

NEW DISEASE REPORT

First report of *Tomato brown rugose fruit virus* in greenhouse tomato in Iran

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In August 2021, symptoms of a viral-like infection were observed on the leaves and fruits of tomato plants, cvs. Emperador RZF1 (Rijk Zwaan, The Netherlands) Maxifort, Eshkol and 4129 (Seminis Vegetable Seeds, USA) in a 3.2 ha greenhouse complex in Isfahan province, Iran. Plants had been raised in Iran from imported seed. The symptoms consisted of severe mosaic and deformation of leaves (especially the upper and young leaves) and chlorotic and brown necrotic spots on the fruits (Figure 1). These symptoms resembled those of *Tomato brown rugose fruit virus* (ToBRFV) reported elsewhere (Salem et al., 2016). About 30% of plants were affected by symptoms across the green-

house complex. The cultivars Eshkol and 4129 were more severely affected than others.

Extracts from leaf and fruit samples induced the formation of necrotic local lesions on mechanically inoculated *Nicotiana glutinosa* (Figure 2) indicating the possible presence of a tobamovirus. The samples were also subjected to RT-PCR using ToBRFV-specific primers: ToBRFV-F (5'-GAAGTCCCGATGCTGTGTAAGG-3') and ToBRFV-R (5'-GTGCCTACGGATGTGTATGA-3') (Ling et al., 2019). The fragment obtained from the PCR reaction (842 bp) was isolated, purified after size confirmation (by comparison with molecular weight markers), and

**FIGURE 1** *Tomato brown rugose fruit virus* symptoms on tomato leaves and fruit

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FIGURE 2 Necrotic local lesions on *Nicotiana glutinosa* leaves two days after mechanical inoculation with extracts from infected tomato leaves

Sanger sequenced (Sinuhe Biotech Company, Iran). Sequence comparison using BLAST verified the presence of ToBRFV in the samples. The sequence was 99.75% identical with that of ToBRFV isolate Tom1-Jo (KT383474) from Jordan. The sequence was submitted to GenBank (Accession No. OK075081). To the best of our knowledge, this is the first report of ToBRFV in Iran. Following this study, all plants

were removed and destroyed from the affected greenhouse. Additional studies have been started to investigate the possible source of the outbreak.

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