



TOMATO INFO

Field Observations
Fusarium
Southern blight
Cost study
Meeting Jan 11, Thurs

Field Observations

The year 2017 was one of the most challenging for tomato production.

Weather was a major influencing factor, particularly with spring rainfall and several runs of extended high temperatures during flowering across a wide span of fields scheduled for August harvest.

From a CIMIS weather station located in Davis, data is presented to compare 2016 to 2017.

Days of rainfall at or above 0.10" and monthly accumulation.

| | 2016 year | | 2017 year | |
|-------|-----------|--------|-----------|--------|
| | days | inches | days | inches |
| Jan | 12 | 5.4 | 12 | 11.0 |
| Feb | 2 | 0.7 | 12 | 7.4 |
| Mar | 9 | 4.8 | 5 | 3.5 |
| April | 1 | 0.3 | 4 | 2.5 |
| May | 2 | 0.9 | 0 | 0.0 |
| June | 0 | 0.01 | 2 | 0.8 |

High temperatures with daily highs \geq 99°F; and separately, nightly lows \geq 65°F.

| | 2016 | | 2017 | |
|------|-----------|------|-----------|------|
| | # of days | | # of days | |
| | highs | lows | highs | lows |
| June | 7 | 8 | 5 | 0 |
| July | 8 | 1 | 7 | 1 |
| Aug | 5 | 3 | 2 | 0 |
| Sept | 3 | 7 | 1 | 0 |

Surprisingly, the number of days of high temperatures and of warm nights were greater in our more crop productive 2016 season than what I suspect most of us recall of 2017.

When comparing the combination of daily high extremes and high nighttime temperatures, our June 2017 strung 7 days of unrelenting highs together. If fruit ripening occurs 45 to 60 days after pollination, the adverse effect would especially reflect in August harvests for our area.

Number of days of combined daytime highs \geq 99°F with nighttime lows \geq 65°F.

| | # of days | |
|------|-----------|------|
| | 2016 | 2017 |
| June | 0 | 7 |
| July | 1 | 1 |
| Aug | 0 | 1 |
| Sept | 0 | 3 |

Plant physiologists in controlled studies have measured reductions in carbohydrate and sugar levels, pollen growth, release and germination plus other factors affecting flower set and fruit development from exposure to high temperatures. Adding to the complexity are high nighttime temperatures and extremes in relative humidity

Practical field management strategies for dealing with high temperature extremes include variety selection and irrigation management.

Variety performance differences might be more easily judged during these adverse conditions. The extremes of the 2017 season may have helped identify varieties with improved performance.

Maintain optimal soil moisture. Buried drip irrigation can deliver water more frequently, evenly and without as many interruptions compared to furrow or sprinkler methods. The advantage of drip to deliver is especially clear during vine training or other tractor cultivation operations, as conventional irrigation is temporarily stopped to dry soils for the tractors. Sprinkler method raises relative humidity and furthers evaporative cooling to partially reduce high temperature extremes, but most sprinkler systems lack the capacity to quickly and frequently cover a field.

Fusarium wilt

The spread of Fusarium wilt continues in our area. Adding to the discussion is mechanisms of spread. Plant pathologists agree that diseased tomato plant tissue has the highest pathogen load to provide inoculum into the future. Thus, most effort should be to limit the spread of plant debris from field to field. Cleaning harvest equipment is the most logical step: as the number of diseased plants is the highest at end of the crop season; and harvest equipment including vine diverters are usually the most laden with debris of all operations. Removing the stems and long wraps of vines should minimally be the target. Soil could also be a carrier. And lowest on the list are infected tomato seed from Fusarium wilt diseased plants. While all are sources, the highest priority is reducing spread of infected tomato vines. Sanitation is a grower-controlled tool which has near-future impact.

If a field had a limited area of diseased plants, the spread might be reduced by harvesting that area last and equipment cleaned in that same headland area before moving to another field.

While the pace of harvest can be hectic, the investment in cleanup will slow the spread. All of us are very aware that 'tomato' ground is being reduced by continued planting of almonds, walnuts and pistachios. Sanitation practices aren't solely targeting the Fusarium wilt pathogen, but include other pathogens, as well as nematode and weeds. Sanitation is a step towards sustainability.

Other Fusariums

There is also good news! While Fusarium wilt, race 3 is on the rise, the incidence of Fusarium crown and root rot (*Fusarium oxysporum* f.sp. *radicis-lycopersici*) has been at a low level for the past few years. We anticipated this destructive disease to spread with major impact, but it has not.

However, positive identification of the crown rot pathogens has become muddled. In the last years before Plant Pathologist Mike Davis



retired, we began seeing crown rotting symptoms which did not clearly separate in lab isolations nor in molecular identification techniques. Most commonly, Fusarium wilt and Fusarium crown and root rot were in the mix. Because lab identification wasn't clear, we became unable to make a preliminary field diagnosis based on plant symptoms. California Tomato Research Institute has funded research work in the recent years to help develop lab tools to distinguish between the Fusariums. This has left some uncertainty whether a race 3 variety is the right tool in some of these Fusarium-disease impacted fields. Substantial CTRI-funded research at UC Davis is currently focused on identification and management.

Southern blight incidence

The soilborne pathogen *Sclerotium rolfsii* causing Southern blight was more prevalent in several local fields and reported

across other regions in our Central Valley in

2017. The rise of Southern blight may



be attributed to the high temperatures this growing season. Growth of the pathogen favors high temperatures plus high surface soil moisture/humidity. The pathogen causes a rapid wilt followed by collapse of the tomato plant. Snow-white colored fungal growth develops on stems near the soil line. Overwintering seed-like sclerotia often develop on stems.

The incidence is not new for our area. Southern blight is commonly seen on a few plants in a couple of fields. What is uncommon is the greater number of fields involved and the large areas impacted in 2017. Historically, a few growers have been more impacted in the western part of Yolo County. Decades ago, the worst cases I've seen were on furrow-irrigated sugar beets and on summer beans, but included sprinkler irrigated tomatoes. This year, diseased fields included those with buried drip which limited surface soil wetting.

While a late recommendation, those fields with high incidence should consider rotating out of tomatoes into a small grain like wheat or into corn for a year or more. There is a wide host range of crops impacted, but grass crops are less susceptible. Growing triticale solely as a winter cover crop isn't a likely effective strategy to continue consecutive years of tomato cropping in highly diseased fields.

While we don't expect to have such high temperatures in 2018, in those impacted

fields, the inoculum level is elevated. See article by Extension Pathologist Cassandra Swett and UC-Kern County Advisor Joe Nunez. http://ccveg crops.ucanr.edu/newsletters/Tomato_Info_Newsletters72607.pdf

Other minor issues

Bacterial speck activity was low this year. Spotted wilt virus, with a few exceptions, is under control (attributable perhaps to plant genetic resistance). Curly top remains at a low level in our area. To date, powdery mildew has not been reported as a problem. In part, the use of sulfur and the number of preventive sulfur dust applications likely are helping.

Cost study: 2017

A sample cost of production study for lower Sacramento Valley and northern San Joaquin Valley was completed in 2017 together with advisor Brenna Aegerter and UC Davis Ag Econ Department through Don Stewart. With many assumptions for the study and grower input, costs were estimated to be \$3,313 per acre of which cash outlay was \$3,086. Total cost estimate was over \$75 per ton. Listed is a comparison of some major inputs with a previous local study.

<http://ccveg crops.ucanr.edu/files/275955.pdf>

Cost comparison of select items from 2014 vs. 2017
UC cost of production studies.

| <u>ITEM</u> | <u>unit</u> | <u>2014</u> | <u>2017</u> | <u>% change</u> |
|----------------------------|-------------|-------------|-------------|-----------------|
| transplanting | \$/acre | \$ 636 | \$ 763 | 20 |
| seed | 1,000 | \$ 18 | \$ 25 | 39 |
| labor: tractor driver | hour | \$17.00 | \$19.21 | 13 |
| labor: irrigator | hour | \$13.60 | \$17.40 | 28 |
| labor: non-machine | hour | \$13.60 | \$16.31 | 20 |
| diesel | gallon | \$ 4.12 | \$ 2.87 | -30 |
| UN 32 | lb of N | \$ 0.84 | \$ 0.58 | -31 |
| <u>ASSUMPTIONS:</u> | | | | |
| yield | tons/A | 44 | 44 | 0 |
| crop price | \$/ton | 80 | 72.5 | -9 |

UPCOMING TOMATO MEETINGS:

- √ 11 January 2018 (Thursday AM) South Sacramento Valley Processing Tomato Production Meeting, Woodland Community & Senior Center, 2001 East Street, Woodland, 95776
- √ 24 January 2018 (Wednesday AM) N. San Joaquin Valley Processing Tomato Production Meeting (AM) follow by CA Tomato Growers Association Business Meeting, DoubleTree Hotel, 1150 9th St, Modesto. Registration required for CTGA luncheon (916) 925-0225 http://www.ctga.org/img/uploadedFiles/2018_Annual%20Meeting%20Reg.pdf
- √ 21& 22 Feb 2018 (Wed-Thursday)- EXPO, CA League of Food Processors, Sacramento Convention Center, 1400 J Street, Sacramento. Registration required <http://clfp.com>

We appreciate the support of CTRL and of our cooperating growers in our local 2017 field tests:

Blake Harlan, Harlan Family Farm and Josh Chase, Growers Transplanting Inc.

Sam and Steve Meek of J.H. Meek and Sons;

Colin and Frank Muller of Muller Ranch.

Ag Seeds and TS&L

Plant Pathology Dept, Armstrong facility, UC Davis, Bryan Pellissier

Best wishes for a Happy Holiday Season,

Gene Miyao

Gene Miyao

Farm Advisor, Yolo, Solano & Sacramento counties

The University of California prohibits discrimination against or harassment of any person employed by or seeking employment with the University on the basis of race, color, national origin, religion, sex, physical or mental disability, medical condition (cancer-related or genetic characteristics), ancestry, marital status, age, sexual orientation, citizenship, or status as a covered veteran (covered veterans are special disabled veterans, recently separated veterans, Vietnam era veterans, or any other veterans who served on active duty during a war or in a campaign or expedition for which a campaign badge has been authorized). University policy is intended to be consistent with the provisions of applicable State and Federal laws. Inquiries regarding the University's equal employment opportunity policies may be directed to the Affirmative Action/Staff Personnel Services Director, University of California, Agriculture and Natural Resources, 300 Lakeside Drive, 6th Floor, Oakland, CA 94612-3550, (510) 987-0096.

SOUTH SACRAMENTO VALLEY PROCESSING TOMATO PRODUCTION MEETING

University of California Cooperative Extension Farm Advisors
Colusa/Sutter/Yuba and Yolo/Solano/Sacramento Counties

Woodland Community Center

2001 East Street, Woodland 95776

(From Highway 113, exit on CR 25A, head west to East Street. Right turn on East St. for ~1 mile)

8 am to noon, Thursday, January 11, 2018

-
-
- | | |
|--------------|---|
| 7:45 | Doors will open — Coffee and refreshments will be ready |
| 8:15 | <i>Progress report on grafting evaluation:</i> Gene Miyao, UC Farm Advisor, Yolo/Solano/Sacramento counties |
| 8:40 | <i>Local Pesticide Regulation Update:</i> Jenni King, Deputy Ag Commissioner, Yolo County |
| 9:00 | <i>Sustainable sourcing trends in the food world: perspective from Campbell Soup</i> Dan Sonke, Director, Sustainable Agriculture, Campbell Soup |
| 9:20 | <i>Processing tomato N management research update:</i> Daniel Geisseler, Nutrient Management Specialist, UC Davis |
| 9:40 | <i>Changes in PTAB color measurement:</i> Dave Slaughter, Bio and Ag Engineering Dept, UC Davis. |
| 10:00 | ————— Short Break ————— |
| 10:20 | <i>Southern blight and root knot nematode control evaluations:</i> Joe Nunez, UC Farm Advisor Emeritus, Kern County |
| 10:40 | <i>Variety Evaluations 2017:</i> Lance Stevens, Ag Seeds Inc. |
| 11:00 | <i>Tomato spotted wilt virus management with resistance-breaking strains:</i> Tom Turini, UC Farm Advisor, Fresno County |
| 11:20 | <i>Research direction of California Tomato Research Institute:</i> Zach Bagley, Manager, CTRI |
| 11:30- 11:50 | <i>Fusarium diseases of tomato: Current research on identification and management</i> Cassandra Swett, Plant Pathology Dept, UC Davis |

Hall Rental and Refreshments Courtesy of:

| | |
|--------------------------------|---|
| Dow AgroSciences (Jill LeVake) | Gowan (James Brazzle) |
| Syngenta (Derrick Hammonds) | Farm Credit West (Anna Fricke) |
| Bayer (Bob Austin) | Morningstar Company (Renee Rianda) |
| Valent USA (Leanne Becker) | Campbell Soup Company (Ag Operations) |
| BASF (Leigh Ann Harrison) | Olam (Chris Della Maggiore) |
| FMC (Tim Gallagher) | Pacific Coast Producers (Steve Freeman) |

Meeting is open to any interested party. Meeting facility is handicap accessible. 

PCA credits: pending

Meeting Code: M-???-18

CCA credits: 0. Nutrients, 0. IPM, 0.0 Crop Management & 0.0 Professional Dev

CCA tracking # CA pending