

TOMATO INFO

General Observations
Potassium Fertilization
Tomato Production Meeting,
Thursday, 7 January 2016

FIELD NOTES (2015 SEASON)

Early-stage, vine growth in local tomato fields in the past few years has been exceptional. I concur with the grower-led thought that drier soil condition during the spring results in better crop growth and yield outcome. The dry soils are less prone to soil compaction from springtime seedbed tillage and thus root growth is better. With that in mind, delaying or reducing tillage in the early spring when soils are wet should be a management goal to implement as we face the uncertain extent and duration of forecasted El Niño weather conditions in 2016.

Fusarium wilt race 3 was first confirmed in the Sutter Basin in 1987. Over a 25-year period, race 3 slowly became established beyond that region. In recent years, we have witnessed its spread into many distant production areas with an increased number of infested fields as well as higher incidence within fields to become a major Central Valley pest. Fusarium wilt, race 3 resistant varieties offer a remedy. Correct identification is needed between several Fusarium diseases of tomato. Limiting the spread, especially by cleaning harvest equipment before moving to clean fields, is wise. Sanitation as a preventive is a strategy for an array of pests.

Contrastingly, Fusarium crown and root rot has not developed into a major, widespread pest as we had projected, although the potential still exists. Root knot nematode populations that overcome the *Mi* genetics in our current resistant varieties continue to spread with discoveries in additional fields. Bacterial speck levels were again low because of the drier and warmer spring weather conditions. Powdery mildew was moderate in many fields.

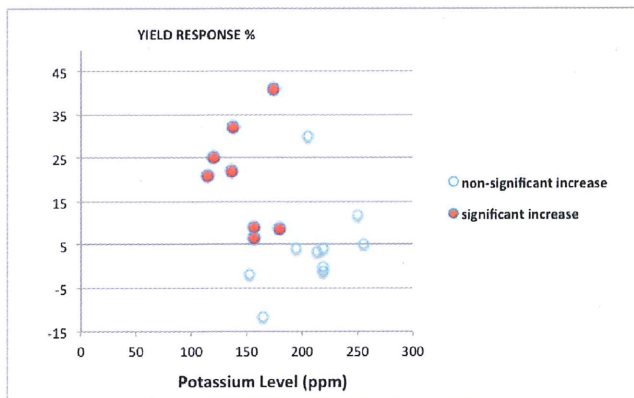
Potassium- Do you need it?

Tomatoes may benefit from potassium applications.

From supplemental applications of composted poultry manure, Plant Pathologist Mike Davis and I have measured yield responses up to 40%. Our tests explored improving tomato plant health, initially as a soilborne disease control project. In our first season, a supplemental application of composted poultry manure increased yield by 30%. While not demonstrably reducing disease level, we repeatedly observed yield responses to composted manure over the years.

As we gathered and processed more data, our focus shifted to nutrient management as we began to see that potassium was the primary driver in our field tests with composted poultry manure (Table 1). While Dr. Davis has retired, our interest in K applications and in composted manure remains.

Table 1. Influence of soil K level (in ppm) on processing tomato yield response to composted poultry manure, Yolo-Solano, 2011-2015.



Summary of 4 tests conducted in 2015:

2 field tests included composted poultry manure and potassium treatments while another 2 tests only evaluated synthetic K. Composted poultry manure applications at 5 or 10 tons per acre did not significantly increase yield in either of our 2015 tests. The lack of a yield response was related to either a high soil K level or a high Fusarium wilt disease pressure at our test sites. Potassium (KCl) applications increased yields from 6 to 16% in 2 of the 4 tests. These responding fields had soil K levels ranging from 144 to ~170 ppm with K levels from 1.9 to 2.2% of the cation exchange.

The results continue to support that yield responses to potassium applications likely occur in soils with K levels below 200 ppm using an ammonium acetate extraction method and secondarily, in combination with K levels not exceeding 2% of the cation exchange capacity (CEC).

Briefs of Results

In a test site near Yolo (the town), soil K levels approached 200 ppm and 2.8%. Yield was not improved with either composted manure or potassium. With a sidedressed, preplant placement of potassium muriate (KCl) close to the transplant line, at the high rate of 400 lbs or more of K₂O per acre, seedlings suffered from salt damage. At the high rate, replanting was needed to replace seedlings that died; plant vigor was reduced and vines never fully recovered; maturity was delayed; and yields suffered. Fertilizer placement is an issue.

In a Woodland-area field site with modest K level of 165 ppm and 2.2%, a yield response was expected. Fusarium wilt was unforeseen and incidence was high. Approximately 20% of the plants displayed Fusarium symptoms at full flower and continued to a much higher level through the fruit ripening stage. Composted poultry manure did not reduce the incidence of Fusarium wilt and these plants had poorer plant health compared to the control. Yields were lower with the compost application compared to the control (43.2 vs. 50.3 tons/acre, respectively, at a 90% confidence level). Potassium fertilizer as KCl increased yield from 50.3 to 57.5 tons/acre with K₂O rates up to 400 lbs/acre, then sharply declined with the highest rate of 800 lbs.

Northeast of Davis, soil K level in a select field was believed to be moderate when a test was initiated. Subsequent soil lab results indicated K levels were ~220 ppm with 3.0%. With potassium muriate applications from 50 to 800 lbs of K₂O per acre, yields were not responsive to any applied potassium.

In the last test site in a field north of Zamora, soil K levels were between 144 to 168 ppm with 1.9%. A positive, linear yield response was measured with preplant, sidedressed rates from 50 to 800 lbs of K₂O per acre (Table 2). The control yielded 56.7 tons per acre while the highest application rate of 800 lbs K₂O per acre yielded 65.9 tons/acre. Brix levels were modestly improved. Plant health was improved with the K applications, although the nontreated plots were healthy as well. Plant tissue lab results indicated K level was improved with the application.

Table 2. Barrios Farms, Zamora-area field, 2015 (144 to 168 ppm K @ 1.9%)			
	yield	leaf	11 days
		tissue	preharvest
		@ bloom	visual
TREATMENT	tons/A	% K	greenness
1 control non K ₂ O (KCl)	56.7	1.18	7.5
2 K @ 50 lbs K ₂ O sidedress	58.2	1.21	7.5
3 K @ 100 lbs K ₂ O sidedress	59.6	1.26	8.0
4 K @ 200 lbs K ₂ O sidedress	60.5	1.43	8.0
5 K @ 400 lbs K ₂ O sidedress	63.9	1.60	9.0
6 K @ 800 lbs K ₂ O sidedress	65.9	1.89	9.2
LSD 5%	2.86	0.17	0.85
% CV	4	10	9
GROUP CONTRASTS (probability)			
A rate: linear response	0.00	0.00	0.00
control vs	56.7	1.18	7.5
any KCl	61.6	1.48	8.3
probability	0.00	0.00	0.02

Note: A discrepancy between 2 commercial labs created a temporary setback in our 2015 tests. Soils were resampled and split between 3 labs, one included our UC Davis diagnostic lab, to establish confidence in the soil K level and lab work.

We strongly suggest that growers establish confidence in their lab service partners. If a lab doesn't follow standardized procedures and methods, the results from these labs, if consistent over the years, may still provide guidance. However, growers will need to establish their own thresholds apart from the University guidelines. Regardless, the ultimate test of benefit is to conduct on-farm evaluations in individual fields to gauge if potassium can improve yield in those specific fields.

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 7, 2016

7:45	Doors will open — Coffee and refreshments will be ready
8:30	<i>Evaluation of supplemental composted manure & potassium on plant health</i> Gene Miyao, UC Farm Advisor, Yolo/Solano/Sacramento counties
8:50	<i>Insight into Fusarium wilt of tomato</i> Tom Gordon, Plant Pathology Dept, UC Davis
9:10	Fusarium wilt studies Hung Doan, graduate student, Plant Pathology Dept, UC Davis
9:20	<i>Variety Evaluations:</i> Lance Stevens, AgSeeds Unlimited
9:40	<i>Local Pesticide Regulation Update</i> Yolo County Ag Commission's office
10:00	————— Short Break —————
10:15	<i>Powdery mildew management in processing tomatoes</i> Brenna Aegerter, UC Farm Advisor, San Joaquin County
10:35	<i>Root knot nematode control evaluations; and Southern Blight control attempts</i> Joe Nunez, UC Farm Advisor, Kern County
10:55	<i>Chemical control evaluations for stink bug; and leafhopper surveys for Curly top</i> Tom Turini, UC Farm Advisor, Fresno County
11:15	<i>Groundwater Quantity and Quality: Recent Regulations that Affect Growers</i> Vicki Kretsinger Grabert, Senior Hydrologist, Luhdorff & Scalmanini, Consulting Engineers
11:45	Question Period
12:00 -	end

Hall Rental and Refreshments Courtesy of:

Dow AgroSciences (Jill LeVake)	Gowan (James Brazzle)
Syngenta (Derrick Hammonds)	FMC (Leanne Becker)
Bayer (Bob Austin)	Farm Credit West (Anna Fricke)
Valent USA (JR Gallagher)	Morningstar Company (Renee Rianda)
BASF (Dawn Brunmeier)	Campbell Soup Company (Ag Operations)
DuPont (Tim Gallagher)	Olam (Zach Bagley)

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

<p>PCA credits: hours requested Meeting Code: to be assigned CCA credits: Soils & Water 0.5, IPM 2.5, Crops 0.5</p>
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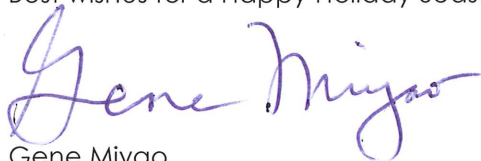
UPCOMING TOMATO MEETINGS:

- √ 7 January 2016 (Thursday AM) South Sacramento Valley Processing Tomato Production Meeting, Woodland Community & Senior Center, 2001 East Street, Woodland, 95776
- √ 27 January 2016 (Wednesday AM) N. San Joaquin Valley processing tomato production meeting (AM) follows with CA Tomato Growers Association meeting, DoubleTree Hotel, 1150 9th St, Modesto. Registration required for CTGA luncheon (916) 925-0225 ctga@sbcglobal.net
- √ 17-18 Feb 2016 (Wed-Thursday)–EXPO, CA League of Food Processors, Sacramento Convention Center, 1400 J Street, Sacramento. Registration required.
https://www.foodprocessingexpo.net/register_now.cfm

We appreciate the support of CTRI and of our cooperating growers in our 2015 fertilizer tests:

Tom and Bryan Barrios of Barrios Farms;
Sam and Steve Meek of J.H. Meek and Sons;
Colin, Frank and Louie Muller of Muller Ranch.

Best wishes for a Happy Holiday Season,



Gene Miyao
Farm Advisor, Yolo, Solano & Sacramento counties

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