

2005 STATEWIDE PROCESSING TOMATO VARIETY TRIALS
UC West Side Research & Extension Center - FRESNO County Results

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INTRODUCTION

Since 1972, the California Tomato Research Institute, in collaboration with UC Cooperative Extension, has supported the Statewide Variety Evaluation Project. Variety trials are annually conducted in major processing tomato growing areas of the state by UC Farm Advisors in cooperation with seed companies, processors, and growers. In 2005 eight counties (Colusa, Yolo, Contra Costa, San Joaquin, Stanislaus, Merced, Fresno and Kern) participated in the statewide variety evaluation trials conducting 5 early and 5 midseason trials. All of the early season trials were direct-seeded, while the midseason trials were a combination of direct-seeding and transplanting. A final report summarizing results across all locations and by each county is available as the 2005 Statewide Processing Tomato Variety Evaluations Final Report at http://cetulare.ucdavis.edu/Vegetable_Crops. The following report summarizes 2 early season trials and 1 midseason variety trial conducted at the UC West Side Research and Extension Center in FRESNO County.

EARLY SEASON VARIETY TRIALS

Two identical trials were conducted with the only difference being the number of plant rows per bed: single vs. double row.

Direct Seeded: February 14, 2005

Emergence: March 1, 2005

Thinned: April 4, 2005

Machine Harvested: July 19, 2005

Soil: Panoche clay loam

Irrigated: Rainfall February 14-18, 2005

Furrow Irrigation

Irrigation Cutoff: June 17, 2005

Plot Size: 1 66-inch bed x 65' row;

Randomized Complete Block Design, 4 reps

Fertilizer: 100 lbs P₂O₅ (11-52-0); Pop up + 180 units nitrogen

Weed Control: Matrix at planting, Dual Magnum at layby

Insect Control: Sulfur & Success applied July 2, 2005

EARLY Season Varieties & Resistance Traits

Seed Company	Variety	Resistance**
Seminis	1. APT 410*	\$VFFNP
Harris Moran	2. HMX 2853	\$VFFNP
Heinz	3. H 5003	\$VFFNP
	4. H 9280*	\$VFFNP
	5. H 9997	\$VFFNP
Unilever	6. U 250	\$VFFNP
	7. U 446	\$VFFNP
Seminis	8. HyPeel 45*	\$VFFNP
Seminis	9. PS 740	\$VFFNP
Hazera	10. HA 3523	\$VFFN, TMV, SW
Orsetti	11. BOS 66508	\$VFFNP

* Trial standards
 ** Check with seed company to confirm disease resistance.

Code for Disease Resistance and Hybrid Status		
\$	=	Hybrid
V	=	Verticillium wilt Resistant
F	=	Race 1 Fusarium wilt Resistant
FF	=	Race 1and 2 Fusarium wilt Resistant
FFF3	=	Race 1,2, and 3 Fusarium wilt Resistant
N	=	Root Knot Nematode Resistant (some species)
P	=	Bacterial speck resistant
D	=	Dodder tolerance
TMV	=	Tobacco Mosaic Virus
Sw	=	Spotted Wilt Virus

Table 1. EARLY Season (Replicated) Process Tomato Variety Trial Results, Fresno County, 2005

SINGLE row per bed										
Code	VARIETY	Yield Tons/A		Brix %	Brix Yield	PTAB Color	pH	% green	% rot + sunburn	lbs per 50 fruit
3	H 5003	48.0 (01)	A	5.9 (01)	2.83 (01)	22.3 (01)	4.35 (06)	3.5	13.7	7.1
5	H 9997	45.5 (02)	A B	5.1 (09)	2.30 (03)	23.5 (05)	4.40 (09)	5.6	19.3	8.8
6	U 250	43.9 (03)	B C	5.1 (09)	2.22 (04)	26.5 (11)	4.37 (07)	2.6	20.1	9.7
11	BOS 66508	41.1 (04)	C D	5.7 (03)	2.34 (02)	23.0 (03)	4.32 (03)	4.5	13.3	8.9
2	HMX 2853	38.4 (05)	D E	5.2 (07)	2.00 (09)	24.0 (07)	4.42 (10)	3.2	25.6	9.1
7	U 446	37.7 (06)	E	5.5 (06)	2.05 (06)	23.0 (03)	4.38 (08)	4.9	13.2	11.0
8	HyPeel 45	37.4 (07)	E	5.8 (02)	2.18 (05)	24.0 (07)	4.29 (01)	3.6	24.1	9.6
4	H 9280	37.3 (08)	E	4.9 (11)	1.82 (10)	24.3 (09)	4.33 (04)	3.9	22.7	9.3
1	APT 410	36.7 (09)	E	5.6 (04)	2.05 (07)	23.8 (06)	4.35 (05)	3.1	16.7	8.8
9	PX 740	36.4 (10)	E	5.6 (05)	2.02 (08)	24.3 (09)	4.30 (02)	3.9	22.0	8.8
10	HA 3523	35.2 (11)	E	5.1 (08)	1.79 (11)	22.5 (02)	4.45 (11)	3.3	19.5	9.2
AVERAGE		39.8		5.4	2.14	23.7	4.36	3.8	19.1	9.1
LSD @ 5%		3.2		0.2	0.19	1.3	0.06	NS	NS	
C.V. %		5.6		3.1	6.2	3.9	1.0	46.4	35.6	8.4

Table 2. EARLY Season (Replicated) Process Tomato Variety Trial Results, Fresno County, 2005

DOUBLE row per bed										
Code	VARIETY	Yield Tons/A		Brix %	Brix Yield	PTAB Color	pH	% green	% rot + sunburn	lbs per 50 fruit
5	H 9997	44.7 (01)	A	5.0 (08)	2.25 (02)	23.3 (06)	4.40 (10)	2.1	21.5	8.5
3	H 5003	44.6 (02)	A	5.7 (02)	2.54 (01)	23.0 (04)	4.36 (07)	3.6	18.0	7.1
6	U 250	39.3 (03)	B	4.9 (10)	1.91 (07)	25.3 (11)	4.31 (04)	2.4	15.9	9.2
2	HMX 2853	38.4 (04)	B C	5.0 (09)	1.90 (08)	24.8 (10)	4.39 (09)	4.4	26.6	8.6
11	BOS 66508	37.9 (05)	B C	5.6 (03)	2.16 (03)	22.3 (01)	4.28 (02)	8.0	14.3	8.7
1	APT 410	37.7 (06)	B C	5.2 (05)	1.95 (05)	23.0 (05)	4.36 (06)	3.6	20.1	8.4
8	HyPeel 45	37.0 (07)	B C D	5.8 (01)	2.14 (04)	24.3 (08)	4.27 (01)	3.1	23.6	9.0
7	U 446	36.5 (08)	B C D E	5.3 (04)	1.94 (06)	22.8 (03)	4.38 (08)	4.2	17.6	10.2
4	H 9280	35.1 (09)	C D E	4.7 (11)	1.65 (10)	24.0 (07)	4.34 (05)	3.3	17.9	8.7
9	PX 740	33.5 (10)	D E	5.2 (05)	1.73 (09)	24.3 (08)	4.29 (03)	2.6	19.0	8.5
10	HA 3523	32.5 (11)	E	5.1 (07)	1.65 (11)	22.5 (02)	4.41 (11)	4.2	27.9	9.0
AVERAGE		37.9		5.2	1.98	23.6	4.35	3.8	20.2	8.7
LSD @ 5%		4.1		0.3	0.23	1.0	0.06	NS	NS	
C.V. %		7.5		3.8	8.0	2.9	1.0	69.1	33.1	9.1

DISCUSSION

Spring weather in 2005 was abnormally rainy, yet crop development was not noticeably hampered. Weeds were kept to a minimum and the field was relatively free of insect, disease, and weed pressure at harvest. Results were very similar between the two experiments which only differed by having either a single seed line or two seed lines per bed. Yields of single row plots averaged 39.8 tons per acre (range = 35.2 to 48.0 tons) and 5.4 °brix (range = 4.9 to 5.9) across all varieties. Double row plots averaged 37.9 tons per acre (range = 32.5 to 44.7 tons) and 5.2 °brix (range = 4.7 to 5.8). H 9997 and H 5003 were the top yielding varieties followed by U 250 and BOS 66508. H 5003, Hypeel 45, & BOS 66508 consistently had the highest solids. Average fruit color (23.7) and pH (4.36) were nearly the same in both trials.

MID-SEASON VARIETY TRIAL

Direct Seeded: March 15, 2005

Irrigated: March 18, 2005

Emergence: April 8, 2005

Furrow Irrigation

Machine Harvested: August 19, 2005

Irrigation Cutoff: July 22, 2005

Soil: Panoche Clay Loam

Plot Size: one 66" bed x 85' row; single row/bed

Randomized Complete Block Design, 5 reps

Observational: single plot replication

Fertilizer: 100 lbs P₂O₅ (11-52-0); Pop up + 180 units nitrogen

Weed Control: Matrix at planting, Dual Magnum at layby

Insect Control: Sulfur & Success applied July 2, 2005

2005 MID-Season VARIETIES and RESISTANCE TRAITS

<u>Replicated</u>			<u>Observation</u>		
Seed Company	Variety	Resistance**	Seed Company	Variety	Resistance**
AB Seeds	1. AB 2*	\$VFFP	Seminis	1. PS 607	\$VFFN
Nunhems	2. SUN 6366	\$VFFNP	Heinz	2. H 9780*	\$VFFNP
Unilever	3. U 232	\$VFFNP	Unilever	3. U 567	\$VFFNP
Harris Moran	4. HMX 3859	\$VFFNP	Heinz	4. H 8004	\$VFFNP
Peto	5. PS 345	\$VFFNP	Orsetti	5. BOS 67374	\$VFFNP
Heinz	6. H 5803	\$VFFNP	Harris Moran	6. HMX 4799	\$VFFNP
	7. H 9665	\$VFFNP		7. HMX 4802	\$VFFF3NP
		\$VFFNP	CTRI	8. CTRI 4863-N	VFFN
United Genetics	8. UG 151	\$VFFN		9. DRI 9730	\$VFFNP
Heinz	9. H 8892	\$VFFNP			
Orsetti	10. HALLEY 3155	\$VFF	Nunhems	10. SUN 6371	\$VFFNP
			Unilever	11. U 519	\$VFFNP
Heinz	11. H 2401	\$VFFNP	Harris Moran	12. HMX 4798	\$VFFF3NP
Unilever	12. U 005	\$VFFNP		13. HMX 4801	\$VFFNP Sw
Heinz	13. H 2601*	\$VFFNP	Del Monte	14. NDM 3379	\$VFFNP
Nunhems	14. Red Spring	\$VFFNP	Nunhems	15. SUN 6374	\$VFFNP
	15. Sun 6360	\$VFFNP			
	16. Sun 6368	\$VFFNP			

* Trial standards

** Check with seed company to confirm disease resistance.

Code for Disease Resistance and Hybrid Status		
\$	=	Hybrid
V	=	Verticillium wilt Resistant
F	=	Race 1 Fusarium wilt Resistant
FF	=	Race 1 and 2 Fusarium wilt Resistant
FFF3	=	Race 1, 2, and 3 Fusarium wilt Resistant
N	=	Root Knot Nematode Resistant (some species)
P	=	Bacterial speck resistant
D	=	Dodder tolerance
TMV	=	Tobacco Mosaic Virus
Sw	=	Spotted Wilt Virus

Table 3. MID-Season REPLICATED Processing Tomato Variety Trial Results, Fresno County, 2005.

Code	VARIETY	Yield Tons/A					Brix %		Brix Yield	PTAB Color	pH
5	PX 345	61.4 (01)	A				5.1 (10)		3.11 (02)	28.5 (16)	4.40 (05)
7	H 9665	60.2 (02)	A	B			4.7 (16)		2.83 (11)	26.8 (15)	4.42 (06)
3	U 232	60.1 (03)	A	B	C		5.0 (12)		3.02 (05)	26.3 (12)	4.45 (08)
12	U 005	58.0 (04)	A	B	C	D	5.1 (09)		2.97 (07)	26.0 (11)	4.39 (04)
11	H 2401	57.3 (05)	A	B	C	D	5.2 (07)		2.97 (06)	26.5 (13)	4.35 (02)
2	Sun 6366	57.1 (06)	A	B	C	D	5.5 (05)		3.15 (01)	24.8 (04)	4.47 (12)
6	H 5803	56.6 (07)	A	B	C	D	5.5 (06)		3.08 (04)	25.5 (09)	4.45 (09)
9	H 8892	56.2 (08)	A	B	C	D	5.2 (08)		2.89 (10)	25.3 (07)	4.42 (07)
13	H 2601	55.4 (09)	A	B	C	D	E	4.9 (14)	2.71 (13)	26.5 (13)	4.47 (11)
15	Sun 6360	54.2 (10)		B	C	D	E	4.9 (13)	2.67 (15)	25.0 (06)	4.48 (13)
16	Sun 6368	54.1 (11)		B	C	D	E	5.7 (02)	3.09 (03)	25.8 (10)	4.46 (10)
14	Red Spring	53.5 (12)		B	C	D	E	5.1 (11)	2.70 (14)	23.8 (02)	4.55 (16)
8	UG 151	53.3 (13)			C	D	E	4.7 (15)	2.51 (16)	24.3 (03)	4.54 (14)
10	Halley 3155	52.9 (14)				D	E	5.6 (04)	2.97 (09)	23.8 (01)	4.37 (03)
4	HMX 3859	52.5 (15)				D	E	5.7 (03)	2.97 (08)	25.3 (07)	4.54 (14)
1	AB 2	48.7 (16)					E	5.8 (01)	2.82 (12)	25.0 (05)	4.34 (01)
	AVERAGE	55.7					5.2		2.90	25.5	4.44
	LSD @ 5%	6.9					0.4		N.S.	1.6	0.06
	C.V. %	8.6					5.3		9.2	4.4	1.0

Table 4. MID-Season OBSERVATION Process Tomato Variety Trial Results, Fresno County, 2005

Code	Variety	Yield (Tons/A)	° Brix	Brix Yield	PTAB Color	pH
1	PS 607	48.1	5.0	2.4	25	4.44
2	H 9780	63.9	5.2	3.3	28	4.26
3	U 567	49.2	4.4	2.2	26	4.51
4	H 8004	60.2	5.5	3.3	27	4.38
5	BOS 67374	53.0	5.1	2.7	24	4.36
6	HMX 4799	51.7	4.7	2.4	25	4.46
7	HMX 4802	55.1	4.7	2.6	29	4.46
8	CTRI 4863-N	55.4	4.9	2.7	26	4.36
9	DRI 9730	48.4	5.5	2.7	28	4.34
10	SUN 6371	49.5	5.1	2.5	28	4.30
11	U 519	49.8	4.7	2.3	25	4.48
12	HMX 4798	54.7	5.4	3.0	24	4.51
13	HMX 4801	48.3	5.1	2.5	26	4.63
14	NDM 3379	48.4	5.1	2.5	31	4.38
15	SUN 6374	49.7	5.5	2.7	28	4.36
	AVERAGE	52.4	5.1	2.7	26.7	4.42

DISCUSSION

The summer weather in 2005 was abnormally hot, yet crop set and fruit development in the Fresno mid-season variety trial was fairly advanced before the hottest weather arrived and then persisted throughout August. The field had small amounts of dodder, curly top, and Tomato Spotted Wilt Virus randomly scattered throughout the trial at harvest. Weeds were kept to a minimum and there was very little insect pressure.

All varieties performed exceptionally well and the trial averaged 55.7 tons with a range of 48.7 to 61.4 tons per acre. PX 345 ranked at the top of the chart, but was not statistically different from the top 9 varieties on the list whose yields ranged from 61.4 to 55.4 tons per acre. AB 2 the industry standard ranked lowest with a yield determination of 48.7 tons per acre, but this was not statistically significant from eight other varieties between 48.7 and 55.4 tons per acre.

Soluble solids (°brix) ranged from 4.7 (H 9665) to 5.8 (AB 2). PTAB color ranged from 23.8 to 28.5 and averaged 25.5 over all varieties, which is a little higher than desirable. pH ranged from 4.34 to 4.55 and averaged 4.44 over all varieties.

Observation plots had very similar averages to the replicated trial. Top yield performers included H 9780, the standard, and H 8004. Varieties with the highest °brix in this trial were H 8004, DRI 9730, and Sun 6374. Color on average was also higher in value (less red), which is undesirable. Trial results from single plot observations should be viewed cautiously because they lack replication, which increases the chance of error.

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