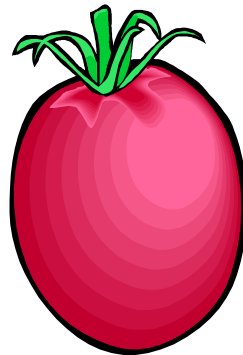


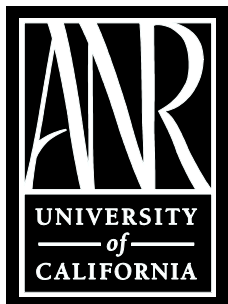
PROCESSING TOMATOES

IN

SAN JOAQUIN & CONTRA COSTA
COUNTIES



2007 VARIETY TRIALS SUMMARY
RESEARCH PROGRESS REPORT



University of California Cooperative Extension
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2007
SAN JOAQUIN and CONTRA COSTA 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.

The 2007 California processing tomato growing season was successful for producers statewide, as well as locally. Harvest did not conclude until the second half of October. Statewide yield figures resulted in a crop just over 12 million tons, the second biggest ever. A couple of rainfall events caused some yield loss, particularly in the Sacramento Valley.

Locally, crop yields were generally very good despite delayed harvests, some heat stress and disease pressure from powdery mildew. Insect pressure was moderate with some problem areas with stink bug, worm and mite pressure. Overall, the growing season was favorable for a good processing tomato crop. Two processing tomato variety trials were conducted locally in 2007. One was an early maturity trial, done cooperatively with Janet Caprile, Contra Costa County Horticulture Farm Advisor, near Byron, California.

GROWTH, DEVELOPMENT and YIELD

The early season maturity processing tomato trial was conducted with Simoni and Massoni Farms (Anthony Massoni and Paul Simoni) off Hoffman Lane near Byron, California. The soil at the trial site was a Sorrento silty clay loam. The trial was direct seeded, using Earthway hand-push planters, on March 12, 2007, in 100 foot plots on 66-inch, double row beds. Prior to planting, 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 area, as well as the rest of the field. The field variety was Halley 3155. Spring rainfall, sprinkler irrigation and furrow irrigation were used over the course of the growing season. Growing conditions were very good in the Brentwood area but plants were a bit smaller this year due to the dry spring, lack of deep moisture and some resultant heat stress. The trial was mechanically harvested August 10, 2007, about two weeks later than the ideal harvest date. Yields in the ten replicated varieties in the trial averaged 42.19 tons/acre. Brix yield average was 2.422 tons/acre, while soluble solids (°Brix) averaged 5.70, pH levels averaged 4.50, a bit high, and fruit color averaged 21.7. Two varieties that demonstrated reduced plant size, that was mentioned earlier, were H-9280 and H-2206 that was reflected in yield at harvest. Both varieties also exhibited signs of potassium deficiency by mid-June.

The top yielding variety in the replicated early season trial was BOS 1411 at 48.89 tons/acre, followed by Halley 3155 (47.43 tons/acre), SUN 6366 (46.73 tons/acre), BOS 66509 (44.12 tons/acre) and H-5003 (44.11 tons/acre). Yield figures for all the varieties in the early season replicated trial are presented in **Table 1**, along with fruit quality data on soluble solids (°Brix), fruit color, pH and Brix yield.

The mid-maturity processing tomato variety trial was established with nursery grown transplants on May 8, 2007, on single row 60-inch beds at Del Terra Farms (Mark and John Bacchetti) off Finck Road northwest of Tracy, California. The soil type at the trial site was a Sacramento clay/Piper fine sandy loam mix and the field variety was SUN 6368. Once again the trial site had been prepared by the growers prior to transplanting and a preplant herbicide had been soil incorporated into the beds, along with preplant fertilizer in a band. Furrow irrigation was used throughout the growing season. Planting conditions on the transplanting date were adverse with hot temperatures (97°F), dry soil in the field and plants that were not “hardened” off. Consequently, a great number of plants in the first two replications did not survive, leaving a poor crop stand. The trial became an observational test with one replication of the replicated trial in good condition as well as the block of observational lines. This remaining portion of the original trial grew pretty well with good fruit set and size. The 22 single replication plots were hand harvested on September 5, 2007. Yields were excellent with many of the varieties in the remainder of the replicated trial led by SUN 6368 at 64.9 tons/acre, followed by AB 8058 (61.4 tons/acre), AB2 (60.8 tons/acre), H 8004 (56.4 tons/acre) and Red Spring (46.2 tons/acre). Fruit quality was generally good with most lines giving adequate color (averaging 24.4), soluble solids (averaging 4.95), average pH was 4.39, higher than desirable. **Table 2** provides yield and fruit quality for all lines in the fourth replication of the replicated trial. The reader of this report is reminded that the figures reported are the result of only one replication.

In the observation block of the trial (eleven lines) yields were excellent, led by NUN 877 at 65.9 tons/acre, followed by NDM 4464 (64.8 tons/acre), HMX 5894 (63.9 tons/acre), BOS 67374 (63.4 tons/acre), NDM 5578 (61.9 tons/acre), UG 4305 (60.1 tons/acre), NUN 889 (59.2 tons/acre) and PX

1723 (54.9 tons/acre). In terms of fruit quality, color averaged 24.6, soluble solids (°Brix) averaged 4.72, a bit low, and pH averaged 4.40, higher than desirable. Best color was achieved by UG 36003, highest soluble solids occurred with PX 1723 and NDM 5578, and PX 1723 had the most desirable pH. Again, the reader of this report is reminded that the figures shown for the observation block are the results of only one replication. **Table 3** shows the yield and fruit quality data for all lines in the observation variety block.

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.

MANY THANKS

Many thanks to Anthony Massoni and Paul Simoni, Mark and John Bacchetti, and Kevin Robertson 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 35 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, Kim Stroud 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 2007, and to everyone in the tomato industry for their guidance.

2007 STATEWIDE UNIFORM PROCESSING TOMATO VARIETY TRIALS

EARLY SEASON MATURITY VARIETY LIST

Seminis Seeds

APT 410 \$VFFNP

H. J. Heinz Seed

H-9280 \$VFFN

H-5003 \$VFFNP

H-2206 VF

Nunhems USA

Sun 6366 \$VFFNP

Orsetti Seeds

BOS 66508 \$VFFNP

BOS 66509 \$VFFNP

BOS 1411 \$VFFJ

Halley 3155 \$VFF

Harris Moran Seed

HMX 5883 \$VFFF3NP

DISEASE RESISTANCE AND HYBRID CODES

O.P.	= Open Pollinated	T	= Tobacco Mosaic Resistance
\$	= 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		
FFF3	= Fusarium Wilt – Race I, II, and III Resistant		

Table 1. 2007 Early Season Processing Tomato Variety Trial
 Simoni-Massoni Farms; off Hoffman Lane, Byron, California

Variety	Yield ¹ (tons/Acre)		Agtron ¹ Color	Soluble ¹ Solids ° Brix	pH ¹	Brix ¹ Yield
BOS 1411	48.89	A	21.75	6.08	4.49	2.972
HALLEY 3155	47.43	A	21.75	5.88	4.42	2.789
SUN 6366	46.73	A	22.00	6.45	4.51	3.014
BOS 66509	44.12	AB	20.75	5.75	4.52	2.537
H-5003	44.11	AB	21.25	5.90	4.52	2.602
APT 410	40.69	BC	21.25	5.50	4.52	2.238
BOS 66508	40.69	BC	21.25	5.60	4.50	2.279
HMX 5883	40.43	BC	22.30	5.33	4.52	2.155
H-2206	37.00	CD	23.25	5.68	4.55	2.102
H-9280	31.78	D	22.00	4.83	4.50	1.535
LSD @ 0.05 =	5.09		0.76	0.50	0.06	
Mean =	42.19		21.75	5.70	4.50	2.422
C.V. (%)	8.3					

¹ Average of four replications

2007 STATEWIDE UNIFORM PROCESSING TOMATO VARIETY TRIALS

MID SEASON MATURITY VARIETY LIST

AB/TS & L Seeds

AB2 \$VFFP
AB 8058 \$VFFNTSWV

Nippon/Del Monte

NDM 4464 \$VFFNP
NDM 5578 \$VFFP

H. J. Heinz Seed

H 2005 \$VFFNP H 9780 \$VFFNP
H 2601 \$VFFNP H 8004 \$VFFNP
H 2506 \$VFFNP

Orsetti Seeds

BOS 67374 \$VFFNPJ

Harris Moran

HMX 4802 \$VFFF3NP
HMX 5894

Seminis Seeds

PX 1723 \$VFFNP

United Genetics Seed

UG 4305
UG 36003

Nunhems USA

Red Spring \$VFFNP
Sun 6368 \$VFFNP
NUN 567 \$VFFNTSWV
NUN 877 \$VFFNP
NUN 889 \$VFFNP

HED Seed

HT 1058 \$FN
HT 1075 \$VFFN

DISEASE RESISTANCE AND HYBRID CODES

\$ = Hybrid	LV = Powdery Mildew (Leveillula)
V = Verticillium Wilt Race I Resistant	N = Root Knot Nematode Resistant
F = Fusarium Wilt – Race I Resistant	P = Bacterial Speck Resistant
FF = Fusarium Wilt – Race I and II Resistant	J = Jointless
FFF3 = Fusarium Wilt – Race I, II, and III Resistant	TSWV = Tomato Spotted Wilt Virus

Table 2. 2007 Midseason Processing Tomato Variety Trial
Mark and John Bacchetti (Del Terra Farms), Fabian Tract

Replicated Lines	Yield ¹ (tons/Acre)	Agtron Color ¹	Soluble ¹ Solids (° Brix)	pH ¹
SUN 6368	64.90	26	4.8	4.37
AB 8058	61.40	26	4.5	4.40
AB2	60.77	24	4.8	4.33
H-8004	56.45	24	5.1	4.32
Red Spring	46.22	25	4.5	4.55
H-9780	45.30	23	5.7	4.33
H-2005	45.08	23	5.5	4.48
H-2506	40.51	24	5.1	4.42
H-2601	40.25	23	4.6	4.48
HMX 5893	37.46	25	4.9	4.39
NUN 567	35.81	25	5.0	4.23

¹ Average of only one replication

Table 3. 2007 Midseason Processing Tomato Variety Trial
Mark and John Bacchetti (Del Terra Farms), Fabian Tract

Observational Lines	Yield ¹ (tons/Acre)	Agtron Color ¹	Soluble ¹ Solids (° Brix)	pH ¹
NUN 877	65.86	24	4.4	4.44
NDM 4464	64.82	24	4.7	4.37
HMX 5894	63.86	26	4.6	4.53
BOS 67374	63.38	25	4.8	4.36
NDM 5578	61.94	25	5.0	4.39
UG 4305	60.11	25	4.6	4.37
NUN 889	59.24	25	4.4	4.37
PX 1723	54.88	25	5.2	4.26
UG 36003	49.66	23	4.7	4.53
HT 1075	48.00	24	4.8	4.40
HT 1058	46.87	25	4.7	4.41

¹ Average of only one replication

**2007 STATEWIDE
PROCESSING TOMATO
VARIETY TRIALS**

2007 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, field personnel and University researchers with valuable information on variety yield performance in field trials over a wide geographical area, as well as generating significant data on processing fruit quality characteristics. It has also provided critical information to individual production districts and counties on varietal adaptability to local conditions. This year, the project evaluated nine replicated early maturing varieties, 11 replicated midseason maturing lines and 11 single-replication observation midseason maturity selections common to 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 season saw statewide processing tomato production approaching at just over 12 million tons, one of the largest crops ever. Conditions for planting were nearly ideal with mild, dry conditions. Harvest extended well into October with mild, with a couple of rain events primarily from Tracy north into the Sacramento Valley. In the wettest areas some yield loss occurred. Primary disease pressure this year came from some Bacterial Speck early and Powdery Mildew later. In some locations there were fields with some Verticillium and Fusarium problems. Insect pressure was moderate with some stink bug and worm problems and some mite injury.

The statewide UCCE variety evaluation project averaged 45.8 tons/acre for the early season replicated trials and 40.3 tons/acre for the midseason maturity replicated trials. Early season soluble solids ($^{\circ}$ Brix) averaged 5.2, early season color in the replicated trials was 23.7, while pH levels averaged 4.48, higher than desired. In the statewide midseason replicated trials soluble solids averaged 5.3, color averaged 22.8, and pH levels averaged 4.45, also higher than preferred.

Results and Discussion

Seven counties (Yolo, Contra Costa, San Joaquin, Stanislaus, Merced, Fresno and Kern) participated in the statewide variety evaluation studies this past season, conducting three early and seven midseason trials. The three following tables represent summaries of combined yield and fruit quality data from the 2007 Statewide UCCE Farm Advisor/Specialist Processing Tomato Variety Evaluation Project. These summaries were obtained from data analyses done by Gail Nishimoto, Programmer Analyst, at UC Davis and coordinated by Scott Stoddard, Vegetable Crops Farm Advisor in Merced County.

Table E1 represents yield and quality means from the Combined Uniform Replicated Early Season Maturity Variety trials. Results are from three trials in Yolo, Contra Costa/San Joaquin and Fresno Counties. Highest yield in the combined data was achieved by SUN 6366 at 52.6 tons/acre, followed by H-5003 (51.4 tons/acre), BOS 66509 (49.4 tons/acre) and BOS 1411 (48.3 tons/acre). In terms of fruit quality, the top varieties in soluble solids were SUN 6366 at 5.8, followed by BOS 1411 (5.7),

H-5003 (5.4) and H-2206 (5.3). The varieties with the best fruit color were H-5003 and BOS 66508, both at 22.8, followed by APT 410 (23.4), BOS 66509 (23.5) and H 9280 (23.6). An Agtron color meter is used to determine fruit color, so the lower the numerical value, the better the fruit color. Best pH levels were given BOS 1411 at 4.45, followed by H 5003 and BOS 66508, both at 4.47. pH levels are best when at 4.35 or lower.

Table M1 presents results from the Midseason Maturity Replicated Variety trials. Data is shown for six trials in five counties (Yolo, Stanislaus, Fresno 1 and Fresno 2, Merced and Kern). Highest combined yield was provided by SUN 6368 at 45.0 tons/acre, followed by H 8004 (43.4 tons/acre), H 2005 (43.2 tons/acre), H 9780 (42.4 tons/acre), AB 8058 (41.2 tons/acre) and AB2 (41.0 tons/acre). Best soluble solids (°Brix) occurred with H 2005 at 5.6, followed by SUN 6368, H 8004, H 9780, AB2, and H 2506 all at 5.4. Varieties showing the best fruit color were led by H 2506 at 21.3, followed by H 8004, AB 8058 and Red Spring, all at 22.5, and H 2005 (22.7). Best pH levels were given by H 9780 at 4.35, followed by AB2 (4.36) and H 8004 (4.42).

Table M2 shows data summarized for the Midseason Maturity Observation Variety trials from six locations in five counties (Yolo, Stanislaus, Merced, Fresno 1 and Fresno 2, and Kern). Highest combined yield in the trials for the eleven observation lines tested was led by NUN 877 at 40.6 tons/acre, followed by UG 4305 (40.3 tons/acre), NDM 5578 (39.8 tons/acre), NDM 4464 (39.5 tons/acre), NUN 889 (39.4 tons/acre) and BOS 67374 (38.9 tons/acre). Best soluble solids were achieved by PX 1723 at 5.8, followed by HT 1075 (5.5), BOS 67374 (5.4) and NUN 877, UG 4305 and NDM 5578, all at 5.3. Best fruit color occurred with NUN 877 and NDM 5578, both at 21.5, followed by NUN 889 (21.8), UG 4305 (22.2) and NDM 4464 and HT 1075, both at 22.3. Best pH levels were present with NDM 5578 and HT 1058, both at 4.44, followed by BOS 67374 (4.46) and NUN 877, PX 1723 and NDM 4464, all at 4.47.

TABLE E1 PROCESSING TOMATO EARLY MATURITY VARIETY TRIALS 2007
STATEWIDE 3 LOCATIONS

VARIETY	Yield tons/acre		Brix %		Color	pH
937 SUN 6366	52.6 (01)	A	5.8 (01)		23.9 (06)	4.48 (05)
883 H 5003	51.4 (02)	A B	5.4 (03)		22.8 (01)	4.47 (03)
938 BOS 66509	49.4 (03)	B C	5.1 (07)		23.5 (04)	4.51 (09)
950 BOS 1411	48.3 (04)	C D	5.7 (02)		24.0 (07)	4.45 (01)
921 BOS 66508	45.5 (05)	D E	5.2 (05)		22.8 (01)	4.47 (02)
935 HMX 5883	43.4 (06)	E F	4.9 (08)		24.7 (09)	4.50 (07)
732 APT 410	43.2 (07)	E F	5.2 (06)		23.4 (03)	4.50 (07)
951 H 2206	41.7 (08)	F	5.3 (04)		24.3 (08)	4.49 (06)
637 H 9280	36.7 (09)	G	4.7 (09)		23.6 (05)	4.48 (04)
MEAN	45.8		5.2		23.7	4.48
LSD @ 0.05=	3.1		0.3		0.7	0.03
C.V.=	8.3		6.4		3.6	0.9
VARIETY X LOCATION LSD @ 0.05=	5.4		N.S.		1.2	N.S.

Numbers in parentheses (x) represent relative ranking within a column.

LSD = Least significant difference at the 95% confidence level. Means followed by the same letter are not significantly different.

N.S. = not significant.

CV = coefficient of variation (%), a measure of the variability in the experiment.

Variety x location LSD = LSD when comparing varieties across locations.

TABLE M1 PROCESSING TOMATO MID-SEASON MATURITY VARIETY TRIALS 2007
STATEWIDE 6 LOCATIONS

VARIETY	Yield tons/acre		Brix %	Color	pH
923 SUN 6368*	45.0 (01)	A	5.4 (05)	23.5 (10)	4.45 (05)
545 H 8004	43.4 (02)	A B	5.4 (06)	22.5 (02)	4.42 (03)
944 H 2005*	43.2 (03)	A B C	5.6 (01)	22.7 (05)	4.47 (07)
866 H 9780	42.4 (04)	B C D	5.4 (03)	23.3 (08)	4.35 (01)
942 AB 8058*	41.2 (05)	C D	5.0 (08)	22.5 (03)	4.45 (06)
868 AB 2*	41.0 (06)	D	5.4 (02)	23.2 (06)	4.36 (02)
865 H 2601	38.7 (07)	E	5.1 (07)	23.2 (06)	4.48 (08)
943 HMX 5893*	36.6 (08)	E F	5.0 (09)	23.5 (09)	4.53 (10)
922 RED SPRING	36.0 (09)	F	4.8 (10)	22.5 (03)	4.53 (09)
952 H 2506*	35.4 (10)		5.4 (04)	21.3 (01)	4.45 (04)
933 NUN 567 (2)	35.6	see note below	4.8	23.0	4.47
MEAN	40.3		5.3	22.8	4.45
LSD @ 0.05=	2.1		0.2	0.6	0.04
C.V.=	9.3		6.1	4.4	1.5
VARIETY X LOCATION LSD @ 0.05=	5.2		0.4	N.S.	N.S.

* asterisked varieties are missing one plot for yield
varieties 545 and 923 are missing 1 plot for Brix, Color and pH
Note: Some varieties have missing plots. To make pairwise comparisons of variety means see LSD Table 5
for the proper LSD to use.

** San Joaquin County not included in the statistical analysis.

(2) NUN 567 not included in the statistical analysis because of too many missing plots.

Numbers in parentheses (x) represent relative ranking within a column.

LSD = Least significant difference at the 95% confidence level. Means followed by the same letter are not significantly different.

N.S. = not significant.

CV = coefficient of variation (%), a measure of the variability in the experiment.

Variety x location LSD = LSD when comparing varieties across locations.

TABLE M2 PROCESSING TOMATO MID-SEASON MATURITY VARIETY TRIALS 2007
STATEWIDE 6 LOCATIONS

VARIETY	Yield tons/acre			Brix %	Color	pH
956 NUN 877	40.6	(01)	A	5.3 (05)	21.7 (01)	4.47 (04)
960 UG 4305*	40.3	(02)	A	5.3 (06)	22.2 (04)	4.49 (08)
955 NDM 5578	39.8	(03)	A	5.3 (04)	21.7 (01)	4.44 (01)
949 NDM 4464	39.5	(04)	A	4.8 (11)	22.3 (05)	4.47 (06)
957 NUN 889	39.4	(05)	A	4.9 (09)	21.8 (03)	4.49 (09)
924 BOS 67374*	38.9	(06)	A B	5.4 (03)	23.2 (11)	4.46 (03)
953 HT 1058	36.6	(07)	A B C	5.4 (03)	23.2 (10)	4.44 (02)
954 HT 1075	33.6	(08)	B C D	5.5 (02)	22.3 (05)	4.48 (07)
958 PX 1723*	31.5	(09)	C D	5.8 (01)	22.6 (08)	4.47 (05)
959 HMX 5894*	31.5	(10)	C D	5.1 (07)	22.6 (08)	4.53 (10)
961 UG 36003*	30.8	(11)	D	5.0 (08)	22.4 (07)	4.54 (11)
MEAN	36.9			5.2	22.3	4.48
LSD @ 0.05 (to compare 6 loc varieties vs 6 loc varieties	5.61			0.51	N.S.	N.S.
LSD @ 0.05 (to compare 6 loc varieties vs 5 loc varieties	5.89			0.53	N.S.	N.S.
LSD @ 0.05 (to compare 5 loc varieties vs 5 loc varieties	6.15			0.56	N.S.	N.S.
C.V.=	13.1			8.4	3.9	2.0

* 1 missing plot (Kern)

** San Joaquin County data not included in statistical analysis

Numbers in parentheses represent relative ranking within a column.

LSD @ 0.05 = least significant difference at 95% probability level.

N.S. = not significant.

C.V. = coefficient of variation.

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