Psyllid management update

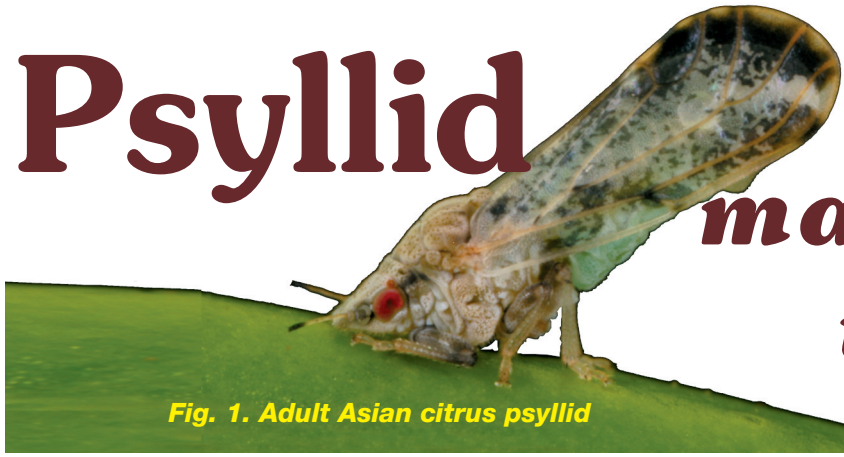

Fig. 1. Adult Asian citrus psyllid

By Michael E. Rogers and Philip A. Stansly

The Asian citrus psyllid (ACP) *Diaphorina citri* (Fig. 1) is a sucking insect that attacks young flush and transmits greening disease, also known as Huanglongbing (HLB). ACP was first detected in Broward County, Florida in 1998 and HLB in Miami-Dade County in 2005. As of early February of this year, citrus trees testing positive for HLB have been found in 14 Florida counties. A map of the current HLB positive finds is available from FDACS at the following Web address: http://www.doacs.state.fl.us/pi/chrp/greening/maps/cgsit_map.pdf

During the early part of this year, growers in the southern part of Florida where many of the HLB finds are being reported have been proactive in managing ACP and removing trees displaying symptoms of the disease (Fig. 2). While there are a number of Central Florida counties where HLB positive trees are undiscovered, this does not mean that growers there can forget about managing psyllid populations. Citrus greening is a disease that can take some time to appear. A period of months or even years may transpire between initial infection and visible symptoms. This so-called latent period tends to lengthen with tree maturity and size. During the latent period, psyllid populations left uncontrolled may move the HLB pathogen throughout a grove, resulting in extensive spread before disease symptoms are detected. Thus, all Florida citrus growers should be developing and implementing a plan for managing HLB that includes psyllid control.

SEASONALITY OF PSYLLID POPULATIONS

The two main factors that influence psyllid reproduction and development are the presence of new flush and temperature. Female psyllids need new flush to mature their eggs, and psyllid nymphs can only develop on young tender leaf tissue. Psyllid development can occur over a wide range of temperatures (53-90°F), but is optimal around 82° when females average 750 eggs laid during a lifetime of five weeks, according to laboratory studies. Thus, typical springtime and fall conditions in the citrus growing regions of Florida are most favorable for psyllid reproduction and development, although there are usually a few hours a day throughout the year when temperature fall is within the acceptable range. Psyllid development ceases when temperatures are below 50°F, corresponding to winter conditions, during which time there is very little flush available anyway and adult psyllids can be found feeding on the midveins of mature leaves within the tree canopy.

Mortality factors represent the other side of the population coin, and during the winter months, temperatures below freezing, while detrimental to tree health, may help to reduce psyllid populations early in the season. Later in the year, mortality from predaceous insects such as ladybeetles, lacewings or the parasitic wasp *Tamarixia radiata* may exert significant pressure on psyllid populations. However spring flush is the time when all conditions work in favor of the psyllid — ideal temperatures, unlimited food, and a relative paucity of beneficial insects. The result is unabated reproduction and spread of HLB. Therefore, the grower's strategy should be to impede this process, while at the same time preserving beneficial insects necessary for biological control of this and myriad other pests.

Based on the tree flushing patterns and average seasonal temperatures in Florida, psyllid populations can be generalized as increasing most rapidly during the spring flush. Psyllids emerging at the end of this period will be forced to take flight in search of food, spreading the disease near and far. Young trees will be favorite targets, but due to low amounts of flush and increasing activity of natural enemies, attrition will probably be high.

Summer will bring on additional flush, but also high temperatures that impede reproduction.

Fall again brings favorable environmental conditions for psyllids, flush and natural enemies. Again, young trees flush most and therefore are favored targets. Those adults that develop on the fall flush will overwinter in citrus groves and begin laying eggs again on flush available early in the year.

Fig. 2. Leaves showing blotchy-mottle symptoms of HLB.

WHEN IS PSYLLID CONTROL NEEDED?

One commonly asked question is "How do I know when and where to

Fig. 3. Use a hand lens to examine developing flush for buildup of psyllid eggs and small nymphs (photo magnified 70X)

control psyllids?" Unfortunately, there is not an easy answer to this question. To date, no studies have provided conclusive evidence that insecticide applications will reduce the incidence of HLB in a grove. Thus, our current recommendations on psyllid control are a "best guess" given what we do know: The greening pathogen is spread to healthy trees by psyllids. Thus, reduction in the psyllid population (via insecticide application or other means) will likely help to reduce or slow down disease spread.

Current recommendations for psyllid management focus on reducing multiplication of psyllids in the spring flush and, to a lesser extent, on synchronized flushes that occur during early summer and fall. This can be best accomplished by actions taken in the winter when psyllid populations are at their lowest ebb. These actions include timely applications to the soil of systemic insecticides to allow sufficient translocation of active ingredient into the first spring flush to assure that overwintering psyllids encounter a toxic concentration. Presently available choices include aldicarb (Temik) for trees of all sizes, and imidacloprid (Admire Pro and others) for young trees. These applications can be replaced or supplemented with foliar sprays of broad spectrum insecticides active against psyllid adults such as chlorpyrifos (Lorsban and others) or fenpropathrin (Danitol). The objective is to reduce the overwintering population prior to the spring flush, hopefully with minimal impact on beneficial insects that may be still dormant, hidden or not yet present in large numbers.

If this strategy is successful, it may not be necessary to treat mature trees during the summer beyond the usual post bloom and summer oil sprays, thus conserving natural enemies. The decision to treat mature trees in summer and fall should be based on evaluations of the amount of flush present and the degree of infestation (Fig. 3). Oil alone will provide some control of eggs and young nymphs. If more control is needed, the more selective insecticides should be used. Among these is imidacloprid, although it is less selective when sprayed than when applied as a drench, and its overuse could result in resistance to this critical material.

Young trees are at high risk and should be protected proactively. Resets can be drenched repeatedly with imidacloprid, so long as the amount used does not exceed that permitted on a per-acre basis. However, applications should not be made during periods of heavy rainfall to avoid excessive leaching. Soil should be damp, and the application concentrated around the crown in sufficient water (8 to 12 oz.) followed by a short irrigation. Irrigation should then be withheld for a day or two to dry down the soil and allow the active ingredient to adhere to small particles.

Major flushes will have to be sprayed with foliar insecticide sprays. During the rainy season, multi-targeting sprays are more economical, and if timed properly, may provide adequate control of the lower levels of psyllids present during this time. One example of a multi-targeting spray is use of a miticide for rust mite control in the summer that will also provide some control of psyllids and other pests of concern such as leafminer. To be effective in this manner, these sprays must be used when there is some new flush available for psyllid development. (For more information on multi-targeting sprays, refer to the article "Citrus pest overview — Where's IPM now?" on page 18 of the February 2007 issue of *Citrus Industry*.)

PSYLLID CONTROL IS NOT ENOUGH!

Psyllid control cannot be relied on as the single answer to managing HLB. Equally important is scouting and removal of HLB symptomatic trees as soon as they are identified. HLB positive trees that are not removed from a grove will continue to serve as a source of the greening pathogen for psyllids to acquire and then transmit to healthy trees within a grove and beyond. Thus, both psyllid management and removal of infected trees (Fig. 4) must be practiced together!

There are many questions regarding transmission of the HLB pathogen by psyllids that need to be answered to better develop an economically viable psyllid/HLB management program. Questions include:

➤At what time of year is transmission most likely to occur?

➤ What percentages of psyllids in the grove are actually transmitting the pathogen throughout the year?

➤ Can use of systemic and/or foliar insecticide applications prevent disease transmission for some period of time?

➤ Is there a threshold in terms of psyllid numbers that would justify psyllid control?

Fig. 4. Brazilian grove where HLB symptomatic trees are removed and resets are treated regularly with systemic insecticides.

These and many other important questions are currently being researched to better refine psyllid management programs. In the meantime, the best strategy for growers to combat this disease is to keep psyllid populations as low as possible and scout regularly for HLB infected trees, removing any HLB symptomatic trees found.

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