METAM POTASSIUM FOR THE CONTROL OF PREMATURE VINE DECLINE ON PROCESSING TOMATO

Marja Koivunen[1*] and Peter Porpiglia[2]
AMVAC Chemical Corporation, [1] Davis, CA, [2] Newport Beach, CA

Background: California is the leading producer of processing tomatoes in the United States. In 2018, the amount of fruit harvested from 240,000 acres in San Joaquin and Sacramento Valley is expected to be roughly 11.9 million tons. According to the USDA National Agricultural Statistics Service, NASS (2018), the average tomato yield has increased from 32 t/A in 1998 to 47 t/A in 2017, mostly due to improved varieties and advances in production technology, such as buried drip irrigation for improved fertilizer and water use efficiency. The main factors limiting processing tomato yield in California are associated with soil borne diseases and plant parasitic nematodes. In the Sacramento Valley, infection with *Verticillium* wilt, *Fusarium* wilt and *Fusarium* root and stem rot often lead to premature vine senescence and eventual yield losses through decreased photosynthesis and low fruit quality due to increased incidence of sunburn and mold. Soil fumigants can increase fruit yield when used as a preplant treatment against soil borne diseases and nematodes for transplanted tomato. However, previous small-plot trials conducted in Sacramento Valley by Miyao et al. (2015), showed only moderate effect on premature vine senescence and yield increase in processing tomato with metam potassium (K-Pam® HL) applied via drip irrigation at a broadcast rate of 15 gal/A.

Objective: The objective of this large-plot field trial was to demonstrate the beneficial effect of K-Pam applied at a recommended 33 gal/A broadcast rate via buried drip lines. Since the application window before transplanting in the spring is very narrow, two application timings (fall and spring) were used to test if K-Pam HL applied in the previous fall would be equal to the spring application for the control of premature vine decline caused by soil borne pests.

Methods: A pre-plant fumigation trial was conducted in Sacramento Valley, California in a 75-acre commercial field with Marvin silty clay loam (pH 7.6, 0.9 % OM) and a known history of soil borne diseases and root knot nematodes. K-Pam HL at a broadcast rate 33 gal/A (corresponds to 50 gal K-Pam HL per treated acre based on the width of the treated zone around the drip line in the silty clay loam soil) was applied in the two 37.5-acre subplots via a buried drip system in either November 2017 (FALL) or February 2018 (SPRING). Five beds in each subplot were left untreated (UTC) by closing the drip lines with a valve in the end of each bed during the application. Two rows of processing tomato transplants (var. BP13) were planted in the 60-inch beds on March 20, 2018, using a commercial transplanter and a plant density of 8,700 plants/A. Plants were monitored for disease (*Verticillium* wilt, *Fusarium* wilt, *Fusarium* stem and root rot) symptoms and plant vigor throughout the growing season. Besides the PRE and POST herbicides (trifluralin, S-metolachlor and rimsulfuron), the only

maintenance pesticide treatment in the field was dusting sulfur at 40 lb/A applied on June 2, 2018. To calculate the tomato yield in both UTC and treated areas, four randomly selected plots (8 by 5 feet) in each area were harvested manually on July 15. Marketable (red) and unmarketable (green) fruit weights were recorded for each plot. Nematode control was assessed by root galling and by the number of juvenile (J2) plant pathogenic nematodes (*Meloidogyne incognita*, *Pratylenchus thornei*, *Xiphinema americanum*) in soil samples collected from each plot. The main harvest in the field was conducted with a commercial tomato harvester on July 22. During the main harvest, fruit from the UTC beds (FALL and SPRING) were harvested separately from the rest of the field. Commercial yield quantity and quality were determined at the cannery.

Results: During the first three months of the trial, only slight differences in plant growth and vigor were observed between the UTC and treated beds. Towards the end of the 120-day trial period, the UTC plants in both FALL and SPRING areas started to wilt and decline, showing visible symptoms of both *Verticillium* and *Fusarium* wilts. Yield data from the small plots indicated approximately 20% increase in the marketable yield attributed to K-Pam HL treatment, with average marketable yields of 62 t/A and 51 t/A harvested from the treated and UTC areas, respectively. Small-plot yields in the SPRING treatment area were slightly higher than in the area treated in the FALL but the difference was not statistically significant at $p<0.05$. The yield from the commercial harvest confirmed the small-plot yields. No differences in percent green fruit and the content of soluble solids (Brix) were measured in fruit harvested from the UTC and treated plots. No significant differences were observed in root galling between UTC and treated plants sampled in the small plots. However, the number of juvenile root-knot nematodes (*Meloidogyne incognita*) in the FALL treated area was significantly lower than in the adjacent UTC plots. Overall results confirm the beneficial effect of K-Pam HL preplant treatment (33 gal/A) via buried drip in reducing premature vine decline in processing tomato, leading to about 20 % increase in marketable yield, regardless of application timing.

References:

Miyao, G., Davis, R.M., Leveau, J. 2015. Evaluation of chemigation treatments on premature vine senescence of processing tomatoes in the Sacramento Valley, California. Acta Horticulturae 1069: 159-165

USDA NASS. 2018. 2018 California processing tomato report. May 31, 2018. Accessed August 30, 2018. https://www.nass.usda.gov/Statistics_by_State/California/Publications/Specialty_and_Other_Releases/Tomatoes/2018/201805ptom.pdf