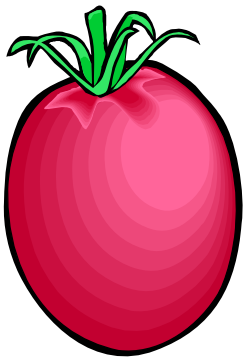
PROCESSING TOMATOES

IN
SAN JOAQUIN
&
CONTRA COSTA
COUNTIES



2001 VARIETY & WEED MANAGEMENT TRIALS SUMMARY

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2001
SAN JOAQUIN AND CONTRA COSTA COUNTY 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 and improve fruit set under high temperature conditions.

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 2001, California tomato growers produced an 8.6 million ton crop, quite a bit below anticipated processor requirements. This was caused by very hot temperatures and strong winds knocking out complete fields or reducing crop stands at a critical period of tomato establishment in the mid San Joaquin Valley (Fresno, Kings, Madera and Merced Counties). Locally, the season was excellent climatically for growers with good warm weather for crop growth, fruit set and sizing of fruit. Yields in San Joaquin County should easily exceed the statewide average. Harvest was completed by mid October. Disease pressure was moderate with a mix of Verticillium Wilt, Fusarium Foot Rot and Powdery Mildew the primary pathogens. Loss from Phytophthora Root Rot was very minimal due to good grower irrigation management.

Two processing tomato variety trials were conducted locally in 2001. One was an early-season maturity trial, cooperatively done with Janet Caprile, Contra Costa County Farm Advisor. The grower cooperators were Anthony Massoni and Paul Simoni of Massoni-Simoni Bros. Farms near Byron, California. Twelve replicated varieties and an additional 10 observational lines were

planted. The trial was direct seeded on March 9, 2001 and the field variety was Halley (BOS 3155). The trial was first sprinkler irrigated on March 15, 2001. A midseason maturity trial was established at Marca Bella Farms (Mark and John Bacchetti) off Tracy Boulevard north of Tracy, California. The trial was transplanted on May 23, 2001 under warm/hot temperature conditions and the field variety was H-9494. The trial contained 19 replicated varieties and another 19 lines in the observational block. The trial was first furrow irrigated on May 26, 2001.

GROWTH AND DEVELOPMENT

Crop growth and development was excellent with the early season maturity trial at Massoni-Simoni Bros. Farms. The field soil type in the early season trial was a Brentwood clay loam. Despite some very warm days at transplanting time, timely irrigation by Marca Bella Farms ensured a very good transplanted stand and crop growth and development were excellent in the midseason maturity trial. The soil type at the Marca Bella Farms trial site was a Sacramento clay loam. Fruit set and size were outstanding at both trials, guaranteeing high yield potential.

Varieties for the early season maturity trial were direct seeded using Earthway hand-push planters after the growers had left a premarked, prepared bed area that had already been fertilized with a preplant starter, and herbicide had already been applied for this trial, as well as the rest of the field. The varieties were transplanted in the midseason maturity trial with commercial 3-row transplanting machines and the plants were provided by Plantel Nursery. Bed preparation had included preplant fertilizer and herbicide incorporation. The transplanting help provided by Crimson Valley Co. was greatly appreciated. Bed spacing was 60 inches for both trials, with the early season trial double-row planted, while the midseason trial was single-row planted. Sprinkler application was used to bring the crop up in the early season maturity trial followed by furrow irrigation; the midseason maturity trial was furrow irrigated throughout the season. The early season trial was mechanically harvested using the growers' harvester while the mid season trial was hand harvested due to the lateness of the season and the need for the grower to get loads in his fields mechanically harvested as soon as possible because a commercial harvesting company did the actual harvest. Marca Bella Farms 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 the Department of Food Science and Technology at UC Davis where Dr. Diane Barrett ran °Brix, pH, Bostwick, Titrateable acidity (% citric), USDA color, Predicted Paste 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 maturity trial was mechanically harvested on August 10, 2001. Yields were outstanding in the replicated trial with the 12 varieties averaging 54.1 tons/acre. Soluble solids, fruit color and pH in the replicated trial averaged 4.84, 25.3 and 4.35 respectively. The 10 varieties in the single replication observation block averaged 53.3 tons/acre in yield with soluble solids at 4.9, color at 24.6 and pH @ 4.37.

The top yielding variety in the replicated early season trial was UG 606 at 61.6 tons/acre, followed by CXD 216 (61.2 tons/acre), PS 816 (60.1 tons/acre), CXD 206 (58.4 tons/acre), CTRI 1056 (57.5 tons/acre) and H-1100 (57.0 tons/acre). Yield figures for all the varieties in the replicated trial are shown in **Table 1**., along with fruit quality data on soluble solids (°Brix), Brix Yield, color and pH (acidity).

Highest yield in the observation block of the early season trial was attained by H-9997 at 63.8 tons/acre, followed by Halley (61.6 tons/acre), UGX 8120 (60.4 tons/acre), CTRI-1090 (55.4 tons/acre) and Hypeel 45 (54.5 tons/acre). Complete data on yield, soluble solids (°Brix), Brix Yield, color and pH for all the varieties in the early season observation block are given in **Table 2.**

The midseason maturity variety trial was hand harvested on September 24th and 25th, 2001. Yields in this trial were exceptional, with the entire replicated block of 19 varieties averaging 60.7 tons/acre while the 19 observation lines averaged 62.4 tons/acre. Soluble solids in the replicated block averaged 4.94, while fruit color averaged 23.7 and pH averaged 4.28. The 19 observation varieties gave an average of 4.97 for soluble solids, 24.10 for color and 4.28 for pH.

The best yielding varieties in the midseason maturity replicated trial were H-9775 @ 70.8 tons/acre, followed by HM 830 (69.8 tons/acre), CXD 215 (67.2 tons/acre), H-9665 (67.0 tons/acre), H-8892 (67.0 tons/acre), BOS 24675 (66.5 tons/acre), CXD 208 (62.7 tons/acre), ENP 113 (61.1 tons/acre), H-9998 (61.0 tons/acre) and Sun 6332 (60.6 tons/acre). Yield figures for all the varieties in the replicated trial, along with fruit quality data on soluble solids, Brix Yield, color and pH, are contained in **Table 3.**

In the midseason maturity observational trial block, highest yield among the 19 lines was attained by AP 863 @ 73,4 tons/acre, followed by Sun 6340 (72.6 tons/acre), CTRI-1056 (71.7 tons/acre), PX 849 (68.9 tons/acre), NDM 969 (68.4 tons/acre), CXD 218 (67.7 tons/acre), AP 847 (67.3 tons/acre), PX 133 (64.5 tons/acre), CXD 224 (62.6 tons/acre) and La Rossa (61.8 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 observational trial, including fruit quality data on soluble solids, Brix Yield, color and pH, are presented in **Table 4**.

MANY THANKS

Many thanks to Anthony Massoni and Paul Simoni and Mark Bacchetti and John Bacchetti for their participation and cooperation in these trials. These trials are a disruption in normal grower operations, but these gentlemen put up with these interruptions to increase their own knowledge and to benefit the whole industry. Thanks also to Bob Williams and Hal Robertson of Crimson Valley Co. for their help and all tomato growers who continue to support research through cash contributions to the California Tomato Research Institute. The CTRI funded the Uniform Quality Determinations and Statewide Processing Tomato Variety Trials project for the 29th year.

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. Appreciation is also expressed to Panella Trucking, Inc. (Bob Panella and Art Pratt) for allowing the quality samples to be run at their grading station facility.

Much gratitude is also expressed to Diane Barrett and Sam Matoba of the Department of Food Science and Technology for all their efforts in running quality samples for the Farm Advisor trials, and to Mike Cahn, UC Farm Advisor in Sutter/Yuba Counties, for doing the statistical analysis (individual and combined trials) for the Farm Advisor variety trials project.

Many thanks also to the seed industry, which provide the basic material for the trials and who provided financial support in 2001, and to everyone in the tomato industry for their guidance and support.

2001 STATEWIDE UNIFORM PROCESSING TOMATO VARIETY TRIALS

EARLY SEASON MATURITY VARIETY LIST

Asgrow Seed
- APT 410 $VFFNP

Campbell Soup
- CXD 206 $VFFNP
- CXD 216 $VFFNP

CTRI
- CTRI 1056 VFFNP – O.P.
- CTRI 1090 VFFNP – O.P.

H. J. Heinz
- H-9280 $VFFNP
- H-9881 $VFFNP
- H-9888 $VFFNP
- H-1100 $VFFNP
- H-1800 $VFFNP

Nippon Del Monte
- NDM 970 $VFFN(TMV)

Orsetti
- Halley (BOS 3155) $VFF

Petoseed
- Hypeel 45 $VFFNP
- Hypack 280 $VFFNP
- Peto 816 $VFFNP

United Genetics, Inc.
- UGX 8120 $VFFNP
- UGX 8168 $VFFNP
- UGX 606 $VFFNP

DISEASE RESISTANCE AND HYBRID CODES

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

Table 1. 2001 EARLY SEASON PROCESSING TOMATO VARIETY TRIAL
Massoni/Simoni Farms – Byron, California
Replicated Trial

Variety	Yield [1] (Tons/Acre)	Brix [1] Yield (Tons/Acre)	°Brix [1] (% Soluble Solids)	Agtron [1] Color	pH [1]
UG 606	61.6 A	2.804	4.55	27.25	4.35
CXD 216	61.2 AB	3.059	5.00	25.25	4.37
PS 816	60.1 ABC	3.095	5.15	25.75	4.34
CXD 206	58.4 ABCD	2.734	4.68	26.25	4.34
CTRI 1056	57.5 BCD	2.834	4.93	24.50	4.29
H-1100	57.0 CD	2.723	4.78	26.00	4.39
Hypeel 45	56.7 CD	2.889	5.10	26.75	4.32
APT 410	56.1 DE	2.766	4.93	24.00	4.35
H-9888	52.7 E	2.713	5.15	25.50	4.37
H-9280	45.6 F	2.041	4.48	23.50	4.37
Hypack 280	42.4 FG	2.006	4.73	23.75	4.40
H-9881	39.5 G	1.811	4.58	25.50	4.28
Mean	54.1	2.623	4.84	25.30	4.35
LSD @ 5%:	3.9	0.21	0.30	2.00	0.04
C.V. =	5.1%	5.6%	3.7%	5.5%	0.7%

[1] Average of four replications

Table 2. 2001 EARLY SEASON PROCESSING TOMATO VARIETY TRIAL
Massoni/Simoni Farms – Byron, California
Observation Trial

Variety	Yield [1] (Tons/Acre)	Brix [1] Yield (Tons/Acre)	°Brix [1] (% Soluble Solids)	Agtron [1] Color	pH [1]
H-9997	63.8	2.678	4.20	23.00	4.35
Halley	61.6[2]	3.016	4.90	26.00	4.34
UGX 8120	60.4	3.138	5.20	27.00	4.31
CTRI-1090	55.4	2.938	5.30	25.00	4.33
Hypeel 45	54.5	2.725	5.00	27.00	4.35
APT 410	53.3	2.505	4.70	24.00	4.42
H-9280	52.4	2.359	4.50	23.00	4.35
UGX 8168	52.3	2.457	4.70	24.00	4.38
NDM 970	42.6	2.429	5.70	25.00	4.51
H-1800	36.3	1.705	4.70	22.00	4.34

[1] Average of only one replication
[2] Average of three replications for yield

2001 STATEWIDE UNIFORM PROCESSING TOMATO VARIETY TRIALS

MID SEASON MATURITY VARIETY LIST

Asgrow Seed
- AP 847 $VFFNP
- AP 863 $VFFN

Campbell Soup
- CXD 199 $VFFNP
- CXD 207 $VFFN
- CXD 208 $VFFN
- CXD 211 $VFFNP
- CXD 215 $VFFFNP
- CXD 218 $VFFNP
- CXD 220 $VFFNP
- CXD 221 $VFFFNP
- CXD 224 $VFFNP

CTRI
- CTRI 5158 VFFN-O.P.
- CTRI 1056 VFFN-O.P.

H. J. Heinz
- H-8892 $VFFN
- H-9492 $VFNC
- H-9665 $VFFNP
- H-9775 $VFFNP
- H-9992$VFFNP
- H-9995 $VFFNP
- H-9998 $VFFNP

Harris Moran
- HM 830 $VFFN

Lipton
- U 2010 $VFFN

Nippon Del Monte
- NDM 969 $VFFN (TMV)

Orsetti Seed
- Halley $VFF
- BOS 24675 $VFFN
- BOS 24593 $VFFNP

Petoseed
- Hypeel 303 $VFFNP
- Hypeel 347 $VFFNP
- PS 173 $VFFFNP
- PX 849 $VFFNP
- PX 133 $VFFNP

Rogers Seed (Novartis)
- La Rossa $VFF

Sunseeds
- Sun 6324 $VFFNP
- Sun 6332 $VFFNP
- Sun 6340 $VFFNP
- Sun 6333 $VFFNP

United Genetics
- ENP 113 $VFFNP
- UG 8154 $VFFNP

DISEASE RESISTANCE AND HYBRID CODES

O.P.	= Open Pollinated	TMV	= Tobacco Mosaic Resistance
$	= Hybrid	C	= Bacterial Canker Tolerance
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	FFF	= Fusarium Wilt - Race I, II and III Resistant

Table 3. 2001 MID SEASON PROCESSING TOMATO VARIETY TRIAL
Marca Bella Farms – Tracy, California
Replicated Yield Trial

Replicated Variety	Yield [1] (Tons/Acre)		Brix [1] Yield (Tons/Acre)	°Brix [1] (% Soluble Solids)	PTAB [1] Color	pH [1]
H-9775	70.8	A	3.397	4.80	24.25	4.23
HM 830	69.8	AB	3.517	5.03	25.50	4.26
CXD 215	67.2	ABC	3.081	4.60	25.00	4.30
H-9665	67.0	ABC	3.205	4.78	24.00	4.25
H-8892	67.0	ABC	3.114	4.65	23.75	4.25
BOS 24675	66.5	ABC	3.413	5.13	25.50	4.30
CXD 208	62.7	BCD	3.068	4.90	23.50	4.34
ENP 113	61.1	CD	3.141	5.15	24.00	4.27
H-9998	61.0	CDE	2.969	4.88	22.25	4.28
Sun 6332	60.6	CDE	3.138	5.18	22.25	4.29
Hypeel 303	57.6	DE	2.883	5.03	22.75	4.29
H-9492	56.8	DE	2.737	4.83	23.00	4.27
Halley 3155	56.5	DE	2.974	5.28	25.00	4.24
Hypeel 347	56.4	DE	2.939	5.20	24.75	4.21
BOS 24593	55.9	DE	2.646	4.75	23.00	4.29
CTRI 5158	55.7	DE	2.620	4.70	22.50	4.29
CXD 221	53.9	E	2.781	5.15	24.50	4.32
CXD 199	53.7	E	2.543	4.75	23.50	4.28
CXD 207	53.3	E	2.691	5.05	20.75	4.41
Mean:	60.7		2.992	4.94	23.67	4.28
LSD @ 5%:	8.0		0.430	0.40	1.20	0.06
C.V. =	9.3%		10.2%	5.2%	3.6%	1.0%

[1] Average of four replications

Table 4. 2001 MID SEASON PROCESSING TOMATO VARIETY TRIAL
Marca Bella Farms – Tracy, California
Observation Yield Trial

Observation Variety	Yield [1] (Tons/Acre)	Brix [1] Yield (Tons/Acre)	°Brix [1] (% Soluble Solids)	PTAB [1] Color	pH [1]
AP 863	73.4	3.084	4.20	25	4.27
Sun 6340	72.6	3.630	5.00	24	4.20
CTRI-1056	71.7	3.799	5.30	23	4.28
PX 849	68.9	3.583	5.20	26	4.17
NDM 969	68.4	3.694	5.40	24	4.23
CXD 218	67.7	3.521	5.20	23	4.28
AP 847	67.3	3.097	4.60	23	4.30
PX 133	64.5	3.227	5.00	25	4.30
CXD 224	62.6	3.253	5.20	22	4.36
La Rossa	61.8	2.718	4.40	26	4.33
CXD 220	61.4	2.762	4.50	24	4.24
U-2010	60.2	2.769	4.60	25	4.36
CXD 211	59.8	3.468	5.80	25	4.27
UG-8154	59.8	2.751	4.60	23	4.37
Sun 6324	58.2	2.911	5.00	24	4.27
H-9992	54.6	2.732	5.00	24	4.28
Sun 6333	53.8	2.800	5.20	24	4.28
PS 173	49.9	2.694	5.40	24	4.37
H-9995	48.3	2.319	4.80	24	4.12

[1] Average of only one replication

2000 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 performance in field trials over a wide geographical area as well as for processing quality characteristics. It has also provided vital data to individual production districts and counties on varietal adaptability to local conditions. This year, the project evaluated 12 replicated early maturing varieties, 19 replicated midseason maturing lines and 28 single replication (observational) early and midseason maturity selections common to all locations.

This past season saw statewide processing tomato production at only 8.6 million tons. Considerable tonnage was lost to heat and wind damage in the central San Joaquin Valley resulting in a short tonnage crop. Harvest was completed by mid October, with an open, warm, dry summer/early fall. Disease pressure for the whole season was low to moderate with Curly Top virus problems in the central San Joaquin Valley and Fusarium Foot Rot, Verticillium Wilt and Powdery Mildew scattered elsewhere.

The statewide UCCE variety evaluation project averaged 37.9 tons/Acre for the early season replicated variety trials and 38.2 tons/Acre for the midseason maturity replicated trials. Early season replicated trial soluble solids (°Brix) averaged 5.0, the same as 2000. Soluble solids were slightly higher in the midseason replicated trials averaging 5.2. Early season color in the replicated trials (25.1) was not as good as 2000 (24.2) while color in the midseason replicated trials was 23.8, a bit less than 2000 (22.8).

Results and Discussion

Eight counties (Sutter, Colusa, Yolo, San Joaquin, Contra Costa, Stanislaus, Fresno and Kern) participated in the statewide variety evaluation studies this past season, conducting fifteen early and midseason trials. The four following tables represent summaries of yield and fruit quality from the 2001 Statewide UCCE Farm Advisor/Specialist Processing Tomato Variety Evaluation Project. These summaries were obtained from the computer trial data analysis done by Mike Cahn, Farm Advisor in Sutter/Yuba Counties. Merced County established a midseason trial that was lost to heat and wind.

Table A represents yields 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 was attained by CXD 216 at 41.4 tons/acre, followed by PS 816 (41.1 tons/acre) UG 606 (40.6 tons/acre), H-1100 (40.1 tons/acre, APT 410 (39.5 tons/acre) and H-9888 (38.1 tons/acre). In terms of fruit quality, the top varieties in soluble solids (°Brix) were H-9888 (5.4), Hypeel 45 (5.3), CTRI 1056 (5.3), PS 816 (5.2) and APT 410 (5.1). Best color was achieved by APT 410 (23.9), H-9280 (24.2), CTRI 1056 (24.4), H-9888 (24.4) and Hypack 280 (24.8). Best pH (acidity) levels occurred with H-9881 (4.30), CTRI 1056 (4.31), Hypeel 45 (4.33) and PS 816 (4.35). 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 analysis. The highest yield in these trials occurred with APT 410 and H-9997, both at 39.5 tons/acre, followed by UGX 8120 (38.8 tons/acre), Hypeel 45 (37.8 tons/acre) and H-9280 (36.3 tons/acre). The top lines for soluble solids were NDM 970 (5.3), CTRI 1090 (5.1) and Hypeel 45 (5.0). Varieties providing the best fruit color were H-1800 (22.3), H-9997 (23.5), NDM 970 (24.3), H-9289 (24.5) and APT 410 (24.8). Best pH levels were shown by CTRI 1090 (4.32), UGX 8120 (4.33), H-1800 (4.33) and Hypeel 45 (4.35).

Table C provides data from the Midseason Maturity Replicated Trials. Results are shown for eleven trials in 7 county locations (Colusa, Sutter, Yolo, San Joaquin, Stanislaus, Fresno and Kern). Best yield was produced by H-9665 at 43.4 tons/acre, followed by H-9492 (42.9 tons/acre), H-9775 (42.8 tons/acre), H-8892 (41.6 tons/acre), Hypeel 303 (40.2 tons/acre), CXD 208 (39.3 tons/acre) and CXD 215 (38.1 tons/acre). Soluble solids (˚Brix) values were led by CXD 221 (5.7), CXD 208 (5.5), HM 0830 (5.4), CXD 207 (5.4), Halley 3155 (5.4), Sun 6332 (5.3) and ENP 113 (5.3). Varieties giving the best fruit color were CXD 207 (21.9), CTRI 5158 (22.9), H-9998 (22.9), Sun 6332 (23.0), CXD 208 (23.1), H-9492 (23.2), H-8892 (23.3) and Hypeel 303 (23.4). Good pH levels occurred with HM 0830 (4.26), H-9665 (4.27), Halley 3155 (4.28), H-9975 (4.20), Hypeel 347 (4.29), H-8892 (4.30) and CXD 199 (4.30).

Table D shows data summarized for the Midseason Maturity Observational Variety Trials from 10 trials in 7 county locations (Colusa, Sutter, Yolo, San Joaquin, Stanislaus, Fresno and Kern). Highest yield occurred with Sun 6340 at 50.8 tons/acre, followed by AP 863 (45.8 tons/acre),H-9992 (44.8 tons/acre), CXD 220 (44.2 tons/acre), PX 849 (43.7 tons/acre), U2010 (43.3 tons/acre), Sun 6324 (42.3 tons/acre) and CXD 218 (42.0 tons/acre). In terms of fruit quality, the best lines for soluble solids were CTRI 1056 (5.6), PS 173 (5.5), Sun 6324 (5.4), CXD 211 (5.3), H-9995 (5.3), Sun 6333 (5.3), NDM 969 (5.3), CXD 211 (5.3), CXD 224 (5.3), and H-9995 (5.2). Best fruit color was provided by CXD 224 (22.7), H-9992 (22.8), CXD 218 (22.9), H-9992 (22.9), Sun 6340 (23.3), U2010 (23.3) and CXD 220 (23.4). Best pH levels were attained by PX 849, CTRI 1056 and H-9995, all at 4.26, followed by Sun 6340 (4.30), Sun 6333 (4.30), PX 133 (4.31) CXD 220 (4.32) and La Rossa (4.32).

Table A. 2001 PROCESSING TOMATO EARLY SEASON MATURITY VARIETY TRIALS
Combined Yield and Quality Data
Replicated Variety Trials
(Four Locations: Yolo, Contra Costa/San Joaquin, Fresno & Colusa Counties)

Variety	Yield (Tons/Acre)		°Brix [1]	PTAB Color	Acidity pH
CXD 216	41.4	A	5.0	25.5	4.40
PS 816	41.1	A	5.2	25.4	4.35
UG 606	40.6	A	4.8	25.8	4.39
H-1100	40.1	AB	5.0	25.4	4.38
APT 410	39.5	ABC	5.1	23.9	4.39
H-9888	38.1	BCD	5.4	24.4	4.39
Hypeel 45	37.7	CDE	5.3	26.4	4.33
CXD 206	36.7	CDE	4.8	25.9	4.40
CTRI 1056	35.9	DE	5.3	24.4	4.31
H-9280	35.8	EF	4.6	24.2	4.39
H-9881	34.2	FG	4.6	25.1	4.30
Hypack 280	32.6	G	4.8	24.8	4.38
Mean:	37.9		5.0	25.1	4.37
LSD @ 5%:	2.2		0.2	0.9	0.03
C.V. =	8.0		5.6	4.9	0.9
Variety x Location:					
LSD @ 5%:	4.0		n.s.	n.s.	n.s.

Table B. 2001 PROCESSING TOMATO EARLY SEASON MATURITY VARIETY TRIALS
Combined Yield and Quality Data
Observation Variety Trials
(Four Locations: Yolo, Contra Costa/San Joaquin, Fresno & Colusa Counties)

Variety	Yield (Tons/Acre)	°Brix [1]	PTAB Color	Acidity pH
APT 410	39.5	4.7	24.8	4.37
H-9997	39.5	4.8	23.5	4.37
UGX 8120	38.8	4.8	26.2	4.33
Hypeel 45	37.8	5.0	27.3	4.35
H-9280	36.3	4.4	24.5	4.39
CTRI 1090	35.4	5.1	25.5	4.32
UGX 8168	35.2	4.8	25.0	4.39
NDM 970	33.7	5.3	24.3	4.43
H-1800	28.5	4.7	22.3	4.33
Mean:	36.9	4.9	24.7	4.36
LSD @ 5%:	n.s.	0.4	1.6	n.s.
C.V. =	14.5	5.9	4.3	0.90

Table C. 2001 PROCESSING TOMATO MID SEASON MATURITY VARIETY TRIALS
Combined Yield and Quality Data
Replicated Variety Trials
(Eleven Locations: Colusa, Sutter, Yolo, San Joaquin, Stanislaus, Fresno & Kern Counties)

Variety	Yield (Tons/Acre)		°Brix [1]	PTAB Color	Acidity pH
H-9665	43.4	A	5.1	24.3	4.27
H-9492	42.9	A	5.2	23.2	4.33
H-9775	42.8	A	5.0	24.3	4.29
H-8892	41.6	AB	5.0	23.3	4.30
Hypeel 303	40.2	BC	5.0	23.4	4.34
CXD 208	39.3	CD	5.5	23.1	4.38
CXD 215	38.1	CDE	5.1	24.7	4.37
Hypeel 347	37.8	DEF	5.2	24.5	4.29
HM 0830	37.5	DEF	5.4	24.7	4.26
BOS 24675	37.3	DEFG	5.1	25.3	4.32
CXD 207	37.2	DEFG	5.4	21.9	4.42
CXD 199	37.2	DEFG	5.2	24.1	4.30
Sun 6332	37.1	DEFG	5.3	23.0	4.32
Halley 3155	36.8	EFG	5.4	24.4	4.28
ENP 113	36.5	EFG	5.3	23.9	4.35
BOS 24593	36.2	EFG	4.8	24.1	4.33
CTRI 5158	35.6	FGH	4.9	22.9	4.33
H-9998	35.1	GH	5.1	22.9	4.33
CXD 221	33.4	H	5.7	24.3	4.36
Mean:	38.2		5.2	23.8	4.32
LSD @ 5%:	2.2		0.1	0.6	0.06
C.V. =	13.9		6.4	5.8	3.0
Variety x Location:					
LSD @ 5%:	7.4		0.5	n.s.	n.s.

Table D. 2001 PROCESSING TOMATO MIDSEASON MATURITY VARIETY TRIALS
Combined Yield and Quality Data
Observation Variety Trials
(Ten Locations: Colusa, Sutter, Yolo, San Joaquin, Stanislaus, Fresno & Kern Counties)

Variety	Yield (Tons/Acre)		°Brix [1]	PTAB Color	Acidity pH
Sun 6340	50.8	A	5.0	23.3	4.30
AP 863	45.8	AB	4.7	24.2	4.34
H-9992	44.8	BC	5.2	22.8	4.36
CXD 220	44.2	BCD	5.0	23.4	4.32
PX 849	43.7	BCDE	5.0	26.9	4.26
U 2010	43.3	BCDE	4.9	23.3	4.39
Sun 6324	42.3	BCDEF	5.4	24.1	4.39
CXD 218	42.0	BCDEF	5.1	22.9	4.37
CXD 211	41.5	BCDEF	5.3	23.6	4.34
H-9995	41.3	BCDEF	5.3	22.9	4.26
Sun 6333	41.3	BCDEF	5.3	23.7	4.30
NDM 969	40.3	BCDEFG	5.3	23.8	4.34
AP 847	40.2	BCDEFG	4.9	25.0	4.34
PX 133	39.7	CDEFG	5.0	25.1	4.31
CTRI 1056	39.5	CDEFG	5.6	23.3	4.26
UG 8154	38.6	DEFG	5.0	23.6	4.36
CXD 224	38.3	EFG	5.3	22.7	4.39
La Rossa	37.0	FG	5.1	25.2	4.32
PS 173	35.4	G	5.5	24.3	4.43
Mean:	41.9		5.2	23.9	4.34
LSD @ 5%:	5.6		0.3	1.2	0.05
C.V. =	15.2		6.5	5.6	1.4

2001
Processing Tomato

Weed Management Trials

2001 PROCESSING TOMATO WEED MANAGEMENT RESEARCH PROGRESS REPORT

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CAUTION

This report is a summary of processing tomato weed management studies conducted in San Joaquin and Contra Costa Counties. IT SHOULD NOT, IN ANY WAY, BE INTERPRETED AS A RECOMMENDATION OF THE UNIVERSITY OF CALIFORNIA. Chemical or common names of herbicides are used in this report instead of the more common trade names of these materials. 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.

Trade Name	**Common or Chemical Name**	**Manufacturer**
Prowl (3.3E)	pendamethalin	BASF Corporation
Shadeout (25DF)	rimsulfuron	DuPont Ag Products
Devrinol (50DF)	napropamide	United Phosphorus Limited
Dual Magnum (7.62E)	metolachlor	Syngenta Corporation
Sandea (75WG)	halosulfuron	Gowan Chemical Company

In 2001, three weed control studies were conducted on processing tomatoes in San Joaquin and Contra Costa Counties, evaluating five herbicide materials alone or in combination treatments for preemergence and postemergence weed control efficacy and crop safety.

The first trial was a pre-transplant preemergence incorporated study looking at Dual Magnum (metolachlor), Shadeout (rimsulfuron), Prowl (pendamethalin) and Devrinol (napropamide) alone or in combination treatments. The primary weed species of concern in this trial was yellow nutsedge. All treatments were applied to the surface of the tomato beds and then incorporated into the soil using a Performer rotivator prior to transplanting the tomato crop. In the second pre-transplant preemergence incorporated trial, the same herbicides were evaluated alone or in combination treatments using the same soil incorporation technique but the target weed species was nightshade. The third trial was a postemergence study that evaluated Sandea (halosulfuron) alone or in combination with Shadeout to control/suppress yellow nutsedge and black nightshade. One treatment involved a sequential spray of Shadeout plus Crop Oil Concentrate (COC) followed 2 weeks later with an application of Sandea plus COC. Yellow nutsedge at trial establishment was at the 3 to 6 true leaf stage of growth, black nightshade was at 1 to 3 true leaf stage and the tomato crop (direct seeded) was at a post layby growth stage of 6 to 8 true leaves.

Detailed descriptions of each trial follow, along with weed control and crop vigor/phytotoxicity ratings, plus crop yield data.

A PRE-TRANSPLANT INCORPORATED WEED CONTROL TRIAL IN PROCESSING TOMATOES.

Robert Mullen, Scott Whiteley, Michelle Leinfelder and Nick Prichard

A pre-transplant incorporated weed control trial in processing tomatoes, evaluating four herbicides and/or combination treatments, was established at Marca Bella Farms on Fabian Tract near Tracy, California May 4, 2001. All treatments were applied to the soil surface of the beds using a handheld CO_2 backpack sprayer with 8002 nozzles at 40 psi in a spray volume of 30 gallons per acre water. The soil type at the trial site was a Sacramento clay loam. There were four replications of each treatment in a randomized complete block design. The field had been pre-irrigated 7 days before herbicides were applied. The treatments were soil incorporated using a tractor-pulled Performer rotary tiller. Although incorporation depth was intended to be 2 to 3 inches deep, the wetness of the soil resulted in an incorporation depth of 4 to 6 inches, thereby diluting the effectiveness of most of the herbicides tested. The field was transplanted on May 9, 2001 and the first furrow irrigation followed five days later.

Weed control efficacy and crop vigor ratings were taken on May 24th, 2001 and again on June 7th, 2001. Due to the previous discussion on herbicide dilution because of a deeper soil incorporation depth than desired, best control/suppression of a heavy infestation of yellow nutsedge and redroot pigweed occurred with the highest rate (5.08 Lbs./Acre a.i.) of Dual Magnum (metolachlor), followed by the next highest rate (3.81 Lbs./Acre a.i.) of Dual Magnum, and the mid rate combination (2.54 Lbs./Acre a.i.) of Dual Magnum plus Shadeout (rimsulfuron) at 0.031 Lbs./Acre a.i.. Most treatments, including Prowl (pendamethalin) alone, gave excellent control of redroot pigweed. Crop vigor was excellent with all treatments. Yields were taken September 6th and 7th, 2001. All treatments, led by Dual Magnum at the highest rate, provided higher yields than the untreated control with 5 of the treatments giving significantly higher yields.

2001 PROCESSING TOMATO PREEMERGENCE WEED CONTROL
Marca Bella Farms – Fabian Tract near Tracy, California

Treatment	Rate Lb/Acre a.i.	Weed Control[1] Yellow Nutsedge 5/24	Yellow Nutsedge 6/7	Redroot Pigweed 5/24	Redroot Pigweed 6/7	Crop Vigor[1] 5/24	Crop Vigor[1] 6/7	Yield[2] (Tons/Acre)
Dual Magnum (7.62E)	1.27	6.5	5.4	7.8	6.8	9.4	9.4	40.8
Dual Magnum	2.54	7.5	6.5	9.0	7.0	9.2	9.3	44.2
Dual Magnum	3.81	8.3	7.0	9.6	7.9	9.3	9.4	47.3
Dual Magnum	5.08	8.5	8.0	9.6	7.6	9.4	9.3	55.0
Shadeout (25DF) + Dual Magnum	0.031 + 1.27	7.0	6.3	10.0	8.8	9.2	9.5	47.1
Shadeout + Dual Magnum	0.031 + 2.54	7.8	7.3	10.0	8.9	9.3	9.3	50.2
Shadeout + Devrinol (50DF)	0.031 + 2.00	6.3	5.3	9.1	8.5	9.4	9.5	40.7
Dual Magnum + Devrinol	1.27 + 2.00	6.5	6.0	9.0	7.8	9.3	9.4	39.4
Shadeout	0.031	6.9	6.1	9.5	8.9	9.4	9.4	49.0
Prowl (3.3E)	1.50	5.8	5.3	10.0	8.6	9.3	9.5	41.1
Prowl + Shadeout	1.50 + 0.031	5.5	5.1	9.6	9.0	9.3	9.4	40.7
Untreated Control	----	1.8	1.3	2.5	1.0	9.4	9.4	27.2

[1] Average of four replications: LSD @ 5%: 18.2
Weed Control – 0 = no weed control; 10 = complete weed control CV = 29.1%
Crop Vigor - 0 = crop dead; 10 = crop growing vigorously

[2] Average of four replications

A PRE-TRANSPLANT INCORPORATED WEED CONTROL STUDY IN PROCESSING TOMATOES.

Robert Mullen, Scott Whiteley, Michele Leinfelder and Nick Prichard

A pre-transplant incorporated weed control trial in processing tomatoes, evaluating four herbicides and/or combination treatments, was initiated on May 17th, 2001 at Hal Robertson Farms southeast of Tracy, California. All treatments were applied to the soil surface of the beds using a handheld CO_2 backpack sprayer with 8002 nozzles at 40 psi in a spray volume of 30 gallons per acre water. 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 2 to 3 inches deep using a tractor-pulled Performer rotary tiller. The field was transplanted the following day with the variety H-9775. The first furrow irrigation followed on May 21st, 2001.

Weed control and crop vigor ratings were taken on June 7th, 2001. Best control of the mixture of black and hairy nightshade present in the trial occurred with the combination treatment of Dual Magnum (metolachlor) at 2.54 Lbs./Acre a.i. plus Shadeout (rimsulfuron) at 0.031 Lbs./Acre a.i., followed by the high rate (5.08 Lbs./Acre a.i.) of Dual Magnum alone, and the combination treatment of Prowl (pendamethalin) plus Shadeout. All treatments exhibited excellent crop safety. The trial was harvested by hand on September 12th and 13th, 2001. All treatments gave higher yields than the untreated control. The combination treatments of Shadeout plus Devrinol (napropamide) and Prowl plus Shadeout gave significantly higher yields.

2001 PROCESSING TOMATO PREEMERGENCE WEED CONTROL
Robertson Farms – Banta Road near Tracy, California

Treatment	Rate Lb/Acre a.i.	Weed Control [1] Black & Hairy Nightshade	Crop Vigor [1]	Yield [2] (Tons/Acre)
Dual Magnum (7.62E)	1.27	7.4	9.5	51.1
Dual Magnum	2.54	8.0	9.5	51.6
Dual Magnum	3.81	8.1	9.2	53.1
Dual Magnum	5.08	8.7	9.4	50.4
Shadeout (25DF) + Dual Magnum	0.031 + 1.27	7.8	9.4	52.5
Shadeout + Dual Magnum	0.031 + 2.54	9.0	9.4	53.4
Shadeout + Devrinol (50DF)	0.031 + 2.00	7.8	9.5	57.7
Dual Magnum + Devrinol	1.27 + 2.00	8.1	9.3	49.7
Shadeout	0.031	7.6	9.4	50.5
Prowl (3.3E)	1.50	8.1	9.5	51.8
Prowl + Shadeout	1.50 + 0.031	8.5	9.4	56.7
Untreated Control	------	2.0	9.4	45.5

LSD @ 5%: 8.9
CV = 11.8%

[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 PROCESSING TOMATOES

Robert Mullen, Scott Whiteley, Michelle Leinfelder and Nick Prichard

A postemergence weed control trial in processing tomatoes, evaluating Sandea (halosulfuron) and Shadeout (rimsulfuron) alone, in combination treatments and as a sequential treatment, was established at Vaquero Farms near Byron, California, on April 24, 2001. Weeds at the time of initial treatment were 3 to 6 true leaf yellow nutsedge, 1 to 3 true leaf black nightshade and 5 to 10 inch rosette field bindweed; the tomato crop was at post thinning and layby stage – 6 to 8 true leaf. The field was a direct seeded tomato field and the soil type at the trial site was a Brentwood clay loam. There were four replications of each treatment in a randomized complete block design. All treatments were applied as directed sprays using a handheld CO_2 backpack sprayer with 8002 nozzles at 40 psi in a spray volume of 30 gallons per acre water. All treatments, except two and the untreated control, had Crop Oil Concentrate (COC) added to the spray solution. Sandea, at 0.032 Lbs./Acre a.i. and 0.047 Lbs./Acre a.i., was evaluated with and without COC. The treatments without Crop Oil Concentrate were applied on 4/24/01, while the same 2 rates with Crop Oil Concentrate went on 5/9/01/.

Weed control and crop phytotoxicity ratings were taken 5/4/01, 5/21/01 and 6/6/01. Best control of yellow nutsedge and black nightshade occurred with the combination treatment of Shadeout at 0.031 Lbs./Acre a.i. plus Sandea at 0.016 Lbs./Acre a.i. plus 1% Crop Oil Concentrate. The treatment of the high rate (0.047 Lbs./Acre a.i.) of Sandea plus 1% Crop Oil Concentrate gave the next best control of yellow nutsedge but was considerably less effective on black nightshade. Shadeout alone plus 1% Crop Oil Concentrate gave very good control of black nightshade but was only partially effective on yellow nutsedge. The combination treatment of Shadeout (0.031 Lbs./Acre a.i.) plus Sandea (0.008 Lbs./Acre a.i.) plus 1% COC gave good control of both yellow nutsedge and black nightshade. Good levels of control on yellow nutsedge and black nightshade also occurred with the sequential treatment of Shadeout (0.031 Lbs./Acre a.i.) plus 1% COC, followed 14 days later with Sandea (0.032 Lbs./Acre a.i.) plus 1% COC. None of the treatments provided adequate control of field bindweed. All treatments showed excellent crop safety. The trial was hand harvested on July 25th and 26th, 2001. All treatments out yielded the untreated control, led by the combination treatment of Shadeout (0.031 Lbs./Acre a.i.) plus Sandea (0.016 Lbs./Acre a.i.). Most of the treatments significantly out yielded the untreated control.

2001 PROCESSING TOMATO POSTEMERGENCE WEED CONTROL
Vaquero Farms – south of Hoffman Lane, Byron, California

Treatment	Rate Lb/Acre a.i.	Application Timing	Weed Control[1] Yellow Nutsedge 5/4	Yellow Nutsedge 5/21	Yellow Nutsedge 6/6	Black Nightshade 5/4	Black Nightshade 5/21	Black Nightshade 6/6	Field Bindweed 5/4	Field Bindweed 5/21	Field Bindweed 6/6	Crop Phyto[1] 5/4	Crop Phyto 5/21	Crop Phyto 6/6	Yield[1] (Tons/Acre)
Sandea (75WG)	0.032	I.A.*	6.3	6.0	6.0	5.8	5.0	4.5	1.3	1.8	1.5	0.6	0.6	0.5	42.8
Sandea	0.047	I.A.	6.9	6.9	6.8	6.0	4.5	4.8	2.0	2.5	1.8	0.8	0.6	0.6	40.0
Sandea + COC[2]	0.032 + 1%	14 days after I.A.	NR**	7.0	7.3	NR	4.8	4.8	NR	2.5	1.8	0.6	0.7	0.6	42.1
Sandea + COC	0.047 + 1%	14 days after I.A.	NR	7.4	7.8	NR	5.3	5.3	NR	2.5	2.5	0.7	0.6	0.6	44.6
Shadeout (25DF) + COC	0.031 + 1%	14 days after I.A.	6.0	5.8	4.5	8.5	8.4	8.8	3.3	4.3	4.8	0.7	0.7	0.7	45.2
Shadeout + Sandea + COC	0.031 + 0.016 + 1%	I.A.	7.0	8.3	8.5	8.8	9.0	9.0	3.4	4.8	4.8	0.7	0.7	0.7	49.9
Shadeout + Sandea + COC	0.031 + 0.008 + 1%	I.A.	6.8	7.9	7.5	8.4	8.5	8.5	3.1	4.3	4.0	0.8	0.7	0.7	39.8
Shadeout + Sandea + (COC)	0.031 + 0.032 + (1%)	I.A. w/Sandea applied 14 days later	6.1	7.1	7.5	8.6	8.4	8.8	3.9	3.8	4.0	0.7	0.6	0.6	43.2
Untreated Control	----	----	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.6	0.5	0.8	33.4

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

LSD @ 5%: 7.1
C.V. = 11.5%

[2] COC = Crop Oil Concentrate
* I.A. = Initial Application
** NR = Not Rated

This is a report of work in progress only. The chemicals and uses contained in this publication are experimental data and should not be considered as recommendations for use.

Until the products and their uses given in this report appear on a registered pesticide label or other legal, supplementary direction for use, it is illegal to use the chemicals as described.

WARNING ON THE USE OF CHEMICALS

Pesticides are poisonous. Always read and carefully follow all precautions and safety recommendations given on the container label. Store all chemicals in their original labeled containers in a locked cabinet or shed, away from food or feeds, and out of the reach of children, unauthorized persons, pets, and livestock.

Recommendations are based on the best information currently available, and treatments based on them should not leave residues exceeding the tolerance established for any particular chemical. Confine chemicals to the area being treated. **THE GROWER IS LEGALLY RESPONSIBLE** for residues on his crops as well as for problems caused by drift from his property to other properties or crops.

Consult your County Agricultural Commissioner for correct methods of disposing of leftover spray material and empty containers. Never burn pesticide containers.

PHYTOTOXICITY

Certain chemicals may cause plant injury if used at the wrong stage of plant development or when temperatures are too high or when overcast conditions occur. Injury may also result from excessive amounts or the wrong formulation or mixing incompatible materials. Inert ingredients such as wetters, spreaders, emulsifiers, diluents, and solvents, can cause plant injury. Since formulations are often changed by manufacturers, it is possible that plant injury may occur, even though no injury was noted in previous seasons.

No endorsement of named products is intended, nor is criticism implied of similar products which are not mentioned.

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