



Resistance management for mites vectoring citrus leprosis in Brazil*

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Citrus leprosis is the most important viral disease affecting Brazilian citrus orchards. The disease is caused by the cilevirus citrus leprosis virus C (CiLV-C) and transmitted by flat mites *Brevipalpus yothersi* Baker (Acari: Tenuipalpidae). Citrus leprosis can reduce yield by causing premature fruit drop, defoliation, and drying of branches of citrus trees. The main method for managing citrus leprosis is using synthetic acaricides to control the mite vector. However, the current mite control is ineffective; consequently, the disease has become increasingly common in citrus orchards. Several factors can compromise the vector control, and the selection of mite resistance to acaricides is a major concern. Therefore, the objectives of this study was to monitor and characterize the resistance of *B. yothersi* populations to spiroadiclofen (Envidor®) and cyflumetofen (Obny®). From 2018 and 2022, several populations of *B. yothersi* were collected from commercial orange groves in the State of São Paulo. A susceptible reference strain (S) of *B. yothersi* has been maintained in the laboratory for more than ten years without exposure to pesticides. Mites were reared on citrus fruits under laboratory conditions. The toxicity of spiroadiclofen and cyflumetofen was measured directly on *B. yothersi* using a Potter tower. Fully expanded leaves of jack bean plants (*Canavalia ensiformis* L.) were used as experimental units. The susceptibility of *B. yothersi* populations to spiroadiclofen was monitored in nine populations from different commercial orchards. Eggs from each population were subjected to a diagnostic concentration of 16.4 ppm of spiroadiclofen. To monitor resistance to cyflumetofen, adult females of *B. yothersi* from five populations were submitted to LC99 at 0.76 ppm of this acaricide. Variability was higher among populations in terms of susceptibility to spiroadiclofen. The frequency of resistant eggs between populations ranged from 0.7% to 85.8%. The resistance ratio of *B. yothersi* to spiroadiclofen was low to moderate. Survival rates of the immature stages, total adult longevity, oviposition duration, and female fecundity were lower in the resistant strain. Furthermore, net reproduction rate, intrinsic rate of increase, finite rate of increase, and mean length of a generation were also lower in the R strain. Although variations in resistance to spiroadiclofen were observed between populations, the resistance ratio was low to moderate. The frequency of adult female's resistance to the diagnostic concentration of cyflumetofen ranged from 1.5 to 94.1%. The lowest mortality rate was observed in a population from the municipality of Colombia, São Paulo, Brazil. The lower mortality in this population is possibly due to the prolonged and continuous use of cyflumetofen (higher selection pressure). Two populations showed survival lower than 4.0% and did not differ from the susceptible population. The results of this study can be useful in developing resistance management strategies for *B. yothersi* in Brazilian citrus groves.

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