

**2000**  
**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, and 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 2000, California tomato growers produced a 10.28 million ton crop, exceeding processor requirements by some 300 thousand tons. The season was excellent climatically for growers with good warm weather for crop growth, fruit set and sizing of fruit. Acreage was down considerably from San Joaquin County north through the Sacramento Valley. Harvest was completed by mid October and yields were generally very good. Disease pressure was pretty light during the 2000 season.

Two processing tomato variety trials were conducted locally in 2000. One was an early-season maturity trial, cooperatively done with Janet Caprile, Contra Costa County Farm Advisor. The grower cooperators were Stan Nunn and "Supy" Lopez of Nunn farms near Brentwood, California. Eleven replicated varieties and an additional 10 observational lines were planted. The trial was established on March 29, 2000 and the field variety was H-9492. A midseason maturity trial was established at Alvarez Farms (Larry, Jack and Joe Alvarez) off East 11<sup>th</sup> Street and Cabe Road in Tracy, California. This trial contained 16 replicated lines and another 26 varieties in a single replication observation block. The midseason maturity trial was planted on April 25, 2000 and the field variety was Peto 303.

## GROWTH AND DEVELOPMENT

Crop growth and development was excellent with the early season maturity trial at Nunn Farms. Despite a light to moderate dodder infestation the trial set a heavy crop load with good fruit size. The midseason maturity trial at Alvarez Farms also grew well with the warm summer weather and except for a few minor spots affected by garden symphylan (centipede) the crop stand was good followed by excellent plant growth, fruit set and yield potential. Ethepon was applied to the field where the trial was located with minimal vine burn on the varieties. The field soil type in the early season trial was a Brentwood clay loam and the midseason trial soil type was a Sorrento silty clay.

Varieties for the trial were planted 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. In the trials, both the replicated and observation plots were 100 feet long. Bed spacing was 60 inches at the Nunn Farms trial and 66 inches at Alvarez Farms; the Nunn Farms trial was single row planted while the Alvarez Farms trial had twin rows per bed. Winter-spring rainfall brought the crop up and that was followed by furrow irrigation at Nunn Farms; the Alvarez Farms trial was furrow irrigated throughout the season. Both trials were grown under each grower's normal cultural management practices. The early season trial was intended for mechanical harvest. However, due to the unavailability of a farm advisor yield trailer, the trial was hand harvested. The midseason maturity trial was mechanically harvested with the grower's machine, crew and a repaired farm advisor weigh trailer.

Fruit quality samples 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<sup>o</sup>) 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 <sup>o</sup>Brix, pH, Bostwick, Titratable 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 hand harvested on August 16 & 17, 2000. Samples of each variety were taken and sent to the PTAB Inspection Station owned by Panella Trucking, Incorporated in Stockton for soluble solids (<sup>o</sup>Brix) and fruit color analysis. Yields were excellent in the replicated trial with the 11 varieties averaging 47.8 tons/acre. Soluble solids and fruit color in the replicated variety block averaged 4.9 and 21.7, respectively. The field variety, H-9492, averaged 46.0 tons/acre in yield with soluble solids at 5.2 and color at 20.3. The 10 varieties in the single replication observation block averaged 45.8 tons/acre in yield with soluble solids at 4.8 and color at 21.4.

The top yielding variety in the replicated early season trial was CXD 204 at 58.5 tons/acre, followed by HyPack 280 (55.2 tons/acre), Peto 816 (54.0 tons/acre), Sun 6287 (53.3 tons/acre) and AP723 (51.3 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 (<sup>o</sup>Brix), Brix Yield and color.

Highest yield in the observation block of the early season trial was attained by CXD 206 at 53.5 tons/acre, followed by H-8773 (51.5 tons/acre), UGX 606 (49.1 tons/acre), CXD 216 (48.3 tons/acre) and CalMarzano (47.5 tons/acre). Complete data on yield, soluble solids (°Brix), Brix Yield and color for all the varieties in the early season observation block are given in Table 2.

The midseason maturity variety trial was mechanically harvested on September 19, 2000. Samples of each variety were taken just before trial harvest and sent to the PTAB Inspection Station owned by Panella Trucking, Incorporated in Stockton for soluble solids (°Brix) and fruit color evaluation. Yields were excellent, with the entire replicated block of 16 varieties averaging 41.4 tons/acre while the 26 single replication observation lines averaged 42.2 tons/acre. Soluble solids in the replicated block averaged 5.0, while the observation trial averaged 5.1. Fruit color was exceptionally good with the replicated varieties averaging 20.2 and the observation lines also providing an average of 20.2.

The best yielding varieties in the midseason maturity replicated trial were H-8892 at 53.5 tons/acre, followed by H-9665 (50.1 tons/acre), H-9775 (46.5 tons/acre), H-9773 (46.0 tons/acre), H-9663 (43.7 tons/acre), CXD 215 (42.1 tons/acre), PS 34716 (42.1 tons/acre) and APT 866 (40.6 tons/acre). Yield figures for all the varieties in the replicated trial, along with fruit quality data on soluble solids, Brix Yield and color, are contained in Table 3.

In the midseason maturity observational trial block containing 26 varieties, highest yield was achieved by CXD 188 at 51.1 tons/acre, followed by La Rossa (50.7 tons/acre), OSX-388 (49.3 tons/acre), CXD 203 (49.1 tons/acre), Gibraltar 505 (48.7 tons/acre), H-9885 (47.4 tons/acre), AP708 (46.3 tons/acre) and H-9886 (45.6 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), Brix Yield and color, are presented in Table 4.

### **Many Thanks**

Many thanks to Stan Nunn and “Supy” Lopez, and Larry, Jack and Joe Alvarez 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 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 28<sup>th</sup> 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 Gail Nishimoto at UC Davis for doing the statistical analysis (individual and combined trials) for the farm advisor variety trials project.

Many thanks also to the seed industry, who provide the basic material for the trials and who provided financial support in 2000, and to everyone in the tomato industry for their guidance and support.

2000 STATEWIDE UNIFORM PROCESSING TOMATO VARIETY TRIALS

EARLY SEASON MATURITY VARIETY LIST

<u>Asgrow Seed</u>		<u>Petoseed</u>
AP 723 \$VFFNP		Hy Peel 45 \$VFFNP
APT 410 \$VFFNP		Hy Pack 280 \$VFFNP
		Peto 816 \$VFFNP
<u>Campbell Soup</u>		
CXD 204 \$VFFNP	CXD 216 \$VFFNP	
CXD 206 \$VFFNP		<u>Lipton</u>
		U2002 \$VFFNP
<u>Harris Moran Seed Co.</u>		<u>Sunseeds</u>
FMX 1095NP \$VFFNP		Sun 6287 \$VFFNP
<u>H. J. Heinz</u>		<u>AB Seed Co.</u>
H-9280 \$VFFNP	H-9881 \$VFFNP	DR 135 ??
H-8773 \$VFFN	H-9492 \$VFN	DR 136 ??
H-9888 \$VFFNP		
<u>United Genetics, Inc.</u>		
ENP 113 \$VFFNP	UGX 604 \$VFFP	
Cal Marzano \$VFFNP	UGX 606 \$VFFNP	

DISEASE RESISTANCE AND HYBRID CODES

\$	= 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. 2000 Early Season Processing Tomato Variety Trial  
Nunn Farms - Brentwood, California**

Replicated Varieties	Yield (Tons/Acre)	Brix Yield (Tons/Acre)	Soluble Solids (°Brix)	Color (Agtron)
CXD 204	58.5	2.86	4.9	20.0
HyPack 280	55.2	2.72	4.9	21.5
Peto 816	54.0	2.76	5.1	21.8
Sun 6287	53.3	2.51	4.7	21.5
AP 723	51.3	2.21	4.3	23.0
H-9280	47.0	2.07	4.4	22.0
ENP 113	45.0	2.29	5.1	22.3
H-9888	44.8	2.37	5.3	20.5
H-9881	41.5	1.91	4.6	21.8
HyPeel 45	41.4	2.19	5.3	22.5
FMX 1095 NP	34.3	1.99	5.8	22.0
LSD @ 5%: 8.0				
C.V. = 11.6%				
Mean: 47.8				
		0.42	0.4	n.s.
		12.4%	5.5%	5.9%
		2.34	4.9	21.7
H-9492 (Grower Field Variety)	46.0	2.40	5.2	20.3

**Table 2. 2000 Early Season Processing Tomato Variety Trial  
Nunn Farms - Brentwood, California**

Observation Varieties	Yield (Tons/Acre)	Brix Yield (Tons/Acre)	Soluble Solids (°Brix)	Color (Agtron)
CXD 206	53.5	2.67	5.0	20.0
H-8773	51.5	2.32	4.5	22.0
UGX 606	49.1	2.36	4.8	21.0
CXD 216	48.3	2.17	4.5	22.0
Cal Marzano	47.5	2.47	5.2	24.0
U-2002	45.4	2.04	4.5	21.0
UGX 604	44.4	2.40	5.4	21.0
DR 136	41.6	2.08	5.0	20.0
APT 410	40.4	2.02	5.0	21.0
DR 135	36.0	1.62	4.5	22.0

2000 STATEWIDE UNIFORM PROCESSING TOMATO VARIETY TRIALS

MID SEASON MATURITY VARIETY LIST

<u>AB Seeds Ltd.</u> AB 97-405 \$VFFNP		<u>Nippon Del Monte</u> NDM 834 \$VFFNP	
<u>Asgrow Seed</u> AP 708 \$VFFN      Brigade \$VFF AP 539 \$VFFN      APT 866 \$VFFFNP AP 721 \$VFFNP      APT 859 \$VFFFN		<u>Orsetti Seed</u> Halley \$VFF      BOS 24675 \$VFFN BOS 315 \$VFFN      BOS 24593 \$VFFNP	
<u>Campbell Soup</u> CXD 188 \$VFF      CXD 199 \$VFFNP CXD 207 \$VFFN      CXD 203 \$VFFNP CXD 208 \$VFFN      CXD 211 \$VFFNP CXD 215 \$VFFFNP		<u>Ochoa Seed</u> OSX 388 \$VFF	
<u>H. J. Heinz</u> H-9886 \$VFFNP      H-9992 \$VFFNP H-8892 \$VFFN      H-9663 \$VFFNP H-9773 \$VFFNP      H-9775 \$VFFNP H-9998 \$VFFNP      H-9665 \$VFFNP H-9885 \$VFFNP		<u>Petoseed</u> PX 41816 \$VFFNP      PX 173 \$VFFFNP PX 34716 \$VFFNP      PX 224 \$VFFNP	
<u>Lipton</u> U2003 \$VFFNP      U2011 \$VFFNP U2010 \$VFFN		<u>Rogers Seed (Novartis)</u> La Rossa \$VFF	
		<u>Sunseeds</u> Sun 6324 \$VFFNP      Sun 6346 \$VFFNP Sun 6332 \$VFFNP	
		<u>United Genetics</u> Gibraltar 505 \$VFFNP      UG 709 \$VFFNP	

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

**Table 3. 2000 Midseason Processing Tomato Variety Trial  
Alvarez Farms - Tracy, California**

Replicated Varieties	Yield (Tons/Acre)	Brix Yield (Tons/Acre)	Soluble Solids (°Brix)	Color (Agtron)
H-8892	53.5	2.51	4.7	20.0
H-9665	50.1	2.33	4.7	20.5
H-9775	46.5	2.16	4.7	20.0
H-9773	46.0	2.36	5.1	20.0
H-9663	43.7	2.05	4.7	20.0
CXD 215	42.1	2.13	5.0	20.0
PS 34716	42.1	2.17	5.1	20.0
APT 866	40.6	1.99	4.9	20.3
CXD 208	40.3	2.03	5.0	20.0
AP 539	39.5	2.11	5.3	19.8
CXD 207	37.9	2.03	5.3	20.0
Halley	36.9	1.89	5.1	21.0
APT 859	36.8	1.89	5.1	20.0
CXD 199	36.2	1.74	4.8	20.0
PX 173	35.7	1.93	5.4	20.8
BOS 315	35.2	1.86	5.3	20.8
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	LSD @ 5%: 4.2	0.27	0.3	0.6
	C.V. = 7.1%	9.0%	4.5%	2.1%
	Mean: 41.4	2.08	5.0	20.2

**Table 4. 2000 Midseason Processing Tomato Variety Trial  
Alvarez Farms - Tracy, California**

Observation Varieties	Yield (Tons/Acre)	Brix Yield (Tons/Acre)	Soluble Solids (°Brix)	Color (Agtron)
CXD 188	51.1	2.60	5.1	20.0
LaRossa	50.7	2.53	5.0	20.0
OSX-388	49.3	2.46	5.0	21.0
CXD 203	49.1	2.36	4.8	20.0
Gibraltar 505	48.7	2.53	5.2	21.0
H-9885	47.4	2.23	4.7	19.0
AP 708	46.3	2.36	5.1	20.0
H-9886	45.6	2.05	4.5	20.0
AP 721	44.5	2.05	4.6	20.0
AB 97-405	42.8	2.27	5.3	20.0
H-9992	42.7	2.13	5.0	20.0
H-9998	42.0	2.02	4.8	20.0
Sun 6324	41.6	2.33	5.6	20.0
BOS 24675	40.9	2.13	5.2	21.0
Sun 6332	40.8	2.20	5.4	20.0
Brigade	40.6	2.03	5.0	20.0
UG 709	39.6	1.78	4.5	20.0
U-2003	39.2	2.04	5.2	21.0
U-2011	39.0	2.07	5.3	20.0
NDM 834	38.7	2.17	5.6	20.0
PX 41816	38.4	2.11	5.5	20.0
PX 224	38.2	1.95	5.1	20.0
CXD 211	35.6	1.99	5.6	20.0
U-2010	35.4	1.56	4.4	20.0
BOS 24593	35.4	1.70	4.8	22.0
Sun 6346	33.3	1.76	5.3	20.0

## 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 11 replicated early maturing varieties, 16 replicated midseason maturing lines and 36 single replication (observational) early and midseason maturity selections common to all locations.

This past season saw statewide processing tomato production at 10.28 million tons. With the exception of some cool early spring temperatures, the season was excellent in terms of climate. Harvest was completed by mid October, with an open, warm, dry summer/early fall. Disease pressure for the whole season was very low for the most part.

The statewide UCCE variety evaluation project averaged 39.0 tons/Acre for the early season replicated variety trials and 40.8 tons/Acre for the midseason maturity replicated trials. Early season replicated trial soluble solids (°Brix) averaged 5.0, a bit higher than 1999 (4.8). Soluble solids were slightly higher in the midseason replicated trials averaging 5.1. Early season color in the replicated trials (24.2) was better than 1999 (25.2) while color in the midseason replicated trials was 22.8, better than 1999 (23.9).

### Results and Discussion

Nine counties (Sutter, Colusa, Yolo, San Joaquin, Contra Costa, Stanislaus, Merced, Fresno and Kern) participated in the statewide variety evaluation studies this past season, conducting thirteen early and midseason trials. The four following tables represent summaries of yield and fruit quality from the 2000 Statewide UCCE Farm Advisor/Specialist Processing Tomato Variety Evaluation Project. These summaries were obtained from the computer trial data analysis done by Gail Nishimoto at Davis under private contract.

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 and Fresno Counties are contained in this analysis. Highest yield was attained by PS 816 at 42.2 tons/acre, followed by AP 723 (41.6 tons/acre), CXD 204 (41.3 tons/acre), Sun 6287 (40.1 tons/acre) and H-9280 (39.2 tons/acre). In terms of fruit quality, the top varieties in soluble solids (°Brix) were H-9888 (5.5), HyPeel 45 (5.4), PS 816 (5.3), FMX 1095P (5.3) and ENP 113 (5.1). Best color was achieved by H-9888 (22.4), CXD 204 (23.1), HyPack 280 (23.6), H-9280 (23.7) and H-9881 (23.9). An Agtron color meter is used to determine fruit color, so the lower the numerical value, the better the fruit color.

Table B presents results from the Early Season Maturity Observational Variety Trials. Results of four trials from Yolo, Colusa, Contra Costa and Fresno Counties are contained in this analysis. The highest yield in these trials occurred with CXD 206 at 44.4 tons/acre, followed by UGX 606 (40.0 tons/acre), CXD 216 (38.8 tons/acre), H-8773 (38.4 tons/acre) and U-2002 (37.2 tons/acre). The top lines for soluble solids were CXD 206, Cal Marzano, APT 410 and UGX 604, all at 5.3, with CXD 216 at 5.1. Varieties providing the best fruit color were UGX 604 (23.0), CXD 206 (23.3), DR136 (23.3), DR135 (23.5) and U-2002 (23.6).

Table C shows data summarized for the Midseason Maturity Replicated Trials. Results are shown for nine county locations: Yolo, Colusa, Sutter, San Joaquin, Stanislaus, Merced, Fresno 1 & 2, Kern. Best yield was produced by H-9775 at 46.0 tons/acre, followed by H-9663 (44.6 tons/acre), H-8892 (44.4 tons/acre), H-9665 (44.0 tons/acre), CXD 215 (42.3 tons/acre), PS 34716 (41.3 tons/acre) and CXD 208 (41.0 tons/acre). Soluble solids (°Brix) values were led by PS 173 (5.5), Halley 3155 (5.4), CXD 208, CXD 207, BOS 315 and AP 539, all at 5.3, and AP 859 and H-9773, both at 5.2. Varieties having the best fruit color were CXD 207 (21.5), AP 539 (22.1), H-8892 (22.3), CXD 208 (22.3), AP 859 (22.5) and H-9773 and AP 866, both at 22.6.

Table D provides data from the Midseason Maturity Observational Variety Trials in seven county locations: Yolo, Colusa, San Joaquin, Stanislaus, Merced and Fresno 1 & 2. Highest yield occurred with CXD 188 at 45.1 tons/acre, followed by H-9885 and PX 41816, both at 45.0 tons/acre, La Rossa (44.4 tons/acre), H-9992 (44.3 tons/acre), AP 708 (43.6 tons/acre), PX 224 (43.6 tons/acre), CXD 203 (43.5 tons/acre), Sun 6324 (43.4 tons/acre) and BOS 24675 (43.3 tons/acre). In terms of fruit quality, the best varieties for soluble solids were Sun 6324 and Sun 6346, both at 5.6, followed by AB97-405 (5.5), CXD 211, Gibraltar 505 and Sun 6332, all at 5.4, U-2011 (5.3) and PX 41816 and BOS 24675, both at 5.2. Best fruit color was provided by CXD 203 (21.9), CXD 211 and U-2011, both at 22.0, H-9992 and Sun 6332, both at 22.1, AB 97-405 (22.2), H-9885 (22.3) and CXD 188, Sun 6346 and PX 224, all at 22.4.

**Table A.** Processing Tomato Early Season Maturity Variety Trials  
Combined Yield and Quality Data

Replicated Variety Trials  
(Four Locations: Yolo, Colusa, Contra Costa and Fresno Counties)

Variety	Yield Tons/Acre	°Brix	PTAB Color
PS 816	42.2 A	5.3	24.0
AP 723	41.6 AB	4.3	24.5
CXD 204	41.3 ABC	4.8	23.1
Sun 6287	40.1 ABCD	4.8	24.8
H-9280	39.2 BCDE	4.5	23.7
HyPack 280	38.9 CDE	4.9	23.6
ENP 113	38.4 DE	5.1	24.5
H-9888	38.2 DE	5.5	22.4
HyPeel 45	37.6 DEF	5.4	24.7
H-9881	36.6 EF	4.7	23.9
FMX 1095NP	35.2 F	5.3	27.4
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LSD @ 5% =	2.6	0.2	0.9
C.V. =	10.0%	5.4%	5.3%
Mean =	39.0	5.0	24.2
Variety x Location			
LSD @ 5% =	1.8		

**Table B.** Processing Tomato Early Season Maturity Variety Trials  
 Combined Yield and Quality Data  
 Observation Variety Trials  
 (Four Locations: Yolo, Colusa, Contra Costa and Fresno Counties)

Variety	Yield Tons/Acre	°Brix	PTAB Color
CXD 206	44.4	5.3	23.3
UGX 606	40.0	5.0	24.3
CXD 216	38.8	5.1	24.8
H-8773	38.4	4.3	24.4
U-2002	37.2	4.9	23.6
APT 410	36.1	5.3	24.0
DR 136	36.1	5.0	23.3
Cal Marzano	35.3	5.3	25.7
DR 135	34.0	4.9	23.5
UGX 604	31.3	5.3	23.0
LSD @ 5% =	N.S.	0.4	N.S.
C.V. =	14.0%	6.0%	6.0%
Mean =	37.3	5.1	23.9

**Table C.** Processing Tomato Mid Season Maturity Variety Trials  
Combined Yield and Quality Data

Replicated Variety Trials  
(Nine Locations: Yolo, Colusa, Sutter, San Joaquin, Stanislaus, Merced,  
Fresno 1 & 2, Kern)

Variety	Yield Tons/Acre	°Brix*	PTAB Color*
H-9775	46.0 A	4.9	23.5
H-9663	44.6 A	4.8	22.8
H-8892	44.4 A	4.9	22.3
H-9665	44.0 AB	4.9	23.2
CXD 215	42.3 BC	4.9	23.1
PS 34716	41.3 CD	5.0	22.9
CXD 208	41.0 CDE	5.3	22.3
CXD 199	40.6 CDE	5.0	22.4
H-9773	40.6 CDE	5.2	22.6
AP 866	40.0 DE	5.1	22.6
CXD 207	39.1 EF	5.3	21.5
Halley 3155	38.9 EF	5.4	23.3
AP 859	37.9 F	5.2	22.5
BOS 315	37.3 F	5.3	23.5
PS 173	37.3 F	5.5	23.5
AP 539	37.1 F	5.3	22.1
LSD @ 5% =	2.1	0.1	0.6
C.V. =	11.0%	6.0%	6.0%
Mean =	40.8	5.1	22.8
Variety x Location			
LSD @ 5% =	6.2	0.4	1.8

\*All locations except Kern County

**Table D.** Processing Tomato Mid Season Maturity Variety Trials  
Combined Yield and Quality Data

Observation Variety Trials  
(Seven Locations: Yolo, Colusa, San Joaquin, Stanislaus,  
Merced, Fresno 1 & 2)

Variety	Yield Tons/Acre	°Brix*	PTAB Color*
CXD 188	45.1	5.1	22.4
H-9885	45.0	4.9	22.3
PX 41816	45.0	5.2	23.6
La Rossa	44.4	5.0	23.1
H-9992	44.3	4.9	22.1
AP 708	43.6	4.9	22.6
PX 224	43.6	5.1	22.4
CXD 203	43.5	5.0	21.9
Sun 6324	43.4	5.6	23.0
BOS 24675	43.3	5.2	23.9
NDM 834	41.8	5.1	23.3
AB 97-405	41.7	5.5	22.2
U-2003	41.6	5.0	24.3
CXD 211	41.0	5.4	22.0
H-9886	40.7	4.9	23.5
UG 709	40.7	5.0	23.0
BOS 24593	39.6	4.7	23.3
Gilbralter 505	38.8	5.4	22.8
OSX 388	38.7	5.0	25.1
H-9998	38.5	5.1	22.8
AP 721	38.3	4.6	23.9
Brigade	38.2	5.1	22.9
U-2010	38.1	5.0	23.5
U-2011	37.4	5.3	22.0
Sun 6332	35.3	5.4	22.1
Sun 6346	34.7	5.6	22.4
LSD @ 5% =	N.S.	0.3	1.2
C.V. =	15.7%	6.0%	5.0%
Mean =	41.1	5.1	22.9

\*Eight locations, includes Sutter County

## 2000 PROCESSING TOMATO WEED MANAGEMENT RESEARCH PROGRESS REPORT

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### Acknowledgements

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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.

<u>Trade Name</u>	<u>Common or Chemical Name</u>	<u>Manufacturer</u>
Prowl (3.3E and 3.8CS)	pendimethalin	BASF Corporation
Shadeout (25DF)	rimsulfuron	DuPont Ag Products
Devrinol (50DF)	napropamide	United Phosphoros Limited
Dual Magnum (7.62E)	metolachlor	Syngenta Corporation
Authority (75DF)	sulfentrazone	FMC Corporation
GWN-3060 (75WDG)	halosulfuron	Gowan Chemical Company

In 2000, four weed control studies were conducted on processing tomatoes in San Joaquin and Contra Costa Counties, evaluating six herbicide materials and/or combination treatments for preemergence and postemergence weed control efficacy and crop safety. The first trial was a pre-transplant preemergence incorporated study looking at two formulations (3.3E and 3.8CS) of Prowl (pendimethalin), plus Authority (carfentrazone), Dual Magnum (metolachlor), GWN-3060 (halosulfuron), and a combination treatment of Shadeout (rimsulfuron) with Devrinol (napropamide).

Treatments were soil incorporated using a Performer rotivator prior to transplanting tomatoes. A second preemergence trial in transplanted tomatoes was established, looking at the same herbicide candidates as in the previous trial, but this amounted to a layby trial with the materials applied as directed sprays 3 weeks after transplanting and the herbicides incorporated with the grower's power driven rotary tiller. A third trial was a postemergence study that looked at single versus sequential treatments of GWN-3060 (halosulfuron) with an MSO (methylated seed oil) and AMS (liquid ammonium sulfate) added to the spray mixture and compared to a single application of Shadeout (rimsulfuron) plus COC (crop oil concentrate). The trial sought to control/suppress 3 to 5 true leaf yellow nutsedge. All sprays were directed to the base of early flowering tomato transplants. A fourth weed study on direct-seeded tomatoes looked at postemergence single applications of GWN-3060 (halosulfuron) at 2 different rates with X-77, Herbimax, or AMS (liquid ammonium sulfate) added and compared to a single rate of Shadeout (rimsulfuron) plus Herbimax adjuvant. The crop was at the 3 to 4 true leaf stage of growth at time of treatment and the mixture of weeds included 1 to 4 true leaf common lambsquarters, 2 to 4 inch tall barnyardgrass, 1 to 3 true leaf black nightshade, 1 to 3 inch rosette shepherdspurse, 3 to 7 true leaf yellow nutsedge and 2 to 4 inch tall redroot pigweed.

Detailed descriptions of each trial follow, along with weed control and crop vigor/phytotoxicity ratings, plus crop harvest data (yield and crop maturity, where taken).

### **A Pre-Transplant Incorporated Weed Control Study in Processing Tomatoes.**

Robert J. Mullen, Don Colbert, Scott Whiteley and Chuck Cancilla

A pre-transplant incorporated weed control trial in processing tomatoes, evaluating six herbicides and/or combination treatments, was established at Hal Robertson Farms southeast of Tracy, California on May 5, 2000. All treatments were applied to the soil surface of the beds using a handheld CO<sub>2</sub> backpack sprayer with 8002 nozzles at 40 psi in a spray volume of 30 gal/Acre water. The treatments were then soil incorporated 2 inches deep using a tractor-pulled Performer rotary tiller. The soil type at the trial site was a Sorrento silty clay and the field variety was H-9775. The field was transplanted three days after herbicide treatment and incorporation; furrow irrigation was not applied until May 17, 2000. There were four replications of each treatment in a randomized complete block design.

Weed control efficacy ratings were made on 6/15/00 while crop vigor ratings were taken 5/30/00 and 6/15/00. Best control of the mixture of black and hairy nightshade, yellow nutsedge and jungle rice present occurred with Dual Magnum (metolachlor) alone, the combination treatment of Shadeout (rimsulfuron) plus Devrinol (napropamide), the high rate of Authority (sulfentrazone) alone and the high rate of Prowl (pendimethalin) 3.3E alone. All treatments were safe to the crop, except for both rates of GWN-3060 (halosulfuron), which caused some crop growth suppression. The trial was hand harvested on August 28 and 29, 2000. The highest yield was achieved by the Dual Magnum treatment, followed by the combination of Shadeout plus Devrinol and the high rate of Prowl 3.3E. Both treatments of GWN-3060 showed a yield decrease of over 6 tons relative to the untreated control.

**2000 Processing Tomato Pre-Transplant Incorporated Weed Control  
Hal Robertson Farms - Tracy, California**

Treatment	Rate lb./Acre a.i.	Weed Control <sup>1</sup>			Crop Vigor <sup>1</sup>		Yield <sup>2</sup> Tons/Acre	% Green <sup>2</sup> Fruit @ Harvest
		Black & Hairy <u>Nightshade</u>	Yellow <u>Nutsedge</u>	Jungle <u>Rice</u>	5/30	6/15		
		6/15	6/15	6/15				
Prowl (3.3E)	1.50	6.4	7.1	10.0	9.1	9.0	49.3	15.8
Prowl (3.8CS)	1.50	7.3	7.0	10.0	9.3	9.3	49.3	14.5
Prowl (3.3E)	3.00	8.3	8.1	10.0	8.9	9.3	50.1	16.8
Prowl (3.8CS)	3.00	7.4	7.4	10.0	9.1	9.1	46.3	14.5
Authority (75DF)	0.10	8.5	6.3	6.3	9.0	8.5	43.0	16.6
Authority	0.20	9.4	7.4	8.3	9.0	9.0	46.7	15.1
Authority	0.25	8.5	8.4	9.8	9.4	9.0	48.3	18.6
GWN 3060 (75WDG)	0.032	4.8	6.6	5.5	8.5	8.3	40.7	19.5
GWN 3060	0.064	5.8	8.5	6.5	8.2	8.1	40.8	21.3
Shadeout (25DF) + Devrinol (50DF)	0.031 + 2.00	8.8	7.9	10.0	9.3	9.1	50.2	20.1
Dual Magnum (7.62E)	1.27	8.3	9.0	9.5	9.3	9.4	52.1	14.4
Untreated Control	---	1.0	3.3	2.3	9.1	9.4	47.1	14.7

LSD @ 5%: 7.4  
C.V. = 10.9%

<sup>1</sup> Average of four replications:

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

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

<sup>2</sup> Average of four replications

## **A Post Transplant Layby Incorporated Weed Control Trial in Processing Tomatoes.**

Robert J. Mullen, Don Colbert, Scott Whiteley and Chuck Cancilla

A post transplant layby incorporated processing tomato weed control trial, evaluating six herbicides and/or combination treatments, was established at Eugene Caffese Farms near Farmington, California on June 6, 2000. The field had been transplanted on May 16, 2000 and the field variety was H-8892. All treatments were applied to the crop beds as directed sprays, utilizing a handheld CO<sub>2</sub> backpack sprayer with 8002 nozzles at 40 psi in a spray volume of 30 gal/Acre water. The treatments were then soil incorporated 3 inches deep using the grower's power driven rotary tiller. The soil type of the trial field was a Landlow adobe clay and the field was furrow irrigated throughout the season. There were four replications of each herbicide treatment and the plot design was a randomized complete block.

Weed control and crop phytotoxicity ratings were made on 6/26/00, 6/30/00 and 7/7/00. The primary weed species evaluated in the trial was barnyardgrass. Best weed control efficacy occurred with all rates of both Prowl (pendimethalin) formulations, 3.3E and 3.8CS, followed by Dual Magnum (metolachlor). The combination treatment of Shadeout (rimsulfuron) plus Devrinol (napropamide), and all rates of Authority (sulfentrazone) and GWN-3060 (halosulfuron) only gave partial to intermediate control of barnyard grass. Due to the size of the transplants at the time of treatment, some spray contact on the crop did occur, resulting in some temporary crop leaf burn with Authority and some temporary growth suppression with the high rate of Prowl 3.3E. The trial was hand harvested on 9/13/00 and 9/14/00 and all treatments, led by Dual Magnum, the high rate of Prowl 3.8CS, the combination of Shadeout plus Devrinol and the low rate of GWN-3060, out-yielded the untreated control.

**2000 Layby Incorporated Weed Control in Transplanted Processing Tomatoes  
Eugene Caffese Farms - Farmington, California**

Treatment	Rate lb./Acre a.i.	Weed Control <sup>1</sup> Barnyardgrass			Crop Phyto <sup>1</sup>			Yield <sup>2</sup> (Tons/Acre)	% Green <sup>2</sup> Fruit @ Harvest
		6/26	6/30	7/7	6/26	6/30	7/7		
Prowl (3.3E)	1.50	10.0	9.4	8.9	1.4	1.0	1.1	47.7	9.6
Prowl (3.8CS)	1.50	10.0	9.3	8.9	0.6	0.6	0.5	48.7	7.2
Prowl (3.3E)	3.00	10.0	9.5	9.7	2.9	1.8	1.5	49.4	7.5
Prowl (3.8CS)	3.00	10.0	9.6	9.8	0.6	0.6	0.5	52.0	4.8
Authority (75DF)	0.10	5.3	4.0	2.5	2.3	1.3	1.6	49.0	7.7
Authority	0.20	7.5	5.8	5.0	3.0	2.1	2.3	48.5	7.5
Authority	0.25	7.3	7.1	5.8	3.4	1.8	2.1	48.9	7.3
GWN 3060 (75WDG)	0.032	7.5	6.5	5.8	0.6	0.5	0.5	51.8	5.6
GWN 3060	0.064	6.4	6.5	6.1	0.9	0.8	0.5	48.5	7.3
Shadeout (25DF) + Devrinol (50DF)	0.031 + 2.00	7.5	6.8	6.5	0.5	0.6	0.5	51.8	7.4
Dual Magnum (7.62E)	1.27	9.5	8.3	8.3	0.6	0.6	0.5	52.9	6.6
Untreated Control	---	4.0	3.8	3.0	0.6	0.7	0.5	43.3	7.0

LSD @ 5%: 8.3  
C.V. = 11.6%

<sup>1</sup> Average of four replications:

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

    Crop Phyto - 0 = no crop damage; 10 = crop dead

<sup>2</sup> Average of four replications

**A Postemergence Yellow Nutsedge Control Trial in Processing Tomatoes.**

Robert J. Mullen, Scott Whiteley, Chuck Cancilla and Jim Williamson

A weed control trial in processing tomatoes, evaluating GWN-3060 (halosulfuron) and Shadeout (rimsulfuron) for postemergence yellow nutsedge control/suppression, was established at Nunn Farms near Brentwood, California on May 10, 2000. The direct seeded tomato variety was H-9492 and the crop was at the early flowering stage of growth on the initial treatment date, while the yellow nutsedge was at the 3 to 5 true leaf stage of growth. A second application of both rates of GWN-3060 and the single rate of Shadeout was made on May 26, 2000. In this way one versus two applications of GWN-3060 could be compared. All treatments were applied as directed sprays using a handheld CO<sub>2</sub> backpack sprayer with 8002 nozzles at 40 psi in a spray volume of 30 gal/Acre water. There were four replications of each herbicide treatment in a randomized complete block design. The GWN-3060 treatments had an MSO (methylated seed oil) plus AMS (liquid ammonium sulfate) added to the spray mixture while COC (Crop Oil Concentrate) was added to the Shadeout treatment. The soil type at the trial location was a Brentwood clay and the field was furrow irrigated throughout the season.

Weed control efficacy and crop vigor ratings were made on 5/26/00 and 6/8/00. Best control/suppression of yellow nutsedge was attained by two applications of GWN-3060 at the high rate, followed by two applications of GWN-3060 at the low rate. Shadeout only gave partial yellow nutsedge suppression/control. The trial was hand harvested on 7/18/00 and all treatments out yielded the untreated control. Yields were somewhat low due to the presence of Phytophthora root rot in the trial.

**2000 Processing Tomato Postemergence Yellow Nutsedge Control Trial  
Nunn Farms - Brentwood, California**

Treatment *	Rate lb./Acre a.i.	No. Applic	Weed Control <sup>1</sup> Yellow Nutsedge		Crop <sup>1</sup> Vigor		Yield <sup>2</sup> Tons/Acre	Crop Maturity <sup>2</sup> @ Harvest (%)		
			<u>5/26</u>	<u>6/8</u>	<u>5/26</u>	<u>6/8</u>		Red	Green	Culls
GWN-3060 (75WDG) + MSO + AMS	0.032 + 0.5% + 2.5%	1	7.8	7.4	9.3	9.4	24.00	80.9	10.4	8.7
GWN-3060 + MSO + AMS	0.032 + 0.5% + 2.5%	2	8.0	8.6	9.4	9.4	22.20	85.0	6.5	8.5
GWN-3060 + MSO + AMS	0.047 + 0.5% + 2.5%	1	8.6	8.0	9.0	9.1	23.06	87.9	4.7	7.4
GWN-3060 + MSO + AMS	0.047 + 0.5% + 2.5%	2	8.4	8.8	9.3	9.4	23.41	79.3	11.9	8.8
Shadeout (25DF) + COC	0.031 + ½%	2	4.5	5.3	9.5	9.4	22.65	85.5	8.3	6.2
Untreated Control	---	---	1.0	0.5	9.3	9.5	19.80	87.8	7.2	5.0

LSD @ 5%: n.s.  
C.V. = 19.5%

<sup>1</sup> Average of four replications:

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

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

<sup>2</sup> Average of four replications

\*MSO = Methylated Seed Oil - 0.5% v/v

AMS = 33.1% ammonium sulfate in Embrace Plus - 2.5% v/v

## **A Processing Tomato Postemergence Weed Control Study.**

Robert J. Mullen and Scott Whiteley

A postemergence weed control study in processing tomatoes, evaluating single sprays of GWN-3060 (halosulfuron) at two rates with different adjuvants and Shadeout (rimsulfuron) plus Herbimax, a crop oil concentrate, was established at John Pereira Farms northeast of Tracy, California on 6/2/00. All treatments were applied over the crop and weeds present utilizing a handheld CO<sub>2</sub> backpack sprayer with 8002 nozzles at 40 psi in a spray volume of 30 gal/Acre water. The crop growth stage on the treatment date was 3 to 4 true leaf while the weed growth stage was 1 to 4 true leaf common lambsquarter, 2 to 4 inch tall barnyardgrass, 1 to 3 true leaf black nightshade, 1 to 3 inch rosette shepherdspurse, 3 to 7 true leaf yellow nutsedge and 2 to 4 inch tall redroot pigweed. There were four replications of each herbicide treatment in a randomized complete block plot design. The soil type of the trial field was a Columbia silty clay loam and the field was furrow-irrigated throughout the season. The field variety was Fancy Peel. Windy weather in the week prior to treatment precluded treating the trial any earlier.

Weed control and crop phytotoxicity ratings were taken on 6/8/00 and 6/14/00. Best control of all the weeds present occurred with the Shadeout plus Herbimax treatment; it was only significantly weak on common lambsquarter. The addition of AMS 9(liquid ammonium sulfate) to GWN-3060 did not provide any gain in weed control activity. GWN-3060 gave the best control or suppression of yellow nutsedge but was weak on lambsquarter and barnyardgrass, while giving only intermediate control of black nightshade. GWN-3060 plus X-77 spreader showed some temporary crop growth suppression; otherwise all treatments exhibited good crop safety. The trial was hand harvested on September 8, 2000 and all treatments out-yielded the untreated control. Yields were somewhat low due to the presence of Phytophthora root rot in the trial area.

**2000 Processing Tomato Postemergence Weed Control  
Pereira Farms - Tracy, California**

Treatment	Rate lb./Acre a.i.	Weed Control <sup>1</sup>												Crop Phyto <sup>1</sup>		Yield <sup>2</sup> (Tons/Acre)
		Yellow Nutsedge		Black Nightshade		Barnyardgrass		Shepherd's purse		Lambsquarter		Redroot Pigweed		6/8	6/14	
		6/8	6/14	6/8	6/14	6/8	6/14	6/8	6/14	6/8	6/14	6/8	6/14			
GWN-3060 (75WDG) + X-77	0.032 + ¼%	7.6	8.3	5.8	6.3	3.1	2.3	7.6	9.0	2.0	2.5	6.8	7.6	2.1	1.8	23.2
GWN-3060 + Herbimax	0.032 + 1%	8.0	8.3	7.0	6.5	3.0	2.8	8.4	8.8	2.3	2.3	7.6	8.4	1.3	1.2	22.3
GWN-3060 + AMS*	0.032 + 2.5%	5.8	6.5	5.5	5.3	2.5	2.5	7.6	8.0	2.0	2.3	7.1	7.5	0.7	0.6	24.6
GWN-3060 + X-77	0.047 + ¼%	7.9	8.6	6.9	7.1	3.0	2.5	8.3	8.9	2.8	2.5	8.3	8.3	2.6	1.7	20.4
GWN-3060 + Herbimax	0.047 + 1%	8.1	8.5	7.0	7.1	2.0	2.3	8.3	9.1	2.5	2.5	8.3	8.6	1.3	1.0	22.9
GWN-3060 + AMS*	0.047 + 2.5%	6.8	6.5	6.0	5.6	2.9	2.8	7.8	8.5	2.3	2.3	7.5	8.3	0.6	0.6	19.1
GWN-3060	0.047	6.5	6.8	5.5	6.0	2.5	2.3	7.8	8.3	2.8	2.8	7.3	7.4	0.8	0.8	22.7
Shadeout (25DF) + Herbimax	0.031 + 1%	7.4	7.3	8.3	8.6	7.8	8.5	8.8	9.0	2.8	3.0	8.6	9.1	1.1	1.1	27.2
Untreated Control	---	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.9	0.6	15.6

LSD @ 5%: 8.6  
C.V. = 26.8%

<sup>1</sup> Average of four replications:  
Weed Control - 0 = no weed control; 10 = complete weed control  
Crop Phyto - 0 = no crop damage; 10 = crop dead

<sup>2</sup> Average of four replications

\*AMS = 33.1% ammonium sulfate contained in CMR Embrace Plus

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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.

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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.

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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.

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