Assessment of *Tomato spotted wilt virus* (TSWV) symptom incidence in processing tomato varieties in 2007 to 2010.

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INTRODUCTION: *Tomato spotted wilt virus* is common in many processing tomato production areas in California and economic loss due to this virus has been reported. Variety is a factor that can be considered when evaluating the risk of loss due to TSWV. Genetic resistance (SW5) is in commercially available processing and fresh market tomato varieties, but among varieties lacking this gene, there are apparent differences in susceptibility to the disease. Differences in incidence of plants expressing symptoms have been recorded in 8 variety trials with 10 to 16 entries each grown in Fresno County from 2007 to 2010. The resistant varieties tested, including AB 8058, H5608, N 6394 and N 6385, consistently had no or very low TSWV incidence, while some varieties, including NUN 672, H 2601, AB 3, H 8504, HM 6898 and H 8004, consistently had the highest incidence. This information is intended for use as one of several factors in determining relative risk of experiencing losses due to TSWV

METHODS: *Tomato spotted wilt virus* (TSWV)-symptom incidence among mid-maturity (>118 days) processing tomato varieties was compared in studies conducted at University of California West Side Research and Extension Center (WSREC) in Five Points from 2007 to 2010. Entries were selected by seed companies and processors. The variety comparisons presented were one of 6 locations of the UCCE Statewide Processing Tomato Variety Evaluation trials. Details on yield and quality of these entries can be accessed at http://cemerced.ucdavis.edu/files/60020.pdf. This project is funded by California Tomato Research Institute (CTRI).

At WSREC, all trials were on a Panoche Clay Loam and were sprinkled for 3 weeks after planting and drip irrigated for the remainder of the season except in 2007 when furrow irrigation was used after planting. The experimental design for all three studies was a four replication randomized complete block. Plot size was one 66-inch bed x 50-70ft row, single plant row per bed except for 2010 trial # 3 where plots were 20 ft in length. Additional trial details are as follows:

Trial Year	Plant date	Planting method	TSWV rated	Harvest date
2007	8 Mar	direct seed	3 Aug	7 Aug
2008 #1	16 Apr	transplant	18 Aug	21 Aug
2008 #2	13 May	transplant	16 Sep	18 Sep
2008 #3	13 May	direct seed	23 Sep	24 Sep
2009	22 May	transplant	21 Sep	22 Sep
2010 #1	16 Apr	transplant	3 Jun	27 Aug
2010 #2	20 May	transplant	3 Jul	16 Sep
2010 #3	18 Apr	transplant	9 Aug	--------

The number of plants expressing TSWV-symptoms was recorded one to three days before harvest in each plot. Plant canopies were moved and carefully inspected. Shoots which bore symptomatic fruit were traced to a plant to help ensure that the count was accurate. Representative samples were tested with TSWV immunostrips (AgDia). Percentages of plants expressing symptoms were calculated. Analysis of Variance was performed and Least Significant Difference is presented.

RESULTS and DISCUSSION: Percentage TSWV-symptomatic plants differed statistically among entries lacking the resistance gene (SW5) in 7/8 variety trials conducted (see table on next page). Entries with genetic resistance consistently had no or very low TSWV symptom incidence. Based on incidence ranking among varieties within a minimum of 3 trials, variety response to TSWV was separated into four categories. Variety placement into categories and processed use of the variety is as follows:

Genetic resistance (SW5)		Low		Variable or Medium		High	
AB 8058	paste	SUN 6368	peel, solids	H 2005	multi use	NUN 672	viscosity
H 5608	paste	UG 4305	multi use	PX 1723	dice, peel	H 2601	pear
N 6394	multi use	H 4007	multi use	H 9780	multi use	AB 3	multi use
N 6385	peel, solids			HMX 7885	pear	H 8504	paste
				CXD 255	multi use	HM 6898	multi use
				AB 2	multi use	H 8004	multi use
				SUN 6366	multi use		
				CXD 282	multi use		
				NDM 5578	multi use		

Variety response to TSWV is one factor for considering when evaluating TSWV risk. Other factors to consider include planting date, surrounding crops, proximity to weedy fallow fields and site history.

Incidence of Tomato spotted wilt virus symptoms on processing tomato cultivars at University of California West Side Research and Extension Center, 2007-10.

	Plants with TSWV symptoms **%**																							
Tomato cultivar	Direct seeded 8 Mar, rated 3 Aug 2007			Transplanted 16 Apr, rated 18 Aug 2008			Transplanted 13 May, rated 16 Sep 2008			Direct Seeded 13 May, rated 23 Sep 2008			Transplanted 22 May, rated 21 Sep 2009			Transplanted 16 Apr, rated 3 Jun 2010			Transplanted 20 May, rated 3 Jul 2010			Transplant Apr, rated 2010	
PX 002*[z]													**0.0**	e[y]	(16)[x]									
AB 8058*	**0.3**	f	(08)	**0.0**	e	(13)	**0.5**	f	(13)	**0.3**	e	(13)												
H 5608*																**0.0**	c	(14)	**0.6**	e	(13)	**0.0**	f	
N 6394*																**0.0**	c	(14)	**0.0**	e	(14)	**6.9**	f	
N 6385*																**0.6**	bc	(12)	**0.0**	e	(14)	**2.7**	f	
HMX 7883													**18.2**	d	(15)									
SUN 6368	**6.5**	cde	(06)	**2.7**	de	(12)	**5.3**	def	(11)	**2.0**	de	(12)												
H 5508																**0.6**	bc	(12)	**0.0**	e	(14)			
HMX 5893	**4.3**	ef	(07)																					
N 6390													**24.7**	abcd	(11)									
UG 19406																**0.7**	bc	(11)	**1.8**	cde	(11)			
UG 4305				**8.7**	c	(05)	**3.0**	ef	(12)	**3.0**	d	(09)												
H 4007				**7.7**	c	(06)	**10.0**	bcd	(09)	**2.8**	de	(10)	**25.8**	abcd	(10)	**2.7**	bc	(07)	**0.9**	de	(12)	**26.5**	e	
H 2005	**13.3**	ab	(02)	**4.3**	cde	(11)	**7.8**	cde	(10)	**3.0**	d	(08)												
PX 1723				**7.3**	c	(08)	**11.5**	abcd	(08)	**3.8**	cd	(06)												
BQ 205																**1.3**	bc	(10)	**2.3**	bcde	(08)			
H 9780	**6.5**	cde	(06)	**7.0**	cd	(09)	**12.8**	abc	(06)	**2.8**	de	(11)	**20.4**	cd	(13)	**3.8**	ab	(03)	**4.7**	ab	(02)	**33.6**	de	
HMX 7885													**34.5**	ab	(04)	**0.0**	c	(14)	**1.9**	bcde	(10)	**50.2**	bc	
CXD 255													**30.2**	abcd	(07)	**2.0**	bc	(09)	**3.8**	abc	(06)	**32.1**	de	
BQ 163																**2.7**	bc	(07)	**1.9**	bcde	(09)			
H 2506	**7.0**	cde	(05)																					
HMX 6903													**29.2**	abcd	(08)									
AB 2	**7.0**	cde	(05)	**6.0**	cd	(10)	**13.3**	abc	(05)	**3.8**	cd	(07)	**27.6**	abcd	(09)	**3.2**	bc	(05)	**3.9**	abc	(04)	**74.3**	a	
SUN 6366													**18.5**	d	(14)	**3.9**	ab	(02)	**3.9**	abc	(05)	**37.4**	bc	
CXD 282													**31.8**	abc	(05)	**3.1**	bc	(06)	**3.5**	abcd	(07)	**46.0**	bcd	
NDM 5578				**13.3**	b	(04)	**12.0**	abc	(07)	**4.5**	cd	(04)												
PX 650													**30.5**	abcd	(06)									
RED SPRING	**11.5**	bc	(03)																					
NUN 672				**14.0**	b	(03)	**15.0**	ab	(03)	**4.3**	cd	(05)												
H 2601	**9.8**	bcd	(04)	**7.3**	c	(07)	**17.2**	a	(01)	**8.0**	b	(02)	**35.8**	ab	(03)									
AB 3													**25.1**	bcd	(12)	**7.3**	a	(01)	**5.3**	abc	(01)	**60.4**	ab	
H 8504													**36.4**	ab	(02)	**3.4**	bc	(04)	**4.2**	abc	(03)	**56.7**	b	
HM 6898				**18.7**	a	(02)	**13.8**	abc	(04)	**6.0**	bc	(03)	**37.7**	a	(01)									
H 8004	**18.0**	a	(01)	**20.3**	a	(01)	**16.0**	ab	(02)	**11.3**	a	(01)												

[z] Cultivars followed by an asterisk "*", have genetic resistance to TSWV

[y] Values in each column followed by a different letter are significantly different according to the Least Significant Difference ($P = 0.05$).

[x] Number in parenthesis is the ranked order among entries within the trial from lowest to highest TSWV symptom incidence.