Co infection of OMMV and OLV-1 enhances symptoms and increases both viruses accumulation and viral derived siRNAs in plants

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Previous extensive field surveys in olive orchards have revealed high levels of Olive mild mosaic virus (OMMV) and Olive latent virus 1 (OLV-1), frequently appearing in mixed infections. These viruses belong to genus Alphanecrovirus and their RNA dependent RNA polymerase (RdRp),as well as their p6 and p8 amino acid sequences share over 87% identity. Preliminary studies have shown that co infection of OMMV and OLV-1 is associated to an intensification of symptoms, as well to an increase in transmission efficiency, suggesting a synergistic effect. Single and double infections of OMMV and OLV-1 were obtained through mechanical inoculation of Nicotiana benthamiana plants and the second upper leaf from each inoculated plant was collected at different stages and used for quantitative PCR. In this study we found that the co infection of OMMV and OLV-1 causes an exacerbation of symptoms and increases the accumulation of both viruses in N. benthamiana plants. Highthroughput sequencing of siRNAs from both viruses in singly and co infected plants showed that OMMV and OLV-1 co infection increased the accumulation of siRNAs, mainly of 21 and 22 nt in length, with most non distinguishable between OMMV and OLV-1 siRNAs. Our findings suggest that siRNAs of both viruses have possible roles in the synergistic interaction between OLV-1 and OMMV in N. benthamiana plants. Whether a similar situation occurs in olive fields is not yet known and studies are being pursued.