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TOMATO INFO

WEATHER CHALLENGES

A newcomer to Seattle arrives on a rainy day. He gets up the next day and it's raining. It also rains the day after that, and the day after that. He goes out to lunch and sees a young kid and asks in despair, "Hey kid, does it ever stop raining around here?" The kid says, "How do I know? I'm only 6." (*Internet stuff*)

In April, we recorded 15 days of rainy weather with an accumulated monthly total of over 3.5 inches, 2 inches above normal for our Woodland area.

BACTERIAL SPECK CONTROL IN TOMATOES

Bacterial speck can be a major springtime foliar disease of tomato. The pathogen, *Pseudomonas syringae* pv *tomato,* favors cool, rainy weather conditions. Disease can develop on young seedlings as well as mature plants. Greater impact appears to occur at earlier crop growth stages. Plant vigor can be reduced along with yield and soluble solids.

The symptoms of the disease on foliage are dark lesions often initially surrounded by yellowing tissue. Margins of the leaves, where moisture collects, may be most affected. While symptoms on leaf margins may be confused with salt burn, speck also infects stems, branches and fruit.

Major disease outbreaks are usually not the result of a single rain event. The potential for greater disease severity increases with prolonged rainy periods coupled with cool temperature. Weather conditions that maintain high leaf wetness such as morning dews and cloudy, overcast days extend conditions favorable for disease development. Switching from sprinkler to furrow irrigation during favorable disease conditions is helpful. In fields with a recent history of speck, rotation out of tomatoes can reduce the incidence of speck in succeeding years. Since the disease can survive in debris of diseased tissue, tillage to thoroughly bury the residue is helpful.

Resistant varieties offer an effective control measure. However, even when speck resistant varieties are used, remain vigilant when disease conditions are favorable, as resistant strains exist. Another reason to continue to monitor fields is other common bacterial pathogens exist, such as bacterial spot (*Xanthomonas campestris*).

What about chemical controls? Copper is effective in reducing infection when applied as a preventive application. Mancozeb (e.g. Dithane®) tank mixed with copper slightly increases effectiveness, although some processors do not allow the EBDCs.

Application timing may be the most important factor in controlling bacterial speck. While a preventive spray may not be economically warranted, an application made at first sign of the disease is reasonable. The ability to accurately forecast weather conditions helps guide management. Repeat applications may be required if rainy weather conditions persist. Note that resistance to copper exists, and at best, copper is only partially effective in reducing the impact of susceptible strains.

The chemical control program is only a temporary mechanism to reduce the disease level until warmer, dryer weather arrests the disease. UC field research funded by the California Tomato Research Institute helped develop this information regarding chemical control of bacterial speck.

Should sprays continue? With the onset of dry and warm weather, the risk of further disease spread is greatly reduced. Since the current materials are not eradicants, it is not useful to target old diseased tissue, but rather to assess whether the disease is continuing to spread by focusing on the new growth. If sprinkler irrigation will be used, perhaps a final spray might be made, although the likelihood it is warranted is limited. Leaving untreated comparison strips would be wise.

UC IPM Pest Management Guidelines is a source of information along with photos of symptoms. The Internet address is http://www.ipm.ucdavis.edu/PMG/crops-agriculture.html

SOIL COMPACTION

Tillage in wet soils creates soil compaction, which restricts root growth. While trying to stay on target for a fall harvest date is important, soil condition is a key to good root development. Patience to allow soils to dry may pay-off in faster growth, healthier vines and higher yields at the end of the season.

SIDE DRESSING WITH AQUA AMMONIA

Although an infrequent occurrence, plants have wilted and stems collapsed within hours after side dressing with aqua ammonia. The stem collapse can be traced from a major root to one of the upper branches. The number of plants affected is usually only a few percent and normally scattered along the row.

The common factors associated with this infrequent mishap appear to be: larger plants beyond normal layby period of 4 to 5-true leaves, high soil moisture levels often following substantial rainfall, and warm soil temperatures. We've been able to duplicate the symptoms in field tests by carefully digging to secondary roots and placing these attached but cut roots into test tubes filled with aqua ammonia. While the majority of attempts were unsuccessful, a link can be tied to aqua ammonia.

Bottom line Especially with substantial rain delays, the problem from side dressing with aqua ammonia can increase. If plants are approaching the rapid vegetative growth stage, move the side dress N application knife to avoid pruning major roots if problems occur.

PLANT SPACING-DIRECT SEEDING

In a 2002 field test at a UC experiment station on the Westside of Fresno County, UC Farm Advisor Jesus Valencia evaluated direct seeded plants comparing single, double and triple plants per clump every 12 inches on a single seed line configuration. The varieties compared were Halley, H 8892 and HM 830.

Two-plants per clump were superior yielding to either a single or triple plants across all varieties in the Fresno test.

Plant population per clump, direct seeded
UC Westside, Five Points, 2002.

	Variety	plants per clump	fruit yield tons/acre	Brix
1	Halley	1	39.2	4.9
		2	48.6	4.5
		3	39.9	4.2
2	H 8892	1	35.4	4.7
		2	46.3	4.6
		3	39.4	4.7
3	HM 830	1	35.3	4.7
		2	47.9	4.3
		3	39.5	5.0
	LSD 5%		3.8	0.11
	CV		18	8

The information is preliminary and is continuing at the Westside. Note that soluble solids levels were depressed with the double plant configuraton.

It is premature to change. My experience as well as others has been that multiple plants per clump are slightly superior yielding over singles. We've glossed over looking specifically at double plants per clump, especially with the more current varieties. We've also not seen plant population influence soluble solids levels to this degree. Let's pay attention to the 2003 Fresno results. I'll initiate local tests the following year, if needed.

IRRIGATION

The following is an article on drip irrigation, which is gaining interest in our local area.

YEAR OF THE STINK BUG?

With all of the late rainy weather, plant food for stink bugs is abundant. Pest Management Advisor Rachael Long and UC Entomologist Les Ehler point out that mustard, radish and malva provide fuel for the stink bugs that have migrated from overwintering under blackberry bushes or woody debris. These intermediary-fueling stations may provide a base for an early June migration into surrounding tomato fields as a next stop.

Food for thought: Since these weedy hosts play a role in the development of the stink bug population, it would be wise to try to control these weeds around the fields. Malva has become much more widespread in many local fields.

Managing Drip Irrigation of Tomatoes

Blaine Hanson, Irrigation and Drainage Specialist, UC Davis
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Introduction

Efficient irrigation water management involves knowing how much water was used by the crop between irrigations and how much water is applied during irrigation. Knowing the amount of water used requires estimating the crop's evapotranspiration (ET). The amount of water applied depends on the irrigation set time, the field flow rate, and the number of acres irrigated.

Estimating Crop ET

Crop ET between irrigations is estimated using the following equation:

$$ETc = Kc \times ETo \times I_n \qquad (1)$$

where ETc is the crop ET, ETo is the reference (or real time) ET, I_n is the days between irrigation, and Kc is the crop coefficient. The reference ET is obtained from the California Irrigation Management Information System (CIMIS). The crop coefficient depends on many factors such as crop type, canopy size, plant height, and climate conditions. Crop coefficients are found in several University of California publications.

Recent research along the west side of the San Joaquin Valley involved measuring ETc of processing tomatoes in several drip-irrigated fields. At the same time, measurements of canopy coverage were also made, where *canopy coverage is defined as the percent of the soil area shaded by the canopy at mid-day.* These data were used to develop a relationship between canopy coverage and crop coefficient (Figure 1), which shows the data points and the best-fit curved line to the data points. Thus, by measuring the canopy coverage at any time, the crop coefficient can be determined, regardless of planting time. Canopy coverage is estimated by

$$C = 100 \times W / S \qquad (2)$$

where C is the canopy coverage (%), W is the canopy width (measured with a tape measure) and S is the bed spacing. Once the canopy coverage is determined, the crop coefficient can be determined from the curved line in Fig 1.

Reference ET can be accessed over the internet at the web address www.cimis.water.ca.gov. However, historical ET can be used with a minimal error because of the relatively consistent climate from year to year. Historical ET is simply an average value calculated from many years of data. Table 1 contains historical ET (ETo) for several locations in the southern San Joaquin Valley.

How Long Should I Irrigate?

The irrigation set time needed to apply a desired amount of water during irrigation can be calculated from the following equation:

$$T_s = 449 \times A_s \times D / Q \qquad (3)$$

where T_s is the set time in hours, A_s is the acres irrigated per set, D is the desired depth in inches, 449 is a conversion factor, and Q is the field flow rate in gallons per minute. The desired depth (D) is the crop ET between irrigations divided by the irrigation efficiency expressed as a decimal fraction. An irrigation efficiency of about 85% is recommended if the actual value is unknown.

The Problem of Solids in Processing Tomatoes

A concern with drip-irrigated processing tomatoes is unacceptable soluble solids. Earlier studies have reported that by either cutting back on irrigation water or cutting off the water near harvest can increase the solids content however, yield is reduced. Results of a three year study at the UC West Side Research and Extension Center showed that as a compromise between yield reduction and solids increase, cutting the irrigation water application about 60 days before harvest to about 75% of the potential evapotranspiration reduced crop yield by about 6%, but solids were increased to acceptable levels.

This result may not occur where shallow ground water conditions exist or where large amounts of stored soil moisture are available near harvest time. However, other UC research has shown acceptable levels of soluble solids occur under drip irrigation in salt affected soil.

Example: Determine the irrigation set time needed for the following data for a field irrigated every 3 days near Five Points:

Time period: June 1-15 — Bed spacing = 60 inches
Acres irrigated per set = 80 — Canopy width = 36 inches
Field flow rate = 1500 gpm

1. From Table 1, historical ETo equals 0.29 inches per day for the Five Points CIMIS station
2. Canopy coverage equals 100 x 36 in / 60 in = 60%
3. From Figure 1, Kc equals 0.86 for a canopy coverage of 60%
4. Crop ET equals 0.86 x 0.29 inches per day x 3 days = 0.75 inches
5. The desired depth of application is 0.75 / 0.85 (irrigation efficiency) = 0.88 inches
6. The irrigation set time is 449 x 80 acres x 0.88 inches / 1500 gpm = 21 hours.

Figure 1: Relationship between Canopy Coverage and Crop Coefficient

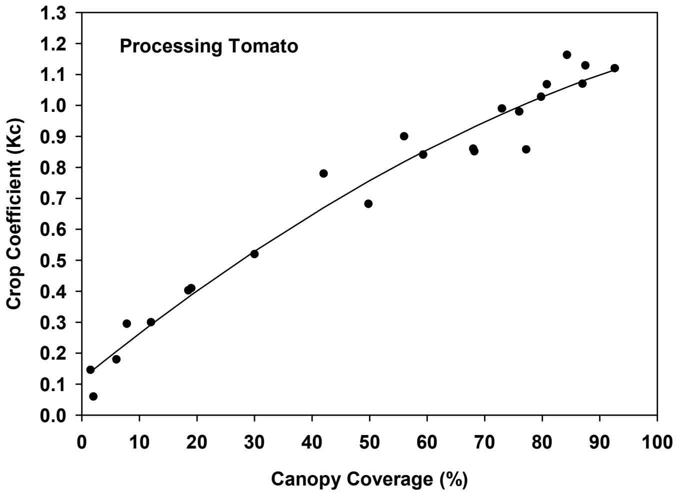

Table 1. Values of Historical ET for Several Locations in the Southern Sacramento Valley

		DAVIS	NICOLAUS	FIVE POINTS
		-- inches of water per day --		
JAN	1-15	.03	.03	.04
	16-31	.05	.04	.05
FEB	1-15	.07	.06	.06
	16-30	.09	.08	.09
MAR	1-15	.11	.10	.11
	16-31	.14	.13	.15
APR	1-15	.19	.17	.20
	16-30	.20	.19	.22
MAY	1-15	.24	.22	.26
	16-31	.26	.24	.27
JUN	1-15	.27	.26	.29
	16-30	.28	.27	.30
JUL	1-15	.28	.27	.30
	16-31	.26	.25	.28
AUG	1-15	.25	.24	.28
	16-31	.23	.22	.25
SEP	1-15	.21	.19	.23
	16-30	.18	.15	.20
OCT	1-15	.16	.13	.17
	16-31	.12	.09	.13
NOV	1-15	.08	.07	.10
	16-30	.06	.04	.07
DEC	1-15	.05	.03	.05
	16-31	.03	.02	.03

California Irrigation Management Information System www.cimis.water.ca.gov

CIMIS is a state agency that serves the public free of charge. Register your name, enter a password and then you can access detailed weather information and tailor reports to fit your need. It's easy to use.

There are 189 weather stations around the state try a few in your area.

Hourly, daily, weekly, monthly weather information is available. Reports are fast and easy to download. ETo variance report provides a comparative view of ETo for stations and date range you specify and compares it with last year's values and historical average. Very useful.

DUAL MAGNUM® USE IN TOMATOES:
Federal label approved, CA label progresses, Section 24-C granted

The USEPA has recently approved a food tolerance and federal label for Dual Magnum (s-metolachlor) manufactured by Syngenta. California Department of Pesticide Regulation is now able to begin work on a full California label, but the process will take some time.

For the last two years this preemergence herbicide for nutsedge control has had a Sec 18 emergency use label. Now that Sandea, a postemergence herbicide that specifically controls nutsedge has become available, there is no current emergency need for Dual. However since its introduction Dual has gained wide grower interest as it is a very effective preplant treatment for transplants, and an alternative product to use on sandy ground where Eptam (EPTC) cannot be used.

CDPR announced that copies of the 24-C label for Dual Magnum are available from local Agricultural Commissioners beginning Wednesday, April 9th. You can only begin use of Dual Magnum when the supplemental label is in your possession. CA Tomato Research Institute has been instrumental in staying on task with this registration process.

Submitted by,

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