Mini data sheet on Tomato mottle mosaic virus (Tobamovirus maculatessellati)

Added to the EPPO Alert List in 2020 – Deleted in 2024

Reasons for deletion:
A PRA was conducted in 2022 which concluded that ToMMV did not met the criteria of a quarantine pest. In 2024, the Working Party on Phytosanitary Regulations agreed that it could be deleted.

Why: Tomato mottle mosaic virus (*Tobamovirus*, ToMMV) was first described in 2013 infecting tomato crops in Mexico. It was subsequently found in the Americas, Asia and Europe causing infections on tomato and capsicum crops. As ToMMV is an emerging virus which present similarities with another emerging tobamovirus, tomato brown rugose fruit virus (ToBRFV - EPPO A2 List), and as capsicum and tomato are important crops in the EPPO region, the EPPO Panel on Phytosanitary Measures recommended that ToMMV should be added to the EPPO Alert List.

Where: Although being a distinct species, ToMMV is closely related to tomato mosaic virus (ToMV) and cross-reactions have been observed when using serological tests. It is noted that before ToMMV was characterized in 2013 in Mexico, several isolates deposited in GenBank as ToMV corresponded in fact to ToMMV (e.g. isolates from Brazil (2003), China and Iran previously attributed to ToMV have now been re-attributed to ToMMV). The distribution below shows the countries where ToMMV has been detected using molecular tests, but it cannot be excluded that some past records of ToMV should be attributed to ToMMV and that its distribution might be wider than shown below.
EPPO region: Czech Republic (detected in 2020 in 3 asymptomatic seed crops), Netherlands (detected in 2022 in seeds), Spain (detected in 2015 in a research glasshouse).
Africa: Mauritius.
Asia: China (Anhui, Gansu, Hainan, Henan, Hunan, Liaoning, Neimenggu, Shaanxi, Shandong, Xizhang, Yunnan), Iran.
North America: Mexico, USA (California, Florida, New York, South Carolina).
South America: Brazil (Minas Gerais, Sao Paulo).

On which plants: Natural infections have mainly been reported on tomato and capsicum (*C. annum, C. frutescens*) grown in the field and under glasshouses, and there is one record of ToMMV in symptomatic peas (*Pisum sativum* - Fabaceae) in Yunnan province (China) and one record in *Trichosanthes kirilowii* (Cucurbitaceae) in Anhui province (China).Laboratory experiments have shown that the host range of ToMMV might be wider, as the virus could be mechanically transmitted to other Solanaceae (*Nicotiana* spp., *Petunia hybrida*, *Physalis* spp.) and Brassicaceae (*Brassica* spp., *Raphanus sativus*). The presence of ToMMV has also been detected by metagenomics in *Cicer arietinum* (Fabaceae) in Italy but this has not been confirmed by further studies. In China, mixed infections of ToMMV with tobacco mild green mosaic virus have been observed on aubergine (*Solanum melongena*) causing symptoms and yield losses, but the host status of *S. melongena* for ToMMV remains to be clarified.

Damage: Affected tomato plants show leaf distortion, mosaic, mottle and necrosis. During inoculation experiments, susceptible tomato cultivars were seriously stunted, flowers aborted and no fruit was produced. Outbreaks on capsicum crops have been reported from China (Tibet and Yunnan) where affected plants showed foliar mottle, shrinking, and necrosis. As is the case for other *Tobamovirus*, it has been observed that disease symptoms rapidly spread within infected crops. During experiments carried out on several tomato cultivars in China, it has been shown that ToMMV could overcome the resistance to ToMV in some cultivars.

Transmission: Further studies are needed on the transmission of ToMMV, but observations suggest that as other tobamoviruses, it is a highly contagious virus which is mechanically transmitted from plant to plant through common cultural practices. Like tomato brown rugose fruit virus, ToMMV might also be spread by bumblebees. Most tobamoviruses contaminate the seed coat (but not necessarily the embryo) of their host plants. So far, seed transmission has not been clearly demonstrated, but observations suggest that seeds could play a role in the rapid spread of the virus at global level. For example, ToMMV was detected in 2019 by the Australian NPPO in an imported seed lot of *C. annuum* and emergency measures are currently taken to prevent any further entry of the virus in Australia.

Pathways: Plants for planting, fruit?, seeds? of *S. lycopersicum* and *Capsicum* spp. from countries where ToMMV occurs.

Possible risks: Tomato and capsicum are important crops for the EPPO region, either grown under glasshouses (across the EPPO region) or in the field (Southern part of the region). For many years, tobacco mosaic virus (TMV) and tomato mosaic virus (ToMV) have been the main tobamoviruses infecting tomatoes, but they were managed by the use of resistant cultivars and virus-tested seed lots. However, the recent emergence of new tobamoviruses such as ToMMV and Tomato brown rugose fruit virus (EPPO A2 List) which are able to overcome cultivar resistance could represent a serious threat to the tomato industry. An Express PRA conducted in Germany concluded that ToMMV could present a high risk to tomato and pepper production in Germany and in other EU member states. In a Dutch express PRA (quick scan), the absence of symptoms observed so far on the EU territory and the lack of data on resistance of cultivars used in Europe against ToMMV raised uncertainties about the potential impact of this virus. Further studies on ToMMV are necessary to better determine its geographical distribution, host range, epidemiology and economic impact, but in the meantime, it seems desirable to avoid its further spread within the EPPO region.

Sources

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