

## **CITRUS TRISTEZA**

The citrus Tristeza, caused by Citrus tristeza virus (CTV), is a disease of economic importance, is present in the major citrus producing regions of the world. First observed in South Africa, it was introduced in Brazil in 1937, decimating about ten million trees budded on 'Azeda' orange (*Citrus aurantium* L.), intolerant rootstock to the virus. The disease was designated Tristeza due to the fast decline of the affected plant.

The CTV belongs to the genus *Closterovirus* and is transmitted by infected propagation material and by aphids, being the citrus black aphid (*Toxoptera citricida* Kirkaldy) the most important vector in Brazil, which control is not efficient.

Tristeza is a disease of interaction between the canopy and the rootstock. In Brazil, its control was developed primarily from information generated by researchers led by Dr. Sylvio Moreira, in the Experimental Station in Limeira, São Paulo, current APTA Citrus Sylvio Moreira Center. The control was based on the replacement of the rootstock 'Azeda' orange by other tolerant or ungrafted tree originating from nucellar embryos.

Some sweet oranges, as the 'Pera' and other more sensitive species may be affected by aggressive isolates of CTV, even when set on tolerant rootstocks. Researches conducted by Dr. Alvaro Santos Costa and succeeded by Dr. Gerd Müller Walter team, from the Instituto Agronômico of Campinas (IAC), have led to the selection of less aggressive isolates of the virus, which have been used in the pre-immunization of these canopies, highlighting the Pera IAC. In Bahia, researchers from Embrapa Cassava and Fruits, coordinated by Dr. Orlando Sampaio Passos, selected the Pear CNPMF-D6 as pre-immunized variety, which is used in the citrus industry of the North and Northeast of Brazil.

Genes conferring immunity to CTV have been identified. Furthermore, genetic transformation of plants is a tool that is being used to obtain plants tolerant or resistant. In Brazil, the National Institute of Science and Genomics Technology for Citrus Improvement (Citrus-INCT), coordinated by Dr. Marcos Antonio Machado, works on the functional characterization of the CTV genome and in the transgeny for tolerance to the virus.

Although Tristeza is controlled in Brazil, is still a threat due to its endemic character, the presence of the vector and the large variability of the virus. Accordingly, the Citrus Breeding Program from Embrapa Cassava and Fruits directed by the researcher Walter Soares dos Santos Filho, has been working for twenty-six years in getting thousands of hybrids with potential for use as rootstocks, having so far been preselected more than 300 individuals. Most of them have tolerance to CTV, being evaluated in national network of experiments in different ecosystems. It is highlighted the Rangpur 'Santa Cruz', the tangerine 'Sunki Tropical' and the citrandarins 'Indio', 'Riverside' and 'San Diego', as rootstocks recommended by Embrapa to be used in combination with several canopy-varieties.

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