	4.44	4.55	4.45	4.47
994 BQ 198	4.51					E	4.52	4.38	4.53	4.38	4.72
Mean	**4.44**										
CV	**1.2**										
LSD @ 0.05	**0.069**										

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

TABLE 4a. 2010 PROCESSING TOMATO VARIETY TRIAL MID SEASON REPLICATED COMBINED ANALYSIS

Variety	Yield tons/acre										Brix %		Color		pH	
974 N 6385	60.1	(01)	A								4.8	(15)	23.3	(04)	4.44	(11)
987 H5608	59.9	(02)	A								4.9	(12)	22.4	(01)	4.43	(10)
986 H5508	59.2	(03)	A								4.7	(16)	23.7	(06)	4.35	(03)
919 SUN 6366	54.7	(04)		B							5.5	(05)	23.3	(04)	4.49	(14)
991 UG 19406	54.4	(05)		B	C						5.6	(03)	24.2	(10)	4.32	(01)
990 N 6394	53.9	(06)		B	C	D					5.5	(04)	23.9	(07)	4.53	(15)
969 CXD 255	53.3	(07)		B	C	D	E				5.2	(08)	24.4	(13)	4.42	(09)
866 H9780 (STD)	52.9	(08)		B	C	D	E				5.0	(11)	25.1	(16)	4.41	(08)
982 BQ163	52.5	(09)		B	C	D	E				5.6	(02)	23.9	(07)	4.40	(06)
973 HM 7885	51.3	(10)			C	D	E	F			4.9	(13)	25.0	(15)	4.56	(16)
984 BQ 205	51.1	(11)				D	E	F			5.7	(01)	24.2	(10)	4.39	(05)
972 H8504	50.5	(12)					E	F			5.1	(09)	24.3	(12)	4.34	(02)
966 H 4007	48.9	(13)						F	G		5.0	(10)	23.1	(03)	4.47	(12)
868 AB 2	47.3	(14)							G	H	5.5	(07)	24.0	(09)	4.37	(04)
971 AB3 (DRI0303)	46.1	(15)							G	H	5.5	(06)	24.7	(14)	4.41	(07)
976 CXD 282	45.5	(16)								H	4.9	(14)	23.0	(02)	4.47	(13)
Mean	**52.6**										**5.2**		**23.9**		**4.42**	
CV	**8.4**										**5.4**		**5.6**		**1.2**	
LSD @ 0.05	**3.07**										**0.18**		**0.83**		**0.034**	
Variety X Location LSD @ 0.05	**6.14**										**0.39**		**1.85**		**0.077**	
# Locations	**4**										**5**		**5**		**5**	

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.
Numbers in parenthesis are the relative ranking of each variety within a column.

TABLE 4b. 2010 PROCESSING TOMATO VARIETY TRIAL MID SEASON REPLICATED COMBINED ANALYSIS YIELD, TONS/ACRE

Variety	Yield tons/acre									Yolo	San Joaquin	Fresno	Kern	Merced
974 N 6385	60.1	A								50.3	55.0	57.2		77.9
987 H5608	59.9	A								53.0	54.0	52.1		80.4
986 H5508	59.2	A								57.9	43.8	51.6		83.6
919 SUN 6366	54.7		B							52.1	49.8	44.0		72.7
991 UG 19406	54.4		B	C						49.5	58.2	36.7		73.1
990 N 6394	53.9		B	C	D					44.6	52.1	47.2		71.8
969 CXD 255	53.3		B	C	D	E				53.3	46.0	39.6		74.3
866 H9780 (STD)	52.9		B	C	D	E				49.8	50.5	36.9		74.5
982 BQ163	52.5		B	C	D	E				50.2	43.5	43.9		72.4
973 HM 7885	51.3			C	D	E	F			45.5	48.1	37.5		74.3
984 BQ 205	51.1				D	E	F			47.2	44.6	46.4		66.3
972 H8504	50.5					E	F			50.3	48.3	29.2		74.0
966 H 4007	48.9						F	G		49.7	36.0	46.0		63.7
868 AB 2	47.3							G	H	45.6	43.6	36.3		63.8
971 AB3 (DRI0303)	46.1							G	H	46.6	41.1	32.7		63.9
976 CXD 282	45.5								H	48.2	35.9	39.6		58.1
Mean	**52.6**									**49.6**	**46.9**	**42.3**		**71.5**
CV	**8.4**									**5.5**	**10.7**	**12.5**		**5.7**
LSD @ 0.05	**3.07**									**3.86**	**7.15**	**7.55**		**5.83**
Variety X Location LSD @ 0.05	**6.14**													

TABLE 4c. 2010 PROCESSING TOMATO VARIETY TRIAL MID SEASON REPLICATED COMBINED ANALYSIS BRIX%

Variety	Brix %								Yolo	San Joaquin	Fresno	Kern	Merced
984 BQ 205	5.7	A							5.8	5.3	6.3	6.0	5.1
982 BQ163	5.6	A	B						5.8	5.3	6.2	5.7	5.1
991 UG 19406	5.6	A	B						5.7	5.3	6.4	5.5	5.1
990 N 6394	5.5	A	B						5.9	5.0	5.8	5.8	5.3
919 SUN 6366	5.5	A	B						5.9	5.1	5.9	5.5	5.2
971 AB3 (DRI0303)	5.5	A	B						5.8	5.3	5.7	5.8	5.1
868 AB 2	5.5		B						5.9	5.4	5.5	5.7	5.0
969 CXD 255	5.2			C					5.5	5.1	5.7	5.3	4.5
972 H8504	5.1			C	D				5.4	4.6	5.7	5.3	4.6
966 H 4007	5.0				D	E			5.7	4.6	5.2	5.1	4.4
866 H9780 (STD)	5.0				D	E	F		5.5	4.7	5.1	5.1	4.5
987 H5608	4.9				D	E	F		5.5	4.7	5.0	5.2	4.3
973 HM 7885	4.9					E	F		5.3	4.7	5.2	5.0	4.3
976 CXD 282	4.9					E	F		5.3	4.6	4.8	5.1	4.6
974 N 6385	4.8						F	G	5.4	4.5	5.0	4.7	4.5
986 H5508	4.7							G	5.1	4.5	4.8	4.9	4.2
Mean	**5.2**								**5.6**	**4.9**	**5.5**	**5.3**	**4.7**
CV	**5.4**								**5.8**	**3.7**	**4.8**	**5.8**	**6.6**
LSD @ 0.05	**0.18**								**0.46**	**0.26**	**0.38**	**0.44**	**0.44**
Variety X Location LSD @ 0.05	**0.39**												

TABLE 4d. 2010 PROCESSING TOMATO VARIETY TRIAL MID SEASON REPLICATED COMBINED ANALYSIS COLOR

Variety	Color									Yolo	San Joaquin	Fresno	Kern	Merced
987 H5608	22.4	A								23.0	21.8	21.8	22.3	23.3
976 CXD 282	23.0	A	B							21.5	22.3	23.8	22.8	24.5
966 H 4007	23.1	A	B	C						22.8	22.3	22.5	23.3	24.5
974 N 6385	23.3		B	C	D					22.5	23.5	23.8	23.8	22.8
919 SUN 6366	23.3		B	C	D					23.3	22.5	23.8	23.5	23.3
986 H5508	23.7		B	C	D	E				22.8	23.5	23.5	23.8	24.8
990 N 6394	23.9			C	D	E	F			22.3	24.3	24.0	23.8	25.0
982 BQ163	23.9			C	D	E	F			23.8	23.8	25.3	23.8	22.8
868 AB 2	24.0				D	E	F			23.3	23.3	25.3	24.0	24.0
991 UG 19406	24.2					E	F	G		22.8	23.5	22.8	24.0	27.8
984 BQ 205	24.2					E	F	G		23.5	24.3	23.0	24.3	25.8
972 H8504	24.3					E	F	G		23.0	23.5	25.5	24.0	25.3
969 CXD 255	24.4					E	F	G	H	23.0	24.0	25.8	24.5	24.8
971 AB3 (DRI0303)	24.7						F	G	H	24.5	23.8	25.3	24.8	25.0
973 HM 7885	25.0							G	H	24.0	23.3	25.5	24.3	27.8
866 H9780 (STD)	25.1								H	24.3	24.5	25.3	25.3	26.3
Mean	**23.9**									**23.1**	**23.4**	**24.2**	**23.9**	**24.8**
CV	**5.6**									**3.6**	**2.9**	**6.5**	**4.4**	**8.1**
LSD @ 0.05	**0.83**									**1.17**	**0.98**	**2.23**	**NS**	**2.88**
Variety X Location LSD @ 0.05	**1.85**													

TABLE 4e. 2010 PROCESSING TOMATO VARIETY TRIAL MID SEASON REPLICATED COMBINED ANALYSIS
pH

Variety	pH									Yolo	San Joaquin	Fresno	Kern	Merced
991 UG 19406	4.32	A								4.31	4.23	4.36	4.29	4.41
972 H8504	4.34	A								4.32	4.24	4.40	4.27	4.46
986 H5508	4.35	A	B							4.39	4.29	4.33	4.34	4.41
868 AB 2	4.37		B	C						4.39	4.30	4.39	4.29	4.51
984 BQ 205	4.39			C	D					4.43	4.31	4.41	4.34	4.47
982 BQ163	4.40			C	D	E				4.41	4.32	4.41	4.34	4.54
971 AB3 (DRI0303)	4.41			C	D	E				4.43	4.33	4.43	4.33	4.52
866 H9780 (STD)	4.41				D	E				4.36	4.31	4.55	4.35	4.50
969 CXD 255	4.42				D	E				4.42	4.33	4.50	4.33	4.53
987 H5608	4.43					E				4.49	4.36	4.43	4.34	4.52
974 N 6385	4.44					E	F			4.49	4.36	4.42	4.38	4.55
966 H 4007	4.47						F	G		4.45	4.44	4.54	4.38	4.55
976 CXD 282	4.47						F	G		4.46	4.36	4.54	4.38	4.62
919 SUN 6366	4.49							G		4.56	4.41	4.48	4.40	4.58
990 N 6394	4.53								H	4.56	4.40	4.55	4.46	4.68
973 HM 7885	4.56								I	4.59	4.52	4.57	4.49	4.66
Mean	**4.42**									**4.44**	**4.34**	**4.45**	**4.36**	**4.53**
CV	**1.2**									**0.9**	**0.8**	**1.7**	**1.2**	**1.4**
LSD @ 0.05	**0.034**									**0.060**	**0.051**	**0.107**	**0.074**	**0.088**
Variety X Location LSD @ 0.05	**0.077**													