Differential Sets

Tomato spotted wilt virus (TSWV) Solanaceae vegetable crops

Tomato spotted wilt virus (TSWV) causes major economic losses globally due to an extremely wide host range involving more than 1000 species of plants in more than 85 families that include important ornamental, fruit, and vegetable crops (German et al. 1992, Pappu et al. 2009)

Resistance to TSWV is present in both tomato and pepper. The most commonly used resistance genes are named Sw5 (tomato) and Tsw (pepper). Isolates originating from tomato can infect pepper and also isolates originating from pepper can infect tomato.

Resistance breaking strains are reported in tomato (Crescenzi et al. 2015, Hoffmann et al. 2001) and pepper (Roggero et al. 2002, Moury 2012). Mutations leading to resistance breaking of Sw5 and Tsw occur at different locations on the virus genome.
- tomato; Nsm (Lopez et al. 2011)
- Pepper; NSs (de Ronde et al. 2013)

An integrated disease management approach must be taken to effectively manage this disease as no single strategy holds up over time. Continuous use of resistant tomato and pepper varieties led to the emergence of resistance breaking strains in both crops.

To characterize resistance breaking isolates per crop coding T1/P1 is used (Smilde and Peters, 2007)

<table>
<thead>
<tr>
<th>Isolate</th>
<th>Sw5</th>
<th>Tsw</th>
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<tbody>
<tr>
<td>P0</td>
<td>non-breaking</td>
<td>non-breaking</td>
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<tr>
<td>P1</td>
<td>non-breaking</td>
<td>breaking</td>
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<tr>
<td>T0</td>
<td>non-breaking</td>
<td>non-breaking</td>
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Resistance breaking isolates can be grouped in races that can be characterized by the common differentials listed in the tables below:
Tomato

Differential hosts | TSWV: 0* | TSWV: 1*
---|---|---
VFN8*, Momor* | S | S
Stevens*, Mospomor (Sw5)* | HR | S

S = susceptible, necrotic and chlorotic ringspots, systemic necrosis, stunting in early infections; HR = highly resistant, local necrotic lesions
*differential hosts and isolates that are used by the seed sector

Pepper

Differential hosts | TSWV: 0* | TSWV: 1*
---|---|---
Yolo Wonder* | S | S
PI152225*, Chi7 (Tsw)* | HR | S

S = susceptible, chlorotic ringspots and mottling, stunting,
HR = highly resistant, local necrotic lesions.
*differential hosts and isolates that are used by the seed sector

P1 isolates can cause systemic mosaic and/or necrosis and plant death on pepper plants carrying the Tsw-gene.

References


Protocol
CPVO. See http://www.cpvo.europa.eu/ for a protocol on disease resistance testing

For more information contact the ISF Secretariat at isf@worldseed.org

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