

Progress Report: Results of Study to Assess Effect of Thrips Control Programs on TSWV Incidence and Yield on Processing Tomato, 2007

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Introduction

Recent commercial production losses of processing tomatoes due to the thrips-transmitted virus, *Tomato spotted wilt virus* (TSWV), has resulted in an increased importance of thrips, which was previously considered a minor pest in this crop. Among other approaches that must be evaluated, is potential of the use of insecticide programs to reduce TSWV incidence and severity.

Methods

In 2007, a study to assess the effect of insecticide programs on the incidence of TSWV, percentage of TSWV-symptomatic fruit and yield of processing tomatoes was conducted at University of California West Side Research and Extension Center at Five Points, California. On 4 May, 'H9553' variety processing tomato seeds were sown on Panoche clay loam and sprinkler irrigated on 7 May.

The experimental design was a split block with 3 replications.

Main plot treatments were shank applied at a 3 in depth to one 66 in bed, 315 ft long on 1 May 2007

1. Platinum 8 fl oz
2. Platinum 11 fl oz
3. Admire Pro 10.5 fl oz
4. Untreated

Sub-plot treatments were applied to the foliage: All foliar materials were applied in the equivalent of 25 gallons of water per acre with a CO₂ pressurized backpack sprayer at 30 psi. A spray boom with three Teejet 8002 flat fan nozzles spaced 18-inches apart was used. The adjuvant, Induce 0.25% v/v was included in all applications. Each sub-plot consisted of one 66-inch bed 45 feet long. Treated areas were separated by 5 feet between plots within a row. The insecticides, rates and application dates were as follows:

1. Success 6.0 fl oz on 15 Jun
2. Dimethoate 4EL 1 pt on 15 Jun
3. Dimethoate 4EL 1 pt on 15 Jun, Mustang on 17 Jul
4. Mustang 4.3 fl oz on 17 Jul
5. No foliar treatment

Ten flowers were collected randomly and placed in vials with 70% ethanol one week following the foliar applications. Number of thrips from each vial was recorded. On 29 Jul, the number of plants exhibiting TSW-symptoms was recorded. The incidence of symptomatic plants is presented as a percentage of total plants. On 10 Sep, each 45 ft sub-plot was harvested with a commercial harvester and weighed. An 18 to 22 lb sub-sample was taken from each plot. The fruit in each sub-sample was sorted by healthy red fruit, healthy green fruit, sun burned fruit, rotten fruit, TSW-symptomatic fruit. Fruit in each category were weighed and a percentage is presented below. Factorial Analysis of Variance was performed and Least Significant Difference ($P \leq 0.05$) is presented

Results

No differences in thrips counts or yield were present ($P=0.05$). In addition, there was no consistent effect of the soil applications nor the foliar applications in terms of TSW-symptoms on the plants or on the fruit. The TSW-symptom incidence was numerically lowest for the plots receiving soil-applied treatment of Platinum 11.0 oz/a and a foliar application of Success 6.0 fl oz on 15 Jun $P=0.05$. However, this treatment was not significantly lower than 10 other treatments, which includes several treatments receiving no foliar applications $P=0.05$ (see table). These results suggest that under the virus pressure and other conditions of this study, the programs evaluated were not sufficient to observe an effect. In future studies, more intensive insecticide programs will be evaluated.

Influence of insecticide programs on TSWV incidence and yield in processing tomato, 2007

Soil application rate/acre	Foliar applications	TSW plants (%) 29 Jul	Thrips counts/ 10 flowers		Fruit rating					Yield (tons/ acre)	
			22 Jun	24 Jul	Red (%)	Grn (%)	Rot (%)	Sun-burn (%)	TSW (%)		
Platinum 8 fl oz	Success 6.0 fl oz 6/15	6.7	2.3	21.3	79.4	0.3	4.8	8.1	7.4	45.4	
	Dimethoate 4EL 1 pt 6/15	6.7	6.0	23.7	80.8	0.7	3.7	9.2	5.5	44.2	
	Dimethoate 4EL 1 pt 6/15, Mustang 7/17	5.9	5.0	23.7	79.4	3.4	4.8	7.9	4.5	42.9	
	Mustang 4.3 fl oz 6/15	4.4	5.3	20.7	78.8	3.7	5.8	5.6	6.1	43.5	
	Untreated	3.7	6.3	23.7	72.4	1.7	5.8	9.1	11.0	43.9	
	Platinum 11 fl oz	Success 6.0 fl oz 6/15	2.2	3.7	20.3	76.1	2.4	8.6	9.2	3.8	41.7
Platinum 11 fl oz	Dimethoate 4EL 1 pt 6/15	5.9	2.0	21.7	68.8	2.2	2.9	6.2	4.7	41.6	
	Dimethoate 4EL 1 pt 6/15, Mustang 7/17	5.2	3.0	18.0	70.1	2.6	10.8	8.7	7.7	41.6	
	Mustang 4.3 fl oz 6/15	8.9	4.0	20.0	75.5	1.9	7.0	8.5	7.1	43.4	
	Untreated	8.1	2.7	17.0	75.5	1.6	8.1	10.2	4.6	42.5	
	Admire Pro 10.5 fl oz	Success 6.0 fl oz 6/15	3.7	4.3	224.3	78.2	1.6	2.0	12.4	5.8	42.3
	Dimethoate 4EL 1 pt 6/15	5.9	2.0	16.3	76.5	0.9	5.0	11.7	5.8	41.4	
Admire Pro 10.5 fl oz	Dimethoate 4EL 1 pt 6/15, Mustang 7/17	5.9	1.3	25.7	81.3	0.9	6.4	5.9	5.7	43.3	
	Mustang 4.3 fl oz 6/15	3.0	5.0	20.7	78.7	0.6	3.7	9.1	7.9	45.4	
	Untreated	5.2	4.0	16.0	73.2	1.7	3.5	15.4	6.2	37.6	
	Untreated	5.2	3.0	26.3	73.0	2.2	7.4	9.3	8.1	37.0	
Untreated	Success 6.0 fl oz 6/15	5.2	3.0	26.3	73.0	2.2	7.4	9.3	8.1	37.0	
	Dimethoate 4EL 1 pt 6/15	3.0	4.3	19.7	78.6	1.8	5.2	7.8	6.5	43.2	
	Dimethoate 4EL 1 pt 6/15, Mustang 7/17	5.2	2.0	12.3	74.9	1.7	6.9	6.9	9.7	46.1	
	Mustang 4.3 fl oz 6/15	3.7	4.3	17.7	79.2	3.5	3.8	7.2	6.3	44.7	
	Untreated	5.9	4.7	16.0	71.0	4.3	7.4	10.4	7.0	43.1	
	LSD (P=0.05)		3.7	NS ^x	NS	NS	NS	NS	NS	6.0	NS

^z All soil applications were shank applied at a depth of approximately 3 inches in 15 gal water per acre on 1 May.

^y All foliar applications were made with the adjuvant, Induce 0.25% v/v, in the equivalent of 25 gallons of water per acre with a CO₂-pressurized backpack sprayer at 30 psi.

^x No significant differences among treatments (P=0.05)