

Biologically-Based Management of Citrus Pests

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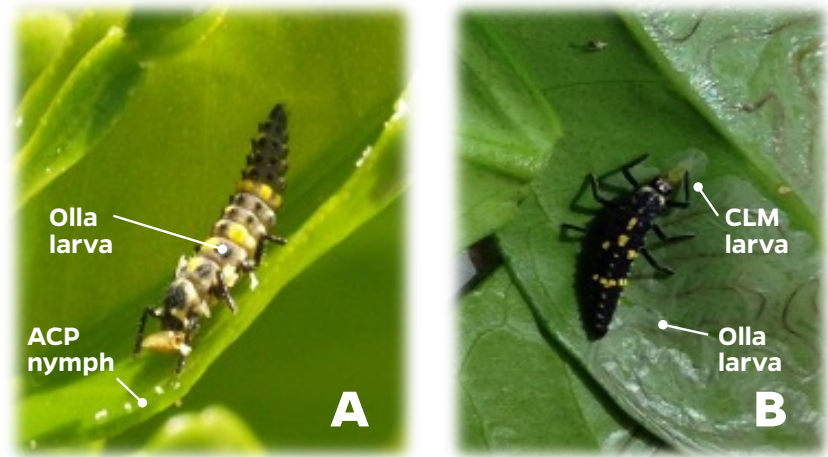


Fig. 1: *Olla v-nigrum* larva attacking ACP nymph (A) and CLM (B) larva.

Take Home Message:

- Predators, parasitoids, and entomopathogenic fungus contribute to controlling citrus pest complex including ACP.
- Conserving beneficial organisms is essential to developing integrated and sustainable crop production systems.
- Selective insecticides are likely to cause less harm to beneficial organisms.

Effort Statement: Additional experiments were conducted in the young and mature citrus blocks as well as the high-density citrus plantings. Lacewings and ladybeetles were observed to inflict mortality in the developing colonies of Asian citrus psyllid immatures which ultimately translate into reduced number of psyllids.

Summary: Asian citrus psyllid (ACP) is the vector of huanglongbing (HLB), or citrus greening disease, causing significant losses to the citrus industry. It is essential to manage the spread and severity of this insect pest and disease. Biological control by naturally occurring predators, parasitoids, and pathogens is critical in reducing populations of ACP and several other pests. After the advent of HLB in Florida, we reported several species of ladybeetles, lacewings, and spiders that were causing 90-100% mortality of ACP immatures. The incidence of those predators has reduced over time due to the increased use of insecticides for several years to control ACP. However, we still see significant biological control activity in the groves. In recent years, we have conducted studies in the young and mature citrus including the high-density plantings and observed several species of

ladybeetles, lacewings, and spiders in the commercial groves inflicting natural mortality averaging 40-85%. These predators have also been shown to kill and reduce populations of other pests. An example of a ladybeetle *Olla v-nigrum* larva attacking ACP nymph (A) and CLM (B) larva is shown. Therefore, conserving the populations of beneficial organisms is helpful for pest management such using selective insecticides and timely sprays. For example, targeting overwintering psyllids with sprays of insecticides from November to February when beneficials are rare because of fewer prey. During spring and summer, parasitoid *Tamarixia radiata*, which attack ACP nymphs and predators, and entomopathogenic fungus, *Hirsutella citriformis*, which attack multiple pests are more active. Therefore, using selective insecticides is useful to reduce collateral damage to beneficial organisms.

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