

Biological and Molecular Characterization of *Olive latent virus 1*

Maria do Rosário Félix^{1,3*} • Joana M. S. Cardoso^{2,3} • Solange Oliveira^{2,3} •

Maria Ivone E. Clara^{1,3}

¹ Departamento de Sanidade Animal e Vegetal, Universidade de Évora, Apartado 94, 7002-554 Évora, Portugal

² Departamento de Biologia, Universidade de Évora, Apartado 94, 7002-554 Évora, Portugal

³ ICAM, Instituto das Ciências Agrárias Mediterrâneas, Universidade de Évora, Apartado 94, 7002-554 Évora, Portugal

Corresponding author: * mrff@uevora.pt

ABSTRACT

Olive latent virus 1 (OLV-1) belongs to the *Necrovirus* genus, *Tombusviridae* family and is pathogenic to olive, citrus and tulip plants. It is easily mechanically transmissible to indicator plants causing necrotic lesions and can be transmitted through the soil into the plant roots in the absence of biological vectors. Infected cells contain virus aggregates, inclusions made up of excess of viral coded peptides and extensive vesiculation in the cytoplasm. The virions are isometric with *ca.* 30 nm, possess a monopartite single-stranded positive-sense RNA genome sized 3700 nt with 5 open reading frames (ORFs) and small inter cistronic regions. ORF 1 encodes a polypeptide with a molecular weight of 23 kDa and the read through of its amber stop codon results in ORF 1 RT that encodes the virus RNA dependent RNA polymerase with 82 kDa. ORF2 and ORF3 encode two small peptides, with 8 kDa and 6 kDa, respectively, which appear to be involved in the virus cell-to-cell movement. ORF 4 is located in the 3'-terminal and encodes a protein with 30 kDa identified as the viral coat protein. The complete genomic sequences of two well characterized OLV-1 isolates (obtained from citrus and olive) are similar, revealing an overall nucleotide sequence identity of 95%. The electrophoretic profile of the dsRNAs recovered from infected tissues exhibits three major species with *ca.* 3.7, 1.5, and 1.3 kbp. Application of molecular techniques based on PCR and on dot blot hybridization has been successfully used for routine diagnosis of OLV-1 infections.

Keywords: OLV-1, olive, molecular characterization, necrovirus, virus diagnosis

Abbreviations: bp, base pair; CP, coat protein; dsRNA, double stranded RNA; ELISA, Enzyme linked immunosorbent assay; kb, kilo base; nt, nucleotide; OMMV, Olive mild mosaic virus; ORF, open reading frame; PCR, polymerase chain reaction; RdRp, RNA dependent RNA polymerase; RT-PCR, reverse transcription polymerase chain reaction; ssRNA, single stranded RNA; TNV-A, *Tobacco necrosis virus A*; TNV-D, *Tobacco necrosis virus D*