



# First report of tomato leaf curl New Delhi virus in zucchini crops in Greece

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In autumn of 2018, a novel virus-like disease was observed in zucchini (*Cucurbita pepo* L. hybrid Linea F1) crops in the Ileia and Messinia regions in southeastern Greece. Symptoms included short internodes and curling, vein swelling and mosaic in young leaves, resembling those of a begomovirus infection. DNA was isolated from the leaves of 15 symptomatic plants collected in Tragana, Ileia, and analyzed by PCR with primers specific to the coat protein (CP) gene of begomoviruses (Lecoq and Desbiez 2012). PCR fragments of the expected size (~600 bp) were amplified from all samples and three of them were sequenced (GenBank accession Nos. LR030280-LR030282). BlastN analysis showed highest nucleotide identity (99%) to a tomato isolate of tomato leaf curl New Delhi virus (ToLCNDV) from Almeria, Spain (KM977733). The virus presence was confirmed by DAS-ELISA (Agdia, Inc). Additional molecular characterization of the Greek ToLCNDV isolates was performed using two primer pairs ND-F1 (5'-TCCCCTGTGCGTGAATCC-3') / ND-R1 (5'-GCCAGTCATGATTAAGGWGG-3') (designed herein) and 5'-AATACACGCGTAAGGAAATA TGT-3' / 5'-AGTCATGGGCTAGCAGATCG-3' (Ruiz et al. 2015), specific to a 200 bp region of the replication initiation protein (REP) gene, and a 890 bp region covering partially the BV1 and BC1 genes of the virus, respectively. Sequencing analysis of PCR products (LR030283-LR030285 and MK316370-MK316371) showed that both genomic regions

exhibited 99% nt identity to the respective regions of a Spanish isolate of ToLCNDV (KM977733). National surveys for ToLCNDV occurrence are conducted in the country since 2016. This is the first report of ToLCNDV detection in zucchini crops in Greece, thus extending information on its geographical distribution.

## Compliance with ethical standards

**Conflict of interest** All authors declare that they have no conflict of interest.

**Ethical approval** This article does not contain any studies with human participants or animals performed by any of the authors.

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