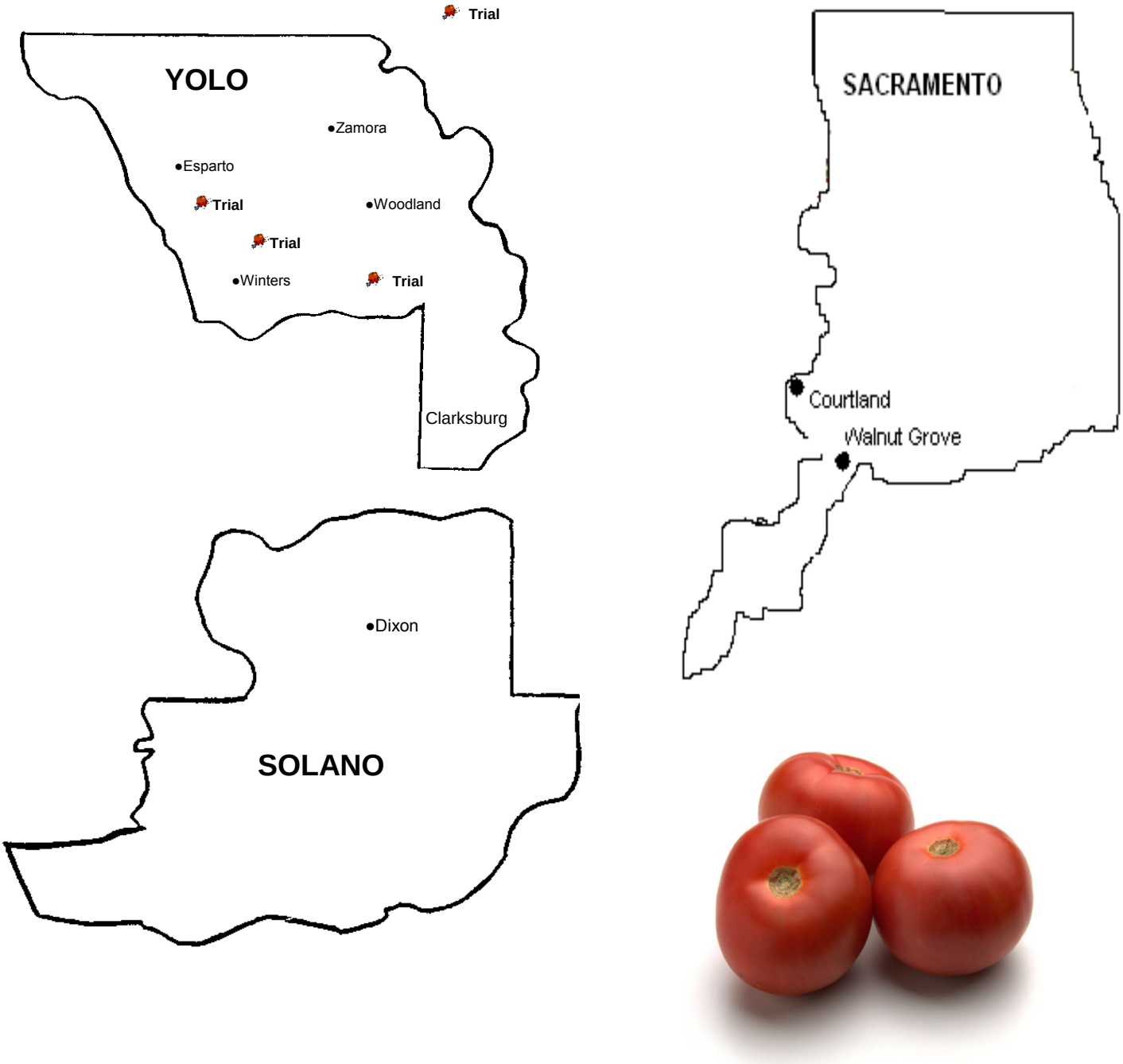
2012 Processing Tomato Variety Trials



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Cooperative Extension in Agriculture and Home Economics. US Department of Agriculture, University of California and Yolo County Cooperating.

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Statewide compile variety report is located on the Internet at:

http://ceyolo.ucdavis.edu/Vegetable_Crops/Processing_Tomato_Variety_Trials/

This report, as well as historical reports, is electronically available at the same web site.

2012 Processing Tomato Variety Evaluation Trials
Yolo/Solano/Sacramento Counties

by

Gene Miyao, UC Farm Advisor, and Mark Kochi, Field Assistant, Yolo County

The California processing tomato industry produced 12.6+ million tons in 2012 with an estimated statewide record average of 49 tons per acre.

Locally, we saw limited harvest activity until late July due to rain-delayed planting. While rains were limited in January through early March, storms beginning in mid-March and continuing into mid April created wet soil conditions for many (Fig. 1). Harvest was relatively dry and without major rainfall until mid October.

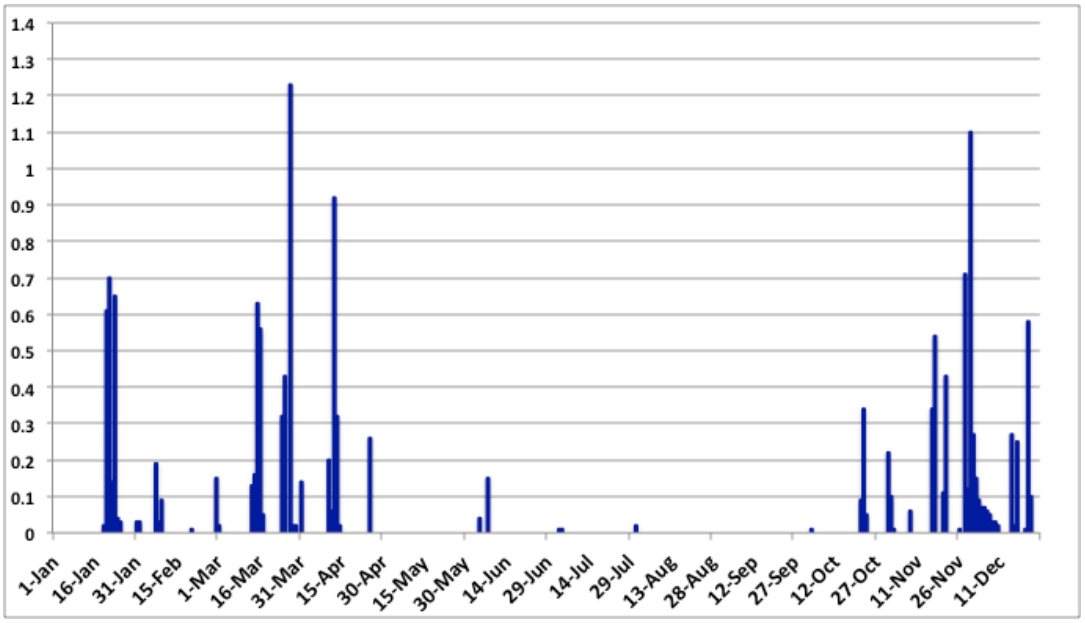

Figure 1. Daily rainfall in 2012. Source: Davis CIMIS #6 station

Temperatures were moderate in the late spring through the summer (Table A). During the bulk of the fruit setting period, in the spring through August, there were only 20 days with temperatures over 95° F. Only 3 days were above 100° F (June 16, July 11 and August 11 with 103°, 102° and 103° F, respectively). Extreme high temperatures were not prevalent in 2012.

Table A. 2012 temperatures, Davis.

	Number of days	
Month	> 95° F	>100° F
April	0	0
May	1	0
June	5	1
July	7	1
August	7	1
Sept	2	0
Oct	2	0
Total	**24**	**3**

Tomato powdery mildew activity was again low compared to a run several years ago when mildew appeared to be a major, widespread disease. Bacterial speck incidence was very low, especially compared to last year.

Tomato spotted wilt virus (TSWV) was widespread and common in our area. There were some fields (or portions of fields) where damage was severe. For some growers, the need to reduce losses to TSWV may include use of resistant varieties or early spray programs. For the vast majority, TSWV may well be present, but without the intensity that requires an aggressive treatment program.

Fusarium crown and root rot is spreading with a high level of severity in a number of fields.

Resistance breaking populations to our root knot nematode resistant varieties are continuing to develop in several additional fields. The resistance problem may also be occurring in other fields, but at a level that isn't readily detectable.

The use of drip irrigation systems continues to increase in popularity. Wide beds on 80-inch centers are being used and will likely remain a part of the culture into the near future, as will the traditional 60-inch configurations.

Variety Evaluation Trials

Evaluation of varieties for local adaptation continued to be a part of the University of California farm advisor program. Our objective was to identify dependable, high yielding and high quality variety releases that can be grown over a wide geographic area under varying environmental conditions. The varieties were compared side-by-side in an experimentally sound designed test within local counties in the Central Valley from Yolo to Kern. Tests were conducted in a similar fashion to combine and to compare local results with tests by UC farm advisors in other locations.

Entries:

Varieties were selected in consultation with processors and seed companies.

The early-maturity trial included 15 varieties (table 1A). Variety standards were Heinz 2206 and APT 410. All early varieties were evaluated in a replicated design. UG 15908 and HMX 1893 have spotted wilt resistance.

In the mid-maturity trial, 16 replicated and 15 observational varieties were included (table 1B). Mid-maturity standards were AB 2, H 9780 and Sun 6366. All mid entries except AB 2 were nematode resistant. Several varieties were listed as resistant to spotted wilt virus. Campbell C 316 was the only entry with Fusarium wilt race 3 resistance.

Additionally, in 2012, two local tests were conducted in certified organic production fields with a set of 15 varieties (Table 6). The test was in cooperation with OLAM Foods.

Locations:

The local early trial was northeast of Winters with Don Rominger and Sons. The mid maturity trial was between Davis and Winters with J.H. Meek and Sons.

Other UC tests were conducted by farm advisors representing San Joaquin, Stanislaus, Merced, Fresno and Kern counties.

The evaluation in organic fields was conducted with Joe Rominger of D.A. Rominger and Sons near

Winters and also with Scott and Brian Park of Park Farming south of Meridian.

Methods:

Both the early and mid-maturity trials were established from commercially grown greenhouse transplants. All plants in the replicated portion of the trial were directly planted from trays. Non-replicated entries were pulled from trays, counted, bundled and bagged ahead of the field planting to conserve space on the transplant sled storage racks. The grower's equipment and crew mechanically set the transplants. Skips were filled within a day of the planting. The few transplants that did not survive were replaced over a 2-week period.

Both our trials were transplanted on twin lines, with each line 12" apart from each other, on a bed centered on 5'. All plots were 100' long with the exception of the non-replicated mid-maturity lines that were 60 feet long. A short alley separated each replicate block.

All cultural practices in these ~1 acre experimental sites were those of the cooperating grower and matched management of the remaining larger area of their commercial tomato field.

Field meetings were held at each site as fruit ripened to provide an opportunity to examine the performance of the varieties in side-by-side comparisons.

To measure yield, fruit from the entire plot were harvested into special weigh trailers using the grower's harvesting equipment and crew. A 5-gallon volumetric sample of non-sorted fruit was collected from the mechanical harvester to evaluate fruit defects. Fruit was sampled along the length of the plot. These fruit were graded into categories of marketable red, pink, green, sun-damage, mold and blossom end rot and measured by weight.

From the marketable reds, an ~7 pound sample from each plot was bagged and delivered to a local inspection station of the Processing Tomato Advisory Board. Color, °Brix (soluble solids) and pH were determined by PTAB with a procedure consistent with commercial grading. Additionally, similar samples were hand picked by the Diane Barrett Lab from the UC Davis Food Science and Technology Department to evaluate processing quality.

Statistical analysis of variance methods were used to help interpret the data. Conclusions derived from non-replicated data should be viewed with much less confidence.

Organic evaluations: Fields were mechanically transplanted from plants grown in trays but pulled and transported in cardboard boxes. The Meridian trial was planted on single lines per 5' centered beds with plots 100' long. The Winters trial was planted on double lines per 5' centered beds with plots 75' long.

EARLY-MATURITY EVALUATION: WINTERS

Early-maturity varieties were evaluated with Joe Rominger in a D.A. Rominger and Sons field north of Winters. We transplanted on April 6 into twin lines per bed into a combination of Brentwood and Rincon silty clay loam soils (Table 2A). Seedlings established well

although soils were wet at planting from untimely rainfall. Water supply was limited during fruit sizing; and as a result, yield suffered. Harvest was on 2 August, 122 days after transplanting.

Table 4 early replicated—yield, fruit quality and culls: The trial averaged 20.6 tons per acre, while our standard APT 410 was one of the lowest yielding. The highest yielding group was led by SVR 0599 with 24.8 tons per acre, although statistically grouped with 8 other varieties.

Brix levels were very high with a trial average of 6.8. SVR 0541 had the highest Brix level with 7.6, but included HMX 1893 and UG 15308 in the high solids group.

Rots were high, predominately composed of blossom end rot.

Vine size was difficult to judge with the twin row planting. Overall vine size was moderate. The smaller-vined varieties in this test were BQ 204, H 2206, K 2769 and H 3044 at 73% or less of the row width. The larger vined varieties were N 6397 and SVR 0541 with 95% cover of the row width.

Canopy cover for fruit protection from sun damage ranged from 43 to 80%. Fruit canopy cover was moderate overall, but especially weak with K 2770, H 3044, H 2206 and BQ 204, all 50% or less at harvest. Levels above 80% are good targets.

Visual rating of 'days-to-estimated-harvest' date was made relative to APT 410. The differences ranged from -6 to 5 days later on average. The earliest variety in the test was H 2206, which was 6 days earlier than APT 410. The latest maturing varieties, 5 days behind APT 410, were BOS 602, HMX 1893, N 6397, SVR 0541 and UG 15308.

MID-MATURITY EVALUATION: WOODLAND

Our local mid-maturity variety trial evaluation was transplanted with Steve and Sam Meek and Jon Pon of J.H. Meek and Sons in a field between Davis and Winters on a class 2, Rincon silty clay loam soil. Seedling plugs were mechanically transplanted on May 9th in double lines per bed (Table 2B). Seedbed condition was very good. The field was irrigated with a buried drip system. Plants established quickly and vines grew well. Verticillium wilt was prevalent, while spotted wilt and Fusarium crown rot were present, but minor. Harvest was timely on 12 September (126 days after transplanting).

REPLICATED ENTRIES (WOODLAND)

Table 5A mid replicated— yield, fruit quality and culls: Overall the yield average for the trial was 63.4 tons per acre. Seven of the varieties were in the top yield category led by UG 19406 with 69.6 tons per acre and included N 6402, N 6404, AB 2, UG 19306, HM 9905 and BQ 205. The lowest yielding group included H 9780, PX 1245 and BQ 163, all with less than 60 tons per acre. *Note: last year with high levels of bacterial speck, UG 19406 was in the lowest yielding group*.

°Brix level was moderate with an average of 4.9. The high Brix group included DRI 0319 and AB 0311 with 5.58 and 5.35 °Brix, respectively.

Fruit pH levels were overall good with an average of 4.33. Interestingly, the high fruit pH levels (above 4.40) were measured from N 6402, N 6404, Sun 6366 and included H 5608 and HM 9905.

Overall, cull levels were low. Spotted wilt virus levels measured on fruit were below 1%.

Table 5B mid replicated— vine size, canopy cover and estimated maturity: All of the varieties covered the width of the beds completely or nearly so, with an average of 97%. The smaller vined varieties were H 5508, H 9780 and PX 1245 with a row cover of 93% or less.

Fruit protection from canopy cover was evaluated shortly before harvest. A canopy cover at time of harvest of 80% or more is desirable, while levels below 50% are usually problematic for fruit protection from sun damage. Canopy was poorest with PX 1245 at 39% resulting from a high level of leaf necrosis. H 5608 was measured at 55%. Cover was best with UG 19306, DRI 0319, BQ 205, AB 2 and AB 311, all with a cover of 81% or higher.

A visual estimate of days to harvest was assessed and compared to the standard AB 2. The earliest variety was Sun 6366 at 4 days early than AB 2. The latest maturity varieties were H 9780 and UG 19306 at 5 days later than AB 2.

NON-REPLICATED ENTRIES (WOODLAND)

Table 5C: mid observational— yield, fruit quality and culls: The highest yielding non-replicated variety was HMX 1892 with 81.9 tons per acre.

The high Brix varieties were BQ 268 and Campbell C 316, both at 5.5.

HMX 1885 had the lowest sun damaged fruit at 1% while BQ 270 and BQ 273 had the highest with 10% each.

Fruit with spotted wilt symptoms were at a low level.

Table 5D mid observational— vine size, canopy, and estimated maturity: Vines were overall large and covered from 90 to 100% of the row width, except for C 316 at 85%.

Canopy cover was highly variable amongst the varieties. H 1175 and BQ 270 were poorest with 40%. H 1170 and SVR 0686 had the best with 90% (but were also in the later maturing group).

Maturities ranged from -5 days to +7 days to estimated harvest compared to AB 2. BQ 272, BQ 270 and BQ 273 appeared to be the earliest.

ORGANIC EVALUATION: WINTERS

An evaluation of organic varieties was conducted with Joe Rominger in a D.A. Rominger and Sons field north of Winters. We transplanted on May 1 into twin lines per bed into a Brentwood silty clay loam soil (Table 7A). Irrigation was by furrow. Plants grew especially well after early bloom and were very healthy. Harvest was on 4 September, 126 days after transplanting.

Table 8A Organics, Winters— yield, fruit quality and culls: At Winters, fruit yields were high with an average yield of 50.9 tons per acre. Plants grew vigorously, especially after early bloom. The highest yielding variety in the Winters test was clearly H 5608 with 60.7 tons per acre. Nine of the 15 varieties exceeded 50 tons per acre. Brix levels were modest with an average of 4.9. The highest Brix varieties were AB 319 with 5.63 and included AB 311, BQ 163 and BQ 206. Harvest was relatively clean. While spotted wilt virus was relatively light at the Winters site, PS 650 appeared to be more prone to damage.

Table 8B Organics, Winters— vine size, canopy cover and estimated maturity: Varieties covered the width of the beds within a range of 78 to 100%. The smaller vined varieties were H 3402, H 5508 and Sun 6366 all at 83% or less. AB 319 was the largest at 100% row width.

Fruit protection as canopy cover was evaluated shortly before harvest. Canopy cover was poorest with H 3402 at 53%, H 5508 at 63% and PS 650 at 66%. Cover was best with several including AB 311, AB 319 and PS 002, all with a cover of 85%.

A visual estimate of days to harvest was assessed and compared to the standard AB 2. Maturities were similar to each other with a relatively narrow range of 6 days separating the extreme differences with most centered around the AB 2 maturity in this trial. The earliest variety was Sun 6366, which was 3 days early than AB 2. The later maturity varieties were PS 650 and H 3402, which were 2 to 3 days later than AB 2.

ORGANIC EVALUATION: MERIDIAN

The same 15 varieties were evaluated in an organic field of Scott and Brian Park south of Meridian. We transplanted on April 30 in a single line per bed into a Shanghai silty clay loam soil (Table 7B). Plants grew well and were healthy. Irrigation was by furrow. Harvest was on 31 August, 123 days after transplanting.

Table 9A Organics, Meridian— yield, fruit quality and culls: At Meridian, the highest yielding varieties were H 5608 and H 5508 with 51.2 and 47.3 tons/a, respectively, and both with few culls. Overall, Brix was modest with an average of 4.6. The high Brix performer was AB 311 with 5.0, and also included BQ 163, N 6397, AB 2, BQ 206 and H 3402. Blackmold fruit rot levels were a concern. An earlier harvest would have lessened the damage. Sun 6366, PS 002 and AB 2 had levels at or exceeding 13%. Fruit rot levels were lowest with H 5508, H 3042 and H 5608, with 1, 3 and 4%, respectively. Fruit size was large.

Table 9B Organics, Meridian— vine size, canopy cover and estimated maturity: Vine size was moderate with an average spread of 80% of the row width. The largest vines were H 5608 with 91%, AB 319 with 90%, HM 9905 with 89%, AB 311 with 88%, N 6404 with 85% and N 6397 with 83%.

Fruit protection from canopy cover was good overall. Canopy was weakest with H 3402 with 65% and Sun 6366 with 70%. Best cover was with AB 319 with 86%, N 6404 with 85%, H 5608 and HM 9905, both with 83%.

Maturity differences compared to AB 2 were not large, ranging from 2 day earlier with Sun 6366 to 3 to 4 days later with AB 319, N 6404 and PS 650.

Spotted wilt incidence was moderately low. The highest levels were from BQ 163, AB 2 and PS 650 at 1.8, 2 and 2.5 plants per 100' plot, respectively.

Table 1A. Early Maturity Entries, 2012 Statewide UC Processing Tomato Variety Trial, D.A. Rominger and Sons, Winters.

	Company	Replicated (15)	
1	Harris Moran	HMX 1893	VFFN SW
2	Heinz	H 1015	VFFNP
		H 2206	VF
		H 3044	VFFN
3	Keithly Williams	K 2769	VFFNP A
		K 2770	VFFN, A, TYLCV
4	Orsetti	BOS 602	VFFN
5	Nunhems	N 6397	VFFN
6	Seminis	**APT 410**	VFFNP
		SVR 0541	VFFP
		SVR 0599	VFF
7	United Genetics	UG 15308	VFFNP
		UG 15908	VFFN SW
8	WoodBridge	BQ 204	VFFNP
		BQ 287	VFFNP

BOLD LETTERS = trial standards

Check with seed company to confirm disease resistance

Code: Disease Resistance

V	=	VERTICILLIUM WILT RESISTANT
F	=	RACE 1 FUSARIUM WILT RESISTANT
FF	=	RACE 1 AND 2 FUSARIUM WILT RESISTANT
FFF_3	=	RACE 1, 2 AND 3 FUSARIUM WILT RESISTANT
N	=	ROOT KNOT NEMATODE RESISTANT (SOME SPECIES)
P	=	BACTERIAL SPECK RESISTANT (RACE 0)
D	=	DODDER TOLERANCE
TYLCV	=	TOMATO YELLOW LEAF CURL VIRUS
A	=	ALTERNARIA STEM CANKER
SW	=	TOMATO SPOTTED WILT VIRUS

Bacterial speck resistance to race 0 appears to have little value with our current pathogen population.

Table 1B. Mid-Maturity Varieties, 2012 Statewide, UC Processing Tomato Variety Trial, JH Meek and Sons, Woodland.

Company	16 replicated		15 observational	
1 Campbell Soup			C 316	$VFFF_3NP$
2 Monsanto	**AB 2**	VFFP	SVR 0686	VFFNP
	AB 0311	VFFNP SW		
	DRI 0319	VFFNP SW		
	PX 1245	VFFNP		
3 Harris Moran	HM 9905	VFFN	HMX 1885	VFFNP SW
			HMX 1892	VFFNP
			HMX 1894	VFFNP SW
4 Heinz	H 5508	VFFN SW	H 1161	VFFNP
	H 5608	VFFNP SW	H 1170	VFFN
	H 9780	VFFNP	H 1175	VFFN
5 Nunhems	**SUN 6366**	VFFNP	N 6405	VFFN
	N 6402	VFFN SW	N 6407	VFFN SW
	N 6404	VFFN SW		
6 United Genetics	UG 19006	VFFNP	UG 18806	VFFNP
	UG 19306	VFFNP		
	UG 19406	VFFNP		
7 WoodBridge	BQ 163	VFFNP	BQ 268	VFFNP
	BQ 205	VFFNP	BQ 270	VFFNP
			BQ 272	VFFNP SW
			BQ 273	VFFNP SW

BOLD = Standards

Check with seed company to confirm disease resistance.

Table 2A. Plot Specifications, Early-Maturity, Winters, 2012

Cooperator:	Joe Rominger, D.A. Rominger and Sons, Winters
Location:	NE of Winters. 1.5 miles south of CR 31 and 0.5 east of CR 89 SW ¼ of NE ¼, Section 15, T8N, R1W, MDM. SCS sheet #66.
Field Variety:	BOS 66509, double lines on 5'-centered beds.
Plot Design:	Randomized complete block, 4 reps. Individual plots were 500 square feet, 100' x 5'.
Greenhouse:	Westside Transplants, all in #338 trays
Planting Date:	6 April as transplants
Fertilizers:	100 lbs. 11-52-0 sidedressed in fall 10 gallons 8-24-5 plus zinc chelate pre-plant 55 gallons 28-0-0 (5% S) sidedress at layby 30 lbs N/acre as UN 32 as water run
Field Meeting:	26 July
Fruit Quality Sample:	30 July for Food Science, UCD 2 August for PTAB
Harvest:	2 August (122 days after planting)
Soil type:	Brentwood silty clay loam, Class 1, Storie Index 81 Rincon silty clay loam, Class 2, Storie Index 73
Irrigation method:	furrow
General:	Established well, but grew slowly. Limited water supply during fruit sizing impacted vine growth and fruit yield.

Table 2B. Plot Specifications, Transplant, Mid-Maturity, Woodland, 2012

Cooperator:	Steve and Sam Meek and John Pon, J.H. Meek and Sons, Woodland
Location:	west of Davis- 1/4 mile south of CR 31 & ½ mile west of CR 95. SE ¼ of NW ¼, section 9, T 8N, R 1E, MDM. SCS map #67.
Field Variety:	N 6404, double lines on 5'-centered beds.
Plot Design:	Randomized complete block with 4 reps. Non-replicated plots adjacent to 1st rep. Replicated plots 500 square feet (100' x 5') Non-replicated plots 300 square feet (60' x 5').
Greenhouse:	Westside Transplants in #338 trays for replicated and #392 trays for observational entries
Planting Date:	9 May as transplants
Population:	~8700 plugs per acre.
Field Meeting:	6 September
Fruit Quality Sample:	11 Sept for Food Science, UCD 12 Sept for PTAB
Harvest	12 September (126 days after transplanting)
Soil type:	Brentwood silty clay loam, Class 1, Storie Index 81
Irrigation method:	buried, drip irrigation
General Notes:	Transplants established and grew well. Some spotted wilt infections were noted. Verticillium wilt incidence was moderate. Some Fusarium crown rot was also detected.

Table 3. Fruit Quality Factor Definitions

SOLUBLE SOLIDS OR °BRIX	A measure of mostly fruit sugars. Soluble solids are directly related to finished processed product yield of pastes and sauces. Soluble solids are estimated with a refractometer, and measured as °Brix.
PH	A measure of acidity. A level below 4.35 is desirable to prevent bacterial spoilage of finished product. pH rises as fruit matures.
COLOR	Measured with a Processing Tomato Advisory Board LED instrument simulating Agtron. Lower numbers correspond to better red fruit color.

FIELD SAMPLING PROCEDURE

Fruit quality determinations were obtained by collecting ~7 pound sample of ripe, non-defect fruit from each plot. A local grade station of the Processing Tomato Advisory Board evaluated our fruit samples for soluble solids (Brix), color and pH.

Fruit defects in the field were estimated by collecting ~5 gallons of unsorted fruit from the mechanical harvester. Fruit were separated into marketable red, pink, green, sun-damaged, mold and blossom end rot categories. Measurements were on a weight basis and reported as percent.

To determine finished product thickness, additional samples were collected by Sam Matoba and crew and evaluated in the Diane Barrett lab at the UC Davis Food Science and Technology Department as part of a California League of Food Processors-funded project (T-4). Two blocks of replicated varieties and all non-replicated plots were evaluated. °Brix, pH, titratable acidity (reported as percent citric acid), and juice Bostwick were the factors measured. The results of the Food Science project are in a separate report.

Table 4. Winters, Replicated, Early-Maturity: Yield, quality and cull-out from tomato variety evaluation, D.A. Rominger & Sons, 2012.

	Variety	Yield tons/A		°Brix	PTAB color	pH	% green	% sun burn	% rots	lbs./ 50 fruit	% bed cover	% fruit canopy cover	estimated maturity relative to APT 410 (days)
1	SVR 0599	24.8	A	7.1	21.8	4.48	2	4	7	4.44	83	66	1
2	BOS 602	24.4	A	6.6	20.5	4.50	4	5	9	5.18	90	71	5
3	HMX 1893	22.1	AB	7.3	21.3	4.40	3	8	14	4.82	81	64	5
4	K 2769	22.0	ABC	6.6	21.5	4.53	2	6	3	3.52	71	60	-3
5	N 6397	21.9	ABC	7.0	20.3	4.55	5	2	16	4.21	95	80	5
6	**H 2206**	21.3	ABCD	6.9	21.8	4.53	2	3	3	3.90	69	50	-6
7	BQ 287	20.6	ABCD	6.5	20.5	4.54	3	6	11	4.02	78	56	1
8	H 1015	20.4	ABCD	6.8	20.3	4.54	3	5	17	4.35	83	58	1
9	SVR 0541	20.4	ABCD	7.6	20.0	4.52	7	4	12	4.31	95	74	5
10	K 2770	19.7	BCD	6.2	21.5	4.49	3	8	5	3.54	78	43	0
11	BQ 204	19.4	BCD	6.5	22.0	4.56	2	4	9	4.24	68	50	-3
12	H 3044	19.4	BCD	6.0	20.0	4.51	2	9	11	5.38	73	48	-2
13	UG 15908	18.4	BCD	6.8	20.3	4.49	3	4	19	4.42	85	70	4
14	**APT 410**	17.6	CD	6.7	20.5	4.52	3	8	13	4.74	76	59	0
15	UG 15308	17.1	D	7.2	19.8	4.55	3	8	20	3.79	90	68	5
	LSD 0.05	4.4		0.46	1.05	NS	1.3	NS	5.6	0.77	8	10	2.4
	CV	15		5	4	2	31	87	34	13	7	11	7
	Average	20.6		6.8	20.8	4.51	3.0	5.5	12.4	4.3	72.2	55.1	1.2
	^ non-additivity problem								^				

Table 5A. Woodland, Replicated, Mid-Maturity: Yield, fruit quality and defects from processing tomato variety trial, JH Meek and Sons, 2012.

	Replicated Variety		Yield tons/A	LSD 5% yield	°Brix	PTAB color	pH	% pink	% green	% sun burn	% mold	% BER	lbs. per 50 fruit	fruit w/ spotted wilt (%)
1	UG 19406	VFFNP	69.6	a	4.93	23.3	4.21	1	0	4	2	0	7.60	0.1
2	N 6402	VFFN SW	67.9	ab	4.80	22.5	4.47	0	0	3	2	0	7.50	0.1
3	N 6404	VFFN SW	67.7	ab	5.00	23.0	4.42	1	1	4	2	0	7.95	0.2
4	**AB 2**	VFFP	67.2	ab	5.23	23.8	4.29	1	1	6	3	0	9.03	0.3
5	UG 19306	VFFNP	66.9	ab	5.00	23.0	4.29	5	2	3	1	1	7.87	0.2
6	HM 9905	VFFN	66.6	abc	4.60	24.3	4.42	1	0	4	1	0	7.45	0.7
7	BQ 205	VFFNP	65.5	abcd	5.05	24.5	4.28	0	1	3	4	1	8.22	0.0
8	H 5508	VFFN SW	64.1	bcde	4.30	23.3	4.27	1	1	4	0	1	6.91	0.0
9	DRI 0319	VFFNP SW	63.8	bcde	5.58	23.3	4.34	1	0	5	3	0	7.75	0.1
10	**SUN 6366**	VFFNP	63.2	bcde	4.63	23.3	4.44	0	0	4	4	0	7.31	0.2
11	AB 0311	VFFNP SW	62.6	bcde	5.35	22.0	4.33	0	0	4	4	1	8.21	0.0
12	UG 19006	VFFNP	61.5	cde	5.03	23.5	4.25	1	1	5	1	0	7.44	0.0
13	H 5608	VFFNP SW	60.9	de	4.35	21.5	4.43	0	0	7	2	1	7.25	0.2
14	BQ 163	VFFNP	59.1	ef	5.03	23.5	4.33	0	0	5	4	0	8.74	0.0
15	PX 1245	VFFNP	54.0	f	4.65	24.3	4.26	0	0	8	4	0	7.63	0.8
16	**H 9780**	VFFNP	53.7	f	5.08	22.8	4.34	1	1	5	2	1	7.92	0.2
	LSD 5%		5.3		0.3	1.3	0.09	1.4	NS	NS	2.3	0.6	0.62	0.5
	% CV		6		5	4	1	113	125	47	65	106	6	188
	average		63.4		4.9	23.2	4.33	0.9	0.6	4.7	2.5	0.4	7.8	0.2
	^ statistical non-additivity							^				^		

Table 5B. Woodland, Replicated, Mid-Maturity: stand, vine size, canopy cover and fruit maturity notes (transplant), JH Meek and Sons, 2012.

	Replicated Variety	stand count (100')	vine size (% row width)	fruit canopy cover (%)	estimated maturity (days to AB 2)
1	AB 0311	101	100	81	-1
2	**AB 2**	101	100	81	0
3	BQ 163	101	95	70	1
4	BQ 205	101	98	84	2
5	DRI 0319	101	100	84	-1
6	H 5508	100	89	68	3
7	H 5608	101	100	55	-1
8	**H 9780**	100	93	60	5
9	HM 9905	100	98	75	3
10	N 6402	101	100	78	0
11	N 6404	100	95	78	2
12	PX 1245	101	93	39	0
13	**SUN 6366**	100	100	68	-4
14	UG 19006	100	100	66	2
15	UG 19306	100	95	88	5
16	UG 19406	100	100	75	1
	LSD 5%	NS	5.2	8.2	2.2
	% CV	1	4	8	4
	average	100	97	72	1

Table 5C. Woodland, Non-Replicated, Mid-Maturity: Yield, fruit quality and defects, JH Meek and Sons, 2012.

	Observational variety		Yield tons/A	°Brix	PTAB color	pH	% pink	% green	% sun burn	% mold	% BER	lbs./ 50 fruit	fruit w/ spotted wilt (%)
1	HMX 1892	VFFNP	81.9	4.8	23	4.35	0	1	3	1	0	7.7	1.6
2	N 6407	VFFN SW	71.5	5.1	23	4.24	0	1	6	2	0	7.7	0.4
3	H 1161	VFFNP	70.1	5.1	23	4.30	1	2	5	4	0	8.4	0.0
4	N 6404	VFFN SW	68.6	5.0	23	4.39	0	1	2	3	0	7.4	0.0
5	N 6405	VFFN	66.7	4.7	24	4.42	0	0	2	0	0	8.5	0.2
6	BQ 272	VFFNP SW	66.5	4.2	22	4.53	1	0	5	5	0	7.8	0.0
7	H 1175	VFFN	66.4	4.2	22	4.47	1	0	3	2	1	7.1	0.0
8	UG 18806	VFFNP	66.3	4.9	26	4.28	6	2	3	0	0	7.3	1.3
9	BQ 268	VFFNP	64.9	5.5	26	4.29	2	0	6	0	2	7.5	1.1
10	HMX 1885	VFFNP TSW	64.5	4.8	22	4.40	2	0	1	4	0	7.3	0.0
11	H 1170	VFFN	61.4	4.6	23	4.25	1	1	6	1	0	7.5	0.0
12	HMX 1894	VFFNP TSW	59.0	4.4	25	4.39	8	4	3	2	0	8.3	0.0
13	BQ 270	VFFNP	58.9	4.9	23	4.44	0	0	10	0	0	7.2	0.0
14	BQ 273	VFFNP SW	57.0	4.6	24	4.48	0	0	10	2	0	7.6	0.0
15	C 316	VFFFNP	50.8	5.5	21	4.40	1	0	3	1	1	6.3	0.4
16	SVR 0686	VFFNP	47.6	4.9	25	4.36	6	1	3	9	0	8.8	0.5
	average		63.9	4.8	23.4	4.4	1.7	0.9	4.4	2.2	0.3	7.7	0.3

*Data is **non-replicated** and should be viewed with much less confidence than replicated tests.*

Table 5D Woodland, Non-Replicated, Mid-Maturity: Stand, vine size, canopy cover, and fruit maturity notes, transplants, JH Meek and Sons, 2012.

	Observational Variety	stand count (60')	vine size (% row width)	fruit canopy cover (%)	estimated maturity (days to AB 2)
1	C 316	62	85	80	-2
2	N 6405	63	100	75	2
3	H 1175	60	100	40	3
4	HMX 1894	62	90	80	7
5	HMX 1892	62	100	65	3
6	SVR 0686	61	100	90	6
7	HMX 1885	61	90	85	4
8	BQ 272	61	90	50	-5
9	BQ 273	60	90	55	-3
10	H 1161	62	90	85	1
11	BQ 270	62	100	40	-4
12	N 6407	62	100	85	1
13	H 1170	61	100	90	4
14	UG 18806	63	90	80	5
15	BQ 268	62	100	80	6
16	N 6404	61	100	80	3
	average	62	95	73	2

*Data is **non-replicated** and should be viewed with much less confidence than replicated tests.*

Table 6. Variety Entries, 2012 UC Processing Tomato Variety Trials, **ORGANIC**, D.A. Rominger and Sons, Winters and Park Farming, Meridian

	Company	Replicated (15)	
1	Harris Moran	HM 9905	VFFN
2	Heinz	H 3402	VFFNP
		H 5508	VFFN SW
		H 5608	VFFNP SW
3	Nunhems	N 6397	VFFN
		N 6402	VFFN SW
		N 6404	VFFN SW
		Sun 6366	VFFN
4	Seminis-Monsanto	AB 2	VFFP
		AB 311	VFFNP SW
		AB 319	VFFNP SW
		PS 002	VFFN SW
		PS 650	VFFNP
5	WoodBridge	BQ 163	VFFNP
		BQ 206	VFFNP

Check with seed company to confirm disease resistance

Code: Disease Resistance

V	=	VERTICILLIUM WILT RESISTANT
F	=	RACE 1 FUSARIUM WILT RESISTANT
FF	=	RACE 1 AND 2 FUSARIUM WILT RESISTANT
FFF_3	=	RACE 1, 2 AND 3 FUSARIUM WILT RESISTANT
N	=	ROOT KNOT NEMATODE RESISTANT (SOME SPECIES)
P	=	BACTERIAL SPECK RESISTANT (RACE 0)
D	=	DODDER TOLERANCE
TYLCV	=	TOMATO YELLOW LEAF CURL VIRUS
A	=	ALTERNARIA STEM CANKER
SW	=	TOMATO SPOTTED WILT VIRUS

Bacterial speck resistance to race 0 appears to have little value with our current pathogen population.

Table 7A. Plot Specifications, Organics, Winters, 2012

Cooperator:	Joe Rominger, D.A. Rominger and Sons, Winters
Location:	North of Winters. 1.5 miles west of CR 89 and 1/8 mile north of CR 29A adjacent to eastern bank of Chickahominy Slough SW ¼ of NE ¼, Section 32, T 9N, R 1W, MDM. SCS sheet #58.
Field Variety:	AB 2, double lines on 5'-centered beds.
Plot Design:	Randomized complete block, 4 reps. Individual plots were 375 square feet (75' x 5').
Greenhouse:	Westside Transplants, all in boxes pulled from #338 trays
Planting Date:	1 May as transplants
Fruit Quality Sample:	4 September for PTAB
Harvest:	4 September (126 days after planting)
Soil type:	Brentwood silty clay loam, Class 1, Storie Index 81
Previous Crop:	2012 tomato
Irrigation method:	furrow
General:	Grew vigorously especially after early bloom stage

Table 7B. Plot Specifications, Organics, Meridian, 2012

Cooperator:	Scott and Brian Park, Park Farming, Meridian
Location:	south of Meridian adjacent to eastern bank of Sacramento River North of Tisdale Weir west of intersection of Garmire x Acme Roads, Meridian
Field Variety:	BQ 206, single line on 5'-centered beds.
Plot Design:	Randomized complete block with 4 reps with 500 square feet plots (100' x 5')
Greenhouse:	Westside Transplants, all in boxes pulled from #338 trays
Planting Date:	30 April as transplants
Population:	~8700 plugs per acre.
Fruit Quality Sample:	11 Sept for Food Science, UCD 12 Sept for PTAB
Harvest	31 August (123 days after transplanting)
Soil type:	Shanghai silty clay loam
Previous Crop:	wheat
Irrigation method:	furrow, initially as split beds
General Notes:	Transplants established and grew well. Healthy growth. Some spotted wilt. Some Fusarium wilt. Very good soil tilth. Harvest delayed beyond optimal with blackmold fruit rots a concern.

Table 8A. **Organics,** Winters, Replicated: Yield, quality and cull-out from tomato variety evaluation, D.A. Rominger & Sons, 2012.

	variety	disease resistance	Yield tons/A		color	Brix	pH	% pink	% green	% sun burn	% mold	% BER	* % SW	lbs 50 fruit
1	H 5608	VFFNP SW	60.7	a	21.8	4.63	4.37	0	1	6	2	0	0	7.27
2	HM 9905	VFFN	55.6	b	24.3	4.85	4.41	1	1	5	1	0	1	7.04
3	AB 311	VFFNP SW	54.6	b	22.8	5.50	4.23	1	1	4	2	0	0	7.54
4	N 6397	VFFN	52.8	bc	23.0	5.03	4.31	1	1	6	2	0	0	6.37
5	N 6404	VFFN SW	52.8	bc	23.5	4.48	4.35	2	2	6	2	0	0	8.04
6	AB 2	VFFP	51.9	bcd	25.5	4.75	4.28	1	2	4	4	0	0	8.32
7	PS 002	VFFN SW	51.2	bcde	23.0	4.73	4.34	3	1	3	5	0	1	8.60
8	H 3402	VFFNP	50.9	bcde	23.3	4.60	4.34	2	1	7	1	0	0	6.44
9	PS 650	VFFNP	50.8	bcde	26.3	4.58	4.35	3	4	6	3	0	4	8.72
10	H 5508	VFFN SW	49.6	cdef	23.8	4.28	4.24	1	2	4	1	0	0	6.65
11	AB 319	VFFNP SW	48.8	cdef	25.3	5.63	4.23	2	1	4	2	0	1	7.90
12	BQ 206	VFFNP	47.7	defg	24.0	5.25	4.27	1	1	8	2	0	0	8.45
13	N 6402	VFFN SW	46.9	efg	23.5	4.90	4.34	2	2	4	2	0	0	6.62
14	SUN 6366	VFFN	45.6	fg	24.3	4.78	4.38	0	1	8	4	0	0	7.35
15	BQ 163	VFFNP	44.0	g	22.8	5.33	4.28	2	2	9	2	0	1	7.86
	LSD 5%		4.8		1.6	0.50	0.09	NS	2	NS	2	NS	NS	0.76
	% CV		7		5	7	1	99	83	53	63	440	333	7
	Average		50.9		23.8	4.89	4.31	1.3	1.5	5.7	2.4	0.0	0.6	7.5
	^ significant non-additivity issue								^		^	^	^	

* spotted wilt - Not all plots and varietes were measured

BER= blossom end rot defect

Comments:

Highest yielding variety was H 5608 with 60+ tons per acre.

High Brix varieties were AB 319 and AB 311; and included BQ 163 and BQ 206.

Table 8B. **Organics,** Winters, Replicated: Stand, vine size, canopy and maturity, D.A. Rominger and Sons, 2012.

	Variety	disease resistance	vine size (% of bed)	canopy cover %	maturity (days relative to AB 2)	stand #plants (75')	*spotted wilt infected (plants per 75')
1	AB 2	VFFP	93	83	0	81	0.3
2	AB 311	VFFNP SW	95	85	0	79	0.0
3	AB 319	VFFNP SW	100	85	1	80	0.0
4	BQ 163	VFFNP	88	79	-1	79	0.3
5	BQ 206	VFFNP	90	80	1	80	0.3
6	H 3402	VFFNP	78	53	2	81	0.0
7	H 5608	VFFNP SW	90	73	0	79	0.0
8	H 5508	VFFN SW	83	63	0	82	0.0
9	HM 9905	VFFN	88	75	-1	80	0.0
10	N 6397	VFFN	93	79	-1	79	0.0
11	N 6402	VFFN SW	90	80	1	79	0.3
12	N 6404	VFFN SW	95	83	1	81	0.0
13	PS 002	VFFN SW	98	85	1	80	0.3
14	PS 650	VFFNP	93	66	3	81	0.5
15	SUN 6366	VFFN	83	73	-3	80	0.0
	LSD 5%		7.7	9.4	2.2	NS	NS
	% CV		6	9	5	2	342
	Average		90	68	0.2	80	0.1

* spotted wilt - Not all plots and varietes were measured

Comments:

Large plants in general
Canopy cover weaker with H 3402, H 5508 and PS 650
Earliest maturing was Sun 6366. Later varieties were PS 650 and H 3402.

Table 9A. Organics, Meridian, Replicated: Yield, quality and cull-out from tomato variety evaluation, Park Farming, 2012.

	Variety	resistance	Yield tons/A		°Brix	color	pH	% pink	% green	% burn	% mold	% BER	lbs. per 50 fruit
1	H 5608*	VFFNP SW	51.2	a	4.60	22.7	4.40	4	3	5	4	0	9.5
2	H 5508	VFFN SW	47.3	ab	4.25	23.0	4.26	5	4	4	1	0	9.6
3	AB 319	VFFNP SW	44.9	bc	4.65	24.3	4.34	7	5	5	7	0	9.1
4	N 6404	VFFN SW	44.0	bcd	4.25	24.0	4.43	3	4	3	10	1	9.1
5	N 6397	VFFN	42.2	cd	4.80	23.0	4.51	1	2	3	11	0	9.6
6	N 6402	VFFN SW	41.8	cd	4.58	24.5	4.41	2	2	4	11	0	7.0
7	AB 311	VFFNP SW	41.2	cd	5.00	23.8	4.30	4	4	3	6	0	8.3
8	HM 9905*	VFFN	40.7	cd	4.63	25.0	4.50	3	5	3	9	0	7.8
9	BQ 163	VFFNP	39.9	de	4.93	24.5	4.35	4	6	2	10	0	9.6
10	AB 2	VFFP	35.8	ef	4.78	27.0	4.37	4	3	2	13	0	7.4
11	PS 650	VFFNP	35.6	ef	4.53	28.0	4.44	14	4	2	6	0	8.3
12	BQ 206	VFFNP	34.9	f	4.78	26.0	4.36	4	5	2	9	0	9.7
13	PS 002*	VFFN SW	34.3	f	4.43	23.2	4.39	2	3	3	13	0	10.0
14	H 3402	VFFNP	33.9	f	4.70	23.8	4.40	3	3	3	3	0	9.6
15	SUN 6366*	VFFN	32.5	f	4.53	24.6	4.40	4	3	4	15	0	9.1
	LSD 5%		4.3		0.32	1.2	0.61	3.0	2.4	NS	4.1	NS	1.27
	% CV		8		5	3	1	49	46	72	33	238	10
	Average		40.0		4.6	24.5	4.39	4	4	3	9	0	8.9

* average of 3 reps
all others average of 4 reps

Comments:

H 5608 and H 5508 were the top yielding varieties with 51.2 and 47.3 tons/acre and relatively clean fruit.

AB 319, BQ 163, BQ 206 and AB 2 were among the high Brix varieties approaching 4.8 °Brix or above.

Mold levels primarily from blackmold were a concern with many varieties at or above 10% levels including Sun 6366 with 15%.

Table 9B. **Organics,** Meridian, Replicated: Stand, vine size, canopy and maturity, Park Farming, 2012.

	Variety	disease resistance	vine size (% of bed)	canopy cover %	maturity (days relative to AB 2)	stand #plants (100')	spotted wilt infection (plants per 100')
1	AB 2	VFFP	78	78	0	76	2.0
2	AB 311	VFFNP SW	88	80	2	75	0.0
3	AB 319	VFFNP SW	90	86	3	77	0.0
4	BQ 163	VFFNP	80	80	2	79	1.8
5	BQ 206	VFFNP	74	78	1	76	0.8
6	H 3402	VFFNP	73	65	2	72	1.3
7	H 5608*	VFFNP SW	91	83	2	78	0.0
8	H 5508	VFFN SW	73	74	1	81	0.0
9	HM 9905*	VFFN	89	83	2	80	1.3
10	N 6397	VFFN	83	81	-1	78	0.3
11	N 6402	VFFN SW	80	75	-1	78	0.0
12	N 6404	VFFN SW	85	85	3	81	0.0
13	PS 002*	VFFN SW	76	77	1	76	0.1
14	PS 650	VFFNP	78	78	4	75	2.5
15	SUN 6366*	VFFN	70	70	-2	80	1.3
	LSD 5%		8	8	1.8	NS	1.2
	% CV		7	7	3.8	6	113
	Average		80	78	1.2	77	0.7

* average of 3 reps

Comments:

Vine size was modest, averaging 80% bed cover.

Vine canopy cover was good, with the exception of H 3402 with a low of 65%, although sun damage was only 3%.

Earliness maturing was Sun 6366 and later varieties were PS 650 and AB 319 (about 5 to 6 days later than Sun 6366).

Spotted wilt incidence was highest with PS 650 and AB 2, while the varieties with resistance appeared to hold well to the virus.