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Title

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Permalink

<https://escholarship.org/uc/item/7w29z1pm>

Journal

International Organization of Citrus Virologists Conference Proceedings
(1957-2010), 15(15)

ISSN

2313-5123

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Publication Date

2002

DOI

10.5070/C57w29z1pm

Peer reviewed

***Citrus tristeza virus* Epidemiological Surveillance and Eradication Program in Cuba: Recent Results**

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ABSTRACT. *Citrus tristeza virus* (CTV) is associated with substantial losses in all citrus-producing areas in the world. In Cuba, the presence of the CTV-*Toxoptera citricida* complex is relatively recent, so it has been necessary to set up a surveillance and eradication program, key to the disease management strategy. The infection percentages found in Cuba fall in an interval between 0 and 14.7%, the areas with less than 3% predominating. This has allowed the establishment of eradication programs. In the five main citrus enterprises, where eradication has been carried out, 1,780 infected trees have been eliminated, located in areas with 6% CTV incidence, where *T. citricida* has been present for 7 yr, and 0.88%, in areas where the vector has appeared more recently. At present the program is complemented by periodic screening to establish the population fluctuations of *T. citricida* in the country and the search for trees with CTV-associated symptomatology.

In Cuba, the presence of *Citrus tristeza virus* (CTV) and its efficient vector, *Toxoptera citricida*, the brown citrus aphid (BCA), is relatively recent. In the survey carried out from 1992 to 1995, the infection percentages ranged from 0 to 14.7% (2). However, most areas showed less than 3%, indicating the feasibility of establishing eradication programs as part of the epidemiological surveillance program for disease management. The second stage of this program included a 100% analysis of the plants in all the fields where CTV had been detected during the national survey, as well as the eradication of the infected plants.

The results obtained in five of the main citrus enterprises from different regions of the country indicated that the infection percentages obtained are related to the time interval after BCA colonization (data not shown). The results have allowed us to define that, even in the presence of BCA, there are production areas with low infection indices, where eradication is effective. In areas where the vector has been present for 7 yr, incidence values surpassed 1%, and where the vector appeared more recently they

were lower. These results contrast with those obtained in other citrus areas of the Caribbean Basin, where the infection surpassed 50%, 3 yr after BCA detection (3).

Considering international experience with respect to the appearance of tristeza epidemics 5 to 10 yr after BCA colonization of citrus areas (4), a new national survey was begun in 2000. This survey, which will allow the determination of the current CTV situation in Cuba, includes the sampling of 20 plants per field in all production areas.

The results obtained to the present (Fig. 1) show an increase in virus infected plants in all the areas. Nevertheless, the real incidence in each enterprise is not proportional to the one detected in the 1992-95 period. As can be observed the differences between localities remain. The incidence increase was higher in the case of Ceiba del Agua, Victoria de Girón, La Jíquima and Jiguaní. The highest infection percentages were detected in Ciego de Avila and Ceiba del Agua, and the lowest ones in Contramaestre. These results correspond to those obtained by Batista et al. (1). CTV epidemiological studies performed

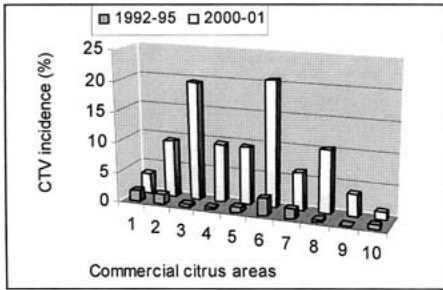


Fig. 1. Increase of *Citrus tristeza virus* incidence 7 yr after *Toxoptera citricida* detection in Cuba. Commercial citrus areas: 1-Troncoso; 2-Capitán Tomás; 3-Ceiba del Agua; 4-Victoria de Girón; 5-Arimao; 6-Ciego de Avila; 7-Sola; 8-La Jíquima; 9-Jiguaní; 10-Contra-maestre.

in these areas indicated that factors such as the citrus species and the initial infection percentage in the fields, influenced the spread of CTV in the evaluated plots.

At present, the program is complemented by continuous surveys to establish *T. citricida* population fluctuations in the country and

search for trees with CTV associated symptoms. With respect to the vector, its presence has been determined in all citrus areas, although, in general, populations are low and there is a high parasitism percentage.

The predominance of asymptomatic virus-infected plants persists even in trees infected for more than 2 yr, and only isolated cases of plants with CTV-associated symptoms are found. In the plants that start to show progressive decline the most common symptoms are presence of abundant dry twigs and scarce, yellowish-colored flush, which confer a weakened look to the trees.

These results indicate that variations with respect to disease behaviour have occurred due to the presence of BCA in Cuba during the past 7 yr. Nevertheless, the situation in the country contrasts with that of other Caribbean countries as a result of the epidemiological surveillance and management program established in the country.

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