Journal of Plant Pathology (2022) 104:455
https://doi.org/10.1007/s42161-021-01011-z

DISEASE NOTE

First report on the occurrence of grapevine leafroll-associated virus 7 in teaplants

Xueying Xie[1] · Changxiang Zhu[2] · Xiaoyang Han[3]

Received: 10 December 2020 / Accepted: 15 November 2021 / Published online: 25 November 2021

Keywords *Grapevine leafroll-associated virus 7* · Teaplant · China

Teaplant (*Camellia sinensis* (L.) O. Kuntze) is an importantly economical crop in China. In July of 2018, chlorosis and downward leafroll, some of typical symptoms of disease caused by grapevine leafroll-associated viruses (GLRaVs), members of species in the family *Closteroviridae* (Al Rwahnih et al. 2012; Reynard et al. 2015), were observed on leaves of teaplant with green vein in Daolang Town, Tai'an City. In June of 2019, a field survey was carried out to assess the sanitary status of teaplants in the Daolang region of China. This teayard was near grapevine yards heavily infected with GLRaV-7. Based on the prevalence of GLRaV-7 near this teayard and the occurrence of delphacidae, the infection of GLRaVs, especially GLRaV-7, had been suspected in this teayard. The leaf samples of teaplant were taken from symptomatic plants and asymptomatic nearby ones. A total of 436 samples was collected and tested for the detection of five GLRaVs using five commercial ELISA kits (GLRaV-1 DAS, GLRaV-2 DAS, GLRaV-3 DAS, GLRaV-4 DAS and GLRaV-7 DAS, Invitrogen™, U.S.A.). The results showed that twenty-one samples (five symptomatic ones and sixteen asymptomatic ones) were positive for the detection of GLRaV-7. Total RNA was extracted from twenty-one positive samples by a Trizol Kit (Invitrogen™, U.S.A.) and reverse transcription (RT)-PCRs were performed using the specific primer pair: GLRV-7-P61F (5′-GGTTTGAAATGG AAAACATGATAC-3′) and GLRV-7-P61R (5′-CACGTT TAGTTGAATTGGTTAATC-3′) (Lyu et al. 2014) specific to the *p61* gene of GLRaV-7. The twenty-one positive samples respectively produced one single band of 518 bp. The PCR products were purified using a DNA Purification Kit (Solarbio™, China), sequenced and analyzed by BLAST. The twenty-one isolates selected for sequence analysis had identical gene sequences, and hence, only one sequence for isolate TPSD1 was submitted to GenBank (accession number MW258966) which showed 97 to 99% nucleotide identity and 100% amino acid identity with various GLRaV-7 isolates in the NCBI database. Negative ELISA samples had been randomly tested by RT-PCR, but no amplicon was obtained in these samples using the same primer pair. To our knowledge, this is the first occurrence of GLRaV-7 in teaplants in China. This finding is important because this virus affects yield and quality of teaplants.

✉ Xiaoyang Han
hanxy@sdau.edu.cn

[1] Shandong Key Laboratory of Applied Microbiology, Ecology Institute, Qilu University of Technology (Shandong Academy of Sciences), Ji'nan 250103, China

[2] State Key Laboratory of Crop Biology, College of Life Sciences, Shandong Agricultural University, Tai'an 271018, China

[3] State Key Laboratory of Crop Biology, College of Horticulture Science and Engineering, Shandong Agricultural University, Tai'an 271018, China

References

Al Rwahnih M, Dolja VV, Daubert S, Koonin EV, Rowhani A (2012) Genomic and biological analysis of *Grapevine leafroll-associated virus 7* reveals a possible new genus within the family Closteroviridae. Virus Res 163:302–309. https://doi.org/10.1016/j.virusres.2011.10.018

Lyu MD, Li XM, Guo R, Li MJ, Liu XM, Wang Q, Cheng YQ (2014) Prevalence and distribution of *Grapevine leafroll-associated virus 7* in China detected by an improved reverse transcription polymerase chain reaction assay. Plant Pathol 63:1168–1176. https://doi.org/10.1111/ppa.12195

Reynard JS, Schneeberger PHH, Frey JE, Schaerer S (2015) Biological, Serological, and Molecular Characterization of a Highly Divergent Strain of *Grapevine leafroll-associated virus 4* Causing Grapevine Leafroll Disease. Phytopathology 105:1262–1269