

Tomato rugose mosaic virus in Tomato Crops in São Paulo State, Brazil

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RESUMO

Presença do *Tomato rugose mosaic virus* em cultivos de tomateiro no Estado de São Paulo, Brasil

Em levantamento realizado em cultivos de tomateiro no Estado de São Paulo, identificou-se o *Tomato rugose mosaic virus* (ToRMV) associado a sintomas de redução de crescimento, mosaico e rugosidade foliar.

Geminiviruses were of limited economic importance to tomato crops until the introduction of *Bemisia tabaci* biotype B, when an increase in the incidence of begomovirus was reported (Ribeiro *et al.*, Arch. Virol. 148:281. 2003). In recent years, the occurrence of geminivirus in tomato causing a severe outbreak has been observed in the Campinas region, SP. In preliminary surveys *Tomato yellow vein streak virus* (ToYVSV) turned out to be the most frequent begomovirus species, affecting about 70% of tomato crops. Occasionally, however, another possible begomovirus, inducing leaf crumple, has been noticed affecting tomato in that region (Colariccio *et al.*, Summa Phytopathol. 27:105. 2001). The present work aimed to identify the virus associated with the leaf crumple symptom. Thus, leaf samples from affected 'Carmen' tomato plants from Mogi Guaçu, SP, showing growth reduction, green and yellow mosaic, besides leaf crumple and curling, were submitted to electron microscopy, mechanical, graft and *Bemisia tabaci* transmissions, as well as DNA extraction for PCR using universal primers (Rojas *et al.*, Plant Dis. 77:340. 1993). Sequencing and phylogenetic analysis were performed to compare this virus with other geminivirus sequences deposited in the GenBank. Typical geminated particles were observed in negatively stained preparations from foliar veins. *In situ* observation revealed the presence of hexagonally-packed crystalline array or of loose aggregates in the nuclei of phloem-infected parenchyma cells, with partial alteration of nucleoli into a granular structure. These cytopathic effects corresponded to those described for begomoviruses. The virus was transmitted by *B. tabaci* and graft, but not mechanically, like *Tomato rugose mosaic virus* (ToRMV) from Minas Gerais State. A DNA-A fragment of about 1.2 kbp was amplified, and the sequence showed 98% identity with ToRMV-[MG-Ub1] isolated in Minas Gerais, Brazil. They also shared the same cluster in the phylogenetic tree (Fig. 1). These results indicate that the begomovirus isolated in the present work is an isolate of ToRMV, named ToRMV-SP. In the twelve tomato-growing regions surveyed, ToRMV was found infecting tomatoes in only one. ToRMV was first described in

Minas Gerais (Fernandes *et al.* Fitopatol. Bras. 25: 440. 2000), and the complete sequencing of ToRMV-SP is required for further comparative studies.

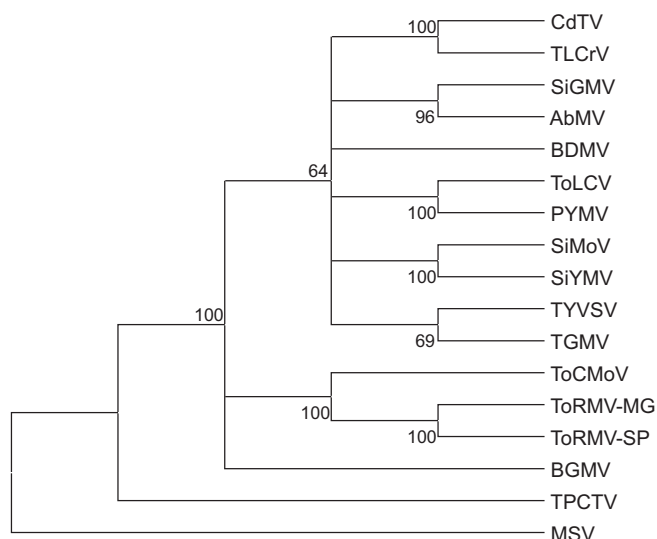


FIG. 1 – Phylogenetic tree based on the multiple alignment of geminivirus coat protein nucleotide sequences. The tree was generated with Mega 2.1, using the Neighbor Joining method. Bootstrap percentage values are shown at each branch. TPCTV - *Tomato pseudo curly top virus*, Topocuvirus (X84735) and MSV - *Maize streak virus*, *Mastrevirus* (K02026) were used as outgroups. CdTV - *Chino del tomate virus* (AF226665); TLCrV - *Tomato leaf crumple virus* (L34747); SiGMV - *Sida golden mosaic virus* (AF049336); AbMV - *Abutilon mosaic virus* (X15983); BDMV - *Bean dwarf mosaic virus* (M88179), ToLCV - *Tomato leaf curl virus* (Y15034); PYMV - *Potato yellow mosaic virus* (AF039031); SiMoV - *Sida mottle virus* (AY090555); SiYMV - *Sida yellow mosaic virus* (AY090558); TYVSV - *Tomato yellow vein streak virus* (U79998); TGMV - *Tomato golden mosaic virus* (NC_001507); ToCMoV - *Tomato chlorotic mottle virus* (AF490004); BGMV - *Bean golden mosaic virus* (M88686); ToRMV-MG and ToRMV-SP - *Tomato rugose mosaic virus* from Minas Gerais (AF291705) and São Paulo, respectively.