



HAL
open science

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

Bisola Mercy Babalola, Chantal Faure, Armelle Marais, Aurora Fraile,
Fernando Garcia-Arenal, Thierry Candresse

► To cite this version:

Bisola Mercy Babalola, Chantal Faure, Armelle Marais, Aurora Fraile, Fernando Garcia-Arenal, et al.. First report of carrot torrado virus 1 (CaTV1) naturally infecting carrots in Spain. *Journal of Plant Pathology*, 2022, Online first, 10.1007/s42161-022-01196-x . hal-03756735

HAL Id: hal-03756735

<https://hal.inrae.fr/hal-03756735>

Submitted on 22 Aug 2022

HAL is a multi-disciplinary open access archive for the deposit and dissemination of scientific research documents, whether they are published or not. The documents may come from teaching and research institutions in France or abroad, or from public or private research centers.

L'archive ouverte pluridisciplinaire **HAL**, est destinée au dépôt et à la diffusion de documents scientifiques de niveau recherche, publiés ou non, émanant des établissements d'enseignement et de recherche français ou étrangers, des laboratoires publics ou privés.

DISEASE NOTE

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

B.M. Babalola¹, C. Faure², A. Marais², A. Fraile¹, F. Garcia-Arenal¹, T. Candresse

^{2*}

¹Centro de Biotecnología y Genómica de Plantas, (UPM-INIA) and E.T.S.I.A.A.B., Universidad Politécnica de Madrid, Campus de Montegancedo, 28223, Pozuelo de Alarcón, Madrid, Spain

²Univ. Bordeaux, INRAE, UMR BFP, CS 20032, 33882 Villenave d'Ornon CEDEX, France

*Corresponding author: T. Candresse

E-mail: thierry.candresse@inrae.fr

1 Carrot torrado virus 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

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

24 **Conflict of interest**

25 The authors confirm that they have no conflict of interest

26 **Data availability**

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

28 **References:**

29 Adams IP, Skelton A, Macarthur R, Hodges T, Hinds H, Flint L, Nath PD, Boonham N,
30 Fox A (2014) Carrot yellow leaf virus is associated with carrot internal necrosis. PLoS
31 One 9(11):e109125. <https://doi.org/10.1371/journal.pone.0109125>

32 Marais A, Faure C, Bergey B, Candresse T (2018) Viral double-stranded RNAs
33 (dsRNAs) from plants: alternative nucleic acid substrates for high-throughput
34 sequencing. *Methods in Molecular Biology* 1746:45-53.
35 https://doi.org/10.1007/978-1-4939-7683-6_4

36 Rozado-Aguirre Z, Adams I, Collins L, Fox A, Dickinson M, Boonham N (2016)
37 Detection and transmission of carrot torrado virus, a novel putative member of the
38 *Torradovirus* genus. *J Virol Methods* 235:119.
39 <https://doi.org/10.1016/j.jviromet.2016.05.018>

40