

**Project Title:** UC Division of Agriculture and Natural Resources Statewide Processing Tomato Variety Evaluation Trials, 2001

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### **Summary:**

Four early- and 11 mid-maturity variety tests were conducted throughout major processing tomato production regions of California during the 2001 season. An additional mid-maturity test (Merced County) was lost due to sustained adverse environmental conditions. All of the major production areas, from Kern to Sutter/Colusa Counties, had one or more field tests to identify tomato cultivars appropriate for that specific region.

Increasing industry interest in the use of transplants has led us to incorporate this production technique into our variety evaluation program, where appropriate. Three of the mid-season test sites (Colusa, San Joaquin and Yolo Counties) utilized transplants. Two of the locations conducted both direct-seeded and transplant mid-season tests.

The highest yielding early- maturing replicated varieties were CXD 216, PS 816, UG 606, H 1100 and 'APT 410', across all locations. The overall highest yielding mid-maturing replicated varieties were H9665, H9492, H9775, and H8892.

### **Objectives:**

The objectives have remained the same since this program was initiated over 25 years ago: to conduct well-designed, replicated varietal performance field tests throughout major California processing tomato production regions. The primary way of accomplishing that is the evaluation of recently-developed and industry standard cultivars. Parameters of particular interest include fruit quality (soluble solids, pH and color), fruit yields, disease resistance/tolerance and plant architecture. These tests are designed and conducted with input or collaboration from seed companies, processors, producers and other industry partners, and are intended to generate information useful for making intelligent variety selection management 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 tests included 9 observational & 12 replicated early-maturity entries and 19 observational & 19 replicated entries in the mid-maturity tests (Tables 1A and 1B).

Early-maturing tests were planted from January to the end of March and mid-maturity 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. Tests are established in commercial production fields with grower cooperators. A common set of varieties are utilized in all of the tests, and individual Farm Advisors have the latitude to add to this core-group, to meet specific local unique needs.

Each variety is planted in a one-bed wide by 100 foot long plot. The replicated varieties are planted in four randomly selected plots and the observational varieties in one non-replicated plot. The plots are seeded/transplanted by the researcher, separately from the remainder of the field outside of the test area. All cultural operations, with the exception of planting and harvesting, are done by the grower/cooperator and are consistent with what is done to the remainder of the field outside of the test area.

All variety trials were furrow irrigated with the exception of the 3<sup>rd</sup> 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.

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 were statistically analyzed using analysis of variance procedures and reports of results were disseminated to 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-Maturity Observational—Yield, Soluble solids, PTAB Color, pH

Table 3: A, B, C, D Early-Maturity Replicated—Yield, Soluble solids, PTAB Color, pH

Table 4: A, B, C, D Mid-Maturity Observational—Yield, Soluble solids, PTAB Color, pH

Table 5: A, B, C, D Mid-Maturity Replicated—Yield, Soluble solids, PTAB Color, pH

### **Early-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), although there was an 11 ton/acre difference between the highest and lowest yields.

The average soluble solids level across all locations and varieties was 4.9%. The varieties with the highest brix levels were 'NDM970', 'CTRI1090' and 'HyPeel 45' (Table 2B).

Varieties with the lowest PTAB color were 'H1800', and 'H9997' (Table 2C). The average PTAB color across locations/varieties was 24.7.

Fruit pH levels were not significantly different between observational varieties (Table 2D). The average fruit pH for all locations and varieties was 4.36.

### **Early-Maturing Replicated Varieties**

The average fruit yield for all replicated varieties across the 4 trial locations was 37.9 tons/acre. Highest yielding varieties included 'CXD 216', 'PS816', 'UG606', 'H1100' and 'APT 410' (Table 3A). Note that there was a significant interaction among varieties and locations, meaning that the relative ranking of varieties differed significantly among locations.

The average soluble solids level across locations and varieties was 5.0%. The varieties with the highest brix levels were 'H9888', 'CTRI1056' and 'HyPeel 45'(Table 3B). Brix levels were consistent between locations.

Varieties with the lowest PTAB color were 'APT410', 'H9280', 'H9888', 'CTRI1056' and 'Hypack 280' (Table 3C). Fruit color averaged 25.1 across all varieties and locations.

Varieties with the lowest fruit pH were 'H9881' and 'CTRI1056'(Table 3D). The average fruit pH for all locations and varieties was 4.37. pH was not measured at the Fresno location.

#### **Mid- Maturity Observational Varieties**

Yield data from observational varieties were analyzed for 10 locations. Kern County yields were not included in the analysis due to high variability. In addition PTAB data was unavailable for Kern County. The average fruit yield for all observational varieties across the 10 trial locations was 41.9 tons/acre. The highest yielding varieties were 'Sun 6340' and 'AP863'(Table 4A).

The average brix level across all locations and varieties was 5.2%. The varieties with the highest brix levels were 'CTRI1056', 'PS173', 'Sun 6324', 'SUN 6333', 'CXD211', 'CDX224' and 'H9995' (Table 4B).

Twelve of the 19 varieties were in the lowest PTAB color group(Table 4C). The average across locations and varieties was 23.9.

Varieties with the lowest pH were 'PX849', 'CTRI1056', 'H9995', 'Sun 6340', and 'Sun 6333' (Table 4D). The average fruit pH for all locations and varieties was 4.34.

#### **Mid-Maturity Replicated Varieties**

The average fruit yield for all replicated varieties across the 11 trial locations was 38.2 tons/acre. The highest yielding varieties were 'H9665', 'H9492', 'H9775', and 'H8892' (Table 5A). There was a significant variety by location interaction, meaning that the relative ranking of varieties differed among locations.

The average soluble solids level across all locations and varieties was 5.2%. The variety with the highest brix level was 'CXD 221' (Table 5B). A significant variety times location interaction was found for fruit brix.

The variety with the lowest PTAB color was 'CXD 207' (Table 5C). The average PTAB color across locations and varieties was 23.8.

Varieties with the lowest fruit pH were 'H9665', 'Halley 3155', 'H9775' and 'HyPeel 347' (Table 5D). The average fruit pH for all locations and varieties was 4.33.

#### **Acknowledgements:**

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**Table 1A. Early-maturing test varieties.**

<b>Company</b>	<b>Replicated</b>	<b>Varieties</b>	<b>Observational</b>	<b>Varieties</b>
Asgrow	<b>APT 410</b>	\$VFFNP	<b>APT 410</b>	\$VFFNP
CTRI	CTRI1056	¢VFFNP	CTRI1090	¢VFFNP
Campbell	CXD206 CXD216	\$VFFNP \$VFFNP		
Heinz	<b>H9280</b> H1100 H9881 H9888	\$VFFNP \$VFFNP \$VFFNP \$VFFNP	<b>H9280</b> H1800 H9997	\$VFFNP \$VFFNP \$VFFNP
Nippon Del Monte			NDM970	\$VFFN
Peto	<b>HyPeel 45</b> HyPack 280 PS 816	\$VFFNP \$VFFNP \$VFFNP	<b>HyPeel 45</b>	\$VFFNP
United Genetics	UG606	\$VFFNP	UGX8120 UGX8168	\$VFFNP \$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- maturing test varieties.**

<b>Company</b>	<b>Replicated</b>	<b>Varieties</b>	<b>Observational</b>	<b>Varieties</b>
Asgrow			AP847 AP863	\$VFFNP \$VFFN
CTRI	CTRI5158	φVFFN	CTRI1056	φVFFN
Campbell	CXD199 CXD207 CXD208 CXD215 CXD221	\$VFFNP \$VFFN \$VFFN \$VFFF3NP \$VFFF3NP	CXD211 CXD218 CXD220 CXD224	\$VFFNP \$VFFNP \$VFFNP \$VFFNP
Harris Moran	HM830	\$VFFN		
Heinz	<b>H8892</b> <b>H9492</b> H9665 H9775 H9998	\$VFFN \$VFN \$VFFNP \$VFFNP \$VFFNP	H9992 H9995	\$VFFNP \$VFFNP
Lipton			U2010	\$VFFN
Nippon Del Monte			NDM969	\$VFFN
Orsetti	<b>Halley 3155</b> BOS24593 BOS24675	\$VFF \$VFFNP \$VFFN		
Rogers			<b>La Rossa</b>	\$VFF pear
Peto	HyPeel 303 HyPeel 347	\$VFFNP \$VFFNP	PS173 PX849 PX133	\$VFFF3NP pear \$VFFNP \$VFFNP
Sunseeds	Sun 6332	\$VFFNP	Sun 6324 Sun 6333 Sun 6340	\$VFFNP \$VFFNP \$VFFNP
United Genetics	ENP113	\$VFFNP	UG8154	\$VFFNP

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

**Table 2A. FRUIT YIELDS FOR EARLY-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 SOLUBLE SOLIDS FOR EARLY-MATURING OBSERVATIONAL VARIETIES**

VARIETY	Soluble solids (%)				SAN	
	(4 LOCATIONS COMBINED)				JOAQUIN	YOLO
	COLUSA	FRESNO	JOAQUIN	YOLO		
NDM 970	5.3	A	5.3	4.7	5.7	5.4
CTRI 1090	5.1	A B	5.1	4.9	5.3	5.2
HyPeel 45	5.0	A 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 FOR EARLY-MATURING OBSERVATIONAL VARIETIES**

VARIETY	PTAB Color (4 LOCATIONS COMBINED)		COLUSA	FRESNO	SAN JOAQUIN	YOLO
H 1800	22.3	A	23	22	22	22
H 9997	23.5	A 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		25.1	24.1	24.4	25.2
LSD @ 0.05	1.6					
C.V. (%)	4.3					

**Table 2D. FRUIT pH FOR EARLY-MATURING OBSERVATION VARIETIES**

VARIETY	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 FOR EARLY-MATURING REPLICATED VARIETIES**

VARIETY	Yield tons/acres	STATEWIDE (4 LOCATIONS COMBINED)	SAN			
			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	A B	30.7	57.0	36.3	36.5
APT 410	39.5	A B C	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 BRUX FOR EARLY-MATURING REPLICATED VARIETIES**

VARIETY	Soluble Solids(%)	STATEWIDE (4 LOCATIONS COMBINED)	SAN			
			YOLO	JOAQUIN	FRESNO	COLUSA
H 9888	5.4	A	5.5	5.2	5.3	5.7
CTRI 1056	5.3	A B	5.4	4.9	5.5	5.5
HyPeel 45	5.3	A B	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	4.9
UG 606	4.8	D E	4.9	4.6	5.0	5.0
CXD 206	4.8	D E F	4.7	4.7	4.9	5.1
HyPack 280	4.8	E F	4.9	4.7	4.8	4.8
H 9881	4.6	F G	4.6	4.6	4.8	4.6
H 9280	4.6	G	4.6	4.5	4.8	4.5
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 FOR EARLY-MATURING REPLICATED VARIETIES**

VARIETY	PTAB COLOR	STATEWIDE (4 LOCATIONS COMBINED)	YOLO	SAN JOAQUIN	FRESNO	COLUSA
APT 410	23.9	A	23.5	24.0	23.0	25.3
H 9280	24.2	A	23.8	23.5	24.3	25.3
H 9888	24.4	A B	23.5	25.5	23.8	24.8
CTRI 1056	24.4	A B	24.5	24.5	23.5	25.3
HyPack 280	24.8	A B C	23.5	23.8	25.8	26.0
H 9881	25.1	B C D	24.3	25.5	25.0	25.8
H 1100	25.4	C D	25.3	26.0	24.3	26.0
PS 816	25.4	C D	25.0	25.8	23.8	27.3
CXD 216	25.5	C D	25.3	25.3	24.5	27.0
UG 606	25.8	D E	25.0	27.3	24.3	26.5
CXD 206	25.9	D E	24.8	26.3	24.8	27.8
HyPeel 45	26.4	E	26.5	26.8	24.3	28.0
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 FOR EARLY-MATURING REPLICATED VARIETIES**

VARIETY	pH	STATEWIDE (4 LOCATIONS COMBINED)	YOLO	SAN JOAQUIN	FRESNO	COLUSA
H 9881	4.30	A	4.23	4.28		4.39
CTRI 1056	4.31	A 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 FOR MID-MATURING OBSERVATIONAL VARIETIES**

VARIETY	YIELD (ton/acre) (10 LOCATIONS COMBINED)	COLUSA COLUSA FRESNO FRESNO FRESNO FRESNO FRESNO										STANISLAUS	SUTTER	YOLO #1	YOLO #2	
		#1	#2	#1	#2	#3	#3	#3	#3	#3	#3					JOAQUIN
Sun 6340	50.8 A		44.9	39.6	61.6	49.0	72.6	52.8	40.8	52.7	52.9					
AP 863	45.8 A	B	41.8	38.4	50.7	29.2	73.4	41.3	49.4	47.9						
H 9992	44.8 B	C	30.1	44.9	49.7	35.2	54.7	48.9	35.5	48.1	64.9					
CXD 220	44.2 B	C D	38.9	43.8	27.0	56.4	61.4	48.4	36.2	46.3	58.3					
PX 849	43.7 B	C D E	34.4	41.8	28.1	53.4	68.9	42.7	45.9	42.9	53.3					
U 2010	43.3 B	C D E	21.8	34.8	29.4	89.7	60.2	46.6	38.8	41.5	43.8					
Sun 6324	42.3 B	C D E F	34.4	28.9		53.3	58.2	52.8	35.7	47.1	51.3					
CXD 218	42.0 B	C D E F	29.2	42.0	24.5	48.2	67.7	49.7	42.9	39.8	49.6					
CXD 211	41.5 B	C D E F	35.3	36.6	29.8	49.6	59.8	44.3	46.2	44.8	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	36.3	58.9					
Sun 6333	41.3 B	C D E F	33.5	30.9	36.6	51.8	53.9	57.8	35.6	40.0	49.5					
NDM 969	40.3 B	C D E F G	37.5	29.4	36.8	23.7	68.4	53.0	37.0	30.2	52.9					
AP 847	40.2 B	C D E F G	31.8	35.7	34.5	49.0	67.3	29.4	29.4	36.9	44.2					
PX 133	39.7	C D E F G		23.1	56.8	20.9	64.6	26.4	38.7	45.6	55.8					
CTRI 1056	39.5	C D E F G	33.1	37.0	34.8	43.8	71.7	31.6	36.4	40.8	39.4					
UG 8154	38.6	D E F G	27.9	26.1	30.7	49.7	59.8	48.6	27.0	40.8	52.9					
CXD 224	38.3	E F G	24.4	36.2	33.0	43.1	62.6	38.6	35.2	35.8	52.5					
La Rossa	37.0	F G		34.8	31.4	40.9	61.8	39.3	35.4	44.1	39.4					
PS 173	35.4	G	27.4	31.6	27.1	42.9	49.9	36.9	32.6	32.7	51.8					
MEAN	41.9		31.7	37.4	31.5	51.5	62.4	44.7	37.2	41.9	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 BRUX FOR MID-MATURITY OBSERVATIONAL VARIETIES**

VARIETY	Soluble solids (%) (10 LOCATIONS COMBINED)									
	COLUSA #1	COLUSA #2	FRESNO #1	FRESNO #2	FRESNO #3	SAN JOAQUIN	STANISLAUS	SUTTER	YOLO #1	YOLO #2
CTRI 1056	5.0	5.1	5.4	6.0	5.8	5.3	6.3	6.1	5.5	5.5
PS 173	5.4	5.6	5.0	5.4	5.7	5.4	4.9	6.1	5.9	5.6
Sun 6324	5.0	5.6	5.4	5.1	6.0	5.0	5.0	6.4	5.3	5.2
Sun 6333	5.5	5.0	5.3	5.3	5.8	5.2	4.7	5.9	5.4	5.4
CXD 211	5.3	5.1	5.0	4.9	5.7	5.8	5.1	5.4	5.7	5.2
CXD 224	5.0	5.4	4.7	4.6	5.8	5.2	5.8	5.7	5.7	5.3
H 9995	5.2	5.2	5.1	4.6	5.6	4.8	6.1	5.8	6.0	4.8
NDM 969	4.8	5.0	4.8	5.3	6.2	5.4	5.4	5.7	5.3	5.0
H 9992	5.2	4.8	5.4	4.7	5.7	5.0	5.2	6.0	5.1	4.5
La Rossa	5.2	4.8	5.3	5.0	5.5	4.4	4.8	5.1	5.4	5.4
CXD 218	5.0	4.5	5.0	5.1	5.1	5.2	5.2	5.2	5.5	4.9
CXD 220	5.7	4.5	5.1	4.8	5.4	4.5	5.4	5.8	4.7	4.5
PX 133	5.0	4.7	4.7	5.3	5.0	5.0	5.6	5.2	5.1	4.4
Sun 6340	4.8	5.0	5.2	4.6	5.4	5.0	4.3	5.2	5.3	5.0
UG 8154	5.0	5.0	4.7	4.8	5.8	4.6	4.6	5.5	5.0	4.8
PX 849	4.9	4.7	4.8	5.2	5.5	5.2	4.3	5.1	5.1	4.7
U 2010	4.8	5.4	4.6	4.6	5.5	4.6	4.4	4.9	5.5	4.9
AP 847	5.0	4.7	5.0	4.7	5.9	4.6		5.0	4.7	4.5
AP 863	5.4	4.6	4.4	4.6	5.1	4.2		4.3	4.9	4.8
MEAN	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 FOR MID-MATURITY OBSERVATIONAL VARIETIES**

VARIETY	PTAB Color (10 LOCATIONS COMBINED)											
	COLUSA COLUSA		FRESNO FRESNO		FRESNO FRESNO		SAN JOAQUIN		STANISLAUS SUTTER		YOLO	YOLO
	#1	#2	#1	#2	#1	#2	#3	#3	#3	#3	#1	#2
CXD 224	24	25	27	23	22	22	22	19	20	23	22	22
H 9992	23	25	25	22	24	24	24	20	21	23	21	21
CXD 218	23	24	24	23	25	23	25	20	22	23	22	22
H 9995	24	26	23	23	23	24	24	21	22	22	21	21
U 2010	23	25	26	24	24	25	25	20	22	21	23	23
CTRI 1056	26	25	22	21	26	23	20	21	25	23	22	22
Sun 6340	25	25	25	24	24	24	24	21	22	22	21	21
CXD 220	24	27	23	23	23	24	23	20	22	25	23	23
UG 8154	26	26	25	24	23	23	23	21	23	23	22	22
CXD 211	23	26	25	25	21	25	21	20	22	25	24	24
Sun 6333	23	25	25	26	24	24	24	24	22	22	22	22
NDM 969	27	25	25	24	23	24	23	21	24	22	23	23
Sun 6324	24	25	30	24	25	24	25	21	23	23	22	22
AP 863	25	28	25	22	23	25	23	21	23	26	24	24
PS 173	26	28	26	25	23	24	24	21	24	24	22	22
AP 847	24	30	29	24	25	23	23	22	24	26	23	23
PX 133			27	27	24	25	24	22	23	27	22	22
La Rossa	26	28	26	28	25	26	25	21	24	25	23	23
PX 849	29	32	27	30	25	26	25	23	27	28	22	22
MEAN	24.7	26.4	25.6	24.3	23.8	24.1	23.8	20.9	22.9	23.8	22.3	22.3
LSD @ 0.05												
C.V. (%)												

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 FOR MID-MATURING OBSERVATIONAL VARIETIES**

VARIETY	pH (10 LOCATIONS COMBINED)	COLUSA			FRESNO			FRESNO #3	SAN JOAQUIN	STANISLAUS	SUTTER	YOLO #1	YOLO #2
		#1	#2	#3	#1	#2	#3						
PX 849	4.26 A	4.29	4.28	4.32	4.22	4.34	4.34	4.17	4.23	4.28	4.28	4.16	
CTRI 1056	4.26 A B	4.28	4.27	4.26	4.23	4.37	4.37	4.28	4.34	4.13	4.25	4.20	
H 9995	4.26 A B	4.27	4.23	4.20	4.17	4.65	4.65	4.12	4.34	4.27	4.16	4.23	
Sun 6340	4.30 A B C	4.36	4.35	4.27	4.32	4.42	4.42	4.20	4.33	4.23	4.30	4.20	
Sun 6333	4.30 A B C	4.33	4.35		4.29	4.41	4.41	4.28	4.32	4.21	4.36	4.18	
PX 133	4.31 B C D		4.27	4.27	4.23	4.33	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	4.51	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	4.31	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	4.35	4.27	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	4.41	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	4.49	4.30	4.34	4.34	4.37	4.26	
CXD 211	4.34 C D E F	4.39	4.34	4.45	4.31	4.43	4.43	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	4.53	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	4.47	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	4.61	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	4.58	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	4.49	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	4.54	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	4.63	4.37	4.28	4.34	4.42	4.36	
MEAN	4.34	4.40	4.34	4.33	4.32	4.47	4.47	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 FOR MID-MATURING REPLICATED VARIETIES**

VARIETY	Yield (tons/acre)	(11 LOCATIONS COMBINED)	SUTTER	YOLO YOLO	SAN	FRESNO	FRESNO	FRESNO	COLUSA	COLUSA			
			#1	#2	JOAQUIN	STANISLAUS	#1	#2	#3	KERN	#1	#2	
H9665	43.4	A	41.5	45.9	65.0	67.0	43.9	31.9	52.5	30.8	33.8	37.5	27.3
H9492	42.9	A	35.3	47.2	59.9	56.7	48.2	36.4	54.6	26.0	37.2	34.9	35.2
H9775	42.8	A	41.1	45.7	62.1	70.8	43.8	32.5	53.5	30.6	27.6	32.9	30.0
H 8892	41.6	A B	35.8	49.4	54.8	67.0	49.2	36.1	52.1	25.3	27.6	31.0	29.4
HyPeel 303	40.2	B C	32.2	36.6	61.9	57.6	45.4	34.6	52.4	28.0	29.0	35.0	29.2
CXD 208	39.3	C D	37.5	40.9	57.5	62.7	51.0	36.3	46.2	21.7	17.8	32.8	28.2
CXD 215	38.1	C D E	35.4	37.3	53.1	67.2	41.7	31.3	48.3	25.6	17.1	35.3	27.3
HyPeel 347	37.8	D E F	35.4	42.1	55.4	56.4	37.6	27.7	51.5	23.8	23.9	32.7	29.3
HM10830	37.5	D E F	35.5	43.0	59.6	69.8	39.9	32.5	50.2	17.8	10.9	30.4	22.5
BOS 24675	37.3	D E F G	36.0	37.4	54.2	66.5	32.9	31.7	49.1	24.5	19.6	30.4	27.4
CXD 207	37.2	D E F G	38.3	40.4	53.4	53.3	39.1	36.0	45.0	26.3	18.5	32.6	26.4
CXD 199	37.2	D E F G	36.2	40.9	55.4	53.7	32.6	32.8	43.5	18.0	28.5	34.9	32.3
Sun 6332	37.1	D E F G	36.1	39.0	51.3	60.6	33.9	29.4	42.6	18.6	33.3	37.7	25.9
Halley 3155	36.8	E F G	34.6	42.4	53.3	56.4	26.4	33.9	47.3	25.9	23.1	33.1	28.8
ENP 113	36.5	E F G	33.9	39.0	50.6	61.0	32.7	36.2	46.4	23.8	20.9	34.0	22.7
BOS 24593	36.2	E F G	39.8	33.3	53.2	55.8	32.9	30.8	45.5	25.6	19.9	34.1	26.9
CTRI 5158	35.6	F G H	33.5	37.4	49.4	55.7	33.2	29.1	45.4	22.9	24.9	34.3	25.7
H9998	35.1	G H	30.1	33.9	47.6	61.0	40.9	33.0	44.8	20.6	23.8	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	28.0	32.0	22.3
MEAN	38.2		36.0	40.5	55.1	60.7	38.2	32.7	48.0	23.9	24.5	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	12.8	N.S.	7.0
CV (%)	13.9		13.7	7.1	7.2	9.3	22.0	9.8	7.2	16.8	36.9	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 SOLUBLE SOLIDS LEVELS FOR MID-MATURING REPLICATED VARIETIES**

VARIETY	Soluble solids (%)	(10 LOCATIONS COMBINED)	SUTTER	YOYOLO SAN		FRESNO FRESNO		COLUSA COLUSA				
				#1	#2	#1	#2	#1	#2			
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 31155	5.4	B C	5.9	5.5	5.5	5.3	5.3	5.3	5.3	5.7	5.2	5.4
CXD 207	5.4	B C D	5.5	6.4	5.4	5.1	4.6	5.1	5.3	6.0	5.4	5.3
HM 0830	5.4	B C D	5.7	5.8	5.2	5.0	4.8	5.1	5.2	5.9	5.4	5.5
ENP 113	5.3	C D E	5.6	5.9	5.4	5.2	5.0	5.1	4.7	5.6	5.0	5.5
Sun 6332	5.3	D	5.7	5.9	5.3	5.2	5.0	5.1	4.8	5.2	5.1	5.4
CXD 199	5.2	E F G	5.6	5.6	5.1	4.8	4.6	5.0	4.9	6.2	5.1	5.3
HyPeel 347	5.2	E F G	6.1	5.2	5.0	5.2	5.1	4.8	5.1	5.3	4.9	5.3
H9492	5.2	E F G H	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	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 H I	5.8	5.5	4.7	4.6	5.4	4.9	5.0	5.2	4.7	5.3
H9998	5.1	G H I	5.4	5.6	4.9	4.9	4.7	4.6	4.6	5.5	5.1	5.5
H9665	5.1	G H I	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 FOR MID-MATURING REPLICATED VARIETIES**

VARIETY	PTAB Color	(10 LOCATIONS COMBINED)	SUTTER		YOLO YOLO SAN		FRESNO FRESNO FRESNO		COLUSA COLUSA			
			#1	#2	JOAQ	STANISLAUS	#1	#2	#3	KERN	#1	#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	22.5	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	22.3	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	22.8	22.3	22.8	21.8	25.3	25.8	23.3	23.5	25.0
ENP 113	23.9	C	22.0	23.3	23.5	24.0	21.0	25.3	24.3	24.0	25.0	26.5
CXD 199	24.1	D E	21.8	23.8	23.8	23.5	21.3	24.5	26.5	23.0	24.8	27.8
BOS 24593	24.1	D E	21.8	25.3	22.5	23.0	22.5	25.5	25.0	24.3	25.0	26.0
H9665	24.3	D E F	23.0	23.3	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	24.5	23.3	24.3	22.3	25.0	24.5	24.3	25.0	26.8
Halley 3155	24.4	D E F	22.5	25.0	23.0	25.0	21.5	25.5	24.8	24.5	26.0	25.8
HyPeel 347	24.5	E F	22.0	24.0	24.0	24.8	21.3	25.3	25.0	25.3	25.8	28.0
HM 0830	24.7	E F	22.0	23.8	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	24.8	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	22.8	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 FOR MID-MATURING REPLICATED VARIETIES**

VARIETY	pH	(10 LOCATIONS COMBINED)	SUTTER		YOLO		SAN JOAQUIN		STANISLAUS		FRESNO		FRESNO		KERN		COLUSA	
			#1	#2	#1	#2	#1	#2	#1	#2	#1	#2	#1	#2	#1	#2	#1	#2
H9665	4.27	A	4.22	4.24	4.26	4.25	4.24	4.32	4.29	4.36	4.25	4.28	4.33	4.33	4.32	4.34	4.28	4.33
Halley 3155	4.28	A B	4.22	4.30	4.28	4.24	4.25	4.31	4.27	4.34	4.28	4.33	4.33	4.32	4.34	4.28	4.33	4.33
H9775	4.29	A B	4.22	4.29	4.28	4.23	4.28	4.32	4.27	4.35	4.32	4.33	4.33	4.32	4.34	4.32	4.33	4.33
HyPeel 347	4.29	A B	4.24	4.30	4.26	4.21	4.26	4.27	4.34	4.36	4.32	4.33	4.33	4.32	4.34	4.32	4.34	4.34
CXD 199	4.30	B C	4.23	4.31	4.26	4.28	4.32	4.33	4.24	4.37	4.34	4.32	4.32	4.34	4.32	4.34	4.32	4.32
H 8892	4.30	B C	4.31	4.28	4.29	4.25	4.28	4.36	4.26	4.32	4.34	4.32	4.32	4.34	4.32	4.34	4.34	4.33
BOS 24675	4.32	C D	4.26	4.32	4.29	4.30	4.30	4.33	4.32	4.35	4.39	4.35	4.35	4.39	4.35	4.39	4.35	4.35
Sun 6332	4.32	C D	4.26	4.29	4.30	4.29	4.29	4.40	4.30	4.40	4.34	4.40	4.40	4.34	4.34	4.34	4.34	4.36
H9492	4.33	D E	4.36	4.30	4.29	4.27	4.28	4.32	4.26	4.47	4.36	4.37	4.36	4.36	4.36	4.36	4.36	4.37
BOS 24593	4.33	D E	4.30	4.36	4.32	4.29	4.25	4.33	4.29	4.38	4.37	4.40	4.40	4.37	4.40	4.37	4.40	4.40
CTRI 5158	4.33	D E	4.27	4.33	4.33	4.29	4.32	4.36	4.29	4.39	4.39	4.39	4.39	4.39	4.39	4.39	4.39	4.33
H9998	4.33	D E F	4.32	4.28	4.33	4.28	4.27	4.38	4.34	4.36	4.33	4.43	4.33	4.33	4.43	4.33	4.43	4.43
HyPeel 303	4.34	D E F G	4.25	4.32	4.32	4.29	4.33	4.40	4.30	4.41	4.38	4.40	4.38	4.40	4.38	4.40	4.40	4.40
HM 0830	4.35	E F G H	4.36	4.38	4.33	4.26	4.30	4.36	4.36	4.40	4.40	4.40	4.40	4.40	4.40	4.40	4.40	4.34
ENP 113	4.35	F G H	4.34	4.33	4.30	4.27	4.29	4.43	4.39	4.41	4.41	4.41	4.41	4.41	4.41	4.41	4.41	4.38
CXD 221	4.36	G H I	4.36	4.36	4.30	4.32	4.25	4.42	4.33	4.48	4.37	4.41	4.41	4.41	4.41	4.41	4.41	4.41
CXD 215	4.37	H I	4.34	4.33	4.34	4.30	4.35	4.41	4.33	4.45	4.43	4.43	4.43	4.43	4.43	4.43	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	4.40	4.40	4.40	4.40	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	4.41	4.41	4.41	4.41	4.41	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	4.31	4.40	4.36	4.36	4.36	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	0.08	0.11	0.08	0.08	0.08	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	1.4	1.8	1.2	1.2	1.2	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.