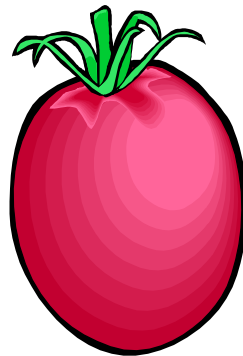


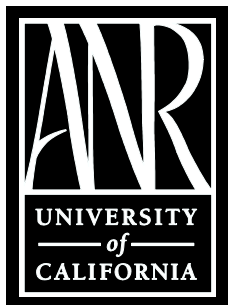
PROCESSING TOMATOES

IN

SAN JOAQUIN, CONTRA COSTA &
STANISLAUS COUNTIES



2004 VARIETY & WEED MANAGEMENT
TRIALS SUMMARY
RESEARCH PROGRESS REPORT



University of California Cooperative
Extension
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2004
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 2004, California tomato growers produced a near record crop, approaching 11.3 million tons, as of this writing. A moderate summer produced excellent growing conditions throughout the San Joaquin and Sacramento Valleys. Locally, crop yields were good but may be down from average due to significant delays in the harvest schedule that occurred not primarily due to weather. Some fields were 3 to 4 weeks late in beginning harvest, reducing the yields in those plantings. Harvest continued well into October and some early rain also contributed to some yield loss due to mold. Disease pressure included Verticillium Wilt, some Phytophthora Root Rot, Powdery Mildew, Blackmold and a little Fusarium Wilt Race III, southeast of Lodi, California. As usual, there was also some aphid, worm and stinkbug pressure in some fields.

Two processing tomato variety trials were conducted locally in 2004. 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. Twelve replicated varieties were direct seeded into twin row 66 inch beds on March 10, 2004. The crop emerged on March 23, 2004; 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 transplanted into double-row 66-inch beds on April 30, 2004; the field variety was ENP 113. 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 between Westley and Vernalis, California, off Highway 33. Furrow irrigation was used throughout the season. The trial contained eighteen replicated varieties and another twelve lines in the single replication observation block.

GROWTH AND DEVELOPMENT

Crop growth and development were very good with the Simoni-Massoni Farms early season maturity trial near Byron, California. However there was some herbicide injury in parts of the trial. Dual (metolachlor) was applied at layby (1 pint/Acre) to the bedtop and incorporated into the soil with sprinkler irrigation. Due to some wind, the sprinkler application was not uniform and certain sections of the field didn't receive enough water to move the herbicide below the root zone. Those areas showed phytotoxicity symptoms for about 2 weeks and then recovered. However, reduced growth (vigor) and/or a spotty stand were evident in some affected varieties within the trials – H 9280, H 9997, HA 3523 and PX 740. Not surprisingly these same varieties were in the bottom half in yields among the 12 varieties tested. Mild potassium deficiency occurred as the trial field approached harvest, but this condition was present in a number of Brentwood-Byron fields that experienced heavy fruit set under a mild climate, producing very big yields. The soil type at the trial was a Brentwood clay loam. The transplanted midseason maturity trial at Cox and Perez Farms near Westley, California also showed good growth and development, although there were some water stress issues and the moderate incidence of Spotted Wilt Virus. The soil type at the midseason maturity trial was a Yolo clay loam. Fruit set was very good to excellent at both trials but fruit size was a bit smaller in the midseason maturity trial.

Varieties in the early season trial 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 trial, as well as the rest of the field. The midseason maturity trial was a double row transplant field, set by the grower's transplanter and crew. Plant population was 8,700 plants/acre and all preplant fertilizer and herbicide application/incorporation was done by the grower prior to transplanting. The early season maturity trial was mechanically harvested using the grower's harvester while the midseason maturity trial was hand harvested due to a commercial mechanical harvesting company doing the field harvest and the need to get loads harvested as quickly as possible, which a test plot would have impeded. Cox and Perez Farms graciously provided personnel to help get the trial 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 °Brix, pH, Bostwick, Titratable 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 harvested mechanically on August 5, 2004. Yields were outstanding in the replicated trial with the twelve varieties averaging 45.0 tons/acre. Brix yield average was 2.21 tons/acre, soluble solids (°Brix) averaged 4.89, fruit color averaged 23.4 and pH averaged 4.48.

The top yielding variety in the replicated early season trial was H-5003 at 64.9 tons/acre, followed by APT 410 (53.0 tons/acre), AGT 771 (51.0 tons/acre), Hypeel 45 (50.0 tons/acre), UG 8168 (49.8 tons/acre), and HA 3303 (47.6 tons/acre). Yield figures for all the varieties in the replicated trial are presented in **Table 1**, along with fruit quality data on Brix yield, soluble solids (°Brix), fruit color and pH.

The midseason maturity variety trial was hand harvested on August 24th and 25th, 2004. Yields were very good in the trial, with the entire replicated block of 18 varieties averaging 41.6 tons/acre, while the 12 observation lines averaged 46.7 tons/acre. Brix yield in the replicated block averaged 2.37 tons/acre, while soluble solids (°Brix) averaged 5.7, fruit color averaged 22.05 and pH averaged 4.33. The 12 observation lines gave an average of 2.61 tons/acre in Brix yield, soluble solids (°Brix) averaged 5.6, fruit color averaged 22.5 and pH averaged 4.35.

The best yielding varieties in the midseason maturity replicated trial were led by PS 296 at 53.2 tons/acre, followed by H-8892 (46.1) tons/acre, H-5503 (45.4 tons/acre), U-941 (44.5 tons/acre), UG 151 (43.1 tons/acre), Sun 6360 (42.1 tons/acre), Halley 3155 (42.1 tons/acre) and Red Sky (41.7 tons/acre). Yield figures for all the varieties in the replicated trial, along with fruit quality data on Brix yield, soluble solids (°Brix) fruit color and pH, as contained in **Table 2**.

In the midseason maturity observational block, highest yield among the 12 lines evaluated occurred with U-232 at 62.4 tons/acre, followed by Sun 6366 (52.1 tons/acre), HMX 3859 (50.3 tons/acre), U-258 (48.9 tons/acre), PS 345 (47.8 tons/acre) and NDM 0098 (46.9 tons/acre). Yield figures for all the lines in the observation trial, including fruit quality data on Brix yield, soluble solids (°Brix) fruit color and pH, are presented in **Table 3**. The reader of this report is cautioned to remember that results shown in the observation trial are only from one replication of each line.

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 32 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 2004, and to everyone in the tomato industry for their guidance and support.

2004 STATEWIDE UNIFORM PROCESSING TOMATO VARIETY TRIALS

EARLY SEASON MATURITY VARIETY LIST

Asgrow Seed

APT 410 \$VFFNP

Petoseed

Hypeel 45 \$VFFNP

PX 740 \$VFFNP

H. J. Heinz

H-9280 \$VFFNP

H-9997 \$VFFNP

H-5003 \$VFFNP

Sunseed

Sun 6358 \$VFFNP

Hazera Seed

HA 3523 \$VFFN

HA 3303 \$VFF

Unilever Seed

U-250 \$VFFNP

United Genetics, Inc.

UGX 8168 \$VFFNP

Orsetti

AGT 771 \$VFFNP

DISEASE RESISTANCE AND HYBRID CODES

O.P. = Open Pollinated

\$ = Hybrid

V = Verticillium Wilt Race I Resistant

F = Fusarium Wilt - Race I Resistant

FF = Fusarium - Wilt Race I and II Resistant

FFF = Fusarium Wilt - Race I, II
and III Resistant

T = Tobacco Mosaic Resistance

N = Root Knot Nematode Resistant

P = Bacterial Speck Resistant

Table 1. 2004 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
H-5003	Heinz Seed	64.9 A	3.37	5.20	22.0	4.46
APT 410	Asgrow Seed	53.0 B	2.54	4.78	23.0	4.51
AGT 771	Orsetti Seed	51.0 B	2.72	5.33	23.3	4.49
Hypeel 45	Peto Seed	50.0 B	2.65	5.30	23.8	4.41
UG 8168	United Genetics Seed	49.8 B	2.38	4.78	24.5	4.48
HA 3303	Hazera Seed	47.6 BC	2.16	4.53	23.0	4.53
Sun 6358	Sunseeds	43.1 BCD	1.99	4.63	24.0	4.47
HA 3523	Hazera Seed	39.4 BCDE	1.90	4.83	23.0	4.54
U 250	Unilever Seed	38.2 CDE	1.83	4.80	25.5	4.48
PX 740	Peto Seed	36.9 DE	1.92	5.20	22.5	4.44
H-9997	Heinz Seed	35.5 DE	1.63	4.60	23.0	4.48
H-9280	Heinz Seed	31.2 E	1.43	4.60	23.3	4.47
LSD @ 0.05 =		10.4	0.57	0.34	2.1	0.04
C.V. =		16.1	17.9	4.8	6.3	0.6
Mean		45.0	2.21	4.89	23.4	4.48

2004 STATEWIDE UNIFORM PROCESSING TOMATO VARIETY TRIALS

MID SEASON MATURITY VARIETY LIST

<u>Campbell Soup</u> CXD 236 \$VFFN		<u>Nippon Del Monte</u> NDM 0098 \$VFFN	
<u>CTRI</u> CPL 4863 VFFN-O.P.		<u>Orsetti Seed</u> Halley 3155 \$VFF	BOS 47721 \$VFFN BOS 52295 \$VFFNP
<u>H.J. Heinz</u> H-8892 \$VFFN H-2401 \$VFFNP H-2501 \$VFFNP H-5803 \$VFFNP	H-2601 \$VFFNP H-5503 \$VFFNP H-9665 \$VFFNP	<u>Petoseed</u> PX 607 \$VFFN	PS 296 \$VFFNP PS 345 \$VFFNP
<u>Harris Moran</u> HMX 3859 \$VFFNP	HMX 3863 \$VFFNP	<u>Rogers Seed (Novartis)</u> La Rossa \$VFF	
<u>Unilever Seed</u> U 005 \$VFFNP U 258 \$VFFNP	U 941 \$VFFN U 232 \$VFFNP	<u>Sunseeds</u> Sun 6119 \$VFFN Sun 6360 \$VFFNP	Red Sky \$VFFP Sun 6365 \$VFFNP Sun 6366 \$VFFNP
		<u>United Genetics</u> UG 151 \$VFFN	

DISEASE RESISTANCE AND HYBRID CODES

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

Table 2.

2004 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
PS 296	Peto Seed	53.2A	3.353	6.33	22.50	4.25
H-8892	Heinz Seed	46.1AB	2.608	5.68	22.50	4.35
H-5503	Heinz Seed	45.4 B	2.470	5.45	21.00	4.34
U-941	Unilever Seed	44.5 B	2.473	5.58	22.00	4.35
UG 151	United Genetics	43.1 BC	2.345	5.43	21.25	4.43
Sun 6360	Sunseeds	42.1 BC	2.265	5.43	22.50	4.34
Halley 3155	Orsetti Seed	42.1 BC	2.485	5.93	22.50	4.33
Red Sky	Sunseeds	41.7 BC	2.318	5.60	21.00	4.38
U-005	Unilever Seed	41.4 BC	2.283	5.53	23.25	4.27
H-2601	Heinz Seed	41.0 BC	2.160	5.30	23.00	4.36
H-2401	Heinz Seed	40.4 BC	2.205	5.48	22.00	4.26
CPL 4863N	CTRI	40.2 BC	2.140	5.35	21.75	4.32
H-2501	Heinz Seed	40.0 BC	2.343	5.88	20.75	4.29
H-9665	Heinz Seed	39.6 BC	2.245	5.68	22.25	4.27
Sun 6119	Sunseeds	39.4 BC	2.419	6.15	22.50	4.33
H-5803	Heinz Seed	36.4 C	2.303	6.33	22.00	4.29
La Rossa	Rogers Seed	35.9 C	2.143	5.98	22.00	4.38
PS 607	Peto Seed	35.8 C	2.193	6.13	22.25	4.37
	Mean	41.6	2.370	5.7	22.05	4.33
	LSD @ 0.05 =	7.7	0.427	0.51	1.37	0.05
	C.V. =	13.0	12.7	6.3	4.4	0.82

Table 3. 2004 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
U 232	Unilever Seed	62.4	3.245	5.2	24.0	4.31
Sun 6366	Sunseeds	52.1	3.178	6.1	21.0	4.38
HMX 3859	Harris Moran Seed	50.3	2.968	5.9	26.0	4.33
U 258	Unilever Seed	48.9	2.592	5.3	22.0	4.41
PS 345	Petoseed	47.8	2.390	5.0	21.0	4.36
NDM 0098	Nippon Del Monte Seed	46.9	2.579	5.5	21.0	4.42
BOS 47721	Orsetti Seed	45.6	2.690	5.9	22.0	4.38
BOS 7025	Orsetti Seed	44.9	2.604	5.8	25.0	4.35
CXD 236	Campbell Seed	44.3	2.525	5.7	21.0	4.38
BOS 52295	Orsetti Seed	41.6	2.205	5.3	23.0	4.25
HMX 3863	Harris Moran Seed	38.9	2.062	5.3	21.0	4.43
Sun 6365	Sunseeds	36.7	2.239	6.1	23.0	4.24
Mean:		46.7	2.606	5.6	22.5	4.35

**2004 STATEWIDE
PROCESSING TOMATO
VARIETY TRIALS**

2004 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 12 replicated early maturing varieties, 18 replicated midseason maturing lines and 12 single replication observation midseason maturity selections common to almost all trial locations. Individual county trial reports should be obtained to get an accurate tabulation of varieties tested in both the early and midseason maturity trials.

This past season saw statewide processing tomato production approaching 11.3 million tons at this writing, nearly 2 million tons greater than the 2003 crop. Nearly ideal growing conditions in all production areas and good grower management accounted for the large increase in tonnage. There were no major disease losses, except for some localized areas of Verticillium Wilt, Phytophthora root rot and some black mold on late harvested fields. 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 39.9 tons/acre for the early season replicated variety trials and 39.9 tons/acre for the midseason maturity replicated trials. Early season replicated trial soluble solids (°Brix) averaged 5.1. Soluble solids were the same in 2004 as in 2003 in the midseason replicated trials, averaging 5.3. Early season color in the replicated trials (23.6) was better than 2003, while color in the midseason replicated trials was 24.5, which was slightly better than 2003. pH levels in the early season replicated trials were higher (4.44) than 2003 while the pH levels in the midseason replicated trials (4.36) were the same as 2003.

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 six 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 three following tables represent summaries of combined yield and fruit quality from the 2004 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 and coordinated by Jan Mickler, Vegetable Crops Farm Advisor in Stanislaus County.

Table A represents yield and quality means from the Uniform Replicated Early Season Maturity Variety Trials. Results of four trials from Yolo, Colusa, Contra Costa/San Joaquin and Fresno Counties are contained in this analysis. Highest yield in the combined data was achieved by H-5003 at 46.7 tons/acre, followed by APT 410 (42.1 tons/acre), UG 8168 (41.9 tons/acre) and Hypeel 45 (40.5 tons/acre). In terms of fruit quality the top variety in soluble solids (°Brix) was AGT 771 at 5.7 (only present in three locations), followed by Hypeel 45 (5.6), H-5003 (5.5) and PX 740 (5.3). Highest Brix yield occurred with H-5003 at 2.54 tons/acre, followed by Hypeel 45 (2.27 tons/acre), AGT 771 (2.21 tons/acre) and APT 410 (2.16 tons/acre). Best fruit color was attained by H-9997 (22.4), H-5003 (22.6), HA 3523 (22.9) and Calista (23.1). Best pH levels were shown by Hypeel 45 (4.38), PX 740 (4.38), Sun 6358 (4.42) and H 9280 and UG 8168 both at 4.43. 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 Mid Season Maturity Replicated Trials. Data is shown for six trials in seven county locations (Yolo, Colusa, Stanislaus/San Joaquin, Merced, Fresno and Kern). Best combined yield was provided by U 941 at 45.1 tons/acre, followed by H 8892 (43.2 tons/acre), H 5503 (43.0 tons/acre), H-2401 (42.9 tons/acre), H-9665 (42.4 tons/acre), H-5803 (40.9 tons/acre), and Sun 6360 (40.3 tons/acre). Best soluble solids were attained by H 5803, P S 296 and Halley 3155, all at 5.7, PX 607 (5.6), H 2501 (5.5), and Sun 6119, Red Sky and La Rossa all at 5.4. Varieties giving the highest Brix yield were U 941 at 2.31 tons/acre, followed by H 5803 (2.30 tons/acre), PS 296 (2.28 tons/acre), H 2401 (2.20 tons/acre), H 8892 and H 5503, both at 2.18 tons/acre, Halley 3155 (2.17 tons/acre) and H-2501 (2.15 tons/acre). Best fruit color was achieved by H-2501 at 22.8, followed by UG 151 (23.3), Sun 6360 (23.4), H 5503 (23.5), Red Sky (23.8), H 5803 (23.8) and H-9665 (24.3). Best pH levels were demonstrated by H-2401 and PS 296, both at 4.27, U-005 (4.31), H-5803 (4.32), H-9665 (4.32), Halley 3155 (4.33) and H-2501 (4.35).

Table C shows data summarized for the Mid Season Observation Variety Trials from six trials in seven county location (Yolo, Colusa, Stanislaus/San Joaquin, Merced, Fresno and Kern). Highest combined yield in the twelve cultivars common to all locations occurred with U-232 and PX 345, both at 47.9 tons/acre, followed by U-258 (43.7 tons/acre), HMX 3859 (42.3 tons/acre), BOS 52295 (40.6 tons/acre) and NDM 0098 (39.8 tons/acre). Best Brix yield was achieved by U 232 (2.52 tons/acre), followed by HMX 3859 (2.40 tons/acre), PX 345 (2.37 tons/acre), Sun 6366 (2.22 tons/acre), and U-258 and BOS 47721, both at 2.18 tons/acre. Varieties producing the highest soluble solids (°Brix) levels were BOS 47721 and Sun 6365, both at 5.9, followed by Sun 6366 and BOS 7025, both at 5.8, HMX 3859 (5.7) and NDM 0098 and CXD 236, both at 5.5. Best fruit color was provided by CXD 236 at 23.0, followed by NDM 0098 (23.2), Sun 6366 (23.5), U-258 (23.8), BOX 7025 (24.2) and HMX 3863 (24.5). Best pH levels were attained by Sun 6365 at 4.30, followed by PX 345 (4.35), BOS 52295 (4.36), BOS 47721 (4.37), U-232 (4.38) and HMX 3859, NDM 0098 and CXD 236, all at 4.41.

TABLE A. 2004 COMBINED LOCATION MEANS FOR YIELD, BRIX, BRIX YIELD, COLOR AND pH OF REPLICATED EARLY MATURITY PROCESSING TOMATO VARIETIES INDICATING SIGNIFICANT LOCATION X VARIETY INTERACTIONS FOR ALL VARIABLES BUT BRIX AND COLOR. Four Locations: Yolo, Colusa, Fresno, Contra Costa/San Joaquin Counties

Variety	Yield (Tons/A)			Brix (%)	Brix Yield	Color	pH
	Combined Locations						
H 5003	46.7	(01)	A	5.5 (03)	2.54 (01)	22.6 (02)	4.45 (08)
APT 410	42.1	(02)	B	5.2 (05)	2.16 (04)	23.3 (05)	4.44 (06)
UG 8168	41.9	(03)	B	5.1 (06)	2.13 (05)	24.3 (10)	4.43 (05)
Hypeel 45	40.5	(04)	B C	5.6 (02)	2.27 (02)	24.4 (11)	4.38 (01)
AGT 771	39.7* ^V	(05)	B C	5.7* (01)	2.21* (03)	23.4* (06)	4.44* (07)
U 250	39.5*	(06)	B C	4.6* (12)	1.82* (10)	25.8* (12)	4.46* (10)
PX 740	39.3	(07)	B C	5.3 (04)	2.08 (06)	23.8 (07)	4.38 (02)
H 9997	39.1	(08)	B C	5.0 (09)	1.94 (07)	22.4 (01)	4.46 (09)
Calista	39.0	(09)	B C	4.9 (10)	1.89 (09)	23.1 (04)	4.50 (11)
Sun 6358	38.0	(10)	C D	5.0 (07)	1.91 (08)	24.0 (09)	4.42 (03)
H 9280	37.6	(11)	C D	4.6 (11)	1.74 (12)	23.9 (08)	4.43 (04)
HA 3523	35.6	(12)	D	5.0 (08)	1.76 (11)	22.9 (03)	4.55 (12)
MEAN	39.9			5.1	2.04	23.6	4.44
LSD 1 ^W @ 0.05 =	3.3			0.15	0.18	0.76	0.02
LSD 2 ^X @ 0.05 =	3.5			0.16	0.19	0.82	0.02
LSD 3 ^Y @ 0.05 =	3.8			0.18	0.21	0.87	0.03
C.V.=	11.7			4.3	12.6	4.6	0.7
VARIETY X LOCATION							
LSD @ 0.05=	6.5			NS ^Z	0.36	NS	0.05

^V Arithmetic mean of 12 plots over 3 locations (least squares mean could not be estimated because the entire variety was missing from one location). All other means are calculated from 16 plots over 4 locations.

^W LSD 1 =Least significant difference for comparing means of all varieties except AGT 771 and U 250.

^X LSD 2 = Least significant difference for comparing means of AGT 771 and U 250 to all other varieties.

^Y LSD 3 = Least significant difference for comparing means of AGT 771 to U 250.

^Z NS = Not significant.

TABLE B. COMBINED LOCATION MEANS FOR YIELD, BRIX, BRIX YIELD, COLOR AND pH OF REPLICATED MIDSEASON MATURITY PROCESSING TOMATO VARIETIES INDICATING SIGNIFICANT LOCATION X VARIETY INTERACTIONS FOR ALL VARIABLES BUT pH. Seven locations: Yolo, Colusa, Stanislaus/San Joaquin, Fresno, Kern and Merced Counties

Variety	Yield (Tons/A)				Brix (%)	Brix Yield		Color		pH							
U 941	45.1	(01)	A		5.2	(12)	2.31	(01)	24.5	(09)	4.38	(12)					
H 8892	43.2	(02)	A	B	5.2	(15)	2.18	(05)	24.5	(08)	4.36	(09)					
H 5503	43.0	(03)	A	B	5.1	(17)	2.18	(06)	23.5	(04)	4.36	(08)					
H 2401	42.9	(04)	A	B	C		5.2	(10)	2.20	(04)	24.8	(12)	4.27	(01)			
H 9665	42.4	(05)	A	B	C	D		5.2	(16)	2.14	(09)	24.3	(07)	4.32	(05)		
H 5803	40.9	(06)		B	C	D	E		5.7	(01)	2.30	(02)	23.8	(06)	4.32	(04)	
Sun 6360	40.3	(07)		B	C	D	E		5.2	(11)	2.05	(11)	23.4	(03)	4.40	(16)	
PS 296	40.1	(08)			C	D	E		5.7	(03)	2.28	(03)	25.7	(17)	4.27	(02)	
H 2501	39.9	(09)				D	E		5.5	(05)	2.15	(08)	22.8	(01)	4.35	(07)	
H 2601	39.6	(10)				D	E		5.2	(12)	2.03	(12)	25.2	(15)	4.39	(14)	
Red Sky	39.2	(11)					E		5.4	(07)	2.08	(10)	23.8	(05)	4.42	(17)	
UG 151	38.9	(12)					E		5.3	(09)	1.99	(13)	23.3	(02)	4.45	(18)	
Halley 3155	38.7	(13)					E		5.7	(02)	2.17	(07)	24.8	(13)	4.33	(06)	
CPL 4863-N	38.7	(14)					E		5.0	(18)	1.91	(16)	24.7	(10)	4.37	(10)	
U 005	38.3	(15)					E		5.2	(14)	1.97	(15)	25.5	(16)	4.31	(03)	
Sun 6119	38.1	(16)					E	F	5.4	(06)	1.98	(14)	27.1	(18)	4.38	(11)	
La Rossa	35.4	(17)						F	G	5.4	(08)	1.85	(18)	24.8	(11)	4.40	(15)
PX 607	34.0	(18)							G	5.6	(04)	1.87	(17)	25.2	(14)	4.38	(13)
MEAN	39.9									5.3		2.09		24.5		4.36	
LSD @ 0.05=	2.9									0.2		0.16		0.9		0.04	
C.V.=	12.7									6.1		13.4		6.1		1.6	
VARIETY X LOCATION																	
LSD @ 0.05=	7.1									0.5		0.39		2.1		N.S.	

TABLE C. COMBINED LOCATION MEANS FOR YIELD, BRIX, BRIX YIELD, COLOR AND pH OF OBSERVED MIDSEASON MATURITY PROCESSING TOMATO VARIETIES. Seven locations: Yolo, Colusa, Stanislaus/San Joaquin, Fresno, Kern and Merced Counties

VARIETY	YIELD (TONS/A)			BRIX		BRIX YIELD	COLOR	pH	
	6 LOCATIONS COMBINED			(%)					
U 232	47.9	(01)	A			5.4 (08)	2.52 (01)	25.5 (11)	4.38 (05)
PX 345	47.9	(02)	A			5.3 (10)	2.37 (03)	26.3 (12)	4.35 (02)
U 258	43.7	(03)	A	B		5.1 (11)	2.18 (05)	23.8 (04)	4.43 (09)
HMX 3859	42.3	(04)	A	B	C	5.7 (05)	2.40 (02)	25.2 (10)	4.41 (08)
BOS 52295	40.6	(05)	A	B	C	5.4 (09)	2.12 (08)	24.8 (09)	4.36 (03)
NDM 0098	39.8	(06)		B	C	5.5 (06)	2.17 (07)	23.2 (02)	4.41 (06)
Sun 6366	39.0	(07)		B	C	5.8 (04)	2.22 (04)	23.5 (03)	4.44 (11)
BOS 47721	38.3	(08)		B	C	5.9 (01)	2.18 (06)	24.7 (07)	4.37 (04)
HMX 3863	38.1	(09)		B	C	5.0 (12)	1.86 (12)	24.5 (06)	4.50 (12)
BOS 7025	37.4	(10)		B	C	5.8 (03)	2.11 (09)	24.2 (05)	4.43 (10)
CXD 236	37.0	(11)		B	C	5.5 (07)	2.04 (10)	23.0 (01)	4.41 (07)
Sun 6365	35.1	(12)			C	5.9 (02)	2.00 (11)	24.7 (07)	4.30 (01)
MEAN	40.6					5.5	2.18	24.4	4.40
LSD @ 0.05=	8.0					0.4	NS	1.6	0.07
C.V.=	17.0					7.0	16.8	5.7	1.3

**PROCESSING TOMATO
WEED MANAGEMENT TRIALS**

2004 PROCESSING TOMATO WEED MANAGEMENT
RESEARCH PROGRESS REPORT

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CAUTION

This report is a summary of processing tomato weed control studies conducted in San Joaquin County. **IT SHOULD NOT, IN ANY WAY, BE INTERPRETED AS A RECOMMENDATION OF THE UNIVERSITY OF CALIFORNIA.**

Chemical and common names of herbicides are used in this report. NO endorsement of products mentioned or criticism of similar products is intended.

The rates of herbicides in this report are always expressed as active ingredient (a.i.) of the material per treated acre, unless otherwise indicated.

<u>Trade Name</u>	<u>Common or Chemical Name</u>	<u>Manufacturer</u>
Devrinol (2E)	napropamide	United Phosphorus Limited
Matrix (25DF)	rimsulfuron	DuPont Chemical Company
Spartan (75DF)	sulfentrazone	FMC Corporation
Dual Magnum (7.62E)	metolachlor	Syngenta Corporation
Prowl (3.8CS)	pendimethalin	BASF Corporation
Sandea (75WG)	halosulfuron	Gowan Chemical Company
Maverick (75WG)	sulfosulfuron	Monsanto Chemical Company

A Pre-Transplant Incorporated Weed Management Study in Processing Tomatoes

Robert Mullen, Scott Whiteley, Don Colbert and Randall Wittie

A pre-transplant soil incorporated, preemergence/postemergence weed management study in processing tomatoes, evaluating five herbicides and/or combination treatments, was established at Robertson Farms (Hal and Keith Robertson) off Linne Road, east of Interstate 5, southeast of Tracy, California, on April 27, 2004. All preemergence treatments were applied to the soil surface of the beds using a handheld CO₂ backpack sprayer with 8002 nozzles at 40 psi in a spray volume of 30 gallons water per acre. The soil type at the trial site was a Sorrento silty clay and there were four replications of each treatment in a randomized complete block design. The treatments were soil incorporated 3 to 4 inches deep using a tractor-pulled Performer rotary tiller. The field was transplanted five days later to the variety H-9780, with furrow irrigation following about 5 days later. On May 29, 2004, a single postemergence application of Matrix (rimsulfuron) plus X-77 spreader was made over an earlier preemergence incorporated treatment of Matrix using a handheld CO₂ backpack sprayer. The spray application was applied over cotyledon to early second true leaf hairy nightshade and the crop, which was 12 to 14 inches tall. The trial also was inadvertently sprayed with Matrix on 5/28/2004, so weed control ratings were made relatively soon thereafter.

Weed control and crop vigor ratings were made on 5/29/04 and again 6/5/04. Best control of the hairy nightshade present occurred with the preemergence/postemergence combination of Matrix, followed closely by the preemergence combination treatment of Prowl (pendimethalin) plus Dual Magnum (metolachlor), the preemergence combination of Matrix plus Dual Magnum, the preemergence application of Matrix alone, the preemergence treatment of Spartan (sulfentrazone) alone, and the preemergence treatment of Dual Magnum plus Devrinol (napropamide). All treatments in the trial were very safe to the tomato crop. The trial was harvested on September 9, 2004. Yields were excellent with all treatments outyielding the untreated control, led by the preemergence combination of Dual Magnum plus Devrinol, the preemergence/postemergence treatment of Matrix and the preemergence combination of Prowl plus Dual Magnum.

2004 Processing Tomato Preemergence Weed Control
Hal Robertson Farms; southeast of Tracy, California

Treatment	Rate Lb/Acre A.I.	Type Trtmt	Weed Control ¹		Crop ¹ Vigor		Yield ² Tons/Acre
			Hairy Nightshade		5/29/04	6/5/04	
			5/29/04	6/5/04			
Matrix (25DF)	0.062	Pre	8.8	8.0	9.4	9.3	44.3
Matrix + (Matrix + X77)	0.062 + (0.031 + ¼%)	Pre + (Post)	9.0	9.2	9.4	9.3	49.9
Matrix + Dual Magnum (7.62E)	0.062 + 1.43	Pre	9.3	8.5	9.4	9.1	47.8
Dual Magnum + Devrinol (50DF)	1.43 + 2.00	Pre	8.4	7.9	9.1	9.0	51.4
Matrix + Devrinol	0.062 + 2.00	Pre	8.7	8.1	9.5	9.3	46.2
Dual Magnum	1.43	Pre	8.3	7.8	9.3	9.1	46.6
Spartan (75DF)	0.25	Pre	8.6	8.0	9.1	9.0	46.7
Prowl (3.8CS)	1.50	Pre	8.0	7.5	9.4	9.3	42.5
Prowl + Dual Magnum	1.50 + 1.43	Pre	9.3	8.8	9.4	9.1	49.2
Untreated Control	----	----	1.5	0.5	9.4	9.3	42.1

LSD @ 5%: 7.3
C.V. = 10.7%

¹ Average of four replications:

Weed Control - 0 = no weed control; 10 = complete weed control

Crop Vigor - 0 = crop dead; 10 = crop growing vigorously

² Average of four replications

A Postemergence Weed Control Trial in Transplanted Processing Tomatoes

Robert Mullen, Scott Whiteley, Don Colbert and Randall Wittie

A postemergence weed control trial in transplanted processing tomatoes, evaluating three herbicides and/or combination treatments, was established at Marca Bella Farms (Mark and John Bacchetti) south of Grimes Road and west of Tracy Boulevard on Fabian Tract northwest of Tracy, California, on May 13, 2004. With selected treatments, second applications of the same rate of the same herbicide were made on May 24, 2004. At the time of initial treatment the tomato crop was 5 to 6 inches tall and the weeds present included 1 to 3 true leaf barnyardgrass, 2 to 3 true leaf hairy crabgrass, 1 to 2 true leaf hairy nightshade, 2 to 4 true leaf common purslane and 2 ½ to 3 ½ inch tall (2 to 4 true leaf) yellow nutsedge. All treatments were applied using a handheld CO₂ backpack sprayer with 8002 nozzles at 40 psi in a spray volume of 30 gallons water per acre. There were four replications of each treatment in a randomized complete block design. The soil type at the trial site was a Burns clay loam. The trial was furrow irrigated on a 7 to 8 day cycle throughout the season. Weed control and crop phytotoxicity ratings were made on May 24, 2004 and again on May 31, 2004. On May 21, 2004, spray drift of a private application of Matrix hit a portion of the trial. Best control of the weed species present at both rating dates occurred with the single application of Matrix (rimsulfuron) plus Sandea (halosulfuron) at the higher rate, plus Unifilm 707, followed by the single application of Matrix plus Sandea, at the lower rate, plus Unifilm 707. Matrix plus Unifilm 707 alone, with one or two applications gave excellent control of all weeds except yellow nutsedge. Maverick (sulfosulfuron) plus Unifilm 707 alone, at the high rate and two applications gave good control to all weeds present and was better in controlling yellow nutsedge than two applications of Matrix plus Unifilm 707. Sandea plus Unifilm 707 alone at one or two applications was weak to intermediate in controlling most of the weeds present – two applications gave the best yellow nutsedge control however. All treatments, exhibited excellent crop safety with only Maverick at the high rate and two applications showing slight leaf chlorosis. The trial was harvested on August 19, 2004. Yields were quite good, with all treatments outyielding the untreated control, except for the two-application treatment of Sandea alone. Highest yields occurred with the two applications of Matrix plus Unifilm 707 and two applications of both rates of Maverick plus Unifilm 707.

2004 Processing Tomato Postemergence Weed Control
 Marca Bella Farms; on Fabian Tract north of Tracy, California

Treatment	Rate Lb/Acre	# of App's	Weed Control ¹										Crop ¹ Phyto		Yield ² Tons/Acre
			Barnyard Grass		Hairy Crabgrass		Hairy Nightshade		Common Purslane		Yellow Nutsedge		5/24	5/31	
			5/24	5/31	5/24	5/31	5/24	5/31	5/24	5/31	5/24	5/31	5/24	5/31	
Matrix (25DF) + Uni 707	0.031 + ¼%	1	9.3	8.9	9.4	8.8	9.7	8.8	9.0	8.9	4.5	3.0	0.9	0.8	45.4
Matrix + (Uni 707)	0.031 + 0.031 + (¼%)	2	9.3	9.9	9.3	9.5	9.7	9.3	9.1	9.5	5.1	5.0	0.6	0.9	51.8
Sandea (75WG) + Uni 707	0.032 + ¼%	1	4.5	3.9	3.9	4.8	7.6	5.0	4.1	3.8	7.9	6.5	0.6	0.8	45.7
Sandea + (Uni 707)	0.032 + 0.032 + (¼%)	2	3.0	4.9	3.8	5.3	7.4	6.5	4.0	5.5	7.8	8.8	0.9	0.8	43.0
Matrix + Sandea + Uni 707	0.031 + 0.032 + ¼%	1	9.5	9.9	9.6	9.8	9.5	9.0	9.0	9.5	8.0	7.5	1.0	0.9	48.2
Matrix + Sandea + Uni 707	0.031 + 0.016 + ¼%	1	9.0	9.3	9.1	9.1	9.0	8.5	8.5	8.3	7.5	7.1	0.9	0.8	48.2
Maverick (75WG) + (Uni 707)	0.05 + 0.05 + (½%)	2	6.4	6.9	6.1	7.4	8.4	8.3	7.3	8.8	3.5	7.4	0.6	1.0	50.6
Maverick + (Uni 707)	0.10 + 0.10 + (½%)	2	7.3	8.1	6.9	8.1	8.6	8.8	7.4	9.3	4.3	7.8	1.2	1.4	50.6
Untreated Control	----	----	0.5	0.0	0.5	0.0	0.5	0.0	0.0	0.0	1.0	0.0	0.9	0.9	45.2

¹ Average of four replications:
 Weed Control – 0 = no weed control; 10 = complete weed control
 Crop Phyto – 0 = no crop injury; 10 = crop dead

LSD @ 0.05: 4.7
 C.V. = 6.8%

² Average of four replications

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