University of California Cooperative Extension

Vegetable Crop Facts

Merced and Madera Counties

2145 WARDROBE AVE., MERCED, CA 95340 (209) 385-7403

2002 CALIFORNIA VEGETABLE PRODUCTION

California had a big crop of tomatoes in 2002—production was up for both processing and fresh market compared to 2001. Processing tomato production, at over 11 million tons, was the second largest crop on record. This, of course, will probably put a damper on 2003 contract prices. For some reason, Merced County's average yields, 35.91 tons/A, were lower than the other counties last year—directly opposite of our normal position in the state. This may have been due to the depressed yields that were experienced by many during harvest in the month of August, but I am unclear why this occurred.

CDFA reports that prices received for fresh market tomatoes were better in 2002 than 2001. What is not shown in the numbers, however, is the sharp increase in trucking fees that hit the industry last year. There were multiple reasons, including a lack of trucks and licensed drivers and competition with other commodities, but the end result was an increase of about $1,000 per load, or $0.75 per box.

Below are state production figures for common vegetable crops grown in the County in 2002. Data is from CA Agriculture Statistics Service, 24:1. (2003)

Table 1. California vegetable crop production, 2002.

Crop	*Harvest Area acres*	*Average Yield Tons/A*	*Production*
Sweet Corn	24,000	8.5	204,000 tons
Cantaloupes	54,900	12.25	673,000 tons
Watermelon	11,800	25.5	301,000 tons
Bell Peppers	21,000	16.5	347,000 tons
Sweetpotatoes	10,400	11.75	122,000 tons
Tomatoes, Fresh	38,500	15.0	578,000 tons
Tomatoes, Processing	291,000	38.0	11.06 million tons
Merced	18,200	35.91	653,500 tons
Fresno	106,900	39.29	4.2 million tons
Stanislaus	16,600	36.45	605,000 tons

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March, 2003

Cooperative Extension Work in Agriculture, Home Economics and 4-H, U.S. Department of Agriculture, University of California, and county of Merced Cooperating

2002 RESEARCH SUMMARY

Fresh Market Variety Trial. Marketable yields for the replicated trial ranged from nearly 2200 boxes/A for Bobcat (Syngenta) to 1570 boxes/A for SRT6710 (Sunseeds). The standard, Shady Lady, produced 1929 boxes/A (Table 1).

Quali T 21, T-23 (Syngenta) and B 807 (LSL Seeds) had the most XL fruit, around 50%. Significant differences were observed for culls, ranging from 11 to 23 tons/A. At harvest, Shady Lady and BHN 503 had the highest red percentage, near 30%. This trial was harvest slightly late, as several very hot days in 2002 contributed to faster fruit development than average.

Many thanks to Bob Giampaoli with Live Oak Farms and the many seed reps who cooperated with this trial and the LeGrand Field Day.

Process Tomato Variety Trial. Best overall performers in the replicated trial (Table 2) were H9780, SUN 6324, PS849, HMX 830, and AP938, with yields ranging from 38.4 to 31.7 tons per acre. These varieties were not significantly different from each other, but were significantly better than the bottom six varieties in the test. Best °Brix yield came from AP938 and H9780, at 1.95 and 1.93 tons/A, respectively.

Soluble solids were in general very good this year, ranging from 4.7% to 6.15%. AP938 had the best soluble solids at 6.15%. Significant differences were also found for pH and color. All of the varieties tested were below the pH 4.6 tolerance limit set for paste.

Many thanks to Daniel Burns with San Juan Ranch and the many seed companies who cooperated with this trial.

Ditera Nematicide Trial. Two rates of Ditera were compared to Vydate and an untreated check in a drip irrigated, process tomato field. Less nematodes were found in a July sampling with the Ditera treatments, especially the 3 gal per acre rate, but there was no significant difference in yield between any of the treatments. Overall yields were good, averaging 42.5 tons/A. The main reason for the lack of yield was probably because the variety used, H9665, is a processing type with nematode resistance. Very little galling was found on any of the plants, regardless of nematode treatment.

Table 1. Fresh market tomato variety trial yield and grade results. Replicated varieties, Merced County 2002.

			Market Yield			XL	L	M	S	Culls	total	Red
Var #	Variety	Company	Tons/A	Boxes/A		% of marketable yield			tons/A	tons/A	tons/A	%
9	Bobcat	Syngenta	27.42	2193.60	a	41.53	43.12	15.35	2.28	20.81	50.51	14.9
10	T-21	Syngenta	27.21	2176.80	a	57.32	30.38	12.31	2.16	10.76	40.13	16.6
3	XP150440	Seminis	24.90	1992.00	a b	33.36	47.33	19.31	3.07	23.09	51.06	23.2
8	Shady Lady	Sunseeds	24.11	1928.80	a b c	30.36	47.46	22.18	2.13	16.20	42.44	29.1
6	SRT6718	Sunseeds	24.05	1924.00	a b c	33.53	45.36	21.10	3.80	11.67	39.52	5.7
5	SRT6722	Sunseeds	23.58	1886.40	a b c	26.25	49.50	24.25	3.98	13.04	40.60	13.3
11	T-23	Syngenta	23.58	1886.40	a b c	47.38	41.40	11.21	1.86	16.88	42.32	20.1
1	BHN 503	BHN Seed	23.09	1847.20	a b c	37.24	46.45	16.32	2.22	19.28	44.59	27.6
4	SXT6624	Sunseeds	21.71	1736.80	b c	31.52	43.70	24.78	3.51	12.91	38.13	17.8
2	B 807	LSL	19.91	1592.80	c	56.74	33.41	9.84	1.65	22.54	44.10	13.0
7	SRT6719	Sunseeds	19.65	1572.00	c	29.76	47.38	22.87	4.05	11.28	34.98	15.1
	Average		23.56	1885.16		38.64	43.23	18.14	2.79	16.22	42.58	17.85
	LSD 0.05		4.80	384		9.1	7.4	6.8	1.2	5.72	7.8	5.5
	CV (%)			14.1		16.2	11.9	26	29.6	24.4	12.5	21.1

Means followd by the same letter are not significantly different at the 95% confidence level.

Sidedress N on Processing Tomatoes. Five different sidedress N rates (0, 35, 65, 130, and 185 lbs/A) were applied to a direct seeded Heinz 9491 field to evaluate yield response. Pre-sidedress soil nitrate test (PSNT) samples were also taken. Based on the soil tests, no yield response was expected, however, petiole tests showed the crop to be below sufficiency ranges at full bloom. No yield differences were found for any of the treatments (Table 3). This trial showed again that total N requirements for maximum yield in processing tomatoes are moderate—best yields have consistently occurred at 125 lbs total N per acre.

While I am pleased that the PSNT correctly identified this field as unresponsive to addition N, I am a little concerned that the petiole tests indicated just the opposite. I plan to do further work on this matter.

Many thanks to Dan Burns of San Juan Ranch for his help with this trial.

Table 3. Yield results for the process tomato sidedress N trial, 2002.

Sidedress N lbs/A	*Tons per Acre*	*% green*	*% rot*
1. 0 (UTC)	22.84	15.5	1.77
2. 65 (½ x rate)	23.43	14.1	1.76
3. 130 (1x rate)	23.02	13.1	1.81
4. 185 (1.5 x rate)	22.14	17.7	2.81
5. 35 + 30[1]	22.68	17.5	1.63
Average	22.82	15.6	1.96
LSD 0.10	NS	NS	NS

1. Second application not applied.

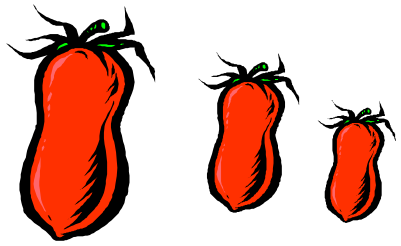


Table 2. Processing tomato mid-season variety trail. Replicated varieties, Merced County 2002.

Variety	Company	fruit yield T/A					LED color	SS	pH	Brix yield T/A
H9780	Heinz	38.44a					25.25	5.00	4.29	1.93
SUN 6324	Sunseeds	34.09a	b				22.25	5.25	4.46	1.79
H9491	Heinz	33.76a	b				22.00	4.70	4.38	1.59
PS 849	Seminisd	32.67a	b	c			24.00	4.95	4.31	1.61
HMX 830	Harris Moran	32.23a	b	c	d		22.50	5.88	4.38	1.88
AP 938	Seminis	31.69a	b	c	d		22.50	6.15	4.36	1.95
H8892	Heinz	31.15	b	c	d		22.25	5.13	4.44	1.60
CXD 215	Campbells	30.60	b	c	d		24.00	5.40	4.42	1.66
CXD 222	Campbells	29.62	b	c	d	e	23.00	5.48	4.35	1.60
3155	Orsetti	29.40	b	c	d	e	23.00	5.48	4.38	1.60
H2501	Heinz	27.33	b	c	d	e	23.75	5.33	4.39	1.46
H9665	Heinz	26.24		c	d	e	23.75	4.85	4.37	1.28
H9491	Heinz	26.14		c	d	e	22.50	4.93	4.37	1.28
H2601	Heinz	25.92		c	d	e	24.00	5.05	4.42	1.32
CXD 221	Campbells	25.48			d	e	23.50	5.68	4.41	1.45
H9998	Heinz	23.41				e	22.25	5.05	4.39	1.18
CTRI 1056	CTRI	17.75					22.75	5.30	4.41	0.94
Average		**29.2**					**23.3**	**5.3**	**4.4**	**1.5**
LSD 0.05		**7.0**					**1.0**	**0.5**	**0.1**	**0.4**
CV, %		**16.8**					**3.1**	**7.2**	**1.3**	**18.1**

Means followed by the same letter are not significantly different at the 96% confidence level.

Worm Monitoring Results. As in the past, bucket traps were used in LeGrand and Dos Palos to monitor six different species of worm pests common in tomatoes. The type of crop had an impact on the relationship between trap counts and worm sprays. On fresh market tomatoes in LeGrand, sprays often occurred when trap counts met or exceeded 10 moths per trap per day. However, sprays at this threshold did not always occur, as crop growth stage plays a role as to whether a spray is warranted. This threshold applied when the crop was past full bloom and fruit were present. In Dos Palos with processing tomatoes, worm sprays occurred much less often, and there was no association between trap counts and an insecticide application.

In general, the use of bucket traps to predict potential pest problems in tomatoes appears to be too limited for widespread use. Adjacent crops, target crop, and crop growth stage all impact the quality of the trap data and make analysis very difficult.

SPRING FREEZE PROBABILITIES

The following tables use long-term weather data to predict the probability of a frost for different areas in the county. Latest is the last date when a minimum temperature below the threshold occurred, while the 50% column is the probability that a minimum temperature below 32.5 F will occur after the given date. For example, there is a 50% chance that LeGrand will get a frost after March 11, but less than 30% this will occur in Los Banos.

The risk takers among you may feel very comfortable at the 50% level or higher before you start putting out tender transplants. The more conservative types may want to wait until there is less than a 20% chance of frost.

Source: Western Regional Climate Center.

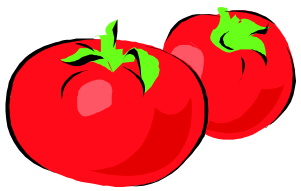
Spring freeze probabilities by date for select Merced County locations.

DENAIR, CA				
Temp F	80%	50%	20%	Latest
	date			
36.5	3/24	4/19	4/29	5/18
32.5	3/7	3/23	4/14	4/28
28.5	1/24	2/18	3/5	3/14

LE GRAND, CA				
Temp F	80%	50%	20%	Latest
	date			
36.5	3/27	4/16	4/26	5/7
32.5	2/27	3/11	3/30	4/28
28.5	1/4	1/27	2/29	3/15

LOS BANOS, CA				
Temp F	80%	50%	20%	Latest
	date			
36.5	3/9	3/26	4/9	5/4
32.5	2/4	2/23	3/16	4/28
28.5	1/4	1/22	2/20	3/21

MERCED, CA				
Temp F	80%	50%	20%	Latest
	date			
36.5	3/22	4/9	4/24	5/31
32.5	2/14	3/8	3/26	5/16
28.5	1/4	1/31	2/24	3/24



N-P-K UCCE FERTILIZER GUIDELINES FOR PROCESSING TOMATOES

Nitrogen. Total 120—180 lbs/A. About 80% of this from the sidedress application. A PSNT above 16 ppm NO_3-N suggests additional N is not needed. Remember to credit manure.

Phosphorous. Soil test below 6 ppm: 100 lbs/A P_2O_5 before listing plus 50 lbs from starter. Soil test 6—12 ppm: 50—60 lbs/A P_2O_5 from starter. Above 12 ppm: yield response to additional P fertilizer not expected.

Potassium. Soil test for ammonium acetate extractable K less than 150 ppm K: 60 to 150 lbs/A K_2O. Above 150 ppm: response to addition K fertilizer not expected.

Zinc. Soil test below 0.4 ppm: 10-20 lbs/A Zn broadcast or 5 lbs/A banded. A broadcast application may last 4—7 years. Soil test above 0.5 ppm: no additional zinc recommended.

Starter Fertilizers. Placement is important. Band 1—2 inches below the seed line, a little deeper and offset for transplants. Use a high phosphorous material, such as 10-34-0. Pop-up applications with direct seeding can also be used where 1 gallon of fertilizer is diluted with 5 gallons of water and applied over the seed row. Be careful here—application rates need to be low to prevent seed injury. With transplants, 8 gallons of 10-34-0 (or equivalent) can be diluted into 400 gallons of transplant water.

SOIL AMENDMENTS: WHAT THEY CAN AND CANNOT DO

I'll be blunt: we haven't had a lot of rain this year. Nor have we had a good wet winter since '98. The problem with having less than average rainfall is that salt problems get worse. Sometimes amendments can effectively correct a problem, but sometimes they do not. Following is a discussion on the limitations of amendments to correct some common problems related to salts and irrigated agriculture in the arid West.

Problem 1: Salinity.
Salinity refers to the total salt content of the soil. Potassium, sodium, calcium, chlorides, sulfates, carbonates, and others, add to the total salinity of the soil. It is measured as electrical conductivity, or E.C. The higher the E.C., the higher the level of total salts. For most vegetable crops, soil E.C. values above 2.5 dS/m can cause yield decline.

Salinity is important because it affects the ease with which water in the soil can be extracted and used by crops. The point here is that all salts, not just sodium, contribute to soil salinity.

Amendments will not neutralize salts or greatly change the salinity of soil or water. You read that correctly: amendments have little chance of improving production if the problem is strictly salinity.

Problem 2. Soil permeability.
This refers to the ease with which water soaks into the soil. Infiltration rates less than 0.1 inch per hour indicates a permeability problem.

Soil permeability problems can be chemical of physical. Soil compaction, plow pans, and hard pans are examples of physical problems. Chemical problems are caused by either excess sodium or by too little calcium. Poor permeability is often caused by the irrigation water— either extremely low salt (less than E.C. 0.2 dS/M) or high sodium (SAR > 6).

Amendments have an excellent chance of improving water infiltration rates when the problem is chemical in nature. Amendments like gypsum, sulfur, sulfuric acid, and N-phuric are effective because they either supply soluble calcium or liberate it from the soil. Additionally, sodium combines with sulfate and can be leached out of the root zone.

To restate, gypsum and sulfur are most effective when there is a sodium problem with the soil.

Problem 3. Toxicity.
Sodium, chloride, and boron are the elements to be concerned with here. Sometimes they can accumulate in the plant to toxic levels. Amendments are marginally effective if speed leaching or replace sodium with calcium.

FRESH MARKET TOMATO DEFINITIONS AND INDUSTRY CHARACTERISTICS
By Roberta Cook, UCCE Economist

Mature green tomatoes (57% of CA production) are round tomatoes picked at stage 1 of a 5-stage maturity scale, when the fruit are fully developed but still completely green. They are then ripened with ethylene, the plant's natural ripening hormone. Vine-ripe tomatoes (about 25% of California's volume and the majority of Midwestern and eastern production) are picked at the first blush of color, usually stage 2. Mature green tomatoes are preferred in foodservice markets due to their firmness and slicing characteristics, hence, the vast majority of tomatoes served in foodservice establishments are mature green, while the retail markets in the U.S. and Canada are shared by many tomato types, including mature green, vine-ripe, roma, hot house, grape, cherry, colored, and other specialty tomatoes. Hot house tomatoes are dominated by round (beefsteak) and cluster tomatoes, although cherry tomatoes, including cherry tomatoes-on-the-vine and other specialty tomatoes are also grown in hot houses.

A word about the budget….

In case you haven't heard, UCCE is facing the possibility of a 30% budget cut this year. While we have faced budget cuts in the past, none have been of this magnitude. A 30% cut would result in some pretty drastic consequences, possibly including elimination of programs, closed offices, and layoffs. Hopefully, through our efforts and those of our friends in agriculture, the proposed reductions will be lessened in the final budget and this will not occur. We have to wait until after July 1 to know. In the meantime, it's business as usual here at the office.

Wishing you a very productive and profitable 2003 growing season.

Scott Stoddard
Farm Advisor—Vegetable Crops
Merced and Madera Counties