EFFECT OF THE BEGOMOVIRUS TRANSMISSION EFFICIENCY FOR THE PREDOMINANCE OF *TOMATO SEVERE RUGOSE VIRUS* (TOSRV) IN TOMATOS CROPS

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Tomato severe rugose virus (ToSRV) and Tomato golden vein virus (TGVV) are bipartite begomoviruses, transmitted by whiteflies (*Bemisia tabaci* biotype B), frequently found infecting tomato (*Solanum lycopersicum*) crops in Brazil. To more fully understand the interaction begomovirus/whitefly, as well as how occurrence of mixed infection may influence virus emergence and dominance in an infected plant, a study on begomovirus transmission was carried out focusing on the determination of transmission efficiency of two begomoviruses, ToSRV and TGVV, in single and double infection. Transmission tests were done with single and double infections, using the ToSRV 1164 and TGVV 1799 isolate. Whitefly colonies were maintained on virus-free cabbage or tobacco plants in a greenhouse. The virus isolates were inoculated on tomato plants ca. 30 days prior to transmission tests, when they showed clear interveinal chlorosis and leaf distortion symptoms. Infection was confirmed by PCR using species specific primers. A large population of whiteflies was allowed to mass feed on virus-infected source plants for 48h acquisition access period (AAP). Following virus acquisition, the whiteflies were transferred to plastic cups (three insects per plant both in simple and mixed infection) and allowed an inoculation access period (IAP) of 48h. After inoculation, the insects were manually killed. Plants were incubated for three weeks and analyzed for the presence of ToSRV and TGVV by PCR. The percentage of infected plants (detection by PCR) by ToSRV and TGVV in single infections was respectively equal to 41.9 and 25.0%, and in mixed infection it was 86.2% for ToSRV, 3.6% for TGVV, and 8.1% for both viruses. After 48 h AAP, the insects used in the transmission tests were collected, total DNA was individually extracted and PCR done to assess the percentage of insects that have acquired ToSRV and TGVV (single and mixed infections). Almost 90% of whiteflies acquired ToSRV or TGVV in single infection and all evaluated insects acquired both viruses when fed on leaves with mixed infection. A second trial was carried out for testing the effect of mixed infections, by using large cages, and in two types of mixed infection: in the first type, one tube with ToSRV viruliferous insects and one with TGVV were placed inside a cage containing 12 healthy plants; in the second type, viruliferous insects (two tubes) fed on detached leaves of plants with mixed infection were caged with the healthy plants. As a result, by inoculating both viruses from singly infected viruliferous whiteflies 32.7% of the plants were infected with ToSRV, 5.3 by TGVV and 27.4 by the two viruses. When the virus source was a plant infected with both viruses, 100% of infected plants contained only ToSRV. Therefore, when the two viruses were inoculated with the same insect, TGVV failed to infect any plant, but when the two viruses were inoculated by different insects, there was a higher infection rate of TGVV. We

concluded that as the percentage of whiteflies that acquired ToSRV and TGVV in single and mixed infections was similar, the highest rate of ToSRV infection seemed not to be related to differences in the acquisition of virus by the insect vector. Moreover, in all tests, the transmission efficiency of ToSRV was higher than of TGVV. This was an expected result and may explain why ToSRV predominates over TGVV in the field.