

## Short Communication

# Mixed infection of CTV and HSVd in yellow corky vein disease of Washington navel orange trees

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### Abstract

*Hop stunt viroid* (HSVd) and *Citrus tristeza virus* (CTV) are the causal agents of most important diseases of citrus. Previously we reported a novel variant of HSVd that constantly associated with the yellow corky vein disease. Here, 19 individual citrus leaves with yellow corky vein symptoms were sampled for CTV by ELISA. In this study, most symptomatic samples were found to be infected with CTV. Therefore mixed infection of CTV and HSVd may be, involve in appearance of yellow corky vein symptom in mentioned disease.

In recent years, a disease with yellow corky vein has emerged in navel oranges in the Fars province of Iran. These symptoms are often associated with declining of affected trees. It has become of concern to the growers as it appears to be spreading from tree to tree. Previously we reported a novel variant of *Hop stunt viroid* (HSVd) that constantly associated with the disease (1). In other hand, *Citrus tristeza virus* (CTV) is distributed worldwide and is the causal agent of one of the most economically important diseases of citrus. In this investigation, 19 individual leaves of affected Washington navel orange trees with yellow corky vein symptoms were surveyed for CTV

by ELISA using CTV polyclonal antibodies. Double antibody sandwich-indirect (DAS-I) ELISA was performed using the method described by Converse and Martin (2) to assay for CTV. In this study, 70% of samples with yellow corky vein symptoms were found to be infected with CTV. Therefore mixed infection of CTV and HSVd may be, involve in appearance of yellow corky vein symptom in mentioned disease.

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### References

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stunt viroid associated with yellow corky vein disease of sweet orange and split bark disorder of sweet lime. 21st International Conference on Virus and Other Graft Transmissible Diseases of Fruit Crops. Julius-Kühn-Archiv 427, p.105-113.

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