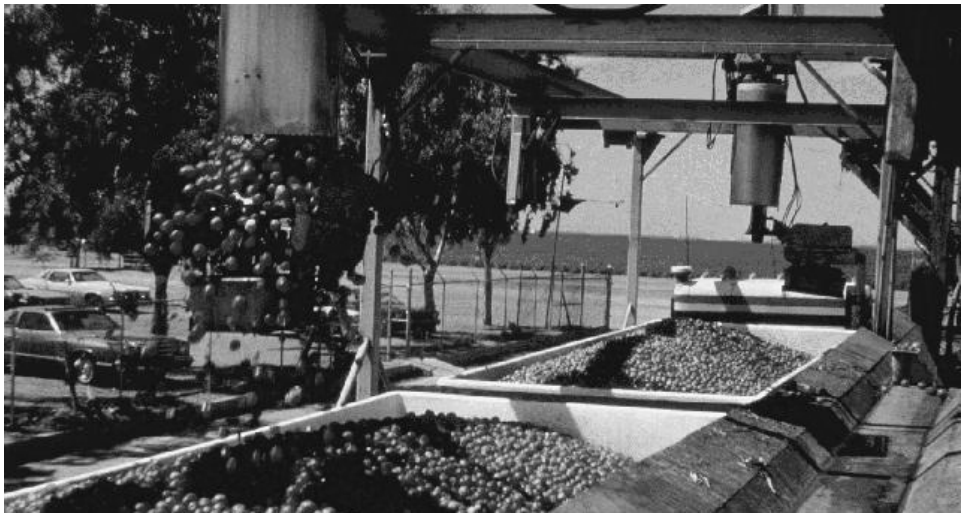
PROCESSING TOMATOES

IN

SAN JOAQUIN, CONTRA COSTA & STANISLAUS COUNTIES



2003 VARIETY TRIALS SUMMARY RESEARCH PROGRESS REPORT

University of California Cooperative Extension
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2003
SAN JOAQUIN, CONTRA COSTA & STANISLAUS COUNTIES PROCESSING TOMATO VARIETY TRIAL REPORT

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The processing tomato industry in California depends on the availability of consistently dependable varieties that provide maximum yield and quality, yet conform to the demands of mechanical harvest and handling. In recent years, great emphasis has been placed on developing varieties with improved processing qualities as well as horticultural characteristics, including field vine storage, disease and nematode resistance, transportability and early plant emergence under cool climatic conditions. Breeding programs (public and private) are attempting to provide varieties with high soluble solids, better consistency (viscosity of juice and puree), improved firmness and color, jointlessness, easier peelability, better flavor, improved foliar cover to reduce losses from sunburn/scald, insect, nematode and disease resistance.

Tomato variety trials provide a good opportunity to realistically evaluate and make side-by-side comparisons of various new and standard lines under actual grower field conditions. Standardized procedures for variety trials in a number of counties allow for greater variety comparisons over a wider geographical area. This greatly improves the value of variety trials and the information derived from them.

In 2003, California tomato growers produced a little less than 9.3 million tons, a good deal below the winter-projected figure of 10.5 million tons. An extremely hot July, coupled with two thunderstorms in August that dropped heavy rain in the Sacramento Valley contributed to reduced production statewide. Locally, the crop yields were very good west of Interstate 5, while yields were down a bit east of Stockton and Tracy due to the aforementioned heat and rainfall conditions. Overall, San Joaquin County fared reasonably well compared to other production areas. Harvest finally finished at the end of the third week in October. Disease pressure, other than mold associated with the rainfall events of August, was not high. Verticillium Wilt, Fusarium Foot Rot, Powdery Mildew and Phytophthora root rot did occur in scattered fields, with Verticillium probably being the most common problem. There was also some aphid, worm, and stinkbug pressure in some fields.

Two processing tomato variety trials were conducted locally in 2003. One was an early season maturity trial, done cooperatively with Janet Caprile, Contra Costa County Farm Advisor. The grower cooperators, Anthony Massoni and Paul Simoni of Simoni-Massoni Farms, were located near Byron, California. Eleven replicated varieties and another eleven observation varieties were direct seeded into twin row 66 inch beds on March 6, 2003. The crop emerged on March 19, 2003; the field variety was Halley 3155. Sprinkler irrigation was utilized to establish the crop stand, followed by furrow irrigation for the balance of the season. A midseason maturity trial was direct seeded into single-row 60-inch beds on April 23, 2003; the field variety was Hypeel 65. The trial was done cooperatively with Jan Mickler, Stanislaus County Farm Advisor; the grower cooperators were Bill and Chuck Cox of Cox and Perez Farms, and the trial was located just east of Westley, California. Furrow irrigation was used throughout the season and crop emergence did not occur until mid May 2003 due to a delay in applying the initial furrow irrigation. The trial contained eighteen replicated varieties and another twenty-one lines in the single replication observation block.

GROWTH AND DEVELOPMENT

Crop growth and development were excellent with the Simoni-Massoni Farms early season maturity trial near Byron, California. The field soil type for the early season trial was a Brentwood clay loam. Crop growth and development were also excellent at the midseason maturity trial with Cox and Perez Farms near Westley, California. The soil type at the midseason maturity trial was a Yolo clay loam. Fruit set was excellent at both trials, but fruit size was generally a little smaller at the early season trial compared to the midseason trial.

Varieties for both trials were direct-seeded using Earthway hand-push planters after the growers had left a preworked, prepared bed area that had already been fertilized with a preplant starter solution, and herbicide had already been applied for the trials, as well as the rest of the fields. The early season maturity trial was mechanically harvested using the grower's harvester while the midseason maturity trial was hand harvested, due to the lateness of the season and because a commercial mechanical harvesting company did the actual field harvest, needing to get loads picked as quickly as possible. Cox and Perez Farms graciously provided personnel to help get the trial hand harvest done as quickly and efficiently as possible.

Fruit quality samples from all replications for all varieties in each trial were taken just prior to trial harvest and sent to the local Processing Tomato Advisory Board Inspection Station at Panella Trucking, Incorporated, for soluble solids (°Brix), pH and color evaluation. Samples from both trials were also taken by Sam Matoba of the Department of Food Science and Technology at UC Davis, where Dr. Diane Barrett ran ºBrix, pH, Bostwick, Titrateable acidity (% citric), USDA color, Predicted Past Bostwick, Predicted Paste Yield and Predicted Catsup Yield. Two replications were sampled out of the replicated variety block of each trial, while one sample was taken from each observational line in the trials. The data for all trials sampled by the Department of Food Science and Technology in the Statewide Farm Advisor Tomato Variety Evaluation Project will be provided in Diane Barrett's California League of Food Processors T-4 Project Report.

YIELD

The early season variety trial was mechanically harvested on August 12, 2003. Yields were outstanding in the replicated trial with the eleven varieties averaging 48.9 tons/acre. (This includes Halley 3155). Brix yield average was 2.63 tons/acre, soluble solids (ºBrix) averaged 5.34, fruit color average 23.0 and pH averaged 4.31. The eleven varieties in the single replication observation block averaged 46.5 tons/acre in yield with Brix yield averaging 2.55 tons/acre, soluble solids averaging 5.50, fruit color averaging 23.2 and pH averaging 4.33.

The top yielding variety in the replicated early season trial was BOS 3155 at 56.0 tons/acre, followed by H-9997 (53.9 tons/acre), APT 410 (51.4 tons/acre), H-1100 (51.1 tons/acre) and AP 957 (50.3 tons/acre). Yield figures for all the varieties in the replicated trial are shown in **Table 1**, along with fruit quality data on Brix yield, soluble solids (ºBrix), fruit color and pH.

Highest yield in the observation block of the early season trial was attained by HMX 2853 at 57.2 tons/acre, followed by UG 8168 (53.3 tons/acre), BOS 3155 (52.0 tons/acre), H-9280 (50.5 tons/acre) and APT 410 (47.7 tons/acre). Complete data on yield, Brix yield, soluble solids (ºBrix, fruit color and pH for all of the varieties in the early season observation block are given in **Table 2.**

The midseason maturity variety trial was hand harvested on September 22nd and 23rd, 2003. Yields were excellent in the trial, with the entire replicated block of 18 varieties averaging 48.2 tons/acre, while the 21 observation lines averaged 53.5 tons/acre. Brix yield in the replicated block averaged 2.41, while soluble solids (ºBrix) averaged 5.00, fruit color averaged 24.6 and pH averaged 4.27. The 21 observation lines gave an average of 2.65 for Brix yield, 4.98 for soluble solids, 24.5 for fruit color and 4.29 for pH.

The best yielding varieties in the midseason maturity replicated trial were H-8892 at 60.6 tons/acre, followed by U 941 (56.3 tons/acre), PS 296 (54.7 tons/acre), AB 5 (53.4 tons/acre), AB 2 (52.1 tons/acre), CXD 222 (51.4 tons/acre) and PX 849 (50.3 tons/acre). Yield figures for all the varieties in the replicated trial, along with fruit quality data on Brix yield, soluble solids (ºBrix), fruit color and pH, are contained in **Table 3**.

In the midseason observational trial block, highest yield among the 21 lines tested was achieved by CXD 223 at 70.6 tons/acre, followed by HMX 2855 (69.3 tons/acre), Sun 6324 (64.6 tons/acre), H-8892 (61.4 tons/acre), H-2401 (59.7 tons/acre), U-886 (58.6 tons/acre) and Hypeel 65 (56.2 tons/acre). Remember the results shown are only from one replication of each line in the observational trial. Yield figures for all of the lines in the observation trial, including fruit quality data on Brix yield, soluble solids (ºBrix), fruit color and pH, are presented in **Table 4.**

MANY THANKS

Many thanks to Anthony Massoni and Paul Simoni and Bill Cox and Chuck Cox for their participation and cooperation in these variety trials. These trials can be a disruption in normal grower operations, but these gentlemen put up with these interruptions to increase their own knowledge and to benefit the tomato industry.

Appreciation is also expressed to Chuck Rivara and the California Tomato Research Institute Board for their continued support over 31 years for the Uniform Quality Determinations and Statewide Processing Tomato Variety Trials project conducted by University of California Cooperative Extension.

Thanks also to Tom Ramme, Gary Grant, Kay Ricketts and Sheri Campbell of the Processing Tomato Advisory Board Inspection System for all their help and cooperation in running tomato fruit quality samples from the trials. Appreciation is also expressed to Panella Trucking, Inc. (Bob Panella and Art Pratt) for allowing the quality samples to be run and analyzed at their grading station facility in Stockton, California.

Much gratitude is also expressed to Diane Barrett and Sam Matoba of the UC Davis Department of Food Science and Technology for all their efforts in running fruit quality samples from the Farm Advisor variety trials as part of the processor sponsored T-4 Project, and to Gail Nishimoto, Program Analyst at UC Davis for doing the statistical analysis (individual and combined trials) for the Farm Advisor variety trials project.

Final thanks also to the seed industry, which provides the basic material for the trials and continuing financial support in 2003, and to everyone in the tomato industry for their guidance and support.

2003 STATEWIDE UNIFORM PROCESSING TOMATO VARIETY TRIALS

EARLY SEASON MATURITY VARIETY LIST

Asgrow Seed
- APT 410 $VFFNP
- AP 957 $VFFNP

Campbell Soup
- CXD 224 $VFFNP

H. J. Heinz
- H-9280 $VFFNP
- H-1100 $VFFNP
- H-1400 $VFFNP
- H-9997 $VFFNP

Harris Moran Seed
- HMX 2853 $VFFNP

Hazera Seed
- Calista $VFF
- HA 3523 $VFFN

Orsetti
- Halley (BOS 3155) $VFF
- AGT 771 $VFFNP
- BOS 40809 $VFFN

Petoseed
- Hypeel 45 $VFFNP

Sunseed
- Sun 6358 $VFFNP

Unilever Seed
- U-205 $VFFNP

United Genetics, Inc.
- UGX 8168 $VFFNP

DISEASE RESISTANCE AND HYBRID CODES

O.P.	= Open Pollinated	FFF	= Fusarium Wilt - Race I, II and III Resistant
$	= Hybrid	T	= Tobacco Mosaic Resistance
V	= Verticillium Wilt Race I Resistant	N	= Root Knot Nematode Resistant
F	= Fusarium Wilt - Race I Resistant	P	= Bacterial Speck Resistant
FF	= Fusarium - Wilt Race I and II Resistant		

Table 1. 2003 Early Season Processing Tomato Variety Trial
Massoni and Simoni Farms – Byron, California

Replicated Varieties

Variety	Seed Co.	Yield (tons/Acre)	Brix Yield (tons/Acre)	Soluble Solids (° Brix)	Color PTAB	pH
H9997	Heinz Seed	53.9 A	2.71	5.0	22.3	4.36
*APT 410	Asgrow Seed	51.4 AB	2.71	5.3	22.3	4.31
H-1100	Heinz Seed	51.1 AB	2.86	5.6	24.5	4.31
AP 957	Asgrow Seed	50.3 AB	2.54	5.1	22.3	4.32
*Hypeel 45	Peto Seed	48.7 BC	2.78	5.7	23.0	4.25
*H-9280	Heinz Seed	48.1 BC	2.42	5.1	23.3	4.33
H-1400	Heinz Seed	47.8 BC	2.76	5.8	23.0	4.28
CXD 224	Campbell Seed	44.8 CD	2.50	5.6	22.0	4.33
Sun 6358	Sunseeds	44.4 CD	2.40	5.5	23.5	4.32
Calista	Hazera Seed	42.1 D	2.02	4.8	22.5	4.44
Mean		48.2	2.57	5.3	22.9	4.32
LSD @ 0.05 =		4.3	0.24	0.5	1.1	0.03
C.V. =		6.2	6.4	6.2	3.2	0.5
BOS 3155 [1]	Orsetti Seed	56.0	3.24	5.8	24.3	4.26

[1] Variety was the field variety and was included in the replicated variety trial. Data is reported separately because the variety was not included in other early season maturity trials as part of the Statewide Farm Advisor Variety Evaluation Trial Project.

* Standard comparison variety

Table 2. 2003 Early Season Processing Tomato Variety Trial
Massoni and Simoni Farms – Byron, California

Observation Varieties

Variety	Seed Co.	Yield (tons/Acre)	Brix Yield (tons/Acre)	Soluble Solids (° Brix)	Color PTAB	pH
HMX 2853	Harris Moran Seed	57.2	3.32	5.8	23.0	4.34
UG 8168	United Genetics Seed	53.3	2.88	5.4	22.0	4.34
BOS 3155	Orsetti Seed	52.0	2.91	5.6	24.0	4.38
*H-9280	Heinz Seed	50.5	2.52	5.0	24.0	4.37
*APT 410	Asgrow Seed	47.7	2.48	5.2	22.0	4.36
AGT 771	Orsetti Seed	47.4	3.08	6.5	21.0	4.28
BOS 40809	Orsetti Seed	46.7	2.10	4.5	25.0	4.32
*Hypeel 45	Peto Seed	45.0	2.25	5.0	24.0	4.46
U 205	Unilever Seed	41.2	2.47	6.0	23.0	4.21
H-1100	Heinz Seed	38.2	2.14	5.6	23.0	4.34
HA 3523	Hazera Seed	32.1	1.89	5.9	24.0	4.22

* Standard comparison variety

2003 STATEWIDE UNIFORM PROCESSING TOMATO VARIETY TRIALS

MID SEASON MATURITY VARIETY LIST

AB Seeds
- AB 2 $VFFNP
- AB 5 $VFFNP

Campbell Soup
- CXD 221 $VFFFNP
- CXD 222 $VFFNP
- CXD 223 $VFFNP

CTRI
- CPL 1056 VFFN-O.P
- CPL 4863 VFFN-O.P.
- CPL 155 VFFNP-O.P.

H. J. Heinz
- H-8892 $VFFN
- H-2601 $VFFNP
- H-2401 $VFFNP
- H-9780 $VFFNP
- H-2501 $VFFNP
- H-2801 $VFFNP

Harris Moran
- HM 830 $VFFN
- HMX 1852 $VFFNj
- HMX 2855 $VFFNP

Unilever Seed
- U 729 $VFFN
- U 941 $VFFN
- U 886 $VFFN

Nippon Del Monte
- NDM 0098 $VFFNT

Orsetti Seed
- Halley 3155 $VFF
- BOS 52295 $VFFNP
- AGT 210 $VFFN
- BOS 47579 $VFFNP
- BOS 39422 $VFFNP

Petoseed
- Hypeel 65 $VFFNP
- PS 849 $VFFNP
- PX 607 $VFFNPj
- PS 296 $VFFNP

Rogers Seed (Novartis)
- La Rossa $VFF

Sunseeds
- Sun 6324 $VFFNP
- Sun 6360 $VFFNP
- Sun 6119 $VFFN

United Genetics
- UG 151 $VFFN

DISEASE RESISTANCE AND HYBRID CODES

$	= Hybrid	T	= Tobacco Mosaic Resistance
V	= Verticillium Wilt Race I Resistant	N	= Root Knot Nematode Resistant
F	= Fusarium Wilt Race I Resistant	P	= Bacterial Speck Resistant
FF	= Fusarium Wilt - Race I and II Resistant	j	= jointless
FFF	= Fusarium Wilt - Race I, II and III Resistant	O.P.	= Open Pollinated

Table 3. 2003 Midseason Processing Tomato Variety Trial
Cox and Perez Farms – Westley, California

Replicated Varieties

Variety	Seed Co.	Yield (tons/Acre)	Brix Yield (tons/Acre)	Soluble Solids (° Brix)	Color PTAB	pH
*H-8892	Heinz Seed	60.6 A	2.92	4.8	24.3	4.28
U 941	Unilever Seed	56.3 AB	2.64	4.7	24.8	4.31
PS 296	Peto Seed	54.7 ABC	2.83	5.2	25.3	4.20
AB 5	AB Seed	53.4 ABCD	2.83	5.2	24.5	4.25
AB 2	AB Seed	52.1 BCDE	2.69	5.2	25.0	4.21
CXD 222	Campbell Seed	51.4 BCDE	2.67	5.2	24.0	4.25
PX 849	Peto Seed	50.3 BCDEF	2.48	4.9	26.0	4.25
HM 0830	Harris Moran Seed	50.1 BCDEF	2.60	5.2	24.5	4.32
NDM 0098	Del Monte Seed	47.3 CDEF	2.32	4.9	23.3	4.34
H-2501	Heinz Seed	46.8 CDEF	2.32	5.0	23.3	4.23
*Halley 3155	Orsetti Seed	46.8 CDEF	2.23	4.8	25.3	4.27
H-9780	Heinz Seed	46.2 DEF	2.30	5.0	25.3	4.23
H-2601	Heinz Seed	46.0 DEFG	2.21	4.8	25.5	4.28
Sun 6119	Sunseeds	44.7 EFG	2.25	5.1	25.8	4.27
*La Rossa	Rogers Seed	44.4 EFG	2.08	4.7	24.3	4.35
CPL 155	CTRI	43.0 FGH	2.16	5.0	25.3	4.31
H-2801	Heinz Seed	38.1 GH	2.07	5.4	22.8	4.29
CXD 221	Campbell Seed	35.9 H	1.89	5.3	24.0	4.26
Mean		48.2	2.41	5.0	24.6	4.27
LSD @ 0.05 =		8.0	0.41	0.3	1.5	0.04
C.V. =		11.6	12.0	4.5	4.2	0.6

* Standard comparison variety

Table 4. 2003 Midseason Processing Tomato Variety Trial
Cox and Perez Farms – Westley, California

Observation Varieties

Variety	Seed Co.	Yield (tons/Acre)	Brix Yield (tons/Acre)	Soluble Solids (° Brix)	Color PTAB	pH
CXD 223	Campbell Seed	70.6	3.246	4.6	25.0	4.29
HMX 2855	Harris Moran Seed	69.3	3.186	4.6	25.0	4.35
Sun 6324	Sunseeds	64.6	3.292	5.1	23.0	4.30
*H-8892	Heinz Seed	61.4	2.764	4.5	24.0	4.32
H-2401	Heinz Seed	59.7	2.805	4.7	24.0	4.20
U-886	Unilever Seed	58.6	2.873	4.9	26.0	4.32
Hypeel 65	Peto Seed	56.2	2.810	5.0	28.0	4.28
UG 151	United Genetics Seed	55.1	2.812	5.1	23.0	4.32
BOS 52295	Orsetti Seed	54.4	2.777	5.1	25.0	4.30
NDM 0098	Del Monte Seed	54.4	2.886	5.3	22.0	4.28
*Halley 3155	Orsetti Seed	53.6	2.625	4.9	24.0	4.25
CPL 1056	CTRI	50.1	2.354	4.7	25.0	4.33
HM 1852	Harris Moran Seed	50.1	2.605	5.2	23.0	4.34
PX 607	Peto Seed	50.0	2.700	5.4	22.0	4.29
*La Rossa	Rogers Seed	49.6	2.280	4.6	27.0	4.29
BOS 47579	Orsetti Seed	47.5	2.754	5.8	25.0	4.24
Sun 6360	Sunseeds	45.6	2.096	4.6	23.0	4.29
BOS 39422	Orsetti Seed	44.9	2.468	5.5	26.0	4.23
U 729	Unilever Seed	44.3	2.080	4.7	24.0	4.37
CPL 4863	CTRI	44.0	2.244	5.1	25.0	4.25
AGT 210	Orsetti Seed	38.8	1.977	5.1	25.0	4.25

* Standard comparison variety

2003 STATEWIDE PROCESSING TOMATO VARIETY EVALUATION TRIALS

Since 1972, the California Tomato Research Institute, in cooperation with UC Cooperative Extension, has supported the Statewide UCCE Farm Advisor/Specialist Processing Tomato Variety Evaluation Project. This project has supplied growers, processors, seedsmen and field personnel with valuable information on variety yield performance in field trials over a wide geographical area as well as giving vital data on processing quality characteristics. It has also provided critical data to individual production districts and counties on varietal adaptability to local conditions. This year, the project evaluated 10 replicated early maturing varieties, 18 replicated midseason maturing lines and 28 single replication (observational) early and midseason maturity selections common to all trial locations.

This past season saw statewide processing tomato production at slightly below 9.3 million tons, nearly 1.2 million tons under projections prior to the harvest season. Most of the lost production occurred because of extreme heat during July followed by fruit mold losses, due to rainfall from 2 unseasonable storms in late August. There were no other major disease losses, except for some pocket areas of Verticillium Wilt, Phytophthora root rot and Curly Top Virus. Insect pressure was about average with some problems involving aphids, fruit worm and stinkbugs. Harvest was completed by mid October, with a few isolated fields picked as late as the week of October 20th.

The statewide UCCE variety evaluation project averaged 45.9 tons/acre for the early season replicated variety trials and 37.0 tons/acre for the midseason maturity replicated trials. Early season replicated trial soluble solids (°Brix) averaged 5.2, above the levels for 2002. Soluble solids were also higher in 2003 in the midseason replicated trials, averaging 5.3. Early season color in the replicated trials (25.0) was better than 2002, while color in the midseason replicated trials was 25.1, which was not as good as 2002. pH levels in the early season replicated trials were higher (4.40) than 2002 while the pH levels in the midseason replicated trials (4.36) were slightly lower than 2002.

Results and Discussion

Eight counties (Colusa, Yolo, Contra Costa, San Joaquin, Stanislaus, Merced, Fresno and Kern) participated in the statewide variety evaluation studies this past season, conducting four early and eight midseason trials. All of the early season trials were direct-seeded, while five of the midseason trials were direct-seeded and three were transplanted. The four following tables represent summaries of combined yield and fruit quality from the 2003 Statewide UCCE Farm Advisor/Specialist Processing Tomato Variety Evaluation Project. These summaries were obtained from the computer trial data analyses done by Gail Nishimoto, Program Analyst, at UC Davis.

Table A represents yield and quality means from the Uniform Replicated Early Season Maturity Variety Trials. Results of four trials from Colusa, Yolo, Contra Costa/San Joaquin and Fresno Counties are contained in this analysis. Highest yield in the combined data was attained by AP 957 at 52.5 tons/acre, followed by H-9997 (48.7 tons/acre), H-9280 (48.0 tons/acre), H-1400 (46.9 tons/acre), and APT 410 and H-1100, both at 46.3 tons/acre. In terms of fruit quality, the top variety in soluble solids (°Brix) was Hypeel 45 at 5.5, followed by H-1400, Sun 6358 and CXD 224 – all at 5.4, and APT 410 and H-1100 both at 5.3. Best color occurred with H-9997 at 23.1, followed by CXD 224 (24.1), APT 410 (24.6) and AP 957 and Calista both at 24.8. Best pH (acidity) levels occurred with H-1400 (4.35), Hypeel 45 (4.36), AP 957 (4.37) and APT 410 (4.38). An Agtron color meter is used to determine fruit color, so the lower the numerical value, the better the fruit color; pH levels are best when at 4.35 or lower.

Table B presents results from the Early Season Maturity Observational Variety Trials. Results of four trials from Colusa, Yolo, Contra Costa/San Joaquin and Fresno Counties are contained in this combined analysis of nine varieties common to all trial locations. The highest yield in these trials was delivered by UG 8168 at 48.4 tons/acre, followed by Hypeel 45 (44.5 tons/acre), H-9280 (44.0 tons/acre), APT 410 (43.3 tons/acre) and BOS 40809 (41.7 tons/acre). The top lines for soluble solids were APT 410 (5.7), HMX 2853 and AGT 771, both at 5.5, UG 8168 (5.4) and U 205 (5.3). Varieties providing the best fruit color were HMX 2853 (23.3), APT 410 (23.5), AGT 771 (24.0), H-9280 (24.3) and Hypeel 45 (24.5). Best pH levels were shown by U 205 (4.37), HA 3523 (4.38) and AGT 771 (4.40).

Table C provides data from the Mid Season Maturity Replicated Trials. Results are shown for eight trials in 7 county location (Colusa, Yolo, Stanislaus/San Joaquin, Merced, Fresno and Kern). Best combined yield was provided by H-8892 at 43.3 tons/acre, followed by U 941 (41.8 tons/acre), AB 5 (41.7 tons/acre), NDM 0098 (39.8 tons/acre). Best soluble solids were achieved by CXD 221 and CPL 155, both at 5.6, H-2801 (5.5) and AB 2 and HM 0830, both at 5.4. Five other varieties (AB 5, H-2501, PS 296, H-9780 and Halley 3155 were all at 5.3. Varieties giving the best fruit color were NDM 0098 and H-2801, both at 23.8, followed by H-2501 (23.9), AB 2 (24.3), H-8892 (24.6) and CXD 222 (24.8). Best pH levels were demonstrated by PS 296 (4.28), AB 2 (4.30), AB 5, H-2501, PX 849 and H 9780, all at 4.32, and Halley 3155 (4.34).

Table D shows data summarized for the Mid Season Observation Variety Trials from 8 trials in seven county locations (Colusa, Yolo, Stanislaus/San Joaquin, Merced, Fresno and Kern). Highest combined yield occurred with CXD 223 at 43.4 tons/acre, followed by H-8892 (42.4 tons/acre), U-729 (41.2 tons/acre), Sun 6360 (40.6 tons/acre), HMX 2855 (39.7 tons/acre), Sun 6324 (39.5 tons/acre), H-2401 (39.1 tons/acre), U 886 (38.7 tons/acre) and CPL 4863 (37.8 tons/acre). In terms of fruit quality, the best lines for soluble solids (°Brix) were BOS 52295 and PX 607, both at 5.6, followed by HMX 2855, BOS 47579, Halley 3155 and AGT 210, all at 5.5, and 6 additional varieties (Sun 6324, U-886, CPL 4863, BOS 39422, La Rossa and CPL 1056) at 5.4. Best fruit color was provided by UG 151 (23.1), Sun 6360 (23.3), Sun 6324 (23.4), HM 1852 (23.5), H-8892 (23.6), CPL 1056 (23.8) and U 729 and U-886, both at 23.9. Best pH levels occurred with H-2401 (4.30), BOS 47579 and BOS 39422, both at 4.33, BOS 52295 (4.35), AGT 210 and CPL 1056, both at 4.36, and CPL 4863 and PX 607, both at 4.37.

Table A. 2003 Processing Tomato Early Season Maturity Variety Trials
Combined Yield and Quality Data
Replicated Variety Trials
Four Locations: Colusa, Yolo, Contra Costa/San Joaquin and Fresno Counties

Variety	Yield (Tons/Acre)					°Brix	Brix Yield (Tons/Acre)	PTAB Color	pH
AP 957	52.5	A				4.9	2.57	24.8	4.37
H-9997	48.7		B			5.0	2.41	23.1	4.42
H-9280	48.0		B			4.8	2.28	25.3	4.40
H-1400	46.9		B	C		5.4	2.52	25.9	4.35
APT 410	46.3		B	C		5.3	2.45	24.6	4.38
H-1100	46.3		B	C		5.3	2.49	26.2	4.40
Sun 6358	45.4		B	C		5.4	2.43	25.5	4.40
Hypeel 45	43.8			C	D	5.5	2.40	25.7	4.36
Calista	41.1				D	E	4.9	1.99	24.8	4.48
CXD 224	39.4					E	5.4	2.12	24.1	4.43
Mean	45.9						5.2	2.36	25.0	4.40
LSD @ 0.05=	3.7						0.2	0.18	0.7	0.04
C.V.=	11.5%						6.1%	10.5%	3.7	1.1
Variety x Location	7.4						N.S.	0.35	1.3	N.S.

Table B. 2003 Processing Tomato Early Season Maturity Variety Trials
Combined Yield and Quality Data
Observation Variety Trials
Four Locations: Colusa, Yolo, Contra Costa/San Joaquin and Fresno Counties

Variety	Yield (Tons/Acre)	°Brix	Brix Yield (Tons/Acre)	PTAB Color	pH
UG 8168	48.4	5.4	2.60	25.3	4.42
Hypeel 45	44.5	5.0	2.25	24.5	4.47
H-9280	44.0	4.8	2.09	24.3	4.44
APT 410	43.3	5.7	2.45	23.5	4.42
BOS 40809	41.7	4.9	2.04	26.5	4.43
HMX 2853	41.1	5.5	2.24	23.3	4.43
U 205	40.2	5.3	2.12	25.5	4.37
AGT 771	40.1	5.5	2.21	24.0	4.40
HA 3523	39.0	5.1	1.97	25.5	4.38
Mean	42.5	5.2	2.22	24.7	4.42
LSD @ 0.05=	N.S.	N.S.	N.S.	N.S	N.S.
C.V.=	17.0%	9.3%	18.5%	6.4%	1.2%

Table C. 2003 Processing Tomato Mid Season Maturity Variety Trials
Combined Yield and Quality Data
Replicated Variety Trials
Eight Locations: Colusa (2), Yolo (2), Stanislaus/San Joaquin, Fresno, Kern and Merced Counties

Variety	Yield (Tons/Acre)									°Brix	Brix Yield (Tons/Acre)	PTAB Color	pH
H-8892	43.3	A								4.8	2.06	24.6	4.37
U 941	41.8	A	B							5.1	2.06	25.5	4.39
AB 5	41.7	A	B							5.3	2.16	25.2	4.32
NDM 0098	39.8		B	C						5.1	1.98	23.8	4.39
H-2501	38.8			C	D					5.3	2.00	23.9	4.32
AB 2	38.1			C	D	E				5.4	1.99	24.3	4.30
PS 296	37.8			C	D	E				5.3	1.98	25.6	4.28
PX 849	37.1				D	E				5.2	1.90	26.4	4.32
H-2801	37.1				D	E				5.5	1.99	23.8	4.41
H-2601	36.7				D	E	F			5.0	1.77	25.3	4.40
H-9780	36.2					E	F	G		5.3	1.86	25.7	4.32
CXD 222	34.8						F	G	H	52	1.80	24.8	4.36
Halley 3155	34.7						F	G	H	5.3	1.80	25.6	4.34
HM 0830	34.5							G	H	5.4	1.83	25.1	4.42
LaRossa	32.8								H	5.1	1.60	25.0	4.41
CXD 221	30.6									I	5.6	1.66	25.2	4.41
CPL 155	30.6									I	5.6	1.66	25.7	4.37
Sun 6119*	39.3										5.1	1.72	26.9	4.35
Mean	37.0										5.3	1.89	25.1	4.36
LSD @ 0.05 =	2.1										0.2	0.12	0.8	0.02
C.V. =	11.6%										6.1%	13.0%	6.4%	1.1%
Variety x Location LSD @ 0.05 =	6.0										0.4	0.34	N.S.	0.07

* Variety not present in all locations

Table D. 2003 Processing Tomato Mid Season Maturity Variety Trials
Combined Yield and Quality Data
Observation Variety Trials
Eight Locations: Colusa (2), Yolo (2), Stanislaus/San Joaquin, Fresno, Kern and Merced Counties

Variety	Yield (Tons/Acre)		Brix	Brix Yield (Tons/Acre)	PTAB Color	pH
CXD 223	43.4	A	5.3	2.21	24.5	4.40
H-8892	42.4	A B	5.2	2.12	23.6	4.39
U 729	41.2	A B C	5.3	2.11	23.9	4.42
Sun 6360	40.6	A B C D	5.1	2.01	23.3	4.40
HMX 2855	39.7	A B C D	5.5	2.09	24.8	4.47
Sun 6324	39.5	A B C D	5.4	2.08	23.4	4.42
H-2401	39.1	A B C D E	5.3	1.97	24.5	4.30
U-886	38.7	A B C D E	5.4	2.02	23.9	4.38
CPL 4863	37.8	B C D E	5.4	1.96	24.1	4.37
BOS 47579	37.4	B C D E	5.5	2.03	24.9	4.33
BOS 52295	37.3	B C D E	5.6	2.02	25.3	4.35
UG 151	36.8	C D E	5.1	1.83	23.1	4.46
HM 1852	35.9	C D E F	5.3	1.84	23.5	4.41
PX 607	35.6	D E F	5.6	1.96	24.9	4.37
Halley 3155	35.5	D E F	5.5	1.92	25.3	4.38
BOS 39422	35.2	D E F	5.4	1.84	24.8	4.33
LaRossa	33.9	E F	5.4	1.76	24.9	4.41
AGT 210	31.0	F	5.5	1.67	24.9	4.36
CPL 1056	30.4	F	5.4	1.59	23.8	4.36
Mean	37.5		5.4	1.95	24.3	4.38
LSD @ 0.05=	5.5		N.S.	0.29	1.5	0.06
C.V.=	14.9%		6.2%	14.9%	6.1%	1.3%

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