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Giuseppe Parrella, E. Troiano, Cecile Desbiez. First report of Pepo aphid-borne yellows virus on courgette in Italy. New Disease Reports, 2023, 47 (1), pp.e12144. ⟨10.1002/ndr2.12144⟩. ⟨hal-04064123⟩

HAL Id: hal-04064123

https://hal.inrae.fr/hal-04064123v1

Submitted on 11 Apr 2023

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Received: 12 December 2022 | Accepted: 22 December 2022

DOI: 10.1002/ndr2.12144

New Disease Reports Open Access BSPP WILEY

NEW DISEASE REPORT

First report of *Pepo aphid-borne yellows virus* on courgette in Italy

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Funding information
Consiglio Nazionale delle Ricerche, Grant/Award Number: Short Term Mobility 2020

KEYWORDS
PABYV, polerovirus, zucchini

During monitoring for cucurbit viruses in greenhouses in the municipalities of Torre del Greco (Napoli province, Campania) and Aversana (Salerno province, Campania) in September 2019 and October 2022, respectively, samples of commercial hybrids of courgette (*Cucurbita pepo*) showing symptoms of leaf yellowing and mosaics (Figure 1) were collected and stored as dried material. Three samples from 2019 and two samples from 2022, were inoculated mechanically onto courgette. Within two weeks, typical symptoms of *Tomato leaf curl New Delhi virus* (ToLCNDV), consisting of leaf crumpling, yellowing and downward curling, were observed. ToLCNDV infection was confirmed by DAS-ELISA (Bioreba, Switzerland). This is not a new record for Campania since ToLCNDV was detected in courgette in 2016 and causes a serious disease problem for cucurbit crops in this region.

The samples were also checked for polerovirus infection by RT-PCR as follows. Total RNA was extracted from infected tissues using TRI-reagent (Sigma-Aldrich, USA) and RT-PCR was performed with polerovirus primers Pol-G-F and Pol-G-R (Knierim et al., 2014). A 1.1 Kb fragment was obtained from two samples, one sampled in 2019 and the other in 2022. These amplicons were sent to Genoscreen (Lille, France) for direct sequencing. The sequences obtained (GenBank Accession Nos. OP156930 and OP973153, respectively), encompassing part of the polerovirus RNA-dependent RNA polymerase, intergenic region, coat protein and movement protein, shared a close relationship with *Pepo aphid-borne yellows virus* (PABYV) isolates from different origins. PABYV was first described in 2008 in Mali (Knierim et al., 2014), then in South Africa (Ibaba et al., 2015), Côte d'Ivoire (Kone et al., 2015), in Tanzania and Mayotte (Desbiez et al., 2016), and a polerovirus closely related to PABYV, named "pumpkin polerovirus" was described more recently in Kenya



FIGURE 1 Courgette plant showing yellowing symptoms found to be infected with *Pepo aphid-borne yellows virus* and *Tomato leaf curl New Delhi virus*

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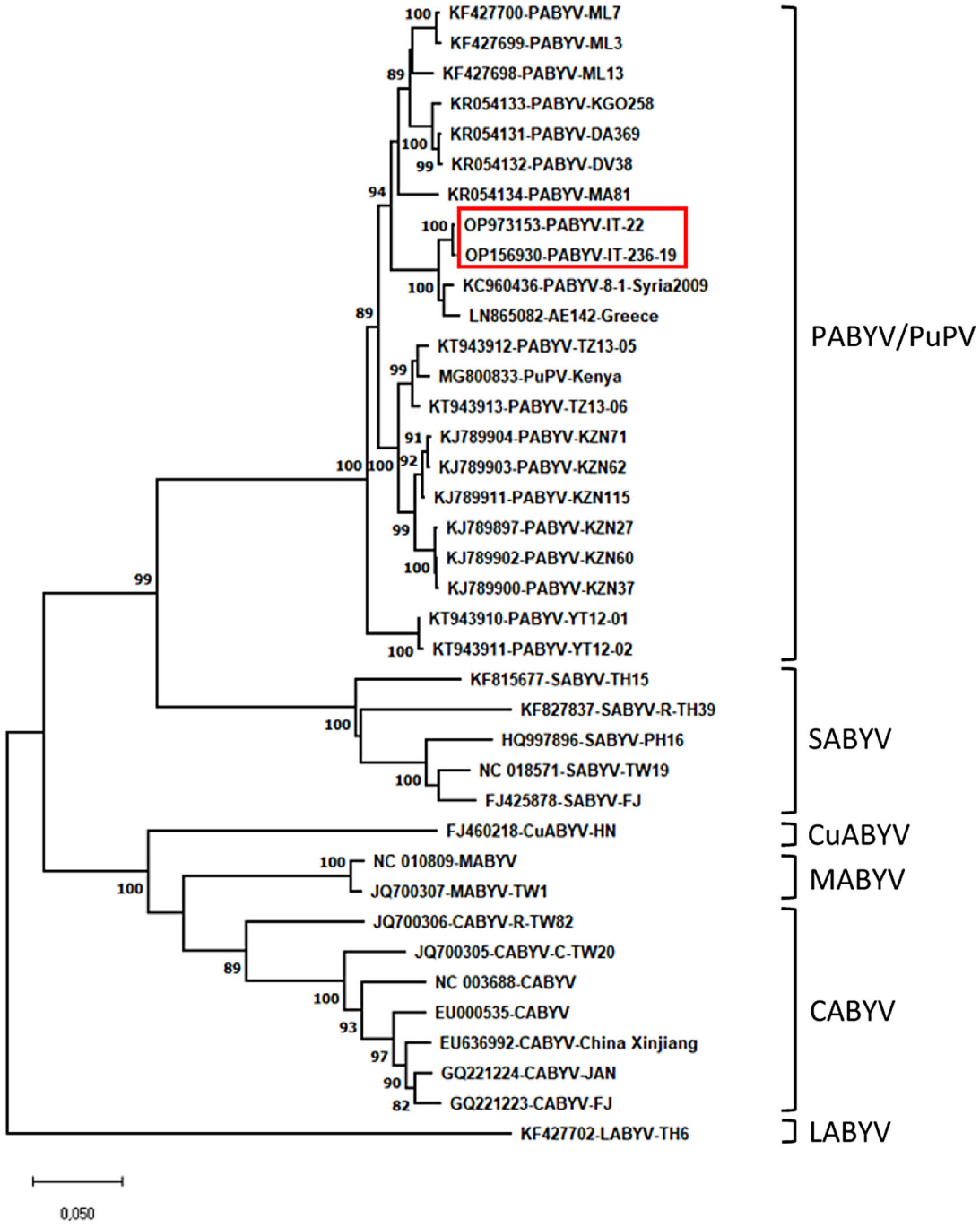

FIGURE 2 Neighbour-joining tree based on the 1.1 Kb fragment of cucurbit-infecting poleroviruses genome (*Cucumber aphid-borne yellows* - Hainan virus, CuABYV-HN; *Cucurbit aphid-borne yellows virus*, CABYV; *Luffa aphid-borne yellows virus*, LABYV; *Melon aphid-borne yellows virus*, MABYV; *Pepo aphid-borne yellows virus*, PABYV; and *Suakwa aphid-borne yellows virus*, SABYV). Bootstrap values (n = 1000) above 75% are indicated for each node. The position of the two Italian PABYV isolates within the phylogenetic tree is highlighted with a red box

(Kidanemariam et al., 2019). In the Mediterranean area, PABYV has been detected in Syria in 2009 and in Greece in 2016 (Lotos et al., 2016). The two sequences of the Italian PABYV isolates (IT-236-19 and IT-22, respectively) were 99.2% identical and shared 98.4% identity with the isolate AE142 (LN865082),reported in Greece in 2016 (Lotos et al., 2016), and 98.3% with isolate W-8-1-Sy-09 (KC960436) reported in Syria in 2009. These four isolates formed a distinct group in a phylogenetic reconstruction (Figure 2), suggesting a common origin for the PABYV isolates spreading in the Mediterranean area.

PABYV belongs to the polerovirus genus which are phloem-restricted RNA plant viruses transmitted by aphids. Nevertheless, *Bemisia tabaci* has been reported recently to transmit a new species of polerovirus, *Pepper whitefly borne vein yellows virus*, in pepper in Israel, as well as a recombinant strain of *Cucurbit aphid-borne yellows*

virus in cucurbits in Brazil. In our case, no aphids were observed during sampling (although previous infestation could not be excluded) but abundant colonies of *B. tabaci* were recorded. The possibility of PABYV transmission by *B. tabaci* requires investigation.

This is the first report of PABYV in Italy. The finding of PABYV in a new geographic area represents further evidence of the active and current spread of the virus, suggesting the need for more extensive sampling of cucurbit crops and the identification of vectors and alternate hosts to better understand the epidemiology of cucurbit-infecting poleroviruses in the Mediterranean and in Africa.

ACKNOWLEDGMENTS

This work was carried out as part of the Short Term Mobility (STM) 2020 programme financed by the National Research Council (CNR) of Italy.

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How to cite this article: Parrella, G., Troiano, E. & Desbiez, C. (2023) First report of *Pepo aphid-borne yellows virus* on courgette in Italy. *New Disease Reports*, 47, e12144. https://doi.org/10.1002/ndr2.12144

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