Presence of Tomato Brown Rugose Fruit Virus (ToBRV) in tomatoes from the Southern Peruvian Coast

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Abstract
Tomato (*Solanum lycopersicum*) (Solanaceae) is an important vegetable crop worldwide that contains significant amounts of vitamins A and C. It also possesses a powerful antioxidant, lycopene, which can help prevent the development of many forms of cancer. However, this vegetable is highly susceptible to a number of emerging viruses. Since the first report of ToBRFV in Jordan, this emerging virus has been detected in Germany, Israel, Italy, Mexico, Palestine, and the United States, but its incidence was not reported in Peru. We collected 56 samples of fresh leaves of tomato plants with viral symptoms and 13 without symptoms as control from two regions that comprise more than 50% of tomato production in Peru, Lima and Ica. Mosaic, mottling, plant stunting and brown rugose symptoms were observed in collected leaves that were preserved in liquid nitrogen until processing. We extracted RNA using a commercial Kit. For virus identification, we used the reverse transcription polymerase chain reaction (RT-PCR) technique for the amplification of the capside protein (cp) gene. Specific primers were designed using the NCBI tool by collecting all available cp sequences from Peru Tomato mosaic virus (PToMV) and Tomato Brown Rough Fruit Virus (ToBRV). Results were observed on 1.5 % agarose gels using Gelred(Biotium®, Fremont, CA, USA) and by standard spectrophotometry. We observed the presence of ToBRFV in 24 samples, PToMV in 8 samples and 11 samples presented a mixed infection with ToBRV and PToMV. To the best of our knowledge, this is the first report of ToBRFV in Peru.

Keywords
horticulture; RT-PCR; ToBRFV; PToMV