

INTERNATIONAL RESEARCH CONFERENCE
ON HUANGLONGBING



Session 11:
Psyllid Management
Strategies



11.1. Bioecology of *Diaphorina citri* and *Tamarixia radiata*: zoning for citrus groves of the State of São Paulo

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In Brazil, citrus is grown commercially in many states. The state of São Paulo is responsible for 79% of the country's yield. Consequently, Brazilian citriculture can be compromised by several phytosanitary problems, including native and introduced pests, which can be detrimental to domestic yield, affecting the industry's competitiveness at an international level. Since 2004, three new pathogens, *Candidatus Liberibacter americanus*, *Candidatus Liberibacter asiaticum*, and a phytoplasma have been detected in citrus orchards in the state of São Paulo; these bacteria are associated with the disease Huanglongbing. A combination between the presence of the psyllid vector, *Diaphorina citri*, and the pathogen in citrus-growing areas is a limiting factor for production, as recorded in other countries. The parasitoid *Tamarixia radiata* is the most important biological control agent against *D. citri*. Successful releases of *T. radiata* have been reported in many countries. The parasitoid provides high parasitism rates, and has high dispersal and establishment capacity in the field. Models to predict the occurrence of insects are prepared based on the insect's temperature requirements for development. In most zoning studies, temperature is the main factor involved. Modeling results provide a better understanding of the population dynamics of insect pests and their natural enemies in agricultural systems which can be applied in pest management programs to determine the most adequate season to conduct sampling and implement control measures. In the laboratory, *D. citri* requires 210.9 degree-days (DD) to complete its biological cycle (egg-adult). Although these values are determined under controlled temperature, humidity, and photoperiod conditions, they need to be demonstrated under field conditions where variable environmental conditions occur. By adopting identical temperature ranges (isotherms) and analyzing their effect on *D. citri* and *T. radiata* development by means of a monthly map, in which the mean monthly temperatures from 256 weather stations were analyzed by multiple linear regression, we managed to obtain the progression and development for the pest and its parasitoid in the state of São Paulo. From the results obtained, 3 to 15 *D. citri* cycles and 19 to 35 *T. radiata* cycles occurred throughout the year in the state of São Paulo. Among the factors that influence the successful establishment and abundance of a biological control agent in an area after its release, temperature is important because it affects processes such as reproduction and development. Therefore, the objective of this study was to determine the ideal conditions for *D. citri* and *T. radiata* development under laboratory conditions, allowing evaluation of its effectiveness in citrus-growing regions of the state of São Paulo, in order to provide support to groups involved in *D. citri* detection, monitoring, and control.