First Report of Tomato Brown Rugose Fruit Virus Infecting the Tomato Crop in Saudi Arabia

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Funding: Funding was provided by King Saud University (research group no. RG-1438-065). Plant Dis. 106:1310, 2022; published online as <https://doi.org/10.1094/PDIS-05-21-1065-PDN>. Accepted for publication 15 October 2021.

Tomato (*Solanum lycopersicum* L.), the most economically important member of family Solanaceae, is cultivated worldwide and is one of the most important crops in Saudi Arabia. The aim of this study was to screen for the most common viruses in the Riyadh region, Saudi Arabia, and it identified the presence of tomato brown rugose fruit virus (ToBRFV) in Saudi Arabia. In January 2021, unusual fruit and leaf symptoms were observed in several commercial greenhouses cultivating tomatoes in the Riyadh region. Fruit symptoms were irregular brown spots, deformation, and yellowing spots that render the fruits nonmarketable, and leaf symptoms included mottling, mosaic with dark green wrinkles, and narrowing. These plants presented symptoms similar to those described in other studies (Luria et al. 2017; Salem et al. 2015). A total of 45 symptomatic leaf samples were collected and tested serologically against suspected important tomato viruses including tomato chlorosis virus, tomato spotted wilt virus, tomato yellow leaf curl virus, tomato chlorotic spot virus, tomato aspermy virus, tomato bushy stunt virus, tomato black ring virus, tomato ringspot virus, tomato mosaic virus, pepino mosaic virus, and ToBRFV using an enzyme-linked immunosorbent assay (ELISA) test (Loewe Biochemica, Germany), according to the manufacturer's instructions. The results showed that 84.4% (38/45) of symptomatic tomato samples were infected with at least one of the studied viruses and that 55.5% (25/45) of symptomatic tomato samples were positive to ToBRFV. Three of the 25 samples (12%)

were infected with ToBRFV alone, and 22 out of 45 (48.8%) were infected with ToBRFV and at least one other studied virus. A sample infected only with ToBRFV was mechanically inoculated into a range of different hosts, including *Chenopodium amaranticolor*, *C. quinoa*, *C. album*, *C. glaucum*, *Nicotiana glutinosa*, *N. benthamiana*, *N. tabacum*, *N. occidentalis*, *Gomphrena globosa*, *Datura stramonium*, *Solanum lycopersicum*, *S. nigrum*, and *Petunia hybrida*. Symptoms were observed weekly, and the systemic presence of ToBRFV was confirmed by reverse transcription-polymerase chain reaction (RT-PCR) and partial nucleotide sequences. Total RNA was extracted from DAS-ELISA positive samples using Thermo Scientific GeneJET Plant RNA Purification Mini Kit. RT-PCR was carried out using specific primers F-3666 (5'-ATGGTACGAACGGCGGCAG-3') and R-4718 (5'-CAATCCTTGATG TG TTTAGCAC-3'), which amplified a 1,052-bp fragment of the open reading frame encoding the RNA-dependent RNA polymerase (RdRp) (Luria et al. 2017). RT-PCR products were analyzed using 1.5% agarose gel electrophoresis. RT-PCR products were sequenced in both directions by Macrogen, Seoul, South Korea. Partial nucleotide sequences from selected samples were submitted to GenBank and assigned the accession numbers MZ130501, MZ130502, and MZ130503. BLAST analysis of Saudi isolates of ToBRFV showed that the sequences' shared nucleotide identities ranged from 98.99 to 99.50% among them and from 98.87 to 99.87% identity with ToBRFV isolates from Palestine (MK881101 and MN013187), Turkey (MK888980, MT118666, MN065184, and MT107885), the United Kingdom (MN182533), Egypt (MN882030 and MN882031), Jordan (KT383474), the United States (MT002973), Mexico (MK273183 and MK273190), Canada (MN549395), and the Netherlands (MN882017, MN882018, MN882042, MN882023, MN882024, and MN882045). To our knowledge, this is the first report of the occurrence of ToBRFV infecting tomato in Saudi Arabia, which suggests it is likely that it was introduced by commercial seeds from countries that reported this virus and spread in greenhouses through mechanical means.

References:

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The author(s) declare no conflict of interest.

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Keywords: ELISA, RT-PCR, Saudi Arabia, tomato, *Tomato brown rugose fruit virus*

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