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DISEASE NOTE

First report of citrus leaf blotch virus in Satsuma mandarin in Korea

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Satsuma mandarin (*Citrus unshiu*) is an economically important fruit in Korea, and more than 90% of the fruit is produced in Jeju Island. To determine the presence of viruses in satsuma mandarin, a survey was performed in Jeju Island in 2017. Leaf samples were collected from three trees with virus-like symptoms such as leaf blotch, chlorosis, distortion, and enation. All samples were mixed and ground in liquid nitrogen. Total RNA was subsequently extracted from this mixed sample by the NucliSENS EasyMAG biorobot (Biomérieux, Marcy l'Etoile, France) for RNA sequencing. A total of 295,758,098 reads obtained via Illumina HiSeq 100 bp paired-end RNA sequencing were analyzed as described by Lim et al. (2017). The resulting four viruses (citrus leaf blotch virus, CLBV; citrus tristeza virus, CTV; citrus vein enation virus, CVEV; and satsuma dwarf virus, SDV) were identified. Twenty-one contigs with high sequence similarities to citrus leaf blotch virus (CLBV), with an average length of 1319 bp, were identified. The largest contig (2112 bp) had 92% sequence identity with the CLBV NZ_G78 isolate (EU857540). A primer pair, CLB-F (5′-GCAA GACACTCTGTCTCAAAT-3′) and CLB-CP-R (5′-ATAG GTATCTACTCCAAAAAGG-3′), was designed according to the contig sequence and used to test all samples in reverse transcription (RT)-PCR. An amplicon of the expected size (214 bp) was obtained from three trees, and CLBV-infection was confirmed by direct sequencing. Of the three CLBV-positive leaf samples, two exhibited blotch symptoms, and one exhibited chlorosis. To determine the complete sequences of CLBV coat protein gene isolated from satsuma mandarin, RT-PCR using a primer set (5′-ACTGCCAGTGACACTGGGA-3′ and 5′-GTGTAAAGTCCTGGCCCAC-3′) was performed on one CLBV-positive sample, and an amplicon (1228 bp) was purified, cloned, and sequenced. Sequence analysis showed that this isolate (GenBank Accession No. LC416591) shared 97–99% nucleotide sequence identity with previously reported CLBV isolates from citrus plants. To the best of our knowledge, this is the first report of CLBV in Korea. CLBV could infect sweet cherry and kiwifruit (Chavan et al. 2013; Wang et al. 2016). Therefore, further investigation is needed to assess the extent and impact of CLBV infections in Korea.

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