

# EPPO Datasheet: *Torradovirus marchitezum*

Last updated: 2022-12-09

## IDENTITY

**Preferred name:** *Torradovirus marchitezum*

**Taxonomic position:** Viruses and viroids: Riboviria: Orthornavirae:

Pisuviricota: Pisoniviricetes: Picornavirales: Secoviridae

**Other scientific names:** *ToMarV*, *Tomato apex necrosis torradovirus*, *Tomato apex necrosis virus*, *Tomato marchitez virus*

[view more common names online...](#)

**EU Categorization:** A1 Quarantine pest (Annex II A)

**EPPO Code:** TOANV0

## Notes on taxonomy and nomenclature

Tomato marchitez virus (ToMarV) was first described by Verbeek *et al.* in 2008, as a new virus species isolated from a symptomatic tomato plant in Sinaloa, Mexico. In 2009, following the elucidation of the complete genomic sequence of ToMarV and tomato torrado virus (ToTV), it was proposed to place both species into a newly established genus called *Torradovirus*, and to assign the latter to Secoviridae, a new family of plant viruses (Sanfaçon *et al.*, 2009).

A virus tentatively called tomato apex necrosis virus (ToANV) which had also been isolated from tomato plants in Sinaloa, Mexico (Turina *et al.*, 2007) was subsequently considered to be a synonym of ToMarV (ICTV, 2022). Three other tomato-infecting torradoviruses closely related to ToMarV have been found in the Americas, namely tomato chocolate virus (ToChV) and tomato chocolate spot virus (ToChSV) in Guatemala (Batuman *et al.*, 2010; Verbeek *et al.*, 2010), and tomato necrotic dwarf virus (ToNDV) in California (Wintermantel *et al.*, 2018). However, it is still unclear whether they are distinct species, three strains of a new torradovirus, or distant strains of ToMarV (García-Estrada *et al.*, 2022; ICTV, 2022). The present datasheet covers ToMarV only, and ToChV, ToChSV, ToNDV have been considered as separate entities, awaiting further clarification on their taxonomic status.

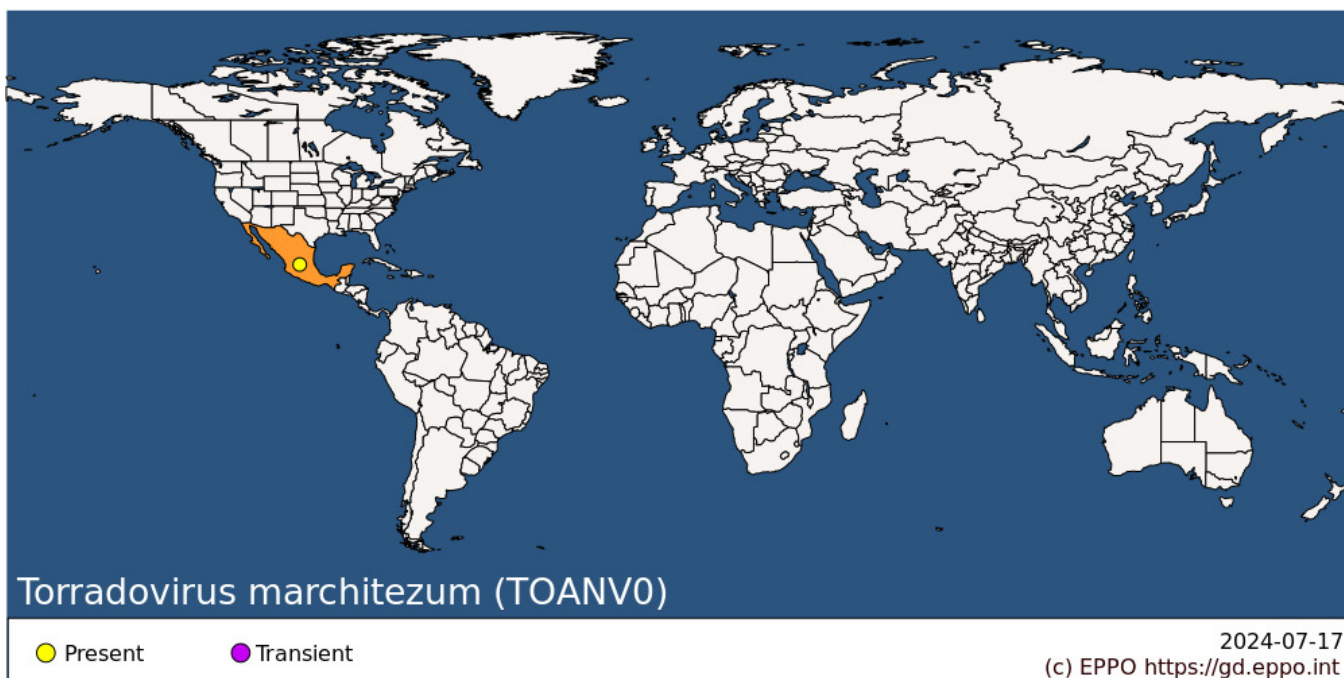
## HOSTS

The known host plants are Solanaceae. Natural hosts are tomato and capsicum; in addition, a number of indicator plants could be infected in inoculation studies (Verbeek *et al.*, 2008, Camacho-Beltrán *et al.*, 2015).

**Host list:** *Capsicum annuum*, *Solanum lycopersicum*

## GEOGRAPHICAL DISTRIBUTION

ToMarV is only known from Mexico.



**North America:** Mexico

## BIOLOGY

ToMarV is transmitted by *Bemisia tabaci* or *Trialeurodes vaporariorum* whiteflies in a semi-persistent stylet-borne manner. In experiments, it could also be transmitted by *Trialeurodes abutiloneus* (Verbeek *et al.*, 2014). The insect should feed for at least 2 hours on an infected plants before being able to transmit it to a healthy plant. The vector can remain viruliferous for at least 8 h. However, if they feed on a non-host plant for 8 h, they lose the ability to transmit the virus (Verbeek *et al.*, 2014).

## DETECTION AND IDENTIFICATION

### Symptoms

Symptoms are similar to those caused by tomato torrado virus (ToTV). Typical symptoms observed on tomato are leaf necrosis beginning at the base of the leaflets, as well as dark necrotic rings on the fruits, already visible on the unripe green fruits. In severely infected plants, the top of the plant shows necrosis and malformation. In Mexico, this disease is known as ‘marchitez’, meaning wilted or withered (Verbeek *et al.*, 2008). Other symptoms include growth delay, necrosis of flowers, necrotic leaf spots, and corky fruits (García-Estrada *et al.*, 2022). On capsicum, the symptoms observed were yellow mosaic, upward leaf curling, and crinkling on leaves and stunting of the whole plant (Camacho-Beltrán *et al.*, 2015).

### Morphology

Torradoviruses possess small spherical virions, approximately 30 nm in diameter, composed of three coat proteins of approximately 23, 26, and 35 kDa (van der Vlugt *et al.*, 2015). ToMarV consists of two molecules of positive single-stranded RNA.

### Detection and inspection methods

RT-PCR tests are available to identify the virus (García-Estrada *et al.*, 2022).

## PATHWAYS FOR MOVEMENT

Spread is predominantly with viruliferous whiteflies. ToMarV can also be transmitted by mechanical inoculation.

In international trade, ToMarV may be carried by infected plants for planting. Import of plants for planting of Solanaceae is regulated in the European Union (EU) and in some non-EU EPPO countries and the introduction of non-European populations of *B. tabaci* is forbidden in the EU.

No information is available on seed transmission of ToMarV. Seed seems to be a possible pathway for tomato torrado virus (ToTV), a closely related torradovirus but was not demonstrated for others closely related torradoviruses such as tomato necrotic dwarf virus (van der Vlugt *et al.*, 2015).

## PEST SIGNIFICANCE

### Economic impact

Substantial economic losses were reported on tomato due to the inhibited growth of the tomato plant and to the unmarketable fruits (Turina *et al.*, 2007; Verbeek *et al.*, 2008, García-Estrada *et al.*, 2022). Although capsicum was reported as a natural host in 2011, no economic impact was reported (Camacho-Beltrán *et al.*, 2015).

### Control

Control of the disease caused by ToMarV relies on the use of healthy plant material, elimination of the infected plants, and the control of whitefly populations. Although no weed species are documented as hosts, control of weeds inside and near the production areas is usually important to remove any potential reservoirs of inoculum.

### Phytosanitary risk

ToMarV caused losses in tomato production where it was reported. It was once considered as an emerging damaging virus but no reports in other countries have been made since the first reports in Mexico in 2007 -2011. García-Estrada *et al.* (2022) list ToMarV as a virus of economic importance in tomato production in Mexico.

If introduced into the EPPO region, ToMarV could probably establish. However its potential impact is difficult to assess as existing measures to control whiteflies and other viruses may reduce its impact.

## PHYTOSANITARY MEASURES

The import of Solanaceae plants for planting is prohibited in many EPPO countries. To prevent the introduction of this virus in countries where it is not prohibited, plants for planting should be tested or come from a pest-free area for ToMarV. There is no data on seed transmission, and therefore it is not known if measures should be applied on seed of host plants.

## REFERENCES

- Batuman O, Kuo YW, Palmieri M, Rojas MR, Gilbertson RL (2010) Tomato chocolate spot virus, a member of a new torradovirus species that causes a necrosis-associated disease of tomato in Guatemala. *Archives of Virology* **155** (6), 857-69. <https://doi.org/10.1007/s00705-010-0653-9>
- Camacho-Beltrán E, Armenta-Chávez R, Romero-Romero JL, Magallanes-Tapia MA, Leyva-López NE, Apodaca-Sánchez MÁ, Méndez-Lozano J (2015) First report of pepper as a natural new host for Tomato marchitez virus in Sinaloa, Mexico. *Canadian Journal of Plant Pathology* **37**(3), 384-389.
- EFSA (2013) Scientific Opinion on the risks to plant health posed by *Bemisia tabaci* species complex and viruses it transmits for the EU territory. *EFSA Journal* **11** (4), 3162. <https://doi.org/10.2903/j.efsa.2013.3162>

García-Estrada RS, Diaz-Lara A, Aguilar-Molina VH, Tovar-Pedraza JM (2022) Viruses of economic impact on tomato crops in Mexico: from diagnosis to management—A review. *Viruses* **14**(6), 1251.  
<https://doi.org/10.3390/v14061251>

ICTV (2022) Report Chapters. Secoviridae. Torradovirus.  
<https://ictv.global/report/chapter/secoviridae/secoviridae/torradovirus>

Sanfaçon H, Wellink J, Le Gall O, Karasev A, van der Vlugt R, Wetzel T (2009) Secoviridae: a proposed family of plant viruses within the order Picornvirales that combines the families Sequiviridae and Comoviridae, the unassigned genera Cheravirus and Sadwavirus, and the proposed genus Torradovirus. *Archives of Virology* **154**, 899–907. <https://doi.org/10.1007/s00705-009-0367-z>

Turina M, Ricker MD, Lenzi R, Masenga V, Ciuffo M (2007) A severe disease of tomato in the Culiacan area (Sinaloa, Mexico) is caused by a new picorna-like viral species. *Plant Disease* **91**(8), 932-941.

van der Vlugt RA, Verbeek M, Dullemans AM, Wintermantel WM, Cuellar WJ, Fox A, Thompson JR (2015) Torradoviruses. *Annual Review of Phytopathology* **53**, 485-512.

Verbeek M, Dullemans AM, Van den Heuvel JF, Maris PC, van der Vlugt RA (2008) Tomato marchitez virus, a new plant picorna-like virus from tomato related to tomato torrado virus. *Archives of virology* **153**(1), 127-134.

Verbeek M, Dullemans A, van den Heuvel H, Maris P, van der Vlugt R (2010) Tomato chocolàte virus: a new plant virus infecting tomato and a proposed member of the genus Torradovirus. *Archives of Virology* **155**(5), 751-755.  
<https://doi.org/10.1007/s00705-010-0640-1>

Verbeek M, van Bekkum PJ, Dullemans AM, van der Vlugt RA (2014) Torradoviruses are transmitted in a semi-persistent and stylet-borne manner by three whitefly vectors. *Virus research* **186**, 55-60.

Wintermantel WM, Hladky LL, Cortez AA (2018) Genome sequence, host range, and whitefly transmission of the torradovirus *Tomato necrotic dwarf virus*. *Acta Horticulturae* **1207**, 295-302.

## ACKNOWLEDGEMENTS

This datasheet was prepared in 2022 by the EPPO Secretariat.

## How to cite this datasheet?

EPPO (2024) *Torradovirus marchitezum*. EPPO datasheets on pests recommended for regulation. Available online.  
<https://gd.eppo.int>

## Datasheet history

This datasheet was first published in 2022. It is maintained in an electronic format in the EPPO Global Database. The sections on 'Identity', 'Hosts', and 'Geographical distribution' are automatically updated from the database. For other sections, the date of last revision is indicated on the right.



Co-funded by the  
European Union