



# First report of carrot torrado virus 1 (CaTV1) naturally infecting carrots in Spain

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## DISEASE NOTE

# First report of carrot torrado virus 1 (CaTV1) naturally infecting carrots in Spain

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1 Carrot torradovirus 1 (CaTV1) was first detected in 2013 in the UK (Adams et al., 2014).  
2 Since then, its presence has been reported in carrot in France and Japan and in other  
3 *Apiaceae* in Germany and Greece. In June 2021, five cultivated carrot (*Daucus carota*  
4 subsp. *sativus*) fields and one wild carrot (*D. carota* subsp. *carota*) population were  
5 sampled near Segovia (Spain). From each population, fifty asymptomatic or symptomatic  
6 plants showing leaf reddening or chlorosis were pooled. Double stranded RNAs were  
7 extracted from each pool (Marais et al., 2018), converted to cDNA, and sequenced (2x125  
8 nt paired reads, Illumina HiSeq2500), yielding 2-6.5 million reads/sample. Mapping reads  
9 on viral reference genomes using CLC Genomics Workbench v22.0 revealed low read  
10 numbers (up to ca. 450 reads or 0.01% of total reads) mapping on the genomic RNAs of  
11 CaTV1 in four of five cultivated carrot libraries. Resequencing one of the libraries at higher  
12 depth (24 million reads) yielded 10,057 CaTV1 reads (0.04% of total) and de novo  
13 assembly identified two large contigs (2.1 and 4.8 kb) for CaTV1 RNA1 and three contigs  
14 (0.6, 0.75 and 4.2 kb) for CaTV1 RNA2. The scaffolds derived from these contigs  
15 represent >99.5% of CaTV1 genomic RNAs at respectively 67x (RNA1) and 154x (RNA2)  
16 average coverage. They show respectively 95% and 98% nucleotide identity with those  
17 of the reference isolate (KF533719-20). CaTV1 presence was confirmed using a two-step  
18 RT-PCR targeting CaTV1 RNA2 (Rozado-Aguirre et al., 2016). Amplicons of expected

size (299 bp) were obtained for the four pools that had yielded CaTV1 reads. Sanger sequencing of one of the amplicons (GenBank OM801195) confirmed the Illumina sequence. To our knowledge, this is the first report of CaTV1 infection in carrots in Spain. The sequencing reads also revealed other carrot-infecting viruses so that it is not possible to derive conclusions on the pathogenicity of CaTV1, for which efforts are still needed.

#### **Conflict of interest**

The authors confirm that they have no conflict of interest

#### **Data availability**

Sequence data relevant to this work has been deposited in GenBank (OM801195).

#### **References:**

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