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Abstract

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Revisiting *Brevipalpus californicus*: a species complex under review and its potential role in the transmission of dichorhaviruses*

ALINE DANIELE TASSI[1], RONALD OCHOA[2], PEDRO LUIS RAMOS-GONZÁLEZ[3], ELLIOT W. KITAJIMA[4], JULIANA FREITAS-ASTÚA[3,5] & DANIEL CARRILLO[1]

[1]*University of Florida, Tropical Research and Education Center, Homestead, FL USA*
aline.tassi@ufl.edu; https://orcid.org/0000-0002-8622-5977
dancar@ufl.edu; https://orcid.org/0000-0003-2291-1844

[2]*Systematic Entomology Laboratory (SEL), Agricultural Research Service (ARS), United States Department of Agriculture (CSDA), Beltsville Agricultural Research Centre (BARC), Maryland, 207 05, USA*
ron.ochoa@usda.gov; https://orcid.org/0000-0003-1680-3601

[3]*Laboratório de Biologia Molecular Aplicada, Instituto Biológico de São Paulo, S ão Paulo, Brazil*
plrg1970@gmail.com; https://orcid.org/0000-0002-9640-6587
juliana.astua@embrapa.br; https://orcid.org/0000-0002-0506-6880

[4]*Escola Superior de Agricultura Luiz de Queiroz (ESALQ), Universidade de São Paulo, Piracicaba, Brazil*
ewkitaji@usp.br; https://orcid.org/0000-0002-9138-2918

[5]*Embrapa Mandioca e Fruticultura, Cruz das Almas, Brazil*

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Brevipalpus-transmitted viruses (BTVs) cause economically important diseases such as citrus leprosis, widespread in Latin America, and coffee ringspot, found mainly in Brazil. One BTV, the orchid fleck virus, has a worldwide distribution infecting orchids. A strain of this virus has been reported to infect citrus and cause a leprosis-like symptoms in Mexico, United States (restricted to Hawaii) and South Africa. Disease symptoms caused by BTVs are characterized by localized chlorotic, ringspot lesions, or necrotic lesions on all aerial parts of the plants, especially on leaves. There are no reports of BTVs invading plants systemically under natural conditions. BTVs are classified into two genera, *Cilevirus* (family *Kitaviridae*) and *Dichorhavirus* (family *Rhabdoviridae*). *Brevipalpus californicus* s.l. is associated with the transmission of Dichorhaviruses characterized by a short bacilliform morphology with bisegmented ss (-) RNA genomes of ~ 6 kb each and six Open Reading Frames. Besides *B. californicus*, *B. phoenicis* and *B. obovatus* were thought to be vectors of plant viruses. However, significant changes in the taxonomy of these mites have occurred due to the use of new morphological parameters and molecular markers. *Brevipalpus phoenicis* s. l. was split into eight species, while *B. californicus* and *B. obovatus* still require taxonomic revisions. The correct taxonomic identity of economically important species is essential for their study and for developing management strategies to mitigate the damage they cause. A degree of morphological variation in the *Brevipalpus californicus* taxon was observed, indicating the existence of a species complex. This species complex is present in several countries associated with many different hosts. Members of this complex were the presumed vectors of citrus leprosis disease in Florida in the 1960s. Recently, two strains of orchid fleck virus were reported in the United States associated with ornamentals, threatening neighboring citrus-growing areas. Our main objective is to review and characterize the *B. californicus* species complex, by examining the type material located at the Smithsonian National Museum of Natura History. We examined over 3000 *Brevipalpus* mites collected from across the world and discovered the existence of at least seven species within the *B. californicus* species complex: *Brevipalpus californicus s.s.*, three new *Brevipalpus* species, and three wrongly synonymized species that will be resurrected. Our next objective is to reevaluate the host associations of this species complex, survey areas in Florida where *Dichorhaviruses* were recently detected, identify additional BTVs, and correctly identify the *Brevipalpus* species responsible for virus transmission.

Keywords: *Brevipalpus* transmitted viruses, flat mites, cryptic species, systematics

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