

Project Title

UC Statewide Processing Tomato Variety Evaluation Trials

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Summary:

Early-season maturing variety trials were conducted at 4 locations and mid-season maturing variety trials were conducted at 11 locations within the major processing tomato production regions of California during the 2001 season. An additional trial (Merced County) was lost due to adverse environmental conditions. All of the major production areas, from Kern to Sutter/Colusa Counties, had one or more field trials to identify tomato cultivars appropriate for each region. The widespread adoption of transplants by industry led us to incorporate this production technique into our variety evaluation program. Three of the mid-season test sites (Colusa, San Joaquin and Yolo Counties) utilized transplants and Farm Advisors in Colusa and Yolo Counties conducted both direct-seeded and transplant mid-season tests. Highest yielding early maturing varieties were CXD 216, PS 816, UG 606, and H 1100 in the replicated tests across all locations. The overall highest yielding mid season maturing varieties were H9665, H9492, H9775, and H8892 in the replicated tests and Sun 6340, AP 863, H9992, and CXD 220 in the observational tests.

Objectives:

The objectives of this program have been consistent for over 20 years: to compare the performance of recently-developed cultivars with industry standard varieties in replicated field trials conducted throughout the major processing tomato production regions of California. Characteristics of particular interest include fruit quality (soluble solids, pH and color), fruit yields and disease resistance/tolerance. These tests are designed and conducted with input and/or collaboration from seed companies, processors, producers and other industry partners, and are intended to generate information useful for making intelligent variety selection decisions.

Procedures:

Tests were established in commercial production fields with grower cooperators. A uniform set of varieties was used at all locations, and individual Farm Advisors had the latitude to add to this core-group, to meet specific local needs. The varieties evaluated included 9 observational and 12 replicated entries in the early-season maturing tests and 19 observational and 19 replicated entries in the mid-season maturing tests (Tables 1A and 1B). Early-season maturing tests were planted from January to the end of March and mid-season maturing tests were planted from April to early June. New varieties usually were screened one or more years in non-replicated, observational tests before being selected for testing in replicated trials. Individual plots of the variety tests measured one-bed in width (5 ft) by 100-feet in length. The replicated varieties were planted in four randomly selected plots, usually following a random complete block design, and the observational varieties were planted in non-replicated plots. The variety trials were seeded/transplanted by the researcher. All other cultural operations, with the exception of harvesting, were done by the grower/cooperator and were consistent with field operations conducted outside of the test area. All variety trials were furrow irrigated with the exception of the 3rd Fresno County mid-season maturing trial, which was subsurface drip irrigated, and the Sutter and Colusa County, mid-season maturing trials, which were sprinkler irrigated. Colusa, San Joaquin, and Stanislaus County mid-season maturing trials received an application of Ethrel to hasten ripening.

Farm Advisors took notes on plant growth and growing conditions throughout the season. A field day, or arrangements for interested persons to visit the plots, occurred at all of the tests. Shortly before or during harvest, fruit samples were collected from all plots and submitted to PTAB for soluble solids, color and pH determinations. The plots were harvested with commercial harvesters (except the San Joaquin trial and the early trial at the Westside Field Station in Fresno), using GT wagons, equipped with weigh cells, to obtain plot weights.

The data was statistically analyzed using analysis of variance procedures and reports of results were disseminated to all factions of the California processing tomato industry through individual newsletters, regional production meetings, CTRI Director meetings, media and other methods.

Results

Results are presented in the following tables for the combination of all locations and for individual trials:

Table 2: A, B, C, D Early-Season Observational—Yield, Brix, Color, pH

Table 3: A, B, C, D Early-Season Replicated—Yield, Brix, Color, pH

Table 4: A, B, C, D Mid-Season Observational—Yield, Brix, Color, pH

Table 5: A, B, C, D Mid-Season Replicated—Yield, Brix, Color, pH

Early-Season Maturing Observational Varieties

The average fruit yield of all observational varieties across the 4 trial locations was 36.9 tons/acre. Yields were not significantly different among varieties (Table 2A). The average brix level across all locations and varieties was 4.9%. The varieties with the highest brix levels were NDM 970, CTRI 1090 and HyPeel 45 (Table 2B). Varieties with the best color on the PTAB scale were H 1800, H 9997, NDM 970 and H 9280 (Table 2C). Acidity levels were not statistically significant among observational varieties (Table 2D). The average fruit pH for all locations and varieties was 4.36. Acidity (pH) was not measured at the Fresno location.

Early-Season Maturing Replicated Varieties

The average fruit yield of all replicated varieties across the 4 trial locations was 37.9 tons/acre. Highest yielding varieties included CXD 216, PS 816, UG 606, and H 1100 (Table 3A). Note that there was a significant interaction among varieties and locations, meaning that the relative ranking of varieties differed significantly among locations. Fruit yields were highest at the San Joaquin Co trial and lowest at the Yolo Co. trial. Yields were not significantly different among varieties at the Fresno trial. The average brix level of all locations and varieties was 5.0%. The varieties with the highest brix levels were H 9888, CTRI 1056, HyPeel 45, and PS 816 (Table 3B). Brix levels were similar among locations. Varieties with the best color (lowest PTAB color) were APT 410, H 9280, H 9888, and CTRI 1056 (Table 3C). Fruit color averaged 25.1 across all varieties and locations. Varieties with the lowest fruit pH were H9881, CTRI 1056, HyPeel 45, and PS816 (Table 3D). The average fruit pH for all locations and varieties was 4.37. Acidity (pH) was not measured at the Fresno location.

Mid-Season Maturing Observational Varieties

Yield data from observational varieties was analyzed for 10 locations. Kern Co yields were not included in the analysis due to high variability in the data. In addition PTAB data was unavailable for Kern Co. Highest yields were obtained at the San Joaquin and the 2nd Fresno trials and lowest yields were measured at the 3rd Fresno trial. The average fruit yield of all observational varieties across the 10 trial locations was 41.9 tons/acre. Highest yielding varieties were Sun 6340, AP 863, H9992, and CXD 220 (Table 4A). The average brix level across all locations and varieties was 5.2%. The varieties with the highest brix levels were CTRI 1056, PS 173, and Sun 6324 (Table 4B). Varieties with the best color were CXD 224, H 9992, CXD 218 and H 9995 (Table 4C). Varieties with the lowest pH were PX 849, CTRI 1056, H 9995, Sun 6340, and Sun 6333 (Table 4D). The average fruit pH for all locations and varieties was 4.34.

Mid-Season Maturing Replicated Varieties

The average fruit yield of all replicated varieties across the 11 trial locations was 38.2 tons/acre. Highest yields were obtained at the San Joaquin and the Yolo trials and lowest yields were measured at the 3rd Fresno trial. Low yields at the 3rd Fresno trial were attributed to reduced vigor, caused by curly-top virus, and high temperatures at fruit set. The field site for the San Joaquin trial was previously in a long-term rotation with alfalfa and silage corn and received regular applications of cow manure. Flea beetles reduced stands up to 50% in some plots at the Stanislaus trial causing increased variation in yields. In addition Ethrel was applied at rate of 3 pints/acre. The Kern County trial also had a high coefficient of variation in the yield data that

can be attributed to variable stands in the plots. Irrigation was cut-off almost 60 days before harvest at the Sutter County trial, which may have increased the variability in the yields.

Highest yielding varieties of all locations were H9665, H9492, H9775, and H8892 (Table 5A). There was a significant variety X location interaction, meaning that the relative ranking of varieties differed among locations. The average brix level across all locations and varieties was 5.2%. PTAB fruit quality data was unavailable for Kern Co. The variety with the highest brix level was CXD 221 (Table 5B). Like the yield analysis, a significant variety X location interaction was found for fruit brix. The variety with the best color was CXD 207 (Table 5C). Varieties with the lowest fruit pH were H 9665, Halley 3155, H 9775 and HyPeel 347 (Table 5D). The average fruit pH for all locations and varieties was 4.33.

Acknowledgements

We thank the CTRI for continued support. We appreciate PTAB's evaluation of brix, color, and pH of our fruit samples. We rely heavily on the statistical expertise of Gail Nishimoto. We thank the many grower cooperators who were involved with these trials: Button and Turkovich Ranches, Crettol Farms, Emerald Farms, Live Oak Farms, Marca Bella Farms, J.H. Meek and Sons, Michelena Farms, Joe Muller and Sons, Poundstone Brothers, Roma Farms, and Simoni and Massoni Farms.

Table 1A. EARLY SEASON MATURING VARIETIES FOR THE 2001 SEASON

Company	Replicated	Varieties	Observational	Varieties
Asgrow	<i>APT 410</i>	\$VFFNP	<i>APT 410</i>	\$VFFNP
CTRI	CTRI 1056	¢VFFNP	CTRI 1090	¢VFFNP
Campbell	CXD 206	\$VFFNP		
	CXD 216	\$VFFNP		
Heinz	<i>H 9280</i>	\$VFFNP	<i>H 9280</i>	\$VFFNP
	H 1100	\$VFFNP	H 1800	\$VFFNP
	H 9881	\$VFFNP	H 9997	\$VFFNP
	H 9888	\$VFFNP		
Nippon Del Monte			NDM 970	\$VFFN(TMV)
Peto	<i>HyPeel 45</i>	\$VFFNP	<i>HyPeel 45</i>	\$VFFNP
	HyPack 280	\$VFFNP		
	PS 816	\$VFFNP		
United Genetics	UG 606	\$VFFNP	UGX 8120	\$VFFNP
			UGX 8168	\$VFFNP

\$= Hybrid	FF= Fusarium Wilt Race I and II Resistant
¢=open pollinated	FFF3 = Fusarium Wilt Race I,II, and III Resistant
V=Verticillium Wilt Race I Resistant	N = Root Knot Nematode Resistant
F=Fusarium Wilt Race I Resistant	P= Bacterial Speck Resistant

Bold = varietal standard

Table 1B. MID SEASON MATURING VARIETIES FOR THE 2001 SEASON

Company	Replicated	Varieties	Observational	Varieties
Asgrow			AP 847 AP 863	\$VFFNP \$VFFN
CTRI	CTRI 5158	ϕVFFN	CTRI 1056	ϕVFFN
Campbell	CXD 199 CXD 207 CXD 208 CXD 215 CXD 221	\$VFFNP \$VFFN \$VFFN \$VFFF3NP \$VFFF3NP	CXD 211 CXD 218 CXD 220 CXD 224	\$VFFNP \$VFFNP \$VFFNP \$VFFNP
Harris Moran	HM 0830	\$VFFN		
Heinz	H 8892 H 9492 H 9665 H 9775 H 9998	\$VFFN \$VFNC \$VFFNP \$VFFNP \$VFFNP	H 9992 H 9995	\$VFFNP \$VFFNP
Lipton			U 2010	\$VFFN
N Del Monte			NDM 969	\$VFFN & TMV
Orsetti	Halley 3155 BOS 24593 BOS 24675	\$VFF \$VFFNP \$VFFN		
Rogers			La Rossa	\$VFF pear
Peto	HyPeel 303 HyPeel 347	\$VFFNP \$VFFNP	PS 173 PX 849 PX 133	\$VFFF3NP \$VFFNP \$VFFNP pear
Sunseeds	Sun 6332	\$VFFNP	Sun 6324 Sun 6333 Sun 6340	\$VFFNP \$VFFNP \$VFFNP
United Genetics	ENP 113	\$VFFNP	UG 8154	\$VFFNP

\$= Hybrid	FF= Fusarium Wilt Race I and II Resistant
ϕ=open pollinated	FFF3 = Fusarium Wilt Race I,II, and III Resistant
V=Verticillium Wilt Race I Resistant	N = Root Knot Nematode Resistant
F=Fusarium Wilt Race I Resistant	P= Bacterial Speck Resistant

Bold = varietal standard

Table 2A. FRUIT YIELDS OF 2001 EARLY-SEASON MATURING OBSERVATIONAL VARIETIES

VARIETY	YIELD (tons/acre)				
	(4 LOCATIONS COMBINED)	COLUSA	FRESNO	SAN JOAQUIN	YOLO
APT 410	39.5	44.4	32.4	53.3	28.1
H 9997	39.5	35.2		63.8	29.6
UGX 8120	38.8		21.2	60.4	31.1
HyPeel 45	37.8	45.5	25.6	54.5	25.6
H 9280	36.3	40.9	27.2	52.4	24.8
CTRI 1090	35.4	33.0	30.0	55.4	23.0
UGX 8168	35.2			52.3	24.3
NDM 970	33.7	42.9	25.1	42.6	24.1
H 1800	28.5	34.9		36.3	24.5
MEAN	36.9	39.5	26.9	52.3	26.1
LSD @ 0.05	N.S.				
C.V. (%)	14.5				

Table 2B. FRUIT BRIX OF 2001 EARLY-SEASON MATURING OBSERVATIONAL VARIETIES

VARIETY	Brix (%)					
	(4 LOCATIONS COMBINED)	COLUSA	FRESNO	SAN JOAQUIN	YOLO	
NDM 970	5.3A	5.3	4.7	5.7	5.4	
CTRI 1090	5.1A B	5.1	4.9	5.3	5.2	
HyPeel 45	5.0A B C	5.0	4.5	5.0	5.5	
UGX 8168	4.8 B C D			4.7	5.2	
UGX 8120	4.8 B C D		4.6	5.2	4.6	
H 9997	4.8 B C D	5.4	4.8	4.2	4.9	
APT 410	4.7 C D	4.6	4.4	4.7	5.1	
H 1800	4.7 C D	4.8	4.3	4.7	5.0	
H 9280	4.4 D	4.4	4.3	4.5	4.5	
MEAN	4.9	4.9	4.6	4.9	5.0	
LSD @ 0.05	0.4					
C.V. (%)	5.9					

Table 2C. FRUIT COLOR OF 2001 EARLY-SEASON MATURING OBSERVATIONAL VARIETIES

VARIETY	PTAB Color					
	(4 LOCATIONS COMBINED)	COLUSA	FRESNO	SAN JOAQUIN	YOLO	
H 1800	22.3A	23	22	22	22	
H 9997	23.5A B	23	24	23	24	
NDM 970	24.3 B C	25	23	25	24	
H 9280	24.5 B C	25	26	23	24	
APT 410	24.8 B C D	25	25	24	25	
UGX 8168	25.0 B C D			24	26	
CTRI 1090	25.5 C D	26	24	25	27	
UGX 8120	26.2 D E		24	27	27	
HyPeel 45	27.3 E	29	25	27	28	
MEAN	24.7					
LSD @ 0.05	1.6					
C.V. (%)	4.3					

Table 2D. FRUIT pH OF 2001 EARLY-SEASON MATURING REPLICATED VARIETIES

VARIETY	Acidity (pH)				
	(4 LOCATIONS COMBINED)	COLUSA	FRESNO	SAN JOAQUIN	YOLO
CTRI 1090	4.32	4.34		4.33	4.29
UGX 8120	4.33			4.31	4.29
H 1800	4.33	4.42		4.34	4.23
HyPeel 45	4.35	4.40		4.35	4.30
H 9997	4.37	4.42		4.35	4.33
APT 410	4.37	4.41		4.42	4.28
H 9280	4.39	4.48		4.35	4.33
UGX 8168	4.39			4.38	4.35
NDM 970	4.43	4.44		4.51	4.34
MEAN	4.36	4.42		4.37	4.30
LSD @ 0.05	N.S.				
C.V. (%)	0.90				

Table 3A. FRUIT YIELDS OF 2001 EARLY-SEASON MATURING REPLICATED VARIETIES

VARIETY	Yield tons/acres	STATEWIDE (4 LOCATIONS COMBINED)				SAN			
		YOLO	JOAQUIN	FRESNO	COLUSA	YOLO	JOAQUIN	FRESNO	COLUSA
CXD 216	41.4 A					31.3	61.2	32.7	40.4
PS 816	41.1 A					30.6	60.1	35.3	38.4
UG 606	40.6 A					31.0	61.6	32.2	37.8
H 1100	40.1 AB					30.7	57.0	36.3	36.5
APT 410	39.5 ABC					29.0	56.1	33.3	39.6
H 9888	38.1 B C D					31.5	52.7	31.3	37.1
HyPeel 45	37.7 C D E					28.6	56.7	28.1	37.4
CXD 206	36.7 C D E					32.1	58.5	29.0	27.2
CTRI 1056	35.9 D E					26.7	57.5	28.4	31.1
H 9280	35.8 E F					27.3	45.6	32.4	38.1
H 9881	34.2 F G					29.2	39.5	29.3	38.8
HyPack 280	32.6 G					25.2	42.4	30.1	32.6
MEAN	37.9					29.4	54.1	31.5	36.2
LSD @ 0.05	2.2					2.8	3.9	N.S.	4.9
CV (%)	8.0					6.6	5.1	13.1	8.0
VARIETY X LOCATION									
LSD @ 0.05	4.4								

Table 3B. FRUIT BRIX OF 2001 EARLY-SEASON MATURING REPLICATED VARIETIES

VARIETY	BRIX %	STATEWIDE (4 LOCATIONS COMBINED)			YOLO	SAN		
		JOAQUIN	FRESNO	COLUSA				
H 9888	5.4	A			5.5	5.2	5.3	5.7
CTRI 1056	5.3	AB			5.4	4.9	5.5	5.5
HyPeel 45	5.3	AB			5.1	5.1	5.5	5.5
PS 816	5.2	B	C		5.1	5.2	5.4	5.1
APT 410	5.1		C		5.1	4.9	5.2	5.1
H 1100	5.0		C	D	5.0	4.8	5.1	5.2
CXD 216	5.0		C	D	E	5.1	5.0	4.9
UG 606	4.8			D	E	4.9	4.6	5.0
CXD 206	4.8			D	E	F	4.7	4.9
HyPack 280	4.8				E	F	4.9	4.8
H 9881	4.6					F	G	4.6
H 9280	4.6						G	4.6
MEAN	5.0				5.0	4.8	5.1	5.1
LSD @ 0.05	0.2				0.3	0.3	N.S.	0.5
CV (%)	5.6				4.0	3.7	7.3	6.4
VARIETY X LOCATION								
LSD @ 0.05		N.S.						

Table 3C. FRUIT COLOR OF 2001 EARLY-SEASON MATURING REPLICATED VARIETIES

VARIETY	STATEWIDE COLOR (4 LOCATIONS AGTRON COMBINED)			YOLO	SAN		
	JOAQUIN	FRESNO	COLUSA				
APT 410	23.9A			23.5	24.0	23.0	25.3
H 9280	24.2A			23.8	23.5	24.3	25.3
H 9888	24.4A	B		23.5	25.5	23.8	24.8
CTRI 1056	24.4A	B		24.5	24.5	23.5	25.3
HyPack 280	24.8A	B	C	23.5	23.8	25.8	26.0
H 9881	25.1	B	C	D	24.3	25.5	25.0
H 1100	25.4		C	D	25.3	26.0	24.3
PS 816	25.4		C	D	25.0	25.8	23.8
CXD 216	25.5		C	D	25.3	25.3	24.5
UG 606	25.8			D	E	25.0	27.3
CXD 206	25.9			D	E	24.8	26.3
HyPeel 45	26.4				E	26.5	26.8
MEAN	25.1			24.6	25.3	24.3	26.2
LSD @ 0.05	0.9			1.3	2.0	N.S.	2.1
CV (%)	4.9			3.8	5.5	4.5	5.6
VARIETY X LOCATION							
LSD @ 0.05		N.S.					

Table 3D. FRUIT pH OF 2001 EARLY-SEASON MATURING REPLICATED VARIETIES

VARIETY	pH	STATEWIDE (4 LOCATIONS COMBINED)		SAN				
		YOLO	JOAQUIN	FRESNO	COLUSA			
H 9881	4.30A			4.23	4.28		4.39	
CTRI 1056	4.31A	B		4.24	4.29		4.41	
HyPeel 45	4.33	B	C	4.28	4.32		4.39	
PS 816	4.35		C	4.27	4.34		4.43	
H 1100	4.38		D	4.29	4.39		4.46	
HyPack 280	4.38		D	4.30	4.40		4.45	
H 9280	4.39		D	4.30	4.37		4.50	
UG 606	4.39		D	4.35	4.35		4.47	
APT 410	4.39		D	4.34	4.35		4.48	
H 9888	4.39		D	4.36	4.37		4.46	
CXD 206	4.40		D	4.36	4.34		4.49	
CXD 216	4.40		D	4.34	4.37		4.49	
MEAN	4.37			4.30	4.35		4.45	
LSD @ 0.05	0.03			0.05	0.04		0.07	
CV (%)	0.9			0.8	0.7		1.1	
VARIETY X LOCATION LSD @ 0.05		N.S.						

Table 4A. FRUIT YIELDS OF 2001 MID-SEASON MATURING OBSERVATIONAL VARIETIES

VARIETY	YIELD (ton/acre)		COLUSA		FRESNO		FRESN	SAN	STANIS-	YOLO		
	(10 LOCATIONS COMBINED)		#1	#2	#1	#2	O #3	JOAQUIN	LAUS	SUTTER	#1	#2
Sun 6340	50.8A			44.9	39.6	61.6	49.0	72.6	52.8	40.8	7	52.9
AP 863	45.8A	B	41.8	36.4	38.4	50.7	29.2	73.4		41.3	4	47.9
H 9992	44.8	B C	30.1	44.9	35.5	49.7	35.2	54.7	48.9	35.5	1	64.9
CXD 220	44.2	B C D	38.9	43.8	27.0	56.4	25.3	61.4	48.4	36.2	3	58.3
PX 849	43.7	B C D E	34.4	41.8	28.1	53.4	25.3	68.9	42.7	45.9	9	53.3
U 2010	43.3	B C D E	21.8	34.8	29.4	89.7	26.4	60.2	46.6	38.8	5	43.8
Sun 6324	42.3	B C D E F	34.4	28.9		53.3	28.6	58.2	52.8	35.7	1	51.3
CXD 218	42.0	B C D E F	29.2	42.0	24.5	48.2	27.0	67.7	49.7	42.9	8	49.6
CXD 211	41.5	B C D E F	35.3	36.6	29.8	49.6	19.8	59.8	44.3	46.2	8	48.5
H 9995	41.3	B C D E F		48.8	34.7	51.8	25.9	48.3	41.7	35.4	3	58.9
Sun 6333	41.3	B C D E F	33.5	30.9	36.6	51.8	23.7	53.9	57.8	35.6	0	49.5
NDM 969	40.3	B C D E F G		37.5	29.4	36.8	27.5	68.4	53.0	37.0	2	52.9
AP 847	40.2	B C D E F G	31.8	35.7	34.5	49.0	29.7	67.3		29.4	9	44.2
PX 133	39.7	C D E F G			23.1	56.8	20.9	64.6	26.4	38.7	6	55.8

CTRI 1056	39.5	C D E F G	33.1	37.0	34.8	43.8	26.4	71.7	31.6	36.4	8	39.4
UG 8154	38.6	D E F G	27.9	26.1	30.7	49.7	22.6	59.8	48.6	27.0	8	52.9
CXD 224	38.3	E F G	24.4	36.2	33.0	43.1	21.5	62.6	38.6	35.2	8	52.5
La Rossa	37.0	F G		34.8	31.4	40.9	16.0	61.8	39.3	35.4	1	39.4
PS 173	35.4	G	27.4	31.6	27.1	42.9	20.9	49.9	36.9	32.6	7	51.8
MEAN	41.9		31.7	37.4	31.5	51.5	26.4	62.4	44.7	37.2	9	50.9
LSD @ 0.05	5.6											
C.V. (%)	15.2											

Yolo1 = transplanted, Yolo2 = direct seeded, Colusa1=direct seeded, Colusa2=transplanted, Fresno1 = 7/25 harvest, Fresno2=8/13 harvest, Fresno3=9/14 harvest. Kern Co yields omitted due to high CV.

Table 4B. FRUIT BRIX OF 2001 MID-SEASON MATURING OBSERVATIONAL VARIETIES

VARIETY	BRIX (%) (10 LOCATIONS COMBINED)	COLUS			FRESN			SAN			YOLO	
		A #1	A #2	O #1	O #2	O #3	JOAQU IN	STANISLA US	SUTTER	#1	#2	
CTRI 1056	5.6A	5.0	5.1	5.4	6.0	5.8	5.3	6.3	6.1	5.5	5.5	
PS 173	5.5A B	5.4	5.6	5.0	5.4	5.7	5.4	4.9	6.1	5.9	5.6	
Sun 6324	5.4A B C	5.0	5.6	5.4	5.1	6.0	5.0	5.0	6.4	5.3	5.2	
Sun 6333	5.3A B C D	5.5	5.0		5.3	5.8	5.2	4.7	5.9	5.4	5.4	
CXD 211	5.3A B C D E	5.3	5.1	5.0	4.9	5.7	5.8	5.1	5.4	5.7	5.2	
CXD 224	5.3A B C D E	5.0	5.4	4.7	4.6	5.8	5.2	5.8	5.7	5.7	5.3	
H 9995	5.3A B C D E	5.2	5.2	5.1	4.6	5.6	4.8	6.1	5.8	6.0	4.8	
NDM 969	5.3 B C D E F	4.8	5.0	4.8	5.3	6.2	5.4	5.4	5.7	5.3	5.0	
H 9992	5.2 C D E F G	5.2	4.8	5.4	4.7	5.7	5.0	5.2	6.0	5.1	4.5	
La Rossa	5.1 D E F G	5.2	4.8	5.3	5.0	5.5	4.4	4.8	5.1	5.4	5.4	
CXD 218	5.1 D E F G	5.0	4.5	5.0	5.1	5.1	5.2	5.2	5.2	5.5	4.9	
CXD 220	5.0 E F G	5.7	4.5	5.1	4.8	5.4	4.5	5.4	5.8	4.7	4.5	
PX 133	5.0 F G			4.7	5.3	5.0	5.0	5.6	5.2	5.1	4.4	
Sun 6340	5.0 G H	4.8	5.0	5.2	4.6	5.4	5.0	4.3	5.2	5.3	5.0	
UG 8154	5.0 G H	5.0	5.0	4.7	4.8	5.8	4.6	4.6	5.5	5.0	4.8	
PX 849	5.0 G H	4.9	4.7	4.8	5.2	5.5	5.2	4.3	5.1	5.1	4.7	
U 2010	4.9 G H	4.8	5.4	4.6	4.6	5.5	4.6	4.4	4.9	5.5	4.9	
AP 847	4.9 G H	5.0	4.7	5.0	4.7	5.9	4.6		5.0	4.7	4.5	
AP 863	4.7 H	5.4	4.6	4.4	4.6	5.1	4.2		4.3	4.9	4.8	
MEAN	5.2	5.1	5.0	5.0	5.0	5.6	5.0	5.1	5.5	5.3	5.0	
LSD @ 0.05	0.3											
C.V. (%)	6.5											

Yolo1 = transplanted, Yolo2 = direct seeded, Colusa1=direct seeded, Colusa2=transplanted, Fresno1 = 7/25 harvest, Fresno2=8/13 harvest, Fresno3=9/14 harvest.
No PTAB data collected at the Kern Co trial

Table 4C. FRUIT COLOR OF 2001 MID-SEASON MATURING OBSERVATIONAL VARIETIES

VARIETY	PTAB Color (10 LOCATIONS COMBINED)	SAN									
		COLUS A #1	COLUS A #2	FRESNO #1	FRESNO #2	FRESNO #3	JOAQUI N	STANISLAU S	SUTTE R	YOLO #1	YOLO #2
CXD 224	22.7A	24	25	27	23	22	22	19	20	23	22
H 9992	22.8A	23	25	25	22	24	24	20	21	23	21
CXD 218	22.9A	23	24	24	23	25	23	20	22	23	22
H 9995	22.9A	24	26	23	23	23	24	21	22	22	21
U 2010	23.3A B	23	25	26	24	24	25	20	22	21	23
CTRI 1056	23.3A B	26	25	22	21	26	23	20	25	23	22
Sun 6340	23.3A B	25	25	25	24	24	24	21	22	22	21
CXD 220	23.4A B	24	27	23	23	23	24	20	22	25	23
UG 8154	23.6A B	26	26	25	24	23	23	21	23	23	22
CXD 211	23.6A B	23	26	25	25	21	25	20	22	25	24
Sun 6333	23.7A B	23	25		26	24	24	24	22	22	22
NDM 969	23.8A B	27	25	25	24	23	24	21	24	22	23
Sun 6324	24.1 B C	24	25	30	24	25	24	21	23	23	22
AP 863	24.2 B C	25	28	25	22	23	25		23	26	24
PS 173	24.3 B C	26	28	26	25	23	24	21	24	24	22
AP 847	25.0 C	24	30	29	24	25	23		24	26	23
PX 133	25.1 C			27	27	24	25	22	23	27	22
La Rossa	25.2 C	26	28	26	28	25	26	21	24	25	23
PX 849	26.9 D	29	32	27	30	25	26	23	27	28	22
MEAN	23.9	24.7	26.4	25.6	24.3	23.8	24.1	20.9	22.9	23.8	22.3
LSD @ 0.05	1.2										
C.V. (%)	5.6										

Yolo1 = transplanted, Yolo2 = direct seeded, Colusa1=direct seeded, Colusa2=transplanted, Fresno1 = 7/25 harvest, Fresno2=8/13 harvest, Fresno3=9/14 harvest. No PTAB data collected at the Kern Co trial

Table 4D. FRUIT pH OF 2001 MID-SEASON MATURING OBSERVATIONAL VARIETIES

VARIETY	Acidity (pH) (10 LOCATIONS COMBINED)	COLUS	COLUS	FRESN	FRESN	FRESN	SAN	STANISLA	SUTTE	YOLO	YOL
		A #1	A #2	O #1	O #2	O #3	JOAQUIN	US	R	#1	O #2
PX 849	4.26A	4.29	4.28	4.32	4.22	4.34	4.17	4.23	4.28	4.28	4.16
CTRI 1056	4.26A B	4.28	4.27	4.26	4.23	4.37	4.28	4.34	4.13	4.25	4.20
H 9995	4.26A B	4.27	4.23	4.20	4.17	4.65	4.12	4.34	4.27	4.16	4.23
Sun 6340	4.30A B C	4.36	4.35	4.27	4.32	4.42	4.20	4.33	4.23	4.30	4.20
Sun 6333	4.30A B C	4.33	4.35		4.29	4.41	4.28	4.32	4.21	4.36	4.18
PX 133	4.31 B C D			4.27	4.23	4.33	4.30	4.33	4.24	4.39	4.34
CXD 220	4.32 C D E	4.36	4.36	4.11	4.34	4.51	4.24	4.29	4.27	4.41	4.31
La Rossa	4.32 C D E	4.35	4.37	4.28	4.30	4.31	4.33	4.30	4.31	4.32	4.34
AP 863	4.34 C D E F	4.43	4.33	4.36	4.44	4.35	4.27		4.27	4.38	4.22
NDM 969	4.34 C D E F	4.37	4.26	4.40	4.34	4.41	4.23	4.28	4.35	4.41	4.33
AP 847	4.34 C D E F	4.37	4.38	4.33	4.26	4.49	4.30		4.34	4.37	4.26
CXD 211	4.34 C D E F	4.39	4.34	4.45	4.31	4.43	4.27	4.28	4.34	4.38	4.25
H 9992	4.36 D E F	4.44	4.33	4.29	4.33	4.53	4.28	4.43	4.37	4.32	4.28
UG 8154	4.36 D E F	4.41	4.29	4.35	4.42	4.47	4.37	4.27	4.36	4.38	4.29
CXD 218	4.37 E F	4.41	4.39	4.36	4.36	4.61	4.28	4.33	4.37	4.36	4.26
U 2010	4.39 F G	4.49	4.30	4.46	4.45	4.58	4.36	4.35	4.27	4.34	4.25
CXD 224	4.39 F G	4.51	4.36	4.36	4.38	4.49	4.36	4.41	4.33	4.39	4.28
Sun 6324	4.39 F G	4.52	4.47	4.36	4.32	4.54	4.27	4.34	4.31	4.40	4.36
PS 173	4.43 G	4.56	4.49	4.45	4.40	4.63	4.37	4.28	4.34	4.42	4.36
MEAN	4.34	4.40	4.34	4.33	4.32	4.47	4.28	4.32	4.29	4.35	4.27
LSD @ 0.05	0.05										
C.V. (%)	1.40										

Yolo1 = transplanted, Yolo2 = direct seeded, Colusa1=direct seeded, Colusa2=transplanted, Fresno1 = 7/25 harvest, Fresno2=8/13 harvest, Fresno3=9/14 harvest. No PTAB data collected at the Kern Co trial

Table 5A. FRUIT YIELDS OF 2001 MID-SEASON MATURING REPLICATED VARIETIES

VARIETY	Yield (tons/ acre)	(11 LOCATIONS COMBINED)	SAN												
			SUTT ER	YOLO O #1	YOLO O #2	JOAQU IN	STANISL AUS	FRES NO #1	FRES NO #2	FRES NO #3	KER N	COLU SA #1	COLU SA #2		
H9665	43.4	A	41.5	45.9	65.0	67.0	43.9	31.9	52.5	30.8	8	37.5	27.3		
H9492	42.9	A	35.3	47.2	59.9	56.7	48.2	36.4	54.6	26.0	2	34.9	35.2		
H9775	42.8	A	41.1	45.7	62.1	70.8	43.8	32.5	53.5	30.6	6	32.9	30.0		
H 8892	41.6	AB	35.8	49.4	54.8	67.0	49.2	36.1	52.1	25.3	6	31.0	29.4		
HyPeel 303	40.2	BC	32.2	36.6	61.9	57.6	45.4	34.6	52.4	28.0	0	35.0	29.2		
CXD 208	39.3	CD	37.5	40.5	57.9	62.7	51.0	36.3	46.2	21.7	8	32.8	28.2		
CXD 215	38.1	CDE	35.4	37.3	53.7	67.2	41.7	31.3	48.3	25.6	1	35.3	27.3		
HyPeel 347	37.8	DEF	35.4	42.4	55.1	56.4	37.6	27.7	51.5	23.8	9	32.7	29.3		
HM 0830	37.5	DEF	35.5	43.0	59.6	69.8	39.9	32.5	50.2	17.8	9	30.4	22.5		
BOS 24675	37.3	DEFG	36.0	37.4	54.2	66.5	32.9	31.7	49.1	24.5	6	30.4	27.4		
CXD 207	37.2	DEFG	38.3	40.4	53.4	53.3	39.1	36.0	45.0	26.3	5	32.6	26.4		
CXD 199	37.2	DEFG	36.2	40.9	55.4	53.7	32.6	32.8	43.5	18.0	5	34.9	32.3		
Sun 6332	37.1	DEFG	36.1	39.0	51.3	60.6	33.9	29.4	42.6	18.6	3	37.7	25.9		
Halley 3155	36.8	EFG	34.6	42.4	53.3	56.4	26.4	33.9	47.3	25.9	1	33.1	28.8		
ENP 113	36.5	EFG	33.9	39.0	50.6	61.0	32.7	36.2	46.4	23.8	9	34.0	22.7		
BOS 24593	36.2	EFG	39.8	33.3	53.2	55.8	32.9	30.8	45.5	25.6	9	34.1	26.9		
CTRI 5158	35.6	F GH	33.5	37.4	49.4	55.7	33.2	29.1	45.4	22.9	9	34.3	25.7		
H9998	35.1	GH	30.1	33.9	47.9	61.0	40.9	33.0	44.8	20.6	8	28.7	21.4		
CXD 221	33.4	H	36.1	37.3	49.9	53.9	20.4	29.2	40.5	18.1	0	32.0	22.3		
MEAN	38.2		36.0	40.5	55.1	60.7	38.2	32.7	48.0	23.9	5	33.4	27.3		
LSD @ 0.05	2.2		N.S.	4.1	5.6	8.0	11.9	4.5	4.9	5.7	8	N.S.	7.0		
CV (%)	13.9		13.7	7.1	7.2	9.3	22.0	9.8	7.2	16.8	9	12.3	18.1		
VARIETY X LOCATION LSD @ 0.05	7.4														

Yolo1 = transplanted, Yolo2 = direct seeded, Colusa1=direct seeded, Colusa2=transplanted, Fresno1 = 7/25 harvest, Fresno2=8/13 harvest, Fresno3=9/14 harvest

Table 5B. FRUIT BRIX LEVELS OF 2001 MID-SEASON MATURING REPLICATED VARIETIES

VARIETY	Brix (%)	(10 LOCATIONS COMBINED)	SAN									
			SUTT ER	YOLO #1	YOLO #2	JOA Q	STANISL AUS	FRES NO #1	FRES NO #2	FRES NO #3	KER N	COLU SA #1
CXD 221	5.7	A	6.2	5.7	5.5	5.2	6.4	5.5	5.4	6.2	5.7	5.6
CXD 208	5.5	B	5.7	6.6	5.3	4.9	4.8	5.3	5.3	5.9	5.5	5.6
Halley 3155	5.4	BC	5.9	5.5	5.5	5.3	5.3	5.3	5.3	5.7	5.2	5.4
CXD 207	5.4	BCD	5.5	6.4	5.4	5.1	4.6	5.1	5.3	6.0	5.4	5.3
HM 0830	5.4	BCD	5.7	5.8	5.2	5.0	4.8	5.1	5.2	5.9	5.4	5.5
ENP 113	5.3	CDE	5.6	5.9	5.4	5.2	5.0	5.1	4.7	5.6	5.0	5.5
Sun 6332	5.3	DEF	5.7	5.9	5.3	5.2	5.0	5.1	4.8	5.2	5.1	5.4
CXD 199	5.2	EFG	5.6	5.6	5.1	4.8	4.6	5.0	4.9	6.2	5.1	5.3
HyPeel 347	5.2	EFG	6.1	5.2	5.0	5.2	5.1	4.8	5.1	5.3	4.9	5.3
H9492	5.2	EFGH	5.6	5.4	4.9	4.8	4.3	5.1	5.0	5.9	5.3	5.3
BOS 24675	5.1	F GH	5.6	5.3	5.1	5.1	5.0	5.0	4.9	6.0	4.6	4.9
CXD 215	5.1	G HI	5.8	5.5	4.7	4.6	5.4	4.9	5.0	5.2	4.7	5.3
H9998	5.1	G HI	5.4	5.6	4.9	4.9	4.7	4.6	4.6	5.5	5.1	5.5
H9665	5.1	G HI	5.5	5.7	4.7	4.8	4.6	4.9	4.8	5.5	5.2	5.2
H 8892	5.0	H I	5.4	5.7	4.9	4.7	4.4	4.7	4.7	5.6	5.1	5.2
HyPeel 303	5.0	H I	5.7	5.5	4.8	5.0	4.1	4.9	4.9	5.3	5.0	5.0
H9775	5.0	I	5.3	5.4	4.7	4.8	4.3	4.8	4.7	5.4	5.2	5.1
CTRI 5158	4.9	I J	5.2	5.1	5.1	4.7	4.3	4.9	5.0	5.3	5.0	4.9
BOS 24593	4.8	J	5.3	5.1	4.8	4.8	4.5	4.7	4.4	5.2	4.5	5.1
MEAN	5.2		5.6	5.6	5.1	4.9	4.8	5.0	4.9	5.6	5.1	5.3
LSD @ 0.05	0.1		0.4	0.4	0.4	0.4	0.6	0.3	0.5	0.7	0.4	N.S.
CV (%)	6.4		5.5	5.3	4.9	5.2	8.3	4.7	6.5	8.2	5.9	7.9
VARIETY X LOCATION												
LSD @ 0.05	0.5											

Yolo1 = transplanted, Yolo2 = direct seeded, Colusa1=direct seeded, Colusa2=transplanted, Fresno1 = 7/25 harvest, Fresno2=8/13 harvest, Fresno3=9/14 harvest. No PTAB data collected at the Kern Co trial.

Table 5C. FRUIT COLOR OF 2001 MID-SEASON MATURING REPLICATED VARIETIES

VARIETY	Color (10 (Agtron LOCATIONS) COMBINED)		SUTT ER	YOL O #1	YOL O #2	SAN JOA Q	STANISLA US	FRESN O #1	FRESN O #2	FRESN O #3	KERN N	COLU SA #1	COLU SA #2
CXD 207	21.9	A	21.3	20.0	20.8	20.8	19.8	23.0	22.5	21.8		23.3	26.3
H9998	22.9	B	21.0	23.0	21.8	22.3	20.8	25.3	26.0	22.3		23.0	23.3
CTRI 5158	22.9	B	21.8	21.3	21.5	22.2	20.8	23.3	24.8	23.8		24.5	24.8
Sun 6332	23.0	B	21.8	22.8	21.5	22.3	20.5	24.5	23.8	23.5		23.8	25.3
CXD 208	23.1	B	21.8	21.3	21.3	23.5	21.3	23.8	24.3	23.5		24.0	25.3
H9492	23.2	B	21.5	22.5	21.8	23.0	20.8	24.5	26.8	23.5		23.0	25.0
H 8892	23.3	B C	22.0	22.0	22.3	23.8	21.0	24.3	23.8	23.5		24.0	26.5
HyPeel 303	23.4	B C	21.5	23.8	23.8	24.4	21.8	25.3	25.8	23.3		23.5	25.0
ENP 113	23.9	C D	22.0	23.3	23.5	23.0	21.0	25.3	24.3	24.0		25.0	26.5
CXD 199	24.1	D E	21.8	25.8	22.8	23.3	21.3	24.5	26.5	23.0		24.8	27.8
BOS 24593	24.1	D E	21.8	23.3	23.5	24.0	22.5	25.5	25.0	24.3		25.0	26.0
H9665	24.3	D E F	23.0	24.3	23.5	24.0	21.8	26.0	25.0	24.0		24.8	27.5
CXD 221	24.3	D E F	23.0	24.0	23.5	24.5	21.3	24.8	26.8	24.3		24.3	26.5
H9775	24.3	D E F	23.3	25.5	23.3	25.0	22.3	25.0	24.5	24.3		25.0	26.8
Halley 3155	24.4	D E F	22.5	24.0	24.0	24.0	21.5	25.5	24.8	24.5		26.0	25.8
HyPeel 347	24.5	E F	22.0	23.0	24.0	25.8	21.3	25.3	25.0	25.3		25.8	28.0
HM 0830	24.7	E F	22.0	24.8	24.5	25.5	22.8	25.8	24.0	25.5		25.8	27.0
CXD 215	24.7	F G	22.3	24.5	23.8	25.0	21.5	27.8	25.0	24.3		26.0	26.3
BOS 24675	25.3	G	23.0	24.8	23.8	25.5	23.8	27.5	25.3	24.5		26.5	28.8
MEAN	23.8		22.1	23.2	22.7	23.7	21.4	25.1	24.9	23.8		24.6	26.2
LSD @ 0.05	0.6		1.2	1.6	1.3	1.2	0.9	1.9	N.S.	N.S.		1.7	N.S.
CV (%)	5.8		3.8	5.0	4.0	3.6	3.1	5.4	7.5	6.3		4.8	9.4
VARIETY X LOCATION													
LSD @ 0.05	N.S.												

Yolo1 = transplanted, Yolo2 = direct seeded, Colusa1=direct seeded, Colusa2=transplanted, Fresno1 = 7/25 harvest, Fresno2=8/13 harvest, Fresno3=9/14 harvest. No PTAB data collected at the Kern Co trial.

Table 5D. FRUIT pH OF 2001 MID-SEASON MATURING REPLICATED VARIETIES

VARIETY	(pH)	(10 LOCATIONS COMBINED)	SUTTE	YOLO	YOLO	SAN	STANISLA	FRESN	FRESN	FRESN	KER	COLUS	COLUS
			R	#1	#2	JOAQ	US	O #1	O #2	O #3	N	A #1	A #2
H9665	4.27A		4.22	4.24	4.26	4.25	4.24	4.32	4.29	4.36		4.25	4.28
Halley 3155	4.28AB		4.22	4.30	4.28	4.24	4.25	4.31	4.27	4.34		4.28	4.33
H9775	4.29AB		4.22	4.29	4.28	4.23	4.28	4.32	4.27	4.35		4.32	4.33
HyPeel 347	4.29AB		4.24	4.30	4.26	4.21	4.26	4.27	4.34	4.36		4.32	4.34
CXD 199	4.30	BC	4.23	4.31	4.26	4.28	4.32	4.33	4.24	4.37		4.34	4.32
H 8892	4.30	BC	4.31	4.28	4.29	4.25	4.28	4.36	4.26	4.32		4.34	4.33
BOS 24675	4.32	CD	4.26	4.32	4.29	4.30	4.30	4.33	4.32	4.35		4.39	4.35
Sun 6332	4.32	CD	4.26	4.29	4.30	4.29	4.29	4.40	4.30	4.40		4.34	4.36
H9492	4.33	DE	4.36	4.30	4.29	4.27	4.28	4.32	4.26	4.47		4.36	4.37
BOS 24593	4.33	DE	4.30	4.36	4.32	4.29	4.25	4.33	4.29	4.38		4.37	4.40
CTRI 5158	4.33	DE	4.27	4.33	4.33	4.29	4.32	4.36	4.29	4.39		4.39	4.33
H9998	4.33	DEF	4.32	4.28	4.33	4.28	4.27	4.38	4.34	4.36		4.33	4.43
HyPeel 303	4.34	DEFG	4.25	4.32	4.32	4.29	4.33	4.40	4.30	4.41		4.38	4.40
HM 0830	4.35	EFGH	4.36	4.38	4.33	4.26	4.30	4.36	4.36	4.40		4.40	4.34
ENP 113	4.35	F GH	4.34	4.33	4.30	4.27	4.29	4.43	4.39	4.41		4.41	4.38
CXD 221	4.36	GHI	4.36	4.36	4.30	4.32	4.25	4.42	4.33	4.48		4.37	4.41
CXD 215	4.37	HI	4.34	4.33	4.34	4.30	4.35	4.41	4.33	4.45		4.43	4.38
CXD 208	4.38	I	4.39	4.40	4.36	4.35	4.36	4.40	4.35	4.42		4.40	4.40
CXD 207	4.42	J	4.37	4.43	4.37	4.41	4.37	4.43	4.39	4.56		4.41	4.42
MEAN	4.33		4.30	4.32	4.31	4.28	4.29	4.36	4.31	4.40		4.36	4.36
LSD @													
0.05=	0.02		0.08	0.06	0.05	0.06	0.06	0.09	0.08	0.11		0.08	0.07
C.V.=	1.3		1.3	0.9	0.9	1.0	1.0	1.4	1.4	1.8		1.2	1.2
VARIETY X													
LOCATION													
LSD @													
0.05=	N.S.												

Yolo1 = transplanted, Yolo2 = direct seeded, Colusa1=direct seeded, Colusa2=transplanted, Fresno1 = 7/25 harvest, Fresno2=8/13 harvest, Fresno3=9/14 harvest. No PTAB data collected at the Kern Co trial.