

INTERACTIONS BETWEEN NATURAL ENEMIES OF THE ASIAN CITRUS PSYLLID  
IN SOUTH FLORIDA

By

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A THESIS PRESENTED TO THE GRADUATE SCHOOL  
OF THE UNIVERSITY OF FLORIDA IN PARTIAL FULFILLMENT  
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Two investigations were conducted to determine the interaction of natural enemies with *Tamarixia radiata*, an ectoparasitoid of *Diaphorina citri* (Hemiptera: Psyllidae) in Homestead, Florida.

The first study focused on the effect of the predator *Zelus longipes* on the populations of *D. citri* and its parasitoid *T. radiata* under controlled conditions. Different densities of adults and 1st instar nymphs of *Z. longipes* were placed in experimental arenas with fixed numbers of *D. citri* nymphs, adults and *T. radiata* adults. Adults and nymphs of *Z. longipes* preyed on adults of *D. citri* and *T. radiata*. They also preyed on nymphs of *D. citri* but at a lower rate. Female *Z. longipes* adults preyed on *D. citri* showed a Type III functional response. An experiment addressing prey preference showed that 1st instar nymphs of *Z. longipes* preferred to prey upon *T. radiata* adults over *D. citri* adults, while female *Z. longipes* preferred to prey upon *Anastrepha suspensa* adults over *D. citri* adults.

The second study aimed to clarify the role of ants in *D. citri* biocontrol. This study was divided into two phases. During the first phase, we identified and observed the behavior of ants present in flushes of orange jasmine (*Murraya paniculata*) infested with *D. citri* during a 24-h period. The second phase focused on determining if ant presence affected parasitism of *D. citri*. In two experiments ants were excluded using Tanglefoot® as a physical ant barrier in both orange jasmine and Persian lime (*Citrus latifolia*). In an additional experiment the chemical bait Extinguish Plus® was used to control ants in Persian lime. The results showed at least four species of ants tending *D. citri* in south Florida. These species are: *Brachymyrmex obscurior*, *B. patagonicus*, *Pheidole megacephala*, and *Solenopsis invicta*. These ants are active day and night and were seen feeding on the honeydew excretions of *D. citri* nymphs. The results of the ant exclusion experiments showed that the percentage of parasitism by *T. radiata* was significantly higher in the flushes where ants were excluded using Tanglefoot® or Extinguish Plus®.

The interaction between predators and parasitoids and the interference of ants in the performance of the parasitoid *T. radiata* might partially explain the lack of success of the biological control of *D. citri* in south Florida.