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Application of next generation sequencing (NGS) for detection of viruses and viroid infecting apple trees in South Korea

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Apple is an economically important fruit crop, covering an area of 23,355 ha with an annual production of about 545,000 tonnes in South Korea. Apple trees are affected by at least six viruses and viroid diseases, which cause economic losses depend on the plant species and virus strains. Among these viruses, *Apple chlorotic leafspot virus* (ACLSV), *Apple stem grooving virus* (ASGV) and *Apple stem pitting virus* (APSV) commonly occur in Korean commercial apple orchards. In 2017, we observed several apple trees (*Malus domestica* Borkh.) showing mosaic patterns on leaves cv. Shinano sweet or dappling and crinkling on fruits cv. Gamhong. To apply next generation sequencing (NGS) for apple virome of symptomatic apple trees, total RNA was extracted and used for constructing a cDNA library followed by high throughput sequencing (HTS). From the HTS data, ACLSV, ASGV, ASPV and *Apple scar skin viroid* (ASSVd) were identified, all of which have been previously reported in South Korea. In addition, *Apple necrotic mosaic virus* (ApNMV) recently described a novel ilarvirus was identified. To confirm the presence of ApNMV, RT-PCR was performed using specific primer pairs ApNMV-F and ApNMV-R. The sequence showed 94% identity with the CP region of the previously published ApNMV (LC108995) from the samples showing leaf mosaic symptoms. The ApNMV positive apple trees were also co-infected with ACLSV, ASGV and ASPV. The symptomatic fruit samples showing dappling and crinkling were infected with ACLSV, ASGV, ASPV and ASSVd. ASSVd is recognized as the causal agent of the dapple apple disease. ASSVd showed 99% nt. sequence identity with apple reference variants. NGS was a valuable and powerful tool for detection and identification of known and unknown virome in infected apple trees.

Biography

In Sook Cho has completed her PhD degree of Plant Pathology from Chungnam National University, South Korea. Her researches have mainly focused on viral diseases of fruit trees for more than 10 years and more than forty published papers in Plant Virology. Currently she has worked as a Research Plant Virologist in National Institute of Horticultural and Herbal Science, Rural Development Administration, South Korea.

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