

Detection of Elm mottle virus (EMoV) and a putative novel Carlavirus in the genus Ulmus in northern Germany

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RT-PCR, European White elm, isometric and filamentous virus particles

Leaves of elm trees showing virus-like symptoms such as mottling, chlorotic ringspots, line pattern, necrosis and mosaic were collected in the northeastern part of Germany and were analyzed by molecular methods. Some of the elm trees were infected by *Elm mottle virus* (EMoV). This virus is an ssRNA(+) virus with isometric particles belonging to the genus *Ilarvirus* which is known to affect different elm species. EMoV detection was based on PCR primers derived from the RNA1 or RNA2 as well as specific primers targeting the RNA3, which codes for the movement protein and the viral coat protein. Furthermore, in symptomatic European White elm (*Ulmus laevis* L.) filamentous viral particles have been observed, which lead to the assumption of an infection with an additional virus. Next generation sequencing data of total RNA from a diseased elm tree identified contigs exhibiting highest identities to plant viruses of the family *Betaflexiviridae*. Together with observed particle morphology this led to the assumption that the elm tree was infected by a putative novel *Carlavirus*. To investigate whether this virus could be associated with the symptoms found in elms, specific primers detection of this putative *Carlavirus* were designed. Symptomatic and asymptomatic trees were tested by RT-PCR. Results are presented and evaluated dealing with the occurrence of EMoV and the putative novel *Carlavirus* in elm trees and their association with observed virus-suspected symptoms.