Papaya Lethal Yellowing Virus (PLYV) Infects *Vasconcellea cauliflora*

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RESUMO

***Papaya Lethal Yellowing Virus* (PLYV) infecta *Vasconcellea cauliflora* (Jacq.) A. DC**

Papaya lethal yellowing virus (PLYV) é um dos três vírus descritos infectando mamoeiros (*Carica papaya* L.) no Brasil. *Vasconcellea cauliflora* (Jacq.) A. DC., antes denominada de *Carica cauliflora* (Jacq.), é uma reconhecida fonte de resistência natural ao *Papaya ringspot virus* (PRSV), causador da "Mancha Anelar" ou "Mosaico" do mamoeiro. Neste estudo é demonstrado que *V. cauliflora* pode ser infectada por PLYV mediante inoculação mecânica. Esta é a segunda hospedeira de PLYV descrita até o momento. Por ser infectado por PLYV, mas não PRSV, esta espécie da família das *Caricaceas* pode ser utilizada para separação destes vírus quando em infecção mista numa planta de *C. papaya*.

Three virus diseases are found infecting papaya (*Carica papaya* L.) in Brazil: *Papaya ringspot virus* (PRSV), *Papaya lethal yellowing virus* (PLYV), and Papaya meleira virus (PMeV). PRSV was first reported in Brazil in the late 60's, while the other two came into sight during the 1980's (Lima *et al*., Fitopatol. Bras. 26:689. 2001). PLYV has an isometric particle of about 25-30 nm in diameter and a genomic ssRNA of ca. 1,6 x 10^6 Da. Molecular studies suggest that it could be a member of the family *Sobemoviridae*, genus *Sobemovirus* (Silva, *Caracterização do Genoma do Papaya Lethal Yellowing Virus e Estudo de Regulação Gênica do Tomato Bushy Stunty Virus.* Tese de Doutorado. Universidade de Brasília. 2001). Greenhouse host range studies with more than 26 plant species from several different botanic families have shown that the PLYV host spectrum was restricted to *C. papaya* (Lima *et al.*, Fitopatol. Bras. 19:437. 1994.), however these authors did not test any other member of the *Caricaeae* Dumort family. This family has six genera: *Carica, Cylicomorpha*, *Jacaratia*, *Horovitzia*, *Jarilla* and *Vasconcellea*. *Vasconcellea cauliflora* (Jacq.) A. DC., is one of the 21 species and five subspecies of the genus *Vasconcellea* present in South America. *V. cauliflora*, known as "tapaculo", "papayo de montaña" or "zonzapote", is found from the South of Mexico to the North of South America, as well as in Trinidad (Badillo, Ernstia 10: 74. 2000 and 11:75. 2001.), and is a well-known source of natural resistance to PRSV (Hammerschlag & Litz, Eds. Biotechnology of Perennial Fruit Crops. CAB International, Wallingford, UK. 1992). The present work aimed to evaluate the response of *V. cauliflora* to mechanical inoculation of PLYV. Seeds were kindly supplied by Dr. D. Foltran from IAC, and the PLYV isolate used was kindly provided by Dr. José A. Lima, from UFC. A PRSV isolate collected in Brasília was used to assess the response to mechanical inoculation. Twenty *V. cauliflora* plants were inoculated with PLYV in two batches. Eight plants were inoculated with PRSV at once. Plants were submitted to two mechanical inoculations, one week apart, when they were about 30 cm height, and showing from six to ten leaves. All plants were then maintained in greenhouse for at least six weeks to evaluate symptoms development. None of the plants inoculated with PRSV developed any symptoms after six weeks of the second inoculation. All control *C. papaya* plants were symptomatic two weeks after the second inoculation with PRSV. Plants of *V. cauliflora* inoculated with PLYV showed leaf distortion, as well as leaf cup and shoestring (Figure 1), which started at least two weeks after the second inoculation. Leaves from the symptomatic *V. cauliflora* were then used as inoculum source in mechanical inoculation of *C. papaya*, and all plants developed symptoms two weeks after inoculation. A RT-PCR test using PLYV-specific primers (5'-ctgaagcggatatttctgg-3' & 5'-gtgtatggcatacagttatc-3') was applied to confirm the presence of the virus in the inoculated plants. A DNA fragment of 0.9 Kb was obtained using PLYV-ssRNA isolated from purified virus, as well as leaf from symptomatic *C. papaya* and *V. cauliflora*; but neither from PLYV-inoculated non-symptomatic *V. cauliflora*, nor in healthy plants (Figure 1). Together, the results show that *V. cauliflora* can be infected by PLYV by means of mechanical inoculation. To the best of our knowledge, this is the first report of *V. cauliflora* as a PLYV host. In some papaya growing areas in Brazil, it is common to find *C. papaya* plants infected by two or even three viruses found in Brazil. In situations where PRSV and PLYV are found infecting the same plant, the use of *V. cauliflora* is suggested in order to separate both virus, and rescue PLYV. *V. cauliflora* is not naturally found in Brazil, consequently, this species has no importance on the dissemination of PLYV in this country.

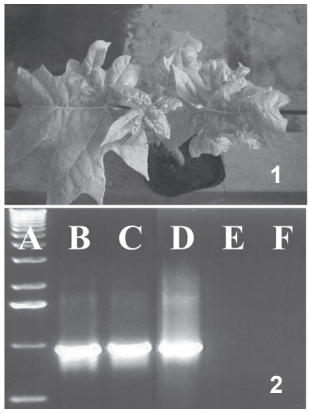

FIG. 1 - *Vasconcellea cauliflora* response to PLYV mechanical inoculation. 1 – *V. cauliflora* plant symptomatic after infection by PLYV; 2 - Gel electrophoresis showing results of PLYV detection by RT-PCR, accordingly to the template: **A.** 1 kb DNA Ladder; **B**. Symptomatic *V. cauliflora*; **C.** Symptomatic *C. papaya*; **D.** Purified virus particles; **E.** Non-symptomatic PLYV mechanically inoculated *V. cauliflora*; **F.** Non-inoculated *V. cauliflora.*