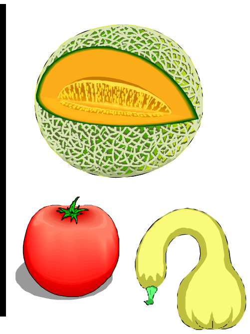
VEGETABLE CROPS FACTS

Merced and Madera Counties



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VEGETABLE RESEARCH TRIAL SUMMARY

Every year is unique in the problems facing vegetable producers in Merced and Madera counties, and 2001 is no exception. A very cold April followed by a shockingly hot and windy May created planting conditions that were a little more than “challenging”. Many fields needed replanting. Then the leafhoppers came storming in, bringing in Curly Top virus pressure not seen in many years, especially for growers in the Los Banos area. This was just the beginning of a high disease pressure year. Processing and fresh market tomatoes, melons, peppers, and sweetpotatoes all seemed to have disease pressure at some point during the growing season. And of course our test plots were not exempt from these problems. Following is a short summary of our research results and variety evaluations for 2001. A complete report will be available soon.

Processing Variety Trial.
We lost this trial this year to very hot and windy conditions back in May. Yield data for Fresno and Stanislaus are shown in Table 2. Contact us for a complete report.

Fresh Market Tomato Variety Trial.
Yield and sizing results are presented in Table 1 on the next page. More information about

MAKE THE MOST OF YOUR FALL SOIL SAMPLING

Knowing your soil nutrient levels helps with crop planning and budgeting, and fall is a good time to sample fields. However, time and method of sampling needs to be done correctly so that you have an accurate picture of the next season’s nutrient status.

- **Depth**. Soil samples should be labeled to the depth they were actually taken for accurate interpretation. For example, if a 0—6 inch sample was actually collected from 0 to 12 inches, P and K values could be reported as low.
- **Location**. When large variability in the landscape exists, more samples need to be taken. Filled in sloughs, old yard sights, soil changes, and hills affect yield and may require separate management.
- **Timing**. Phosphorous, potassium, and most micros can be reliably interpreted in the fall. Nitrate nitrogen, sulfate, and boron are leachable and better determined in the spring or growing season. pH and E.C. (soluble salts) may also change from fall to spring.
- **Sample size**. Use a well mixed composite from 10—20 random locations spread throughout the field.

In this Issue:

- County vegetable research summary.
- Fall soil sampling tips.
- Fall vegetable crop report from the California Agriculture Statistics office.
- Processing tomato nutrient ranges using the DRIS system.

December, 2001

Cooperative Extension Work in Agriculture, Home Economics and 4-H, U.S. Department of Agriculture, University of California, and county of Merced Cooperating this trial, including vine and fruit characteristics, observational lines yield and quality, and post harvest measurements will be available in the tomato progress report.

Foliar Micronutrients on Fresh Market Tomatoes. No response seen to foliar or sidedress applications of calcium or potassium.

Moth trapping survey.
Data are still being taken and analyzed, but it appears that we had some correlation between high trap counts and spray dates, especially for cabbage loopers and beet armyworms.

CABRIO fungicide evaluation on tomatoes and watermelon.
Powdery mildew disease pressure was present, but only at moderate to low levels. These trials were done to evaluate the efficacy of a new fungicide from BASF. We saw some reduction in incidence and severity of disease comparable to the registered materials Quadris and Flint.

Sweetpotatoes. Various sweetpotato trials on such topics such as fertilizers, seed source, skinning, herbicides, insecticides, and developments of a degree day model.

Many thanks to all our cooperators this year, including Mark Hoatson, Lonnie Slayton, Bob Giampaoli, Dan Burns, Dave Souza, Larry Bianchi, Wayne Pricolo, Bob Weimer, Jason Tucker, Tom Nakashima, and Nathan Mininger.

Fresh market tomato variety trial yield and grade results, 2001.
Replicated varieties, Merced County.

			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**	**%**
5	Quali T 21	Syngenta	29.95	2396	a	54.9	32.6	12.5	1.3	11.8	44.5	4.3
2	BHN 503	BHN Seed	26.21	2097	a b	43.3	40.7	16.0	2.0	13.1	43.6	8.4
7	Bobcat	Syngenta	25.29	2023	a b	46.4	39.8	13.8	1.4	11.1	39.1	4.9
1	BHN 102	BHN Seed	25.13	2010	b c	36.7	43.1	20.3	2.3	11.3	40.6	7.5
3	PS150440	Seminis	22.96	1837	b c	56.9	32.7	10.3	1.2	12.6	38.6	7.4
6	Quali T 23	Syngenta	22.70	1816	b c	47.6	36.8	15.6	1.2	13.8	38.9	5.1
8	Shady Lady	Sunseeds	21.18	1694	b c	31.2	49.8	19.0	1.6	14.5	40.2	12.5
10	Classy Lady	Sunseeds	20.96	1677	c d	47.6	37.5	14.9	1.7	12.4	37.0	7.9
9	SXT 6624	Sunseeds	18.96	1517	c d	39.1	44.0	16.9	2.5	13.2	37.4	13.1
4	Sunbright	Seminis	17.99	1439	c d	46.7	40.2	13.1	1.1	18.2	39.9	8.1
11	UGX 895	United Genetics	13.81	1105	d	29.1	50.0	20.8	1.1	14.4	30.7	9.2
	Average		22.29	1783		43.6	40.7	15.7	1.58	13.31	39.1	8.04
	LSD 0.05		5.83	466		7.8	6.8	5.2	NS	NS	NS	5.3
	CV %			18.1		12.5	11.5	23	53.1	24.1	14.7	45.3

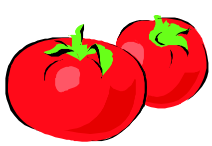
Market yield = XL + L + M size mature-green fruit, average of four replications. One box = 25 lbs.
XL, L, M% = weight of respective fruit sizes divided by marketable yield.
Red% = weight of all red fruit divided by total yield. Indicates relative maturity among tested varieties.
Culls, tons per acre: Any fruit so disfigured (due to rot, cat facing, insect damage, etc.) as to be unmarketable.

XL = 3 inches and larger in diameter
L = 2.5 to 3"
M = 2.25 to 2.5"
S = 2 to 2.25" Fruit smaller than 2" were not harvested.

LSD 0.05 = least significant difference at the 95% probablility level.
Yields followed by the same letter are not significantly different.
NS = not significant at the 95% probability level.
CV = coefficient of variation, a measure of the variability in the experiment.

Table 2. Fruit yields (in tons/acre) of 2001 mid season UCCE processing tomato variety trials in Fresno and Stanislaus Counties.

Variety	*Fresno*	*Stanislaus*
H9665	31.9	43.9
H9492	36.4	48.2
H9775	32.5	43.8
H 8892	36.1	49.2
HyPeel 303	34.6	45.4
CXD 208	36.3	51.0
CXD 215	31.3	41.7
HyPeel 347	27.7	37.6
HM 0830	32.5	39.9
BOS 24675	31.7	32.9
CXD 207	36.0	39.1
CXD 199	32.8	32.6
Sun 6332	29.4	33.9
Halley 3155	33.9	26.4
ENP 113	36.2	32.7
BOS 24593	30.8	32.9
CTRI 5158	29.1	33.2
H9998	33.0	40.9
CXD 221	29.2	20.4
MEAN	**32.7**	**38.2**



FALL VEGETABLE CROP REPORT FROM THE CALIFORNIA AGRICULTURE STATISTICS SERVICE

Broccoli: California's acreage for fall harvest is forecast at 27,500 acres, 2 percent above last year but 4 percent below 1999. Quality of the crop appears to be good due to cool temperatures which allowed the crop to grow well. Harvest is expected to start in November

Cantaloupes: California producers expect to harvest 4,300 acres, 8 percent above last year. California's acreage is up for the fall, but yields are lower due to weather related problems. Nationally, fall cantaloupes acreage is forecast at 8,900 acres, up 3% from the previous year, but 21% below 1999.

Cauliflower: Acreage for fall harvest in California is forecast at 11,000 acres, unchanged from last year but 5 percent above the year before. California's crop is in good condition due to cooler temperatures.

Sweet Corn: California growers expect to harvest 4,400 acres for October-December quarter, up 10 percent from last year. In California, the grounding of crop dusting planes caused some problems with the crop. Occasional reports of worm damage resulted from spraying intervals that went beyond three days. Nationally, fresh market acreage for harvest is forecast at 10,200 acres, up 24 percent from last year and 29 percent more than 1999.

Honeydews: California producers intend to harvest 4,000 acres during the October-December quarter, 33 percent above the previous year. In California, delays in planting due to water uncertainties resulted in some acreage being harvested later than normal.

Head Lettuce: Lettuce producers in California intend to harvest 34,000 acres, 3 percent above the previous year. In California, early wet conditions in the spring caused some of the crop to fall a little behind, but warm, sunny weather during the remainder of the spring helped the lettuce get back on track.

Fresh Market Tomatoes: Fresh market tomato growers in California expect to harvest 9,500 acres through the October-December period, 10 percent below a year ago. California experienced ideal growing conditions in early July; however, by mid-to-late July the weather was cooler than normal. By July's end through mid-August ideal growing conditions returned, but hot weather set in by late August. Despite these weather fluctuations, the crop is progressing normally. Nationally, fresh market acreage for fall harvest is estimated at 24,600 acres, 3 percent above last year, but 15 percent below 1999.

Processing Tomatoes: As of Oct. 20, 2001, California's contracted processing tomato production is forecast at 8.6 million tons, 16% below last year's crop. Processors expected this production to come from 250,000 acres producing an average 34.40 tons per acre. The contracted harvested acreage, yield and production are 6%, 6% and 16% less, respectively, compared to 2000. Earlier in June, processors estimated the planted acreage at 255,000 acres.

Wet conditions in mid-January slowed field preparation for processing tomatoes in some areas. Planting started in early February and continued through mid-March. As of mid-March, the progress of processing tomatoes was reported in good condition. However, between mid-March and April some fields were affected by frost or hail, while some fields were affected by the heat during May. These conditions may have caused the crop to start later than normal, as well as produce yield levels lower than previously anticipated.

Production fell in most counties, with the exception of Stanislaus, which produced 12% more processing tomatoes than a year ago. The largest decline was in Fresno County, where production was off 29%.

SUMMER ONIONS

California's 2000 summer storage onion production is estimated at 16.2 million cwt., down 5 percent from last year, but 13 percent above 1998. Harvested acreage of summer storage onions is estimated at 36,300. The yield is estimated at 445 cwt. per acre. Favorable weather conditions continued for California's summer onion crop.

Table 3. Estimated processing tomato tonnage, 2001.

	County	Tonnage	Percent change from 2000
1.	Fresno	3,028,530	-29
2.	Yolo	1,290,973	-8
3.	San Joaquin	855,113	-3
4.	Colusa	743,095	-1
5.	Stanislaus	561,419	+12
6.	Merced	527,706	-15
7.	Solano	412,150	-7
8.	Sutter	319,583	+1
9.	Kings	291,950	-16
10.	Kern	289,978	+2
	State Total	**8,640,141**	**-16**

Source: CTGA

PROCESSING TOMATO NUTRIENT RANGES USING THE DRIS SYSTEM

Plant tissue analysis during the growing season is often suggested as a way to evaluate the nutritional status of many crops, including processing tomatoes. Usually taken early in the season between first bloom to full bloom, leaf and petiole samples can often reveal a nutrient deficiency with adequate time to provide corrective measures. Armed with this information, a grower can then make the decision to apply lay by sidedress or foliar fertilizers to ensure optimum yields. However, a recent study by UCCE researchers on processing tomatoes (1) using a relatively new system of tissue analysis called **DRIS** suggests that reduced yields from lack of fertilizer are rare, regardless of the leaf nutrient levels. Furthermore, the sufficiency range for potassium may be much lower than previously reported.

Plant analysis interpretation based on sufficiency ranges are based on many years of fertilizer trials where tissue and yield data are taken so that critical nutrient ranges can be determined. This approach is popular because it is rather straightforward: values below a certain number are considered deficient because they can result in a significant yield loss. The concept does have limitations, however, including stage of plant growth, nutrient antagonism, trial set up, and cultivar selection.

DRIS stands for Diagnosis and Recommendation Integration System, and it is a different approach to interpreting leaf analyses. DRIS works by using nutrient ratios to identify nutrients that might be deficient or excessive, thus improving fertilizer recommendations. For example, the percentage of N and K in tomato leaves can by expressed as the ratio N/K. In a high yielding field, the value may be between 1 – 2, but in a low yielding field it could be over 3. The DRIS system is an improvement for interpreting nutrient levels because the use of ratios is more resilient, and can show a nutrient problem even when the sufficiency approach does not.

In the recent UCCE study, DRIS norms were developed for processing tomatoes grown in central California. This was done by taking leaf tissue and yield data from 105 fields over a two year period. Fields were segregated into high (> 40 tons/A) and low yield (< 35 tons/A) groups. Then every possible nutrient ratio or product (e.g. N/P, P/N, N*P) was calculated for each group and given a DRIS index based on mathematical models. From these indices, new sufficiency ranges were developed.

One of the interesting results was the <u>lack</u> of differences

1. Hartz, T.K., E.M. Miyao, and J.G. Valencia. 1998. DRIS evaluation of the nutritional status of processing tomato. HortScience 33(5): 830-832.

between the two yield groups. If too little fertilizer was responsible for reducing yields, then it would seem that the tissue from the low yield group would have lower nutrient concentrations. Instead, the high yielding group actually had lower nitrogen (N) values at the later two sampling times (fields were sampled at first bloom, full bloom, and 10% red fruit). High yield fields did have significantly higher calcium (Ca) levels at all sampling times, but all the other nutrients (P, K, Mg, and S) were essentially the same. The DRIS indices indicated that the high yielding fields had slightly better nutrient balance than the low yielding fields (58 – 65% vs 45 – 63%), but *in general yields were not limited by nutrient deficiencies*.

The DRIS ratios from this study were used to calculate optimum tissue nutrient ranges for processing tomatoes grown in California. These were then compared to sufficiency ranges previously reported (Table 4). Generally, DRIS nitrogen (N) and phosphorous (P) ranges were similar to other studies, while calcium (Ca), magnesium (Mg), and sulfur (S) ranges were higher. The biggest difference was with tissue potassium (K), where the California DRIS range was much lower than previously reported.

Based on the DRIS indices developed from this study, it appears that the potassium (K) sufficiency ranges previously reported seem to be much too high for California processing tomatoes. Old UCCE guidelines gave 30 – 40 g/kg K as adequate, for example, whereas with the new DRIS guidelines 20 g/kg K is fine. This is likely due to a number of factors. Fruit development in processing tomatoes is very determinate—that is, they set and ripen fruit during a relatively short period. This puts a substantial drain on the leaves for nutrients. Furthermore, competition from calcium and magnesium (often amply supplied in irrigation water) can decrease potassium uptake by the roots. This suggests that higher rates of potash fertilizer could be effective, but this study found no correlation between yield and soil K levels or the amount of fertilizer applied. Simply put, adding more potash to increase leaf tissue K values did not increase yield.

These revised guidelines for California processing tomato growers should go a long way to help interpret the nutritional status of the crop. The good news is that the potassium content in the leaves during the growing season is actually adequate at much lower levels than previously thought.

Table 4. Comparison of California DRIS* derived nutrient concentration ranges for processing tomatoes to published nutrient sufficiency ranges.

*Growth Stage***	*Source*	*Tissue nutrient sufficiency range, g/kg*					
		N	*P*	*K*	*Ca*	*Mg*	*S*
1	DRIS	46-52	3.2-4.9	22-35	19-41	10-18	5.0-13
	Univ. of FL (‘91)	28-40	2.0-4.0	25-40	10-20	3.0-5.0	3.0-8.0
2	DRIS	35-45	2.5-4.1	16-31	18-36	---	5.0-12
	Univ. of FL (’91)	25-40	2.0-4.0	25-40	10-20	2.5-5.0	3.0-6.0
	UCCE (’83)	>30	>3.5	>40	---	---	---
3	DRIS	27-38	2.3-3.7	8.0-20	24-41	10-22	7.0-13
	Univ. of FL (’91)	20-30	2.0-4.0	15-25	10-20	2.5-5.0	3.0-6.0
	UCCE (’83)	>25	>2.5	>30	---	---	---

*Diagnosis and Recommendation Integrated System.

** 1= First bloom.
2= Full bloom.
3= 10% red fruit.

UCCE: A service for all farmers and ranchers in Merced and Madera Counties.

Do you have production questions or research ideas? The Cooperative Extension's mission is to help growers by providing information and conducting applied research. We are a public service agency here for your benefit. Please feel free to contact us.

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