



Tomato Virus Resistant Varieties “a way to avoid yield loss”

Rosemary Gutierrez-Coarite, Kylie Tavares and Glenn Teves

College of Tropical Agriculture and Human Resources, University of Hawaii at Manoa
December 17, 2021

Management of tomato diseases is critical to obtaining a successful tomato harvest. Without proper management, viral diseases of tomatoes can drastically reduce tomato yield and quality. The most important viral diseases of tomato in Hawaii are Tomato Spotted Wilt Virus (TSWV) and Tomato Yellow Leaf Curl Virus (TYLCV), both of which can be devastating without proper management.

TSWV is transmitted by thrips, which acquire the virus when they are in a larval stage and then transmit the virus for the remainder of their lives. This virus causes bronzing and spotting of young leaves, dark streaks on stems, brown shoot tips and dark spots of concentric rings on fruits, resulting in unmarketable tomatoes.

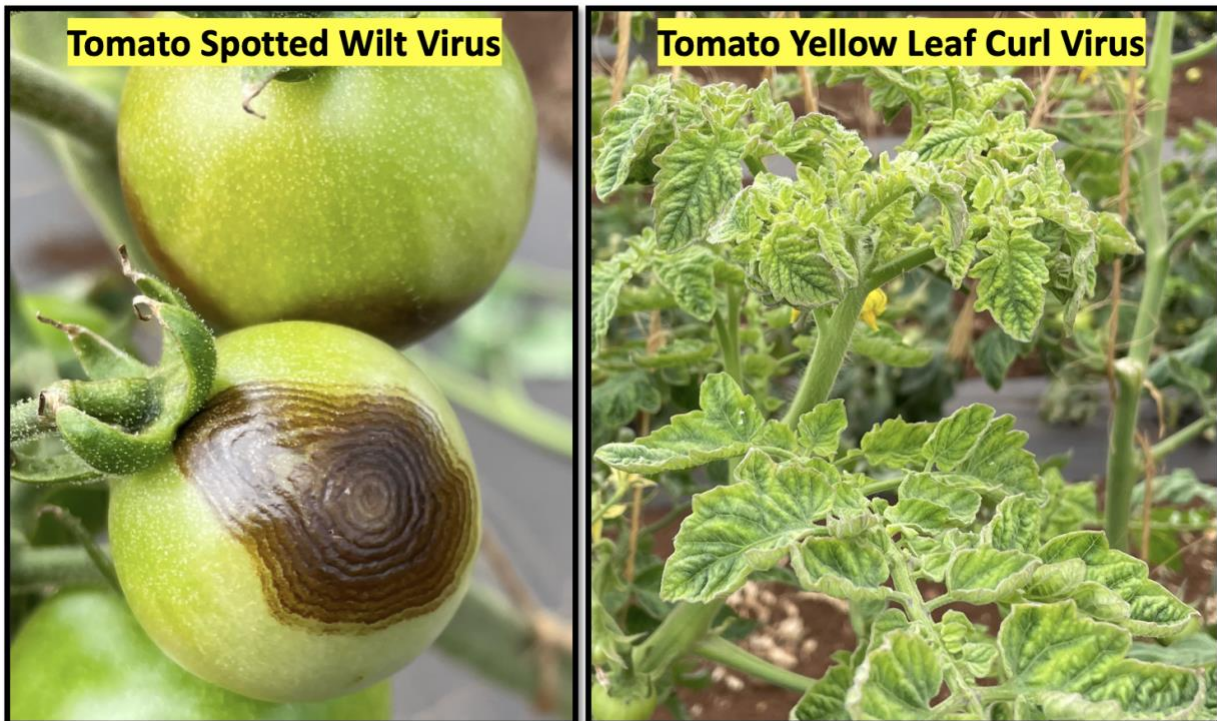


Fig. 1. Common symptoms of TSWV and TYLCV infection.

TYLCV is one of the most devastating viral diseases of tomatoes and can cause crop losses up to 100% when whitefly vector populations are high. Adult whiteflies acquire the virus while feeding on an infected plant in less than 15 minutes and can transmit the virus for several weeks.

This disease causes severe stunting, flower abscission, curled leaves and yellowing of leaf margins. Tomato plants infected at an early age will experience more losses than those infected at an older age.

Managing these diseases is both difficult and expensive for tomatoes grown in open fields as well as those grown in covered systems. One effective method of reducing tomato crop loss by these viruses lies in selecting disease-resistant tomato varieties. Although resistant tomato varieties can also be infected, and resistance can be overcome when infection pressure occurs early and is high, these varieties can produce acceptable yields despite infection.

A field trial conducted at Kula Agricultural Park on Maui, tested 14 cherry tomato varieties and 6 beefsteak tomato varieties with resistance to TYLCV and TSWV (Table 1). The results of this trial showed that out of the 14 cherry varieties only 3 showed TYLCV symptoms, J61, K46-Venus Cocktail and K47 with 30%, 8% and 100% of infection, respectively. The other 11 cherry varieties did not show any TYLCV symptoms and produced healthy fruits. Four varieties of the beefsteak tomatoes showed TYLCV symptoms, Skyway, Primo Red, Amelia and BHN-589F1 with an infection of 2%, 75%, 95% and 100% respectively. Although the Skyway variety showed symptoms, the plants produced fruits similarly to the non-infected varieties (Fig. 2).

Table 1. Tomato varieties tested for TYLCV and TSWV resistance

Cherry Varieties	Beefsteak Varieties
8K12-Purple Sparkler	Cypress
7J39-Sunrise Sparkle	Skyway
7J40-Crimson Torch	Red Snapper
J50	Primo Red
7J61-Red Lightning	Amelia
K13	BHN-589F1
8K19-Sunset Torch	
K17	
8K41-Purple Zebra	
K50	
K53	
8K46-Venus Cocktail	
K47	
7J52-Raspberry Drop	

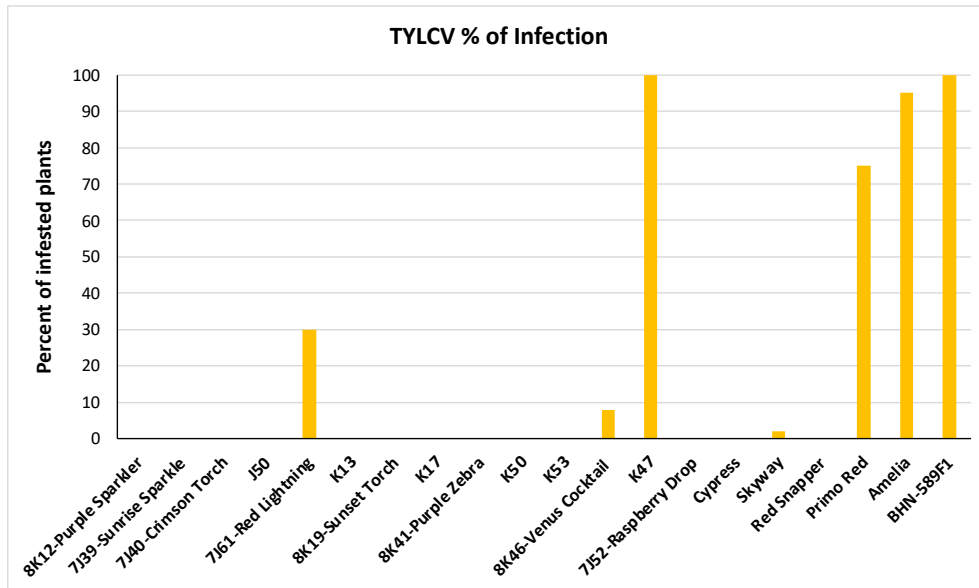


Fig. 2. Percent of TYLCV infection in different tomato varieties.

Infection of TSWV in the different tomato varieties were very low, only one of all the cherry varieties was infested with this disease, 8K19-Sunset Torch with 10% infection and symptoms in the lower leaves and mature fruits. Also, the varieties Skyway, Primo Red, Amelia and BHN-589F1 showed symptoms of TSWV with an infection rate of 10%, 27%, 8% and 11%, respectively. Although the infection was low, 50% of the fruits were unmarketable (Fig. 3).

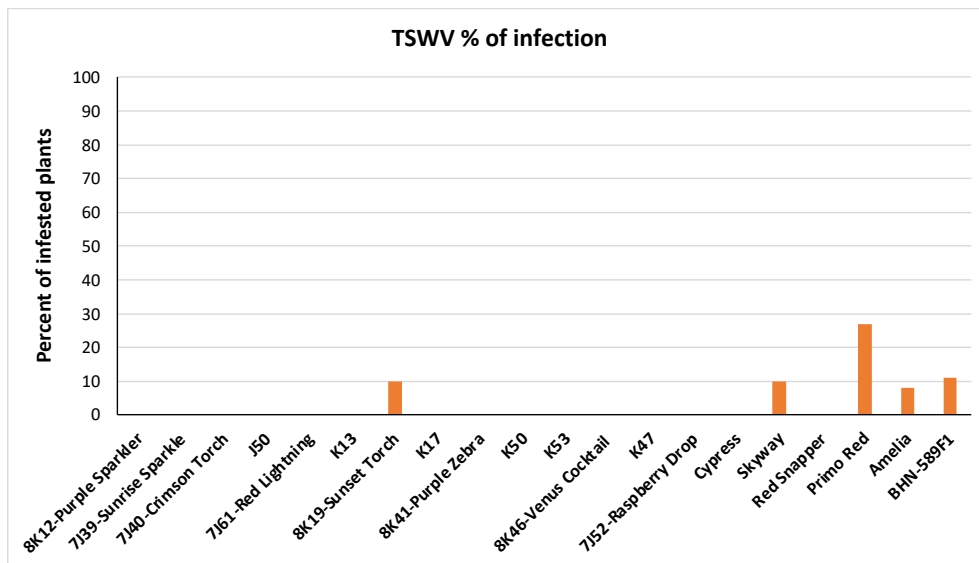


Fig. 3. Percent of TSWV infection in different tomato varieties.

Summary

The varieties that showed resistance to both TYLCV and TSWV are 8K12-Purple Sparkler, 7J39-Sunrise Sparkle, 7J40-Crimson Torch, J50, K13, K17, 8K41-Purple Zebra, K50, K53, 7J52-Raspberry Drop, Cypress, and Red Snapper. However, the only varieties that are currently

available commercially are 7J40-Crimson Torch, 8K41-Purple Zebra, 8K12-Purple Sparkler, 7J39-Sunrise Sparkler, 7J52-Raspberry Drop. We thank A.P. Whaley Seed Company for donating seeds for this trial. Red Snapper is available from Harris Seeds Company and Cypress is available from Seminis Vegetables Seeds Company.

7J40-Crimson Torch



8K41-Purple Zebra



8K12-Purple Sparkler



7J39-Sunrise Sparkle



7J52-Raspberry Drop



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