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TOMATO INFO

GENERAL FIELD NOTES

Ending the season with a California tomato pack of 10.1 million tons in a poor weather year is remarkable. The effects of extended high temperatures in mid to late July greatly reduced fruit set and fruit size. Additionally, fruit ripening was slow and uneven. Use of Ethrel ® to hasten ripening was widespread for the late plantings. Split sets resulted in overripe fruit being harvested along with a mix of immature green fruit.

Mites appeared more persistent this year with some resurgence after initial early sulfur applications. While populations appeared lower than the early infestation, a second treatment was needed in some cases. In many instances, desiccation of the vine caused by mites is welcomed with harvest in October when the threat of high temperatures diminishes.

Tomato powdery mildew was on the rise in late September in some fields. Again, the desiccation of vines was not a major issue this year in the late fields.

Nematode activity should be a concern. Severe galling on nematode resistant varieties was found locally in two fields this year. Bioassay tests by UC Davis nematologist Valerie Williamson confirmed these nematode overcame the variety's genetic resistance. While there was some speculation that high temperature influenced the resistance breakdown, Dr. Williamson confirmed the population was resistance breaking, independent of temperature affects. Reports from other farm advisors in the Central Valley also indicate that nematode populations have begun to overcome the plant resistance that the Mi gene previously conferred. Highest at-risk sites would be the sandy soils with a high usage of nematode resistant tomato varieties.

While too late for this season, early detection of root knot nematode problems would include digging a few suspect plants close to harvest to examine root system for galling, especially in sandy soils. The most common symptom of nematode infestation is poor plant vigor. In severe cases, early plant dieback occurs.

Local Variety Trials: Two local processing tomato variety evaluation trials were conducted: one early and one mid-maturity class in commercial fields. Both trials were transplanted with plants from Westside Transplants and with grower's machines and crews. Trials were mechanically harvested with grower equipment to determine marketable yield. Fruit samples were collected and sent to a local PTAB inspection station to measure fruit color, Brix and pH.

Our early-maturity variety trial was established near Winters with Joe Rominger of D.A. Rominger and Sons. We transplanted on a rain-delayed schedule on April 25 on double lines per bed in a field of APT 410. The previous crop was sunflowers on this class 1, Brentwood silty clay loam soil. Plants grew well during the season. Eight of the 15 varieties were in the top-yielding group led by APT 410 with 52.7 tons/acre (Table 1). HyPeel 45 had the highest soluble solids with 5.4%, but 7 other varieties were also in the top group. Percent sunburn was high especially with HyPeel 45 with 22% damage, but included U 462 and Sun 6366 with levels above 15% as well. Other varieties also had a high incidence of sun-damaged fruit.

We compared single plants per plug vs. double plants per transplant plug across 3 varieties: APT 410, H 9280 and HyPeel 45. No statistically significant differences were detected for yield or fruit quality amongst these varieties when double plants were compared to singles. Fruit were slightly larger on single plants compared to doubles. Stem diameter of single plants was larger compared to doubles at transplanting.

Table 1. Early-maturity variety trial, twin row transplants, D.A. Rominger and Sons, Winters, 2006.

	Variety	Yield tons/A	Brix	% pink	% green	% sun burn	% mold	lbs./ 50 fruit
1	APT 410	52.7	5.1	1	1	11	2	7.85
2	BOS 66509	52.6	4.7	1	1	12	2	7.06
3	H 5003	52.4	5.2	1	3	7	1	6.28
4	APT 410 double*	50.6	5.1	1	1	9	3	7.73
5	BOS 66508	50.3	5.0	2	3	13	1	6.91
6	H 9280 double*	49.3	4.6	1	1	10	0	7.21
7	H 9280	48.9	4.4	2	1	10	1	7.73
8	HMX 5883	48.5	4.7	1	1	13	1	8.81
9	SUN 6366	48.0	5.2	2	2	15	2	7.21
10	BOS 7026	47.8	5.3	1	1	12	2	8.89
11	PX 438	46.0	5.2	2	2	12	2	9.03
12	U 250	45.8	5.0	0	5	13	3	9.61
13	HyPeel 45 double*	43.4	5.3	2	2	18	4	8.28
14	U 462	43.2	4.7	3	2	19	3	8.56
15	HyPeel 45	41.5	5.4	0	2	22	1	8.55
	LSD .05	4.20	0.38	1.4	1.6	7.4	NS	0.96
	% CV	6	5	72	59	40	131	8
	Single vs.	47.7	4.96	0.9	1.3	14.4	1.4	8.04
	*Double Plants	47.8	4.99	1.0	1.2	12.7	2.4	7.74
	LSD 5%	NS	NS	NS	NS	NS	NS	0.07

Our <u>mid-maturity trial</u> was conducted in class 1, Reiff very fine sandy loam & Yolo silt loam soils between Woodland and Davis with Steve Meek and John Pon of JH Meek and Sons. The field was transplanted on May 9. Plants established well despite high temperature at the time of planting. Plants grew vigorously through the vegetative stage. Temperatures were high for an extended period during bloom. Root knot nematode activity was prevalent with noticeably weakened plants and severe root galling as fruit ripening began.

The top yielding varieties were led by PS 345 and AB 2 with 40.1 and 39.7 tons/acre respectively, and followed closely by 8 other varieties in the top yielding group (Table 2). PS 345 had the highest percent pink fruit at 9%, but still had 11% sun damage. Sun 6374 was clearly superior with 6.2° Brix. Sunburn levels averaged 14% while the pear-shaped varieties H 2601 and Red Spring had extensive vine collapse resulting in severe sun damaged fruit with 28 and 25%, respectively.

Table 2. Mid-maturity variety trial, transplanted, J.H. Meek & Sons, Woodland, 2006.

	Variety	Yield tons/A		Color	PTAB °Brix	pH	% Pink	% Green	% Sun	% Mold	lbs per 50 fruit
1	PS 345	40.1	A	27.5	4.6	4.36	9	3	11	1	7.66
2	AB 2	39.7	AB	24.0	5.1	4.35	1	4	10	1	7.31
3	DRI 8058	39.4	AB	23.0	4.6	4.47	3	2	10	1	6.95
4	AB 2 double*	38.3	ABC	22.8	5.2	4.34	0	4	11	1	7.18
5	BOS 67374	37.3	ABC	24.0	5.1	4.36	1	7	5	1	6.63
6	H 9780	36.9	ABC	23.3	5.6	4.31	1	2	15	1	6.58
7	DRI 4610	36.8	ABC	22.0	5.4	4.38	1	5	3	1	7.03
8	Sun 6368	36.7	ABCD	23.5	5.4	4.42	2	3	7	1	6.30
9	U 886	36.6	ABCD	23.0	5.1	4.43	1	5	15	1	6.59
10	H 8004	35.8	ABCD	23.8	5.3	4.37	1	1	15	1	6.11
11	PX 384	35.3	BCD	26.3	5.5	4.36	2	3	10	3	6.70
12	H 9780 double*	34.6	CDE	23.3	5.2	4.34	2	4	12	1	6.45
13	U 567	32.2	DEF	23.8	4.8	4.41	0	5	10	1	7.61
14	Sun 6374	30.2	EF	23.8	6.2	4.38	0	4	11	1	5.84
15	HMX 4802	29.7	F	23.0	5.2	4.50	1	3	11	1	5.93
16	H 2005	29.2	FG	21.8	5.5	4.45	1	2	18	1	5.76
17	Red Spring	28.4	FG	23.3	4.9	4.55	0	1	28	0	5.83
18	H 2601	25.0	G	24.3	5.2	4.48	0	1	25	1	5.75
	LSD (5%)	4.6		1.5	0.3	0.07	2.0	2.2	7.1	NS	0.8
	% C.V.	9		4	4	1	97	48	39	105	8
	Single vs.	38.3		23.6	5.4	4.33	1	3	12	1	6.94
	*Double Plants	36.4		23.0	5.2	4.34	1	4	12	1	6.81
	Probability	NS		NS	0.07	NS	NS	NS	NS	NS	NS

Additionally, within the variety trial, double plants per plug were compared to singles with varieties AB 2 and H 9780. In this test as well as other local tests I've conducted over the years, there was no yield advantage with double plants per plug. Stand establishment in the field was similar between singles and doubles.

Table 3. Non-replicated, transplanted, mid-maturity variety trial, J.H. Meek & Sons, Woodland, 2006.

	Non Rep Variety	Yield tons/A	Color	PTAB °Brix	pH	% Pink	% Green	% Sun	% Mold	lbs per 50 fruit
1	U 898	26.6	22	5.3	4.51	1	1	40	1	5.40
2	HMX 5893	36.7	29	5.0	4.43	1	3	13	1	6.50
3	NDM 4464	29.1	24	5.2	4.40	0	3	26	0	5.60
4	U 892	29.1	23	5.0	4.47	0	1	24	0	6.40
5	BOS 212	35.4	23	5.5	4.44	2	3	6	4	5.90
	Average	31.4	24	5.2	4.45	1	2	22	1	5.96

Non-replicated data should be viewed with less confidence (Table 3). Only HMX 5893 and BOS 212 fared well in the trial while the three other varieties had poor canopies with high sunburn damage levels.

Grass Cover Crop May Increase Yield

In cooperation with Extension Specialist Tim Hartz, triticale grass cover cropping was evaluated as a fall planting ahead of tomatoes. Field trials were located on the Davis campus and in two commercial fields in the Woodland area. Grass was seeded in the late fall and germinated with rain. Seeding rate was about 80 lbs per acre through a grain drill, planting only the tops of preformed beds. We compared wheat vs. triticale (Trios 102) at two biomass levels. In either early or late February, glyphosate was applied to terminate cover crop growth to facilitate seedbed preparation in the spring ahead of transplanting tomatoes.

Compared to wheat, the triticale residue was easier to till. Even so, cultivators with closely spaced, spring tines like an Alloway® would pile and drag debris. Modification of spring tillage equipment is likely needed. Addition of coulters, rolling-type cultivators or more widely spaced shanks with higher clearance may help. Spraying with herbicide to limit triticale growth to 8 inches or so would reduce tillage problems compared to allowing growth to exceed 12 inches tall.

Table 4. Affect of fall-planted grass cover crops on succeeding canning tomato production, Harlan & Dumars, Woodland, 2006.

	Treatment	Yield Tons/A	Brix	PTAB color	pH	% sun burn
1	Fallow control	38.7	5.7	25.4	4.35	12
2	Triticale early kill	47.0	5.1	27.1	4.32	5
3	Triticale late kill	46.7	5.2	27.0	4.33	6
4	Wheat early kill	44.5	5.4	26.3	4.33	7
	LSD 5%	3.2	0.2	1.0	NS	3.5
	% CV	8	4	4	1	38

In one of the 3 trials, the cover crop treatment increased our tomato fruit yield. In the other 2 sites, yields were high, but were not enhanced with the grasses. The yield increase occurred in our only furrow-irrigated field whereas the others were subsurface dripped. Tomato yields increased by 20% with the triticale regardless of termination timing. Wheat also was beneficial (Table 4). Sunburn levels were highest in the control. With the yield increase, soluble solids levels fell.

Phytophthora root rot was more prevalent in the non-cover cropped controls. We suspect the grasses may have influenced water infiltration, either retaining more moisture during irrigations or allowing better internal draining. In all the trials, rainfall run off was also substantially reduced.

At this point, we're not prepared to recommend the use of the grass cover crop. We initiated additional tests this fall with CTRI funding support.

If you try grass cover crops, we're interested in your experience. In fields infested with malva, mustard, radish or other aggressive winter weeds, the triticale is unlikely to be competitive. With wheat in the crop rotation, if our research continues to show benefit, allowing more growth of volunteer wheat before spraying with Roundup may be a simple adjustment.

Upcoming Tomato Meetings:

Dec 30 (Friday) – Veg Production Meeting, UC Westside Research and Extension Center, Five Points.

Jan 12 2007 (Friday) – Lower Sac Valley Tomato Production Meeting, Heidrick Ag History Center, Woodland. Meeting agenda to follow later.

Jan 24 2007 (Wed) — Upper San Joaquin Valley Tomato Production Meeting, Modesto in conjunction with CA Tomato Growers Association annual meeting.

Jan 29-31 (Mon-Wed) California League of Food Processors Expo & Showcase, Sacramento Convention Center.

Submitted by,

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